

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

THERMALTAKE TECHNOLOGY CO., LTD. and
THERMALTAKE INC.,
Petitioner,

v.

CHIEN-HAO CHEN,
Patent Owner.

Case No. IPR2024-01230
U.S. Patent No. 10,690,336 B1

PATENT OWNER'S NOTICE OF APPEAL

Pursuant to 37 C.F.R. § 90.2(a) and 35 U.S.C. § 142, Chien-Hao Chen (“Patent Owner”) hereby gives notice that Patent Owner appeals the Order Denying Director Review, entered on June 17, 2026 (Paper No. 55), and the Patent Trial and Appeal Board’s (“Board’s”) Final Written Decision (“FWD”), entered on March 17, 2026 (Paper No. 50), in the above-captioned *inter-partes* review of United States Patent No. 10,690,336 (“the ’336 Patent”) to the United States Court of Appeals for the Federal Circuit, including all underlying orders, decisions, rulings, and opinions that are adverse to Patent Owner.

For the limited purpose of providing the Director with the information requested in 37 C.F.R. § 90.2(a)(3)(ii), Patent Owner’s issues on appeal may include, but are not limited to: (1) the Board’s determinations and applications of any express or implied constructions for the claim terms at issue to the prior art of record; (2) the Board’s determination regarding the patentability of claims 1-5 under 35 U.S.C. § 103 in view of Lai, Hasegawa, Huang, Echazarreta, Chou, and/or Liu, as well as any other prior art of record; (3) the denial of substitute claims 6-7; (4) the Board’s consideration of the expert testimony, prior art, and other evidence in the record, and the Board’s factual findings, conclusions of law, and other determinations supporting or related to those issues; and (5) any other findings or determinations supporting or related to the aforementioned issues as well as all other issues decided adversely to Patent Owner in any orders, decisions, rulings, phone conference decisions, and/or opinions.

Simultaneously with the submission, Patent Owner is mailing a true and correct copy of this Notice of Appeal to the Director of the United States Patent and Trademark Office, and filing true and correct copies of the same and the FWD, along with the required docketing fee, with the Clerk of the United States Court of Appeals for the Federal Circuit.

Respectfully submitted,

GREENBERG TRAURIG, LLP

Date: August 18, 2026

By: /s/ Kyle Chen
Kyle D. Chen (admitted *pro hac vice*)
Heath J. Briggs (Reg. No. 54,919)
1144 15th St. Suite 3300
Denver, CO 80202
Telephone: 303-685-7418
Facsimile: 720-904-6118
BriggsH@gtlaw.com

Counsel for Patent Owner

CERTIFICATE OF SERVICE

The undersigned certifies that a true and correct copy of this Patent Owner's Notice of Appeal has been electronically served on Petitioner by emailing the following addresses:

- Case-ThermaltakeIPRMembers@Pillsburylaw.com
- robert.perez@pillsburylaw.com
- christopher.kao@pillsburylaw.com
- david.tsai@pillsburylaw.com
- brock.weber@pillsburylaw.com
- surui.qu@pillsburylaw.com
- jaclyn.schade@pillsburylaw.com

In accordance with 37 C.F.R. § 90.2(a)(1) and § 104.2, the undersigned also certifies that on August 18, 2026, in addition to being filed electronically through the Board's PTACTS System and by emailing efileSO@uspto.gov, a true and correct copy of the foregoing Patent Owner's Notice of Appeal was served by Priority Mail Express on the Director of the U.S. Patent and Trademark office, at the following address:

Office of the Solicitor
United States Patent and Trademark Office
Mail Stop 8
P.O. Box 1450
Alexandria, VA 22313-1450

The undersigned further certifies that on August 18, 2026, a true and correct copy of the foregoing Patent Owner's Notice of Appeal, along with a copy of the Final Written Decision, was filed with the Clerk's Office of the United States Court of

Appeals for the Federal Circuit.

GREENBERG TRAURIG, LLP

Date: August 18, 2026

By: /s/ Kyle D. Chen
Kyle D. Chen (admitted *pro hac vice*)
Heath J. Briggs (Reg. No. 54,919)
1144 15th St. Suite 3300
Denver, CO 80202
Telephone: 303-685-7418
Facsimile: 720-904-6118
BriggsH@gtlaw.com

Counsel for Patent Owner

Exhibit A

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE OFFICE OF THE UNDER SECRETARY OF COMMERCE
FOR INTELLECTUAL PROPERTY AND DIRECTOR OF THE
UNITED STATES PATENT AND TRADEMARK OFFICE

THERMALTAKE TECHNOLOGY CO., LTD. and
THERMALTAKE INC. (a.k.a. THERMALTAKE USA),
Petitioner,

v.

CHIEN-HAO CHEN,
Patent Owner.

IPR2024-01230
Patent 10,690,336 B1

Before JOHN A. SQUIRES, *Under Secretary of Commerce for Intellectual
Property and Director of the United States Patent and Trademark Office.*

ORDER

The Office received a request for Director Review of the Final Written Decision in the above-captioned case and an authorized response to the request. *See* Papers 51, 52.

Having reviewed the request and response, it is:

ORDERED that the request for Director Review is denied.

IPR2024-01230
Patent 10,690,336 B1

FOR PETITIONER:

Robert C.F. Pérez
Jaclyn Schade
Christopher Kao
David J. Tsai
Brock S. Weber
Surui Qu
PILLSBURY WINTHROP SHAW PITTMAN LLP
robert.perez@pillsburylaw.com
jaclyn.schade@pillsburylaw.com
christopher.kao@pillsburylaw.com
david.tsai@pillsburylaw.com
brock.weber@pillsburylaw.com
surui.qu@pillsburylaw.com

FOR PATENT OWNER:

Heath J. Briggs
James L. Ryerson
Kyle Chen
GREENBERG TRAURIG, LLP
briggsh@gtlaw.com
ryersonj@gtlaw.com
kchen@gtlaw.com

Exhibit B

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

THERMALTAKE TECHNOLOGY CO., LTD. and
THERMALTAKE INC.,
Petitioner,

v.

CHIEN-HAO CHEN,
Patent Owner.

IPR2024-01230
Patent 10,690,336 B1

Before MONICA S. ULLAGADDI, SHARON FENICK, and
ANDREAS BALTATZIS, *Administrative Patent Judges*.

BALTATZIS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Denying Patent Owner's Revised Motion to Amend
35 U.S.C. § 318(a)

I. INTRODUCTION

Thermaltake Technology Co., Ltd. and Thermaltake Inc. (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–5 (the “challenged claims”) of U.S. Patent No. 10,690,336 B1 (Ex. 1001, “the ’336 patent”). Paper 1 (“Pet.”). Chien-Hao Chen (“Patent Owner”) together with exclusive licensee Lian Li Industrial Co., Ltd. filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). We instituted an *inter partes* review of all challenged claims. Paper 12 (“Inst. Dec.”).

After we instituted trial, Patent Owner filed a Patent Owner Response (Paper 18, “PO Resp.”) to the Institution Decision, Petitioner filed a Reply (Paper 23 (“Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 35, “PO Sur-reply”).

Patent Owner also filed a contingent Motion to Amend and requested preliminary guidance from the Board. Paper 19. Petitioner opposed the Motion to Amend. Paper 24. We provided non-binding preliminary guidance as to Patent Owner’s Motion. Paper 25. Then, Patent Owner filed a contingent Revised Motion to Amend, requesting that the Board consider substitute claims 6 and 7, if original claims 2 and 3 are found unpatentable. Paper 28 (“RMTA”). Petitioner opposed the RMTA. Paper 36 (“RMTA Opp.”). Patent Owner filed a Reply to Petitioner’s Opposition. Paper 40 (“RMTA Reply”). Petitioner filed a Sur-reply. Paper 44 (“RMTA Sur-reply”).

We held an oral hearing on December 11, 2025, and a copy of the transcript was entered into the record. Paper 48 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). Having reviewed the complete

trial record, we determine that Petitioner has shown by a preponderance of the evidence that challenged claims 1–5 of the ’336 patent are unpatentable. We also determine that Petitioner has shown by a preponderance of the evidence that proposed substitute claims 6 and 7 are unpatentable. Therefore, we deny Patent Owner’s Revised Motion to Amend.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner identifies Thermaltake Technology Co., Ltd. and Thermaltake Inc. (a.k.a. Thermaltake USA) as the real parties in interest. *See* Pet. 1. Patent Owner identifies Chien-Hao Chen and exclusive licensee Lian Li Industrial Co., Ltd. as the real parties in interest. Paper 3, 2 (Patent Owner’s Mandatory Notice).

B. *Related Matters*

The parties indicate that the ’336 patent is the subject of a co-pending civil litigation, *Lian Li Industrial Co., Ltd., and, Chen, Chien-Hao v. Thermaltake Technology Co., Ltd. and Thermaltake Inc. (a.k.a. Thermaltake USA)*, No. 2:23-cv-07470-HDV-MAR (C.D. Cal.). Pet. 1 (citing Ex. 1015); Paper 3, 2.

The parties also indicate that the ’336 patent is the subject of a co-pending *ex parte* reexamination, No. 90/019,565, requested by Axpertec, Inc. on July 2, 2024. Pet. 2 (citing Exs. 1020, 1021); Paper 3, 3. We stayed the co-pending reexamination pending the termination or completion of this proceeding. *See* Paper 14 (Order *Sua Sponte* Staying Concurrent *Ex Parte* Reexamination). This decision includes an order lifting the stay. *See infra*.

C. The '336 Patent (Ex. 1001)

The '336 patent relates to connectable illumination fans for a computer. Ex. 1001, 1:50–52. The illumination fans, which include a fan in the center and an illumination area on at least two sides, are housed in fan bodies that may be electrically connected. *Id.* at 1:53–65. The computer power supply may then power two connected fan bodies “to simultaneously drive the fans of the two bodies into rotation and the illumination areas into illumination.” *Id.* at 3:29–34. “This solves the issue of insufficient power cables provided by the power supply and eliminates cumbersome routing due to large number of wires.” *Id.* at 3:34–36.

Figure 1 illustrates an illumination fan with a connectable fan body and is reproduced below.

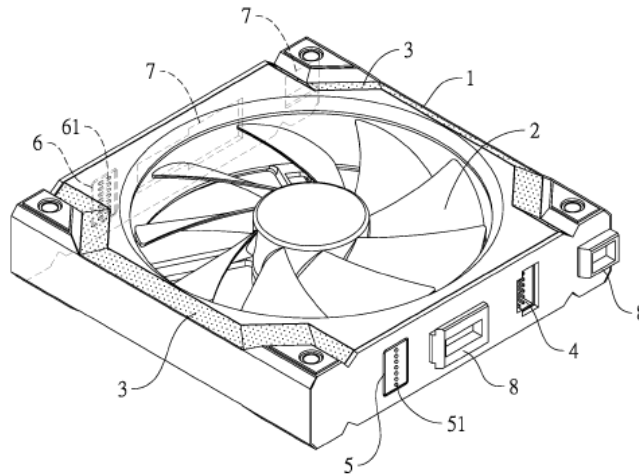


Figure 1 shows a schematic diagram depicting an illumination fan. *Id.* at 2:58–60.

Figure 1 illustrates body 1 as a three-dimensional box with a square top surface and rectangular sides descending therefrom. *See* Fig. 1. Body 1 includes fan 2 disposed in the center of the top of body 1. *Id.* at 2:61–64. The top of body 1 further includes “illumination area 3 disposed on at least two sides of the fan.” *Id.* at 2:64–65. One rectangular side of body 1 includes

power socket 4 and first connector 5. *Id.* at 2:65–66. The opposite side of body 1 includes second connector 6 shown in dashed lines. *Id.* at 2:66–67. “[P]ower socket 4 is electrically connected with the first connector 5, the second connector 6, the fan 2 and the illumination area 3.” *Id.* at 2:67–3:3. First connector 5 is provided with electrically conductive terminal 51 and second connector 6 is provided with electrically conductive face 61. *Id.* at 3:7–11.

Figure 2 illustrates two connectable fan bodies and is reproduced below.

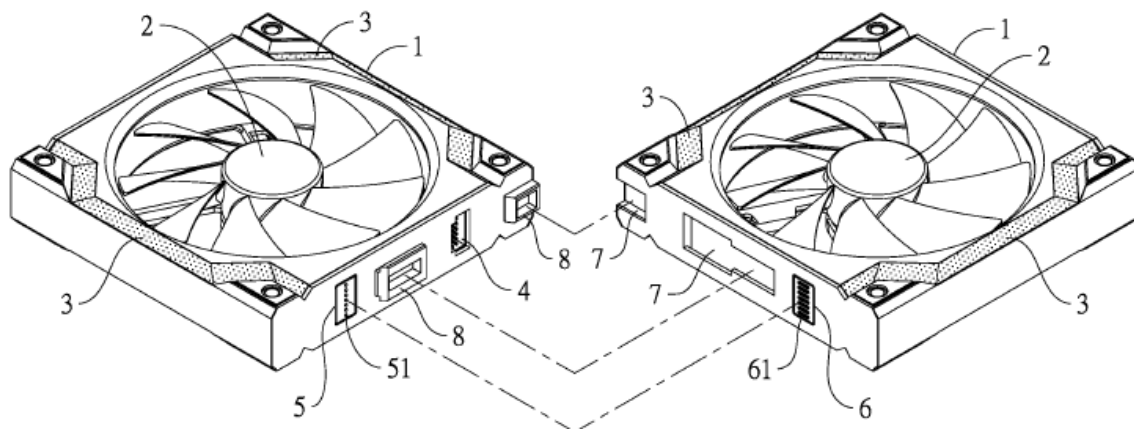


Figure 2 shows a schematic diagram depicting two fan bodies before being assembled together. *Id.* at 2:41–42.

The two fan bodies are assembled together by joining first connector 5 to second connector 6 so that electrically conductive terminal 51 is electrically connected to electrically conductive face 61. *Id.* at 3:7–12. “[W]hen the first connector 5 of a body 1 is connected to the second connector 6 of another body 1, the fan 2 of the another body 1 can be driven into rotation and the illumination area 3 can be illuminated.” *Id.* at 3:13–16.

D. Illustrative Claim

Petitioner challenges claims 1–5 of the '336 patent. Pet. 5–6. Claim 1, the challenged independent claim of the '336 patent, is illustrative of the challenged claims, and is reproduced below.¹ Claims 2–5 depend from claim 1.

1. [preamble] An illumination fan connectable with at least one illumination fan for a computer, comprising:

- [a] a body, provided with a fan in center of the body,
- [b] an illumination area on at least two sides of the fan at top of the body,
- [c] a power socket and a first connector on one side of the body, and a second connector on another side of the body,
- [d] wherein the power socket is electrically connected with the first connector, the second connector, the fan and the illumination area, such that when the power socket on the one side of the body is supplied with power, the fan and the illumination area of the body are respectively driven into rotation and illumination, and when the first connector of the body is connected with a second connector of a body of another illumination fan, a fan and an illumination area of the body of another illumination fan are respectively driven into rotation and illumination.

Ex. 1001, 4:2–19.

E. Asserted Evidence

Petitioner relies on the following references in its asserted grounds of unpatentability:

Name	Reference	Ex. No.
Huang	US 10,082,286 B1	1008
Echazarreta	US 2008/0124234 A1	1009
Chou	US 2008/0279694 A1	1010

¹ We adopt Petitioner's bracketed identifiers.

Name	Reference	Ex. No.
Liu	US 2015/0233391 A1	1011
Lai	US 2017/0314777 A1	1012
Hasegawa	JP 2005051085 A	1013 ²
Tsuji	JP 2018041147 A	1006 ³

F. Asserted Grounds

Petitioner asserts that claims 1–5 of the ’336 patent are unpatentable in view of the following grounds. Pet. 5–6.

Claim(s) Challenged	35 U.S.C. § ⁴	Reference(s)/Basis
1–3	103	Tsuji, Huang
4	103	Tsuji, Huang, Echazarreta
5	103	Tsuji, Huang, Chou
5	103	Tsuji, Huang, Liu
1–2	103	Lai, Hasegawa
3	103	Lai, Hasegawa, Huang
4	103	Lai, Hasegawa, Echazarreta
5	103	Lai, Hasegawa, Chou
5	103	Lai, Hasegawa, Liu

Petitioner supports its contentions with the Declarations of Andrew Wolfe, Ph.D. (Exs. 1004, 1031, 1044). Patent Owner supports its contentions with Declarations of David. B. Tuckerman, Ph.D. (Exs. 2002, 2006, 2052, 2054).

² Hasegawa is a Japanese language document. We rely on Petitioner’s submitted English translation (Ex. 1014).

³ Tsuji is a Japanese language document. We rely on Petitioner’s submitted English translation (Ex. 1007).

⁴ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011), amended 35 U.S.C. §§ 102 and 103, was effective on March 16, 2013. The ’336 patent claims priority to an application that has a filing date after March 16, 2013. *See* Ex. 1001, codes (22), (33). Thus, for purposes of this Decision, we apply the AIA versions of §§ 102 and 103.

III. ANALYSIS

A. *Legal Standards*

“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). Furthermore, Petitioner must explain with particularity how the prior art would have rendered the challenged claims unpatentable. 35 U.S.C. § 312(a)(3); 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”).

A claim is unpatentable under 35 U.S.C. § 103(a) 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 to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in

the art; and (4) objective evidence of nonobviousness.⁵ See *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

To determine whether an invention would have been obvious, we consider the level of ordinary skill in the pertinent art at the critical time. *Graham*, 383 U.S. at 17. Resolution of this question is important because it allows us to “maintain[] objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). In assessing the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quotation omitted). Generally, it is easier to establish obviousness under a higher level of ordinary skill in the art. *Innovention Toys, LLC v. MGA Entm’t, Inc.*, 637 F.3d 1314, 1323 (Fed. Cir. 2011) (“A less sophisticated level of skill generally favors a determination of nonobviousness . . . while a higher level of skill favors the reverse.”).

Petitioner argues that a person of ordinary skill in the art (“POSITA”) relevant to the challenged claims, as of the earliest claimed priority date, “would have a Bachelor’s degree (or equivalent) in Electrical Engineering, Mechanical Engineering, or a comparable subject, and would be generally familiar with the state of cooling and lighting technology for electronic devices.” Pet. 7 (citing Ex. 1004 ¶ 27).

⁵ Neither party presents arguments or evidence relating to objective evidence of nonobviousness.

In the Preliminary Response, Patent Owner asserted a POSITA in the field of the '336 patent as of December 26, 2018 would have (i) earned a bachelor's degree in electrical engineering, mechanical engineering, or computer science, or a similar engineering or science degree, and (ii) attained two or more years of experience in designing and/or implementing hardware components for computers, servers, and/or other electronic devices.

Prelim. Resp. 20 (citing Ex. 2002 ¶ 20).

In our Institution Decision, we preliminarily found Petitioner's proposed educational levels and subject matter (bachelor's degree in electrical or mechanical engineering) more appropriate (as opposed to Patent Owner's reference to a degree in computer science). Dec. 15. We also found Patent Owner's proposed hands-on experience more persuasive (as compared to Petitioner's somewhat vague "generally familiar" reference).

Id. We concluded that

for the purposes of institution, we find that a person of ordinary skill in the art relevant to the challenged claims, as of the earliest claimed priority date, would have a bachelor's degree (or equivalent) in electrical engineering or mechanical engineering, and would have two years of experience in designing and/or implementing hardware components for computers, servers, and/or other electronic devices. We further determine that more experience could compensate for the absence of a bachelor's degree.

Id.

In its Response, Patent Owner "agrees with the definition for a person of ordinary skill in the art ('POSITA') provided by the Board (Decision at 15)." PO Resp. 13. Petitioner does not further discuss, in its Reply, the level of ordinary skill in the art. *See generally* Pet. Reply.

On the complete record, we determine the level of skill discussed in our Institution Decision comports with the qualifications a person would have needed to understand and implement the teachings of the '336 patent and the prior art of record. Inst. Dec. 15. Accordingly, we adopt the level of skill discussed in our Institution Decision.

C. Claim Construction

We construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc), i.e., as construed in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b). Under *Phillips*, claim terms are afforded “their ordinary and customary meaning.” *Id.* at 1312. “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1313. “Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Id.*

Although the parties argue that they apply the plain and ordinary meaning of the claim terms, they disagree as to the scope of that meaning. *See* PO Resp. 10–13; Pet. Reply 1–11; PO Sur-reply 1–9. Specifically, the parties dispute the plain and ordinary meaning of “top” and “side” of the body, “sides of the fan,” and “illumination area.” *See id.* We address “top of the body,” “side of the body,” “sides of the fan,” and “illumination area” in this section. To the extent the parties disagree about applying the art to the plain meaning of these, and other terms, we address those arguments in the art discussion below this section.

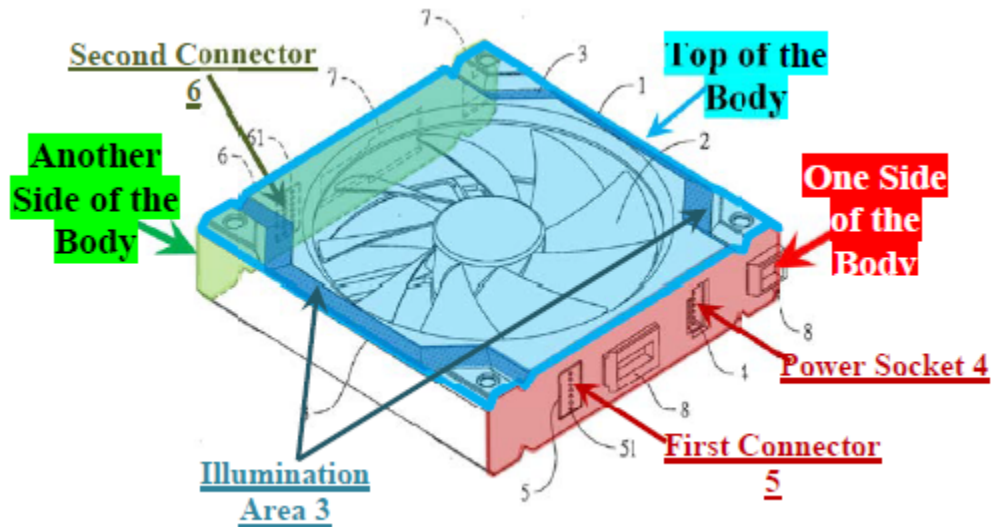
1. *Top and Sides of the Body*

Claim 1 recites

a body, provided with a fan in center of the body, an illumination area on at least two sides of the fan at *top of the body*, a power socket and a first connector on *one side of the body*, and a second connector on *another side of the body* . . . such that when the power socket on the one side of the body is supplied with power, the fan and the illumination area of the body are respectively driven into rotation and illumination . . .

