

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS, LLC,
Petitioner,

v.

OCEANA INNOVATIONS LLC,
Patent Owner.

IPR2020-01463
Patent 6,508,678 B1

Before MINN CHUNG, STEVEN M. AMUNDSON, and
STEPHEN E. BELISLE, *Administrative Patent Judges*.

Opinion of the Board filed by *Administrative Patent Judge* AMUNDSON.

Opinion Dissenting filed by *Administrative Patent Judge* CHUNG.

AMUNDSON, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Unified Patents, LLC (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–5 in U.S. Patent No. 6,508,678 B1 (Ex. 1001, “the ’678 patent”) under 35 U.S.C. §§ 311–319. Paper 1 (“Pet.”). Oceana Innovations LLC (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

In our Institution Decision, we instituted review based on all challenged claims and all grounds presented in the Petition. Paper 11 (“Inst. Dec.”). We have jurisdiction under 35 U.S.C. § 6. We issue this Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons explained below, Petitioner has shown by a preponderance of the evidence that claims 1–5 in the ’678 patent are unpatentable. *See* 35 U.S.C. § 316(e) (2018).

II. BACKGROUND

A. Procedural History

After we instituted review, Patent Owner filed a Response (Paper 16, “Resp.”), and Petitioner filed a Reply (Paper 17, “Reply”). On November 30, 2021, we held an oral hearing, and the record includes the hearing transcript. Paper 26 (“Tr.”).

B. Real Parties in Interest

Petitioner identifies itself as the real party in interest. Pet. 3. Patent Owner identifies itself as the real party in interest. Paper 4, 2. The parties do not raise any issue about real parties in interest.

C. Related Matters

Petitioner and Patent Owner identify the following civil actions where the '678 patent has been asserted by Patent Owner or its predecessor in interest (Interface Linx, LLC) against an alleged infringer:

- *Interface Linx, LLC v. TTE Technology, Inc. et al.*, No. 5:17-cv-00826 (C.D. Cal. filed Apr. 27, 2017);
- *Interface Linx, LLC v. Haier America Company, LLC et al.*, No. 2:17-cv-03170, (C.D. Cal. filed Apr. 27, 2017);
- *Interface Linx, LLC v. Hisense USA Corp.*, No. 2:17-cv-03182 (C.D. Cal. filed Apr. 27, 2017);
- *Interface Linx, LLC v. Onkyo USA Corp. et al.*, No. 2:17-cv-03188 (C.D. Cal. filed Apr. 27, 2017);
- *Interface Linx, LLC v. Pioneer Electronics (USA), Inc. et al.*, No. 2:17-cv-03191 (C.D. Cal. filed Apr. 27, 2017);
- *Interface Linx, LLC v. Sherwood America, Inc. et al.*, No. 2:17-cv-03192 (C.D. Cal. filed Apr. 27, 2017);
- *Interface Linx, LLC v. Sound United, LLC et al.*, No. 2:17-cv-03193 (C.D. Cal. filed Apr. 27, 2017);
- *Interface Linx, LLC v. VOXX International Corp. et al.*, No. 2:17-cv-03194 (C.D. Cal. filed Apr. 27, 2017);
- *Interface Linx, LLC v. Haier America Co., LLC et al.*, No. 1:17-cv-01098 (D. Del. filed Aug. 7, 2017);
- *Interface Linx, LLC v. Onkyo USA Corp. et al.*, No. 1:17-cv-01099 (D. Del. filed Aug. 7, 2017);
- *Interface Linx, LLC v. Pioneer Electronics (USA) et al.*, No. 1:17-cv-01100 (D. Del. filed Aug. 7, 2017);
- *Interface Linx, LLC v. Sherwood America, Inc. et al.*, No. 1:17-cv-01101 (D. Del. filed Aug. 7, 2017);
- *Interface Linx, LLC v. Sound United, LLC et al.*, No. 1:17-cv-01102 (D. Del. filed Aug. 7, 2017);

- *Interface Linx, LLC v. TTE Technology, Inc. et al.*, No. 1:17-cv-01103 (D. Del. filed Aug. 7, 2017);
- *Interface Linx, LLC v. VOXX Int'l Corp. et al.*, No. 1:17-cv-01104 (D. Del. filed Aug. 7, 2017);
- *Oceana Innovations LLC v. Roku, Inc.*, No. 6:20-cv-00399 (W.D. Tex. filed May 15, 2020);
- *Oceana Innovations LLC v. Charter Communications, Inc.*, No. 6:20-cv-00432 (W.D. Tex. filed May 28, 2020);
- *Oceana Innovations LLC v. JVCKenwood USA Corp.*, No. 3:20-cv-01613 (N.D. Tex. filed June 17, 2020); and
- *Oceana Innovations LLC v. Compal Electronics, Inc.*, No. 2:20-cv-00271 (E.D. Tex. filed Aug. 21, 2020).

Pet. 3–6; Paper 4, 2; Paper 10, 2. Petitioner states that all of the above-identified civil actions have been terminated except for the most recently filed action. Paper 10, 2–4.

In addition, Petitioner and Patent Owner identify the following proceedings involving the '678 patent previously before the Board:

- *TTE Technology, Inc. et al. v. Interface Linx, LLC*, IPR2018-01036 (PTAB filed May 7, 2018); and
- *Frontier Communications Corp. v. Oceana Innovations LLC*, IPR2020-01272 (PTAB filed July 16, 2020).

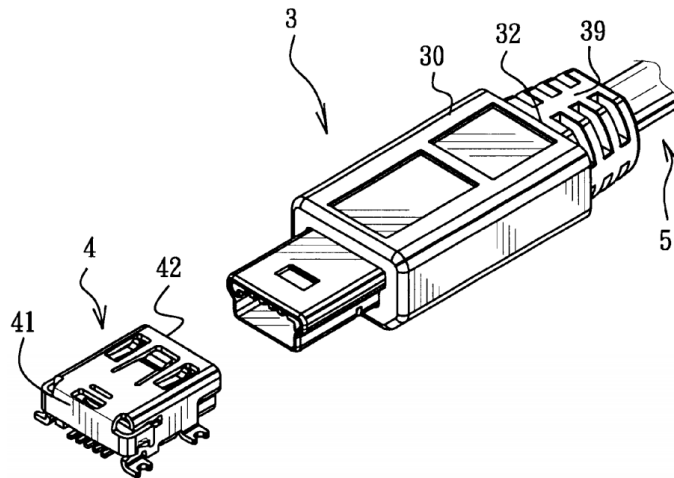
Pet. 6; Paper 4, 2; Paper 10, 4–5. IPR2018-01036 and IPR2020-01272 each ended due to settlement at an early stage, i.e., before the filing of a preliminary response and before the Board decided whether to institute a trial. *See TTE Tech., Inc. v. Interface Linx, LLC*, IPR2018-01036, Paper 10 at 2–3 (PTAB Nov. 15, 2018); *Frontier Commc'ns Corp. v. Oceana Innovations LLC*, IPR2020-01272, Paper 9 at 2–3 (PTAB Dec. 14, 2020).

D. The '678 Patent (Exhibit 1001)

The '678 patent, titled “Electrical Connector Assembly,” issued on January 21, 2003, from an application filed on August 31, 2000. Ex. 1001, codes (22), (45), (54). The patent states that the invention “relates to an electrical connector assembly, more particularly to a [Universal Serial Bus] USB type electrical connector assembly.” *Id.* at 1:6–8.

The '678 patent identifies a deficiency in conventional electrical connector assemblies due to the “same plugs” at opposite ends of a cable. Ex. 1001, 1:27–34. In particular, the patent discusses a “tendency to plug a wrong one of the plugs” into a receptacle on a printed circuit board when using a cable to “connect an electrical device to the printed circuit board.” *Id.* at 1:29–32. An improper plug-receptacle connection “hinder[s] data transmission between the electrical device and the printed circuit board.” *Id.* at 1:32–34. The patent states that “the object of the present invention is to provide an electrical connector assembly that is capable of overcoming the aforementioned drawback.” *Id.* at 1:37–39. Specifically, the patent discloses an electrical connector assembly with a receptacle and a complementary plug having distinct shapes. *See id.* at 1:40–60, 2:29–31, code (57), Fig. 2.

Figure 2 in the '678 patent depicts an embodiment of an electrical connector assembly. Ex. 1001, 2:1–2, 2:29–31, Fig. 2. Figure 2 is reproduced below:



F I G. 2

Figure 2 is “an exploded perspective view of an electrical connector assembly.” *Id.* at 2:1–2, Fig. 2. As Figure 2 shows, the electrical connector assembly “includes a receptacle 4 with a complementary plug 3.” *Id.* at 2:29–31, Fig. 2.

Figures 9 and 10 in the '678 patent depict in more detail receptacle 4 and plug 3, respectively. Ex. 1001, 2:3–4, 2:9–10, 2:17–18, 3:66–4:29.

Figures 9 and 10 are reproduced below:

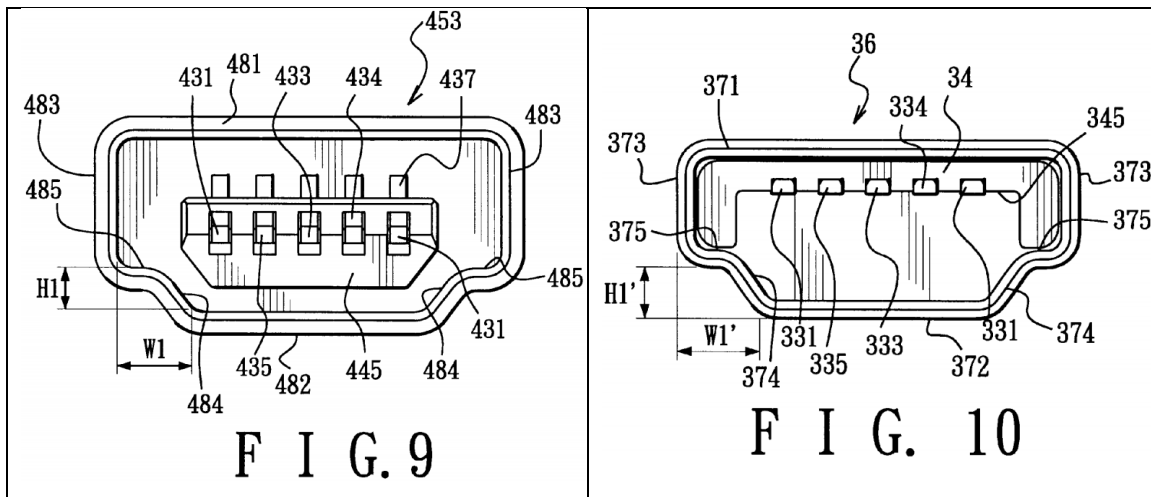


Figure 9 on the left “is a front view of the receptacle,” and Figure 10 on the right “is a front view of the plug.” *Id.* at 2:17–18, Figs. 9–10.

The ’678 patent explains that receptacle 4 and plug 3 depicted in Figures 9 and 10, respectively, have various sides as follows:

- “opposite first and second sides 371, 372 (481, 482)”;
- “a pair of opposite third sides 373 (483) respectively connected to two opposite ends of the first side 371 (481)”;
- “a pair of fourth sides 374 (484) respectively connected to two opposite ends of the second sides 372 (482)”;
- “a pair of fifth sides 375 (485) each extending between and interconnecting one of the third sides 373 (483) and one of the fourth sides 374 (484).”

Ex. 1001, 3:66–4:8.

Further, “[t]he first side 371 (481) is longer than the second side 372 (482).” Ex. 1001, 4:8–9. “The width between the third sides 373 (483) is greater than that between the fourth sides 374 (484).” *Id.* at 4:9–11. “The fifth sides 375 (485) are angled away from each other while extending from the fourth sides 374 (484) to the third sides 373 (483).” *Id.* at 4:11–13. “The first and second sides 371, 372 (481, 482) are substantially parallel.” *Id.* at 4:13–14. “The third sides 373 (483) are substantially perpendicular to the first side 371 (481).” *Id.* at 4:14–16. “The fourth sides 374 (484) extend obliquely and respectively from the opposite ends of the second side 372 (482).” *Id.* at 4:16–18. “The fifth sides 375, (485) are respectively and substantially perpendicular to the third sides 373 (483).” *Id.* at 4:18–19.

For receptacle 4 and plug 3, the ’678 patent describes the following height-to-width relationship:

The shortest distance (indicated as reference mark H1 shown in FIG. 9 or H1' in FIG. 10) from one of, two opposite ends of each third side 373 (483), that is distal from the first side 371 (481), to a plane defined by the second side 372 (482) is smaller than the distance (indicated as reference mark W1 shown in FIG. 9 or W1' in FIG. 10) from one of the opposite ends of the second side 372 (482), that is adjacent to that third side 373 (483), to a plane defined by that third side 373 (483).

Ex. 1001, 4:19–28.

Figures 11 and 12 in the '678 patent depict another embodiment of a receptacle 4' and a complementary plug 3', respectively, having distinct shapes. Ex. 1001, 2:19–22, 4:36–50. Figures 11 and 12 are reproduced below:

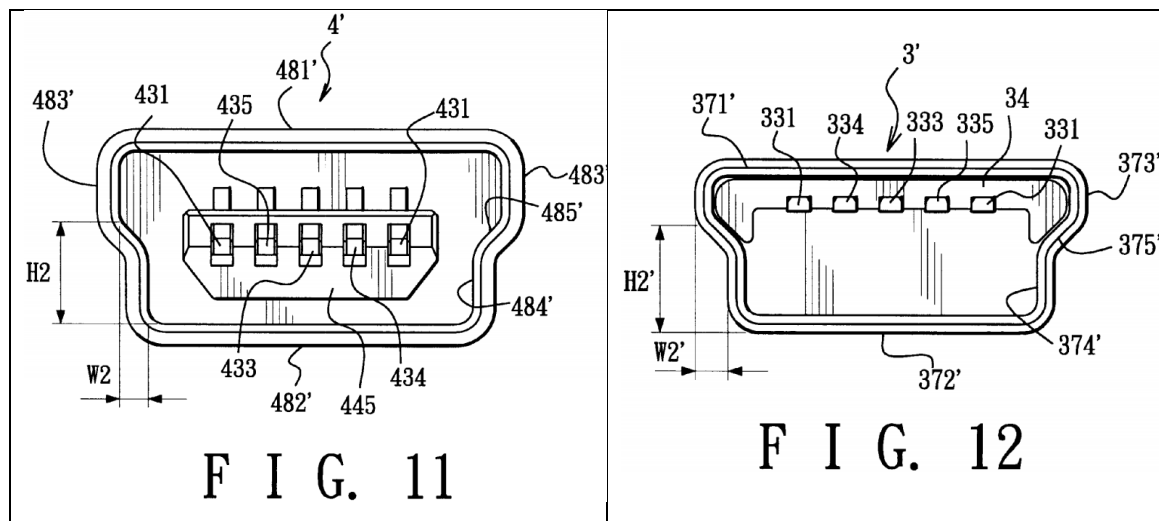


Figure 11 on the left “is a front view to illustrate a modified receptacle,” and Figure 12 on the right “is a front view to illustrate a modified plug.” *Id.* at 2:19–22, Figs. 11–12.

The '678 patent explains that receptacle 4' and plug 3' “are similar to the previous receptacle 4 and the previous plug 3” depicted in Figures 9 and 10 except that:

- “the fourth sides 374' (484') are substantially perpendicular to the second side 372' (482)”; and

- “each fifth side 375' (485') is oblique relative to the respective third side 373' (483') and the respective fourth side 374' (484').”

Ex. 1001, 4:36–42.

For receptacle 4' and plug 3', the '678 patent describes the following height-to-width relationship:

[T]he shortest distance (indicated as reference mark H2 shown in FIG. 11 or H2' in FIG. 12) from one of two opposite ends of each third side 373' (483'), that is distal from the first side 371' (481') to the plane defined by the second side 372' (482') is greater than the distance (indicated as reference mark W2 shown in FIG. 11 or W2' in FIG. 12) from an adjacent one of the opposite ends of the second side 372' (482') to the plane defined by that third side 373' (483').

Ex. 1001, 4:42–50.

E. The Challenged Claims

Petitioner challenges every claim in the '678 patent, i.e., independent claim 1 and claims 2–5 that depend directly or indirectly from claim 1.

Pet. 7–8, 30–84. Claim 1 exemplifies the challenged claims and reads as follows (with formatting added for clarity and letters added for reference purposes¹):

1. [1a] An electrical connector assembly, comprising:
 - [1b] a plug that includes a plug housing having a first mating portion, and
 - [1c] a plurality of plug terminals mounted inside said plug housing,
 - [1d] said first mating portion being defined by a multi-sided first confining wall; and

¹ We use the same letters that Petitioner uses to identify claim 1's limitations.

[1e] a receptacle that includes a receptacle housing having a second mating portion to mate with said first mating portion, and

[1f] a plurality of receptacle terminals mounted inside said receptacle housing,

[1g] said second mating portion being defined by a multi-sided second confining wall,

[1h] each of said first and second confining walls having opposite first and second sides, a pair of opposite third sides respectively connected to two opposite ends of said first side, a pair of fourth sides respectively connected to two opposite ends of said second side, and a pair of fifth sides each extending between and interconnecting one of said third sides and one of said fourth sides,

[1i] said first side being longer than said second side,

[1j] said first and second sides being longer than each of said third sides,

[1k] the width between said third sides being greater than that between said fourth sides,

[1l] said fifth sides being angled away from each other while extending from said fourth sides to said third sides;

[1m] wherein said first and second sides are substantially parallel, and

[1n] said third sides are substantially perpendicular to said first side; and

[1o] wherein said fourth sides extend obliquely from said second side.

Ex. 1001, 5:9–6:5.

F. The Asserted References

For its challenges, Petitioner relies on the following references:

Name	Reference	Exhibit
Jones	US 4,764,129, issued August 16, 1988	1007

Name	Reference	Exhibit
Nishio	US 6,322,395 B1, issued November 27, 2001	1010
Kusagaya	US 6,261,129 B1, issued July 17, 2001	1011
Koizumi	US 5,630,170, issued May 13, 1997	1012
Roldan	US 4,591,230, issued May 27, 1986	1013

Petitioner contends that Jones, Koizumi, and Roldan qualify as prior art under 35 U.S.C. § 102(b).² Pet. 1, 30, 73, 82. Petitioner contends that Nishio and Kusagaya qualify as prior art under 35 U.S.C. § 102(e). *Id.* at 45, 62. Patent Owner does not dispute that each reference qualifies as prior art. *See, e.g.*, Resp. 16–46.

G. The Asserted Challenges to Patentability

Petitioner asserts the following challenges to patentability:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–3	102(b)	Jones
1–3	103(a)	Jones
1–3	103(a)	Nishio, Jones
1–3	103(a)	Kusagaya, Jones
4	103(a)	Jones, Koizumi
4	103(a)	Nishio, Jones, Koizumi
5	103(a)	Jones, Koizumi, Roldan
5	103(a)	Nishio, Jones, Koizumi, Roldan

Pet. 7–8, 30–84.

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 102 and § 103 effective March 16, 2013. Because the ’678 patent’s filing date predates the AIA’s amendments to § 102 and § 103, this decision refers to the pre-AIA versions of § 102 and § 103.

H. Testimonial Evidence

To support its challenges, Petitioner relies on the declaration of Edward M. Cady, Jr. (Ex. 1002, “Cady Decl.”). Mr. Cady states, “I have been retained by Petitioner to provide my opinions concerning” the patentability of claims 1–5 in the ’678 patent. Ex. 1002 ¶ 2. He also states, “After graduating and for the past 50+ years, I have been involved with the design and development of electronic devices, particularly with connectors.” *Id.* ¶ 8; *see id.* ¶ 30. Mr. Cady explains that he has “helped design the connectors used in dozens of electronic products, including connectors used for power, sense/controls, digital, audio, video, RF and photonic signals, as well as connectors used for board, module, peripheral, and system level interconnections.” *Id.* ¶ 8.

Patent Owner does not submit testimonial evidence to support its positions. *See, e.g.*, Resp. 16–56.

I. Burden

In an *inter partes* review, a petitioner bears the burden of persuasion to prove “unpatentability by a preponderance of the evidence.” *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (quoting 35 U.S.C. § 316(e)); *see* 37 C.F.R. § 42.1(d) (2021).

III. PATENTABILITY ANALYSIS

A. Legal Principles: Anticipation

“[T]o demonstrate anticipation, the proponent must show ‘that the four corners of a single, prior art document describe every element of the claimed invention.’” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (quoting *Xerox Corp. v. 3Com Corp.*, 458 F.3d 1310, 1322 (Fed. Cir. 2006)). The prior-art document “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.’” *Id.* (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)). Hence, a patent challenger cannot rely on portions from different embodiments in a prior-art document to demonstrate anticipation. *See id.* at 1369, 1371.

The “disclosure of a limited number of combination possibilities” may anticipate a claim. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 851 F.3d 1270, 1274 (Fed. Cir. 2017); *see Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1380, 1382–83 (Fed. Cir. 2015). Hence, a reference may anticipate “if that reference teaches that the disclosed components or functionalities may be combined and one of skill in the art would be able to implement the combination.” *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1344 (Fed. Cir. 2016). The “dispositive question regarding anticipation [is] whether one skilled in the art would reasonably understand or infer from the [reference’s] teaching” that it discloses every claim element arranged as in the claim. *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991); *see Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368 (Fed. Cir. 2003).

We analyze the anticipation issues according to these principles.

B. Legal Principles: Obviousness

A patent may not be obtained “if the differences between the subject matter sought to be patented 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.” 35 U.S.C. § 103(a) (2006). An obviousness analysis involves underlying factual inquiries including (1) the scope and content of the prior art;

(2) differences between the claimed invention and the prior art; (3) the level of ordinary skill in the art; and (4) where in evidence, objective indicia of nonobviousness, such as commercial success, long-felt but unmet need, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18, 35–36 (1966); *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1047–48 (Fed. Cir. 2016) (en banc). When evaluating a combination of references, an obviousness analysis should address “whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

We analyze the obviousness issues according to these principles.

C. Level of Ordinary Skill in the Art

Factors pertinent to determining the level of ordinary skill in the art include (1) the educational level of the inventor; (2) the type of problems encountered in the art; (3) prior-art solutions to those problems; (4) the rapidity with which innovations are made; (5) the sophistication of the technology; and (6) the educational level of workers active in the field. *Envtl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–97 (Fed. Cir. 1983). Not all factors may exist in every case, and one or more of these or other factors may predominate in a particular case. *Id.* These factors are not exhaustive, but merely a guide to determining the level of ordinary skill in the art. *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007). Moreover, the prior art itself may reflect an appropriate skill level. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

Based on Mr. Cady’s testimony, Petitioner asserts that an ordinarily skilled artisan would have had “at least a Bachelor’s degree in engineering, or equivalent academic or professional experience, plus two to three years of

relevant work experience in the area of electrical connector design, development, or specification.” Pet. 26 (citing Ex. 1002 ¶ 28). Petitioner also asserts that “a higher level of education or specific skill might make up for less experience, and vice-versa.” *Id.* (citing Ex. 1002 ¶ 28).

Patent Owner asserts that an ordinarily skilled artisan would have had “a bachelor’s degree in mechanical engineering involving the design of electronic components” and “specialized knowledge and experience in the field of electrical connector design and fabrication.” Resp. 9–10. In its Preliminary Response, Patent Owner provided the same description of an ordinarily skilled artisan. Prelim. Resp. 10–11. Patent Owner cites no evidence supporting its description of an ordinarily skilled artisan. Prelim. Resp. 10–11; Resp. 9–10.

In our Institution Decision, we noted that “[t]he parties seem to agree generally about the level of ordinary skill in the art” and that “neither party contends that any differences between their respective descriptions of an ordinarily skilled artisan would impact the patentability analysis.” Inst. Dec. 19. Additionally, “we encourage[d] the parties to address whether there are any differences between their respective descriptions that would impact the patentability analysis.” *Id.* After institution, however, the parties did not address whether there are any differences between their respective descriptions that would impact the patentability analysis. *See, e.g.*, Resp. 9–10; Reply 3–4.

Petitioner’s description of an ordinarily skilled artisan requires slightly more experience (“two to three years”) than Patent Owner’s description (no specified period). *See* Pet. 26; Resp. 9–10. We adopt Patent Owner’s description of an ordinarily skilled artisan because it comports with

the technology and claims of the '678 patent as well as the asserted prior art. Moreover, if the prior art renders the claimed subject matter obvious to a person with less experience and less knowledge, then the prior art renders the claimed subject matter obvious to a person with more experience and more knowledge. *See Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1369 (Fed. Cir. 2011).

D. Claim Construction

1. GENERALLY

Because Petitioner filed the Petition after November 13, 2018, we construe claim terms “using the same claim construction standard” that district courts use to construe claim terms in civil actions under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b). Under that standard, “[c]laim terms are given their ordinary and customary meaning, which is the meaning the term would have to a person of ordinary skill in the art at the time of the invention.” *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, 904 F.3d 965, 971 (Fed. Cir. 2018) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc)). The meaning of claim terms may be determined by “look[ing] principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

2. “BEING ANGLED AWAY FROM EACH OTHER”

Claim 1 recites “said fifth sides being angled away from each other while extending from said fourth sides to said third sides.” Ex. 1001, 5:31–33.

Petitioner asserts that “being angled away from each other” means “extending away from each other” and encompasses “angled at 180 degrees (*i.e.*, parallel) and pointing in opposite directions.” Pet. 28 (citing Ex. 1002 ¶ 61); *see* Reply 4. In particular, Petitioner contends that the ’678 patent’s specification discloses an embodiment where (1) “[t]he third sides 373 (483) are substantially perpendicular to the first side 371 (481)” and (2) “[t]he fifth sides 375, (485) are respectively and substantially perpendicular to the third sides 373 (483).” Pet. 28 (citing Ex. 1001, 4:11–19); *see* Reply 4. Based on the “substantially perpendicular” arrangement of the third sides to the first side, *i.e.*, angled at 90 degrees, and the “substantially perpendicular” arrangement of the third sides to the fifth sides, *i.e.*, angled at 90 degrees, Petitioner contends that claim 1 “must encompass fifth sides angled at 180 degrees to each other.” Pet. 28 (citing Ex. 1002 ¶ 61); *see* Reply 4. Petitioner contends that ’678 patent Figures 9 and 10 confirm that “being angled away from each other” encompasses “angled at 180 degrees” because these figures illustrate “co-linear” fifth sides pointing in opposite directions “when starting from the fourth sides 374 (484) and extending to the third sides 373 (483).” Pet. 29 (citing Ex. 1001, 4:11–13); *see* Reply 5.

Patent Owner disputes that “being angled away from each other” encompasses “angled at 180 degrees (*i.e.*, parallel) and pointing in opposite directions.” Resp. 10; *see id.* at 10–16. Specifically, Patent Owner asserts that the “ordinary and customary meaning of the term ‘angled’ is ‘placed or inclined at an angle to something else.’” *Id.* at 11–12 (citing Ex. 2001, 1). Based on that ordinary and customary meaning, Patent Owner asserts that “being angled away from each other” means “inclined away from each other.” *Id.* at 11, 18.

In addition, Patent Owner contends that Petitioner's proposed construction "disregards the ordinary meaning of 'angled,' improperly reads the language 'angled away from' out of claim 1, and improperly reads limitations from the specification into the claims." Resp. 12. Patent Owner also contends that Petitioner "improperly seeks to limit the claims to preferred embodiments." *Id.* at 14.

Further, Patent Owner asserts that it "used the term 'parallel' in the claim language when claiming the relationship between the first and second sides but did not use the term 'parallel' when claiming the relationship between the fifth sides." Resp. 14. According to Patent Owner, Petitioner's proposed construction "is overly broad because it would include a geometric relationship that Patent Owner used in other parts of the claim but chose to not use when claiming the relationship between the fifth sides." *Id.*

For the reasons explained below, we agree with Petitioner that "being angled away from each other" means "extending away from each other" and encompasses "angled at 180 degrees," i.e., pointing in opposite directions. *See* Pet. 28. First, the claim language supports the conclusion that "being angled away from each other" means "extending away from each other" and encompasses "angled at 180 degrees." Claim 1 requires that "said third sides are substantially perpendicular to said first side." Ex. 1001, 6:2–3. Claim 2 depends from claim 1 and requires that "said fifth sides are respectively and substantially perpendicular to said third sides." *Id.* at 6:6–8.

Thus, claim 2 defines an assembly with (1) third sides "substantially perpendicular" to the first side, i.e., third sides arranged about 90 degrees relative to the first side, and (2) fifth sides "substantially perpendicular" to

respective third sides, i.e., fifth sides arranged about 90 degrees relative to respective third sides. In that assembly, the fifth sides are arranged about 180 degrees relative to the first side, and the fifth sides are “angled at 180 degrees” relative to each other.

A dependent claim should narrow a base claim by containing a reference to the base claim and “then specify[ing] a further limitation of the subject matter claimed.” 35 U.S.C. § 112 ¶ 4 (2006); *see Myco Indus., Inc. v. BlephEx, LLC*, 955 F.3d 1, 14 (Fed. Cir. 2020). So if narrower claim 2 encompasses an assembly with fifth sides “angled at 180 degrees” relative to each other, then broader claim 1 also encompasses such an assembly.

As an example, claim 1 covers an arrangement where the fifth side on the left has a slight inclination clockwise from horizontal (↘) and the fifth side on the right has a slight inclination counterclockwise from horizontal (↙), such that the sides angle upwardly (↘ ↙) relative to a centerline. As another example, claim 1 covers an arrangement where the fifth side on the left has a slight inclination counterclockwise from horizontal (↙) and the fifth side on the right has a slight inclination clockwise from horizontal (↘), such that the sides angle downwardly (↙ ↘) relative to a centerline. Patent Owner does not dispute that claim 1 covers these example arrangements. *See* Resp. 10–16; *see also id.* at 47–48, 50–51. Based on the claim language, claim 1 also covers an arrangement intermediate between these example arrangements where the fifth side on the left has no inclination from horizontal (—) and the fifth side on the right has no inclination from horizontal (—), such that the sides point in opposite directions (— —), i.e., the sides are “angled at 180 degrees” relative to each other.

Second, the '678 patent's specification supports the conclusion that "being angled away from each other" means "extending away from each other" and encompasses "angled at 180 degrees." *See* Ex. 1001, 3:66–4:19, Figs. 9–10. When describing the receptacle and the complementary plug depicted in Figures 9 and 10, the patent states that "[t]he third sides 373 (483) are substantially perpendicular to the first side 371 (481)." *Id.* at 4:14–16. The patent also states that "[t]he fifth sides 375, (485) are respectively and substantially perpendicular to the third sides 373 (483)." *Id.* at 4:18–19.

Hence, similar to claim 2, Figures 9 and 10 depict an assembly with (1) third sides "substantially perpendicular" to the first side, i.e., third sides arranged about 90 degrees relative to the first side, and (2) fifth sides "substantially perpendicular" to respective third sides, i.e., fifth sides arranged about 90 degrees relative to respective third sides. Ex. 1001, 4:14–19, Figs. 9–10. In that assembly, the fifth sides are arranged about 180 degrees relative to the first side, and the fifth sides are "angled at 180 degrees" relative to each other. *Id.* at 4:14–19, Figs. 9–10.

Further, when describing the receptacle and the complementary plug depicted in Figures 9 and 10, the '678 patent states that "[t]he fifth sides 375 (485) are angled away from each other while extending from the fourth sides 374 (484) to the third sides 373 (483)." Ex. 1001, 4:11–13, code (57). Thus, the patent uses "angled away" to encompass "angled at 180 degrees," i.e., pointing in opposite directions.

Third, the '678 patent's prosecution history supports the conclusion that "being angled away from each other" means "extending away from each other" and encompasses "angled at 180 degrees." *See* Ex. 1004, 17, 41–48,

144–51, 153–58; *see also* Ex. 1010, 2:52–54, 2:66–3:14, 3:46–4:31, Fig. 1. Application claim 1 became patent claim 1. Ex. 1004, 241. As filed, application claim 1 recited “said fifth sides being angled away from each other while extending from said fourth sides to said third sides.” *Id.* at 17.

In the first Office action, the Examiner rejected application claims 1–3 and 7 as anticipated by Nishio. Ex. 1004, 42–44, 48, 144–51. In rejecting application claim 1, the Examiner found that Nishio discloses an assembly with “fifth sides being angled away from each other while extending from the fourth sides to the third sides.” *Id.* at 43, 145. As explained below, Nishio discloses an assembly with fifth sides “angled at 180 degrees” relative to each other. *See* Ex. 1010, 2:52–54, 2:66–3:14, 3:46–4:31, Fig. 1; *infra* § III.G.2(l). Petitioner provides an annotated excerpt from Nishio’s Figure 1 (reproduced below) depicting an assembly with fifth sides “angled at 180 degrees” relative to each other (Pet. 30):

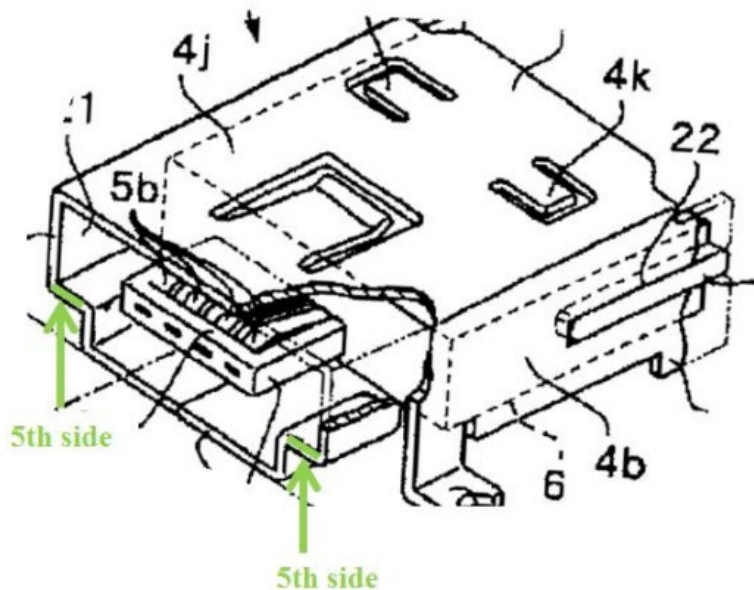


Figure 1 is “an exploded perspective drawing of an electrical connector” with “a section cut away.” Ex. 1010, 2:52–54, Fig. 1. The above annotated excerpt from Figure 1 includes two green lines denoting two fifth sides, and

the two green lines are “angled at 180 degrees” relative to each other. *See* Pet. 30.