Ex. 1001, 4:5–9 (emphasis added). Claim 1 expressly recites three body locations: “the top of the body,” “one side of the body,” and “another side of the body.” *Id.* “A power socket and a first connector” are listed together “on one side of the body.” *Id.* The plain language of the claim further supports that “one side of the body” includes both power socket and first connector, as the limitation is repeated later in the claim: “*the* power socket on *the* one side of the body.” *See id.* at 4:12 (emphasis added). The location of the second connector is defined in relation to the one side with the first connector, the second connector is on “another side of the body.” *See id.* at 4:5–9. In our Institution Decision, we determined that the plain meaning of claim 1 defines three sides of the claimed body, a top of the body, one side of the body with a power socket and a first connector, and another side of the body with a second connector. Inst. Dec. 17.

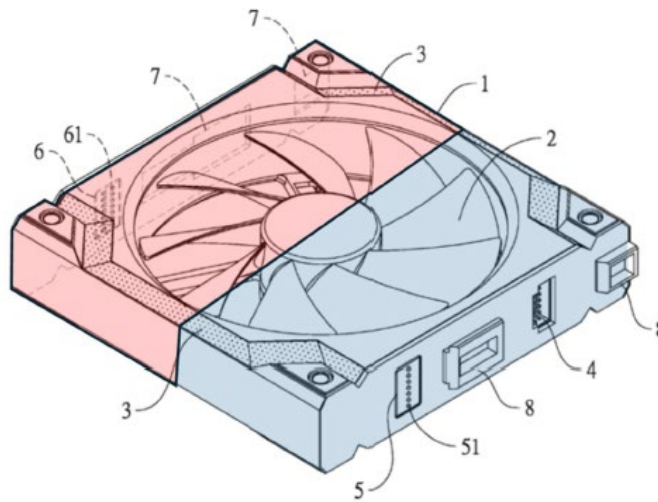
Patent Owner agrees with our analysis from the Institution Decision, “that the claimed illumination fan body has three separately recited locations.” *See* PO Resp. 10. Patent Owner further applies these three locations to the illumination fan illustrated in Figure 1, reproduced below.



Id. at 11. Figure 1 of the '336 patent annotated with Patent Owner's labeling of a "top of the body" (colored blue), "one side of the body" (colored red), and "another side of the body" (colored green). *Id.*

Petitioner disagrees and contends that Patent Owner improperly seeks to interpret "side" differently depending on the context. Pet. Reply 8 (citing Ex. 1030, 134:21–135:17, 54:11–55:16). Petitioner argues that "[i]t is axiomatic that terms of a claim each carry meaning and should be interpreted consistently throughout the same patent." *Id.* at 8–9 (citing *Digital Biometrics, Inc. v. Identix, Inc.*, 149 F.3d 1335, 1345 (Fed. Cir. 1998)). Petitioner proposes that the plain and ordinary meaning of "a 'side' is simply a lateral side or area or region of the body." *Id.* at 9 (citing Ex. 1031 ¶ 15; Ex. 1032, 1157 ("Merriam-Webster's Collegiate Dictionary, Eleventh Edition provides more than a dozen definitions for side, including 'a place, space, or direction with respect to a center or to a line of division (as of an aisle, river, or street).'").

Petitioner applies this construction to Figure 1, reproduced below.



Pet. Reply 10. Figure 1 of the '336 patent annotated by Petitioner with a center line dividing illumination fan body 1 into two halves, a left half (colored red) and a right half (colored blue). *Id.* Petitioner asserts that, in this illustration, “power socket 4 and a first connector 5 are on one side of the body (in red, above), and a second connector 6 is on another side of the body (in blue, above).” *Id.* (Petitioner’s description appears reversed as second connector 6 is illustrated on the red side). Petitioner further argues that this “meaning is also consistent with the Examiner’s finding in a parallel *ex parte* proceeding.” *Id.* at 10–11 (citing Ex. 3004, 5–8).

Patent Owner responds that Petitioner asserts a new construction in Petitioner’s Reply; one that is divorced from the intrinsic evidence. *See* PO Sur-reply 3–4. For example, Patent Owner argues that interpreting “sides of the body” as two halves of the body causes the sides of the body to overlap with the top of the body. *Id.* at 5 (citing Ex. 1001, Fig. 1). Patent Owner further argues that Petitioner’s “construction potentially excludes a preferred embodiment.” *Id.* at 5–6. Patent Owner illustrates this argument as to Figure 1, reproduced below.

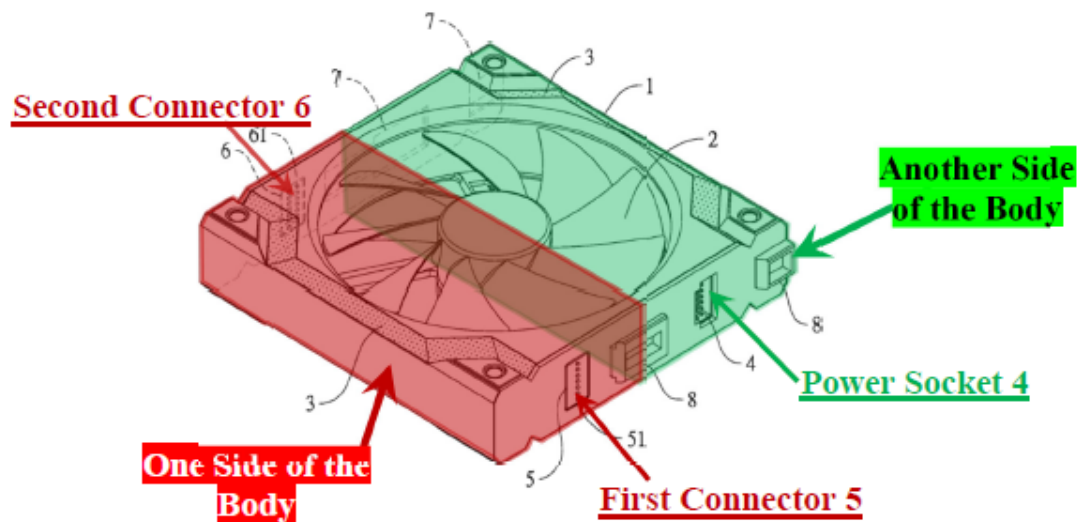


Fig. 1

Id. at 6. Patent Owner annotates Figure 1 “by placing the first and second connectors on the same ‘one side of the body’ (red), while the power socket on the different ‘another side of the body’ (green).” *Id.* According to Patent Owner, “the above preferred embodiment in FIG. 1 is potentially excluded under Petitioner’s construction, and a claim construction excluding a preferred embodiment is rarely, if ever, correct.” *Id.* at 6 (citing *Kaufman v. Microsoft Corp.*, 34 F.4th 1360, 1372 (Fed. Cir. 2022)).

We agree with Patent Owner’s view of the plain and ordinary meaning as it applies to “top” and “sides” of the body. As discussed in our Institution Decision, we find that the term “side” is used to identify separate locations of the body. Inst. Dec. 16–17. That is, the plain meaning identifies three separate locations: (1) a top of the body for the fan, (2) one side for the power socket and first connector, and (3) another side for the second connector. The Specification further supports this plain meaning as illustrated in Figure 1. *See Phillips*, 415 F.3d at 1313.

By contrast, Petitioner’s dictionary definition does not differentiate between a top of the body and two sides of the body.⁶ Further, as Patent Owner identifies, Petitioner’s dictionary definition may exclude the preferred embodiment of Figure 1, whereby the power socket and first connector are located on different “sides,” depending on where a dividing line is drawn. Although we consider Petitioner’s dictionary definition, we find that the proffered definition does not match the intrinsic record. *See id.* at 1319 (“[B]ecause words often have multiple dictionary meanings, the intrinsic record must be consulted to determine which of the different possible dictionary meanings is most consistent with the use of the term in question by the inventor.”).

Finally, we acknowledge that Petitioner’s proposed construction matches the Examiner’s construction in the *ex parte* reexamination. *See* Ex. 3004, 5–8. However, the Examiner applies the broadest reasonable interpretation of the claims, *In re Hyatt*, 211 F.3d 1367, 1372 (Fed. Cir. 2000), unlike our standard under 37 C.F.R. § 42.100(b). Accordingly, the Examiner’s construction does not apply to this proceeding.

2. *Two Sides of the Fan*

As discussed above, Petitioner argues that “side” must be applied consistently for “side[s] of the body” and “sides of the fan.” Pet. Reply 8–9 (citing *Digital Biometrics*, 149 F.3d at 1345).

Patent Owner argues the opposite, that “the same claim term can have different constructions depending upon the context of how the term is used within the claims and specification.” PO Sur-reply 8–9 (citing *Aventis*

⁶ Because we reject Petitioner’s construction, we need not address whether it was properly raised in Petitioner’s Reply.

Pharms. Inc. v. Amino Chemicals Ltd., 715 F.3d 1363, 1374 (Fed. Cir. 2013)). Accordingly, Patent Owner applies a different definition of “side,” in claim 1’s recitation of “an illumination area on at least two sides of the fan at top of the body,” to that definition used to understand “side[s] of the body,” discussed above. Specifically, Patent Owner argues that Petitioner’s dictionary definition of “side,” including “an area next to something” applies to “an illumination area on at least two sides of the fan at the top of the body.” *See id.* at 8–9.

We agree with Patent Owner that the term “side” has a different construction depending upon its context. *See Aventis*, 715 F.3d at 1374 (“The district court’s artificial truncation of the claim term for the expediency of a single interpretation across different contexts was error.”) (internal quote omitted). In the claims, “side” is not used alone but instead identifies locations relating to other elements, i.e., of the body, and of the fan. Separating the term “side” from “body” or “fan” truncates the claim term, similar to the improper construction in *Aventis*. *See id.*

Considering the entire claim term in context, the proper construction of “an illumination area on at least two sides of the fan” encompasses an illumination area on two sides of a center line dividing the fan, corresponding to Petitioner’s dictionary definition. This construction is consistent with the Specification as seen in Patent Owner’s annotated Figure 1 above, showing an illumination area on the red side and green side of the fan. Further, this construction is consistent with the “side[s] of the body” having a different meaning, as discussed above.

3. *Illumination Area*

Claim 1 recites “an illumination area” that is “driven into . . . illumination” “when the power socket . . . is supplied with power.” Ex. 1001, 4:5–15.

Patent Owner argues that an “**illumination area**” is not simply an area where light happens to be visible to the user – it is the area of the body that *actually generates light, i.e., illuminates*.” PO Resp. 19. Patent Owner argues that “Claim 1 itself makes this clear by reciting that the ‘**illumination area**’ is ‘**electrically connected**’ with the power socket such that the illumination area is ‘*driven into . . . illumination*.’” *Id.* (citing Ex. 1001, 4:9–15). In its Sur-reply, Patent Owner argues that the “illumination area” must be a separate physical structure located at the top of the body. *See* PO Sur-reply 12.

Petitioner replies “[t]he patent explains that, when the fan body is supplied with power, the illumination area ‘can be illuminated.’ Thus, an ‘illumination area’ is simply an area that is illuminated.” Pet. Reply 1. Petitioner further argues that “the claim language does not limit the illumination area to the light generating structures nor does it exclude the illumination area from being illuminated by a light separately generated.” *Id.* (citing Ex. 1031 ¶ 27).

We are persuaded by Petitioner’s argument that the plain and ordinary meaning of “illumination area” is an area that is illuminated. There is no description in the Specification or the claim that requires a physical structure or device that itself generates light at the top of body. Rather, the Specification describes an illumination area that “can be illuminated.” Ex. 1001, 3:4–6. Likewise, the claim recites an area that is “driven into . . . illumination,” using the passive voice. *Id.* at 4:13–15. Accordingly, there is

no claim requirement that the illumination area is a separate structure that generates light as opposed to being passively illuminated, e.g., by diffusion, when the power socket is supplied with power. *See id.*

4. *Remaining Claim Terms*

We determine that no other claim terms require express construction for purposes of this decision. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

D. *Asserted Obviousness of Claims 1 and 2 over Lai and Hasegawa*

Petitioner argues that claims 1 and 2 would have been obvious over Lai alone, or in combination with Hasegawa. Pet. 55–75. Patent Owner disputes Petitioner’s contentions. PO Resp. 14–34.

1. *Lai (Ex. 1012)*

Lai relates to a Light Emitting Diode (“LED”) fan control device, which connects multiple fans by wiring each one to a single controller device. Ex. 1012 ¶ 1. “Each addressable [Red Green Blue (“RGB”)] LED . . . is built in with an IC (‘Integrated Circuit’) control chip, which is equipped with a one-wire bus control function and can be connected in a series.” *Id.* ¶ 11. “In addition, all the addressable RGB LEDs 16 are controlled individually by a controller 20 (as shown in FIG 3) to result in even more complex and expressive lighting effects through the change in output signals.” *Id.*

Figure 2 is a schematic of a single fan, reproduced below.

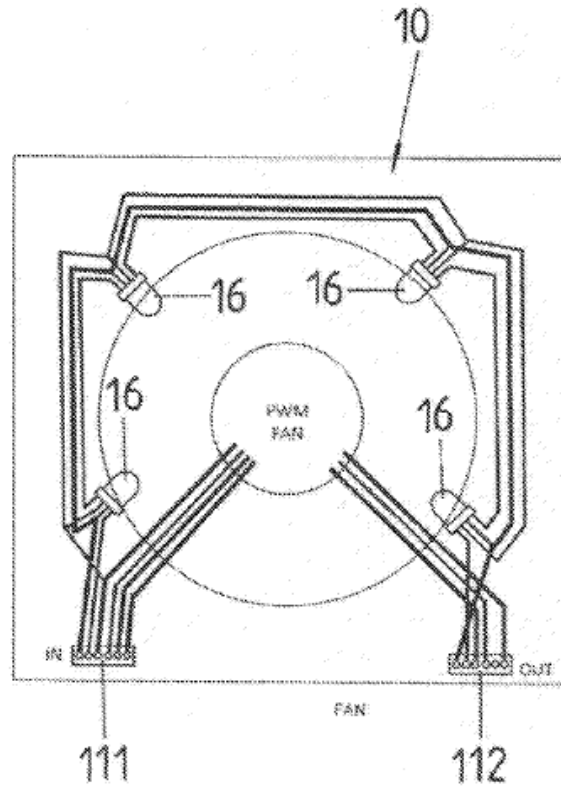


FIG. 2

Figure 2 shows LED fan 10 with four RGB LEDs 16 equally spaced around the interior perimeter of fan 10. *Id.* ¶¶ 6, 11, Fig. 2. LED fan 10 further includes single input 111 and single output 112, located on one side of fan 10. *Id.* ¶ 11, Fig. 2.

Figure 3 is reproduced below.

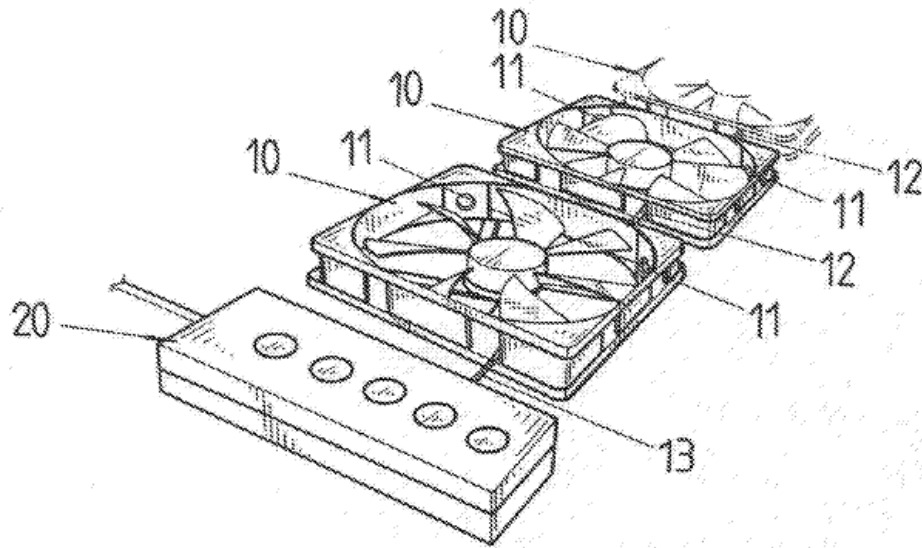


FIG.3

Figure 3 illustrates a planar view of multiple LED fans 10 linked together using single transmission line 12. *Id.* ¶ 12. LED fans 10 are further linked to controller 20 by transmission line 13. *Id.*

2. *Hasegawa (Ex. 1013)*

Hasegawa relates to an air-cooling fan for cooling electronics.

Ex. 1014 ¶ 1. Plural air-cooling fan units can be coupled together to create a large air-cooling fan unit. *Id.* ¶ 114.

Figure 29 shows two fan units and is reproduced below.

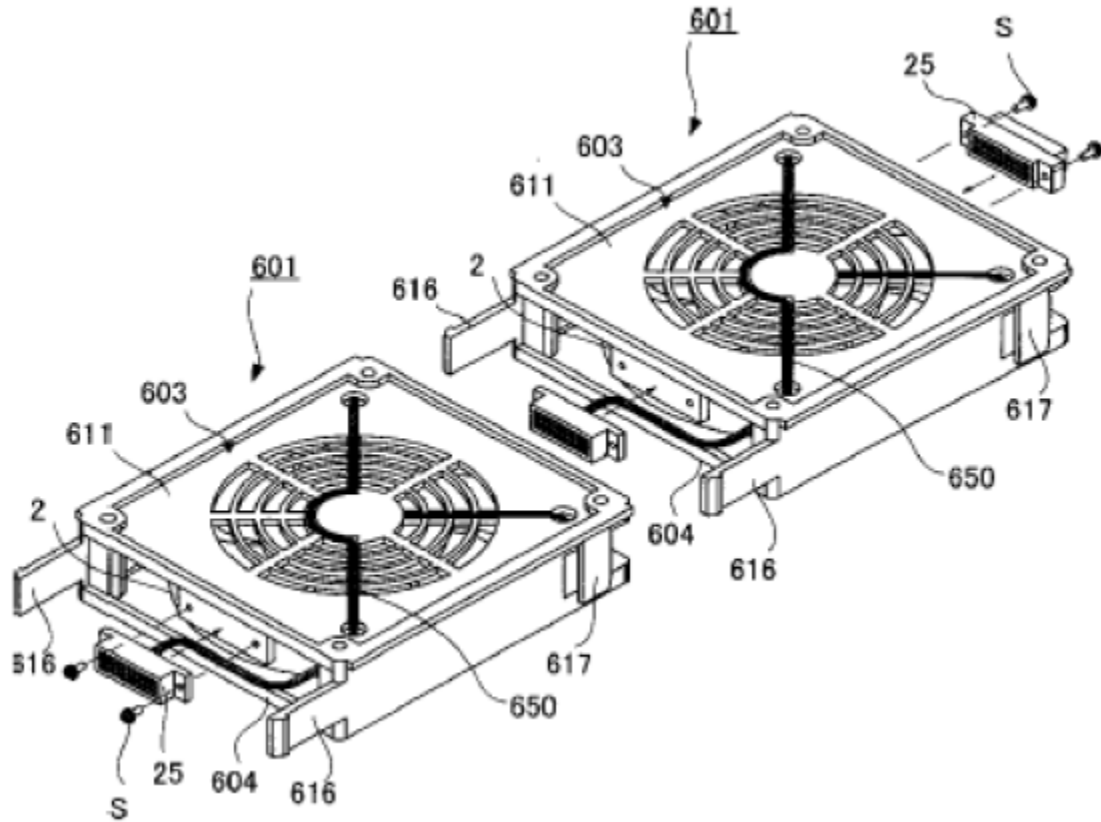


Figure 29 illustrates two air-cooling fan units 601 oriented for coupling. *Id.* ¶¶ 114, 120. Each fan unit 601 includes casing 603 that internally houses fan 2 and a cover that occludes lower opening of case 603. *Id.* ¶ 115. Each fan unit includes connector 25 on two sides of each unit. *Id.* ¶ 119, Fig. 31(b).

Figure 31(b) illustrates two coupled fan units and is reproduced below.

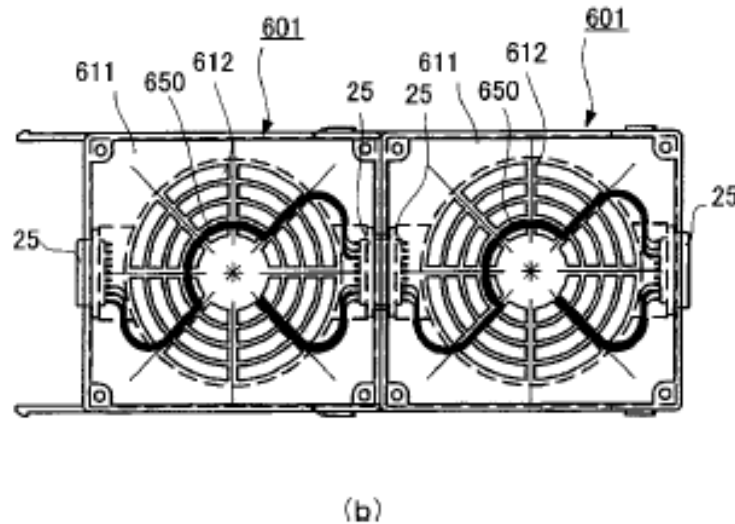


Figure 31(b) illustrates two fan units 601, from above, coupled by connectors 25 located on the sides of each unit. *Id.* ¶¶ 119, 122. Power cable 650 is wired to the motor of fan 2 and to connectors 25. *Id.*

3. *Independent Claim 1*

a) *Preamble*

The preamble of claim 1 recites “[a]n illumination fan connectable with at least one illumination fan for a computer.” Ex. 1001, 4:2–3.

Petitioner asserts Lai teaches the preamble of claim 1. Pet. 55–56 (citing Ex. 1004 ¶ 111). Specifically, Petitioner asserts Lai discloses LED fan 10 including “multiple addressable RGB (Red-Green-Blue) LED lights 16, and . . . a PWM (Pulse Width Modulation) fan.” *Id.* at 56 (citing Ex. 1012 ¶¶ 11, 15, Fig. 2). Petitioner further asserts that Lai’s “LED fan 10 is connectable to another LED fan 10.” *Id.* (citing Ex. 1012, Fig. 3).

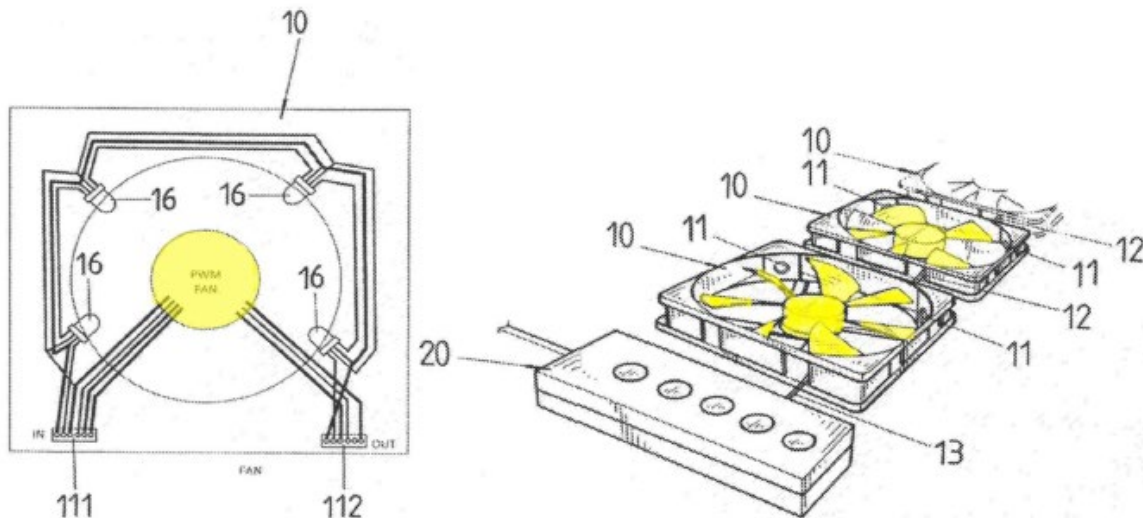
Patent Owner does not dispute that Lai teaches the preamble of claim 1. *See* PO Resp. 14–34.

Considering the entire record, we are persuaded by Petitioner that Lai teaches the preamble of claim 1; thus, we need not decide whether the preamble is limiting.⁷ Ex. 1004 ¶ 111; Ex. 1012 ¶¶ 11, 15, Figs. 2, 3.

b) Limitation 1[a]

Limitation 1[a] recites “a body, provided with a fan in center of the body.” Ex. 1001, 4:5.

Petitioner asserts Lai teaches “a body, provided with a fan in center of the body.” Pet. 56–57 (Ex. 1004 ¶ 112). Petitioner refers to Lai’s Figures 2 and 3, reproduced below with Petitioner’s annotations.



Id. at 56. Petitioner annotates Lai’s Figures 2 and 3 to show “LED fan 10 body with a fan motor and blades (highlighted in yellow) . . . located in the center of the fan body.” *Id.* (citing Ex. 1012, Figs. 2, 3) (emphasis omitted).

Patent Owner does not dispute that Lai teaches limitation 1[a]. *See* PO Resp. 14–34.

Considering the entire record, we are persuaded by Petitioner that Lai teaches limitation 1[a]. Ex. 1004 ¶ 112, Ex. 1012, Figs. 2, 3.

⁷ *See Nidec*, 868 F.3d at 1017.

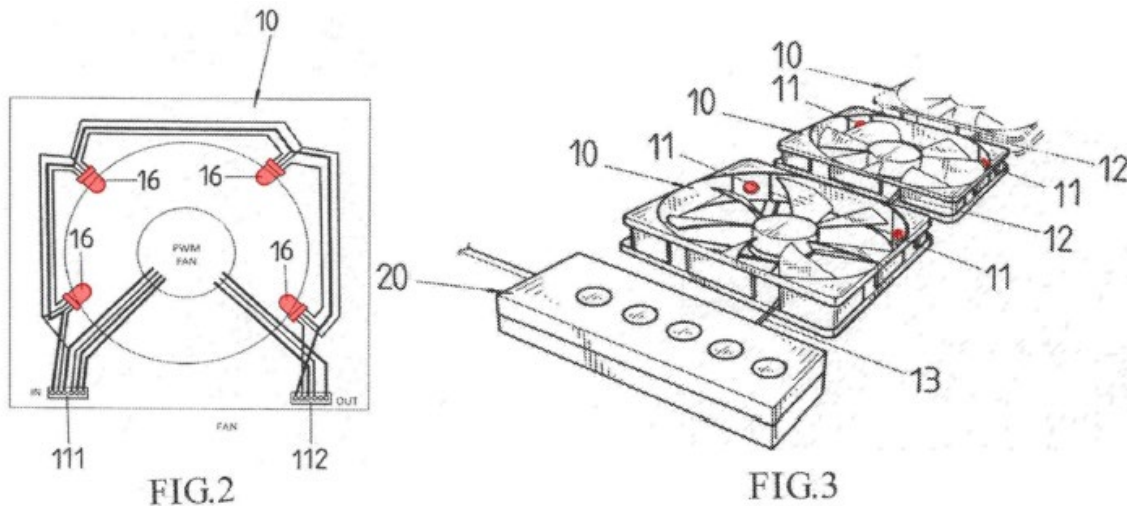
c) Limitation 1[b]

Limitation 1[b] recites “an illumination area on at least two sides of the fan at top of the body.” Ex. 1001, 4:5–7.

(1) Petitioner’s arguments

Petitioner asserts Lai teaches or renders obvious limitation 1[b]. Pet. 57–58 (citing Ex. 1004 ¶¶ 113–115). Because we find that Lai teaches or suggests limitation 1[b], we need not address Petitioner’s second argument, that it would have been obvious to place Lai’s LEDs on the top of the body. *See id.* at 62.

Petitioner’s argument relies on Lai’s Figures 2 and 3, reproduced below with Petitioner’s annotations.



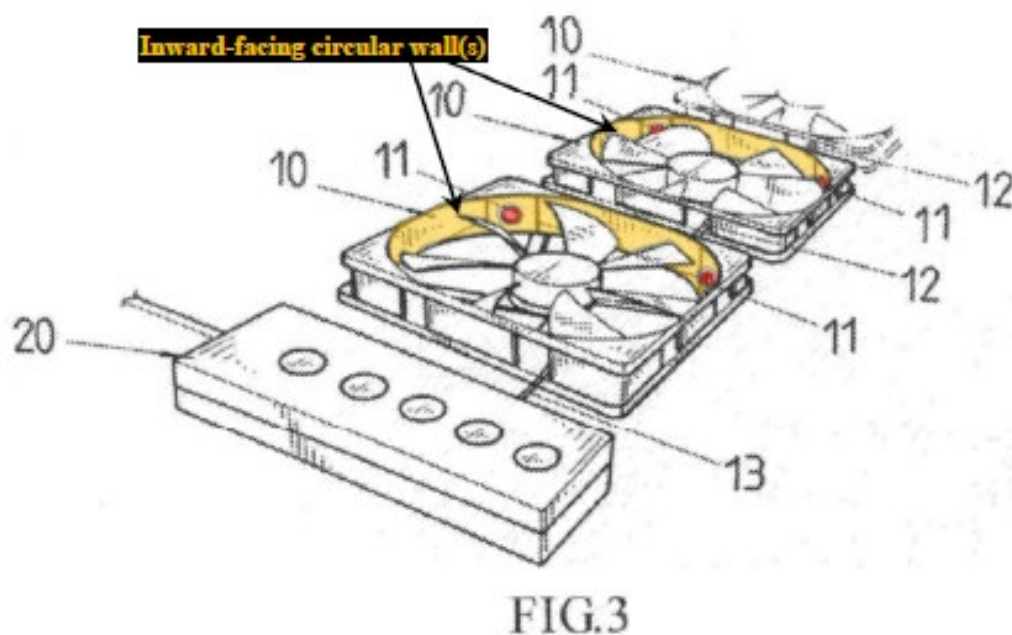
Id. at 57. Petitioner annotates Lai’s Figures 2 and 3 to show “LEDs (for example, LEDs 16 in FIG. 2, and LEDs 11 in FIG. 3, highlighted in red . . .) on at least two sides of LED fan 10.” *Id.* (emphasis omitted). Petitioner cites Lai’s intent to provide decorative lighting using LEDs 16, “which would be understood to be visible from outside the housing when LED fans 10 are normally mounted.” *Id.* (citing Ex. 1004 ¶ 114; Ex. 1012 ¶ 11, claim 1). Petitioner supports this argument with testimony from Dr. Wolfe, who

explains that “[o]rdinary RGB LEDs would be known by a PHOSITA to have a wide viewing area.” *Id.* (citing Ex. 1004 ¶ 114).

In its Reply, Petitioner further contends that “the areas illuminated by Lai’s LEDs include an area that extends to the topmost surface, i.e., the upper part of Lai’s fan body, including, for example, the fan blades, the upper part of the housing walls of the fan cavity as shown in Fig. 3, and the LEDs themselves.” Pet. Reply 12 (citing Ex. 1031 ¶¶ 48–51). To support this contention, Dr. Wolfe explains that “Lai’s LEDs illuminate at least the housing walls and the fan blades.” Ex. 1031 ¶ 48 (citing Ex. 1012, Fig. 3). Further, “the walls of the fan cavity, which extend to the top of the fan body, would also reflect and/or diffuse light.” *Id.* ¶ 49 (citing Ex. 1012, Fig 3).

(2) *Patent Owner’s arguments*

Patent Owner argues that “[n]one of Lai’s LEDs are positioned ‘at the top of the body’ as required by the claims.” PO Resp. 15. Patent Owner illustrates Lai’s LED positions in an annotated Figure 3, reproduced below.



Id. at 14–15 (citing Ex. 2006 ¶ 42). Patent Owner annotates Lai’s Figure 3 to show “LEDs (labeled ‘11’ in this figure) . . . attached near the corners of the fan body and . . . fixed to the inward facing circular wall surrounding the circular opening within which the fan blades rotate.” *Id.* at 15. According to Patent Owner, a “POSITA would have quickly recognized that Lai places the LEDs on the inner wall of its fan body, below the top, so as to illuminate the fan blades as they rotate.” *Id.* Similarly, Patent Owner argues that Lai’s Figure 2 also suggests that the LEDs would be located beneath the top of the fan’s body. *See id.* at 17–18 (citing Ex. 2006 ¶¶ 47, 48).

Patent Owner further responds to Petitioner’s argument that Lai’s lights would have been visible from the top of the fan body. *See id.* at 18 (citing Ex. 1004 ¶ 115). Patent Owner argues that Petitioner relies on Dr. Wolfe’s unsupported conclusory statements. *Id.* Instead, Patent Owner argues that “there is nothing in Lai suggesting that the LEDs’ light should be directly visible from a top view of each fan 10’s body; as explained, the purpose of the LEDs in Lai is not for the LEDs *themselves* to be visible but to emit light onto the rotating fan blades.” *Id.* at 18–19 (citing Ex. 2006 ¶ 49). Moreover, Patent Owner explains that

a POSITA would have understood that (1) the lenses of the LEDs in the use case in Lai would typically have been directional pointing toward the fan blades, and thus would not permit much, if any, light going in the lateral direction toward the user viewing the fan 10 from the top, and (2) the tips of the LEDs would not substantially extend into the circular space in which the fan blades rotate to avoid interfering with the blades’ rotation.

Id. at 20 (citing Ex. 2006 ¶ 52).

In the Sur-reply, Patent Owner elaborates that “*no part* of Lai’s illuminating or illuminated area is *located at* the top of the LED’s fan body.”

PO Sur-reply 11. That is because, “claim 1 requires an ‘illumination area,’ *i.e.*, a separate physical structure, to be located ‘*at the top of the body.*’” *Id.* at 12 (citing Ex. 1031 ¶ 16). Moreover, Patent Owner argues that “the light emission for the LEDs purportedly used in Lai *approaches zero* when viewed in the ‘straight up’ direction.” *Id.* at 13 (citing Ex. 2022; Ex. 1031 ¶ 51; Ex. 1035; Ex. 2051, 213:8–14; *see also id.* at 13–14 (citing Ex. 2051, 216:5–16, 221:24–25)).

(3) *Our analysis*

On the full record, we are persuaded by Petitioner’s argument and evidence that Lai teaches “an illumination area on at least two sides of the fan at top of the body.” In this analysis, we apply the plain and ordinary meaning of “illumination area” as an area that is illuminated. *See supra* § III.C.3. When viewing the top of the body as distinct from the sides, *see* section III.C.1, there is no dispute that Lai teaches LEDs on at least two sides of the fan, thus teaching an illumination area on at least two sides. *See* Ex. 1012, Figs. 2, 3.

We next address the parties’ dispute whether Lai’s illumination area includes the top of the body. We find that Petitioner shows by a preponderance of the evidence that Lai teaches or suggests an area that is illuminated at the top of the body. Lai describes using individually controlled LEDs to provide complex and expressive lighting effects. Ex. 1012 ¶ 11. Dr. Wolfe explains that one skilled in the art would have expected these lighting effects to be visible from the top of the fan body. Ex. 1004 ¶ 114. Dr. Wolfe further explains that “the walls of the fan cavity, which extend to the top of the fan body, would also reflect and/or diffuse light.” Ex. 1031 ¶ 49. We are persuaded by Lai’s teachings and Dr. Wolfe’s

testimony that the walls of Lai's fan cavity, which extend to the top of fan cavity, would reflect and/or diffuse light, thereby forming an illumination area at the top of the fan body.

For these reasons, we are not persuaded by Patent Owner's contrary arguments. First, based on the plain and ordinary meaning of "illumination area," we do not agree with Patent Owner that the claim requires Lai to teach LEDs located at the top of the body. Second, we do not agree that "illumination area" requires a separate physical structure, rather than an area that is illuminated when the power socket is supplied with power. Third, even if we accept Patent Owner's argument and evidence that Lai's LEDs are intended to illuminate the fan and further provide only minimal light in the "straight up" direction, this would not contradict the finding that Lai's walls extend to the top of the body, thereby reflecting and/or diffusing light at the top of the body separate from the fan itself. *See* Ex. 2031, 213:8–215:11, 221:13–25. The claims do not require any minimum amount of light in the illumination area, or exclude illuminating the fan in addition to the illumination area on two sides of the fan.

d) Limitation 1[c]

Limitation 1[c] recites "a power socket and a first connector on one side of the body, and a second connector on another side of the body." Ex. 1001, 7–9.

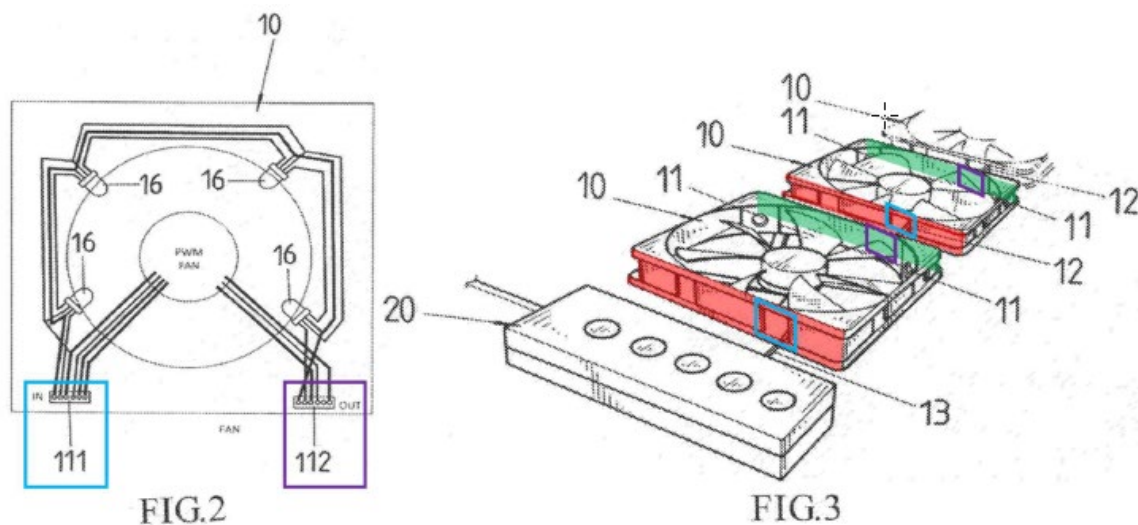
Petitioner asserts Lai alone, or combined with Hasegawa, teaches limitation 1[c]. Pet. 58–75 (Ex. 1004 ¶¶ 116–126). Patent Owner argues that: (1) Lai does not teach a power socket and first connector; (2) Lai does not teach a second connector on another side of the body; and (3) Lai and Hasegawa together do not teach a power socket and first connector on one

side of the body and a second connector on another side of the body. PO Resp. 22–34. We address each of these arguments separately below.

(1) *Whether Lai teaches or suggests a power socket and first connector*

(a) *Petitioner's arguments*

Petitioner asserts Lai teaches or suggests a power socket and first connector on one side of the body. Pet. 58 (citing Ex. 1004 ¶¶ 116–120). Petitioner refers to Lai's Figures 2 and 3, reproduced as annotated below.



Id. at 59. Petitioner annotates Lai's Figures 2 and 3 to show “LED fan 10 having a single input 111 (in blue box) on a first side (highlighted in red) and a single output 112 (in purple box) on a second side (highlighted in green).” *Id.* at 58 (citing Ex. 1012, Abstr., ¶¶ 3, 11–13, Figs. 2, 3) (emphasis omitted).

As to the power socket, Petitioner asserts “single input 111 comprises 6 connectors, including a ground connector that is connected to both the PWM fan and LEDs, and two [voltage common collector] VCC connectors that are connected to the LEDs . . . and control motors 15 that are electrically linked to the PWM fan via controller 20, respectively.” *Id.* at 59 (citing

Ex. 1012 ¶¶ 11, 13, 14, Figs. 2, 4, 5). Although Lai does not expressly refer to a “socket,” Petitioner asserts that “it would have been obvious to a PHOSITA to use a socket-type power connector, which was common in the art and often used for fans.” *Id.* at 60–61 (citing Ex. 1004 ¶ 116). Dr. Wolfe cites Tsuji as evidentiary support for using a socket-style power input for a fan, testifying that “[b]oth male and female connectors are commonly available and for low-voltage applications can be interchangeable as to which is on the cable, and which is on the device.” Ex. 1004 ¶ 116 (citing Ex. 1007).

As to the first connector, Petitioner asserts “[s]ingle input 111 of one LED fan 10 is used in conjunction with a transmission line 12 to connect or link the LED fan 10 to another LED fan 10.” Pet. 61 (citing Ex. 1012 ¶¶ 11–12, Fig. 3). Accordingly, Petitioner asserts “[t]he first connector of Lai comprises the remaining connectors (the LED data signal, the PWM signal, and the sense signal) out of the six connectors of single input 111.” *Id.* at 61–62 (citing Ex. 1004 ¶ 116).

(b) Patent Owner’s arguments

Patent Owner argues that Lai does not teach a power socket and first connector. PO Resp. 22–26. Instead, Lai teaches single input 111, and does not expressly describe a power socket or connector. *Id.* at 23–24 (citing Ex. 2002 ¶ 88. Patent Owner argues that “Petitioner is using hindsight based on the ’336 patent itself to force the mapping of element 111 or 112 as a power socket and/or a connector, which is prohibited.” *Id.* at 24–25 (citing Ex. 2006 ¶ 59).

In the absence of an express teaching, Patent Owner argues that Petitioner “resorts to ‘common sense’ to supply a missing claim limitation.”

Id. at 25 (citing Pet. 60–61). Patent Owner argues that Petitioner cannot rely on “common sense” to supply the missing power socket. *See id.* (citing *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1363 (Fed. Cir. 2016)).

(c) *Our analysis*

We find that a preponderance of the evidence supports Petitioner’s argument that (1) Lai teaches connectors for power and control signals (first connector), and (2) that it would have been obvious to provide a power socket as a structural feature for the connectors. First, we address Lai’s express teaching of connectors. Although Lai does not label input 111 as a power socket or first connector, Petitioner shows that Lai’s input 111 provides the same functions as the claimed elements. For example, the ’336 patent describes the first connector as including an electrically conductive terminal. *See* Ex. 1001, 2:3–5, 3:8–10. Lai teaches input 111 as the same electrically conductive terminal including separate lines for power signals and control signals. *See* Ex. 1012 ¶¶ 11, 12, Figs. 4–6; Ex. 1004 ¶ 116. Specifically, Dr. Wolfe explains that Figures 4 and 5 illustrate input 111 having 6 connectors, wherein “the power socket is comprised of the ground connector and the two VCC connectors. The first connector is comprised of the LED data signal, the [pulse width modulation] PWM signal, and the sense signal.” Ex. 1004 ¶ 116. Lai further teaches the LED fans are linked, i.e., connected, using a single transmission line. Ex. 1012 ¶ 12. Accordingly, we find that Lai’s input 111 teaches a power connector and a first connector.