The Applicant did not dispute the Examiner’s finding that Nishio discloses an assembly with “fifth sides being angled away from each other while extending from the fourth sides to the third sides.” *See* Ex. 1004, 153–58. Instead, the Applicant amended application claim 1 to distinguish over Nishio by adding the following limitation to claim 1: “said fourth sides extend obliquely from said second side.” *Id.* at 158.

Based on the intrinsic evidence, and for the reasons discussed above, we construe “being angled away from each other” to mean “extending away from each other” and encompass “angled at 180 degrees,” i.e., pointing in opposite directions.

Patent Owner contends that this construction renders “the phrase ‘angled away from’ completely meaningless in view of the claim limitations that require ‘fifth sides each *extending* between and interconnecting one of said third sides and one of said fourth sides’ and ‘said fifth sides ‘*extending* from said fourth sides to said third sides.’” Resp. 13 (emphases by Patent Owner).

We disagree. In the limitation “a pair of fifth sides each extending between and interconnecting one of the third sides and one of the fourth sides,” the language “extending between” specifies a relationship between a fifth side, a third side, and a fourth side. In the limitation “the fifth sides being angled away from each other while extending from the fourth sides to the third sides,” the language “extending from” similarly specifies a relationship between a fifth side, a third side, and a fourth side. But the language “being angled away from each other” specifies a relationship

between the fifth sides themselves, i.e., relative to each other. Hence, construing “being angled away from each other” to mean “extending away from each other” does not render any claim language superfluous.

As for Patent Owner’s assertion that it “used the term ‘parallel’ in the claim language when claiming the relationship between the first and second sides but did not use the term ‘parallel’ when claiming the relationship between the fifth sides,” we agree. *See* Ex. 1001, 5:31–6:2; Resp. 14. Patent Owner used the term “parallel” in claim 1 to define a particular geometric relationship between the first and second sides and narrow the claim by requiring that particular geometric relationship. Ex. 1001, 6:1–2. That Patent Owner used the phrase “being angled away from each other” in claim 1 to define a different geometric relationship between the fifth sides indicates that it did not intend to narrow the claim for the fifth sides in the way that it narrowed the claim for the first and second sides. *See id.* at 5:31–6:2. Different claim language connotes different meanings. *CAE Screenplates Inc. v. Heinrich Fiedler GmbH*, 224 F.3d 1308, 1317 (Fed. Cir. 2000). Hence, “being angled away from each other” encompasses “angled at 180 degrees” and other orientations, e.g., fifth sides inclined away from each other.

As for Patent Owner’s contention that Petitioner “improperly seeks to limit the claims to preferred embodiments,” we disagree. *See* Resp. 14. Construing “being angled away from each other” to mean “extending away from each other,” as Petitioner proposes, permits claim 1 to encompass the preferred embodiment depicted in ’678 patent Figures 9 and 10. Petitioner proposes a broader construction than Patent Owner, not a narrower construction that limits the claims to a preferred embodiment.

Construing “being angled away from each other” to mean “inclined away from each other,” as Patent Owner proposes, would exclude from claim scope the preferred embodiment depicted in ’678 patent Figures 9 and 10. *See* Ex. 1001, 3:66–4:19, Figs. 9–10. A construction excluding a preferred embodiment is “rarely, if ever correct.” *PPC Broadband, Inc. v. Corning Optical Commc’ns RF, LLC*, 815 F.3d 747, 755 (Fed. Cir. 2016). Patent Owner identifies no evidence—intrinsic or extrinsic—warranting a departure from the principle. *See* Resp. 10–16.

3. OTHER CLAIM TERMS

We determine that no other claim terms require explicit constructions to decide the patentability issues for claims 1–5. “[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.” *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999); *see Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

E. Alleged Anticipation by Jones: Claims 1–3

Petitioner contends that claims 1–3 are unpatentable under § 102(b) as anticipated by Jones. *See* Pet. 8, 30–42. Below, we provide an overview of Jones, and then we consider the anticipation issues raised by the parties. As explained below, Patent Owner disputes that Jones discloses two limitations in claim 1, i.e., limitations [1j] and [1l]. *See* Resp. 17–28. As also explained below, we agree with Petitioner that claims 1–3 are unpatentable under § 102(b) as anticipated by Jones.

1. OVERVIEW OF JONES (EXHIBIT 1007)

Jones is a U.S. patent titled “Electrical Connector Assemblies,” filed on October 8, 1985, and issued on August 16, 1988. Ex. 1007, codes (22),

(45), (54). Jones states that the invention “relates to a series of electrical connector assemblies and in particular those comprising a socket and a corresponding plug which is received in the socket.” *Id.* at 1:5–8; *see id.* at 1:43–2:9. Jones discloses that the “plugs and corresponding sockets” in the series of electrical connector assemblies have “a number of different widths.” *Id.* at code (57).

Jones explains that “[n]arrower plugs of the series are prevented from insertion into wider sockets of the series by the variation of the height of the plugs and sockets and or the cross-sectional dimensions of a key and keyway provided on the plugs and sockets.” Ex. 1007, code (57). Jones also explains that varying “the location of the key and keyway on the plug and socket sidewalls” or “the cross-sectional dimensions of the keys and keyways” (or both) may further differentiate “between plugs and sockets of the same width.” *Id.*

Jones discusses two advantages of electrical connector assemblies according to the invention. Ex. 1007, 2:10–15. First, “visual inspection to determine whether a plug will fit a particular socket is rendered easy.” *Id.* at 2:10–13. Second, “[t]he design of the plugs and sockets is also rendered simple.” *Id.* at 2:13–15.

Jones’s Figure 1 is reproduced below:

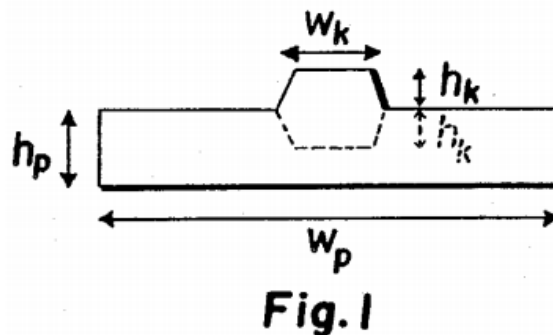


Figure 1 “shows a schematic end-on view in the direction of engagement of the plug and socket of the disposition of the sidewalls and keys or keyways for a plug or socket forming a member of a series” of electrical connector assemblies. Ex. 1007, 3:64–68, Fig. 1; *see id.* at 4:24–26. Figure 1 depicts a trapezoidal key or keyway. *Id.* at 4:44–45, Fig. 1. But “[d]etails such as terminals, catches and the like have been omitted for clarity and only the disposition of the sidewalls and key or keyway are shown.” *Id.* at 4:26–29.

Referring to Figure 1, Jones explains that “[a] first pair of opposed sidewalls separated by a width W_p and a second pair of opposed sidewalls separated by an height h_p and disposed transversely, in this instance orthogonally, to the first pair of sidewalls, form the main body of the recess of engageable portion.” Ex. 1007, 4:33–38. Jones also explains that “[o]n the upper one of the second sidewalls a key or keyway is provided of width W_k and height h_k .” *Id.* at 4:40–42. Jones describes the trapezoidal key or keyway depicted in Figure 1 as preferable. *Id.* at 4:44–46.

Jones's Figures 2 and 3 are reproduced below:

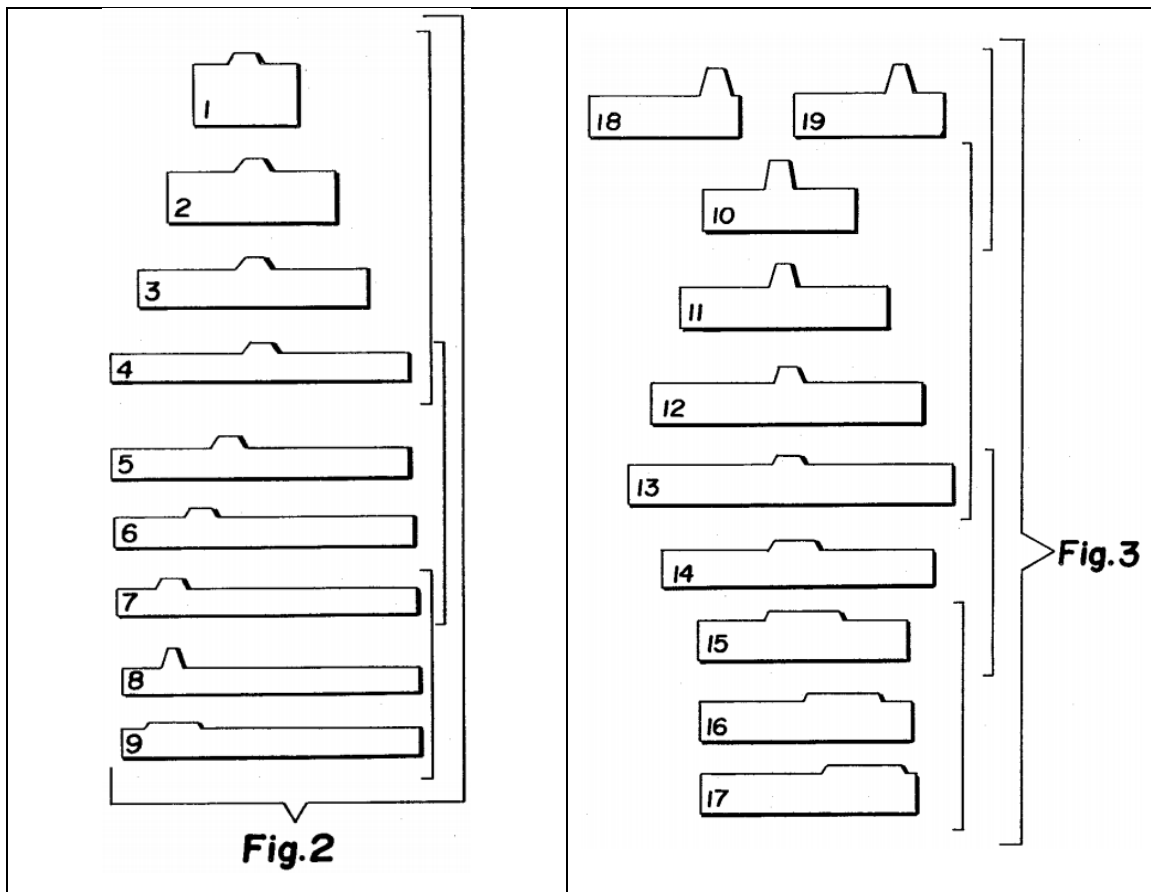


Figure 2 on the left “shows a series of plugs or sockets” viewed in the same manner as in Figure 1 where some of the plugs or sockets have “different heights to prevent mismatching of narrower plugs with wider sockets.”

Ex. 1007, 4:1–5, Fig. 2. Figure 3 on the right “shows a series of plugs or sockets” viewed in the same manner as in Figure 1 where some of the plugs or sockets have “keys and keyways of different cross-sectional dimensions to prevent mismatching of narrower plugs with wider sockets.” *Id.* at 4:6–11, Fig. 3. Jones identifies the series of plugs or sockets in Figure 2 as embodiments 1 through 9. *Id.* at 4:52–5:6, Fig. 2. Jones identifies the series of plugs or sockets in Figure 3 as embodiments 10 through 19. *Id.* at 5:7–20, Fig. 3.

For Figure 2, Jones explains that “a series of plugs 1, 2, 3, 4 are shown for which the height h_p increases with decreasing width W_p ” and that “the variation in h_p ” prevents the insertion of a narrower plug into a wider socket even though “the key cross-sectional dimensions” remain constant for each plug in the series. Ex. 1007, 4:52–57, code (57).

For Figure 3, Jones explains that “a series of plugs are shown all having the same height h_p ” and that “narrower plugs can be prevented from insertion into wider sockets by the width W_k of the keyway being increased as the plug width W_p decreases.” Ex. 1007, 5:7–8, 5:12–15, code (57). Jones describes embodiments 10, 11, 12, and 13 as exemplifying a series of plugs where the keyway height h_k increases as the plug width W_p decreases. *Id.* at 5:8–12. Jones describes embodiments 13, 14, and 15 as exemplifying a series of plugs where the keyway width W_k increases as the plug width W_p decreases. *Id.* at 5:12–16. Further, Jones describes embodiments 15, 16, and 17 as exemplifying a series of plugs where the keyway width W_k remains constant and the plug width W_p remains constant but the keyway location varies along an upper sidewall. *Id.* at 5:16–20.

Jones's Figure 6 is reproduced below:

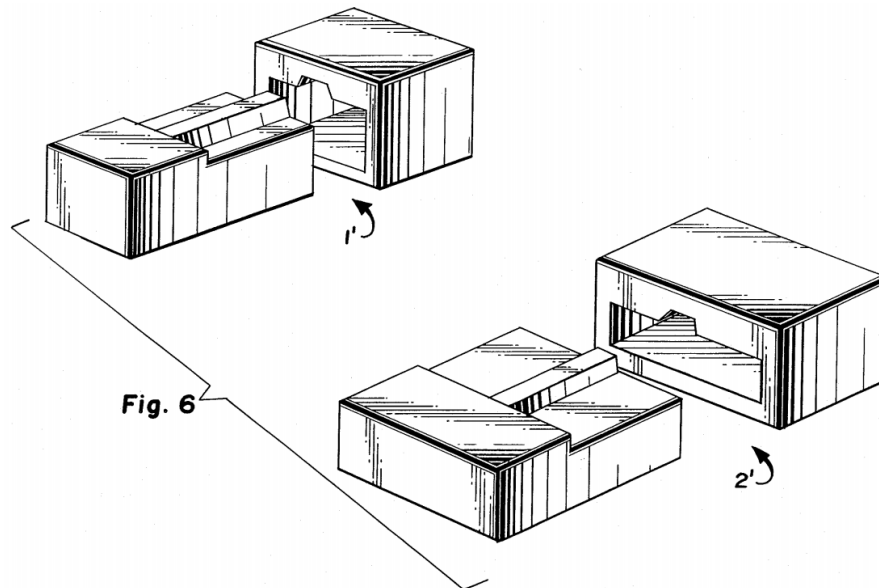


Figure 6 “shows perspective views of plug and socket assemblies corresponding to plugs 1 and 2” in Figure 2. Ex. 1007, 4:19–21, 4:57–59, Fig. 6.

2. INDEPENDENT CLAIM 1

(a) Preamble [1a]

Claim 1’s preamble recites “[a]n electrical connector assembly.” Ex. 1001, 5:9.

Petitioner contends that Jones discloses claim 1’s preamble because Jones discloses “a series of electrical connector assemblies each . . . comprising a socket and a corresponding plug.” Pet. 31 (alteration by Petitioner) (quoting Ex. 1007, 1:43–45).

Patent Owner makes no arguments specific to claim 1’s preamble. See Resp. 16–28. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. See *Dynamic Drinkware*, 800 F.3d at 1378.

Generally, a preamble does not limit a claim. *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002). Here, we need not decide whether claim 1's preamble limits the claim because we agree with Petitioner that Jones discloses the preamble. *See* Pet. 31; Ex. 1002 ¶ 82. As Petitioner contends, Jones discloses “a series of electrical connector assemblies each . . . comprising a socket and a corresponding plug.” Ex. 1007, 1:43–45; *see id.* at 1:5–8, code (57); Ex. 1002 ¶ 82; Pet. 31.

(b) Limitation [1b]

Claim 1 recites “a plug that includes a plug housing having a first mating portion.” Ex. 1001, 5:10–11.

Petitioner contends that Jones discloses limitation [1b] because a plug in Jones includes an engageable portion that “mates with a corresponding socket or receptacle” and “corresponds to the first mating portion recited in claim 1.” Pet. 31 (citing Ex. 1002 ¶ 83; Ex. 1007, 1:46–48). To support Petitioner's contention, Mr. Cady provides an annotated excerpt from Jones's Figure 6 as reproduced below (Ex. 1002 ¶ 83):

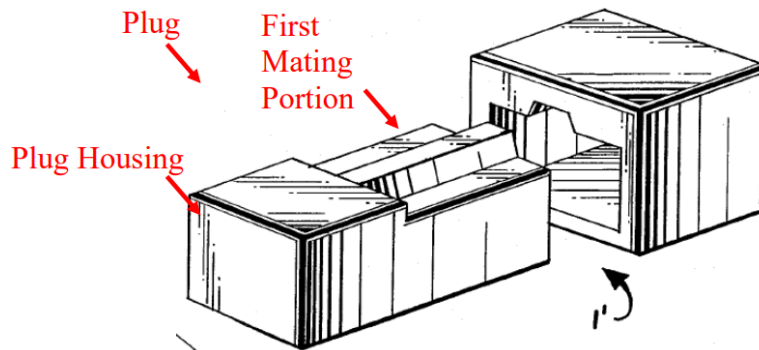


Figure 6 “shows perspective views of plug and socket assemblies.”

Ex. 1007, 4:19–21, 4:57–59, Fig. 6. The above annotated excerpt from Figure 6 includes annotations identifying a plug, a plug housing, and a first

mating portion of the plug housing. *See* Ex. 1002 ¶ 83. Mr. Cady testifies that the above annotated excerpt from Figure 6 “shows the claimed ‘plug that includes a plug housing having a first mating portion.’” *Id.*

In addition, Petitioner contends that embodiment 15 in Figure 3 includes “an engageable portion, or first mating portion, of a plug.” Pet. 32 (citing Ex. 1002 ¶ 84).

Patent Owner makes no arguments specific to limitation [1b]. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses limitation [1b]. *See* Pet. 31–32; Ex. 1002 ¶¶ 83–84. Specifically, Jones discloses that a plug includes “an engageable portion for engaging in said corresponding socket.” Ex. 1007, 1:46–48; *see id.* at 4:19–21, Fig. 6; Ex. 1002 ¶ 83. A plug’s engageable portion corresponds to “a first mating portion” according to limitation [1b]. *See* Ex. 1002 ¶¶ 83–84.

(c) Limitation [1c]

Claim 1 recites “a plurality of plug terminals mounted inside said plug housing.” Ex. 1001, 5:11–12.

Petitioner contends that Jones discloses limitation [1c] because a plug in Jones includes “one or more terminals . . . for contacting one or more corresponding terminals in [a] corresponding socket.” Pet. 33 (alterations by Petitioner) (quoting Ex. 1007, 1:46–54).

Patent Owner makes no arguments specific to limitation [1c]. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses limitation [1c]. *See* Pet. 33; Ex. 1002 ¶ 85. Specifically, Jones discloses that a plug includes “one or more terminals each for contacting one or more corresponding

terminals in said corresponding socket.” Ex. 1007, 1:52–54; *see id.* at 4:24–29, Figs. 1–3; Ex. 1002 ¶ 85.

(d) Limitation [1d]

Claim 1 recites “said first mating portion being defined by a multi-sided first confining wall.” Ex. 1001, 5:12–13.

Petitioner contends that Jones discloses limitation [1d] because a plug in Jones includes an engageable portion defined by “a first pair of opposed plug sidewalls” and “a second pair of opposed plug sidewalls disposed transversely to said first pair of plug sidewalls.” Pet. 33 (quoting Ex. 1007, 1:48–51).

Patent Owner makes no arguments specific to limitation [1d]. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses limitation [1d]. *See* Pet. 33–34; Ex. 1002 ¶ 86. Specifically, Jones discloses “a first pair of opposed plug sidewalls” and “a second pair of opposed plug sidewalls disposed transversely to said first pair of plug sidewalls” that define the engageable portion of a plug. Ex. 1007, 1:48–51; *see id.* at 3:64–4:11, Figs. 1–3; Ex. 1002 ¶ 86. The “first pair of opposed plug sidewalls” and the “second pair of opposed plug sidewalls” form “a multi-sided first confining wall” according to limitation [1d] because the sidewalls collectively confine the plug terminals. Ex. 1007, 1:48–54; *see* Ex. 1002 ¶ 86.

(e) Limitation [1e]

Claim 1 recites “a receptacle that includes a receptacle housing having a second mating portion to mate with said first mating portion.” Ex. 1001, 5:14–16.

Petitioner contends that Jones discloses limitation [1e] because a socket in Jones includes “a recess for receiving said engageable portion of said plug.” Pet. 34 (quoting Ex. 1007, 1:56–58). Petitioner also contends that a recess portion of a socket in Jones “is configured to mate with the first mating portion” of a plug and “corresponds to the second mating portion.” *Id.* (citing Ex. 1002 ¶ 87). To support Petitioner’s contentions, Mr. Cady provides an annotated excerpt from Jones’s Figure 6 as reproduced below (Ex. 1002 ¶ 87):

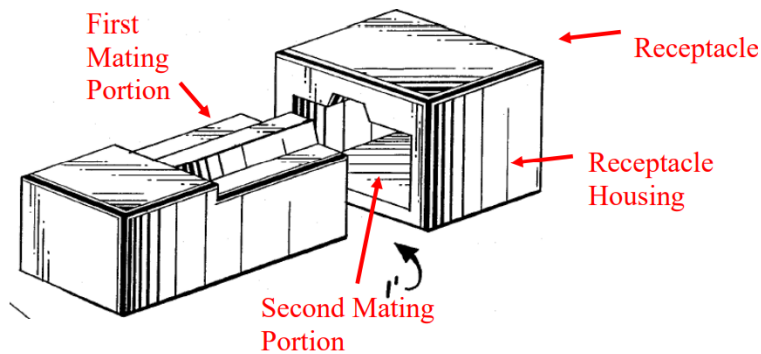


Figure 6 “shows perspective views of plug and socket assemblies.” Ex. 1007, 4:19–21, 4:57–59, Fig. 6. The above annotated excerpt from Figure 6 includes annotations identifying a receptacle, a receptacle housing, a first mating portion of the plug housing, and a second mating portion of the receptacle housing. *See* Ex. 1002 ¶ 87. Mr. Cady testifies that the above annotated excerpt from Figure 6 “shows the claimed ‘receptacle that includes a receptacle housing having a second mating portion to mate with the first mating portion.’” *Id.*

Patent Owner makes no arguments specific to limitation [1e]. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses limitation [1e]. *See* Pet. 34–35; Ex. 1002 ¶¶ 87–88. Specifically, Jones discloses that a socket

includes “a recess for receiving said engageable portion of said plug.” Ex. 1007, 1:56–58; *see id.* at 4:19–21, Fig. 6; Ex. 1002 ¶ 87. A socket’s recess corresponds to “a second mating portion” according to limitation [1e]. *See* Ex. 1002 ¶¶ 87–88.

(f) Limitation [1f]

Claim 1 recites “a plurality of receptacle terminals mounted inside said receptacle housing.” Ex. 1001, 5:16–17.

Petitioner contends that Jones discloses limitation [1f] because a socket in Jones includes “terminals for contacting terminals of the plug.” Pet. 35 (citing Ex. 1002 ¶ 89; Ex. 1007, 1:61–62). Petitioner also contends that a socket’s terminals must reside inside a socket’s recess “to electrically couple with the plug terminals.” *Id.* (citing Ex. 1002 ¶ 89).

Patent Owner makes no arguments specific to limitation [1f]. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses limitation [1f]. *See* Pet. 35; Ex. 1002 ¶ 89. Specifically, Jones discloses that a socket includes “one or more terminals each for contacting one or more corresponding terminals on said plug.” Ex. 1007, 1:61–62; *see id.* at 4:24–29, Figs. 1–3; Ex. 1002 ¶ 89.

(g) Limitation [1g]

Claim 1 recites “said second mating portion being defined by a multi-sided second confining wall.” Ex. 1001, 5:17–20.

Petitioner contends that Jones discloses limitation [1g] because a socket in Jones includes a recess defined by “a first pair of opposed recess sidewalls” and “a second pair of opposed recess sidewalls disposed

transversely to said first pair of recess sidewalls.” Pet. 36 (quoting Ex. 1007, 1:58–61).

Patent Owner makes no arguments specific to limitation [1g]. *See* Resp. 16–28.

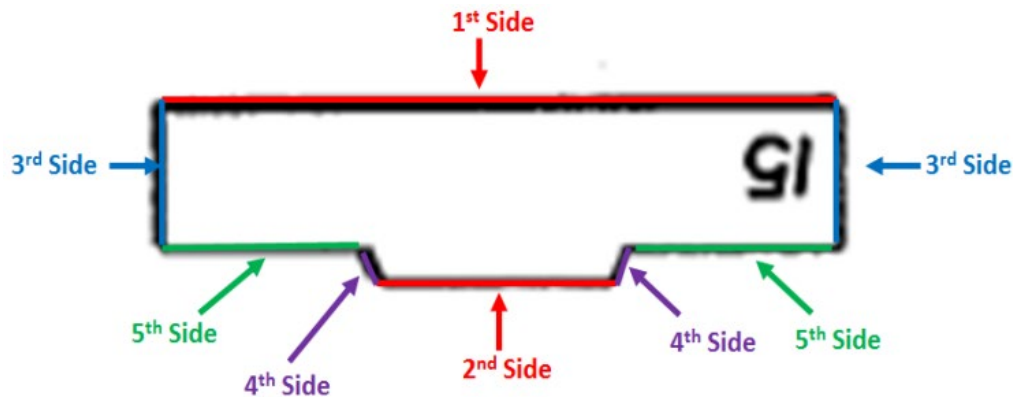
We agree with Petitioner that Jones discloses limitation [1g]. *See* Pet. 36; Ex. 1002 ¶ 90. Specifically, Jones discloses “a first pair of opposed recess sidewalls” and “a second pair of opposed recess sidewalls disposed transversely to said first pair of recess sidewalls” that define the recess in a socket. Ex. 1007, 1:58–61; *see id.* at 3:64–4:11, Figs. 1–3; Ex. 1002 ¶ 90. The “first pair of opposed recess sidewalls” and the “second pair of opposed recess sidewalls” form “a multi-sided second confining wall” according to limitation [1g] because the sidewalls collectively confine the socket terminals. Ex. 1007, 1:58–62; *see* Ex. 1002 ¶ 90.

(h) Limitation [1h]

Claim 1 recites “each of said first and second confining walls having opposite first and second sides, a pair of opposite third sides respectively connected to two opposite ends of said first side, a pair of fourth sides respectively connected to two opposite ends of said second side, and a pair of fifth sides each extending between and interconnecting one of said third sides and one of said fourth sides.” Ex. 1001, 5:21–28.

Petitioner contends that Jones discloses limitation [1h] because embodiment 15 in Figure 3 has “a cross-sectional shape for the engaging portion of a plug and the engaging portion or recess of a corresponding socket” that “comprises the claimed first through fifth sides.” Pet. 36–37 (citing Ex. 1002 ¶ 91; Ex. 1007, 4:6–8, 4:24–26, 4:47–51). To support

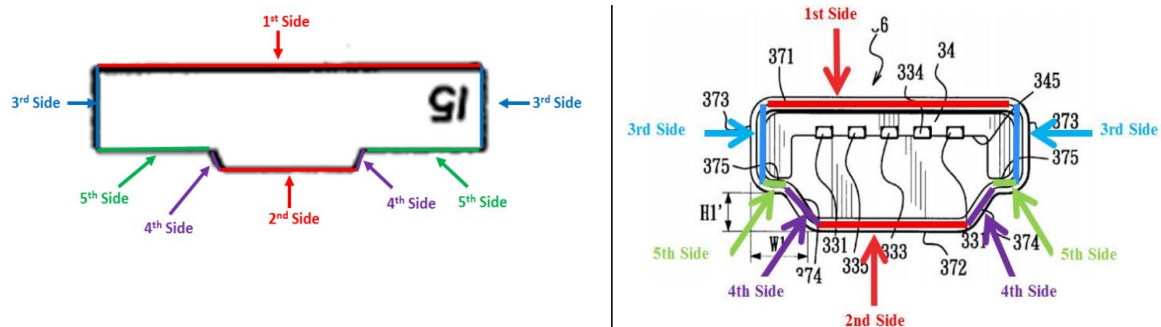
Petitioner's contention, Mr. Cady provides an annotated excerpt from Figure 3 depicting embodiment 15 as reproduced below (Ex. 1002 ¶ 91):



The above annotated excerpt from Figure 3 includes two red lines denoting the first and second sides of a plug or socket, two blue lines denoting the two third sides, two purple lines denoting the two fourth sides, and two green lines denoting the two fifth sides. *See* Ex. 1002 ¶ 91; *see id.* ¶ 68.

Mr. Cady testifies that the above annotated excerpt from Figure 3 “has been rotated to match the orientation” in ’678 patent Figure 10. Ex. 1002 ¶ 91; *see id.* ¶ 68. Mr. Cady also testifies that embodiment 15 in Figure 3 “comprises the claimed first through fifth sides.” *Id.* ¶ 91.

In addition, Petitioner provides an annotated side-by-side comparison of embodiment 15 in Figure 3 and ’678 patent Figure 10 as reproduced below (Pet. 37):



In the above side-by-side comparison, the image on the left shows part of Jones’s Figure 3, i.e., embodiment 15, with annotations denoting various sides. In the above side-by-side comparison, the image on the right shows ’678 patent Figure 10 with annotations denoting various sides. In each image, two red lines denote the first and second sides, two blue lines denote the two third sides, two purple lines denote the two fourth sides, and two green lines denote the two fifth sides. *See* Ex. 1002 ¶¶ 68, 91.

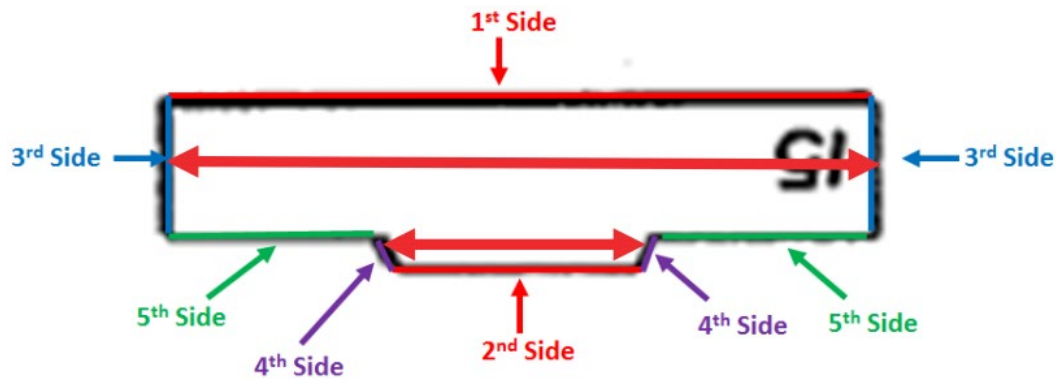
Patent Owner makes no arguments specific to limitation [1h]. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses limitation [1h]. *See* Pet. 36–37; Ex. 1002 ¶¶ 68, 91. As Mr. Cady testifies, embodiment 15 in Figure 3 “comprises the claimed first through fifth sides.” Ex. 1007, Fig. 3; *see id.* at 4:6–11, 4:33–39, 4:44–46, 5:12–20, Fig. 1; Ex. 1002 ¶¶ 68, 91.

(i) Limitation [1i]

Claim 1 recites “said first side being longer than said second side.” Ex. 1001, 5:28.

Petitioner contends that Jones discloses limitation [1i] because embodiment 15 in Figure 3 includes the limitation. Pet. 37 (citing Ex. 1002 ¶¶ 92–94; Ex. 1007, 4:6–8, 4:33–45, 5:7–20, Fig. 3). To support Petitioner’s contention, Mr. Cady testifies that “[i]t is readily apparent” from embodiment 15 in Figure 3 that the “first side is longer than the second side.” Ex. 1002 ¶ 92 (citing Ex. 1007, Fig. 3). Additionally, Mr. Cady provides an annotated excerpt from Figure 3 depicting embodiment 15 as reproduced below (Ex. 1002 ¶ 94):



The above annotated excerpt from Figure 3 includes two red lines denoting the first and second sides of a plug or socket, two blue lines denoting the two third sides, two purple lines denoting the two fourth sides, and two green lines denoting the two fifth sides. *See id.* ¶ 94. The above annotated excerpt from Figure 3 also includes a longer double-sided red arrow extending between the two third sides and having a length equal to the first side’s length and a shorter double-sided red arrow extending between the two fourth sides and having a length slightly longer than the second side’s length. *See id.*

Patent Owner makes no arguments specific to limitation [1i]. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses limitation [1i]. *See* Pet. 37; Ex. 1002 ¶ 92. Embodiment 15 in Figure 3 clearly shows “said first side being longer than said second side” according to limitation [1i]. Ex. 1007, Fig. 3; *see id.* at 5:12–20; Ex. 1002 ¶ 92.

(j) Limitation [1j]

Claim 1 recites “said first and second sides being longer than each of said third sides.” Ex. 1001, 5:29–30.

Petitioner contends that Jones discloses limitation [1j] because embodiment 15 in Figure 3 includes the limitation. Pet. 37 (citing Ex. 1002

¶¶ 92–94; Ex. 1007, 4:6–8, 4:33–45, 5:7–20, Fig. 3); *see* Reply 8–15. To support Petitioner’s contention, Mr. Cady testifies that “[i]t is readily apparent” from embodiment 15 in Figure 3 that the “first and second sides are longer than the third side.” Ex. 1002 ¶ 93 (citing Ex. 1007, Fig. 3).

Patent Owner disputes that embodiment 15 in Figure 3 includes limitation [1j] because embodiment 15 lacks a second side longer than each of the third sides. *See* Resp. 20–28, 35. Patent Owner concedes that “the second side appears to the eye to be longer than the third side.” *Id.* at 24 (citing Ex. 1007, Fig. 3). But Patent Owner contends that “[i]t is unclear from Figure 3 whether the ‘second side’ is longer than the ‘third sides’ as is required by the claims.” *Id.* at 21. Patent Owner also contends that “Figure 3 does not clearly show ‘said first and second sides being longer than each of said third sides.’” *Id.* at 25 (emphasis omitted).