Second, we address Petitioner’s argument and evidence that it would have been obvious to use a power socket structure as Lai’s first input including connectors for power and control signals. In our Institution Decision, we preliminarily determined that claim 1 did not require separate

structures for the power socket and first connector. Inst. Dec. 28. Patent Owner does not dispute this issue in the Patent Owner Response, and therefore forfeited this argument during the trial. *See* PO Resp. 23, n. 4; *In re Nuvasive, Inc.*, 842 F.3d 1376, 1381 (Fed. Cir. 2016).

We find that a preponderance of the evidence supports Petitioner’s argument that it would have been obvious to use a power socket as Lai’s first input. Petitioner shows that socket-style power connectors were known in the art to power computer fans. Specifically, Petitioner provides testimonial evidence that male and female power connectors, i.e., power sockets, were commonly known, with evidentiary support from Tsuji. *See* Ex. 1004 ¶ 116 (citing Ex. 1007). For example, Tsuji describes a female power connector CNA that receives an endpart plug (male) of power cable A. Ex. 1007 ¶ 39; Ex. 1004 ¶ 75.

We consider Patent Owner’s argument that Petitioner relies on common sense to supply a missing limitation. As discussed above, Petitioner relies on testimonial and documentary evidence to show that the power socket would have been known to those of ordinary skill in the art, and thus does not rely on common sense to supply a missing limitation. Even if we accept the premise that Petitioner relies on common sense, our reviewing court has explained that “‘common sense’ can be invoked, even potentially to supply a limitation missing from the prior art,” if it is supported by evidence and a reasoned explanation. *Arendi*, 834 F.3d at 1363. As discussed above, Petitioner supports its argument with evidence and a reasoned explanation and therefore meets the standard set forth in *Arendi*. *See id.* Specifically, Dr. Wolfe’s testimonial evidence further cites to Tsuji, which “evidently and undisputably” shows that power sockets for computer fans

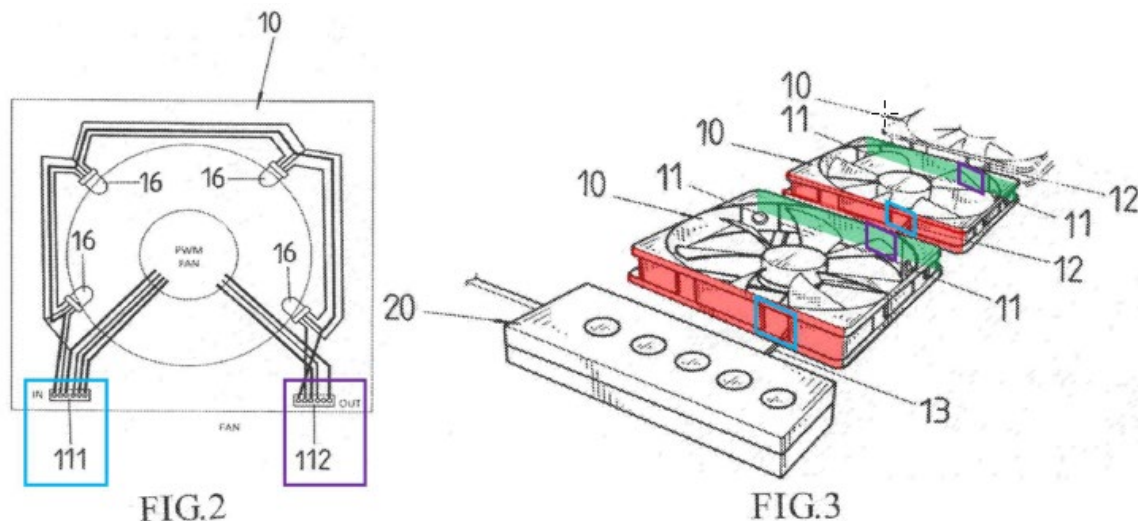
were “within the common knowledge of those skilled in the art.” *See id.* at 1364; *see also* Ex. 1030, 38:11–14 (Dr. Tuckerman testifying that “as you see from . . . Tsuji, it was known” to use power sockets in cooling fans.).

(2) *Whether Lai alone teaches or suggests a second connector on another side of the body*

(a) *Petitioner’s arguments*

Petitioner argues that Lai teaches a second connector on another side of the body. *See* Pet. 58–59, 62–64.

Petitioner references its annotated versions of Lai’s Figures 2 and 3, reproduced below.



Pet. 63. Petitioner asserts

Although the schematic in FIG. 2 of Lai shows both single input 111 and single output 112 on the same side, FIG. 3 of Lai shows LED fans 10 are connected or linked together with a transmission line 12 extending from single input 111 positioned (in blue box) on a first side (highlighted in red) of one LED fan 10 to single output 112 (in purple box) on a second side (highlighted in green) of another LED fan 10.

Id. at 62–63 (citing Ex. 1012 ¶¶ 11, 12, Fig. 3) (emphasis omitted).

Dr. Wolfe explains that output 112 includes “the ground connector and the

two VCC connectors, LED data signal, and the PWM signal.” Ex. 1004 ¶ 117 (citing Ex. 1012, Figs. 3–6). Additionally, Petitioner argues “it would have been obvious to a PHOSITA that the connectors can be moved to opposite edges of the fan body without any substantial impact to the structure or operation of the fan of Lai.” Pet. 63 (citing Ex. 1004 ¶ 118). Petitioner supports this modification with Dr. Wolfe’s testimony, who explains, e.g., that “[s]ide-mounted connectors would reduce or eliminate the cabling required to connect adjacent fans as suggested in Lai figure 3.” Ex. 1004 ¶ 118.

(b) Patent Owner’s arguments

Patent Owner argues that “Lai does not characterize 112 as any ‘connector’ but rather as a ‘*single* output 112,’” whereby one skilled in the art would not have recognized “‘single output 112’ as having any ‘socket’ nor ‘connector’ structures.” PO Resp. 24. Moreover, Patent Owner argues that Lai’s Figure 2 shows output 112 on the same side as input 111. *Id.* at 26. Accordingly, Patent Owner argues that Lai’s output 112 is not on another side from input 111. *See id.* (citing Ex. 2006 ¶ 61). Finally, Patent Owner argues that it would not have been obvious to one of ordinary skill in the art to modify Lai to place the connectors on opposite sides, and that Petitioner relies on common sense and hindsight to provide a missing limitation in the claim. *See id.* at 28 (citing Ex. 2006 ¶ 63).

(c) Our analysis

We find that a preponderance of the evidence supports Petitioner’s argument that Lai teaches or suggests providing a first connector on one side of the body and a second connector on another side.

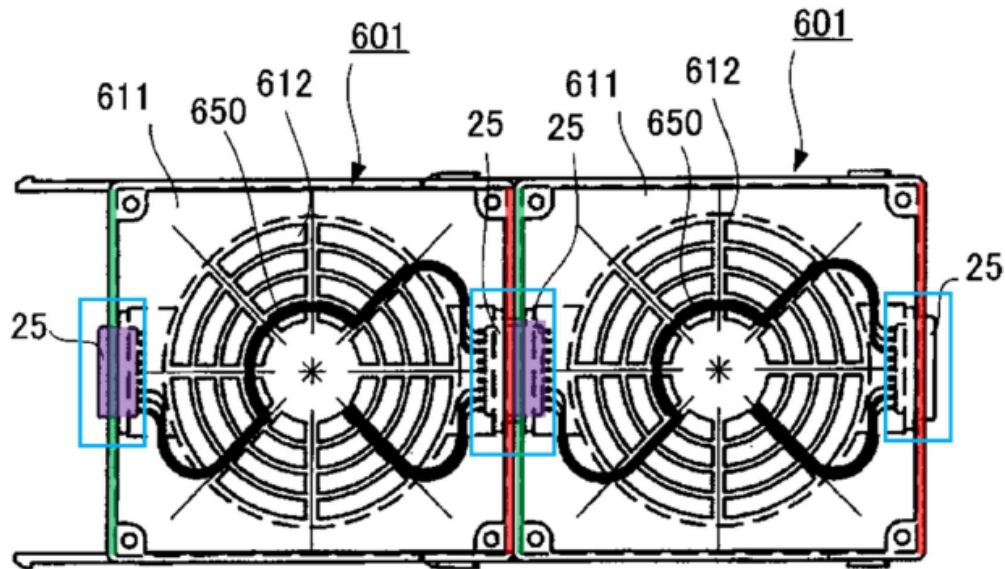
First, we find that Lai's output 112 includes the same power and signal connectors as input 111. *See* Ex. 1012, Figs. 3–6; Ex. 1004 ¶ 117. Accordingly, output 112 teaches a second connector.

Second, we are persuaded by Petitioner's argument that Lai teaches or suggests a second connector on another side of the body. Although Lai's Figure 2 shows input 111 and output 112 on the same side, Lai's Figure 3 shows LED fans 10 in series where the first and second connectors would have been located on opposite sides. Accordingly, at least Lai's Figure 3 teaches or suggests a second connector on another side of the body. *See* Ex. 1004 ¶ 118.

(3) Whether Lai and Hasegawa teach or suggest a second connector on another side of the body

(a) Petitioner's argument

In addition to its argument relying only on Lai, Petitioner asserts that one skilled in the art would have been “motivated to modify Lai to have a first connector (single input 111) on one side of a fan body, and a second connector (second input 112) on the opposite side of the fan body, based on the configuration of connectors for serial connection of fans as disclosed in Hasegawa.” Pet. 64 (citing Ex. 1004 ¶ 119). Specifically, Petitioner cites to Hasegawa's fan units “having Connectors 25 on opposite sides of the Fan Unit 601 body.” *Id.* (citing Ex. 1014, Figs. 29, 31(b)). An annotated version of Hasegawa's Figure 31(b) is reproduced below.



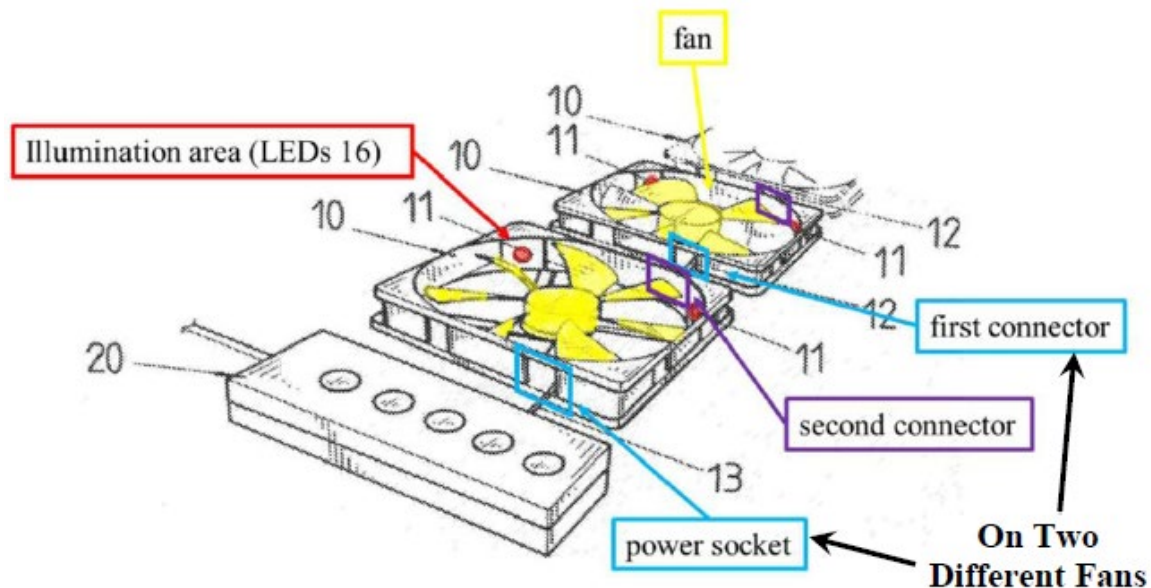
Id. at 65. Petitioner annotates Hasegawa’s Figure 31(b) to show two connected fan units 601 with “a first side highlighted in red, a second side highlighted in green, Connector 25 in blue box, the second connector . . . highlighted in purple.” *Id.* at 64–65 (citing Ex. 1014 ¶¶ 1, 114) (emphasis omitted). Petitioner argues “Connector 25 (highlighted in purple) on the second side (highlighted in green) of the Fan Unit 601 body is a ‘second connector on another side of the body’ as claimed.” *Id.* at 66 (citing Ex. 1004 ¶ 119) (emphasis omitted).

Petitioner asserts that it would have been obvious to one of ordinary skill in the art to combine Lai and Hasegawa as both references relate to “connecting multiple cooling fans in chain that transmit power for the fan motors via single connections between the fans.” *Id.* (citing Ex. 1012, Abstr., ¶¶ 1, 3, 11–12; Ex. 1014 ¶¶ 114, 119, Figs. 29–31; *see also* Ex. 1004 ¶ 119). According to Petitioner “[t]he combination would have involved applying Hasegawa’s known technique of placing cooling fan connectors on opposite sides of a fan body, to the known LED fans of Lai, to yield predictable

results of connecting the fans in series.” *Id.* at 67; *see also* Ex. 1004 ¶¶ 117–120.

(b) *Patent Owner’s arguments*

Patent Owner argues that “Petitioner fails to show that the **modified** Lai system, by itself or in view of Hasegawa, meets the [power socket and first connector on the] Same Side limitation.” *See* PO Resp. 32. Patent Owner illustrates this argument by annotating Lai’s Figure 3, reproduced below.



Id. at 31 (citing Ex. 2006 ¶ 68; Ex. 2002 ¶ 99). Patent Owner contends

As can be seen above, in Petitioner’s purported Lai system as **modified** by itself or in view of Hasegawa, the ‘power socket’ is mapped onto a first fan 10’s body (the *first* fan 10 counting from the left) while the ‘first connector’ is mapped onto a completely different fan (the *second* fan 10 counting from the left).

Id. at 32.

(c) *Our analysis*

We find that a preponderance of the evidence supports Petitioner’s argument that Lai and Hasegawa teach a power socket and first connector on one side of the body and a second connector on another side of the body. First, as discussed above, we are persuaded by Petitioner’s argument that it would have been obvious to one skilled in the art to provide a first connector and power socket on one side of Lai’s fan. *See supra* § III.D.3.d.(1)(c). Additionally, we find that Hasegawa shows a first fan body with a first connector on one side of the fan body, and a second connector on another side of the fan body for connecting with a first connector of a second fan body. *See* Ex. 1014 ¶¶ 1, 114, Fig. 31(b).

We further find that Petitioner shows one skilled in the art would have been motivated to combine Lai and Hasegawa to provide alternative positioning of connectors for connecting multiple cooling fans in a chain. *See* Ex. 1004 ¶¶ 119, 120. The resulting combination of Lai and Hasegawa teaches or suggests a first connector *and* power socket on one side of the body (*see* Lai) and a second connector on the other side of the body that connects to the first connector on the adjacent body (*see* Hasegawa). *See KSR*, 550 U.S. at 418 (“if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill”).

We consider Patent Owner’s argument that relies on Petitioner’s labeling of Lai’s Figure 3 with a power socket only on a first fan and a first connector only on a second fan. However, we do not find Patent Owner’s argument persuasive, because we find above that Lai’s input 111 can serve as both power socket and first connector. *See supra* § III.D.3.d.(1)(c).

e) Limitation 1[d]

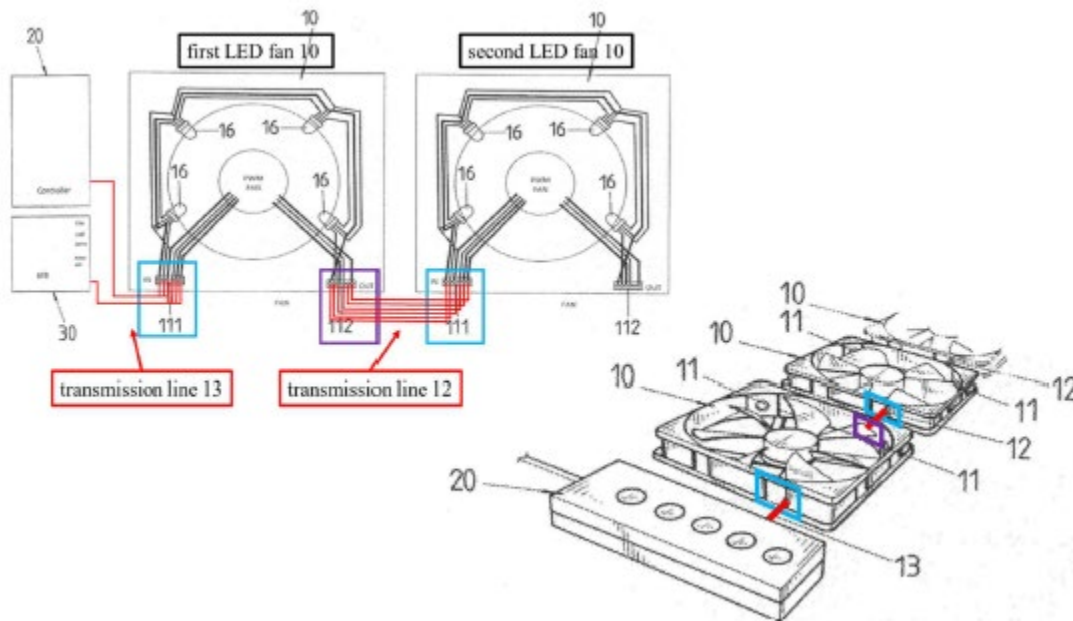
Limitation 1[d] recites a “wherein” clause further describing the electrical connections of the previously recited fan elements, and describing the use of the claimed illumination fan. *See* Ex. 1001, 4:9–19. The wherein clause recites a structural feature, that “the power socket is electrically connected with the first connector, the second connector, the fan and the illumination area.” *Id.* at 4:9–11. Because of these connections, “*when* the power socket on the one side of the body is supplied with power, the fan and the illumination area of the body are respectively driven into rotation and illumination.” *Id.* at 4:11–15 (emphasis added). “[A]nd *when* the first connector of the body is connected with a second connector of a body of another illumination fan, a fan and an illumination area of the body of another illumination fan are respectively driven into rotation and illumination.” *Id.* at 4:15–19 (emphasis added).

(1) Petitioner’s arguments

Petitioner asserts that Lai teaches an electrical connection between the power socket, first connector, second connector, fan and illumination area. Pet. 68–69 (citing Ex. 1004 ¶ 121). Specifically, Petitioner asserts Lai’s “ground line (GND) and VCC signal are electrically connected to the first connector with the first connector (single input 111), the second connector (single output 112), the fan and the illumination area (LEDs 16 or LEDs 11).” *Id.* at 69 (citing Ex. 1012 ¶¶ 12–15, Figs. 4–6; Ex. 1004 ¶ 121).

Petitioner further asserts that Lai teaches “such that when the power socket on the one side of the body is supplied with power, the fan and the illumination area of the body are respectively driven into rotation and illumination.” *Id.* at 69–70 (citing Ex. 1004 ¶¶ 122–126). Specifically,

Petitioner asserts Lai “discloses that when the power socket of single output 111 of the first LED fan 10 is connected (via single transmission line 13), the fan (control motor 15) and illumination area (LEDs 11) both receive power and control from controller 20.” *Id.* at 71–72 (citing Ex. 1012 ¶ 15, Figs. 2, 3, 6). Petitioner illustrates this argument in the figure reproduced below.



Id. at 71. Petitioner’s figure combines diagrams for Lai’s Figure 4 and Lai’s Figure 3 into one illustration with Petitioner’s annotations. The first diagram on the upper left illustrates controller 20 (from Lai’s Figure 4) connected by transmission line 13 (red) to input 111 (blue) of first LED fan 10 (from Lai’s Figure 2) which in turn is connected from output 112 (purple) by transmission line 12 (red) to input 111 (blue) on second LED fan 10. *See id.* The second diagram on the bottom right illustrates Lai’s Figure 3 annotated by coloring transmission lines 13 and 12 red, inputs 111 blue and output 112 purple.

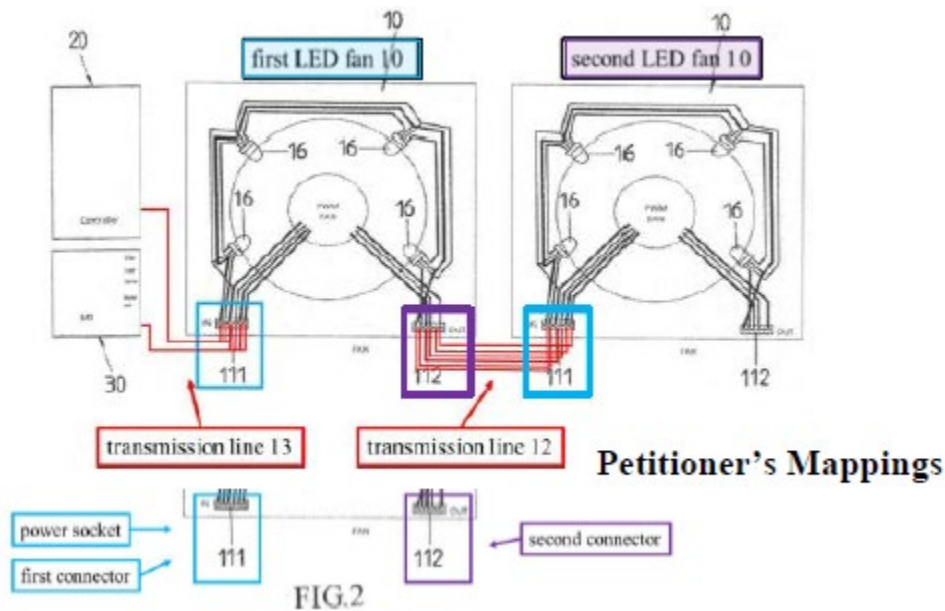
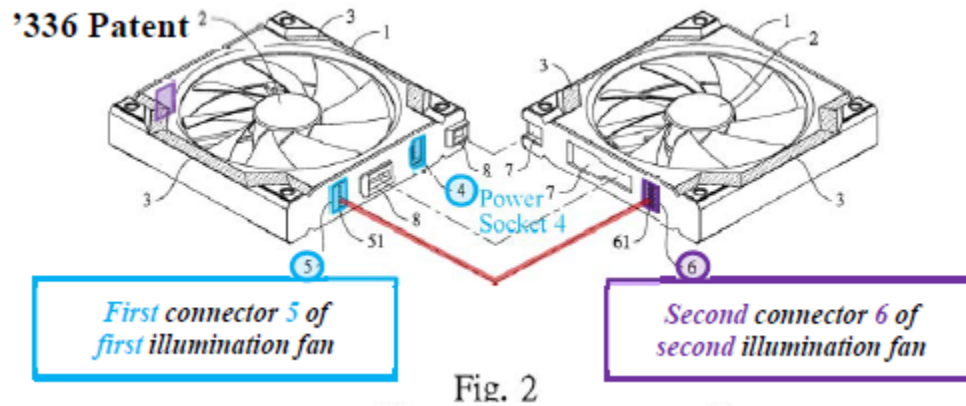
Finally, Petitioner asserts that Lai teaches “when the first connector of the body is connected with a second connector of a body of another illumination fan, a fan and an illumination area of the body of another illumination fan are respectively driven into rotation and illumination.” *Id.* at 69–70 (citing Ex. 1004 ¶¶ 122–126). Specifically, Petitioner asserts “Lai discloses serial connections of at least two LED fans 10 through single connections extending from single input 111 of one LED fan 10 to single output 112 of another LED fan 10 via a single transmission line 12.” *Id.* at 73–74; *see also id.* at 70–71 (citing Ex. 1012, Abstr., ¶¶ 1, 11, 12, 16, Figs. 2–5).

In the Reply, Petitioner contends that “[a] POSITA would understand that the fans in Lai’s Fig. 3 are identical and include the same connectors.” Pet. Reply 22 (citing Ex. 1031 ¶ 66; Ex. 1030, 101:24–102:5). Accordingly, Petitioner argues that the claimed first connector can be met by input 111 of second LED fan 10 and the claimed second connector can be met by the output 112 of the first LED fan 10 shown above. *Id.* at 22–23. In other words, once the fans are connected, the “claimed illumination fan could source power indirectly including via another illumination fan.” *Id.* at 23 (citing Ex. 1030, 67:14–68:20; Ex. 1028, 17:26–18:1).

(2) Patent Owner’s arguments

Patent Owner responds that “Petitioner shows the *converse* of what claim 1 of the ’336 patent requires.” PO Resp. 34. Specifically, Patent Owner argues that “Petitioner shows Lai’s *second* connector 112 of Lai’s *first* LED fan 10 is being connected with Lai’s *first* connector 111 of Lai’s *second* LED fan 10 via transmission line 12.” *Id.*; *see* Ex. 2006 ¶ 70. Accordingly, Patent Owner argues that “Petitioner fails to show that Lai

alone or in view of Hasegawa teaches ‘the first connector of the body [of the first illumination fan] is connected with a second connector of a body of another [*i.e.*, a second] illumination fan’ as required by limitation 1[d].” *Id.* at 34 (citing Ex. 2006 ¶ 67; Ex. 2002 ¶ 104). Patent Owner illustrates this argument in a figure reproduced below.



Patent Owner reproduces Figure 2 of the '336 patent followed by “Petitioner’s Mappings” of Lai, and Patent Owner’s labelling of first and second LED fans. *See id.* at 33.

In the Sur-reply, Patent Owner argues that limitation 1[d] “requires a unidirectional flow of power from the ‘*illumination fan*’ to the ‘*another*

illumination fan.” Sur-reply 18. Specifically, “the ‘first connector’ of the ‘illumination fan’ is supposed to **supply power to**, not **source (i.e., receive) power from**, the second connector of the ‘another illumination fan.’” *Id.* at 20.

(3) *Our analysis*

We find that a preponderance of the evidence supports Petitioner’s argument that Lai teaches or suggests limitation 1[d]. First, we are persuaded by Petitioner’s argument that Lai teaches or suggests a single fan with a power socket that is electrically connected to the first and second connectors, fan, and illumination area whereby the fan and illumination area are driven into rotation and illumination, when the power socket is supplied with power. Ex. 1012 ¶¶ 12–15, Figs. 4–6; Ex. 1004 ¶¶ 121–126. Patent Owner does not contest Petitioner’s description of Lai’s single illumination fan.

Second, we consider the parties’ dispute about the power flow from one illumination fan connected to another illumination fan. Claim 1 recites that the power socket is supplied with power that drives the fan and illumination area. We agree with Petitioner that it would have been obvious to supply power to a power socket at Lai’s input 111 and drive the LED fan 10 into rotation and illumination. Lai further teaches linking identical LED fans in series thereby providing power from one fan to another, including the first connector (input 111), second connector (output 112), fan, and illumination area of another fan. *See* Lai ¶¶ 1, 2, 12, Figures 4–6; Ex. 1004 ¶ 124. That is, when Lai’s fans are connected in series and power is supplied to the power socket, the first connector of the body is connected with a second connector of a body of another illumination fan, and the fan and

illumination area of both fans are driven into rotation and illumination. *See* Ex. 1031 ¶ 66; *see also* Ex. 1030, 68:6–20.

We disagree with Patent Owner that we should limit the claim to the orientation depicted in Figure 2 of the '336 patent, or add the unclaimed limitations of a “first” or “second” fan. In doing so, we determine that the final part of the “wherein” clause, describing what happens “when” connecting two fans does not require a particular sequence of fans or a process. *See* Ex. 1030, 68:6–20; Tr. 26:4–27:12. Rather, the clause merely describes the result of arranging the components previously recited. *See Texas Instruments Inc. v. U.S. Int'l Trade Comm'n*, 988 F.2d 1165, 1172 (Fed. Cir. 1993) (“A ‘whereby’ clause that merely states the result of the limitations in the claim adds nothing to the patentability or substance of the claim.”). The Specification describes the same result, i.e., “connecting the power socket of one of the bodies with a power supply of a computer to simultaneously drive” two illumination fans into rotation and illumination. *See* Ex. 1001, 3:29–34. Accordingly, we are not persuaded by Patent Owner’s argument that the orientation of the fans, as shown in Figure 2, distinguishes claim 1 from Lai’s teachings.

To the extent that Patent Owner relies on a method of using the fans, our reviewing court explains that “apparatus claims cover what a device *is*, not what a device *does*.” *ParkerVision, Inc. v. Qualcomm Inc.*, 903 F.3d 1354, 1361 (Fed. Cir. 2018). Accordingly, “a prior art reference may . . . render obvious an apparatus claim—depending on the claim language—if the reference discloses an apparatus that is reasonably capable of operating so as to meet the claim limitations, even if it does not meet the claim limitations in all modes of operation.” *Id.* As discussed above, we determine

that Lai discloses an apparatus that is reasonably capable of operating so as to meet the limitation 1[d]. For this additional reason, we find that limitation 1[d] would have been obvious over Lai.

f) Conclusion as to Claim 1

Based on our review of the complete trial record, we determine that Petitioner establishes by a preponderance of the evidence that claim 1 would have been obvious to a person of ordinary skill in the art over Lai alone or in combination with Hasegawa.

4. Dependent Claim 2

Claim 2 depends from claim 1 and recites, *inter alia*, “an electrically conductive terminal is provided in the first connector, and an electrically conductive contact surface is provided in the second connector for being electrically connected with the electrically conductive terminal.” Ex. 1001, 4:21–31.

Petitioner asserts “Lai discloses that the first connector (single input 111) includes multiple electrically conductive terminals and that the second connector (single output 112) includes an electrically conductive contact surface being electrically connected with the electrically conductive terminals of the first connector (single input 111).” Pet. 76 (citing Ex. 1004 ¶ 128). Thus, Petitioner asserts that claim 2 would have been obvious over Lai. *Id.* (citing Ex. 1004 ¶¶ 129–130).

Patent Owner does not dispute Petitioner’s showing that Lai teaches or suggests the limitations of claim 2.

We find that Lai teaches or suggests the limitations of claim 2. *See* Ex. 1004 ¶¶ 128–129; Ex. 1012, Figs. 3–6. Accordingly, we determine that

claim 2 would have been obvious over Lai alone or in combination with Hasegawa.

E. Asserted Obviousness of Claim 3 over Lai, Hasegawa, and Huang

Petitioner argues that claim 3 would have been obvious over Lai and Huang, or Lai, Hasegawa, and Huang. Pet. 76–78. Patent Owner does not specifically address Petitioner’s combination of Lai with Huang. *See* PO Resp. 14–34.

1. Huang (Ex. 1008)

Huang relates to a computer cooling fan that provides a light-emitting effect. Ex. 1008, 1:6–8, 1:12–22. More specifically, Huang describes a cooling fan with a plurality of light guide strips and light diffusion portions that provide a uniform light-emitting effect. *Id.* at 1:51–2:13.

Figure 2 is reproduced below.

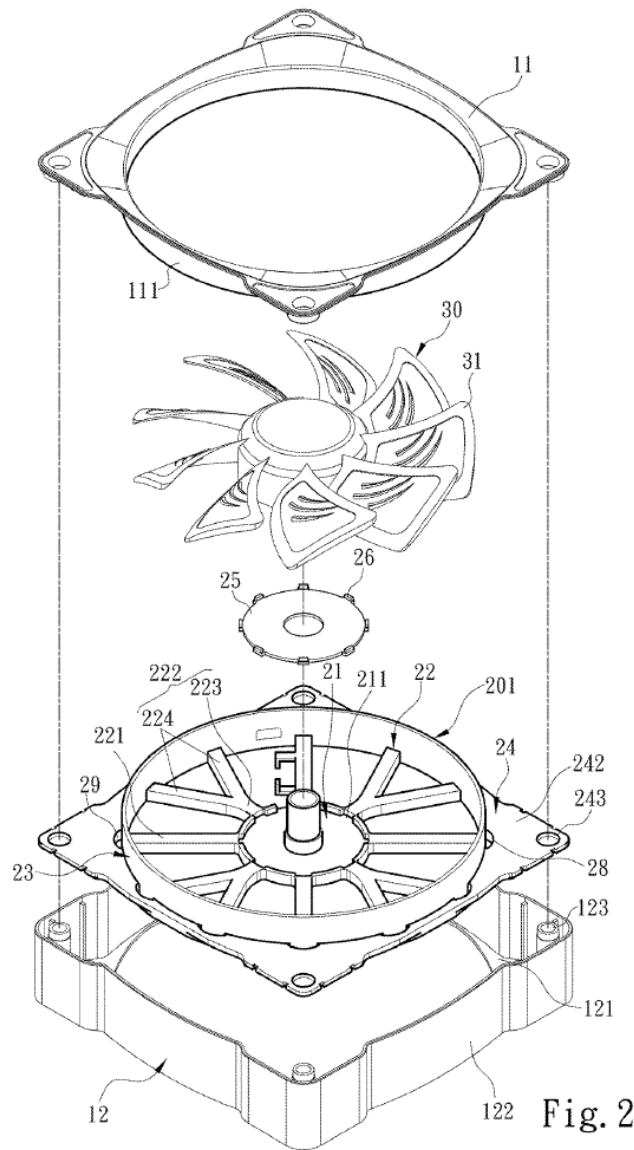


Figure 2 shows an exploded schematic of a cooling fan. *Id.* at 3:35–36.

Huang’s cooling fan includes frame body 10 with light-permeable upper cover 11 attached to light-tight base 12. *Id.* at 4:3–28. Within the frame body, light-emitting assembly 20 is mounted on base 12. *Id.* at 4:29. Fan assembly 30 is arranged on light-emitting assembly 20. *Id.* at 5:29–63. “Finally, the upper cover 11 is assembled on the base 12, i.e., the cooling fan having a light-emitting effect can be assembled.” *Id.* at 5:61–63.

The light-emitting assembly includes “light guide plate 201 which is made from a light-permeable material, a circuit board 25 arranged on the central light-emitting portion 21, and a plurality of light-emitting elements 26 which are electrically connected with the circuit board 25 to emit a light 27 respectively.” *Id.* at 4:30–36. Light guide plate 201 includes central light-emitting portion 21, light guide strips 22 which extend outward from the central light-emitting portion 21, and light diffusion portion 23 which surrounds the central light-emitting portion 21 and is connected with light guide strips 22. *Id.* at 4:36–48. Light 27 travels from light-emitting portion 21 through light guide strips 22 to light diffusion portion 23. *See id.* at 5:64–6:6. Light diffusion portion 23 eventually diffuses and guides light 27 to upper cover 11 that produces a uniform light-emitting effect. *See id.* at 6:6–47.

2. *Dependent Claim 3*

Dependent claim 3 depends from claim 1 and adds “wherein when the body of the illumination fan is connected with the body of another illumination fan, the illumination areas of the two bodies form a continuous illumination area.” Ex. 1004, 4:32–36.

Petitioner asserts that Huang describes an illumination fan with a light element that forms an illumination area at the top of the fan on at least two sides. Pet. 77 (citing Ex. 1008, 8:4–15, Fig. 2). Petitioner asserts that Huang further describes emitting light from the top of the Huang’s fan whereby “the entire upper cover or the entire frame body may be illuminated.” *Id.* (citing Ex. 1004 ¶ 138).

Petitioner contends that “[i]t would have been obvious to a PHOSITA to combine feature of Huang with Lai because Lai explains the purpose of its

LEDs is to provide decorative lighting.” *Id.* (citing Ex. 1004 ¶¶ 136–137). According to Petitioner, when the fans are connected as taught by Lai or Lai and Hasegawa, “the pair of fans together would form a single continuous illumination area” by applying Huang’s teachings. *Id.* (citing Ex. 1004 ¶¶ 136–140); *see also id. at* 78 (citing Ex. 1008, 3:20–29).

Patent Owner does not dispute Petitioner’s showing that the combination of Lai and Huang, or Lai, Hasegawa, and Huang teaches or suggests the limitations of claim 3.

We determine that the combination of Lai and Huang, or Lai, Hasegawa, and Huang teaches or suggests the limitations of claim 3, and that one skilled in the art would have been motivated to combine those teachings with a reasonable expectation of success. *See* Ex. 1004 ¶¶ 136–140; Ex. 1008, 8:4–15, 3:20–29. Accordingly, we determine that claim 3 would have been obvious over Lai and Huang, or Lai, Hasegawa, and Huang.

F. Asserted Obviousness of Claim 4 over Lai, Hasegawa, and Echazarreta

Petitioner asserts that claim 4 would have been obvious over Lai, Hasegawa, and Echazarreta. Pet. 78–80. Patent Owner disputes Petitioner’s contentions. PO Resp. 49–55.

1. Echazarreta (Ex. 1009)

Echazarreta relates to a modular fan tray made of injected molded or cast components. Ex. 1009, code (57). Figure 12 is reproduced below.

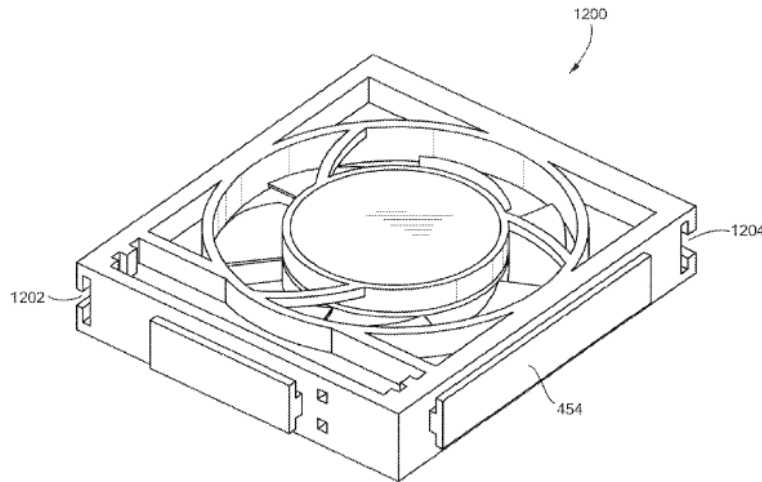


FIG. 12

Figure 12 “is a perspective front view of a modular fan tray.” *Id.* ¶ 39. Fan tray 1200 includes side rail 454 on one side. *Id.* ¶ 70. On the other side, fan tray 1200 includes “complementary-shaped opening (also referred to as a side rail receiver or a mounting bracket receiver) 1202, into which the side rail 454 of another fan tray (not shown) can be slid, thus forming a multi-fan tray.” *Id.* “[F]an tray 1200 also includes a similar opening (also referred to as a front rail receiver or a mounting bracket receiver) 1204,” for joining another fan tray that includes a front rail. *Id.* ¶ 71. “By this mechanism, a fan tray consisting of any number of desired fans, arranged in any desired pattern, can be easily assembled by an end user or system administrator.” *Id.*

2. *Dependent Claim 4*

Dependent claim 4 depends from claim 1 and adds “wherein a groove is provided on one side of the body of the illumination fan, while an engaging block is provided on another side thereof to be engaged into the groove.” Ex. 1001, 4:37–41. Claim 4 further recites “such that when the groove of the body of the illumination fan is engaged with the engaging

block of the body of another illumination fan, the body of the illumination fan is connected with the body of another illumination fan.” *Id.* at 4:41–45.

a) Petitioner’s arguments

Petitioner asserts that Echazarreta teaches a fan module including a groove provided on one side of the body of an illumination fan, i.e., opening 1202 (side rail receiver) and/or opening 1204 (front rail receiver). Pet. 78–79 (citing Ex. 1009 ¶ 70; Ex. 1004 ¶ 144). Petitioner asserts that Echazarreta further teaches “an engaging block provided on another side thereof to be engaged into the groove, in the form of side rail 454.” *Id.* at 79 (citing Ex. 1009 ¶ 70). According to Petitioner, Echazarreta explains that opening 1202 engages with side rail 454 thus forming a multi-fan tray. *Id.* (citing Ex. 1009 ¶ 70; Ex. 1004 ¶ 144).

Petitioner contends that “[i]t would be well within the capabilities of a PHOSITA to add Echazarreta’s groove and engaging block to the fan frame of Lai, as modified by Hasegawa, without substantial experimentation and with a highly predictable expectation of success.” *Id.* at 80 (citing Ex. 1004 ¶ 143). According to Petitioner, “Echazarreta provides an express motivation to do so using this technique: ‘Casting these pieces together reduces the complexity and cost of manufacturing the fan trays.’” *Id.* (citing Ex. 1009, Abstr.); *see also* Ex. 1004 ¶ 144 (citing Ex. 1009 ¶ 71). Petitioner further contends that “a PHOSITA would understand that this is a simple and quick mechanism for connecting fan blocks as suggested by Lai, as modified in light of Hasegawa.” *Id.* (citing Ex. 1004 ¶ 143).

In its Reply, Petitioner contends that “the claims do not require that the connectors directly mate, merely that they be connected and thus could use a cable that could be inserted after mating the engaging block and

groove.” Pet. Reply 29. Moreover, Petitioner asserts that “a POSITA would understand that the fans could be engaged into the groove using a lever or latch supporting the use of connectors that mate through insertion. Even if sliding connections were preferred, a POSITA would have selected an appropriate sliding connector.” *Id.* (citing Ex. 1031 ¶ 77).

b) Patent Owner’s arguments

Patent Owner argues that Echazarreta cannot be used to modify Lai and Hasegawa because “Echazarreta’s fan bodies’ purported engaging blocks will get in the way of . . . Lai/Hasegawa’s electrical connections between their fan bodies’ sides, causing their fans to become inoperable.” PO Resp. 52–53 (citing Ex. 2006 ¶ 94). For example, Patent Owner argues that Hasegawa “cannot be modified in view of Echazarreta” because Hasegawa “has connectors engaging and disengaging with each other in a direction *perpendicular* to that of Echazarreta.” *Id.* at 54 (citing Ex. 2006 ¶ 96).

Likewise, Patent Owner argues that Lai cannot be combined with Echazarreta because Lai’s “fans will first need to be pulled apart so much that Lai’s transmission line 12 . . . between the fans will simply break. *Id.* at 54. Additionally, Patent Owner argues that “Echazarreta’s purported engaging block . . . on Lai’s fans will shear off and sever Lai’s transmission line 12 when ‘engaging into’ the groove.” *Id.* at 54–55 (citing Ex. 2006 ¶ 97). Finally, Patent Owner argues that “upon full engagement, Echazarreta’s purported engaging block . . . will also block off the openings . . . on the sides of Lai’s fan bodies to prevent the transmission line 12 . . . from going through between the adjacent fans altogether.” *Id.*

In its Sur-reply, Patent Owner contends that Petitioner “fails to explain how a POSITA would have implemented the combination without destroying . . . Lai’s transmission lines when the proposed connections in mutually perpendicular directions are forced together.” PO Sur-reply 30. Patent Owner argues that Petitioner’s arguments lack a rational basis and evidence and instead rely on Dr. Wolfe’s unsupported “vague and conclusory statements.” *Id.* (citing Pet. Reply 29).

c) Our analysis

Based on our review of the complete trial record, we determine that Petitioner establishes by a preponderance of the evidence that claim 4 would have been obvious to a person of ordinary skill in the art over Lai, Hasegawa, and Echazarreta. First, we find that Echazarreta teaches a fan including a groove on one side of the fan body, and an engaging block provided on another side to be engaged into the groove to connect two fans. *See* Ex. 1004 ¶¶ 70, 71, Fig. 12. Specifically, Echazarreta’s Figure 12, reproduced above, illustrates modular fan tray 1200 including opening (rail receiver) 1202, corresponding to the claimed groove, and side rail 454, corresponding to the claimed engaging block. Ex. 1004 ¶ 70. Echazarreta further teaches that the opening, i.e., groove, and rail, i.e., engaging block, are engaged to connect multiple fans. *Id.* ¶¶ 70, 71.