Patent Owner quotes the following statement from *Hockerson-Halberstadt, Inc. v. Avia Group International, Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000): “[I]t is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.” Resp. 21. Patent Owner asserts that Jones “is entirely silent as to the lengths of the sides Petitioner points to as the 1st, 2nd, and 3rd sides” and “gives no indication that embodiment 15 is drawn to scale or that its sides have any particular length.” *Id.*; *see id.* at 23. Patent Owner also asserts that “Petitioner’s reliance on Jones is misplaced as the referenced figure is not drawn to scale, and ‘arguments based on drawings not explicitly made to scale in issued patents are unavailing’ as proof of invalidity based on prior

art.” *Id.* at 21 (emphasis omitted) (quoting *Nystrom v. TREX Co.*, 424 F.3d 1136, 1149 (Fed. Cir. 2005)).

Patent Owner contends that if patent drawings “do not evidence actual dimensions of the [claimed limitation] they cannot be relied upon to argue that the disputed terms should be limited to a particular structure.” Resp. 22 (alteration by Patent Owner) (quoting *Plantronics, Inc. v. Aliph, Inc.*, 724 F.3d 1343, 1351 (Fed. Cir. 2013)). Patent Owner also contends that a Federal Circuit predecessor “held that absent any written description in the specification of quantitative values, arguments based on measurement of a drawing are of little value.” *Id.* at 27 (citing *In re Chitayat*, 408 F.2d 475 (CCPA 1969)); *see id.* at 22 & n.9.

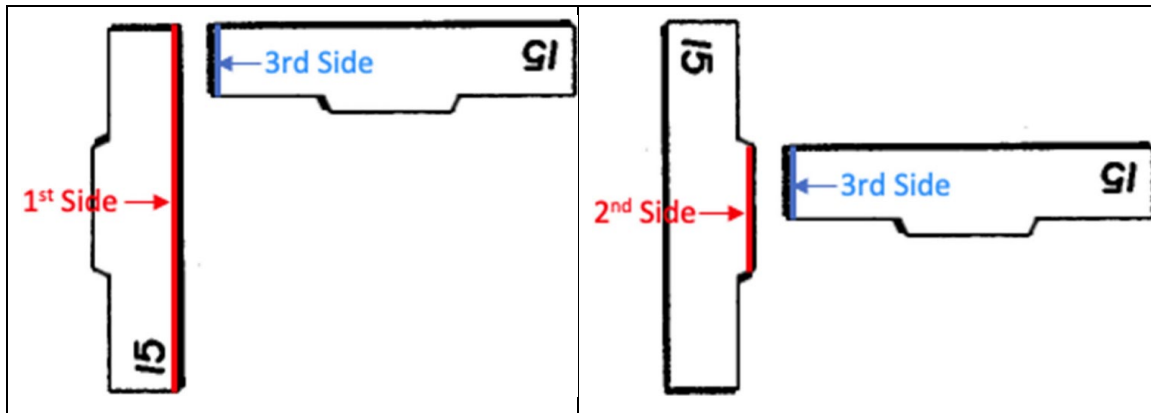
Patent Owner quotes Mr. Cady’s testimony that “[i]t is readily apparent” from embodiment 15 in Figure 3 that the “first and second sides are longer than the third side.” Resp. 26 (quoting Ex. 1002 ¶ 93). Patent Owner characterizes this testimony as “conclusory” and insufficient to “support a finding of invalidity.” *Id.* at 24 (citing *TQ Delta, LLC v. Cisco Sys., Inc.*, 942 F.3d 1352, 1358–59 (Fed. Cir. 2019)); *see id.* at 23, 35.

Inconsistent with its characterization of Mr. Cady’s testimony as “conclusory,” however, Patent Owner contends that Mr. Cady’s testimony rests on “quantitative measurements.” Resp. 26. Patent Owner also contends that “one must first measure the length of the sides” to “conclude whether one side is longer than another.” *Id.* at 26–27.

Petitioner responds by asserting that limitation [1j] requires only “relative dimensions” and that it “properly relied on the relative side lengths” in embodiment 15 in Figure 3. Reply 9 (emphasis omitted).

Petitioner further asserts that embodiment 15 has first and second sides that are longer than each of the third sides. *Id.*

To support its assertions, Petitioner provides two comparisons with annotated versions of embodiment 15 that compare relative side lengths as reproduced below (Reply 9):



The comparison above on the left shows two versions of embodiment 15 with one version of embodiment 15 rotated 90° counterclockwise from its orientation in Figure 3 and having a red line denoting the first side next to another version of embodiment 15 rotated 180° from its orientation in Figure 3 and having a blue line denoting a third side. *See* Reply 8–9. The comparison above on the right shows two versions of embodiment 15 with one version of embodiment 15 rotated 90° clockwise from its orientation in Figure 3 and having a red line denoting the second side next to another version of embodiment 15 rotated 180° from its orientation in Figure 3 and having a blue line denoting a third side. *See id.* In each comparison, the red and blue lines extend vertically and parallel to one another to indicate relative side lengths.

For the comparison above on the left, Petitioner contends that inspection of “the first sides [sic] to one of the third sides shows the first side (red) is clearly longer than the third side (blue).” Reply 8. For the

comparison above on the right, Petitioner contends that “the second side (red) is clearly longer than the third side (blue).” *Id.* at 9.

Further, Petitioner asserts that “it is long settled that ‘[d]escription for the purposes of anticipation can be by drawings alone as well as by words.’” Reply 10 (alteration by Petitioner) (emphasis omitted) (quoting *In re Bager*, 47 F.2d 951, 953 (CCPA 1931)).

We agree with Petitioner that Jones discloses limitation [1j]. *See* Pet. 37; Ex. 1002 ¶ 93. Embodiment 15 in Figure 3 clearly shows “said first and second sides being longer than each of said third sides” according to limitation [1j]. Ex. 1007, Fig. 3; *see id.* at 5:12–20; Ex. 1002 ¶ 93.

A patentability analysis should consider what the drawings in a reference “reasonably disclose and suggest to one skilled in the art.” *In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979). More particularly, a patent drawing may serve as prior art “without referring to the surrounding description” if “the prior art features are clearly disclosed by the drawing.” *PlaSmart, Inc. v. Kappos*, 482 F. App’x 568, 572–73 (Fed. Cir. 2012) (citing *In re Mraz*, 455 F.2d 1069, 1072 (CCPA 1972); *In re Seid*, 161 F.2d 229, 231 (CCPA 1947); *In re Wagner*, 63 F.2d 987, 988 (CCPA 1933)).

As an example, the court in *Mraz* affirmed an unpatentability determination based on a feature disclosed by a patent drawing. *See Mraz*, 455 F.2d at 1069, 1072–73. There, the claims required “inclined surfaces” at an angle “not exceeding 15°.” *Id.* at 1070. A drawing in the principal reference depicted a “V-shaped groove” that “measure[d] about 6° on [the] drawing.” *Id.* at 1071. But the specification said “nothing about the angle.” *Id.*

In affirming the unpatentability determination, the court reasoned that the drawing showed “the grooves thereon to have an angularity well within the range recited in” the claims. *Mraz*, 455 F.2d at 1072. In affirming the unpatentability determination, the court did not require evidence that the drawing used the same scale horizontally and vertically. *Id.* at 1072–73. Also, the court explained that when it previously said that “[p]atent drawings are not working drawings,” it “did not mean that things patent drawings show clearly are to be *disregarded*.” *Id.* (emphasis by the court).

As another example, the Federal Circuit in *Krippelz v. Ford Motor Co.*, 667 F.3d 1261, 1265, 1270 (Fed. Cir. 2012), reversed a district court’s novelty determination after analyzing the drawings in an allegedly anticipatory patent. In *Krippelz*, the patentee disputed that the allegedly anticipatory patent disclosed two claim limitations, namely, a “conical beam of light” and a lamp located “adjacent” to a side window. *Id.* at 1264, 1268–69. The Federal Circuit recognized that it “has repeatedly cautioned against overreliance on drawings that are neither expressly to scale nor linked to quantitative values in the specification.” *Id.* at 1268.

For a “conical beam of light,” however, the Federal Circuit determined that “many figures in [the patent] depict triangles of light extending from various lamps to the surface of the ground,” thus “disclos[ing] the required ‘conical beam of light.’” *Krippelz*, 667 F.3d at 1268–69. Further, for a lamp located “adjacent” to a side window, the Federal Circuit determined that two figures in the patent “plainly show such a lamp.” *Id.* at 1269. The Federal Circuit rejected the patentee’s argument that the figures did not “clearly” show a lamp located “adjacent” to a side window because “a person of ordinary skill, reviewing these figures, would

understand them to show mounting the lamp adjacent to the side window.” *Id.* (emphasis omitted). In rejecting the patentee’s argument, the Federal Circuit did not require evidence that the figures used the same scale horizontally and vertically. *Id.* at 1268–69.

In *Krippelz*, the Federal Circuit’s use of a patent drawing to determine the relative location of a lamp and a side window parallels Mr. Cady’s use of a patent drawing to determine the relative lengths of first, second, and third sides. A person of ordinary skill, reviewing Jones’s Figure 3, i.e., embodiment 15 in the figure, would understand the figure to show first and second sides that are longer than each of the third sides. *See* Ex. 1002 ¶ 93; Ex. 1007, 5:7–16, Fig. 3.

The facts in the cases that Patent Owner cites differ markedly from the facts here. For instance, in *Nystrom* the claims covered a “decking board for use in constructing a flooring surface” having a “convex top surface” defining a “difference in thickness” between a longitudinal centerline and opposite side edges “with the ratio of said difference in thickness to the width of the board being about 1:40.” *Nystrom*, 424 F.3d at 1140, 1148. An allegedly anticipatory patent included perspective drawings of several boards. *Id.* at 1148. An employee of the patent challenger “made a software model of the boards depicted in the perspective drawings” and “then performed computations on the modeled boards to come up with” the claimed ratio of about 1:40. *Id.*; *see id.* at 1149.

The Federal Circuit criticized the district court’s acceptance of invalidity arguments based on a software model rather than “drawing dimensions” or “a written disclosure of dimensions contained directly in the patent itself.” *Nystrom*, 424 F.3d at 1149. In doing so, the court said,

“Under the principles set forth in our prior cases, the speculative modeling premised on unstated assumptions in prior art patent drawings cannot be the basis for challenging the validity of claims reciting specific dimensions not disclosed directly in such prior art.” *Id.*

In contrast to the patent challenger in *Nystrom*, Petitioner relies on “drawing dimensions,” i.e., different relative lengths, shown clearly in an allegedly anticipatory patent. *See* Pet. 37–38; Ex. 1002 ¶ 93; Ex. 1007, Fig. 3.

In *Chitayat*, the disputed claim limitation required “said image to be displaced by at least one hundred fibre diameters.” *Chitayat*, 408 F.2d at 476. To support an obviousness rejection, the PTO relied on measurements made “from the drawings of [the primary reference] of the relative dimensions of the fibers and image displacement, and then by process of arithmetic deduce[d] that [the primary reference] shows a relative image displacement of 45 fiber diameters.” *Id.* at 477. In deeming the measurements to have little probative value, the court said, “In view of the absence in [the primary reference’s] specification of any written description of the quantitative value of the image displacement relative to fiber diameter, the arguments based on mere measurement of the drawings appear to us of little value.” *Id.*

In contrast to the PTO in *Chitayat*, Petitioner does not rely on measurements made from a patent drawing and analyzed by process of arithmetic. *See* Pet. 37–38; Reply 8–9, 15; Ex. 1002 ¶ 93.

In *Hockerson-Halberstadt*, the claim covered an “article of outer footwear” with a “central longitudinal groove” in the underside of the heel part that formed a “pair of fins” in the heel part. *Hockerson-Halberstadt*,

222 F.3d at 953. The district court construed “central longitudinal groove” as requiring a groove width “less than the combined width of the fins.” *Id.* at 954. On appeal, the patentee argued that the district court wrongly construed “central longitudinal groove” because the patent in suit “contain[ed] figures depicting a groove that is wider than the fins.” *Id.* at 956.

The Federal Circuit rejected the patentee’s claim-construction argument because it “hinge[d] on an inference drawn from certain figures about the quantitative relationship between the respective widths of the groove and fins.” *Hockerson-Halberstadt*, 222 F.3d at 956. In doing so, the court said, “Under our precedent, . . . it is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.” *Id.*

In contrast to the patentee in *Hockerson-Halberstadt*, Petitioner does not rely on quantitative measurements from Jones’s Figure 3 to show particular sizes. *See* Pet. 37–38; Reply 8–9, 15; Ex. 1002 ¶ 93. For instance, Mr. Cady does not state that he used a measuring instrument, e.g., a ruler, to measure the various sides in embodiment 15, and the first side has a length of X millimeters, the second side has a length of Y millimeters, and each third side has a length of Z millimeters. *See, e.g.*, Ex. 1002 ¶ 93. For this reason, we disagree with Patent Owner’s contention that Mr. Cady’s testimony rests on “quantitative measurements.” *See* Resp. 26.

Like *Hockerson-Halberstadt*, *Plantronics* involved claim construction, not whether a patent drawing depicted a claim limitation for purposes of anticipation or obviousness. *See Plantronics*, 724 F.3d at

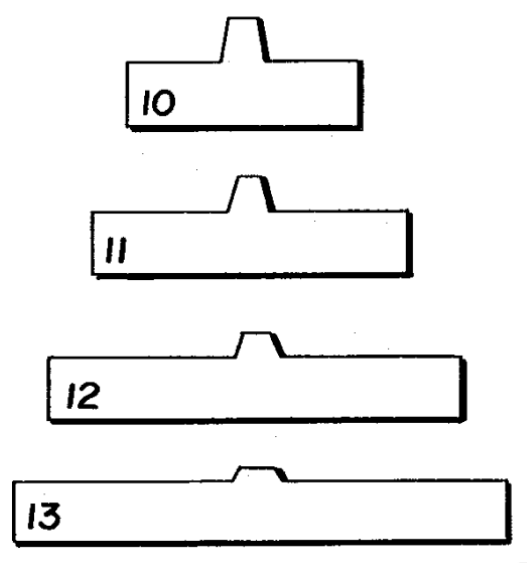
1348–53. In *Plantronics*, the district court construed the claim terms “stabilizer support” and “concha stabilizer” as requiring “elongated” structures and “clarified the meaning of ‘elongated’ as ‘longer than it is wide.’” *Id.* at 1349. On appeal, the patentee argued that the district court’s claim construction “improperly imported a limitation to the claims from the specification.” *Id.*

The Federal Circuit reversed the district court’s claim construction. *Plantronics*, 724 F.3d at 1352–53. In doing so, the Federal Circuit analyzed the claim language, the patent’s specification (including the drawings), and the patent’s prosecution history. *Id.* at 1349–51. Regarding the drawings, the Federal Circuit said, “Because the figures in [the patent] do not evidence actual dimensions of the ‘stabilizer support’ and the ‘concha stabilizer,’ they cannot be relied upon to argue that the disputed terms should be limited to a particular structure.” *Id.* at 1351.

Although Jones does not disclose actual dimensions for the plugs or sockets in Figure 3, Jones discloses relative dimensions and relies on relative dimensions to illustrate the invention. *See* Ex. 1007, 4:6–11, 5:7–20, Fig. 3. Referencing Figure 3, Jones explains that “a series of plugs are shown all having the same height h_p ” and that “narrower plugs can be prevented from insertion into wider sockets by the width W_k of the keyway being increased as the plug width W_p decreases.” *Id.* at 5:7–8, 5:12–15, code (57). For the Figure 3 embodiments, Jones varies dimensions horizontally and vertically to illustrate the invention. *See id.* at 4:6–11, 5:7–20, Fig. 3.

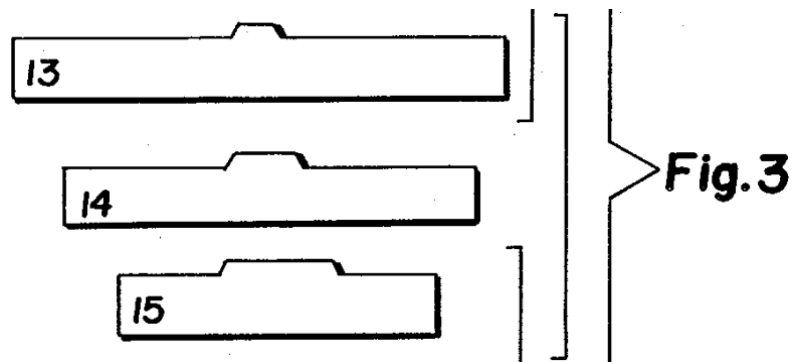
In particular, Jones describes embodiments 10, 11, 12, and 13 as exemplifying a series of plugs where the keyway height h_k increases as the

plug width W_p decreases. Ex. 1007, 5:8–12. The excerpt from Jones's Figure 3 reproduced below depicts embodiments 10, 11, 12, and 13:



The above excerpt from Figure 3 shows embodiments 10, 11, 12, and 13 having the same height h_p for each of the third sides. *See id.* at 5:7–8, Fig. 3. The above excerpt from Figure 3 also shows (1) embodiment 10 having a taller keyway than embodiment 11, (2) embodiment 10 having a shorter first side than embodiment 11, (3) embodiment 11 having a taller keyway than embodiment 12, (4) embodiment 11 having a shorter first side than embodiment 12, (5) embodiment 12 having a taller keyway than embodiment 13, and (6) embodiment 12 having a shorter first side than embodiment 13. *See id.* at 5:8–12, Fig. 3.

In addition, Jones describes embodiments 13, 14, and 15 as exemplifying a series of plugs where the keyway width W_k increases as the plug width W_p decreases. Ex. 1007, 5:12–16. The excerpt from Jones's Figure 3 reproduced below depicts embodiments 13, 14, and 15:



The above excerpt from Figure 3 shows embodiments 13, 14, and 15 having the same height h_p for each of the third sides. *See id.* at 5:7–8, Fig. 3. The above excerpt from Figure 3 also shows (1) embodiment 13 having a longer first side than embodiment 14, (2) embodiment 13 having a shorter second side than embodiment 14, (3) embodiment 14 having a longer first side than embodiment 15, and (4) embodiment 14 having a shorter second side than embodiment 15. *See id.* at 5:12–16, Fig. 3.

Thus, Jones varies dimensions horizontally and vertically in Figure 3 to illustrate the invention. *See Ex. 1007*, 4:6–11, 5:7–20, Fig. 3. Because Jones varies dimensions horizontally and vertically in Figure 3 to illustrate the invention, Jones has no reason to use different scales horizontally and vertically in Figure 3. Indeed, using different scales horizontally and vertically would distort the invention.

Under these circumstances, we see nothing improper in relying on Jones’s relative horizontal and vertical dimensions for embodiment 15 to find that embodiment 15 has first and second sides that are longer than each of the third sides according to limitation [1j]. *See Ex. 1002* ¶ 93; *Ex. 1007*, 5:7–16, Fig. 3.

As for Patent Owner’s contention that “one must first measure the length of the sides” to “conclude whether one side is longer than another,”

we disagree. *See* Resp. 26–27. As an example, no measurement is needed to determine that embodiment 15 has a first side longer than a second side according to limitation [1i]. *See* Ex. 1007, Fig. 3. Patent Owner does not contend otherwise. *See* Resp. 16–28. As another example, no measurement is needed to determine that embodiment 15 has a first side longer than each of the third sides according to limitation [1j]. *See* Ex. 1007, Fig. 3. Patent Owner does not contend otherwise. *See* Resp. 16–28. More broadly, Patent Owner does not dispute that embodiment 15 clearly has the features required by limitations [1h], [1i], [1k], [1m], [1n], and [1o].³ *See id.* at 16–28.

As for Patent Owner’s characterization of Mr. Cady’s testimony as “conclusory,” we disagree. *See* Resp. 24. Mr. Cady’s testimony rests on, among other things, his review of the ’678 patent, its prosecution history, other expert testimony, and Jones, including embodiment 15 in Figure 3. Ex. 1002 ¶¶ 5, 26–27, 33–34, 45, 49–57, 63–68, 91–95. Moreover, Mr. Cady’s testimony comports with other expert testimony about the unpatentability of claim 1. *See id.* ¶ 5; *TTE Tech., Inc. v. Interface Linx, LLC*, IPR2018-01036, Ex. 1002 ¶ 90. Patent Owner offers no testimony rebutting Mr. Cady’s testimony and identifies no evidence undermining his testimony. *See, e.g.*, Resp. 16–28.

Although Mr. Cady does not provide a detailed explanation about how Figure 3 shows limitation [1j], no need exists for a detailed explanation about a clearly shown feature. *See* Ex. 1002 ¶ 93; Ex. 1007, Fig. 3; *Krippelz*, 667 F.3d at 1269. Further, Mr. Cady provides annotated excerpts from Figure 3 depicting embodiment 15 and identifying various features in

³ Similarly, the dissent does not dispute that embodiment 15 clearly has the features required by limitations [1h], [1i], [1k], [1m], [1n], and [1o].

embodiment 15. Ex. 1002 ¶¶ 68, 91–95; *see* Ex. 1007, Fig. 3. According to an old adage, “a picture is worth a thousand words.” Also, as Mr. Cady explains, “the subject matter of the claims is straightforward, with many of the elements lending themselves to visual analyses and comparisons.” *See* Ex. 1002 ¶ 5.

(k) Limitation [1k]

Claim 1 recites “the width between said third sides being greater than that between said fourth sides.” Ex. 1001, 5:30–31.

Petitioner contends that Jones discloses limitation [1k] because embodiment 15 in Figure 3 includes the limitation. Pet. 37 (citing Ex. 1002 ¶¶ 92–94; Ex. 1007, 4:6–8, 4:33–45, 5:7–20, Fig. 3). To support Petitioner’s contention, Mr. Cady testifies that “[i]t is readily apparent” from embodiment 15 in Figure 3 that the “width between the third sides” is “greater than the width between the fourth sides.” Ex. 1002 ¶ 94 (citing Ex. 1007, Fig. 3).

Patent Owner makes no arguments specific to limitation [1k]. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses limitation [1k]. *See* Pet. 37; Ex. 1002 ¶ 94. Embodiment 15 in Figure 3 clearly shows “the width between said third sides being greater than that between said fourth sides” according to limitation [1k]. Ex. 1007, Fig. 3; *see id.* at 5:12–20; Ex. 1002 ¶ 94.

(l) Limitation [1l]

Claim 1 recites “said fifth sides being angled away from each other while extending from said fourth sides to said third sides.” Ex. 1001, 5:31–33.

Petitioner contends that Jones discloses limitation [11] because embodiment 15 in Figure 3 includes the limitation. Pet. 38 (citing Ex. 1002 ¶ 95; Ex. 1007, 4:6–8, 4:33–45, 5:7–20, Fig. 3); *see* Reply 7–8. To support Petitioner’s contention, Mr. Cady testifies that “the fifth sides extend or point away from each other” in embodiment 15 in Figure 3 “while ‘extending from said fourth sides to said third sides,’ in the same manner as claimed.” Ex. 1002 ¶ 95.

Patent Owner disputes that embodiment 15 in Figure 3 includes limitation [11]. *See* Resp. 18–19. In particular, Patent Owner argues that in embodiment 15 “the alleged fifth sides are not angled whatsoever (i.e., Jones discloses an invention in which the fifth sides are in the same plane).” *Id.* at 18 (emphasis omitted).

We agree with Petitioner that Jones discloses limitation [11]. *See* Pet. 38; Reply 7–8; Ex. 1002 ¶ 95. As Mr. Cady testifies, embodiment 15 in Figure 3 includes “fifth sides extend[ing] or point[ing] away from each other while ‘extending from said fourth sides to said third sides’” according to limitation [11]. Ex. 1007, Fig. 3; *see id.* at 5:12–20; Ex. 1002 ¶ 95.

Patent Owner’s argument that embodiment 15 in Figure 3 lacks limitation [11] rests on an incorrect construction of “being angled away from each other.” *See* Resp. 18–19. As discussed above, we construe “being angled away from each other” to mean “extending away from each other” and encompass “angled at 180 degrees,” i.e., pointing in opposite directions. *See supra* § III.D.2. Under that construction, embodiment 15 in Figure 3 includes limitation [11]. Ex. 1007, Fig. 3; *see id.* at 5:12–20; Ex. 1002 ¶ 95.

(m) Limitation [1m]

Claim 1 recites “wherein said first and second sides are substantially parallel.” Ex. 1001, 6:1–2.

Petitioner contends that Jones discloses limitation [1m] because embodiment 15 in Figure 3 includes the limitation. Pet. 38 (citing Ex. 1002 ¶ 96). To support Petitioner’s contention, Mr. Cady testifies that “[i]t is readily apparent” from embodiment 15 in Figure 3 that the “first and second sides are substantially parallel.” Ex. 1002 ¶ 96 (citing Ex. 1007, Fig. 3). Mr. Cady also testifies that Jones confirms this arrangement by disclosing that:

- (1) Figure 3 “shows a series of plugs or sockets . . . viewed in the same [end-on view] manner as in FIG. 1”;
- (2) with reference to Figure 1 (and therefore, Figure 3), the first pair of sidewalls (i.e., the vertical sidewalls) “are separated by a width W_p ” and the second pair of sidewalls (i.e., the horizontal sidewalls) are “separated by a height h_p and disposed transversely, in this instance orthogonally, to the first pair of sidewalls”;
- (3) the “sidewalls . . . are shown as flat surfaces”; and
- (4) “the key or keyway is shown as being trapezoidal.”

Ex. 1002 ¶ 96 (alterations in original) (quoting Ex. 1007, 4:6–8, 4:33–39, 4:44–45) (footnote omitted); *see* Pet. 38–39.

Patent Owner makes no arguments specific to limitation [1m]. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses limitation [1m]. *See* Pet. 38–39; Ex. 1002 ¶ 96. Embodiment 15 in Figure 3 clearly shows “said first and second sides are substantially parallel” according to limitation [1m].

Ex. 1007, Fig. 3; *see id.* at 4:6–11, 4:33–39, 4:44–46, 5:12–20, Fig. 1;
Ex. 1002 ¶ 96.

(n) Limitation [1n]

Claim 1 recites “said third sides are substantially perpendicular to said first side.” Ex. 1001, 6:2–3.

Petitioner contends that Jones discloses limitation [1n] because embodiment 15 in Figure 3 includes the limitation. Pet. 39 (citing Ex. 1002 ¶ 97). To support Petitioner’s contention, Mr. Cady testifies that “[i]t is readily apparent” from embodiment 15 in Figure 3 that the “third sides are substantially perpendicular to the first side.” Ex. 1002 ¶ 97 (citing Ex. 1007, Fig. 3). Mr. Cady also testifies that Jones confirms this arrangement by disclosing that:

- (1) Figure 3 “shows a series of plugs or sockets . . . viewed in the same [end-on view] manner as in FIG. 1”;
- (2) with reference to Figure 1 (and therefore, Figure 3), the first pair of sidewalls (i.e., the vertical sidewalls) “are separated by a width W_p ” and the second pair of sidewalls (i.e., the horizontal sidewalls) are “separated by a height h_p and disposed transversely, in this instance orthogonally, to the first pair of sidewalls”; and
- (3) the “sidewalls . . . are shown as flat surfaces.”

Ex. 1002 ¶ 97 (alterations in original) (quoting Ex. 1007, 4:6–8, 4:33–39) (footnote omitted); *see* Pet. 39.

Patent Owner makes no arguments specific to limitation [1n]. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses limitation [1n]. *See* Pet. 39; Ex. 1002 ¶ 97. Embodiment 15 in Figure 3 clearly shows “said third sides are substantially perpendicular to said first side” according to

limitation [1n]. Ex. 1007, Fig. 3; *see id.* at 4:6–11, 4:33–39, 5:12–20, Fig. 1; Ex. 1002 ¶ 97.

(o) Limitation [1o]

Claim 1 recites “said fourth sides extend obliquely from said second side.” Ex. 1001, 6:4–5.

Petitioner contends that Jones discloses limitation [1o] because embodiment 15 in Figure 3 includes the limitation. Pet. 40 (citing Ex. 1002 ¶ 98). Petitioner also contends that Jones explains that “the ‘key’ and ‘keyway’ on the plug and socket are preferably ‘trapezoidal’ in shape.” *Id.* (citing Ex. 1002 ¶ 98; Ex. 1007, 4:44–47). According to Petitioner, a trapezoidal arrangement “necessarily results in the fourth sides extending obliquely from the second side.” *Id.* To support Petitioner’s contentions, Mr. Cady testifies that “[i]t is readily apparent” from embodiment 15 in Figure 3 that the “fourth sides extend obliquely from the second side.” Ex. 1002 ¶ 98 (citing Ex. 1007, Fig. 3).

Patent Owner makes no arguments specific to limitation [1o]. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses limitation [1o]. *See* Pet. 40; Ex. 1002 ¶ 98. Embodiment 15 in Figure 3 clearly shows “said fourth sides extend obliquely from said second side” according to limitation [1o]. Ex. 1007, Fig. 3; *see id.* at 4:44–47, 5:12–20, Fig. 1; Ex. 1002 ¶ 98.

(p) Summary for Claim 1

For the reasons discussed above, Jones discloses every element of claim 1 arranged as required by the claim. *See supra* §§ III.E.2(a)–(o).

Hence, Petitioner has shown by a preponderance of the evidence that claim 1 is unpatentable under § 102(b) as anticipated by Jones.

3. DEPENDENT CLAIM 2

Claim 2 depends from claim 1 and requires that “said fifth sides are respectively and substantially perpendicular to said third sides.” Ex. 1001, 6:6–8.

Petitioner contends that Jones discloses claim 2’s limitation because embodiment 15 in Figure 3 includes the limitation. Pet. 40 (citing Ex. 1002 ¶¶ 99–100; Ex. 1007, Fig. 3). To support Petitioner’s contention, Mr. Cady testifies that “[i]t is readily apparent” from embodiment 15 in Figure 3 that the “fifth sides are respectively and substantially perpendicular to the third sides” according to claim 2. Ex. 1002 ¶ 100 (citing Ex. 1007, Fig. 3).

Mr. Cady also testifies that Jones confirms this arrangement by disclosing that:

- (1) Figure 3 “shows a series of plugs or sockets . . . viewed in the same [end-on view] manner as in FIG. 1”;
- (2) with reference to Figure 1 (and therefore, Figure 3), the first pair of sidewalls (i.e., the vertical sidewalls) “are separated by a width W_p ” and the second pair of sidewalls (i.e., the horizontal sidewalls) are “separated by a height h_p and disposed transversely, in this instance orthogonally, to the first pair of sidewalls”; and
- (3) the “sidewalls are shown as flat surfaces.”

Ex. 1002 ¶ 100 (alterations in original) (quoting Ex. 1007, 4:6–8, 4:33–39) (footnote omitted); *see* Pet. 40.

Patent Owner makes no arguments specific to claim 2. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses claim 2's limitation. *See* Pet. 40; Ex. 1002 ¶¶ 99–100. Embodiment 15 in Figure 3 clearly shows “said fifth sides are respectively and substantially perpendicular to said third sides” according to claim 2. Ex. 1007, Fig. 3; *see id.* at 4:6–11, 4:33–39, 5:12–20, Fig. 1; Ex. 1002 ¶ 100. Hence, Petitioner has shown by a preponderance of the evidence that claim 2 is unpatentable under § 102(b) as anticipated by Jones.

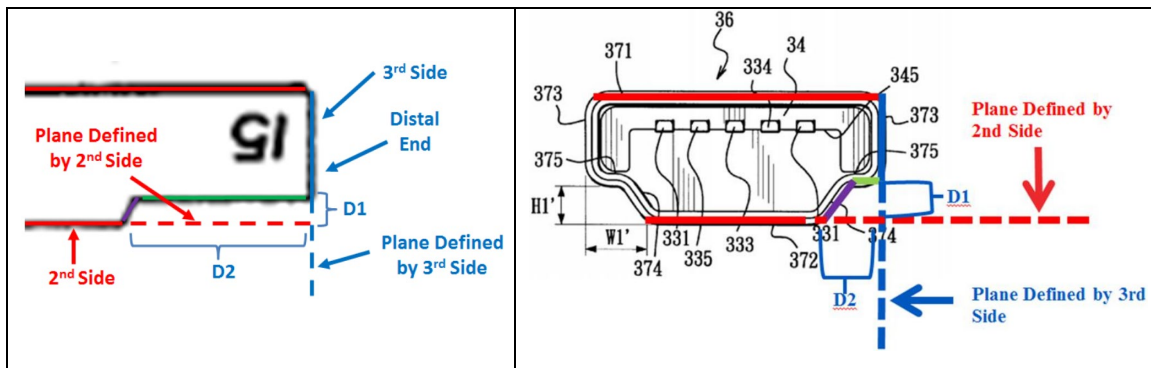
4. DEPENDENT CLAIM 3

Claim 3 reads as follows (with formatting added for clarity):

3. The electrical connector assembly of claim 2,
wherein each of said third sides has two opposite ends,
the shortest distance from one of said opposite ends of
said third side, that is distal from said first side, to a plane
defined by said second side being smaller than that from one of
said opposite ends of said second side, that is adjacent to said
one of said opposite ends of said third side, to a plane defined
by said third side.

Ex. 1001, 6:9–17. Claim 3 covers the preferred embodiment depicted in '678 patent Figures 9 and 10. *See* Ex. 1001, 4:19–28, 6:9–17, Figs. 9–10; Ex. 1002 ¶ 55.

Petitioner contends that Jones discloses claim 3's limitations because embodiment 15 in Figure 3 includes the limitations. Pet. 41–42 (citing Ex. 1002 ¶ 102). To support its contention, Petitioner provides an annotated side-by-side comparison of embodiment 15 in Figure 3 and '678 patent Figure 10 as reproduced below (Pet. 42):



In the above side-by-side comparison, the image on the left shows part of Jones’s Figure 3, i.e., part of embodiment 15, with annotations denoting planes defined by sides and distances between side ends and planes. In the above side-by-side comparison, the image on the right shows ’678 patent Figure 10 with annotations denoting planes defined by sides and distances between side ends and planes. In each image, a red dashed line denotes the plane defined by the second side, a blue dashed line denotes a plane defined by a third side, the annotation D1 denotes the distance between an end of a third side and the plane defined by the second side, and the annotation D2 denotes the distance between an end of the second side and a plane defined by a third side. *See* Pet. 41–42; Ex. 1002 ¶¶ 55, 102.

For the image on the left in the above side-by-side comparison, i.e., part of embodiment 15 in Figure 3, Mr. Cady testifies as follows about the distances D1 and D2:

- (1) distance D1 “represents the distance between ‘one of said opposite ends of said third side, that is distal from said first side, to a plane defined by the second side’”; and
- (2) distance D2 “represents the distance between ‘one of said opposite ends of said second side, that is adjacent to said one of said opposite ends of said third side, to a plane defined by said third side.’”