Second, we find that a preponderance of the evidence supports Petitioner’s argument that one skilled in the art would have been motivated to combine the references with a reasonable expectation of success. Specifically, each of Lai, Hasegawa, and Echazarreta teach connecting modular fans in a series. *See* Ex. 1012, Fig. 3; Ex. 1014, Fig. 29; Ex. 1009 ¶¶ 70, 71, code (57). And Echazarreta expressly describes using its

rail/opening mechanism to connect multiple fans with an easy assembly. Ex. 1009 ¶¶ 70, 71. We are further persuaded by Dr. Wolfe’s testimony that a “POSITA would understand that this is a simple and quick mechanism for connecting fan blocks as suggested by Lai, as modified in light of Hasegawa.” Ex. 1004 ¶ 143; *see also* KSR, 550 U.S. at 417 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”). Dr. Wolfe’s testimony itself provides evidence from the perspective of one of ordinary skill in the art, that the combination would have been made “without substantial experimentation” and with a reasonable expectation of success. *See* Ex. 1004 ¶ 143.

We are not persuaded by Patent Owner’s arguments to the contrary because they require bodily incorporating Echazarreta’s features into Lai and Hasegawa. “The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.” *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016). Rather, the test is “whether a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention.” *Id.* (internal quotes omitted).

Patent Owner’s arguments rely on the inoperability of Lai’s and Hasegawa’s horizontal electrical connections when perpendicularly combined with Echazarreta’s vertically-sliding rail and opening. *See* PO Resp. 52–55 (“Echazarreta’s fan bodies’ purported engaging blocks will get in the way of . . . Lai/Hasegawa’s electrical connections”); Ex. 2006 ¶¶ 96,

97. But challenged claim 4 does not require any specific orientation for the claimed engaging block and groove, particularly a sliding orientation. *See* Ex. 1001, 4:37–45. Instead, claim 4 more broadly encompasses connecting fan bodies when a groove is “engaged” with an engagement block. *See id.* And Echazarreta does not limit its engagement features to a specific orientation. Instead, Echazarreta teaches that its connectors allow “a fan tray consisting of any number of desired fans, arranged in any desired pattern,” and that the side rails and rail receivers “can be oriented along other lines” than “horizontally oriented, i.e., parallel to the plane of the fan tray.” Ex. 1009 ¶¶ 71, 72; Ex. 1004 ¶ 144.

Upon determining that Echazarreta’s engaging block and groove are useful for connecting multiple fans, it would have been obvious to a person of ordinary skill in the art to modify either Lai’s and Hasegawa’s electrical connections or Echazarreta’s engaging block and groove to allow for easy assembly of fans in series. We disagree with Patent Owner’s argument that this combination would require undue experimentation to one of ordinary skill in the art, i.e., a person having a bachelor’s degree (or equivalent) in electrical engineering or mechanical engineering, and two years of experience in designing and/or implementing hardware components for computers, servers, and/or other electronic devices. *See supra* § III.B.

In conclusion, we are persuaded by Petitioner’s argument and evidence that claim 4 is unpatentable as having been obvious over Lai, Hasegawa, and Echazarreta.

*G. Asserted Obviousness of Claim 5 over Lai, Hasegawa, and Chou*⁸

Petitioner argues that claim 5 would have been obvious over Lai, Hasegawa, and Chou. Pet. 82–84. Patent Owner disputes Petitioner’s contentions. PO Resp. 56–65.

1. Chou (Ex. 1010)

Chou relates to a fan assembly including at least two fans. Ex. 1010

¶ 9. Figure 4 is reproduced below.

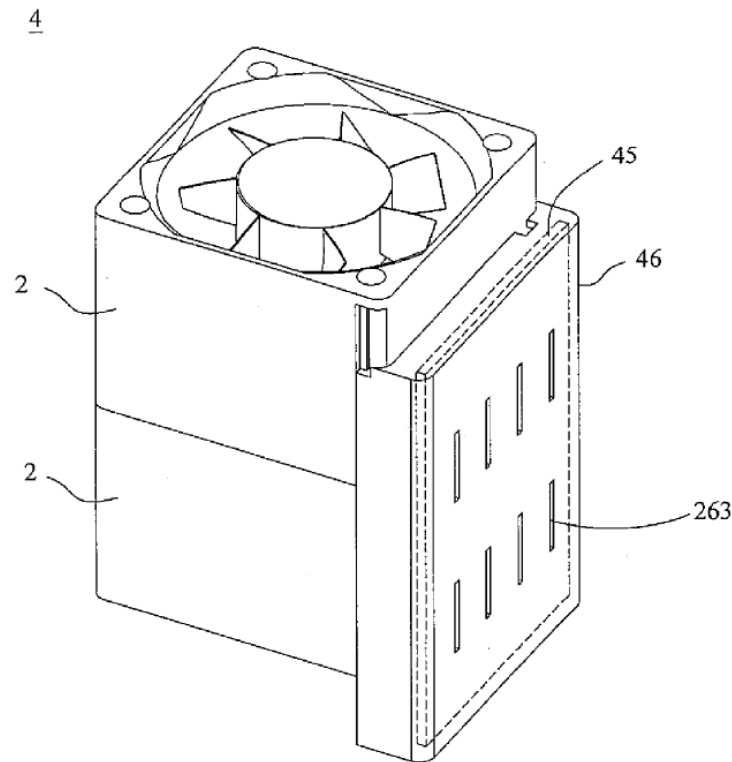


Figure 4 is a schematic illustration showing “fan assembly 4 including two fans 2 connected in series and connected together.” *Id.* ¶ 25. Fans 2 have a common connecting member 46. *Id.* Figure 2 shows connecting member 46/26 with bottom 260 and two sidewalls 261 extending perpendicularly

⁸ Petitioner argues for obviousness Lai, Hasegawa and Chou or Liu. Pet. 84–85. We separate discuss the alternative Liu ground in a separate section below.

from the bottom. *Id.* ¶ 22, Fig. 2. The connecting member is detachably connected to the fan frame “by way of sliding, engaging or hooking.” *Id.* The fan frame has at least two sliding rails “disposed at a peripheral corner of the fan frame” so that the connecting member sidewall is disposed on the sliding rail. *Id.*

2. *Dependent Claim 5*

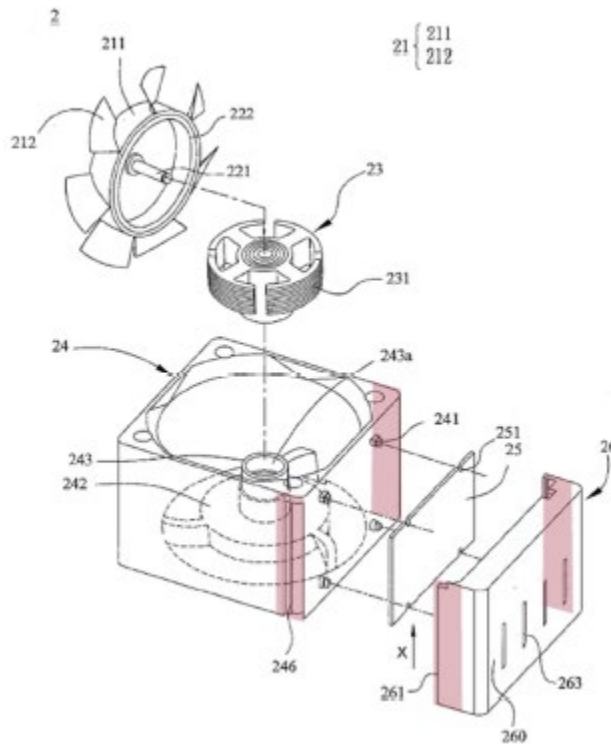
Claim 5 depends from claim 1 and adds

wherein a groove is provided on two sides of the body of the illumination fan, and the body of the illumination fan is connected with the body of another illumination fan by respectively engaging an engaging block with one of the grooves on the sides of the body of the illumination fan and one of the grooves on the sides of the body of another illumination fan.

Ex. 1001, 4:46–53.

a) *Petitioner’s arguments*

Petitioner asserts that Chou teaches a fan having a frame with at least two sliding rails disposed on opposite sides of the fan. Pet. 81 (citing Ex. 1010 ¶ 22). Petitioner refers to Chou’s Figure 2, reproduced below.



Id. at 81–82. Chou’s Figure 2, as annotated by Petitioner, illustrates fan body 24 including sliding rails 246 (colored red) located on opposite sides fan body 24. *Id.* at 82. Figure 2 also illustrates connecting member 26 having side walls 261 (colored red) that extend on opposite sides of connecting member 26, each side wall 261 engaging with corresponding sliding rail 246. *Id.*

According to Petitioner, “[a] PHOSITA would understand such sliding rails 246 on each fan to be ‘grooves’ on the sides of the body of each fan module.” *Id.* at 81 (citing Ex. 1004 ¶ 148). Petitioner further asserts that Chou teaches connecting member 26, that is an “engaging block,” “designed to engage rails 246 on the sides of each fan frame 24.” *Id.* (citing Ex. 1004 ¶ 133; Ex. 1010, Fig. 2). According to Petitioner, Chou’s Fig. 4 “refers to connecting two fans 2 in series by sliding a common connector member 46

into grooves 246 to form a fan assembly.” *Id.* at 82 (citing Ex. 1004 ¶ 149; Ex. 1009, Fig. 4, ¶¶ 25, 26).

Petitioner contends that “[a] PHOSITA would have been motivated to combine Chou with Lai and Hasegawa,” specifically to “to modify the Lai-Hasegawa illumination fan to include grooves on two sides and an engaging block that engages the grooves to connect the fans.” *Id.* at 83 (citing Ex. 1004 ¶¶ 147–149). Dr. Wolfe testifies that Chou provides “an express motivation” to combine fans using an engagement block “to share a printed circuit board between fans.” Ex. 1004 ¶ 147 (citing Ex. 1010 ¶ 25). Dr. Wolfe further explains that “[a] POSITA would understand that this is a simple and quick mechanism for connecting fan blocks as suggested by Lai, as modified in light of Hasegawa.” *Id.* According to Petitioner, “[t]he combination would have involved applying Chou’s known connector member 46 (an engaging block) to engage sliding rails 246 (grooves) on two sides of a fan body, for the known Lai-Hasegawa illumination cooling fans.” Pet. 83–84 (citing Ex. 1004 ¶¶ 147–149).

In its Reply, Petitioner asserts that the ’336 patent “does not limit connecting fans in any specific orientation.” Pet. Reply 30. Accordingly, Petitioner argues that claim does not distinguish Chou’s teachings, that also do “not limit connecting fans in any specific orientation.” *Id.*

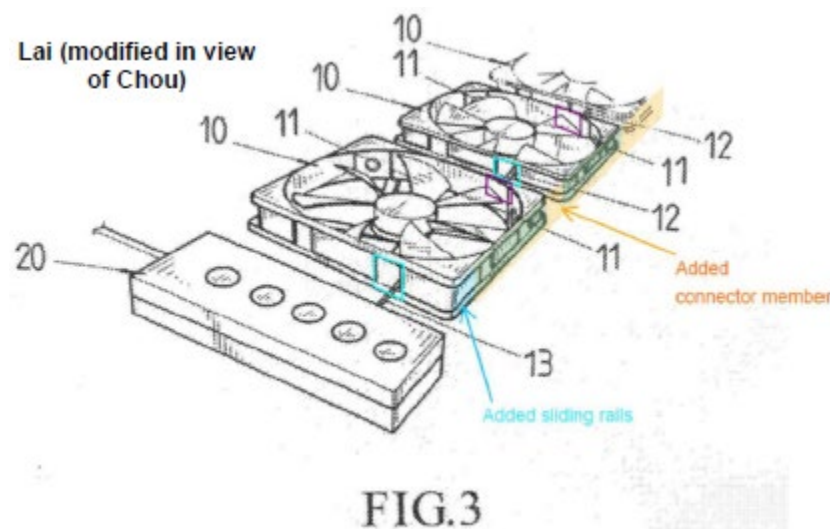
b) Patent Owner’s arguments

Patent Owner argues that “Figures 4 and 5 of the ’336 patent show an *embodiment* of claim 5, in which the illumination fan bodies are connected *laterally on their sides*.” PO Resp. 56–57 (citing Figs. 4, 5) (emphasis added). Patent Owner contends that Chou “does not teach the original claim 5 because Chou’s fan connection is on the top and bottom (or the front

and back) of the fan bodies such that they are connected in the **top/bottom** (front/back) direction of the fans' rotational axes." *Id.* at 57–58 (citing Ex. 1010, Fig. 4). Patent Owner emphasizes that Chou describes connecting fans in series, meaning a “top/bottom (front/back)” connection. *Id.* at 58 (citing Ex. 2006 ¶ 102). “In contrast, the fan bodies in claim 5 are connected on their sides **laterally** at least because claim 5 depends from the claim 1, which recites an illumination area on ‘top’ of the body of the illumination fan.” *Id.* at 58–59 (citing Ex. 2006 ¶ 102).

Patent Owner further argues against combining Chou with Lai and Hasegawa because “Lai/Hasegawa’s electrical connectors are all located laterally on the fan bodies’ sides . . . in a direction **perpendicular** to Chou’s fan body connection.” *Id.* at 59–61 (citing Pet. 34, 65). For example, Patent Owner argues Lai and Hasegawa’s fan bodies “connected laterally on their sides cannot be combined with Chou’s connection on the fan bodies’ top/front and bottom/back.” *Id.*

As to Lai specifically, Patent Owner provides the following illustration.



Id. at 64. Patent Owner reproduces Petitioner’s annotated Lai Figure 3 that shows sliding rails (blue) and connector member (yellow) extending along the sliding rails of multiple fans. *Id.* (citing Pet. 84). Patent Owner argues that the sliding rails of the annotated figure are not located on two sides of the fan body, “instead, they appear to be located on the same lower side of each fan 10’s body.” *Id.*

In the Sur-reply, Patent Owner emphasizes that claim 5 requires the fans to be connected on their lateral sides, with reference to Figure 5 of the ’336 patent. PO Sur-reply 31. Patent Owner argues that Petitioner does “not explain how to join two illumination fan bodies according to claim 5 **without them being joined on their sides**; instead the Petition attempted to show combined prior art fans ***joined on their sides***.” *Id.* at 32 (citing Pet. 51, 54, 84, 87).

c) Our analysis

Based on our review of the complete trial record, we determine that Petitioner establishes by a preponderance of the evidence that claim 5 would have been obvious to a person of ordinary skill in the art over Lai, Hasegawa, and Chou. First, we find that Chou teaches a fan body with a groove provided on two sides of the fan, and an engaging block for engaging with one of the grooves of one fan and one of the grooves of another fan. *See* Ex. 1010 ¶¶ 22, 25, 26, Figs. 2, 4. Specifically, Chou teaches fan 24 including sliding rail 246, corresponding to the claimed groove, provided on two sides of fan 24. *Id.* Chou also teaches connecting member 26/46, corresponding to the claimed engaging block, for engaging the grooves of two fans, as shown in Figure 4. *Id.*

Second, we find that a preponderance of the evidence supports Petitioner’s argument that one skilled in the art would have been motivated to combine the references with a reasonable expectation of success. Specifically, each of Lai, Hasegawa, and Chou teach connecting modular fans in a series. *See* Ex. 1012, Fig. 3; Ex. 1014, Fig. 29; Ex. 1010 ¶¶ 22, 25. Chou further provides a reason to apply its connector to afford a single common circuit board that can be easily disconnected and taken out. Ex. 1010 ¶¶ 22, 25. We are further persuaded by Dr. Wolfe’s testimony that a “POSITA would understand that this is a simple and quick mechanism for connecting fan blocks as suggested by Lai, as modified in light of Hasegawa.” Ex. 1004 ¶ 147; *see KSR*, 550 U.S. at 417. Dr. Wolfe’s testimony itself provides evidence from the perspective of one of ordinary skill in the art, that the combination would have been made “without substantial experimentation” and with a reasonable expectation of success. *See* Ex. 1004 ¶ 147.

We are not persuaded by Patent Owner’s arguments to the contrary because (1) they read a preferred embodiment into the claim, and (2) they require bodily incorporating Chou’s features into Lai and Hasegawa. First, Patent Owner relies on Figures 4 and 5 to argue that claim 5 requires “illumination fan bodies . . . connected laterally on their sides.” PO Resp. 56. But claim 5 does not recite the term “laterally.” *See* Ex. 1001, 4:46–53. Also, to the extent Patent Owner argues that claim 5 relies on the “sides” of claim 1 for antecedent basis, we disagree. *See* PO Resp. 58 (“the fan bodies in claim 5 are connected on their sides *laterally* at least because claim 5 depends from the claim 1”). Notably claim 5 does not refer to “the side” or “said side” previously recited in claim 1. Rather claim 5 recites “a groove

provided on two sides of the body of the illumination fan.” Ex. 1001, 4:48. And as we discussed above in section III.C.1., the term “side” has a different construction depending upon its context. Accordingly, claim 5 does not require the groove to be on the same “sides” recited in claim 1, but instead allows the groove to be on any two sides of the body. Likewise, we decline to confine claim 5 to the embodiments described in Figures 4 and 5, illustrating fan bodies laterally connected. *See Phillips*, 415 F.3d at 1323 (“[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments.”); *see also Bayer AG v. Biovail Corp.*, 279 F.3d 1340, 1348 (Fed. Cir. 2002) (“[A] court may not read into a claim a limitation from a preferred embodiment, if that limitation is not present in the claim itself.”).

Second, Patent Owner argues that Lai and Hasegawa’s laterally connected fan bodies cannot be combined with Chou’s connection on the fan bodies’ top/front and bottom/back. PO Resp. 61. In other words, Patent Owner argues that Chou’s engaging block and grooves cannot be bodily incorporated into Lai and Hasegawa’s laterally connected fan bodies. As discussed above, this is not the test for obviousness. *Allied Erecting*, 825 F.3d at 1381. Chou does not require any specific top/front or bottom/back orientation for its fan bodies. Rather, Chou teaches a mechanism for connecting multiple fans to a common connecting member (engaging block) for the purpose of sharing a common circuit board, without requiring a specific orientation for the fans. Upon determining that Chou’s engaging block and grooves are useful for connecting multiple fans, it would have been obvious to a person of ordinary skill in the art to modify either Lai’s

and Hasegawa's electrical connections or Chou's engaging block and grooves to connect multiple fans in series. We disagree with Patent Owner's argument that this combination would require undue experimentation to one of ordinary skill in the art, i.e., a person having a bachelor's degree (or equivalent) in electrical engineering or mechanical engineering, and two years of experience in designing and/or implementing hardware components for computers, servers, and/or other electronic devices. *See supra* § III.B.

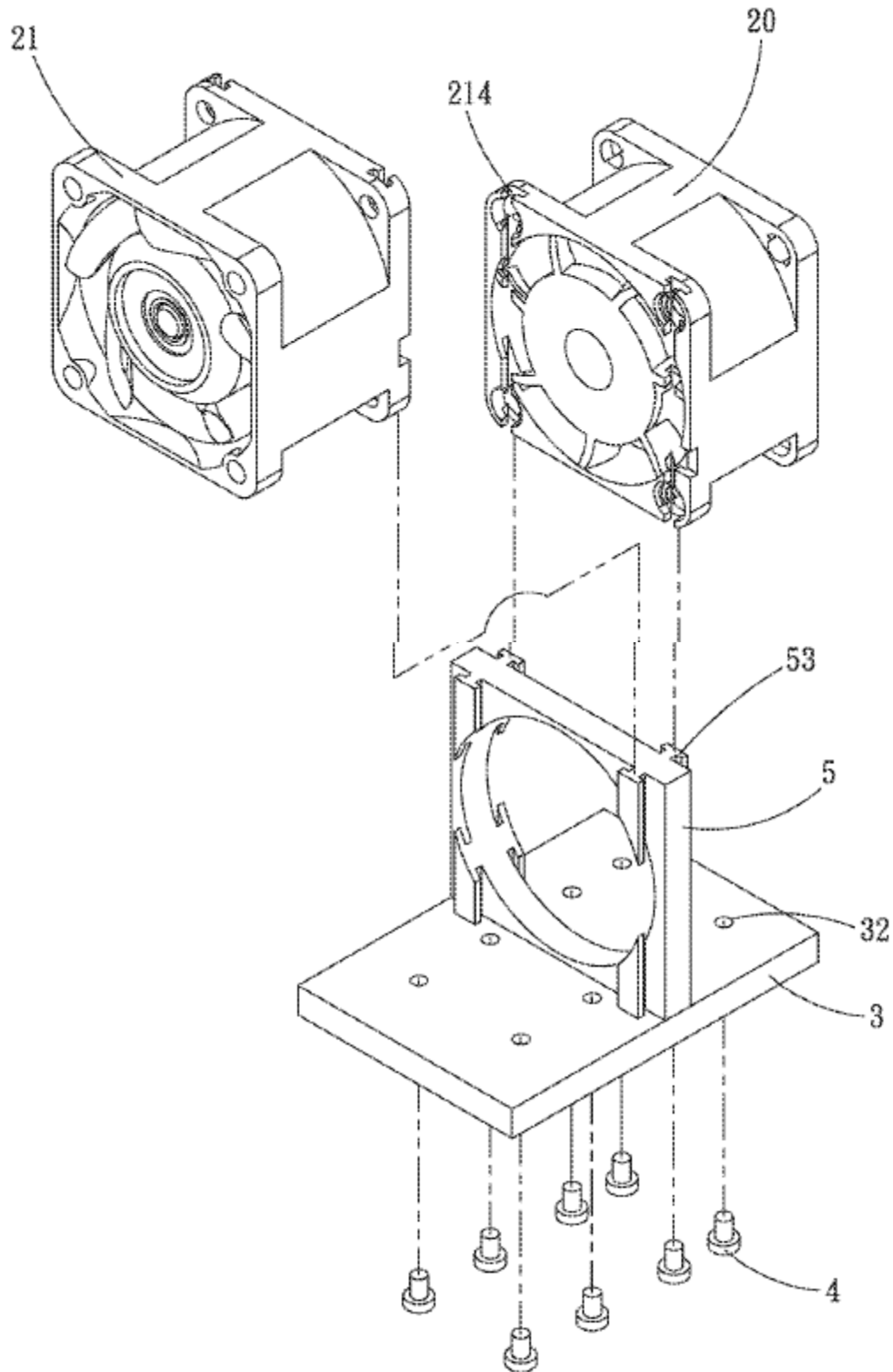
In conclusion, we are persuaded by Petitioner's argument and evidence that claim 5 is unpatentable as having been obvious over Lai, Hasegawa, and Chou.