Ex. 1002 ¶ 102 (quoting Ex. 1001, 6:11–17 (claim 3)). Mr. Cady also testifies that “[i]t is readily apparent that distance D1 is smaller than distance D2” in embodiment 15 in Figure 3. *Id.*

Patent Owner makes no arguments specific to claim 3. *See* Resp. 16–28.

We agree with Petitioner that Jones discloses claim 3’s limitations. *See* Pet. 41–42; Ex. 1002 ¶¶ 101–102. Embodiment 15 in Figure 3 clearly shows “each of said third sides has two opposite ends” and the distance relationship that claim 3 requires. Ex. 1007, Fig. 3; *see id.* at 4:6–11, 4:33–39, 4:44–45, 5:12–20, Fig. 1; Ex. 1002 ¶ 102. Hence, Petitioner has shown by a preponderance of the evidence that claim 3 is unpatentable under § 102(b) as anticipated by Jones.

F. Alleged Obviousness over Jones: Claims 1–3

Petitioner contends that claims 1–3 are unpatentable under § 103(a) as obvious over Jones. *See* Pet. 8, 42–45.

An obviousness analysis assumes that differences exist between the claimed invention and the prior art. *See Graham*, 383 U.S. at 17. As explained above, however, Petitioner has shown by a preponderance of the evidence that claims 1–3 are unpatentable under § 102(b) as anticipated by Jones. *See supra* §§ III.E.2–III.E.4. Absent differences, an obviousness analysis appears misplaced.⁴ Hence, we do not reach this challenge to patentability.

⁴ Moreover, “it is commonly understood that prior art references that anticipate a claim will usually render that claim obvious.” *Cohesive Techs., Inc. v. Waters Corp.*, 543 F.3d 1351, 1364 (Fed. Cir. 2008).

G. Alleged Obviousness over Nishio and Jones: Claims 1–3

Petitioner contends that claims 1–3 are unpatentable under § 103(a) as obvious over Nishio and Jones. *See* Pet. 8, 45–62. Above, we provided an overview of Jones. *See supra* § III.E.1. Below, we provide an overview of Nishio, and then we consider the obviousness issues raised by the parties. As explained below, Patent Owner disputes that the combined disclosures in Nishio and Jones teach one limitation in claim 1, i.e., limitation [1j]. *See* Resp. 28–36. As also explained below, we agree with Petitioner that claims 1–3 are unpatentable under § 103(a) as obvious over Nishio and Jones.

1. OVERVIEW OF NISHIO (EXHIBIT 1010)

Nishio is a U.S. patent titled “Electrical Connector,” filed on January 26, 2000, and issued on November 27, 2001. Ex. 1010, codes (22), (45), (54). Nishio states that the invention “relates to a miniature electrical connector used for connecting electronic devices such as personal computers.” *Id.* at 1:5–7.

Nishio's Figure 1 is reproduced below:

Fig. 1

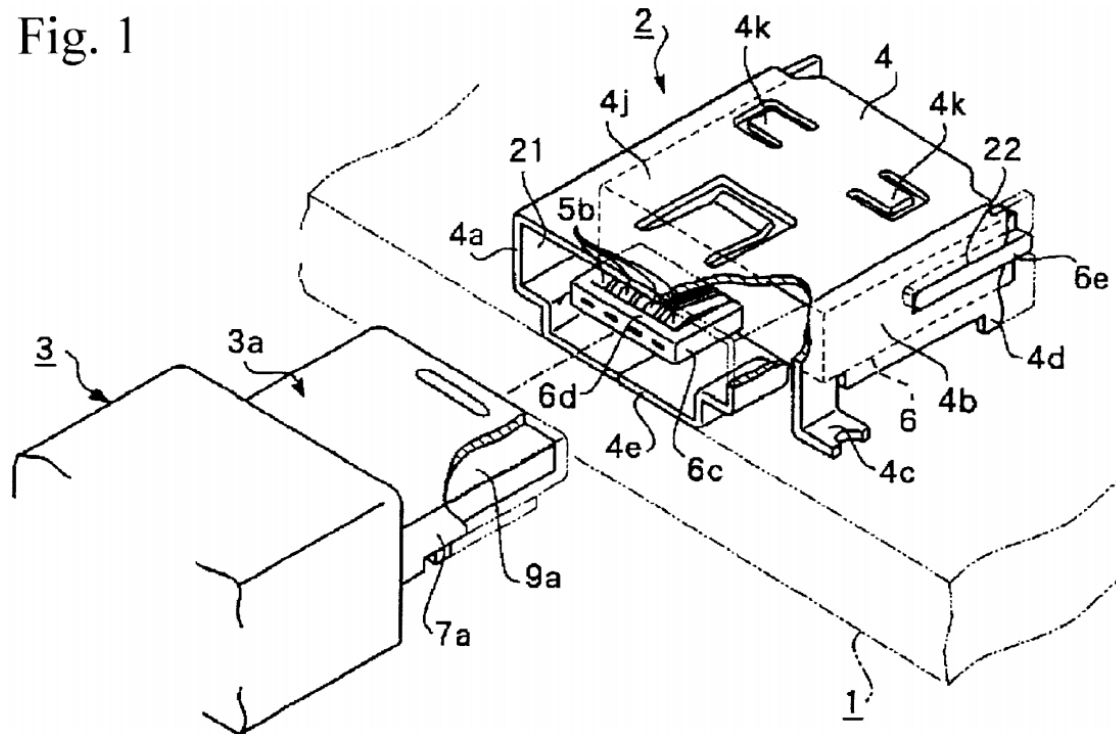


Figure 1 is “an exploded perspective drawing of an electrical connector” with “a section cut away.” Ex. 1010, 2:52–54, Fig. 1. The electrical connector includes a connector socket and a connector plug that is “removably inserted” into the connector socket. *Id.* at 1:62–63, code (57), Fig. 1.

Figure 1 shows printed-circuit substrate 1 supporting connector socket 2. Ex. 1010, 2:66–3:1, 4:63–65, Fig. 1. Connector socket 2 includes shield case 4 defining insertion opening 21. *Id.* at 3:4–6, Fig. 1. Connector socket 2 also includes insulative housing 6 supporting metal contact pins 5. *Id.* at 3:46–50, 4:11–17, Fig. 3.

Figure 1 also shows connector plug 3. Ex. 1010, 3:1–3, Fig. 1. Connector plug 3 includes plug 3a and shield case 7. *Id.* at 3:1–3, 4:31–33, Fig. 2. Shield case 7 includes plug shield 7a positioned inside plug 3a and

cord shield 7b “formed integrally” with plug shield 7a. *Id.* at 4:33–35, 4:54–56, Fig. 2. Plug shield 7a “has an outer dimension that corresponds to the inner dimension of shield case 4” in connector socket 2. *Id.* at 4:35–37, Figs. 1–2. Plug 3a “fits within insertion opening 21” in connector socket 2. *Id.* at 4:37, Figs. 1–2; *see id.* at 3:1–3. Connector plug 3 also includes insulative housing 9 supporting metal contactors 10. *Id.* at 4:38–40, Fig. 2.

“Contactors 10 and contact pins 5 are aligned with each other.” Ex. 1010, 4:41. “Thus, when plug 3a of connector plug 3 is fitted into insertion opening 21, . . . contact ends 10a of contactors 10 come into contact with corresponding contact ends 5b of contact pins 5.” *Id.* at 4:46–53, Figs. 2–3.

2. INDEPENDENT CLAIM 1

(a) Preamble [1a]

Claim 1’s preamble recites “[a]n electrical connector assembly.” Ex. 1001, 5:9.

Petitioner contends that Nishio discloses claim 1’s preamble because Nishio discloses “an electrical connector comprising a connector socket 2 and a connector plug 3.” Pet. 46 (citing Ex. 1002 ¶ 117; Ex. 1010, 2:51–53, 2:66–3:3, Fig. 1).

Patent Owner makes no arguments specific to claim 1’s preamble. *See* Resp. 28–36.

Generally, a preamble does not limit a claim. *Allen Eng’g*, 299 F.3d at 1346. Here, we need not decide whether claim 1’s preamble limits the claim because we agree with Petitioner that Nishio discloses the preamble. *See* Pet. 46; Ex. 1002 ¶ 117. As Petitioner contends, Nishio discloses an

electrical connector comprising connector socket 2 and connector plug 3.
Ex. 1010, 2:51–56, 2:66–3:3, Figs. 1–2; *see* Ex. 1002 ¶ 117; Pet. 46.

(b) Limitation [1b]

Claim 1 recites “a plug that includes a plug housing having a first mating portion.” Ex. 1001, 5:10–11.

Petitioner contends that Nishio discloses limitation [1b] because connector plug 3 comprises plug 3a and shield case 7 including plug shield 7a and cord shield 7b. Pet. 47 (citing Ex. 1002 ¶ 118). Petitioner also contends that plug shield 7a has “an outer dimension that corresponds to the inner dimension of shield case 4,’ such that plug 3a ‘fits within insertion opening 21.’” *Id.* (quoting Ex. 1010, 4:34–37; citing Ex. 1002 ¶ 118). Petitioner also contends that “[t]he ‘plug shield 7a’ and ‘cord shield 7b’ correspond to the claimed ‘first mating portion’ and ‘plug housing,’ respectively.” *Id.*

Patent Owner makes no arguments specific to limitation [1b]. *See* Resp. 28–36.

We agree with Petitioner that Nishio discloses limitation [1b]. *See* Pet. 47; Ex. 1002 ¶ 118. Specifically, Nishio discloses that connector plug 3 includes plug 3a and shield case 7. Ex. 1010, 3:1–3, 4:31–33, Fig. 2; *see* Ex. 1002 ¶ 118. Shield case 7 includes plug shield 7a positioned inside plug 3a and cord shield 7b “formed integrally” with plug shield 7a. Ex. 1010, at 4:33–35, 4:54–56, Fig. 2; *see* Ex. 1002 ¶ 118. Plug shield 7a “has an outer dimension that corresponds to the inner dimension of shield case 4” in connector socket 2. Ex. 1010, 4:35–37, Figs. 1–2; *see* Ex. 1002 ¶ 118. Plug 3a “fits within insertion opening 21” in connector socket 2. Ex. 1010, 4:37, Figs. 1–2; *see* Ex. 1002 ¶ 118. Connector plug 3

corresponds to the claimed “plug,” cord shield 7b corresponds to the claimed “plug housing,” and plug shield 7a corresponds to the claimed “first mating portion.” Ex. 1002 ¶ 118.

(c) Limitation [1c]

Claim 1 recites “a plurality of plug terminals mounted inside said plug housing.” Ex. 1001, 5:11–12.

Petitioner contends that Nishio discloses limitation [1c] because connector plug 3 includes contactors 10 positioned inside plug shield 7a and cord shield 7b. Pet. 49 (citing Ex. 1002 ¶ 120; Ex. 1010, 4:38–40). Petitioner also contends that Nishio’s Figure 2 “shows that contactors 10 correspond to a plurality of plug terminals having ends 10b mounted inside plug housing or cord shield 7b.” *Id.*

Patent Owner makes no arguments specific to limitation [1c]. *See* Resp. 28–36.

We agree with Petitioner that Nishio discloses limitation [1c]. *See* Pet. 48; Ex. 1002 ¶ 120. Specifically, Nishio discloses that connector plug 3 includes contactors 10 positioned inside plug shield 7a and cord shield 7b. Ex. 1010, 4:38–45, 4:57–62, Fig. 2; *see* Ex. 1002 ¶ 120. Contactors 10 include contact ends 10a and cord-connection ends 10b. Ex. 1010, 4:43–45, 4:58–61, Fig. 2; *see* Ex. 1002 ¶ 120. Contact ends 10a come into contact with corresponding contact ends in connector socket 2 when connector socket 2 receives connector plug 3. Ex. 1010, 4:51–53, Fig. 2. Contactors 10 correspond to the claimed “plug terminals.” Ex. 1002 ¶ 120.

(d) Limitation [1d]

Claim 1 recites “said first mating portion being defined by a multi-sided first confining wall.” Ex. 1001, 5:12–13.

Petitioner contends that Nishio discloses limitation [1d] because “‘plug shield 7a [*i.e.*, first mating portion] is formed by bending a sheet of metal into a rectangular column,’ whereby it defines a multi-sided first wall.” Pet. 48 (alteration by Petitioner) (quoting Ex. 1010, 4:38–39; citing Ex. 1002 ¶ 122).

Patent Owner makes no arguments specific to limitation [1d]. *See* Resp. 28–36.

We agree with Petitioner that Nishio discloses limitation [1d]. *See* Pet. 48–49; Ex. 1002 ¶ 122. Specifically, Nishio discloses that “plug shield 7a is formed by bending a sheet of metal into a rectangular column.” Ex. 1010, 4:38–39; *see* Ex. 1002 ¶ 122. The bending produces a “multi-sided first confining wall” according to limitation [1d] because the multi-sided wall that results from bending confines the plug terminals, *i.e.*, contactors 10. Ex. 1002 ¶ 122; *see* Ex. 1010, Figs. 1–2.

(e) Limitation [1e]

Claim 1 recites “a receptacle that includes a receptacle housing having a second mating portion to mate with said first mating portion.” Ex. 1001, 5:14–16.

Petitioner contends that Nishio discloses limitation [1e] because connector socket 2 includes shield case 4 with insertion opening 21 configured to receive plug 3a and plug shield 7a. Pet. 49 (citing Ex. 1002 ¶ 124; Ex. 1010, 3:1–6, 4:33–36). Petitioner identifies shield case 4 as the claimed “receptacle housing having a second mating portion to mate with said first mating portion.” *Id.* at 49–50.

Patent Owner makes no arguments specific to limitation [1e]. *See* Resp. 28–36.

We agree with Petitioner that Nishio discloses limitation [1e]. *See* Pet. 49–50; Ex. 1002 ¶ 124. Specifically, Nishio discloses that connector socket 2 includes shield case 4 with insertion opening 21 configured to receive plug 3a and plug shield 7a. Ex. 1010, 3:1–6, 4:33–36, Figs. 1–2; *see* Ex. 1002 ¶ 124. Plug shield 7a “has an outer dimension that corresponds to the inner dimension of shield case 4” in connector socket 2. Ex. 1010, 4:35–37, Figs. 1–2; *see* Ex. 1002 ¶ 124. Connector socket 2 corresponds to the claimed “receptacle,” shield case 4 corresponds to the claimed “receptacle housing,” and an inner portion or opening in shield case 4 corresponds to the claimed “second mating portion.” Ex. 1002 ¶ 124.

(f) Limitation [1f]

Claim 1 recites “a plurality of receptacle terminals mounted inside said receptacle housing.” Ex. 1001, 5:16–17.

Petitioner contends that Nishio discloses limitation [1f] because connector socket 2 includes contact pins 5 positioned inside shield case 4. Pet. 50–51 (citing Ex. 1002 ¶ 126; Ex. 1010, 3:45–51, Fig. 2).

Patent Owner makes no arguments specific to limitation [1f]. *See* Resp. 28–36.

We agree with Petitioner that Nishio discloses limitation [1f]. *See* Pet. 50–51; Ex. 1002 ¶ 126. Specifically, Nishio discloses that connector socket 2 includes contact pins 5 with external-connection ends 5a and contact ends 5b. Ex. 1010, 3:46–50, 4:15–27, Figs. 1–2; *see* Ex. 1002 ¶ 126. “Contact pins 5 are arranged in a row along the lateral axis of shield case 4.” Ex. 1010, 3:48–50, Fig. 1; *see id.* at 4:14–17; Ex. 1002 ¶ 126. Contact ends 5a come into contact with corresponding contact ends 10a in connector plug 3 when connector socket 2 receives connector plug 3. Ex. 1010,

4:51–53, Fig. 2. Contact pins 5 correspond to the claimed “receptacle terminals.” Ex. 1002 ¶ 126.

(g) Limitation [1g]

Claim 1 recites “said second mating portion being defined by a multi-sided second confining wall.” Ex. 1001, 5:17–20.

Petitioner contends that Nishio discloses limitation [1g] because “[s]hield case 4 is formed by bending a sheet of metal into a rectangular cylinder so that an end defines insertion opening 21,’ whereby insertion opening 21 (*i.e.*, the second mating portion) will define a multi-sided second wall.” Pet. 51 (alteration by Petitioner) (quoting Ex. 1010, 3:4–6; citing Ex. 1002 ¶ 128).

Patent Owner makes no arguments specific to limitation [1g]. *See* Resp. 28–36.

We agree with Petitioner that Nishio discloses limitation [1g]. *See* Pet. 51–52; Ex. 1002 ¶ 128. Specifically, Nishio discloses that “[s]hield case 4 is formed by bending a sheet of metal into a rectangular cylinder so that an end defines insertion opening 21.” Ex. 1010, 3:4–6; *see id.* at 3:31–34, 4:65–66; Ex. 1002 ¶ 128. The bending produces a “multi-sided second confining wall” according to limitation [1g] because the multi-sided wall that results from bending confines the receptacle terminals, *i.e.*, contact pins 5. Ex. 1002 ¶ 128; *see* Ex. 1010, Figs. 1–2.

(h) Limitation [1h]

Claim 1 recites “each of said first and second confining walls having opposite first and second sides, a pair of opposite third sides respectively connected to two opposite ends of said first side, a pair of fourth sides respectively connected to two opposite ends of said second side, and a pair

of fifth sides each extending between and interconnecting one of said third sides and one of said fourth sides.” Ex. 1001, 5:21–28.

Petitioner contends that Nishio discloses limitation [1h] for two reasons. *See* Pet. 46 n.6, 52–53; *see* Ex. 1002 ¶¶ 71, 130. First, Nishio’s Figure 1 shows the required sides. Pet. 52–53 (citing Ex. 1002 ¶ 130; Ex. 1004, 43, 145, 155; Ex. 1010, Fig. 1); *see* Ex. 1002 ¶ 130. Second, the Examiner found that Nishio discloses the required sides when rejecting application claims 1–3 and 7 as anticipated by Nishio. Pet. 46 n.6, 52; *see* Ex. 1002 ¶ 71. Petitioner also contends that the Examiner annotated Nishio’s Figure 1 to identify the required sides when making the rejection. Pet. 52–53; *see* Ex. 1002 ¶ 71.

To support Petitioner’s contentions, Mr. Cady provides an annotated and highlighted excerpt from Nishio’s Figure 1 as reproduced below (Ex. 1002 ¶ 130):

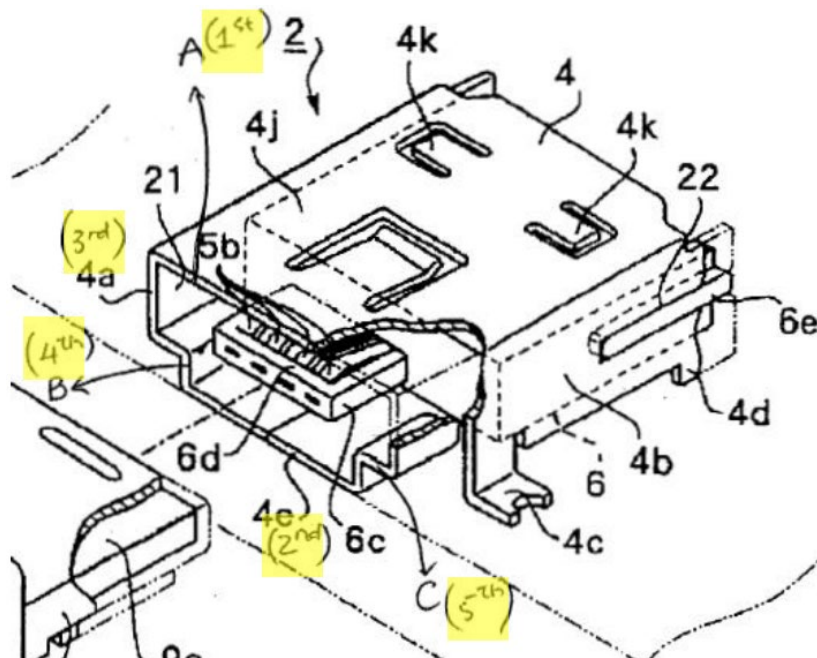


Figure 1 is “an exploded perspective drawing of an electrical connector” with “a section cut away.” Ex. 1010, 2:52–54, Fig. 1. The above annotated

and highlighted excerpt from Figure 1 shows the Examiner's handwritten annotations "1st," "2nd," "3rd," "4th," and "5th" highlighted in yellow. *See* Ex. 1002 ¶ 130; Ex. 1004, 145. Additionally, Mr. Cady testifies that "[t]he confining walls defining" the mating portions of Nishio's connector socket 2 and connector plug 3 "have the claimed first through fifth sides." Ex. 1002 ¶ 130.

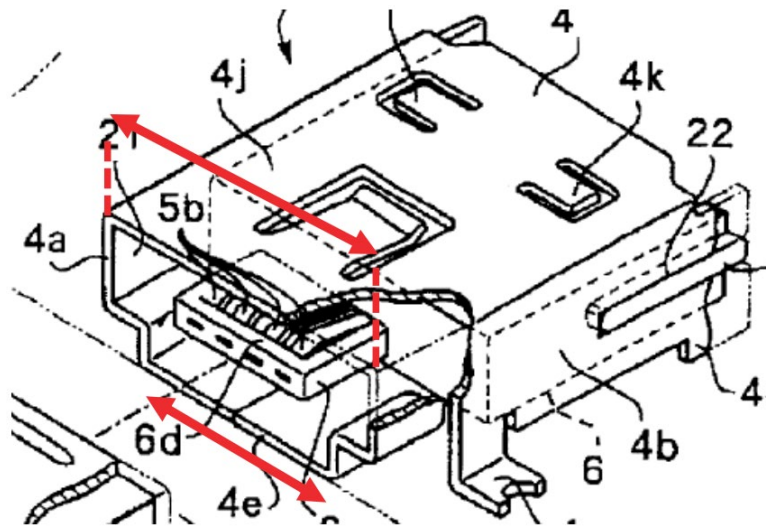
Patent Owner makes no arguments specific to limitation [1h]. *See* Resp. 28–36.

We agree with Petitioner that Nishio discloses limitation [1h]. *See* Pet. 52–53; Ex. 1002 ¶¶ 71, 130. As Mr. Cady testifies, "[t]he confining walls defining" the mating portions of Nishio's connector socket 2 and connector plug 3 "have the claimed first through fifth sides." Ex. 1010, 2:52–58, Figs. 1–3; *see* Ex. 1002 ¶ 130; Ex. 1004, 43, 145.

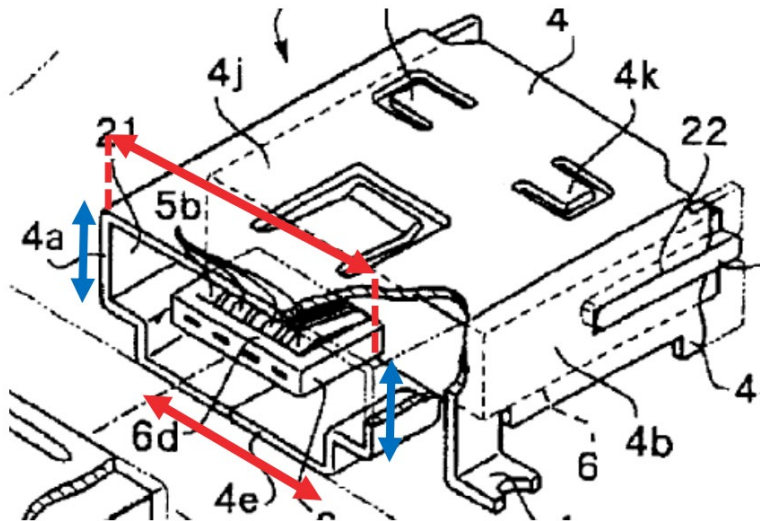
(i) Limitation [1i]

Claim 1 recites "said first side being longer than said second side." Ex. 1001, 5:28.

Petitioner contends that Nishio discloses limitation [1i] because Nishio's Figure 1 shows the claimed length relationship. Pet. 53–55 (citing Ex. 1002 ¶¶ 132–134; Ex. 1010, 3:7–14, 5:41–42, Fig. 1). To support Petitioner's contention, Mr. Cady testifies that "[i]t is readily apparent" from Figure 1 that the "first side is longer than the second side." Ex. 1002 ¶ 132 (citing Ex. 1010, Fig. 1). Additionally, Mr. Cady provides an annotated excerpt from Figure 1 as reproduced below (Ex. 1002 ¶ 132):



provides an annotated excerpt from Figure 1 as reproduced below (Ex. 1002 ¶ 133):



The above annotated excerpt from Figure 1 includes a longer double-sided red arrow denoting the length of the first side, a shorter double-sided red arrow denoting the length of the second side, and two blue double-sided arrows denoting the lengths of the third sides. *See id.*

Patent Owner disputes that Nishio’s Figure 1 shows the length relationships required by limitation [1j]. *See Resp.* 28–34. Specifically, Patent Owner asserts that Nishio “is entirely silent as to the lengths of the sides Petitioner points to as the 1st, 2nd, and 3rd sides” and “gives no indication that its embodiments are drawn to scale or that its sides have any particular length.” *Id.* at 31. Patent Owner also asserts that “Petitioner’s reliance on Nishio is misplaced as the referenced figure is not drawn to scale, and ‘arguments based on drawings not explicitly made to scale in issued patents are unavailing’ as proof of invalidity based on prior art.” *Id.* (emphasis omitted) (quoting *Nystrom*, 424 F.3d at 1149). Additionally, Patent Owner contends that Nishio’s Figure 1 “does not explicitly or implicitly evidence any actual dimensions,” and “[t]herefore, it is not readily

apparent from Nishio’s Figure 1 that the first and second sides are longer than the third sides.” *Id.* at 33 (emphasis omitted) (citing *Plantronics*, 724 F.3d at 1349–51).

We agree with Petitioner that Nishio discloses limitation [1j]. *See* Pet. 53–55; Ex. 1002 ¶ 133. Figure 1 clearly shows “said first and second sides being longer than each of said third sides” according to limitation [1j]. Ex. 1010, Fig. 1; *see* Ex. 1002 ¶ 133.

Patent Owner’s reliance on *Nystrom* and *Plantronics* for the obviousness ground based on Nishio and Jones parallels its reliance on those decisions for the anticipation ground based on Jones. *Compare* Resp. 21–23, 21 n.6, 22 n.8, *with id.* at 31–33. As discussed above for the anticipation ground based on Jones, a patent drawing may serve as prior art “without referring to the surrounding description” if “the prior art features are clearly disclosed by the drawing.” *PlaSmart*, 482 F. App’x at 572–73; *see Krippelz*, 667 F.3d at 1269 (figures “plainly show” claimed feature); *supra* § III.E.2(j). Here, Nishio’s Figure 1 clearly discloses the length relationships required by limitation [1j]. Ex. 1010, Fig. 1; *see* Ex. 1002 ¶ 133.

Nishio describes Figure 1 as “an exploded perspective drawing of an electrical connector” with “a section cut away.” Ex. 1010, 2:52–54. Nothing in Nishio suggests that this exploded perspective drawing uses different scales horizontally and vertically. *See, e.g., id.* at 2:66–3:14, 3:46–4:31, 4:63–5:40. Indeed, using different scales horizontally and vertically would distort the perspective view.

Patent Owner characterizes Mr. Cady’s testimony about Nishio as “conclusory” and insufficient to “support a finding of invalidity.” Resp. 34

(citing *TQ Delta*, 942 F.3d at 1358–59). We disagree. Mr. Cady’s testimony rests on, among other things, his review of the ’678 patent, its prosecution history, other expert testimony, and Nishio, including Figure 1. Ex. 1002 ¶¶ 5, 26–27, 33–34, 49–57, 69–71, 130, 132–135. Moreover, Mr. Cady’s testimony comports with other expert testimony about the unpatentability of claim 1. *See id.* ¶ 5; *TTE Tech., Inc. v. Interface Linx, LLC*, IPR2018-01036, Ex. 1002 ¶ 122. Patent Owner offers no testimony rebutting Mr. Cady’s testimony and identifies no evidence undermining his testimony. *See, e.g.*, Resp. 28–36.

Although Mr. Cady does not provide a detailed explanation about how Figure 1 shows limitation [1j], no need exists for a detailed explanation about a clearly shown feature. *See* Ex. 1002 ¶ 133; Ex. 1010, Fig. 1; *Krippelz*, 667 F.3d at 1269. Further, Mr. Cady provides annotated excerpts from Figure 1 identifying various features in Figure 1. Ex. 1002 ¶¶ 130, 132–135; *see* Ex. 1010, Fig. 1. According to an old adage, as noted above, “a picture is worth a thousand words.” *See supra* § III.E.2(j). Also, as Mr. Cady explains, “the subject matter of the claims is straightforward, with many of the elements lending themselves to visual analyses and comparisons.” *See* Ex. 1002 ¶ 5.

Patent Owner contends that during the ’678 patent’s prosecution, the Examiner initially rejected application claim 1 (corresponding to patent claim 1) based on Nishio. Resp. 28 (citing Ex. 1004, 43, 161). Then, Patent Owner quotes the Examiner’s statement of reasons for allowance as follows:

[n]one of the reference discloses the first and second sides being longer than each of the third sides, the width between the third sides being greater than that between the fourth sides and the fourth sides extend obliquely from the second side,

in combination with the other claimed elements of the embodiments recited.

Id. at 33–34 (alteration by Patent Owner) (emphasis omitted) (quoting Ex. 1004, 189).

Based on the Examiner’s statement of reasons for allowance, Patent Owner contends that the Examiner “determined that none of the prior art on record, including Nishio, disclose the ’678 patent’s claimed first and second sides being longer than each of the third sides,” i.e., limitation [1j]. Resp. 34 (emphasis omitted). Further, Patent Owner asserts that “there is no evidence nor demonstration by Petitioner that the Office erred in a manner material to the patentability of challenged claims” during the ’678 patent’s prosecution.⁵ *Id.* at 29; *see id.* at 34.

The Examiner’s statement of reasons for allowance does not help Patent Owner in view of the entire prosecution history. In the first Office action, the Examiner rejected application claims 1–3 and 7 as anticipated by Nishio. Ex. 1004, 42–44, 48, 144–51. In rejecting application claim 1 (corresponding to patent claim 1), the Examiner found that Nishio discloses an assembly with “[t]he width between the third sides being greater than that between the fourth sides,” i.e., limitation [1k]. *Id.* at 43. The Applicant did not dispute the Examiner’s finding that Nishio discloses limitation [1k]. *See id.* at 153–58. Instead, the Applicant amended application claim 1 to

⁵ In its Preliminary Response, Patent Owner did not present arguments for discretionary denial under 35 U.S.C. § 325(d) where the question whether Petitioner has demonstrated that “the Office erred in a manner material to the patentability of challenged claims” may have had relevance. *See* Prelim. Resp. 1–4; Inst. Dec. 15–16; *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential).

distinguish over Nishio by adding the following limitation to claim 1: “said fourth sides extend obliquely from said second side,” i.e., limitation [1o]. *Id.* at 158.

Subsequently, in the statement of reasons for allowance, the Examiner expressly identified that added limitation and two others when stating that “[n]one of the reference[s] discloses” the following limitations:

- “the first and second sides being longer than each of the third sides,” i.e., limitation [1j];
- “the width between the third sides being greater than that between the fourth sides,” i.e., limitation [1k]; and
- “the fourth sides extend obliquely from the second side,” i.e., limitation [1o].

Ex. 1004, 189; *see* Ex. 1001, 5:29–31, 6:4–5.

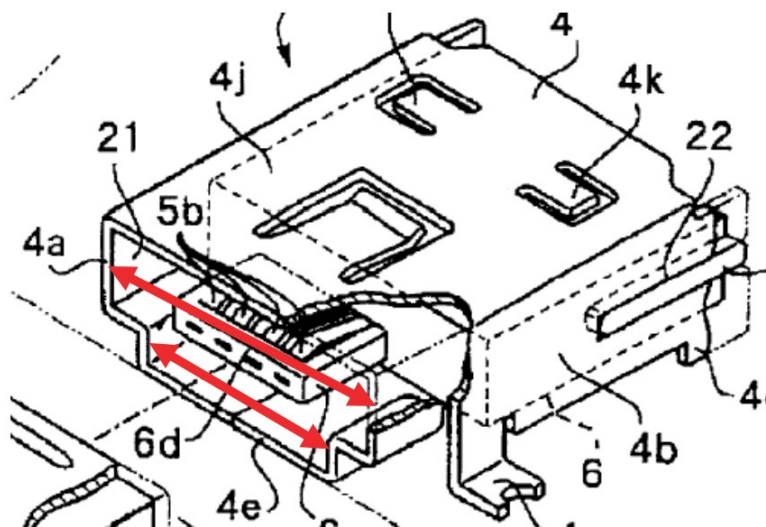
Because the Examiner previously found that Nishio discloses limitation [1k], the Examiner’s reference to limitations [1j], [1k], and [1o] in the statement of reasons for allowance indicates that no single reference considered by the Examiner discloses all three of the limitations together. Ex. 1004, 189. For example, Nishio does not disclose “said fourth sides extend obliquely from said second side,” i.e., limitation [1o]. Ex. 1010, Fig. 1; *see* Ex. 1002 ¶ 139. Hence, Petitioner contends that Jones discloses limitation [1o]. Pet. 58–59; *see* Ex. 1002 ¶¶ 66, 139–141; *infra* § III.G.2(o).

The Examiner’s statement that “[n]one of the reference[s] discloses” all three of the limitations [1j], [1k], and [1o] together does not conflict with our finding that Nishio discloses two of the three limitations, i.e., limitations [1j] and [1k]. Ex. 1010, Fig. 1; *see* Ex. 1002 ¶¶ 133–134; Ex. 1004, 43, 145; *infra* § III.G.2(k).

(k) Limitation [1k]

Claim 1 recites “the width between said third sides being greater than that between said fourth sides.” Ex. 1001, 5:30–31.