H. Asserted Obviousness of Claim 5 over Lai, Hasegawa, and Liu

Petitioner argues that claim 5 would have been obvious over Lai, Hasegawa, and Liu. Pet. 84–88. Patent Owner disputes Petitioner's contentions. PO Resp. 65–69.

1. Liu (Ex. 1011)

Liu relates to a series fan assembly and a connection member connecting a first and second fan. Ex. 1011 ¶ 12. Figure 4A is reproduced below.



Liu's Figure 4A illustrates a series fan assembly including connection member 3, shown as a horizontal base, and assembling member 5, extending

perpendicularly from the middle of connection member 3. Ex. 1011 ¶¶ 33, 35; Fig. 4A. Assembling member 5 includes multiple assembling sections 53 that “can be holes, sockets, mortises, or posts.” *Id.* ¶ 33. First fan 20 and second fan 21 include corresponding connection sections 214 that “can be holes, sockets, mortises, or posts.” *Id.* First fan 20 and second fan 21 are assembled with assembling member 5 “by any other means that can securely connect the first and second fans 20, 21 . . . for example, by means of slide rail (as shown in FIGS. 4A and 4B . . .), locking, insertion, adhesion or latching. This is not limited.” *Id.* ¶ 35.

2. *Petitioner’s Arguments*

Petitioner asserts that Liu teaches a series fan assembly including multiple fan modules. Pet. 85. Each fan module can have mortises on two sides “which are understood by definition to a PHOSITA to be a type of ‘groove.’” *Id.* (citing Ex. 1004 ¶ 151). Petitioner further asserts that Liu teaches an assembling member 5 that acts as an engaging block that connects with connection sections 214 on two fans. *Id.* (citing Ex. 1011 ¶¶ 33, 35, Figs. 4A, 4B; Ex. 1004 ¶ 152).

Dr. Wolfe testifies that Liu provides express motivation to connect the fan bodies to reduce fan vibration and lower fan noise. Ex. 1004 ¶ 150 (citing Ex. 1011, Abstr.). Petitioner asserts that “[t]he combination would have involved applying Liu’s assembling member 5 (an engaging block) to engage connection sections 214 (grooves) on two sides of a fan body, for the known Lai-Hasegawa illumination cooling fans.” Pet. 87 (citing Ex. 1004 ¶¶ 150–152). Dr. Wolfe explains that “[a] POSITA would understand that this is a simple and quick mechanism for connecting fan blocks as suggested by Lai, as modified in light of Hasegawa.” Ex. 1004 ¶ 150.

3. *Patent Owner's Arguments*

Patent Owner contends that Liu is cumulative to Chou and “thus cannot cure the deficiencies of Chou.” PO Resp. 65. Similar to its arguments against the Chou combination, Patent Owner argues that “Liu teaches only a top/bottom connection of the fan bodies, and does not teach any lateral connection on the fan bodies’ sides. As a result, Liu cannot be used to modify . . . Hasegawa, or Lai, each designed to connect on their fan bodies’ sides.” *Id.* Also, Patent Owner argues that “Liu’s engaging block ***that must get in-between the fan bodies*** will also break the electrical connections on the fan bodies’ sides in . . . Hasegawa, and Lai.” *Id.* at 65–66.

4. *Our Analysis*

Based on our review of the complete trial record, we determine that Petitioner establishes by a preponderance of the evidence that claim 5 would have been obvious to a person of ordinary skill in the art over Lai, Hasegawa, and Liu. First, we find that Liu teaches a fan body with a groove provided on two sides of the fan, and an engaging block for engaging with one of the grooves of one fan and one of the grooves of another fan. *See* Ex. 1011 ¶¶ 33, 35, Figs. 4A, 4B. Specifically, Liu teaches fan 20 including mortise 214, corresponding to the claimed groove, provided on two sides of fan 20, the sides defined by a dividing line through the middle of the fan. *Id.* As discussed above as to Chou, the term “side” as used in claim 5 is not the same “sides” having a first connector and second connector of claim 1, because “side” is used in a different context. Liu also teaches connection member 3, including assembling member 5 and assembling sections 53, corresponding to the claimed engaging block, for engaging the grooves of two fans, as shown in Figure 4A. *Id.*

Second, we find that a preponderance of the evidence supports Petitioner’s argument that one skilled in the art would have been motivated to combine the references with a reasonable expectation of success. Specifically, each of Lai, Hasegawa, and Liu teach connecting modular fans in a series. *See* Ex. 1012, Fig. 3; Ex. 1014, Fig. 29; Ex. 1011 ¶¶ 33, 35. Liu further provides a reason to use its structural design to combine fans while reducing vibration and noise. Ex. 1011, code (57). We are further persuaded by Dr. Wolfe’s testimony that a “POSITA would understand that this is a simple and quick mechanism for connecting fan blocks as suggested by Lai, as modified in light of Hasegawa.” Ex. 1004 ¶ 150; *see KSR*, 550 U.S. at 417. Dr. Wolfe’s testimony itself provides evidence from the perspective of one of ordinary skill in the art, that the combination would have been made “without substantial experimentation” and with a reasonable expectation of success. *See* Ex. 1004 ¶ 150.

We are not persuaded by Patent Owner’s contrary arguments for the same reasons stated above as to Chou. First, claim 5 does not require laterally connecting fan bodies. Second, Patent Owner’s argument is based on bodily incorporating Liu’s engaging block and grooves with Lai and Hasegawa. We acknowledge that Liu, unlike Chou, expressly describes connecting fan’s end faces, e.g., top and bottom, in series. *See* Ex. 1011 ¶ 35. However, claim 5 does not exclude that type of connection, as it is not limited to connecting the lateral sides. Nor, do we agree that it would have been beyond the level of one of ordinary skill in the art to modify Liu’s mechanism to laterally connect Lai and Hasegawa’s fan bodies. Accordingly, we find that one skilled in the would have been able to apply

Liu's engaging block and grooves to Lai and Hasegawa's fan bodies without undue experimentation and with a reasonable expectation of success.

In conclusion, we are persuaded by Petitioner's argument and evidence that claim 5 is unpatentable as having been obvious over Lai, Hasegawa, and Liu.

I. Asserted Obviousness of Claims 1–3 over Tsuji and Huang

Petitioner argues that claims 1–3 would have been obvious over Tsuji and Huang. Pet. 23–44. Patent Owner disputes Petitioner's contentions. PO Resp. 34–49.

1. Tsuji (Ex. 1006)

Tsuji relates to an electronic device including a plurality of serially-connected fan units that cool the electronic device. Ex. 1007 ¶ 10. The plurality of fans may be connected using a serial interface. *Id.* ¶ 20.

Figure 5 is reproduced below.

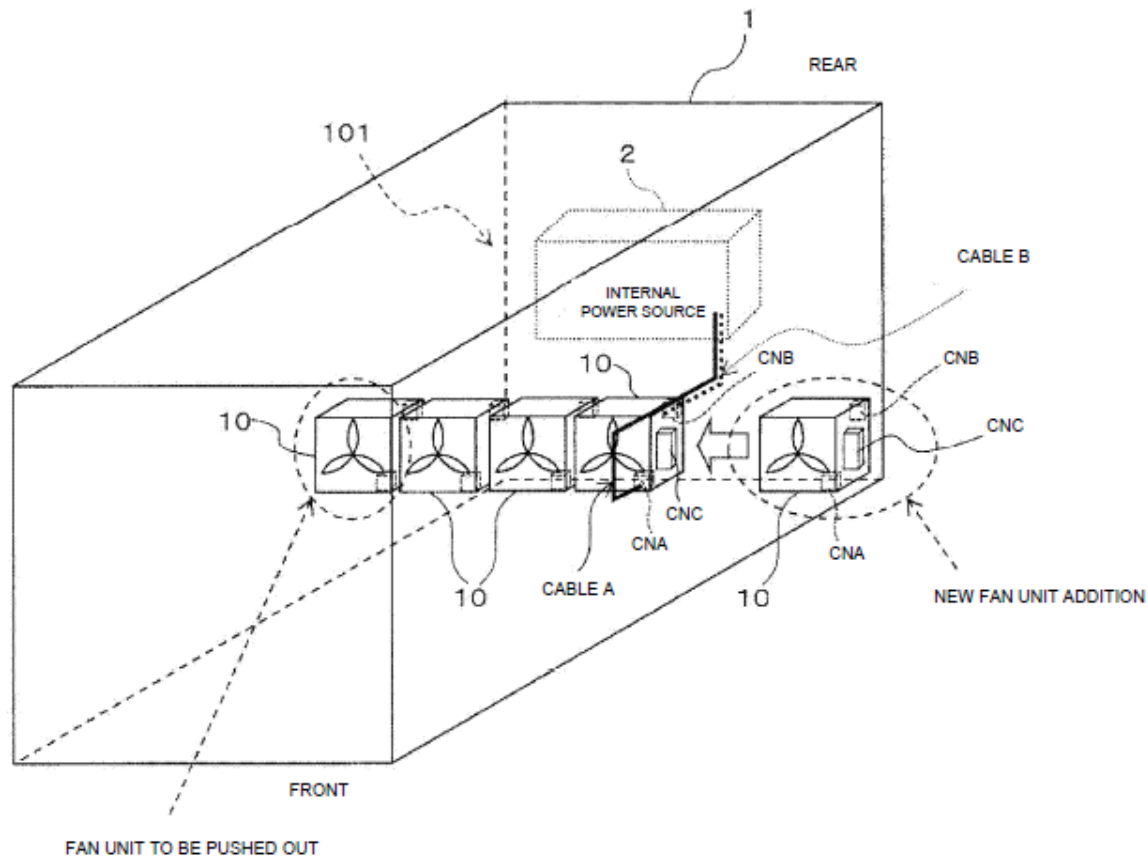


Figure 5 shows a schematic perspective view of an electronic device, e.g., a server, that includes an electronic apparatus cooled by a fan unit. *Id.* ¶¶ 12, 25. Server 1 “includes electronic apparatus 101 and a plurality of serially connected fan units 10 that cools the electronic apparatus 101.” *Id.* ¶ 26. “Each fan unit 10 includes a cooling fan 11 that is driven rotationally by a motor (not-shown), and a controlling unit (not-shown).” *Id.* ¶ 27. “[T]wo adjacent fan units 10 among the plurality of fan units 10 are connected via inter-fan connectors CNC and CND that transmit the pulse signal from one end side to the other end side, and supplies power from one end side to the other end side.” *Id.* ¶ 31. “Moreover, each fan unit 10 includes power connectors CNA and CNB to which two or more power cables capable of supplying power to its own fan unit are connected when its own fan unit is arranged on one end side of the plurality of fan units 10.” *Id.*

Figure 7 illustrates an individual fan unit and is reproduced below.

FIGURE 7

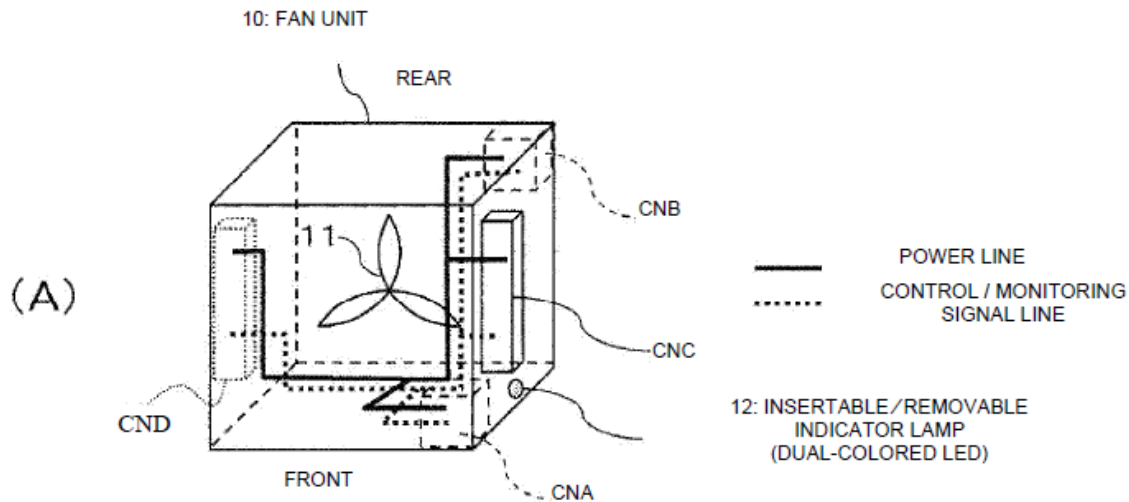


Figure 7(a) shows a schematic perspective view of fan unit 10 with cooling fan 11. *Id.* ¶ 12.

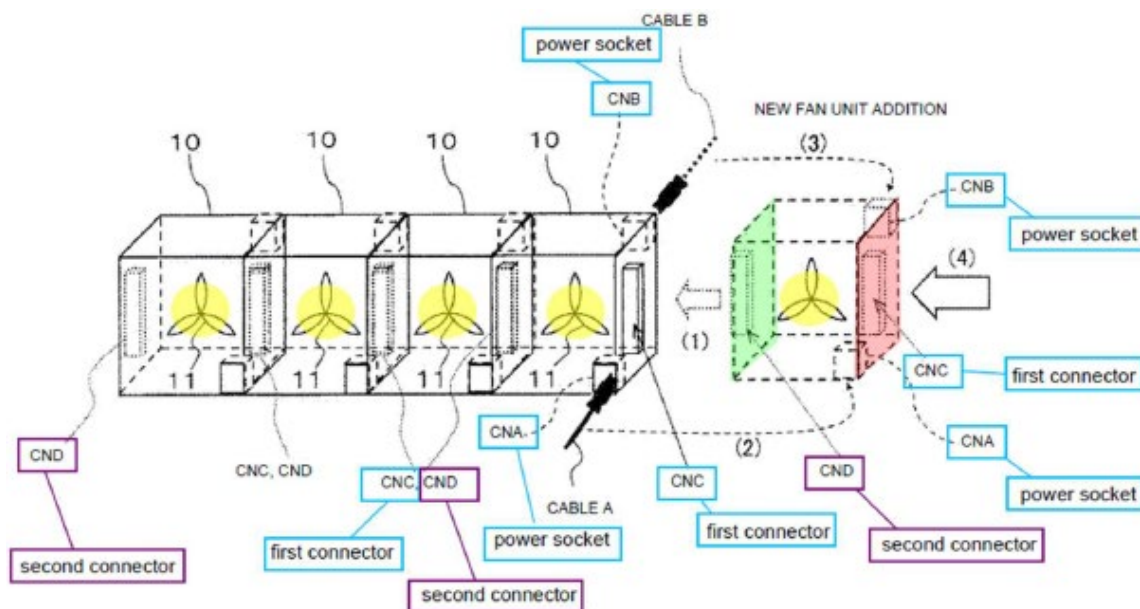
Fan unit 10 includes “insertable/removable indicator lamp 12 . . . provided on the right side surface when viewed from the front surface of each fan unit 10.” *Id.* ¶ 40. “The insertable / removable indicator lamp 12 is, for example, a dual-colored [light emitting diode (LED)]. The lighting color (luminescent color) of the insertable / removable indicator lamp 12 is controlled by . . . LED lighting circuit 20 [not shown].” *Id.*

2. Independent Claim 1

In our Institution Decision, we determined, on the preliminary record, that Petitioner had not sufficiently shown that Tsuji teaches or suggests limitations 1[c], “a power socket and a first connector on one side of the body,” and a second connector on another side of the body. Inst. Dec. 50. Based on our review of the complete trial record, we determine that Petitioner has not met its burden to show that Tsuji and Huang teach or suggest limitation 1[c]. We address this dispositive issue.

a) Petitioner's arguments

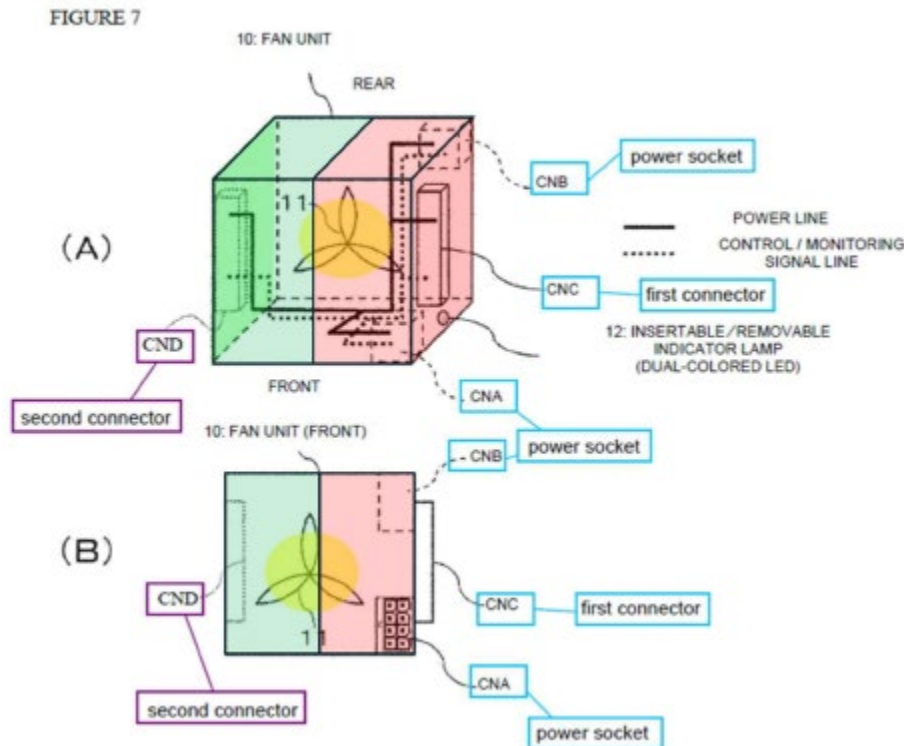
Petitioner asserts that Tsuji teaches “a power socket and a first connector on one side of the body, and a second connector on another side of the body.” Pet. 32–35 (citing Ex. 1004 ¶¶ 73–75). Specifically, Petitioner asserts that Tsuji teaches connectors CNA and CNB that are power sockets, first connector CNC on one side of the body, and second connector CND on another side of the body “as shown in at least Figures 5–7 and Figure 14.” *Id.* at 35 (citing Ex. 1004 ¶¶ 73–75). Petitioner’s annotated Figure 6 is reproduced below.



Id. at 34. Tsuji’s Figure 6 illustrates adding one new fan unit to four connected fan units. Ex. 1007 ¶ 36. Petitioner annotates the new fan unit to highlight power sockets CNA and CNB, a first side (red) with first connector CNC and a second side (green) with second connector CND. Pet. 34–35 (citing Ex. 1007 ¶ 39; Ex. 1004 ¶¶ 73–75) (emphasis omitted). According to Petitioner, “Tsuji teaches that ‘two adjacent fan units among the plurality of the fan units transmit the pulse signal from one side to the other side, and are

connected via an inter-fan unit connector that supplies power from one end to the other.” *Id.* at 33 (quoting Ex. 1007, claim 5).

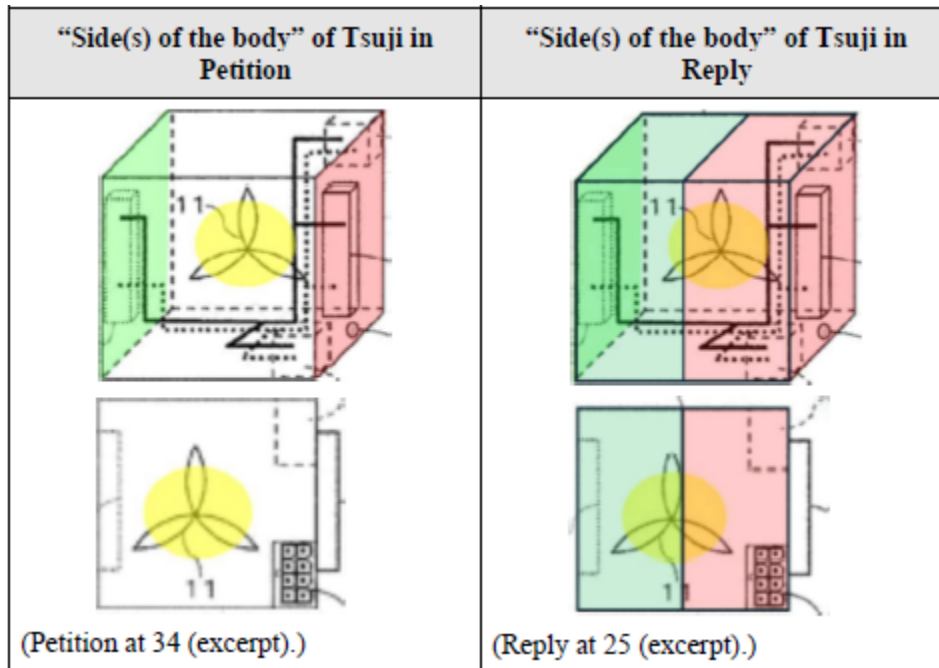
In its Reply, Petitioner provides annotated Tsuji Figure 7, reproduced below.