Petitioner contends that Nishio discloses limitation [1k] because Nishio’s Figure 1 shows the claimed width relationship. Pet. 53–55 (citing Ex. 1002 ¶¶ 132–134; Ex. 1010, 3:7–14, 5:41–42, Fig. 1). To support Petitioner’s contention, Mr. Cady testifies that “[i]t is readily apparent” from Figure 1 that the “width between the third sides” is “greater than the width between the fourth sides.” Ex. 1002 ¶ 134 (citing Ex. 1010, Fig. 1). Additionally, Mr. Cady provides an annotated excerpt from Figure 1 as reproduced below (Ex. 1002 ¶ 134):



The above annotated excerpt from Figure 1 includes a longer double-sided red arrow denoting the width between the third sides and a shorter double-sided red arrow denoting the width between the fourth sides. *See id.*

Patent Owner makes no arguments specific to limitation [1k]. *See* Resp. 28–36.

We agree with Petitioner that Nishio discloses limitation [1k]. *See* Pet. 53–55; Ex. 1002 ¶ 134. Figure 1 clearly shows “the width between said

third sides being greater than that between said fourth sides” according to limitation [1k]. Ex. 1010, Fig. 1; *see* Ex. 1002 ¶ 134; Ex. 1004, 43, 145.

(l) Limitation [1l]

Claim 1 recites “said fifth sides being angled away from each other while extending from said fourth sides to said third sides.” Ex. 1001, 5:31–33.

Petitioner contends that Nishio discloses limitation [1l] because Nishio’s Figure 1 shows the claimed angular relationship. Pet. 55–56 (citing Ex. 1002 ¶ 135; Ex. 1010, 3:7–14, 5:41–42, Fig. 1). To support Petitioner’s contention, Mr. Cady testifies that “the fifth sides extend or point away from each other” in Figure 1 “while extending from said fourth sides to said third sides, as claimed, and in the same manner as they do for the ’678 Patent’s preferred embodiment in Figures 9–10.” Ex. 1002 ¶ 135.

Patent Owner makes no arguments specific to limitation [1l]. *See* Resp. 28–36.

We agree with Petitioner that Nishio discloses limitation [1l]. *See* Pet. 55–56; Ex. 1002 ¶ 135. As Mr. Cady testifies, “the fifth sides extend or point away from each other” in Figure 1 “while extending from said fourth sides to said third sides” according to limitation [1l]. Ex. 1010, Fig. 1; *see* Ex. 1002 ¶ 135; Ex. 1004, 43, 145.

(m) Limitation [1m]

Claim 1 recites “wherein said first and second sides are substantially parallel.” Ex. 1001, 6:1–2.

Petitioner contends that Nishio discloses limitation [1m] because Nishio’s Figure 1 shows the claimed geometric relationship. Pet. 56 (citing Ex. 1002 ¶ 137; Ex. 1010, 3:4–6, 4:36–38, 5:41–42, Fig. 1). To support

Petitioner's contention, Mr. Cady testifies that "[i]t is readily apparent" from Figure 1 that the "first and second sides are substantially parallel." Ex. 1002 ¶ 137 (citing Ex. 1010, Fig. 1).

Patent Owner makes no arguments specific to limitation [1m]. *See* Resp. 28–36.

We agree with Petitioner that Nishio discloses limitation [1m]. *See* Pet. 56; Ex. 1002 ¶ 137. Figure 1 clearly shows "said first and second sides are substantially parallel" according to limitation [1m]. Ex. 1010, Fig. 1; *see* Ex. 1002 ¶ 137; Ex. 1004, 43–44, 145.

(n) Limitation [1n]

Claim 1 recites "said third sides are substantially perpendicular to said first side." Ex. 1001, 6:2–3.

Petitioner contends that Nishio discloses limitation [1n] because Nishio's Figure 1 shows the claimed geometric relationship. Pet. 56–57 (citing Ex. 1002 ¶ 138; Ex. 1010, 3:4–6, 4:36–38, 5:41–42, Fig. 1). To support Petitioner's contention, Mr. Cady testifies that "[i]t is readily apparent" from Figure 1 that the "third sides are substantially perpendicular to the first side." Ex. 1002 ¶ 138 (citing Ex. 1010, Fig. 1).

Patent Owner makes no arguments specific to limitation [1n]. *See* Resp. 28–36.

We agree with Petitioner that Nishio discloses limitation [1n]. *See* Pet. 56–57; Ex. 1002 ¶ 138. Figure 1 clearly shows "said third sides are substantially perpendicular to said first side" according to limitation [1n]. Ex. 1010, Fig. 1; *see* Ex. 1002 ¶ 138; Ex. 1004, 43–44, 145.

(o) Limitation [1o]

Claim 1 recites “said fourth sides extend obliquely from said second side.” Ex. 1001, 6:4–5.

Petitioner contends that Jones discloses limitation [1o] because Jones’s plugs and sockets include trapezoidal keys and keyways with sides extending obliquely. Pet. 58–59 (citing Ex. 1002 ¶¶ 139–144; Ex. 1007, 4:6–8, 4:44–47, Fig. 3). To support Petitioner’s contention, Mr. Cady testifies that Jones discloses “a variety of shapes for the mating walls of the plug and socket, where the walls which define the mating surfaces are shown as generally flat surfaces, with a key, or keyway of ‘width W_k and height h_k ’ that is preferably trapezoidal in shape.” Ex. 1002 ¶ 66 (citing Ex. 1007, 4:38–46); *see id.* ¶¶ 139, 141.

Patent Owner makes no arguments specific to limitation [1o]. *See* Resp. 28–36.

We agree with Petitioner that Jones discloses limitation [1o]. *See* Pet. 58–59; Ex. 1002 ¶¶ 66, 139–141. Jones’s Figure 1 depicts a trapezoidal key or keyway with sides extending obliquely according to limitation [1o]. Ex. 1007, 4:44–45, Fig. 1; *see* Ex. 1002 ¶¶ 66, 139, 141. Jones describes the trapezoidal key or keyway depicted in Figure 1 as preferable. Ex. 1007, 4:44–46; *see* Ex. 1002 ¶¶ 66, 141.

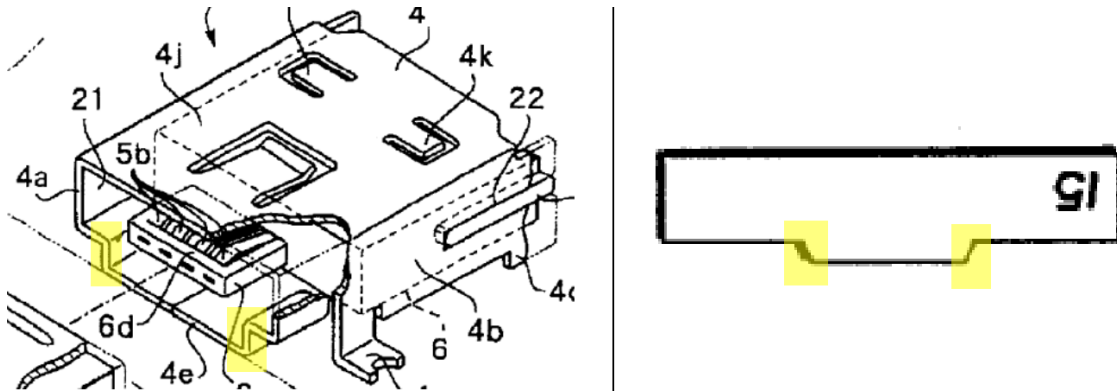
(p) Alleged Reasons for Combining the Teachings of the References

Petitioner contends that an ordinarily skilled artisan would have been motivated to combine Jones’s teachings with Nishio’s teachings to improve the usability of Nishio’s design by incorporating Jones’s trapezoidal key and keyway. Pet. 58 (citing Ex. 1002 ¶¶ 140–141). Petitioner also contends that an ordinarily skilled artisan would have appreciated that incorporating

Jones's trapezoidal key and keyway would "enhance the mateability" of Nishio's plug and socket since "the trapezoidal shape of the keyway helps correct for slight misalignments of the plug in certain orientations of the plug" as it mates with the socket. *Id.* (citing Ex. 1002 ¶ 141).

To support Petitioner's contentions, Mr. Cady testifies that Jones explains that (1) with Jones's approach "based on a single key and keyway 'visual inspection to determine whether a plug will fit a particular socket is rendered easy'" and (2) "a trapezoidally shaped key and keyway shape 'is preferable.'" Ex. 1002 ¶¶ 140–141 (quoting Ex. 1007, 2:11–13, 4:44–46). Mr. Cady also testifies that an ordinarily skilled artisan would have appreciated that "the trapezoidal shape of the keyway helps correct for slight misalignments of the plug in certain orientations of the plug" as it mates with the socket. *Id.* ¶ 141.

In addition, Mr. Cady testifies that an ordinarily skilled artisan would have recognized that substituting the oblique sides of Jones's trapezoidal key and keyway "for the vertical, perpendicular key and keyway sides" in Nishio's socket and plug "would have increased the range of tolerances" for Nishio's shield case 4 and shield plug 7a. Ex. 1002 ¶ 142. To show the proposed substitution, Mr. Cady provides a side-by-side comparison of an excerpt from Nishio's Figure 1 and an excerpt from Jones's Figure 3 with highlighting as reproduced below (Ex. 1002 ¶ 144):



Rambus Inc. v. Rea, 731 F.3d 1248, 1257 (Fed. Cir. 2013)). The patentee “bears the burden of showing that a nexus exists.” *WMS Gaming, Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999).

A rebuttable presumption of nexus arises “when the patentee shows that the asserted objective evidence is tied to a specific product and that product ‘embodies the claimed features, and is coextensive with them.’” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018)). Whether a rebuttable presumption of nexus arises “turns on the nature of the claims and the specific facts.” *Teva Pharm. Int’l GmbH v. Eli Lilly & Co.*, 8 F.4th 1349, 1362 (Fed. Cir. 2021). When, “for example, the patented invention is only a small component of the product tied to the objective evidence, there is no presumption of nexus.” *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1333 (Fed. Cir. 2019). Absent a presumption of nexus, the patentee may prove nexus by showing that the objective evidence resulted directly from “the unique characteristics of the claimed invention.” *Fox Factory*, 944 F.3d at 1373–74; see *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996).

Thus, the Board employs a two-step analysis in evaluating whether a patentee has established a nexus between the evidence concerning objective indicia of nonobviousness and the merits of the claimed invention. See *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 33 at 32–33 (PTAB Jan. 24, 2020) (precedential). Initially, the Board considers whether the patentee has demonstrated that the “products are coextensive (or nearly coextensive) with the challenged claims,” resulting in a rebuttable presumption of nexus. *Id.* at 33. Absent a presumption of nexus, the Board

considers whether the patentee has demonstrated “a legally and factually sufficient connection” between the evidence and the claimed invention. *See Henny Penny*, 938 F.3d at 1332; *Lectrosonics*, IPR2018-01129, Paper 33 at 33.

(ii) Presumption of Nexus

Patent Owner contends that Type A and Type B connectors according to the High-Definition Multimedia Interface (HDMI) specification version 1.0 embody “the claimed features of the ’678 patent.” Resp. 47; *see id.* at 48. To support that contention, Patent Owner provides two side-by-side comparisons. *Id.* at 48. In the first side-by-side comparison, Patent Owner places ’678 patent Figure 11 next to a figure depicting a Type A plug. *Id.* (citing Ex. 1001, Fig. 11; Ex. 2011, 20 (Fig. 4-2)⁶). In the second side-by-side comparison, Patent Owner places ’678 patent Figure 12 next to a figure depicting a Type B plug. *Id.* (citing Ex. 1001, Fig. 12; Ex. 2011, 21 (Fig. 4-4)). Patent Owner then contends that “[b]ecause the Type A and Type B connectors in the HDMI 1.0 specifically embody the claimed features, the Type A and Type B connectors are coextensive with” the challenged claims. *Id.*

Petitioner contends that Patent Owner has not shown that an HDMI connector “embodies the claimed features, and is coextensive with them.” Reply 22 (quoting *Fox Factory*, 944 F.3d at 1373). Specifically, Petitioner asserts that Patent Owner compares HDMI connectors to ’678 patent Figures 11 and 12 and that “Figures 11 and 12 do not embody the claims at

⁶ For Exhibit 2011, we cite the page numbers applied to the exhibit, e.g., page 20 of 51, rather than the page numbers appearing in the HDMI specification.

least because they do not contain ‘fourth sides [that] extend obliquely from said second side,’ i.e., limitation [1o]. *Id.* at 22–23 (alteration by Petitioner) (emphasis omitted) (quoting Ex. 1001, 6:4–5). Petitioner also asserts that Patent Owner’s comparison of HDMI connectors to “figures that do not meet the claims is meaningless.” *Id.* at 23.

We agree with Petitioner that Patent Owner has not shown that an HDMI connector “embodies the claimed features, and is coextensive with them.” *See* Resp. 47–48; Reply 22. Patent Owner makes no attempt to map claim 1’s limitations to an HDMI connector. *See* Resp. 47–55.

Also, as Petitioner asserts, the challenged claims do not cover the embodiment depicted in ’678 patent Figures 11 and 12. *See* Ex. 1001, 4:36–40, 5:9–6:31, Figs. 11–12; Reply 23. For that embodiment, the patent explains that “the fourth sides 374' (484') are substantially perpendicular to the second side 372' (482').” Ex. 1001, 4:38–40. Thus, that embodiment lacks limitation [1o], i.e., “said fourth sides extend obliquely from said second side.”

To satisfy the coextensiveness requirement, a patentee must “demonstrate that the product is essentially the claimed invention.” *Fox Factory*, 944 F.3d at 1374. Here, Patent Owner has not demonstrated that an HDMI connector “is essentially the claimed invention,” e.g., because Patent Owner compared HDMI connectors to a disclosed but unclaimed embodiment. *See, e.g.*, Resp. 47–48. Hence, Patent Owner has not established a rebuttable presumption of nexus.

(iii) Proof of Nexus: Long-Felt but Unmet Need

Patent Owner notes that the ’678 patent discusses a “tendency to plug a wrong one of the plugs” into a receptacle on a printed circuit board when

using a cable to “connect an electrical device to the printed circuit board, thereby hindering data transmission between the electrical device and the printed circuit board.” Resp. 46 (quoting Ex. 1001, 1:29–34). Patent Owner contends that “[a]t the time of the invention of the ’678 patent, there was a long-felt need for a user-friendly cable used to connect an electrical device to a printed circuit board without plugging a plug into a wrong receptacle.” *Id.* at 52; *see id.* at 46.

Additionally, Patent Owner contends that connectors according to the Digital Visual Interface (DVI) standard preceded HDMI connectors. *See* Resp. 49, 52. Patent Owner also contends that HDMI connectors sought to achieve the following goals:

- (1) provide “a smaller, more consumer friendly connector” than prior connectors; and
- (2) “avoid confusion with prior connectors such as the DVI connectors.”

Id. at 52–53 (quoting Ex. 2010, 3; citing Ex. 2014, 2); *see id.* at 49–50.

Further, Patent Owner asserts that the HDMI specification “began its development in 2002 with the objective of creating an audio-video (‘AV’) connector to maintain full backward-compatibility with existing interfaces.” Resp. 49 (citing Ex. 2009, 2). Patent Owner asserts that “HDMI was ‘used to deliver existing DVDs and digital set-top box video signals in their purest digital form, [and] it [was] also the connector of choice for [at the time,] new highdefinition DVD players (Blu-ray and HD DVD) and the next generation gaming consoles.’” *Id.* at 50 (alterations by Patent Owner) (quoting Ex. 2010, 8). Patent Owner asserts that a long-felt need “is also evident in the success of” HDMI connectors, e.g., because “HDMI-enabled device

shipments increased from 5 million in 2004 to 17.4 million in 2005.” *See id.* at 53–54 (citing Ex. 2015, 2; Ex. 2016, 1).

Petitioner contends that Patent Owner offers no “evidence of a relevant long-felt need that HDMI addressed.” Reply 24. Regarding “a smaller, more consumer friendly connector,” Petitioner asserts that the claims do not recite “how big or small the overall connector is.” *Id.* at 24–25. Petitioner also asserts that “it is unclear what, exactly, made the HDMI ‘consumer friendly’ besides its smaller size” and that “[a]ny allegation that it is due to HDMI’s shape is unsupported attorney conjecture.” *Id.* at 25 n.7. Regarding the use of HDMI connectors with DVD players and gaming consoles, Petitioner asserts that such use “is based on the transmission capabilities of HDMI cables and connection wiring, not the shape of the connector.” *Id.* at 25. Regarding the alleged success of HDMI connectors, Petitioner asserts that sales resulted from “the HDMI standard being more compatible with PCs” and that “compatibility with PCs is due to the HDMI transmission standards, not connector shape.” *Id.* at 26.

Additionally, Petitioner contends that “[t]he only need that is remotely connected to the claims is the desire for” a connector that differs from “existing DVI connectors to avoid user confusion.” Reply 27. Petitioner also contends that satisfying the need for a connector that differs from existing DVI connectors requires only “an alternative to the DVI shape,” not a connector with “the particular shape dictated by the claims.” *Id.*

We agree with Petitioner that Patent Owner offers no “evidence of a relevant long-felt need that HDMI addressed.” *See* Reply 24. A long-felt but unmet need “is analyzed as of the date of an articulated identified problem and evidence of efforts to solve that problem.” *Tex. Instrs. Inc. v.*

Int'l Trade Comm'n, 988 F.2d 1165, 1178 (Fed. Cir. 1993). The analysis should consider “the filing date of the challenged invention to assess the presence of a long-felt and unmet need.” *Procter & Gamble Co. v. Teva Pharm. USA, Inc.*, 566 F.3d 989, 998 (Fed. Cir. 2009). Unsupported assertions that a challenged claim improves upon the prior art do not suffice to establish a long-felt but unmet need. *See Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1332–33 (Fed. Cir. 2009).

Except for statements in the '678 patent, Patent Owner identifies no evidence of an “articulated identified problem” concerning using a cable to “connect an electrical device to a printed circuit board without plugging a plug into a wrong receptacle.” *See* Resp. 46, 52 (quoting Ex. 1001, 1:29–34, 1:37–39). And even if the record contained evidence of an “articulated identified problem,” Patent Owner identifies no evidence of “efforts to solve that problem” by others in the industry before the invention. *See* Resp. 46–54; *see also* *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1334 (Fed. Cir. 2016) (discussing efforts to solve an “articulated identified problem” by an alleged infringer before the invention); *Apple Inc. v. Samsung Elecs. Co.*, 816 F.3d 788, 804–05 (Fed. Cir. 2016) (requiring evidence of unsuccessful efforts to solve an “articulated identified problem” before the invention), *vacated in part on other grounds*, 839 F.3d 1034 (Fed. Cir. 2016); *Geo. M. Martin Co. v. Alliance Mach. Sys. Int'l LLC*, 618 F.3d 1294, 1304–05 (Fed. Cir. 2010) (determining that the “need” had been met by others in the industry before the invention); *Tex. Instrs.*, 988 F.2d at 1178 (discussing efforts to solve an “articulated identified problem” by others in the industry before the invention).

HDMI specification version 1.0 was released in December 2002, more than two years after the application for the '678 patent was filed in August 2000. *See* Ex. 1001, code (22); Ex. 2010, 3; Ex. 2013, 1–3; *see also* Ex. 1002 ¶ 24; Ex. 2011, 1–2. Thus, that HDMI specification has little relevance in assessing a long-felt but unmet need as of “the filing date of the challenged invention.” *See Procter & Gamble*, 566 F.3d at 998.

The Digital Visual Interface (DVI) specification version 1.0 “was introduced in April 1999.” Ex. 2013, 2; *see* Ex. 2010, 3. DVI required “multiple cables for audio and video.” Ex. 2010, 3. Another “big problem with DVI [was] that there are several variations” of DVI connectors, i.e., DVI-I Single Link, DVI-I Dual Link, DVI-D Single Link, DVI-D Dual Link, and DVI-A. Ex. 2014, 2. The following figure illustrates the several variations of DVI connectors:



This figure depicts plugs for the several variations of DVI connectors, i.e., DVI-I Single Link, DVI-I Dual Link, DVI-D Single Link, DVI-D Dual Link, and DVI-A. *Id.* The different plugs have an identically shaped housing with different pin arrangements inside the housing, e.g., 24 pins arranged in three rows of eight and 18 pins arranged in two groups of nine. *Id.*

HDMI is “a digital connectivity standard” for “transmitting digital television audiovisual signals” between devices, e.g., “from DVD players, set-top boxes and other audiovisual sources to television sets, projectors and other video displays.” Ex. 2010, 1; Ex. 2011, 9; *see* Ex. 2009, 9. HDMI specification version 1.0 “completely describes the interface such that one could implement a complete transmission and interconnect solution or any portion of the interface.” Ex. 2011, 9. The specification contains technical requirements for, among other things, connectors, cables, signaling and encoding, video format, audio format, and communications channels. *Id.* at 4–6, 18–38. The specification “incorporates a number of innovative technologies” to “transport extremely large amounts of digital data over a long cable length with very high accuracy and reliability.” Ex. 2010, 9.

One HDMI cable “carr[ies] both digital video and digital audio signals” and “leverage[s] the advantage of a digital connection for other control functions.” Ex. 2010, 3; *see id.* at 4; Ex. 2013, 1; Ex. 2014, 2. And one HDMI cable does so while providing “much higher bandwidth capability than DVI.” Ex. 2014, 2; *see* Ex. 2013, 1. Moreover, HDMI reduced the number of cables compared to DVI, e.g., because one HDMI cable “replaces up to” nine conventional cables. Ex. 2009, 23, 27–28.

The HDMI specification “has seen several major enhancements” since 2002. Ex. 2010, 4; *see id.* at 14; Ex. 2013, 2–3. For instance, version 1.1 (June 2004) added “support for full definition DVD [digital versatile disc] Audio,” and version 1.2 (August 2005) added “support for SACD [super audio compact disc] format high-definition audio and a number of enhancements to make the standard easier to use with PCs and PC monitors.” Ex. 2010, 4–5; *see* Ex. 2013, 3.

As initially implemented, the HDMI specification sought to provide “a smaller, more consumer friendly connector” than prior connectors. *See* Ex. 2010, 3. But Patent Owner identifies no evidence linking either advantage to the claimed invention. *See* Resp. 46–54. Specifically, as Petitioner asserts, the claims do not recite “how big or small the overall connector is.” *See* Ex. 1001, 5:9–6:31; Reply 25. So the merits of the claimed invention do not concern connector size.

Further, avoiding confusion with the several variations of DVI connectors made HDMI connectors “more consumer friendly” because “[y]ou don’t have to worry about Dual Link or Single Link, or D, I, or A variations like there are with DVI.” Ex. 2014, 2. Avoiding confusion with the several variations of DVI connectors requires only a connector having a shape different than the DVI connectors, not a connector having the claimed shape. *See* Ex. 2014, 2. As discussed above, the challenged claims do not cover the embodiment depicted in ’678 patent Figures 11 and 12. *See* Ex. 1001, 4:36–40, 5:9–6:31, Figs. 11–12; *supra* § III.G.2(q)(ii). A connector according to that embodiment has a shape different than the DVI connectors and would avoid confusion with the several variations of DVI connectors. *See* Ex. 1001, 4:36–50, Figs. 11–12; Ex. 2014, 2. Thus, the ’678 patent’s disclosure undermines Patent Owner’s argument that the claimed invention addressed a long-felt but unmet need.

As for the alleged success of HDMI connectors, the HDMI specification “has seen several major enhancements” since 2002. *See* Ex. 2010, 4; Ex. 2013, 2–3. Those enhancements contributed to an increase in market share for HDMI-enabled devices, e.g., because version 1.2 made “the standard more compatible with PCs.” *See* Ex. 2010, 5; Ex. 2015, 1.

But those enhancements did not alter the HDMI connectors. *See* Ex. 2010, 4–5; Ex. 2013, 2–3. Patent Owner identifies no evidence that the HDMI connectors contributed to an increase in market share for HDMI-enabled devices. *See* Resp. 46–54. Additionally, any connector selected by the HDMI developers “would have achieved market share commensurate with the success of the standard.” Ex. 1002 ¶ 24.

For the reasons discussed above, Patent Owner has not shown a nexus between the evidence of a long-felt but unmet need and the merits of the claimed invention.

(iv) Proof of Nexus: Industry Praise

Patent Owner contends that the claimed invention received “industry praise and recognition.” Resp. 46, 49, 51, 54. As evidence of “industry praise and recognition,” Patent Owner identifies a January 2009 Technology and Engineering Emmy Award presented by the National Academy of Television Arts and Sciences to “the HDMI founders” for “their development of HDMI.” *Id.* at 51, 54 (citing Ex. 2012, 2).

Petitioner contends that Patent Owner offers no evidence linking any industry praise or recognition to the claimed invention. *See* Reply 28–29. Petitioner also contends that the HDMI specification (1) contains numerous “technical requirements” and (2) “represents the culmination of negotiations between industry giants” about, among other things:

- (i) “signal encoding and decoding protocols”;
- (ii) “how data packetization would occur”;
- (iii) “what video and audio formats would be transmitted”;
- (iv) “which content protections would be required”; and

- (v) “which cables and connectors would be standardized for the transmission of audio and video images.”

Id. at 28 (citing Ex. 2011, 4–6, 9–10).

Further, Petitioner asserts that the Technology and Engineering Emmy Award was “presented to members of the HDMI 1.0 Standard committee” for “their work in developing HDMI” in general, not to the inventor of the ’678 patent. Reply 28 (quoting Ex. 2012, 2). Petitioner also asserts that nothing in the Award “indicates that this praise ‘actually results’ from the claimed elements,” even assuming that “the HDMI connector meets these elements, which Petitioner does not concede.” *Id.* (quoting *In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011)).

We agree with Petitioner that Patent Owner offers no evidence linking any industry praise or recognition to the claimed invention. *See* Resp. 46, 49, 51, 54–55; Reply 28–29. The Technology and Engineering Emmy Award states, “Lauded for their work in developing HDMI are Silicon Image, Thomson, Toshiba, Sony, Matsushita, Hitachi, Philips, Molex, Japan Aviation Electronics (JAE) and Intel.” Ex. 2012, 2. Patent Owner fails to identify any relationship between those entities and the inventor of the ’678 patent. *See, e.g.*, Resp. 49, 54–55.

Further, the HDMI specification contains technical requirements for, among other things, connectors, cables, signaling and encoding, video format, audio format, and communications channels. Ex. 2011, 4–6, 18–38. Industry praise for the HDMI specification in general does not equate to industry praise for each aspect of the specification, such as the connectors. The HDMI specification provided several improvements to earlier equipment. *See, e.g.*, Ex. 2009, 23, 27–28; Ex. 2014, 2. For example,

HDMI provided “much higher bandwidth capability than DVI.”

Ex. 2014, 2; *see* Ex. 2013, 1. Moreover, HDMI reduced the number of cables compared to DVI, e.g., because one HDMI cable “replaces up to” nine conventional cables. Ex. 2009, 23, 27–28.

Patent Owner fails to explain how an award for the HDMI specification in general relates to the claimed invention rather than unclaimed features. *See, e.g.*, Resp. 49, 54–55. Thus, Patent Owner fails to show that any industry praise resulted directly from “the unique characteristics of the claimed invention” rather than other factors “unrelated to the quality of the patented subject matter.” *See Huang*, 100 F.3d at 140.

For the reasons discussed above, Patent Owner has not shown a nexus between the evidence of industry praise and the merits of the claimed invention.

(v) Summary for Objective Indicia of Nonobviousness

For the reasons discussed above, Patent Owner has not shown that an HDMI connector “embodies the claimed features, and is coextensive with them.” *See* Resp. 46–51; *supra* § III.G.2(q)(ii); *Fox Factory*, 944 F.3d at 1373. Nor has Patent Owner established a nexus between the evidence concerning objective indicia of nonobviousness and the merits of the claimed invention. *See* Resp. 51–55; *supra* § III.G.2(q)(iii)–(iv). Thus, we accord little weight to that evidence. But even if that evidence carried more weight, it would not outweigh the other evidence considered in the *Graham* analysis. *See Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (affirming an obviousness determination “given the strength of the prima facie obviousness showing” even though the patentee

“provided substantial evidence of commercial success, praise, and long-felt need”).

(r) Conclusion for Claim 1

For the reasons discussed above, the combined disclosures in Nishio and Jones teach claim 1’s subject matter. *See supra* §§ III.G.2(a)–(o). Moreover, an ordinarily skilled artisan would have been motivated to combine Jones’s teachings with Nishio’s teachings as Petitioner proposes. *See supra* § III.G.2(p). Also, we accord little weight to Patent Owner’s evidence of objective indicia of nonobviousness. *See supra* § III.G.2(q). Hence, Petitioner has shown by a preponderance of the evidence that claim 1 is unpatentable under § 103(a) as obvious over Nishio and Jones.

3. DEPENDENT CLAIM 2

Claim 2 depends from claim 1 and requires that “said fifth sides are respectively and substantially perpendicular to said third sides.” Ex. 1001, 6:6–8.

Petitioner contends that both Nishio and Jones disclose claim 2’s limitation. Pet. 59–60 (citing Ex. 1002 ¶¶ 145–146; Ex. 1010, 1:35–36, 3:4–6, 4:36–38, 5:41–42, Fig. 1); *see id.* at 40 (citing Ex. 1002 ¶¶ 99–100; Ex. 1007, Fig. 3). Specifically, Petitioner asserts that Nishio’s Figure 1 shows the claimed geometric relationship. *Id.* at 59–60. To support Petitioner’s assertion, Mr. Cady testifies that “[i]t is readily apparent” from Figure 1 that the “fifth sides are respectively and substantially perpendicular to the third sides” according to claim 2. Ex. 1002 ¶ 146 (citing Ex. 1010, 1:35–36, Fig. 1).

Petitioner also asserts that Jones’s embodiment 15 in Figure 3 includes the claimed geometric relationship. Pet. 40, 59 (citing Ex. 1002

¶¶ 99–100; Ex. 1007, Fig. 3). To support Petitioner’s assertion, Mr. Cady testifies that “[i]t is readily apparent” from embodiment 15 in Figure 3 that the “fifth sides are respectively and substantially perpendicular to the third sides” according to claim 2. Ex. 1002 ¶ 100 (citing Ex. 1007, Fig. 3); *see id.* ¶ 146.

Patent Owner makes no arguments specific to claim 2. *See* Resp. 28–36.

We agree with Petitioner that both Nishio and Jones disclose claim 2’s limitation. *See* Pet. 40, 59–60; Ex. 1002 ¶¶ 99–100, 145–146. Nishio’s Figure 1 clearly shows “said fifth sides are respectively and substantially perpendicular to said third sides” according to claim 2. Ex. 1010, Fig. 1; *see id.* at 1:35–36, 3:4–6, 4:36–39; Ex. 1002 ¶ 146. As discussed above for the anticipation ground based on Jones, Jones’s embodiment 15 in Figure 3 clearly shows “said fifth sides are respectively and substantially perpendicular to said third sides” according to claim 2. Ex. 1007, Fig. 3; *see id.* at 4:6–11, 4:33–39, 5:12–20, Fig. 1; Ex. 1002 ¶ 100; *supra* § III.E.3. Hence, Petitioner has shown by a preponderance of the evidence that claim 2 is unpatentable under § 103(a) as obvious over Nishio and Jones.

4. DEPENDENT CLAIM 3

Petitioner contends that Jones discloses claim 3’s limitations for the reasons discussed above for the anticipation ground based on Jones. Pet. 60; *see id.* at 41–42; *supra* § III.E.4. Petitioner also contends that:

[i]t would have been obvious to modify Nishio to incorporate the ratio of the width “Wk” to the height “hk” of Jones’s Embodiment 15, to incorporate the ratio of the width “Wk” to the width “Wp” of Jones’s Embodiment 15, and/or to shift the position of the key and keyway as shown in Jones’s

Embodiments 16 or 17, whereby the dimensional relationship of claim 3 would be met.

Pet. 61 (emphases omitted) (citing Ex. 1002 ¶ 153); *see id.* at 61–62.

Mr. Cady’s testimony supports Petitioner’s contentions. *See* Ex. 1002 ¶¶ 147–154.

Patent Owner makes no arguments specific to claim 3. *See* Resp. 28–36.

For the reasons stated by Petitioner and Mr. Cady, we find that it would have been obvious to modify Nishio according to Jones’s teachings to achieve claim 3’s subject matter. *See* Pet. 60–62; Ex. 1002 ¶¶ 147–154. Hence, Petitioner has shown by a preponderance of the evidence that claim 3 is unpatentable under § 103(a) as obvious over Nishio and Jones.

H. Alleged Obviousness over Kusagaya and Jones: Claims 1–3

Petitioner contends that claims 1–3 are unpatentable under § 103(a) as obvious over Kusagaya and Jones. *See* Pet. 8, 62–73. In view of our determination that claims 1–3 are unpatentable under § 103(a) as obvious over Nishio and Jones, we do not reach this challenge to patentability. *See supra* §§ III.G.2–III.G.4; *Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984) (explaining that an administrative agency may render a decision based on “a single dispositive issue”).

I. Alleged Obviousness over Jones and Koizumi: Claim 4

Petitioner contends that claim 4 is unpatentable under § 103(a) as obvious over Jones and Koizumi. *See* Pet. 8, 73–82. Above, we provided an overview of Jones. *See supra* § III.E.1. Below, we provide an overview of Koizumi, and then we consider the obviousness issues raised by the parties.

For the reasons explained below, we agree with Petitioner that claim 4 is unpatentable under § 103(a) as obvious over Jones and Koizumi.

1. OVERVIEW OF KOIZUMI (EXHIBIT 1012)

Koizumi is a U.S. patent titled “System and Method for Determining Peripheral’s Communication Mode over Row of Pins Disposed in a Socket Connector,” filed on May 19, 1995, and issued on May 13, 1997. Ex. 1012, codes (22), (45), (54). Koizumi states that the invention “relates to an improvement in communication between a data processing apparatus and a peripheral device to be connected to the data processing apparatus.” *Id.* at 1:9–12. Koizumi discloses “a data processing apparatus with a system for identifying various types of communication modes” having “an improved pin or terminal contact configuration.” *Id.* at 2:25–33.

Specifically, Koizumi discloses a data processing apparatus with connector ports 4a and 4b for peripheral devices 3a and 3b, respectively. Ex. 1012, 4:19–27, Figs. 1–3. Ports 4a and 4b include sockets 4as and 4bs, respectively. *Id.* at 4:27–29, Fig. 4. Sockets 4as and 4bs mate with plugs 4ap and 4bp, respectively. *Id.* at 4:28–31, Fig. 4. Plugs 4ap and 4bp connect to peripheral devices 3a and 3b, respectively, via cables 5a and 5b, respectively. *Id.* at 4:32–33, 7:6–7, Figs. 1–4. Peripheral devices 3a and 3b are “electrically and functionally connected to internal circuits of” the data processing apparatus via cables 5a and 5b when plugs 4ap and 4bp are inserted into sockets 4as and 4bs. *Id.* at 4:33–38, 6:24–26. The data processing apparatus’s internal circuits include input/output (I/O) interface 37 for communicating with ports 4a and 4b. *Id.* at 5:66–6:3, 6:23–24, 6:64–65, Figs. 3–4.

Koizumi's Figure 4 is reproduced below:

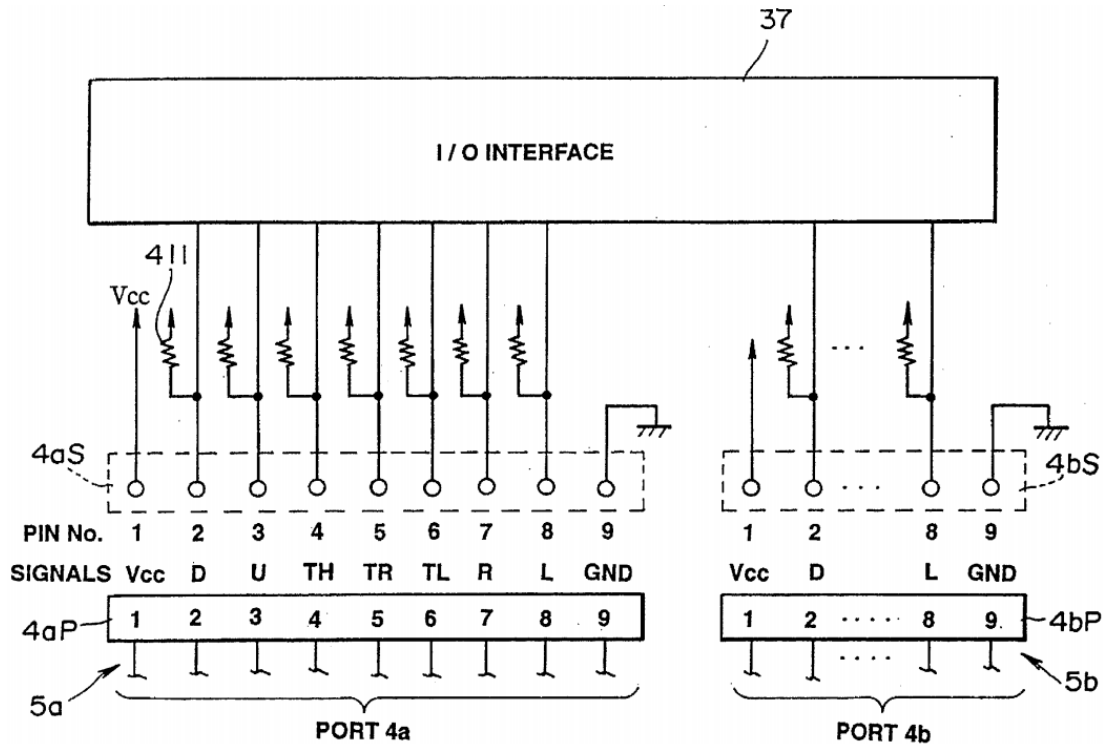


FIG. 4

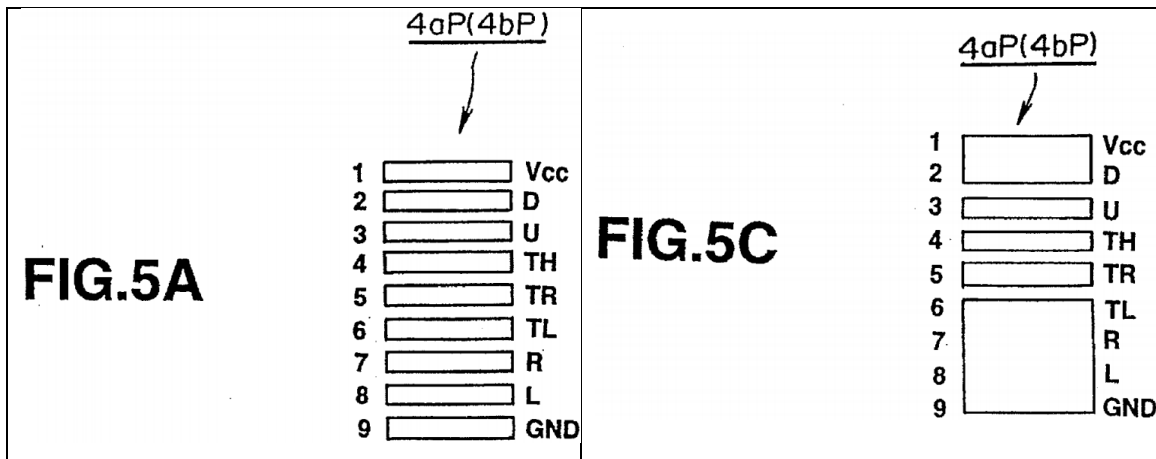
Figure 4 is a block diagram showing “a connector configuration of peripheral ports,” i.e., ports 4a and 4b. Ex. 1012, 3:56–57, Fig. 4.

As Figure 4 shows, I/O interface 37 connects to sockets 4as and 4bs, and sockets 4as and 4bs mate with plugs 4ap and 4bp, respectively. Ex. 1012, 6:64–65, Fig. 4. Each of sockets 4as and 4bs “has a set of socket pins 1 through 9.” *Id.* at 6:65–67, Fig. 4. Each of plugs 4ap and 4bp “has a set of plug pins 1 through 9 corresponding to the socket pins 1 through 9.” *Id.* at 7:3–6, Fig. 4.

Pin 1 connects to power source Vcc, e.g., +5 volts. Ex. 1012, 7:24, 7:66–67, Figs. 4, 5A–5B, 6A–6D. Pin 9 connects to ground. *Id.* at 7:25, 7:67–8:2, Figs. 4, 5A–5B, 6A–6D. Depending on the communication mode,

pins 2 through 8 may carry control signals or data signals. *Id.* at 6:67–7:2, 7:9–65, 8:16–20.

Koizumi’s Figures 5A and 5C are reproduced below:



Figures 5A and 5C are schematic diagrams showing “pin configurations of plug connectors employed to accommodate typical communication modes.” Ex. 1012, 3:58–59; *see id.* at 8:3–5. The different pin configurations “easily accommodate a large number of types of peripheral devices” having different communication modes, e.g., “a three-wire handshake mode, a clocked parallel mode, and a clocked serial mode.” *Id.* at 8:16–24.

Figure 5A “shows a pin configuration for standard communication modes,” e.g., a three-wire handshake mode. Ex. 1012, 8:5–8, Fig. 5A. A peripheral device employing a three-wire handshake mode requires pins 1 through 9 “used electrically independently” as depicted in Figure 5A. *Id.* at 8:24–28, Fig. 5A.

Figure 5C “shows a pin configuration for a clocked serial communication mode.” Ex. 1012, 8:11–12, Fig. 5C. A peripheral device employing a clocked serial mode permits data transmission “through the one data line in cooperation with the two peripheral selection line (TH) and data request line (TR).” *Id.* at 8:35–42. Hence, pin 2 may connect to pin 1 (Vcc),

and pins 6 through 8 may connect to pin 9 (ground) as depicted in Figure 5C. *Id.* at 8:42–44, 9:23–29, 9:49–55, Fig. 5C. The pins may connect via “a short-circuit wire bridging connecting portions” or “a short-circuit pattern on a printed circuit board arranged in the plug.” *Id.* at 9:34–39.

2. DIFFERENCES BETWEEN THE CLAIMED SUBJECT MATTER AND THE PRIOR ART

Claim 4 reads as follows (with formatting added for clarity):

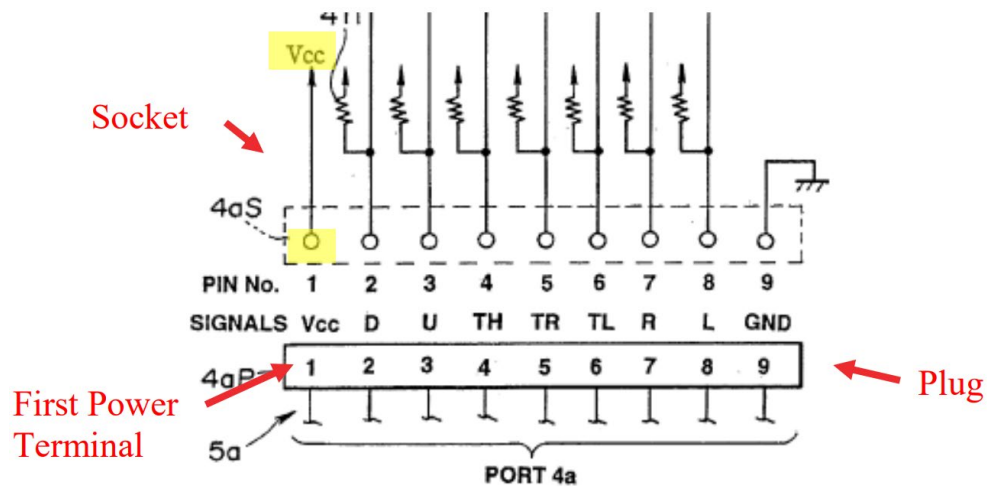
4. The electrical connector assembly of claim 1, wherein
said plug terminals include
 - a first power terminal and
 - a first detecting terminal which is electrically
connected to said first power terminal, andsaid receptacle terminals include
 - a second power terminal and
 - a second detecting terminal
 - which is spaced apart from said second
power terminal and
 - which is electrically connected to said
second power terminal via said first power
terminal and said first detecting terminal when said
first and second mating portions are coupled
together.

Ex. 1001, 6:18–28.

Petitioner contends that Koizumi discloses claim 4’s limitations and provides a detailed analysis supported by Mr. Cady’s testimony mapping claim 4’s limitations to Koizumi’s plug pins and socket pins. *See* Pet. 73–74, 76–82; Ex. 1002 ¶¶ 181–186, 191–200. In particular, Petitioner maps “a first power terminal” to plug pin 1. Pet. 76–77; *see* Ex. 1002

¶¶ 182, 186, 191. Petitioner maps “a first detecting terminal” to plug pin 2. Pet. 78–79; *see* Ex. 1002 ¶¶ 182, 186, 192–193. Petitioner maps “a second power terminal” to socket pin 1. Pet. 79–80; *see* Ex. 1002 ¶¶ 186, 194. Petitioner maps “a second detecting terminal” to socket pin 2. Pet. 80–81; *see* Ex. 1002 ¶¶ 186, 195–200.

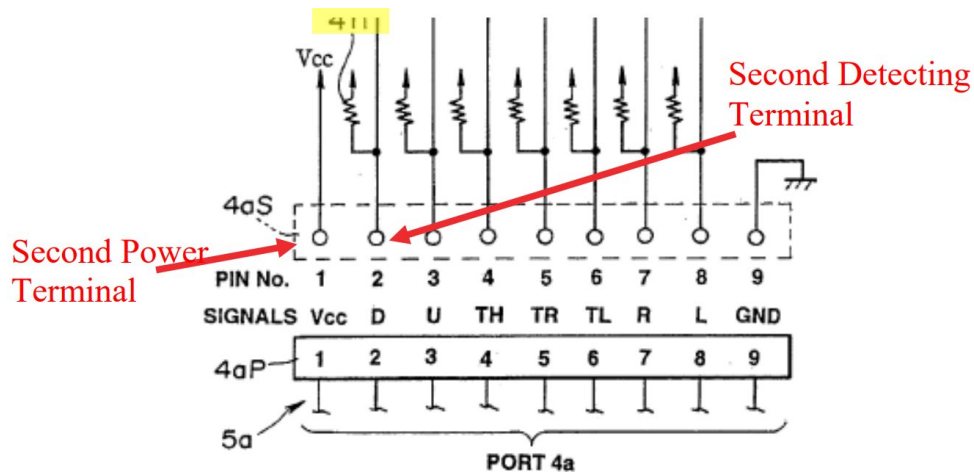
To support Petitioner’s position, Mr. Cady provides an annotated excerpt from Koizumi’s Figure 4 as reproduced below (Ex. 1002 ¶ 191):



The above annotated excerpt from Figure 4 shows a connector configuration with annotations identifying a socket, a plug, and plug pin 1 as the claimed “first power terminal.” *See* Ex. 1002 ¶ 191; Ex. 1012, 3:56–57, Fig. 4.

Mr. Cady testifies that plug pin 2 corresponds to the claimed “first detecting terminal.” Ex. 1002 ¶ 193. Mr. Cady also testifies that plug pin 2 “is electrically connected to” to plug pin 1 by a short-circuit pattern in a configuration according to Koizumi’s Figure 5C. *Id.* ¶¶ 192–193; *see id.* ¶ 76.

To support Petitioner’s position, Mr. Cady provides another annotated excerpt from Koizumi’s Figure 4 as reproduced below (Ex. 1002 ¶ 198):



The above annotated excerpt from Figure 4 shows a connector configuration with annotations identifying socket pin 1 as the claimed “second power terminal” and socket pin 2 as the claimed “second detecting terminal.” See Ex. 1002 ¶ 198; Ex. 1012, 3:56–57, Fig. 4.

Mr. Cady testifies that socket pin 2 “is spaced apart” from socket pin 1. Ex. 1002 ¶ 195. Mr. Cady also testifies that socket pin 2 “is electrically connected to” socket pin 1 when a socket and a plug mate in a configuration according to Koizumi’s Figure 5C. *Id.* ¶¶ 199–200.

Patent Owner does not dispute that Koizumi discloses “a first power terminal,” “a first detecting terminal,” “a second power terminal,” and “a second detecting terminal” according to claim 4. See Resp. 39–43. Instead, Patent Owner notes that during the ’678 patent’s prosecution the Examiner cited U.S. Patent No. 3,710,197 to Olds et al. (“Olds”). *Id.* at 40 (citing Ex. 1004, 163). Then, Patent Owner argues that “Petitioner’s reliance on Koizumi largely overlaps with the Examiner’s reliance on” Kusagaya and Olds and that the “Examiner’s treatment of Olds presents no

material error” to claim 4’s patentability. *Id.* at 40, 43 (emphases omitted). Patent Owner also argues that “the Board should hold that Koizumi is substantially the same art (e.g., Kusagaya and Olds) previously presented to the Office.” *Id.* at 43 (emphases omitted).

For the reasons stated by Petitioner and Mr. Cady, we find that Koizumi discloses claim 4’s limitations. *See* Pet. 73–74, 76–82; Ex. 1002 ¶¶ 76, 181–186, 191–200; Ex. 1012, 6:64–7:50, 8:11–12, 8:42–44, 9:23–33, 9:49–55, Figs. 4, 5C. For example, Koizumi discloses the claimed “plug terminals” and “receptacle terminals” as follows:

- plug pin 1 corresponding to “a first power terminal”;
- plug pin 2 corresponding to “a first detecting terminal”;
- socket pin 1 corresponding to “a second power terminal”; and
- socket pin 2 corresponding to “a second detecting terminal.”

Ex. 1002 ¶¶ 181–186, 191–200; Ex. 1012, 6:64–7:50, Fig. 4.

Plug pin 2 “is electrically connected to” to plug pin 1 by a short-circuit pattern in a configuration according to Koizumi’s Figure 5C. Ex. 1002 ¶¶ 192–193; Ex. 1012, 8:11–12, 8:42–44, 9:23–33, 9:49–55, Fig. 5C. Socket pin 2 “is spaced apart” from socket pin 1, and socket pin 2 “is electrically connected to” socket pin 1 when a socket and a plug mate in a configuration according to Koizumi’s Figure 5C. Ex. 1002 ¶¶ 195, 199–200; Ex. 1012, 7:47–50, 8:11–12, 8:42–44, 9:23–33, 9:49–55, Fig. 5C.

As for Patent Owner’s arguments, whether “Koizumi is [or is not] substantially the same art (e.g., Kusagaya and Olds) previously presented to the Office” does not matter when deciding the merits of Petitioner’s challenge to claim 4 based on Jones and Koizumi. *See* Resp. 43. “[T]here is no legal basis for the proposition the Board must defer to the examiner’s

previous findings in deciding the merits of an IPR.” *TRUSTID, Inc. v. Next Caller, Inc.*, No. 2020-1950, 2021 WL 4427918, at *8 (Fed. Cir. Sept. 27, 2021). The “Supreme Court has characterized the ‘congressional objective’ of the IPR process as ‘giving the Patent Office significant power to revisit and revise earlier patent grants.’” *Skky, Inc. v. MindGeek, s.a.r.l.*, 859 F.3d 1014, 1021 (Fed. Cir. 2017) (quoting *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2139–40 (2016)).

3. ALLEGED REASONS FOR COMBINING THE TEACHINGS OF THE REFERENCES

Petitioner contends that an ordinarily skilled artisan would have been motivated to combine Koizumi’s teachings with Jones’s teachings to facilitate plug-type identification in Jones by incorporating Koizumi’s terminal configuration, thus avoiding “situations where the plug and socket are mismatched.” Pet. 74–75 (citing Ex. 1002 ¶¶ 187, 189–190; Ex. 1007, 1:35–39; Ex. 1012, 1:8–15, 8:11–15, 8:49–54, 9:27–33).

To support Petitioner’s contention, Mr. Cady testifies that Koizumi discloses “a data processing apparatus with a system for identifying various types of communication modes” having “an improved pin or terminal contact configuration.” Ex. 1002 ¶ 188 (quoting Ex. 1012, 2:25–33); *see id.* ¶ 76. Mr. Cady explains that Koizumi provides “a way for a data processing apparatus to detect” information about a peripheral device “by sensing the voltages present on” certain pins in a plug-socket connection. *Id.* ¶ 187 (citing Ex. 1012, 1:8–15, 8:11–15, 8:49–54, 9:27–33); *see id.* ¶ 77.

Mr. Cady also testifies that an ordinarily skilled artisan would have been motivated to combine Koizumi’s teachings with Jones’s teachings to facilitate plug-type identification in Jones by incorporating Koizumi’s

terminal configuration, consistent with Jones’s goal “of avoiding plug/socket mismatching.” Ex. 1002 ¶ 189 (citing Ex. 1007, 1:35–39; Ex. 1012, 1:8–15, 8:11–15, 8:49–54, 9:27–33). According to Mr. Cady, an ordinarily skilled artisan would have applied Koizumi’s teachings to “any situation where it was desirable to detect the type of plug connected to a receptacle on a data processing device, including a computer or telecommunications device of the type referenced in Jones.” *Id.* ¶ 187 (emphasis omitted).

Patent Owner makes no arguments against combining Koizumi’s teachings with Jones’s teachings. *See* Resp. 39–43.

For the reasons stated by Petitioner and Mr. Cady, we find that an ordinarily skilled artisan would have had a reason, i.e., as articulated by Mr. Cady, to combine Koizumi’s teachings with Jones’s teachings as Petitioner proposes. *See* Pet. 74–75; Ex. 1002 ¶¶ 187–189. For example, combining Koizumi’s teachings with Jones’s teachings would have facilitated plug-type identification in Jones by incorporating Koizumi’s terminal configuration, consistent with Jones’s goal “of avoiding plug/socket mismatching.” Ex. 1002 ¶ 189.

4. CONCLUSION

For the reasons discussed above, the combined disclosures in Jones and Koizumi teach claim 4’s subject matter. *See supra* §§ III.E.2, III.I.2. Moreover, an ordinarily skilled artisan would have been motivated to combine Koizumi’s teachings with Jones’s teachings as Petitioner proposes. *See supra* § III.I.3. Further, we accord little weight to Patent Owner’s evidence concerning objective indicia of nonobviousness. *See supra* § III.G.2(q). Additionally, Patent Owner does not argue that any objective indicia of nonobviousness resulted directly from allegedly unique

characteristics of claim 4. *See* Resp. 46–56. Hence, Petitioner has shown by a preponderance of the evidence that claim 4 is unpatentable under § 103(a) as obvious over Jones and Koizumi.

J. Alleged Obviousness over Nishio, Jones, and Koizumi: Claim 4

Petitioner contends that claim 4 is unpatentable under § 103(a) as obvious over Nishio, Jones, and Koizumi. *See* Pet. 8, 73–82. Above, we provided overviews of Nishio, Jones, and Koizumi. *See supra* §§ III.E.1, III.G.1, III.I.1. Below, we consider the obviousness issues raised by the parties. For the reasons explained below, we agree with Petitioner that claim 4 is unpatentable under § 103(a) as obvious over Nishio, Jones, and Koizumi.

1. DIFFERENCES BETWEEN THE CLAIMED
SUBJECT MATTER AND THE PRIOR ART

As discussed above for the obviousness ground based on Jones and Koizumi, Petitioner contends that Koizumi discloses claim 4’s limitations and provides a detailed analysis supported by Mr. Cady’s testimony mapping claim 4’s limitations to Koizumi’s plug pins and socket pins. *See* Pet. 73–74, 76–82; Ex. 1002 ¶¶ 181–186, 191–200; *supra* § III.I.2.

Patent Owner makes the same arguments for the obviousness ground based on Nishio, Jones, and Koizumi as for the obviousness ground based on Jones and Koizumi. *See* Resp. 39–43.

For the reasons stated by Petitioner and Mr. Cady, we find that Koizumi discloses claim 4’s limitations. *See* Pet. 73–74, 76–82; Ex. 1002 ¶¶ 76, 181–186, 191–200; Ex. 1012, 6:64–7:50, 8:11–12, 8:42–44, 9:23–33, 9:49–55, Figs. 4, 5C; *supra* § III.I.2.

2. ALLEGED REASONS FOR COMBINING THE TEACHINGS OF THE REFERENCES

Petitioner contends that an ordinarily skilled artisan would have been motivated to combine Koizumi's teachings with the teachings of Nishio and Jones for substantially the same reasons that an ordinarily skilled artisan would have been motivated to combine Koizumi's teachings with Jones's teachings. *See* Pet. 74–76. Mr. Cady's testimony supports Petitioner's contention. *See* Ex. 1002 ¶¶ 187–189; *supra* § III.I.3.

Patent Owner makes no arguments against combining Koizumi's teachings with the teachings of Nishio and Jones. *See* Resp. 39–43.

For the reasons stated by Petitioner and Mr. Cady, we find that an ordinarily skilled artisan would have had a reason, i.e., as articulated by Mr. Cady, to combine Koizumi's teachings with the teachings of Nishio and Jones as Petitioner proposes. *See* Pet. 74–75; Ex. 1002 ¶¶ 187–189.

3. CONCLUSION

For the reasons discussed above, the combined disclosures in Nishio, Jones, and Koizumi teach claim 4's subject matter. *See supra* §§ III.G.2, III.J.1. Moreover, an ordinarily skilled artisan would have been motivated to combine Koizumi's teachings with the teachings of Nishio and Jones as Petitioner proposes. *See supra* § III.J.2. Further, we accord little weight to Patent Owner's evidence concerning objective indicia of nonobviousness. *See supra* § III.G.2(q). Additionally, Patent Owner does not argue that any objective indicia of nonobviousness resulted directly from allegedly unique characteristics of claim 4. *See* Resp. 46–56. Hence, Petitioner has shown by a preponderance of the evidence that claim 4 is unpatentable under § 103(a) as obvious over Nishio, Jones, and Koizumi.

*K. Alleged Obviousness over Jones,
Koizumi, and Roldan: Claim 5*

Petitioner contends that claim 5 is unpatentable under § 103(a) as obvious over Jones, Koizumi, and Roldan. *See* Pet. 8, 82–84. Above, we provided overviews of Jones and Koizumi. *See supra* §§ III.E.1, III.I.1. Below, we provide an overview of Roldan, and then we consider the obviousness issues raised by the parties. For the reasons explained below, we agree with Petitioner that claim 5 is unpatentable under § 103(a) as obvious over Jones, Koizumi, and Roldan.

1. OVERVIEW OF ROLDAN (EXHIBIT 1013)

Roldan is a U.S. patent titled “Electrical Connector Receptacle,” filed on June 29, 1984, and issued on May 27, 1986. Ex. 1013, codes (22), (45), (54). Roldan states that the invention “relates to a receptacle contact for use in the fabrication of a connector employing a plurality of such receptacle contacts.” *Id.* at 1:5–7. In particular, “the invention concerns a receptacle contact which is formed with less wasted material than prior art receptacle contacts.” *Id.* at 1:15–17.

Roldan's Figure 3 is reproduced below:

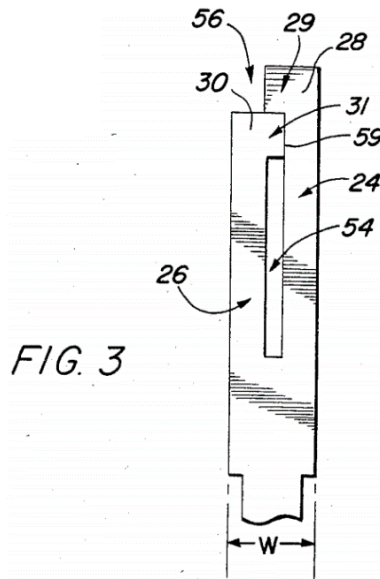


Figure 3 “shows a plan view of the material stamped from” a metal blank to form a receptacle contact. Ex. 1013, 3:26–28, 4:66–68, Fig. 3. “The blank is punched to form a receptacle contact 10 having a width W.” *Id.* at 4:68–5:1; *see id.* at 2:36–40.

As Figure 3 shows, receptacle contact 10 includes right leg 24 and left leg 26. Ex. 1013, 3:54–61, Fig. 3. Right leg 24 includes at its terminal end contact surface 28 with lateral extension 29 extending toward left leg 26. *Id.* at 3:54–58, Fig. 3. Left leg 26 includes at its terminal end contact surface 30 with lateral extension 31 extending toward right leg 24. *Id.* at 3:59–61, Fig. 3. At the ends opposite to the terminal ends, right leg 24 and left leg 26 merge and have a combined width W. *Id.* at 4:68–5:1, Fig. 3.

Roldan describes fabricating receptacle contacts by stamping or punching as conventional, saying:

In the past it has been common in the art to fabricate receptacle contacts by stamping a metal blank and coining the material stamped from the blank material into a desired shape, which may include rolling, bending or twisting certain portions

of the material stamped from the blank in order to form the desired receptacle contact.

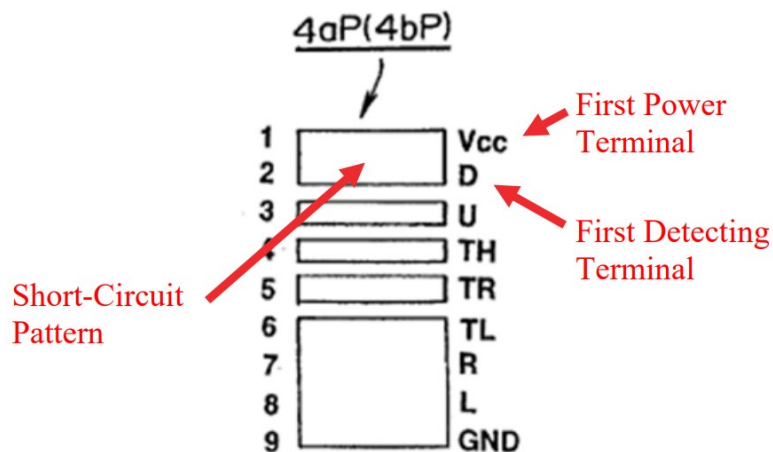
Ex. 1013, 1:25–31.

2. DIFFERENCES BETWEEN THE CLAIMED SUBJECT MATTER AND THE PRIOR ART

Claim 5 depends from claim 4 and requires that “said first power terminal and said first detecting terminal are integrally formed and are punched from a metal plate.” Ex. 1001, 6:29–31.

Petitioner contends that the combined disclosures in Koizumi and Roldan teach claim 5’s limitations and provides a detailed analysis supported by Mr. Cady’s testimony showing how the references do so. *See* Pet. 82–84; Ex. 1002 ¶¶ 79, 202–208. Specifically, Petitioner asserts that Koizumi discloses that plug pin 1 (the claimed “first power terminal”) and plug pin 2 (the claimed “first detecting terminal”) are “integrally formed” by providing “a short-circuit pattern on a printed circuit board arranged in the plug.” Pet. 83 (quoting Ex. 1012, 9:38–39; citing Ex. 1002 ¶ 206); *see* Ex. 1002 ¶ 206. Petitioner asserts that Roldan discloses “another process for integrally forming” a “contact terminal having first and second legs,” in particular, “stamping the contact from a width of metal.” Pet. 83–84 (citing Ex. 1013, 2:36–47; Ex. 1002 ¶ 207); *see* Ex. 1002 ¶ 207.

To support Petitioner’s position, Mr. Cady provides an annotated version of Koizumi’s Figure 5C as reproduced below (Ex. 1002 ¶ 206):



The above annotated version of Figure 5C is a schematic diagram showing a pin configuration of a plug connector with annotations identifying plug pin 1 as the claimed “first power terminal,” plug pin 2 as the claimed “first detecting terminal,” and a short-circuit pattern between plug pin 1 and plug pin 2. *See* Ex. 1002 ¶ 206; Ex. 1012, 3:58–59, 8:3–5, Fig. 5C.

Mr. Cady testifies that plug pin 1 and plug pin 2 in Figure 5C are “integrally formed” by providing “a short-circuit pattern on a printed circuit board arranged in the plug.” Ex. 1002 ¶ 206 (quoting Ex. 1012, 9:38–39); *see id.* ¶¶ 203, 207. Mr. Cady also testifies that Roldan discloses “a contact (i.e., a terminal) formed by a novel fabrication process which includes stamping the contact from a width of metal.” *Id.* ¶ 207 (citing Ex. 1013, 2:36–47); *see id.* ¶ 79.

Patent Owner admits that Roldan “describes fabricating receptacle contacts by stamping or punching as conventional” and that Roldan teaches claim 5’s limitations. Resp. 44–45 (quoting Ex. 1013, 1:25–31). But Patent Owner argues that Roldan teaches claim 5’s limitations “for similar reasons as Olds” and that the “Examiner’s treatment of Olds presents no material error” to claim 5’s patentability. *Id.* at 45–46 (emphases omitted) (citing

Pet. 73–84; Ex. 1004, 163). Patent Owner also argues that “the Board should hold that Roldan is substantially the same art (e.g., Kusagaya and Olds) previously presented to the Office.” *Id.* at 46 (emphases omitted).

For the reasons stated by Petitioner and Mr. Cady and supported by Patent Owner’s admission, we find that the combined disclosures in Koizumi and Roldan teach claim 5’s limitations. *See* Pet. 82–84; Resp. 44–45; Ex. 1002 ¶¶ 79, 202–208; Ex. 1012, 9:34–39, Fig. 5C; Ex. 1013, 1:25–31, 2:36–40, 3:26–28, 3:54–61, 4:66–5:1, Fig. 3. For example, Roldan describes fabricating receptacle contacts by stamping or punching as conventional. Ex. 1013, 1:25–31; *see* Resp. 44–45 (quoting Ex. 1013, 1:25–31).

As for Patent Owner’s arguments, whether “Roldan is [or is not] substantially the same art (e.g., Kusagaya and Olds) previously presented to the Office” does not matter when deciding the merits of Petitioner’s challenge to claim 5 based on Jones, Koizumi, and Roldan. *See* Resp. 46. As discussed above, “there is no legal basis for the proposition the Board must defer to the examiner’s previous findings in deciding the merits of an IPR.” *TRUSTID*, 2021 WL 4427918, at *8; *see supra* § III.I.2.

3. ALLEGED REASONS FOR COMBINING THE TEACHINGS OF THE REFERENCES

Petitioner contends that an ordinarily skilled artisan would have been motivated to combine Roldan’s teachings with the teachings of Jones and Koizumi to “facilitate the manufacturing process.” *See* Pet. 83–84.

To support Petitioner’s contention, Mr. Cady testifies that an ordinarily skilled artisan would have been motivated to combine Roldan’s teachings with the teachings of Jones and Koizumi because the skilled

artisan would have recognized that replacing Koizumi’s “short-circuit pattern on a printed circuit board” with Roldan’s “stamped, connected pair of contacts” would advantageously (1) reduce cost, (2) improve reliability, and (3) simplify manufacturing. Ex. 1002 ¶¶ 207–208.

Patent Owner makes no arguments against combining Roldan’s teachings with the teachings of Jones and Koizumi. *See* Resp. 43–46.

For the reasons stated by Petitioner and Mr. Cady, we find that an ordinarily skilled artisan would have had a reason, i.e., as articulated by Mr. Cady, to combine Roldan’s teachings with the teachings of Jones and Koizumi as Petitioner proposes. *See* Pet. 83–84; Ex. 1002 ¶¶ 207–208.

4. CONCLUSION

For the reasons discussed above, the combined disclosures in Jones, Koizumi, and Roldan teach claim 5’s subject matter. *See supra* §§ III.E.2, III.I.2, III.K.2. Moreover, an ordinarily skilled artisan would have been motivated to combine Roldan’s teachings with the teachings of Jones and Koizumi as Petitioner proposes. *See supra* § III.K.3. Further, we accord little weight to Patent Owner’s evidence concerning objective indicia of nonobviousness. *See supra* § III.G.2(q). Additionally, Patent Owner does not argue that any objective indicia of nonobviousness resulted directly from allegedly unique characteristics of claim 5. *See* Resp. 46–56. Hence, Petitioner has shown by a preponderance of the evidence that claim 5 is unpatentable under § 103(a) as obvious over Jones, Koizumi, and Roldan.

L. Alleged Obviousness over Nishio, Jones, Koizumi, and Roldan: Claim 5

Petitioner contends that claim 5 is unpatentable under § 103(a) as obvious over Nishio, Jones, Koizumi, and Roldan. *See* Pet. 8, 73–82.

Above, we provided overviews of Nishio, Jones, Koizumi, and Roldan. *See supra* §§ III.E.1, III.G.1, III.I.1, III.K.1. Below, we consider the obviousness issues raised by the parties. For the reasons explained below, we agree with Petitioner that claim 5 is unpatentable under § 103(a) as obvious over Nishio, Jones, Koizumi, and Roldan.

1. DIFFERENCES BETWEEN THE CLAIMED SUBJECT MATTER AND THE PRIOR ART

As discussed above for the obviousness ground based on Jones, Koizumi, and Roldan, Petitioner contends that the combined disclosures in Koizumi and Roldan teach claim 5's limitations and provides a detailed analysis supported by Mr. Cady's testimony showing how the references do so. *See* Pet. 82–84; Ex. 1002 ¶¶ 79, 202–208; *supra* § III.K.2.

Patent Owner makes the same arguments for the obviousness ground based on Nishio, Jones, Koizumi, and Roldan as for the obviousness ground based on Jones, Koizumi, and Roldan. *See* Resp. 43–46. In doing so, Patent Owner admits that Roldan “describes fabricating receptacle contacts by stamping or punching as conventional” and that Roldan teaches claim 5's limitations. *Id.* at 44–45 (quoting Ex. 1013, 1:25–31).

For the reasons stated by Petitioner and Mr. Cady and supported by Patent Owner's admission, we find that the combined disclosures in Koizumi and Roldan teach claim 5's limitations. *See* Pet. 82–84; Resp. 44–45; Ex. 1002 ¶¶ 79, 202–208; Ex. 1012, 9:34–39, Fig. 5C; Ex. 1013, 1:25–31, 2:36–40, 3:26–28, 3:54–61, 4:66–5:1, Fig. 3; *supra* § III.K.2.

2. ALLEGED REASONS FOR COMBINING THE TEACHINGS OF THE REFERENCES

Petitioner contends that an ordinarily skilled artisan would have been motivated to combine Roldan's teachings with the teachings of Nishio,

Jones, and Koizumi for substantially the same reasons that an ordinarily skilled artisan would have been motivated to combine Roldan's teachings with the teachings of Jones and Koizumi. *See* Pet. 83–84. Mr. Cady's testimony supports Petitioner's contention. *See* Ex. 1002 ¶¶ 207–208; *supra* § III.K.3.

Patent Owner makes no arguments against combining Roldan's teachings with the teachings of Nishio, Jones, and Koizumi. *See* Resp. 43–46.

For the reasons stated by Petitioner and Mr. Cady, we find that an ordinarily skilled artisan would have had a reason, i.e., as articulated by Mr. Cady, to combine Roldan's teachings with the teachings of Nishio, Jones, and Koizumi as Petitioner proposes. *See* Pet. 83–84; Ex. 1002 ¶¶ 207–208.

3. CONCLUSION

For the reasons discussed above, the combined disclosures in Nishio, Jones, Koizumi, and Roldan teach claim 5's subject matter. *See supra* §§ III.G.2, III.J.1, III.L.1. Moreover, an ordinarily skilled artisan would have been motivated to combine Roldan's teachings with the teachings of Nishio, Jones, and Koizumi as Petitioner proposes. *See supra* § III.L.2. Further, we accord little weight to Patent Owner's evidence concerning objective indicia of nonobviousness. *See supra* § III.G.2(q). Additionally, Patent Owner does not argue that any objective indicia of nonobviousness resulted directly from allegedly unique characteristics of claim 5. *See* Resp. 46–56. Hence, Petitioner has shown by a preponderance of the evidence that claim 5 is unpatentable under § 103(a) as obvious over Nishio, Jones, Koizumi, and Roldan.

IV. CONCLUSION

Based on the evidence of record and the parties' respective arguments, Petitioner has shown by a preponderance of the evidence that:

- (1) claims 1–3 are unpatentable under § 102(b) as anticipated by Jones;
- (2) claims 1–3 are unpatentable under § 103(a) as obvious over Nishio and Jones;
- (3) claim 4 is unpatentable under § 103(a) as obvious over Jones and Koizumi;
- (4) claim 4 is unpatentable under § 103(a) as obvious over Nishio, Jones, and Koizumi;
- (5) claim 5 is unpatentable under § 103(a) as obvious over Jones, Koizumi, and Roldan; and
- (6) claim 5 is unpatentable under § 103(a) as obvious over Nishio, Jones, Koizumi, and Roldan.⁷

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–3	102(b)	Jones	1–3	

⁷ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding after the issuance of this Final Written Decision, we draw Patent Owner's attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–3	103(a)	Jones ⁸		
1–3	103(a)	Nishio, Jones	1–3	
1–3	103(a)	Kusagaya, Jones ⁹		
4	103(a)	Jones, Koizumi	4	
4	103(a)	Nishio, Jones, Koizumi	4	
5	103(a)	Jones, Koizumi, Roldan	5	
5	103(a)	Nishio, Jones, Koizumi, Roldan	5	
Overall Outcome			1–5	

V. ORDER

Accordingly, it is

ORDERED that claims 1–5 in the '678 patent are determined to be unpatentable; and

⁸ In view of our determination that claims 1–3 are unpatentable under § 102(b) as anticipated by Jones, we do not reach this challenge to patentability. *See supra* § III.F.

⁹ In view of our determination that claims 1–3 are unpatentable under § 103(a) as obvious over Nishio and Jones, we do not reach this challenge to patentability. *See supra* § III.H.

FURTHER ORDERED that, because this is a Final Written Decision, the 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.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS, LLC,
Petitioner,

v.

OCEANA INNOVATIONS, LLC,
Patent Owner.

IPR2020-01463
Patent 6,508,678 B1

Before MINN CHUNG, STEVEN M. AMUNDSON, and
STEPHEN E. BELISLE, *Administrative Patent Judges*.

CHUNG, *Administrative Patent Judge, Dissenting*.

I dissent respectfully from the panel majority’s Final Written Decision (“Decision” or “FWD”) finding that Petitioner has demonstrated by a preponderance of the evidence that claims 1–5 (the “challenged claims”) in the ’678 patent are unpatentable. In my view, Petitioner has not shown by a preponderance of the evidence that the challenged claims are unpatentable with respect to any of the grounds of unpatentability asserted in the Petition.

As noted in the Decision (FWD 12), Petitioner bears the burden of persuasion, by a preponderance of the evidence, that the challenged claims are unpatentable. 35 U.S.C. § 316(e). “In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review). In what follows, because Patent Owner does not have the burden of persuasion to rebut Petitioner’s evidence, I focus mainly on the sufficiency of Petitioner’s evidence and arguments. I discuss each of the grounds of unpatentability presented in the Petition, including anticipation by Jones, obviousness over Jones, and obviousness over the combination of Nishio and Jones.

A. Anticipation by Jones

Petitioner contends that claim 1–3 are unpatentable as anticipated by Jones. Pet. 30–42. In my view, Petitioner does not demonstrate by a preponderance of the evidence anticipation by Jones because Petitioner does not show sufficiently that Jones discloses limitation [1j] of claim 1 reciting “said first and second sides being longer than each of said third sides.” As discussed below, limitation [1j] requires a specific quantitative relationship between the lengths of the recited “first and second sides” and the length of “each of” the recited “third sides.” For the reasons described in what

follows, Petitioner does not show sufficiently that Jones discloses this quantitative relationship required by limitation [1j].

Addressing claim 1, Petitioner presents in the Petition an annotated, rotated, and enlarged excerpt from Figure 3 depicting embodiment 15 and asserts that “[i]t is *readily apparent* that Embodiment 15 discloses *these elements*”—“[1i] said first side being longer than said second side, [1j] said first and second sides being longer than each of said third sides, [1k] the width between said third sides being greater than that between said fourth sides.” *Id.* at 37–38 (emphases added) (citing Ex. 1007, 4:6–8, 4:33–45, 5:7–20; Ex. 1002 ¶¶ 92–94). Other than this conclusory sentence that addresses three limitations together, Petitioner does not provide any further explanation. For instance, Petitioner does not explain the significance of the cited portions of Jones in relation to Jones’s alleged disclosure of limitation [1j] reciting “said first and second sides being longer than each of said third sides.”

The portions of Jones cited by Petitioner are reproduced below.

FIG. 3 shows a series of plugs or sockets according to an embodiment of the present invention viewed in the same manner as in FIG. 1 . . .

* * *

A first pair of opposed sidewalls separated by a width W_p and a second pair of opposed sidewalls separated by an height h_p and disposed transversely, in this instance orthogonally, to the first pair of sidewalls, form the main body of the recess of engageable portion. The sidewalls in FIG. 1 are shown as flat surfaces. Whilst this is preferable it is not essential and other suitable contours may be used as required. On the upper one of the second sidewalls a key or keyway is provided of width W_k and height h_k . If the keyway is to be provided on the plug, the plug and socket adopt the contour shown by the dotted line. In FIG. 1 the key or keyway is shown as being trapezoidal, whilst this

shape is preferable it is not essential and other suitable cross-sections may be used.

Ex. 1007, 4:6–8, 4:33–47.

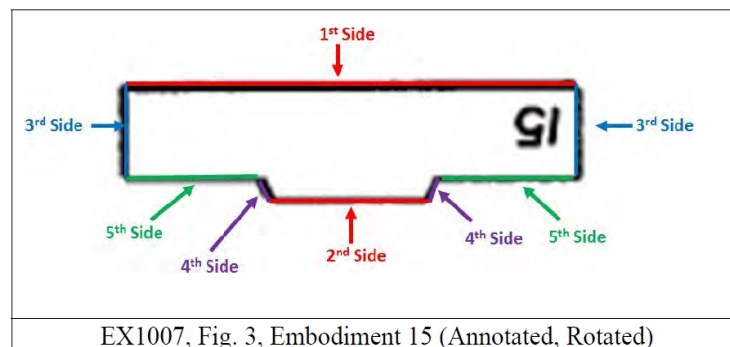
In FIG. 3 a series of plugs are shown all having the same height h_p . In the case of plugs 10, 11, 12 and 13 which are all of different width W_p , the narrower plugs e.g. 10 are prevented from insertion into the sockets of 10 the wider plugs e.g. 11, 12, 13 by their key heights h_k increasing as their width W_p decreases. Alternatively narrower plugs can be prevented from insertion into wider sockets by the width W_k of the keyway being increased as the plug width W_p decreases. Such a series of plugs are 13, 14 and 15. Again in the case of each of the members of the above series a further sub-series of coding may be provided by altering the position of the keyway on the upper second sidewall as shown by plugs 15, 16 and 17 and also 10, 18 and 19.

Id. at 5:7–20.

Petitioner does not identify, nor do I discern, anything in the cited portions of Jones that discloses limitation [1j] of claim 1. *See* Pet. 37–38.

In the cited paragraphs of his Declaration, Mr. Cady provides an annotated, rotated, and enlarged excerpt from Figure 3 depicting embodiment 15, similar to the figure presented in the Petition. Ex. 1002 ¶ 91.

A rotated and annotated excerpt from Figure 3 depicting embodiment 15 presented in the Cady Declaration is reproduced below.



Ex. 1002 ¶ 91. The figure above shows an annotated excerpt from Jones’s Figure 3 depicting embodiment 15 that “has been rotated to match the orientation” in the ’678 patent’s Figure 10. *Id.*

Referring to the annotated, rotated figure presented in his Declaration, Mr. Cady addresses limitation [1j] and asserts that “[i]t is readily apparent that Embodiment 15’s first and second sides are longer than the third side.”

Ex. 1002 ¶ 93. However, other than providing this single conclusory sentence and the cited annotated, rotated figure, Mr. Cady does not provide any further explanation or support. *See id.*

Apparently recognizing that it did not provide in the Petition—other than the single conclusory sentence from Mr. Cady and an annotated, rotated, and enlarged excerpt from Figure 3 depicting embodiment 15—any further explanation or support for its contention that Jones discloses limitation [1j], Petitioner in the Reply cites a number of precedential cases and argues that “***drawings alone***” from prior art are sufficient to demonstrate anticipation by Jones. Reply 10–12 (citing *In re Bager*, 47 F.2d 951 (CCPA 1931); *In re Aslanian*, 590 F.2d 911 (CCPA 1979); *In re Mraz*, 455 F.2d 1069 (CCPA 1972)). The majority discusses the cases cited by Petitioner and Patent Owner in the Patent Owner Response, as well as additional cases relating to the issue of whether prior art drawings alone may be relied on to show anticipation or obviousness. FWD 39–47.

Although “[d]escription for the purposes of anticipation can be by drawings alone as well as by words,” “whether [a] . . . showing in a drawing is or is not an anticipation of a later invention *depends generally upon the facts in each particular case.*” *Bager*, 47 F.2d at 952–53 (emphasis added). In addition, anticipation is a question of fact, including whether a limitation

is present in a prior art reference. *In re Gleave*, 560 F.3d 1331, 1334–35 (Fed. Cir. 2009). In its discussion of case law, Petitioner largely dwells on the general question of whether drawings alone may be used to show anticipation or obviousness, without discussing in sufficient detail specific facts of the cited cases and how they are applicable to the particular facts of this IPR. *See* Reply 10–12. In my view, the majority’s analysis also does not address sufficiently the particular facts specific to the instant proceeding. As discussed below, in my view, a more nuanced analysis is necessary to apply the precedents to the specific facts presented in the instant proceeding and to determine whether Petitioner may rely on the drawing of Jones alone to show Jones discloses the specific quantitative relationship required by limitation [1j].

Claim 1 recites that “said first and second sides are substantially parallel” and “said third sides are substantially perpendicular to said first side.” Ex. 1001, 6:1–3. In other words, claim 1 recites that the recited “first and second sides” are substantially perpendicular to the “third sides.” As recited in limitation [1j], claim 1 also requires “said first and second sides [are] longer than each of said third sides.” Thus, claim 1 requires a specific quantitative relationship between the length values of the recited perpendicular structures—i.e., (1) the length of the first side is greater than the length of each of the perpendicular third sides and (2) the length of the second side is greater than the length of each of the perpendicular third sides. In my view, the key issue presented by Petitioner’s assertion of anticipation by Jones in the instant IPR is this—whether Petitioner may rely on the drawing of Jones *alone* to show, by a preponderance of the evidence,

that Jones discloses this quantitative relationship between the length values of the perpendicular structures, as required by limitation [1j].¹⁰

Figure 3 of Jones is reproduced below.

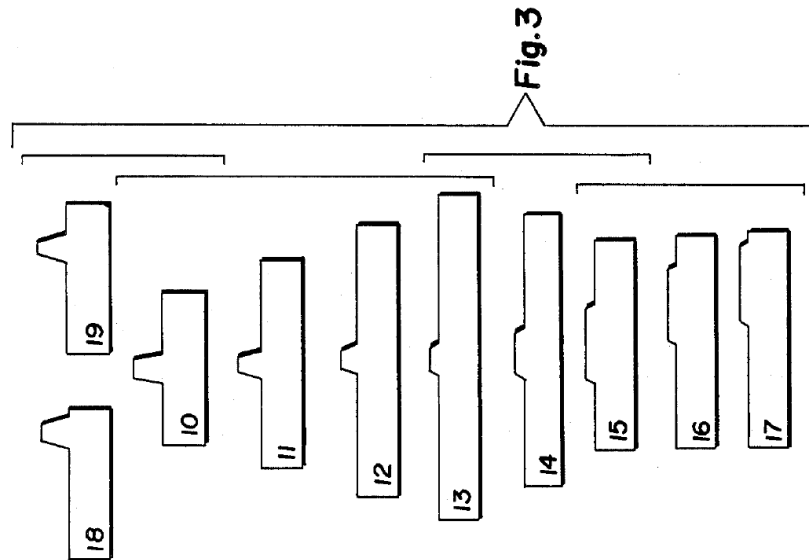


Figure 3 “shows a series of plugs or sockets” with “different cross-sectional dimensions” identified as embodiments 10 through 19. Ex. 1007, 4:6–11, 5:7–20, Fig. 3.

As discussed by the majority in the Final Written Decision, Petitioner asserts, and I agree, that Jones’s first side and second side are each *perpendicular* to Jones’s third sides. FWD 53–55; Pet. 38–39. Thus, by arguing that Jones’s embodiment 15 discloses “said first and second sides

¹⁰ According to the majority, “Petitioner does not rely on quantitative measurements from Jones’s Figure 3 to show particular sizes.” FWD 46 (citing Pet. 37–38; Reply 8–9, 15; Ex. 1002 ¶ 93). In my view, quantitative determinations are not limited to measuring particular sizes. For example, determining length A is greater than length B is a quantitative determination because it requires a quantitative procedure of subtracting the value of length B from the value of length A and determining that the result of the subtraction is a positive number (i.e., a number greater than zero).

being longer than each of said third sides,” as recited in claim 1, Petitioner asserts that the cross-section for embodiment 15 shown in original Figure 3 (in the orientation reproduced above) is *longer than it is wider*. More specifically, Petitioner’s contention amounts to an assertion that, in the orientation shown above, each of the structure on the right and left sides of the cross-section (the claimed “first and second sides”) is longer than the perpendicular top or bottom side of the cross-section (the claimed “third sides”) is wider. *See* Pet. 37–38; Ex. 1002 ¶ 93.

In my view, a recent precedential decision by the Federal Circuit in *Plantronics, Inc. v. Aliph, Inc.*, 724 F.3d 1343 (Fed. Cir. 2013) is instructive, if not controlling, in determining whether Petitioner has demonstrated by a preponderance of evidence that Jones anticipates claim 1 under the particular facts of this case—i.e., whether Petitioner can rely on the cross-section drawing of Jones’s embodiment 15 *alone* to show Jones discloses the specific quantitative relationship required by limitation [1j]. In other words, whether Petitioner can rely on the cross-section drawing of Jones alone to show that the cross-section’s first and second sides are longer than the perpendicular third sides, i.e., the cross-section is *longer than it is wider* in the orientation of Figure 3 shown above.

In *Plantronics*, the Federal Circuit held that figures in a patent that “do not evidence actual dimensions” of a stabilizer of a headset “cannot be relied upon to argue” that the stabilizer is “elongated,” meaning “*longer than it is wide*.” *Plantronics*, 724 F.3d at 1349–51 (emphasis added). In *Plantronics*, the accused infringer argued that the district court’s summary judgment of noninfringement should be sustained because all of the figures of the asserted patent showed stabilizer members of a headset that are

“elongated,” meaning “longer than it is wide.” *Id.* at 1349. The Federal Circuit rejected the accused infringer’s argument and stated

“Patent drawings [however] do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.” *Hockerson–Halberstadt, Inc. v. Avia Grp. Int’l, Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000); *see also In re Wright*, 569 F.2d 1124, 1127 (CCPA 1977) (“Absent any written description in the specification of quantitative values, arguments based on measurement of a drawing are of little value.”); Manual of Patent Examining Procedure 2125 (“Proportions of features in a drawing are not evidence of actual proportions when drawings are *not to scale*.”). Because the figures in the ’453 patent do not evidence actual dimensions of the “stabilizer support” and the “concha stabilizer,” they cannot be relied upon to argue that the disputed terms should be limited to [a stabilizer that is “longer than it is wide”].

Plantronics, 724 F.3d at 1351 (emphasis added) (first alteration in original). The Federal Circuit reversed and vacated the district court’s summary judgment of noninfringement. *Id.* at 1352–53.

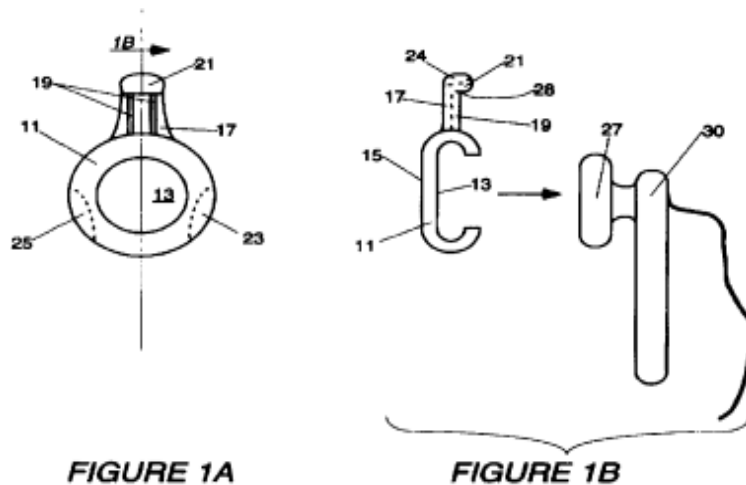
Thus, in *Plantronics*, the Federal Circuit found that the relative lengths in perpendicular dimensions or directions of an object depicted in a patent drawing (“longer than it is wide”—having a greater length in a vertical direction than the length in a horizontal direction) cannot be determined from the drawing alone unless the reference evidences “actual dimensions” of the horizontal and vertical lengths or actual proportions of the lengths in the drawing, or that the figure is drawn to scale. Similarly, without evidence of actual dimensions or actual proportions, or evidence that the figure is drawn to scale, Figure 3 of Jones cannot be relied upon *alone* to show that the cross-section for embodiment 15 shown in Figure 3 (reproduced above) is *longer than it is wider* or with respect to the rotated

and annotated embodiment 15 drawing presented in the Cady Declaration, wider than it is taller.

Petitioner argues, and the majority agrees, that *Plantronics* is not applicable to the issue of anticipation by Jones in this IPR because *Plantronics* is about “the unrelated issue of how a patent’s drawings should be used in construing its claims.” Reply 14 (citing *Plantronics*, 724 F.3d at 1349–51); FWD 46–47 (“*Plantronics* involved claim construction, not whether a patent drawing depicted a claim limitation for purposes of anticipation or obviousness.” (citing *Plantronics*, 724 F.3d at 1348–53)). In particular, Petitioner asserts that the holding of *Plantronics* is limited to the claim construction ruling that “interpreting the claim term ‘stabilizer’ to mean elongated stabilizer merely because the figures showed an elongated stabilizer . . . would be improperly *limiting the claims to a preferred embodiment*.” Tr. 20:1–6 (emphasis added).

I disagree with Petitioner’s argument. Although claim construction is ultimately a question of law, it may be based on underlying factual determinations. See *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 325–26 (2015). In my view, the factual determination underlying the claim construction ruling in *Plantronics* is directly on point on the key *factual question* presented in this IPR of whether a drawing alone can be relied on to teach a structure that is *longer than it is wider*.

The patent figures at issue in *Plantronics* are reproduced below.



The figures above depict embodiments of the concha stabilizer of the patent at issue in *Plantronics*. *Plantronics*, 724 F.3d at 1346–47.

Under Petitioner’s logic, it would be “readily apparent” that these figures (particularly Figure 1B) disclose a stabilizer that is “longer than it is wide” because the figures show the length of the stabilizer is “objectively longer” than the width. *See* Pet. 37; Reply 8. But, in my view, this reasoning has been rejected by the Federal Circuit in *Plantronics*. Instead of merely holding that preferred embodiments cannot be used to limit the scope of the claim, the Federal Circuit in *Plantronics* rejected the argument that the figures reproduced above alone disclose stabilizers that are “longer than [they are] wide” “[b]ecause the figures in the [patent at issue] *do not evidence actual dimensions* of the ‘stabilizer support’ and the ‘concha stabilizer.’” *Plantronics*, 724 F.3d at 1351(emphasis added).

In other words, it is *not* the case that the Federal Circuit in *Plantronics* found that the figures reproduced above alone are sufficient to disclose stabilizers that are “longer than [they are] wide” but that such features of

preferred embodiments do not limit the scope of the claim at issue. Instead, the Federal Circuit found that “the figures in the [patent at issue] *do not evidence actual dimensions* of the ‘stabilizer support’ and the ‘concha stabilizer.’” *Plantronics*, 724 F.3d at 1351 (emphasis added). Such a finding would have been unnecessary if *Plantronics* is merely about preferred embodiments not limiting the scope of the claim in general.

I also note that *Wright* and Section 2125 of the Manual of Patent Examining Procedure (“MPEP”) quoted in *Plantronics* are concerned with whether a patent drawing discloses a claim limitation for purposes of anticipation or obviousness. *See Wright*, 569 F.2d 1124; MPEP § 2125 (9th ed. Rev. 10) (2019) (“Drawings as Prior Art,” “II. PROPORTIONS OF FEATURES IN A DRAWING ARE NOT EVIDENCE OF ACTUAL PROPORTIONS WHEN DRAWINGS ARE NOT TO SCALE”). Thus, the Federal Circuit in *Plantronics* found that *Wright* and Section 2125 of MPEP informed its determination whether the disputed terms should be limited to a stabilizer that is “longer than it is wide” based on patent drawings when “the figures in the [patent at issue] *do not evidence actual dimensions*.” Conversely, in my view, although *Plantronics* is not about anticipation, the factual determination underlying the claim construction ruling in *Plantronics* informs the Board’s determination in this case of the *factual issue* of whether it can be determined from the Jones’s cross-section drawing *alone* that Jones discloses the first and second sides are longer than the perpendicular third sides, i.e., each side of the cross-section is *longer than* the cross-section *is wider*.

As discussed above, determining whether a structure is longer than it is wider requires a quantitative determination of whether a length of a

structure in a vertical direction is greater than a length of the structure in a perpendicular horizontal direction. In my view, under *Plantronics*, such a quantitative determination cannot be made from a drawing *alone* without evidence of actual dimensions or actual proportions, or evidence that the figure is drawn to scale. *Plantronics*, 724 F.3d at 1351. Similarly, here, Petitioner cannot rely on the drawing of Jones alone to show Jones discloses the specific quantitative relationship required by limitation [1j]—i.e., (1) the length of the first side is greater than the length of each of the perpendicular third sides and (2) the length of the second side is greater than each of the perpendicular third sides—without evidence of actual dimensions, actual proportions, or evidence that the figure is drawn to scale.

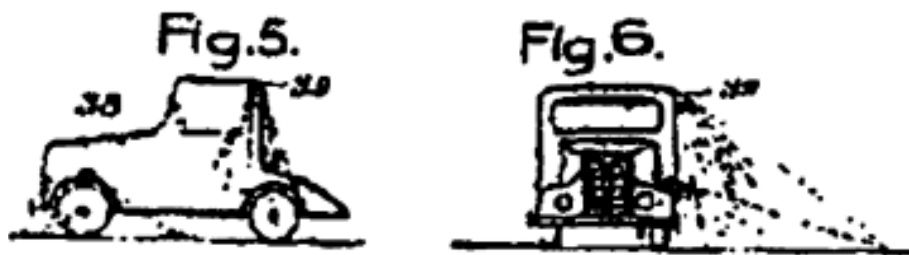
None of the cases discussed by Petitioner or the majority as supporting Petitioner’s assertion of anticipation by Jones addresses this key factual issue presented in this IPR. For example, *Bager* was about whether the prior art drawing discloses “the location of the padlock-sheave in [a] . . . power shovel mounting having the usual dipper handle, handle-end casing, and dipper,” placing the padlock-sheave “below the upper edge of the dipper and behind the wall thereof.” *Bager*, 47 F.2d at 951. In my view, determining whether a drawing discloses the claimed location of a padlock-sheave in *Bager* involves a *qualitative* determination of whether the prior art drawing shows a padlock-sheave “below the upper edge of the dipper and behind the wall thereof.” In contrast, the specific factual issue presented in the instant IPR is whether the drawing of Jones *alone* can be relied on to show the *quantitative* relationship between the length values of perpendicular structures recited in limitation [1j]. Thus, the qualitative

determination at issue in *Bager* is largely irrelevant to the specific quantitative determination at issue in the instant IPR.

Krippelz v. Ford Motor Co., 667 F.3d 1261 (Fed. Cir. 2012) cited by the majority (FWD 43–44) was about whether the prior art drawings disclosed a warning lamp “adjacent to the [side] window” of an automobile. *Krippelz*, 667 F.3d at 1269. Again, in my view, determining whether a warning lamp is adjacent to a side window of an automobile does not inform the determination of the specific factual issue presented in this proceeding.

According to the majority, “the Federal Circuit’s use of a patent drawing to determine the relative location of a lamp and a side window” in *Krippelz* “parallels Mr. Cady’s use of a patent drawing to determine the relative lengths of first, second, and third sides.” FWD 44 (emphasis added). I respectfully disagree with the majority.

The figures of the prior art (DuBois) at issue in *Krippelz* are reproduced below.



Figures above are reproduction of Figures 5 and 6 of the DuBois reference discussed in *Krippelz*. *Krippelz*, 667 F.3d at 1269 (citing DuBois Figs. 5, 6). Based on these drawings, the Federal Circuit found that “[t]here is no question that a person of ordinary skill, reviewing these figures, would understand them to show mounting the lamp adjacent to the side window.” *Id.*

Figures 5 and 6 of DuBois above show a lamp (illuminating the pavement) mounted on a side of an automobile near a side window of the automobile. *Id.* In particular, the figures show that the lamp and the side window are *on the same side* of the automobile. *Id.* Thus, the determination in *Krippelz* whether the automobile figures above alone show the claimed mounting of a lamp “adjacent” to a side window involves a *qualitative* assessment of whether the lamp is mounted *near* the side window on the same side of the automobile. In contrast, the issue presented by Petitioner’s contention of anticipation by Jones in this IPR requires a *quantitative* determination of whether Jones’s drawing alone can be relied on to show the specific quantitative relationship recited in limitation [1j]. Therefore, in my view, the qualitative determination in *Krippelz* does not inform the quantitative determination at issue in this proceeding. Similarly, “the Federal Circuit’s use of a patent drawing to determine the relative location of a lamp and a side window” in *Krippelz* does not “parallel” “Mr. Cady’s use of a patent drawing to determine the relative lengths of first, second, and third sides.” *See* FWD 44.

In *PlaSmart, Inc. v. Kappos*, 482 F. App’x 568 (Fed. Cir. 2012), cited by the majority, the Federal Circuit stated “drawings can be used as prior art, without referring to the surrounding description, *only if the prior art features are clearly disclosed by the drawing*,” but found that an *ambiguous* prior art drawing cannot be relied on to show anticipation. *Id.* at 573. Thus, *PlaSmart* does not support Petitioner contention of anticipation by Jones, but instead shows, as discussed below, an ambiguous drawing of Jones relied upon by Petitioner cannot be used to establish anticipation.

In *Aslanian* cited by Petitioner (Reply 10), the issue was whether a drawing in a design patent *renders obvious* the claimed shapes and locations of various features of a limb restraint for immobilizing a forearm. *Aslanian*, 590 F.2d at 911–15. Thus, *Aslanian* does not inform determination of the specific anticipation issue presented in this proceeding.

In *Mraz* discussed by the majority in some detail (FWD 42–43), the issue was whether a prior art drawing *renders obvious* the claimed “angle . . . not exceeding 15°” of a deburring edging roll comprising a pair of individual roll members. *Mraz*, 455 F.2d at 1070–71. In *Mraz*, the half-angle of the V-shaped groove “measures *about* 6°” on the prior art drawing. *Id.* at 1071 (emphasis added). Thus, in my view, *Mraz* does not inform determination of the specific *anticipation* issue presented in this proceeding. Among other reasons, although an ambiguous drawing may be relied on to show obviousness, it cannot be used to establish anticipation. *See, e.g., PlaSmart*, 482 F. App’x at 572–73 (finding no anticipation by Figure 1 of Song due to its ambiguous disclosure but nonetheless finding that Song in combination with another reference renders the claim obvious).

The majority distinguishes the cases cited by Patent Owner as mostly involving specific quantitative measurements. *See* FWD 44–46 (discussing *Nystrom v. TREX Co.*, 424 F.3d 1136, 1149 (Fed. Cir. 2005); *Hockerson-Halberstadt, Inc. v. Avia Group International, Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000); *In re Chitayat*, 408 F.2d 475 (CCPA 1969)). According to the majority, “[i]n contrast to the patentee in *Hockerson-Halberstadt*, Petitioner does not rely on quantitative measurements from Jones’s Figure 3 to show particular sizes.” *Id.* at 46 (citing Pet. 37–38; Reply 8–9, 15; Ex. 1002 ¶ 93). As discussed above, however, quantitative determinations

are not limited to measuring particular sizes. Here, limitation [1j] requires a specific quantitative relationship between the lengths of the recited “first and second sides” and the length of each of the perpendicular “third sides.” As discussed above, under *Plantronics*, a determination of such a quantitative feature cannot be made from a drawing *alone* without evidence of actual dimensions or actual proportions, or evidence that the figure is drawn to scale. *See Plantronics*, 724 F.3d at 1351.

In the Reply, Petitioner argues that “Petitioner properly relied on the relative side lengths that Jones’ Embodiment 15 would have disclosed to a [person of ordinary skill in the art].” Reply 9 (citing Pet. 37; Ex. 1002 ¶ 93). Petitioner asserts that “[t]he claims only require *relative* dimensions” and that “the first and second sides merely need to be *longer than* the third sides.” *Id.* As discussed above, however, claim 1 also requires that the recited “first and second sides” are “substantially perpendicular” to the recited “third sides.” Petitioner does not explain adequately how a person of ordinary skill in the art would meaningfully compare the lengths of Jones’s purported “first and second sides” with the length of the orthogonal “third sides,” without sufficient evidence that Figure 3 of Jones is drawn to scale, e.g., the *relative scales* of the orthogonal horizontal and vertical dimensions in Figure 3 are *the same or substantially the same*.

In fact, Petitioner asserts that it is *not* required to present any such evidence. During the oral hearing, the panel and Petitioner’s counsel had the following exchange regarding this argument by Petitioner:

JUDGE CHUNG: Isn’t it Petitioner’s burden to point to some evidence that the relative scales of the horizontal and vertical dimensions in Figure 3, are the same or substantially the same?

MS. MARKS: So it's Petitioner's position that *we don't have a burden to show an explanation of a relative scale*. The case law requires that we understand the drawings for what they would teach a POSITA. And it would be a legal fiction to say that something that's readily apparent in this drawing is somehow not taught by the drawing because the specification is silent to it.

Tr. 13:4–13 (emphasis added). In other words, Petitioner asserts that “[Petitioner does *not*] *have a burden* to [provide] an explanation [that] a relative scale” of the horizontal and vertical dimensions in Figure 3 are the same or substantially the same. *Id.* at 13:8–13 (emphasis added).

Not so, in my view, under *Plantronics* and the Board's rules. As discussed above, under *Plantronics*, a drawing alone cannot be relied on to teach a structure that is *longer than it is wider*. Similar to *Plantronics*, the specification of Jones is “completely silent” on whether the cross-section depicted in Jones's embodiment 15 is *longer than it is wider*. Thus, in my view, without sufficient evidence that the ***relative scales*** of the independent orthogonal horizontal and vertical dimensions in the drawing relied upon by Petitioner are the same or substantially the same, it is not possible to meaningfully compare the lengths of Jones's “first and second sides” with the length of the orthogonal “third sides.” Because Petitioner bears the burden of persuasion, by a preponderance of the evidence, that claim 1 is anticipated by Jones, in my view, Petitioner has the burden of providing sufficient evidence and explanation to show that the relative scales of the independent orthogonal horizontal and vertical dimensions in the drawing relied upon by Petitioner are the same or substantially the same.¹¹ *See*

¹¹ The majority states that in *Krippelz* “the Federal Circuit did *not require* evidence that the figures used the same scale horizontally and vertically.” FWD 44 (emphasis added) (citing *Krippelz*, 667 F.3d at 1268–69). But, as

37 C.F.R. § 42.104(b)(3)–(4); *Harmonic*, 815 F.3d at 1363 (“the petitioner has the burden *from the onset* to show *with particularity* why the patent it challenges is unpatentable” (emphasis added) (citing 35 U.S.C. § 312(a)(3))).

Instead of presenting such evidence, Petitioner contends that Jones describes “the series of plugs shown in Embodiments 13, 14, and 15 . . . , where the lengths of the first and second sides are *varied*.” Reply 12 (emphasis added) (citing Ex. 1007, 5:12–16, Fig. 3 (embodiments 13, 14, 15)). Based on these disclosures of varying the lengths of the first and second sides in different embodiments, Petitioner argues that it is “readily apparent” that Jones discloses limitation [1j]. *Id.*

I disagree with Petitioner’s argument. Anticipation under 35 U.S.C. § 102 requires “the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim.” *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010). Specifically, “[f]or a claim to be anticipated, each claim element must be disclosed, either *expressly or inherently*, in a single prior art reference, and the claimed arrangement or combination of those elements must also be disclosed, either

discussed above, a quantitative comparison of lengths in the independent orthogonal horizontal and vertical dimensions in a drawing was not an issue in *Krippelz*. Indeed, this issue was not discussed at all in the portion of the *Krippelz* decision cited by the majority. *See Krippelz*, 667 F.3d at 1268–69. Instead, as discussed above, *Krippelz* involved a *qualitative* assessment of whether a lamp is mounted near the side window on the same side of the automobile. *Id.* at 1269. Thus, the Federal Circuit had no reason to discuss whether “the figures of [DuBois] used the same scale horizontally and vertically,” much less hold that such evidence is “not require[d],” as stated by the majority. *See FWD 44.*

expressly or inherently, in that same prior art reference.” *Id.* at 1332–33 (emphasis added).

During the oral hearing, Petitioner conceded that it does not argue inherent anticipation by Jones.

JUDGE CHUNG: This is Judge Chung. Let me ask a few questions about anticipation by Jones. My first question is whether Petitioner is arguing inherent anticipation by Jones. My guess is no. Right?

MS. MARKS: No, *we’re not relying on inherency*.

Tr. 10:13–18 (emphasis added). Thus, to prevail on its asserted ground of anticipation by Jones, Petitioner must demonstrate by a preponderance of the evidence that Jones *expressly* discloses limitation [1j]. Petitioner does not explain adequately, however, how Jones’s description of different embodiments of *varying* the lengths of the first and second sides *expressly* discloses limitation [1j]. *See* Reply 11–12.

Although varying the lengths of the first and second sides may at some point produce a connector cross-section where the “first and second sides” are “longer than each of said third sides,” as recited in limitation [1j], such a teaching or suggestion is insufficient to *expressly* disclose limitation [1j]. “[D]ifferences between the prior art reference and a claimed invention, however slight, invoke the question of obviousness, not anticipation.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008).

Similar to Petitioner’s argument, the majority discusses the various embodiments depicted in Figure 3 of Jones and finds that “Jones varies dimensions horizontally and vertically in Figure 3 to illustrate the invention.” FWD 49 (citing Ex. 1007, 4:6–11, 5:7–20, Fig. 3). Based on

these teachings of Jones, the majority finds that “Jones discloses *relative dimensions* and *relies on relative dimensions* to illustrate the invention.” *Id.* at 47 (emphases added) (citing Ex. 1007, 4:6–11, 5:7–20, Fig. 3). According to the majority, “[b]ecause Jones varies dimensions horizontally and vertically in Figure 3 to illustrate the invention, *Jones has no reason to use different scales horizontally and vertically in Figure 3.*” *Id.* at 49 (emphasis added).

I respectfully disagree because the evidence cited and the explanation provided by the majority are insufficient to show how Jones *expressly* discloses limitation [1j]. In my view, the majority’s analysis may relate to obviousness over Jones, not express anticipation by Jones.¹²

In the Reply, Petitioner presents new or additional comparisons of various rotated, annotated versions of the embodiment 15 drawing and asserts that the new comparisons show “the first side (red) is *clearly longer than* the third side (blue)” and “the second side (red) is *clearly longer than* the third side (blue).” Reply 8–9 (emphases added). Petitioner, however, does not submit a declaration in support of the Reply, and, therefore, does not present any evidence as to why a person of ordinary skill in the art would “clearly” find such quantitative length relationships from the newly

¹² The majority also states that “[i]ndeed, using different scales horizontally and vertically would *distort the invention* [of Jones].” FWD 49 (emphasis added). In my view, such an analysis may relate to obviousness over Jones but does not explain sufficiently how Jones expressly discloses limitation [1j]. *Cf. Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc.*, 246 F.3d 1368, 1378 (Fed. Cir. 2001) (“the question whether a reference ‘teaches away’ from the invention is inapplicable to an anticipation analysis”) (quoting *Celeritas Techs., Ltd. v. Rockwell Int’l Corp.*, 150 F.3d 1354, 1361 (Fed. Cir. 1998)).

presented drawings alone. Thus, Petitioners new comparisons in the Reply is insufficient as unsupported attorney arguments. *See In re Geisler*, 116 F.3d 1465, 1471 (Fed. Cir. 1997) (attorney argument cannot take the place of evidence).

More importantly, for the same reasons discussed above, Petitioner's additional comparisons of the various rotated, annotated versions of the drawing of Jones are insufficient show, without evidence of actual dimensions or actual proportions of the horizontal and vertical lengths, or evidence that the figure is drawn to scale, that Jones's drawing alone expressly discloses the specific quantitative relationship required by limitation [1j]. *See Plantronics*, 724 F.3d at 1351.

Therefore, there is no evidence or explanation provided by Petitioner during the trial that shows sufficiently that Jones *expressly* discloses limitation [1j]. This then leaves only the evidence and explanation presented in the Petition.

In my view, the single sentence in the Petition addressing, without sufficient specificity, three limitations together (limitations [1i], [1j], and [1k]) and asserting in a conclusory fashion that “[i]t is *readily apparent* that Embodiment 15 discloses” the three limitations of claim 1 (Pet. 37–38 (emphasis added)) does not satisfy the burden required on Petitioner to demonstrate by a preponderance of the evidence that claim 1 is expressly anticipated by Jones. *See* 37 C.F.R. § 42.104(b)(3)–(4); *Harmonic*, 815 F.3d at 1363 (“the petitioner has the burden *from the onset* to show *with particularity* why the patent it challenges is unpatentable” (emphasis added)) (citing 35 U.S.C. § 312(a)(3)).

Nor does the single conclusory sentence in the Cady Declaration that “[i]t is readily apparent that Embodiment 15’s first and second sides are longer than the third side” without further explanation or support (Ex. 1002 ¶ 93) adequately remedy the deficiency in the Petition. During the trial, Petitioner argued that Mr. Cady is a *person of ordinary skill in the art* and that his testimony is “based at least on his *personal review* of Jones” and “his knowledge as a [person of ordinary skill in the art].” Reply 12 (emphases added) (citing Ex. 1002 ¶¶ 26–32); Tr. 26:11–16 (“MS. MARKS: . . . *our POSITA, our declarant* reviewed the reference and understood it to be readily disclosing that the second side was longer than the third side because that’s what it objectively shows in the drawings.” (emphases added)). Mr. Cady, however, never represented in his Declaration that he is a person of ordinary skill in the art, nor has he ever represented that he is providing a personal testimony as a person of ordinary skill in the art.

In his Declaration, Mr. Cady testifies regarding the level of ordinary skill in the art, his “opinion of the characteristics of a [person of ordinary skill in the art],” and his educational background and work experience. Ex. 1002 ¶¶ 28–30. Although Mr. Cady states that he “worked with engineers who were practitioners of ordinary skill in the art” (*id.* ¶ 31), he does not represent affirmatively that he is a person of ordinary skill in the art. Instead, he states that “I am *qualified as an expert* in the area of electrical and electronic connector design, development, and specification – which is the area of the ’678 Patent” (*id.* ¶ 17 (emphasis added)) and that “I believe I have a sufficient level of knowledge, experience and education to provide *an expert opinion* in the field of the ’678 Patent, including *what one of ordinary skill in the art would have understood from the prior art* in this

field at that time” (*id.* ¶ 32 (emphases added)). In other words, Mr. Cady presents himself as a qualified expert and represents that he provides an expert opinion in this proceeding, not a personal testimony as a person of ordinary skill in the art.

Thus, to have probative value, Mr. Cady’s expert opinion must cite sufficient evidence and provide sufficient explanation why a person of ordinary skill in the art would find it “readily apparent that Embodiment 15’s first and second sides are longer than the third side.” *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (Emphasizing “the importance of a *factual foundation* to support a party’s claim about *what one of ordinary skill in the relevant art would have known*.” (emphases added)). But, other than presenting the modified and annotated drawing from Figure 3 of Jones, Mr. Cady does not provide such evidence or explanation. *See* Ex. 1002 ¶ 93. Thus, in my view, the single, unsupported and conclusory sentence from Mr. Cady is entitled to little or no weight in determining whether Jones expressly discloses limitation [1j]. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

The majority finds that Mr. Cady’s testimony is not “conclusory” because “Mr. Cady’s testimony rests on, among other things, his review of the ’678 patent, its prosecution history, other expert testimony, and Jones, including embodiment 15 in Figure 3.” FWD 50 (citing Ex. 1002 ¶¶ 5, 26–27, 33–34, 45, 49–57, 63–68, 91–95). The majority does not explain sufficiently, however, how the prosecution history of the ’678 patent, “other

expert testimony,”¹³ and the cited paragraphs of the Cady Declaration shows that the relied-on drawing of Jones *alone expressly* discloses limitation [1j].

The majority also finds that “Patent Owner offers no testimony rebutting Mr. Cady’s testimony and identifies no evidence undermining his testimony.” FWD 50 (citing Resp. 16–28). As discussed above, however, Patent Owner does not have the burden of persuasion to rebut Petitioner’s evidence. *See Dynamic Drinkware*, 800 F.3d at 1378.

Accordingly, in my view, Petitioner has not presented sufficient evidence or argument to demonstrate by a preponderance of the evidence that Jones anticipates claim 1.

¹³ The majority cites Exhibit 1002 of a previous proceeding before the Board involving the ’678 patent as providing “other expert testimony” that “comports with” Mr. Cady’s testimony. FWD 50 (citing *TTE Tech., Inc. v. Interface Linx, LLC*, IPR2018-01036, Ex. 1002 ¶ 90). The cited document from IPR2018-01036 has not been introduced as evidence in this IPR and, therefore, is not part of the record of this proceeding. To the extent Petitioner purports to rely on the testimony presented in Exhibit 1002 of IPR2018-01036, this amounts to improper incorporation by reference in violation of 37 C.F.R. § 42.6(a)(3). In addition, the majority does not explain the significance of the “other expert testimony” in IPR2018-01036, e.g., whether the challenge was based on the same prior art, Jones, and how paragraph 20 of the “other expert testimony” “comports with” Mr. Cady’s testimony that limitation [1j] is “readily apparent” in Jones’s drawing alone.

Nor do I discern anything in Jones that indicates anticipation by Jones. Figure 3 of Jones is reproduced below.

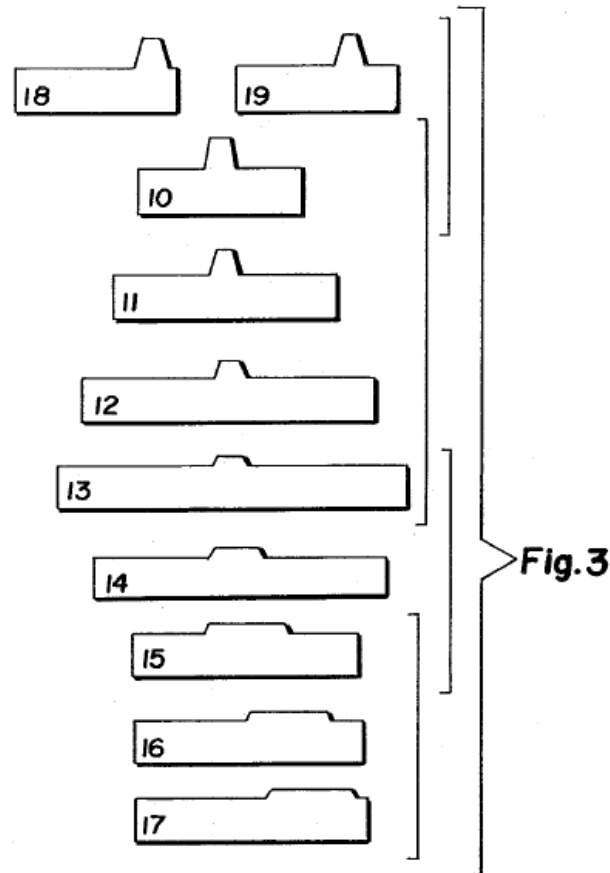


Figure 3 of Jones shows a series of plugs, “all having the same height h_p .” Ex. 1007, 5:7–8.

In my view, Figure 3 of Jones does not show that the plugs are drawn to scale because, although Jones states that the plugs depicted in Figure 3 “all hav[e] the same height h_p ” (*id.* (emphasis added)), Figure 3 shows plugs with different heights. For example, Figure 3 shows that the height for each of plugs 10, 18, and 19 is greater than the height for plug 14. Thus, Figure 3 of Jones indicates that the drawings of various plugs in Figure 3 were created to illustrate various shapes of the plugs (*see id.* at 4:6–11), but

without the awareness or requirements regarding the relative scales of height and width for the drawings.

Thus, Figure 3 of Jones is at best ambiguous regarding the quantitative relationship required by limitation [1j]—that is, whether the cross-section of embodiment 15 shows “said first and second sides being longer than each of said third sides.” Anticipation requires that a single reference “describe the claimed invention *with sufficient precision and detail* to establish that the subject matter existed in the prior art.” *Wasica Fin. GmbH v. Cont’l Auto. Sys., Inc.*, 853 F.3d 1272, 1284 (Fed. Cir. 2017) (quoting *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002)). “For this reason, it has long been understood that *ambiguous* references do not, as a matter of law, anticipate a claim.” *Id.* (emphasis added) (citing *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554 (Fed. Cir. 1983); *In re Turlay*, 304 F.2d 893, 899 (CCPA 1962) (“It is well established that an anticipation rejection cannot be predicated on an *ambiguous* reference.” (emphasis added))). Similarly, in *PlaSmart* cited by the majority, the Federal Circuit affirmed the Board’s determination of finding no anticipation due to the “ambiguity” in the drawing of the prior art allegedly showing the claimed feature. *See PlaSmart*, 482 F. App’x at 573.

For the foregoing reasons, I disagree with the majority that Petitioner has demonstrated by a preponderance of the evidence that Jones anticipates claim 1.

Claims 2 and 3 depend directly or indirectly from claim 1. Petitioner’s arguments and evidence presented in the Petition with respect to these dependent claims only address the additionally recited limitations of

claims 2 and 3, and, therefore, do not remedy the deficiencies in Petitioner's analysis of claim 1 discussed above. *See* Pet. 40–42.

Accordingly, in my view, Petitioner does not demonstrate by a preponderance of the evidence that Jones anticipates claims 1–3.

B. Obviousness over Jones

In the Final Written Decision, the majority states that “we do not reach this challenge to patentability” based on obviousness over Jones because “Petitioner has shown by a preponderance of the evidence that claims 1–3 are unpatentable under § 102(b) as anticipated by Jones.” FWD 59, 117 n.8.

For the reasons explained above, I respectfully disagree that Petitioner has shown by a preponderance of the evidence that claims 1–3 are anticipated by Jones. In my view, Petitioner also does not show by a preponderance of the evidence that the subject matter of claims 1–3 would have been obvious over Jones.

In its arguments that Jones renders obvious the subject matter recited in claim 1, the Petition addresses only limitations [1c] and [1f]. Pet. 42–45. (citing Ex. 1002 ¶¶ 103–114). In other words, Petitioner in the Petition does not contend that limitation [1j] would have been obvious over Jones. Indeed, during the oral hearing, Petitioner conceded that it did not argue in the Petition that limitation [1j] would have been obvious over Jones.

JUDGE CHUNG: So my next question is whether Petitioner addressed Claim Element 1-J in the Petition, in its obviousness ground over Jones. And if you did, can you, point me to the portion of the Petition where you presented that argument?

MS. MARKS: So, in the obviousness grounds, *we did not address Element 1-J specifically for the Jones obviousness grounds.*

Tr. 24:2–9 (emphasis added).

In the Reply, Petitioner argues, for the first time in this IPR, that “to the extent Petitioner’s evidence is insufficient for an anticipatory analysis, an obviousness ground is also provided such that, if nothing else, Embodiment 15 would at least suggest to a [person of ordinary skill in the art] that the first and second sides are longer than the third sides.” Reply 14–15 (citing Pet. 42–45; Ex. 1002 ¶¶ 103–114). But Petitioner did not address or discuss limitation [1j] in the cited portion of the Petition that contains arguments for obviousness over Jones. *See* Pet. 42–45. Similarly, in the cited paragraphs of his Declaration, Mr. Cady addresses only limitations [1c] and [1f] and does not discuss limitation [1j]. *See* Ex. 1002 ¶¶ 103–114. As discussed above, Petitioner does not submit a declaration in support of the Petitioner Reply. Thus, Petitioner’s obviousness contention in the Reply addressing limitation [1j] is insufficient as lacking supporting evidence as to how limitation [1j] would have been obvious to a person of ordinary skill in the art. *See* Reply 14–15.

In addition, Petitioner’s belated obviousness argument addressing limitation [1j] for the first time in the Reply is the type of material that should have been included in the Petition in the first instance to present a *prima facie* case of obviousness over Jones, and, therefore, are improperly introduced for the first time in the Petitioner Reply. *See* Patent Trial and Appeal Board Consolidated Trial Practice Guide 73–75 (Nov. 2019), *available at* <https://www.uspto.gov/TrialPracticeGuideConsolidated> (discussing the appropriate scope for a reply); *id.* at 73 (“Petitioner may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a *prima facie* case of unpatentability.”). Similarly,

to the extent Petitioner argues in the Reply, for the first time in this IPR, that Jones suggests or renders limitation [1j] obvious because Jones describes “the series of plugs shown in Embodiments 13, 14, and 15 . . . , where the lengths of the first and second sides are *varied*” (Reply 12 (emphasis added)), such argument and evidence are improperly introduced for the first time in the Petitioner Reply. It was Petitioner’s burden to demonstrate sufficiently in the Petition that Jones renders the challenged claims unpatentable, including showing that the Petition’s contentions are supported by evidence. *See* 35 U.S.C. § 314(a); *see also Harmonic*, 815 F.3d at 1363 (“In an IPR, the petitioner has the burden *from the onset* to show *with particularity* why the patent it challenges is unpatentable.” (emphases added)) (citing 35 U.S.C. § 312(a)(3)); *Intelligent Bio-Systems*, 821 F.3d at 1369 (requiring “*the initial petition* identify ‘*with particularity*’ the ‘evidence that supports the grounds for the challenge to each claim.’” (emphases added)). Thus, I would not consider Petitioner’s argument and evidence belatedly presented for the first time in the Reply.

Accordingly, based on Petitioner’s argument and evidence presented in the Petition, I would find that Petitioner does not demonstrate by a preponderance of the evidence that the subject matter of claim 1 or its dependent claims 2 and 3 would have been obvious over Jones.

C. Obviousness over Nishio and Jones

Petitioner contends that the subject matter of claim 1–3 would have been obvious over the combination of Nishio and Jones. Pet. 45–62. Petitioner, however, relies on *only* Nishio to teach limitation [1j]. *Id.* at 53–55.

Similar to its analysis of anticipation by Jones, Petitioner presents annotated excerpts from Figure 1 of Nishio and addresses, without sufficient specificity, three limitations together (limitations [1i], [1j], and [1k]) by asserting that “[i]t is *readily apparent* that Nishio discloses, or at least renders obvious, *these elements*.” Pet. 53–55 (emphases added) (citing Ex. 1010, Fig. 1 (as annotated by Petitioner), 3:7–14, 5:41–42; Ex. 1002 ¶¶ 132–134; Pet. 46 n.6). Other than this conclusory sentence that addresses three limitations together, Petitioner does not provide any further explanation. For instance, Petitioner does not explain the significance of the cited portions of Nishio.

The portions of Nishio cited by Petitioner are reproduced below.

Referring now to FIGS. 1 and 3, a pair of fixing wings 4c are formed at the bottom edges of a left side wall 4a and right side wall 4b of shield case 4, respectively. Each Fixing wing 4c is bent to form an L-shaped structure with the foot of L-shaped fixing wing 4c facing printed circuit substrate 1. A pair of fixing legs 4d are formed by cutting rear sections of shield case 4 so that a left and right leg 4d projects downward towards printed circuit substrate 1.

Ex. 1010, 3:7–14.

Having described preferred embodiments of the invention with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various changes and modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims.

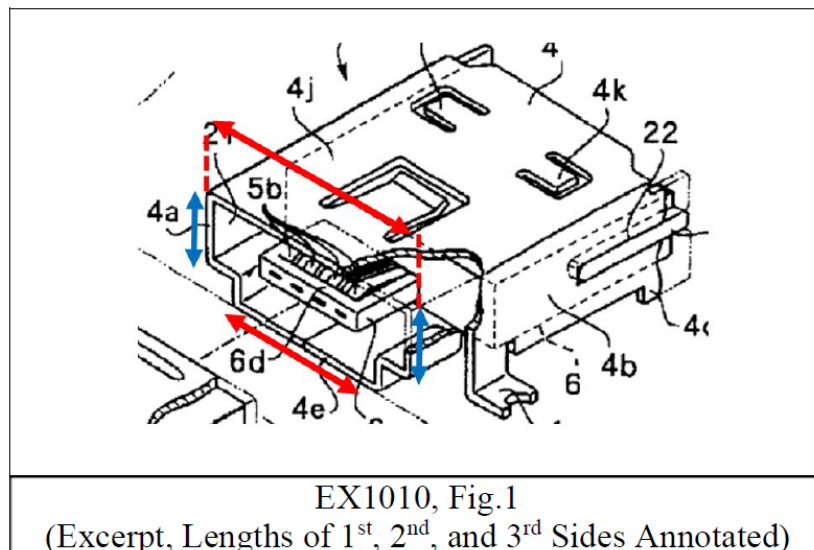
Id. at 5:41–47.

Petitioner does not identify, nor do I discern, anything in the cited portions of Nishio that teaches limitation [1j] reciting “said first and second sides being longer than each of said third sides.” *See* Pet. 53–55.

Footnote 6 of the Petition cited by Petitioner states that “the examiner found that Nishio teaches each of elements [1a]-[1i] and [1k]-[1n].” *Id.* at 46 n.6 (emphases added) (citing Ex. 1004, 43). Petitioner does not explain, however, how this shows Nishio teaches limitation [1j]. In fact, Petitioner asserts that the Examiner made a material error by allowing claim 1 over Nishio because the Examiner “failed to note” that limitation [1j] is allegedly taught by Nishio. Pet. 25–26. Thus, footnote 6 of the Petition cited by Petitioner does not provide evidence that Nishio teaches or suggests limitation [1j]. On the contrary, it shows Petitioner acknowledging that during the prosecution of the application for the ’678 patent, the Examiner did *not* find Nishio teaches limitation [1j].

In his Declaration cited by Petitioner, Mr. Cady presents an annotated excerpt from Figure 1 of Nishio and addresses limitation [1j] of claim 1. Ex. 1002 ¶ 133.

An annotated excerpt from Figure 1 of Nishio presented in the Cady Declaration is reproduced below.



The figure above shows an annotated excerpt from Nishio's Figure 1 presented in the Cady Declaration in connection with Mr. Cady's discussion of limitation [1j]. Ex. 1002 ¶ 133. The same figure is presented in the Petition, but without specific reference to limitation [1j]. *See* Pet. 53–54.

Pointing to the annotated excerpt from Figure 1 of Nishio reproduced above, Mr. Cady states that “[i]t is *readily apparent* that *Nishio's* first and second sides are longer than each of the third sides.” Ex. 1002 ¶ 133 (first emphasis added) (citing Ex. 1010, Fig. 1 (as annotated in the Cady Declaration)).

Figure 1 of Nishio “is an exploded perspective drawing of an electrical connector” with “a section cut away.” Ex. 1010, 2:52–54. Petitioner identifies upper well 4j and lower well 4e depicted in Nishio's Figure 1 as the claimed first side and second side, respectively, and identifies left wall 4a and right wall 4b as the claimed third sides (*see* Pet. 52 (citing Ex. 1002 ¶ 130)). Thus, I understand Petitioner to contend that the double-sided red arrows shown in the above annotated excerpt from Figure 1 indicate the alleged lengths of the purported first and second sides in Nishio and the double-sided blue arrows indicate the alleged lengths of the purported third sides. *See* Pet. 54; Ex. 1002 ¶ 133. By asserting that it is “readily apparent” from the above annotated excerpt from Nishio's Figure 1 that Nishio's first and second sides are longer than each of the third sides, I understand Petitioner to argue that the double-sided red arrows shown in the above annotated excerpt from Figure 1 are longer than each of the double-sided blue arrows.

For the reasons similar to those discussed above with regard to Petitioner's asserted ground of anticipation by Jones, the key fact in

determining whether Petitioner may rely on Figure 1 of Nishio alone to show Nishio teaches limitation [1j] is that the double-sided red arrows and the double-sided blue arrows shown in the above annotated excerpt from Figure 1 lie in the same *rectangular* “cut away” plane of the electrical connector depicted in Figure 1 (*see* Ex. 1010, 2:52–54) and the red arrows are *perpendicular* to the blue arrows.¹⁴ Thus, by arguing that Nishio’s Figure 1 discloses “said first and second sides being longer than each of said third sides,” as recited in claim 1, Petitioner asserts that the “section cut away” shown in Nishio’s Figure 1 is wider (at the top and bottom) than it is taller.

In my view, similar to the reasons explained above with respect to anticipation by Jones, without evidence of actual dimensions, actual proportions, or evidence that the figure is drawn to scale, Figure 1 of Nishio alone cannot be relied upon to show that the “section cut away” of Figure 1 is “wider than it is taller,” i.e., “said first and second sides [are] longer than each of said third sides,” as required by claim 1. Petitioner, however, takes the same position discussed above that Petitioner does not have the burden to provide any explanation or evidence that Figure 1 of Nishio is drawn to

¹⁴ Petitioner concedes, and I agree, that upper well 4j and lower well 4e depicted in Nishio’s Figure 1 (the claimed first side and second side) are each *perpendicular* to left wall 4a and right wall 4b (the claimed third sides) because Nishio describes that its electrical connector is formed by “bending a sheet of metal into a *rectangular cylinder*.” Pet. 56–57 (emphasis added) (arguing that Nishio discloses limitation [1m] (“said first and second sides are substantially parallel”) and limitation [1n] (“said third sides are substantially perpendicular to said first side”)) (citing Ex. 1010, 3:4–6, 4:36–38). Petitioner also notes that, during prosecution, the Examiner found Nishio teaches limitations [1m] and [1n]. *Id.* at 46 n.6 (citing Ex. 1004, 43).

scale, e.g., the *relative scales* of the perpendicular directions in Figure 1 of Nishio are the same or substantially the same. *See* Tr. 13:8–13, 26:1–16.

The majority finds that Nishio teaches limitation [1j] for largely the same or similar reasons discussed with respect to anticipation by Jones. FWD 70–73. For the same or similar reasons discussed above in the context of anticipation by Jones, I respectfully disagree.

In addition, on its face, Figure 1 of Nishio is a two-dimensional representation of a three-dimensional connector. *See* Ex. 1010, 2:52–54. Neither Petitioner nor Mr. Cady discusses how a person of ordinary skill in the art would have understood the nature of the drawing shown in Figure 1 of Nishio or explain how the lengths of the slanted lines of the purported first and second sides in the depth direction in the drawing (annotated with the double-sided red arrows by Petitioner) can be meaningfully compared with the lengths of the vertical lines of the purported third sides (annotated with the double-sided blue arrows by Petitioner) in the vertical direction in the drawing.

As noted above, Petitioner further asserts that Nishio renders obvious limitation [1j]. Pet. 53–55 (citing Ex. 1010, Fig. 1; Ex. 1002 ¶¶ 132–134); Reply 17 (citing Pet. 45). In the cited paragraph of his Declaration, Mr. Cady refers to the annotated excerpt from Nishio’s Figure 1 reproduced above and states that “[i]t is readily apparent that Nishio’s first and second sides are longer than each of the third sides.” Ex. 1002 ¶ 133. Mr. Cady also states “[t]his element is also disclosed by Jones, as set forth in [the section of the Cady Declaration addressing limitation [1j] in the context of the asserted ground of anticipation by Jones].” *Id.* But Mr. Cady does *not* explain how, as Petitioner contends, Nishio renders obvious limitation [1j].

In fact, Mr. Cady does *not* even state Nishio renders obvious limitation [1j], let alone explain why limitation [1j] would have been obvious to a person of ordinary skill in the art over Figure 1 of Nishio. *See id.* Thus, Petitioner’s contention that Nishio renders obvious limitation [1j] is an attorney argument unsupported by evidence of record. *See Geisler*, 116 F.3d at 1471 (attorney argument cannot take the place of evidence).

Petitioner’s contention of obviousness is particularly lacking when considering the nature of the drawing in Figure 1 of Nishio—that is, a two-dimensional representation of a three-dimensional connector—and the total absence of any explanation from Petitioner or Mr. Cady as to how a person of ordinary skill in the art would have understood the nature of the drawing and how a person of ordinary skill in the art would have known to meaningfully compare the lengths of the slanted lines in the depth direction with the lengths of the straight lines in the vertical direction in the drawing to conclude that limitation [1j] is obvious over Nishio. *See Randall Mfg.*, 733 F.3d at 1362 (Emphasizing “the importance of a *factual foundation* to support a party’s claim about *what one of ordinary skill in the relevant art would have known.*” (emphases added)).

Thus, in my view, Petitioner does not establish, by a preponderance of the evidence, limitation [1j] would have been obvious over Nishio to a person of ordinary skill in the art. *See In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) (“To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.”).

For the reasons discussed above, in my view, Petitioner does not show sufficiently that the combination of Nishio and Jones teaches or suggests all limitations of claim 1. *See CFMT, Inc. v. Yieldup Int’l Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) (“obviousness requires a suggestion of all limitations in a claim”) (citations omitted). Thus, I disagree with the majority that Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claim 1 would have been obvious over the combination of Nishio and Jones.

Claims 2 and 3 depend directly or indirectly from claim 1. Petitioner’s arguments and evidence presented in the Petition with respect to these dependent claims only address the additionally recited limitations of claims 2 and 3, and, therefore, do not remedy the deficiencies in Petitioner’s analysis of claim 1 discussed above. *See* Pet. 59–62.

Accordingly, in my view, Petitioner does not demonstrate by a preponderance of the evidence that the subject matter of claims 1–3 would have been obvious over the combination of Nishio and Jones.

D. Obviousness over Kusagaya and Jones

Petitioner contends that the subject matter of claim 1–3 would have been obvious over the combination of Kusagaya and Jones. Pet. 62–73. Petitioner, however, relies on Jones alone to disclose limitation [1j]. *Id.* at 63, 68–69; Reply 19 (“Petitioner relies on Jones to teach element [1j].”). Petitioner notes that during prosecution, the applicant added limitation [1j] to overcome the rejection over Kusagaya. Pet. 63 (citing Ex. 1004, 161–162, 184). Petitioner asserts that “[t]his feature, however, is disclosed in Jones.” *Id.* (citing Ex. 1007, Fig. 3). Although Petitioner also argues that it would have been obvious to *modify Kusagaya* in view of Jones to obtain the

recited feature of limitation [1j], Petitioner's argument is premised on Petitioner's assertion that Jones discloses limitation [1j]. *See id.* at 68–69. Thus, for the reasons similar to those discussed above with respect to anticipation by Jones, in my view, Petitioner does not demonstrate by a preponderance of the evidence that claim 1 is unpatentable over the combination of Kusagaya and Jones.

Petitioner's arguments and evidence presented in the Petition with respect to dependent claims 2 and 3 only address the additionally recited limitations of claims 2 and 3, and, therefore, do not remedy the deficiencies in Petitioner's analysis of claim 1 discussed above. *See Pet.* 71–73.

Accordingly, in my view, Petitioner does not demonstrate by a preponderance of the evidence that the subject matter of claims 1–3 would have been obvious over the combination of Kusagaya and Jones.

E. Remaining Grounds

Claims 4 and 5 depend directly or indirectly from claim 1. Petitioner challenges dependent claim 4 as unpatentable over Jones and Koizumi or Nishio, Jones, and Koizumi. *Pet.* 8, 73–82. Petitioner also challenges dependent claim 5 as unpatentable over Jones, Koizumi, and Roldan or Nishio, Jones, Koizumi, and Roldan. *Id.* at 8, 82–84.

Petitioner's arguments and evidence presented in the Petition with respect to dependent claims 4 and 5 only address the additionally recited limitations of claims 4 and 5, and, therefore, do not remedy the deficiencies in Petitioner's analysis of claim 1 discussed above. *See Pet.* 71–73.

Accordingly, in my view, Petitioner does not demonstrate by a preponderance of the evidence that the subject matter of claim 4 would have been obvious over the combination of Jones and Koizumi or over the

combination of Nishio, Jones, and Koizumi. Petitioner also does not demonstrate by a preponderance of the evidence that the subject matter of claim 5 would be obvious over the combination of Jones, Koizumi, and Roldan or over the combination of Nishio, Jones, Koizumi, and Roldan.

For these reasons, I respectfully dissent.

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