Pet. Reply 25. Figure 7 illustrates a fan unit, annotated by Petitioner to color the right half red and the left half green. Referring to the above annotated Figure 7, Petitioner asserts “Tsuji’s power socket (CNA and/or CNB and/or CNC) and first connector (CNC) are located on the same side of the body of Tsuji (illustrated in red . . .), while a second connector (CND) is located on the left side of the body of Tsuji (illustrated in green . . .).” *Id.* at 24–25.

b) Patent Owner’s arguments

Patent Owner contends that Petitioner introduces new arguments in Petitioner’s Reply. PO Sur-reply 27–28. Patent Owner compares the Petition argument and Petitioner’s Reply argument in a figure, reproduced below.



On the left, Patent Owner’s figure illustrates the Petition argument, with Tsuji’s fan body having a left side colored green, a top of the body with a fan colored yellow, and a right side colored red (applying claim 1’s terminology). *Id.* at 27. On the right, Patent Owner’s figure illustrates Petitioner’s Reply argument, with Tsuji’s fan body having a left half, including the top of the body, colored green, and a right half, including the top of the body, colored red. *Id.* According to Patent Owner, the alleged new arguments are based on a new claim construction. *See id.* Also, Patent Owner argues that these alleged new arguments are not supported by Dr. Wolfe’s testimony. *See id.* (citing Ex. 2051, 118:10–25; Ex. 1004; Ex. 1031).

Patent Owner further disputes the merits of Petitioner’s arguments. Specifically, Patent Owner contends that “Petitioner’s own figures and analysis demonstrate that the CNA or CNB connector (the alleged ‘**power socket**’) is, respectively, located on the ‘front’ or the ‘rear’ of the fan unit, while the CNC connector (the alleged ‘first connector’) is positioned on a

separate side of the fan unit.” PO Resp. 40–41 (citing Pet. 34; Ex. 1007, Figs. 6, 7; Ex. 2006 ¶ 77). Also, Patent Owner argues that “Petitioner does not propose any modification of Tsuji (such as relocating the CNA/CNB connectors) in an attempt to cure the deficiency mentioned above.” *Id.* at 43. Accordingly, Patent Owner contends that Petitioner fails to show Tsuji and Huang teach or suggest a power socket and a first connector on one side of the body as claimed. *Id.*

c) Our analysis

We agree with Patent Owner that Petitioner introduces an improper new argument in Petitioner’s Reply. However, even if we consider this new argument, we find that Petitioner still fails to show that Tsuji and Huang teach or suggest “a power socket and a first connector on one side of the body.”

First, we address Petitioner’s Reply. The Petition asserts that Tsuji teaches connectors CNA and CNB that are power sockets, first connector CNC on one side of a fan body, and second connector CND on another side of a fan body “as shown in at least Figures 5–7 and Figure 14.” *See* Pet. 35. In our Institution Decision, we found that “Tsuji’s Figures illustrate a power socket located on the front of the fan unit and the first connector (and second connector) located on the side(s) of the fan unit. . . . the power socket is not located on the same side as the first connector.” Inst. Dec. 49.

Petitioner’s Reply introduced a new argument, that Tsuji’s first connector side encompasses the top of the body, i.e., the fan location, to include Tsuji’s power socket also located at the top/front of the body. *See* Pet. Reply 24–26; PO Sur-reply 27. In making this argument, Petitioner does not explain how its original Petition was correct, and instead presents a new

argument absent from the Petition. *See Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1287 (Fed. Cir. 2017). Therefore, we reject this improper new argument.

Second, even if we accept this new argument, we find that it does not meet the required claim limitation. As discussed above in Section III.C.1., Petitioner's new claim construction, introduced in its Reply, does not differentiate between a top of the body, where the fan is located, and a side of the body, where the power socket and first connector are located, as required by claim 1. Accordingly, we reject this claim construction. Applying the plain meaning of the claim, Tsuji does not teach or suggest "a power socket and a first connector on one side of the body." And, the Petition does not argue that it would have been obvious to modify Tsuji to move its power socket from the top side to the first connector side. *See* Pet. 32–35. Accordingly, we find that Petitioner fails to show that Tsuji and Huang teach or suggest limitation 1[c]. Because Petitioner has not met its burden of persuasion on limitation 1[c], Petitioner has not shown that claim 1 is unpatentable as obvious in view of Tsuji and Huang.

3. *Dependent Claims 2–5*

Petitioner's unpatentability grounds for dependent claims 2–5 rely on the teachings of Tsuji to address limitation 1[c]. *See* Pet. 5 (Grounds 1–3). As discussed above, we find Petitioner fails to meet its burden of persuasion as to claim 1. Accordingly, Petitioner has not met its burden of persuasion to show claims 2–5 are unpatentable as obvious in view of Tsuji and Huang.

IV. PATENT OWNER'S REVISED MOTION TO AMEND

As discussed above, we determined that Petitioner has proved, by a preponderance of evidence, that claims 2 and 3 of the '336 patent are unpatentable. We, therefore, address Patent Owner's Revised Motion to Amend original claims 2 and 3 and replace them with proposed substitute claims 6 and 7. RMTA 1. We deny Patent Owner's Revised Motion to Amend for the reasons described below.

A. Proposed Substitute Claims

Patent Owner contingently proposes substituting claims 6 and 7 in place of original claims 2 and 3. RMTA 1. Proposed substitute claims 6 and 7 are reproduced below⁹:

6. A system comprising a first illumination fan for a computer connected with a second illumination fan for the computer, wherein:

(A) the first illumination fan comprises:

(i) a body comprising a top, a bottom, and sides, wherein the sides include at least a first side and a second side;

(ii) a center fan located in a center of the body;

(iii) an illumination area located at the top of the body and disposed on at least two sides of the center fan;

(iv) a power socket comprising an opening disposed on the first side of the body;

(v) a first connector disposed on the first side of the body, wherein the first connector is structurally distinct and separable from the power socket, and wherein the first connector comprises a first electrical

⁹ For clarity, we show proposed substitute claims 6 and 7 without emphasizing the proposed amendments by underlining or bracketing.

terminal configured to electrically connect with a second electrical terminal of the second illumination fan; and

(vi) a second connector disposed on the second side of the body;

(B) the power socket is electrically connected with the first connector, the second connector, the center fan and the illumination area, such that when the power socket on the first side of the body is supplied with power via the power socket's electrical connection with the second connector, the center fan and the illumination area of the body of the first illumination fan are respectively driven into rotation and illumination; and

(C) when the first connector of the body of the first illumination fan is connected with a second connector of a body of the second illumination fan, a center fan and an illumination area of the body of the second illumination fan are respectively driven into rotation and illumination.

Id. at 35–36 (App. A).

7. system comprising a first illumination fan for a computer connected with a second illumination fan for the computer, wherein:

(A) the first illumination fan comprises:

(i) a body comprising a top, a bottom, and sides, wherein the sides include at least a first side and a second side;

(ii) a center fan located in a center of the body;

(iii) an illumination area located at the top of the body and disposed on at least two sides of the center fan;

(iv) a power socket comprising an opening disposed on the first side of the body;

(v) a first connector comprising a first flat surface disposed on the first side of the body, wherein the first connector is structurally distinct and separable from the power socket, and wherein the first flat surface comprises a first electrical terminal that is round and configured to

electrically connect with a second electrical terminal of the second illumination fan; and

(vi) a second connector comprising a second flat surface disposed on the second side of the body;

(B) the power socket is electrically connected with the first connector, the second connector, the center fan and the illumination area, such that when the power socket on the first side of the body is supplied with power via the power socket's electrical connection with the second connector, the center fan and the illumination area of the body of the first illumination fan are respectively driven into rotation and illumination; and

(C) when the first connector of the body of the first illumination fan is connected with a second connector of a body of the second illumination fan, a center fan and an illumination area of the body of the second illumination fan are respectively driven into rotation and illumination.

Id. at 36–37 (App. A).

B. Legal Standard

Petitioner bears the burden of persuasion to show that any proposed substitute claim is unpatentable by a preponderance of the evidence.

Lectrosonics, Inc. v. Zaxcom, Inc., IPR2018-01129, Paper 15 (PTAB Feb. 15, 2019) (precedential); 37 C.F.R. § 42.121(d)(2). “Before considering the patentability of any substitute claims, however, the Board first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.”

Lectrosonics, Paper 15 at 4–8. Patent Owner bears the burden of persuasion to show by a preponderance of the evidence that the motion to amend complies with these requirements. 37 C.F.R. § 42.121(d)(1). Specifically, Patent Owner must make an initial showing to demonstrate the following: (1) that a “reasonable number of substitute claims” have been proposed for

each challenged claim (35 U.S.C. § 316(d)(1)(B)); (2) that the proposed amendments respond to a ground of unpatentability involved in the trial (37 C.F.R. § 42.121(a)(2)(i)); and (3) that the amendments do not seek to enlarge the scope of the claims and do not introduce new matter (35 U.S.C. § 316(d)(3)). *Lectrosonics*, Paper 15 at 4–8.

C. Statutory and Regulatory Requirements

Patent Owner bears the burden to ensure that its Revised Motion to Amend complies with the legal requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. *Lectrosonics*, Paper 15 at 4–5, 7–8. For the reasons that follow, we determine that Patent Owner has not satisfied that burden.

1. Reasonable Number of Substitute Claims

Patent Owner proposes a reasonable number of substitute claims. Patent Owner proposes a one-to-one substitution of proposed claims 6 and 7 for original claims 2 and 3. RMTA 1, 3, App. A.

Petitioner does not argue otherwise. *See generally* RMTA Opp.; RMTA Sur-reply.

We determine that Patent Owner meets this requirement.

2. Amendments Responsive to a Ground of Unpatentability

Patent Owner’s proposed substitute claims respond to the grounds of unpatentability involved in this proceeding. *See* RMTA 2–3, 22–25. Upon review of Patent Owner’s arguments, we agree that proposed substitute claims 6 and 7 add limitations and combinations of limitations that respond to the grounds of unpatentability involved in the trial. *See* RMTA 22–25, 35–37 (App. A).

Petitioner does not argue otherwise. *See generally* RMTA Opp.; RMTA Sur-reply.

We determine that Patent Owner meets this requirement.

3. *Scope of the Claims*

A motion to amend may not enlarge the scope of the claims of the patent. 35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii).

Although proposed substitute claims 6 and 7 change the scope of original dependent claims 2 and 3 that they are intended to replace by deleting some limitations present in claims 2 and 3, proposed substitute claims 6 and 7 do not enlarge the scope of the claims of the challenged patent. That is because proposed substitute claims 6 and 7 include narrowing limitations as compared to original independent claim 1, such that both proposed substitute claims are narrower than original claim 1. *See* RMTA 3, 35–37 (App. A).

Thus, the amendment proposed in Patent Owner’s Revised Motion to Amend would not enlarge the scope of the claims of the ’336 patent. Petitioner does not argue otherwise. *See generally* RMTA Opp.; RMTA Sur-reply.

We determine that Patent Owner meets this requirement.

4. *New Matter*

A motion to amend may not introduce new subject matter. 35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii).

Patent Owner submits that the ’336 patent provides written description for proposed substitute claims 6 and 7, referencing Figures 1–3 and various portions of the patent specification in support. *See* RMTA 5–18.

Petitioner asserts that the ’336 patent does not provide written description support for: (i) limitations (B) and (C) of proposed substitute claims 6 and 7; (ii) “an illumination area” in proposed substitute claims 6

and 7 “[u]nder PO’s [d]efinition. . . . that an ‘illumination area’ is not simply an area where light happens to be visible to the user – it is the area of the body that actually generates light, i.e., illuminates”; and (iii) limitations in proposed substitute claim 7 reciting two connectors on two sides of the body, each connector comprising a “flat surface.” Opp. RMTA 1–7.

We do not adopt Patent Owner’s definition of an illumination area as discussed above in Section III.C.3. Thus, we do not address Petitioner’s arguments as to lack of written description support for Patent Owner’s illumination area definition.

We analyze each of Petitioner’s remaining contentions and Patent Owner’s responsive arguments below as to the newly added claim limitations.

a) Limitations (B) and (C) of proposed substitute claims 6 and 7

Limitations (B) and (C) in proposed substitute claim 6 recite:

(B) the power socket [of the first illumination fan] is electrically connected with the first connector, the second connector, the center fan and the illumination area [of the first illumination fan], such that when the power socket on the first side of the body is supplied with power via the power socket’s electrical connection with the second connector, the center fan and the illumination area of the body of the first illumination fan are respectively driven into rotation and illumination; and

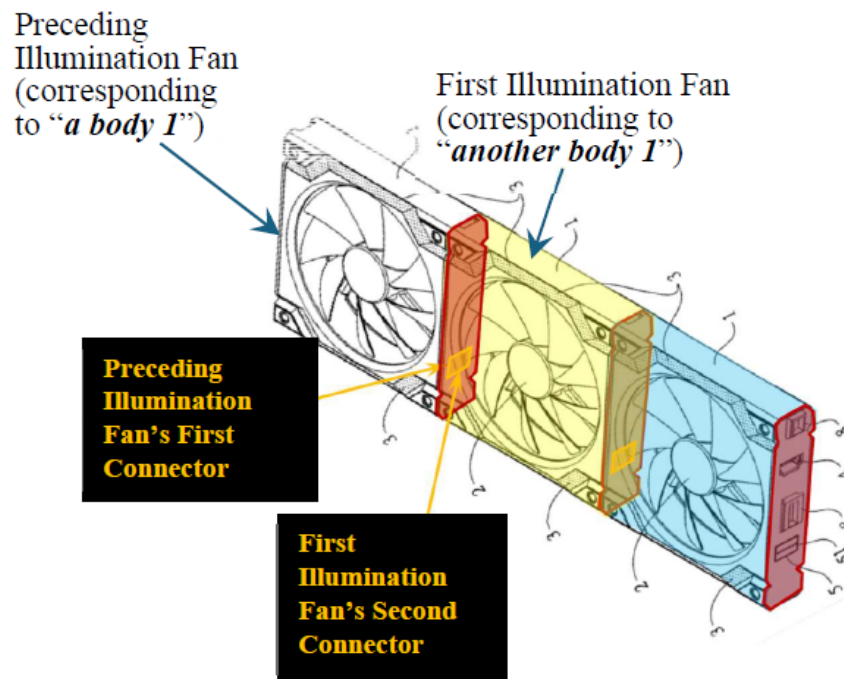
(C) when the first connector of the body of the first illumination fan is connected with a second connector of a body of the second illumination fan, a center fan and an illumination area of the body of the second illumination fan are respectively driven into rotation and illumination.

See RMTA 35–36. Proposed substitute claim 7 recites similar limitations.

See id. at 36–37.

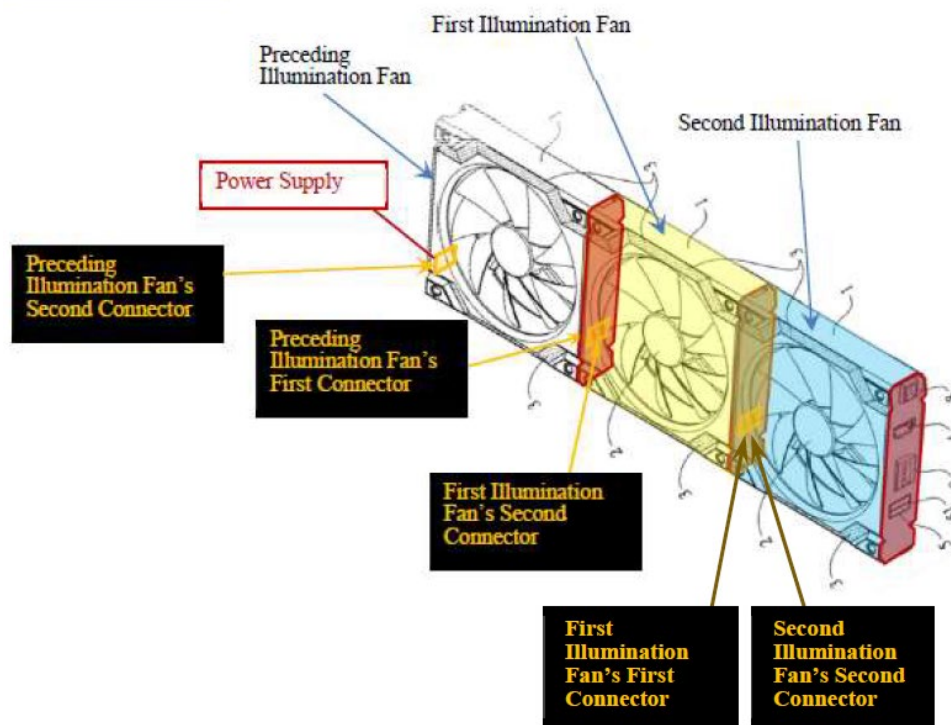
Petitioner asserts that Patent Owner’s outlined support for limitations (B) and (C) relies on “an embodiment wherein *external power is provided directly to the second connector of a third fan* (referred to as a ‘preceding illumination fan’ in the RMTA[.]” but “there is no written description of such an embodiment in the ’336 Patent.” RMTA Opp. 2–3 (citing RMTA 11–14) (emphasis added). Petitioner argues that “[t]he specification [of the ’336 patent] does not disclose the power supply as added by PO’s expert” and “neither the figures nor the text of the specification of the ’336 Patent provides any disclosure that external power is supplied to a second connector.” RMTA Opp. 3; RMTA Sur-reply 1.

Turning to Patent Owner’s demonstration of support for limitation (B), Patent Owner cites to column 1, line 53–column 2, line 2, column 3, lines 4–16, and Figures 1 and 3 of the ’336 patent. *See* RMTA 7–10. Patent Owner provide an annotated version of Figure 3 of the ’336 patent, reproduced below:



RMTA 9. Patent Owner’s annotated Figure 3 includes a preceding illumination fan, connected to first illumination fan (yellow), that is connected to second illumination fan (blue). *Id.*

For limitation (C), Patent Owner cites to column 1, line 53–column 2, line 2, column 3, lines 4–16, and Figs. 1, 2, and 3 of the ’336 patent. *See id.* at 10–14. Patent Owner also provides a further annotated version of Figure 3 of the ’336 patent, reproduced below:



Id. at 13. Patent Owner’s annotated Figure 3 adds a power supply with an arrow pointing to preceding illumination fan’s second connector. *Id.*

We have reviewed Patent Owner’s cited portions from the ’336 patent. The ’336 patent, at column 1, line 65–column 2, line 2, describes two illumination fans connected such that “when the *first connector* of the body [of an illumination fan] is connected with a *second connector* of a body of another illumination fan, a fan and an illumination area of the body of another illumination fan can be respectively driven into rotation and

illumination.” *See* Ex. 1001, 1:54, 1:65–2:2 (emphasis added). This disclosure of the ’336 patent supports **limitation (C)** recited in proposed substitute claim 6 (and similarly recited in claim 7) because the portion discloses that a second illumination fan (“another illumination fan”) is energized through a connection between the second fan’s second connector and a first connector of a first illumination fan (“an illumination fan”). *See id.* at 1:54–2:2.

Further, the ’336 patent, at column 3, lines 11–16, describes two illumination fans’ bodies connected such that “when the *first connector 5* of *a body 1* is connected to the *second connector 6* of *another body 1*, the fan 2 of the *another body 1* can be driven into rotation and the illumination area 3 can be illuminated.” *See* Ex. 1001, 3:11–16 (emphasis added). This disclosure of the ’336 patent again supports limitation (C) recited in proposed substitute claims 6 and 7 because the portion discloses that a second fan (e.g., the fan with the “another body 1”) is energized through a connection between the second fan’s second connector 6, and a first connector 5 of a first fan (fan having “a body 1”). *See id.* at 3:11–16.

Thus, Patent Owner has identified adequate written description support in the ’336 patent for **limitation (C)** recited in proposed substitute claim 6, and the similar limitation (C) recited in proposed substitute claim 7.

With respect to **limitation (B)** of proposed substitute claim 6 (and the similar limitation recited in claim 7), that limitation describes how one fan (the first illumination fan) is energized, particularly reciting that the first fan is energized “when the power socket on the first side of the body [of the first fan] is supplied with power via the power socket’s electrical connection with the second connector [of the first fan].” *See* RMTA 35. Patent Owner’s cited

column 1, line 53–column 2, line 2 of the '336 patent describe “when *the power socket on the one side of the body [of the fan] is supplied with power*, the fan and the illumination area of the body [of the fan] can be respectively driven into rotation and illumination.” See Ex. 1001, 1:55–65 (emphasis added). Thus, column 1, line 53–column 2, line 2 discloses that “the power socket on the one side of the body is supplied with power” but does not disclose that the fan’s power socket is *supplied with power via a power socket’s electrical connection with the fan’s second connector* (as required in limitation (B) of claims 6 and 7).

Patent Owner’s other cited section at column 3, lines 4–16 of the '336 patent describes one fan having “the body 1” for which “*once the power socket 4 at a side of the body is supplied with power*, the fan 2 of the body 1 can be driven into rotation and the illumination area 3 can be illuminated.” See Ex. 1001, 3:4–6¹⁰ (emphasis added). Thus, column 3, lines 4–16 disclose that “the power socket 4 at a side of the body is supplied with power” but, again, do not disclose that the fan’s power socket is *supplied with power via a power socket’s electrical connection with the fan’s second connector* (as recited in limitation (B) of claims 6 and 7).

We reviewed other portions of the '336 patent that reference a “power socket.” Column 3, lines 29–34 describes

once assembled, two fans that could be independently used can be joined together, and *power can be supplied by connecting the power socket of one of the bodies with a power supply of a computer* to simultaneously drive the fans of the two bodies into rotation and the illumination areas into illumination. This solves the issue of insufficient power cables provided by the

¹⁰ A power socket is not mentioned again in column 3, lines 4–16.

power supply and eliminates cumbersome routing due to large number of wires.

See Ex. 1001, 3:29–36 (emphasis added). This description does not disclose that a fan’s power socket is *supplied with power via a power socket’s electrical connection with the fan’s second connector* (as recited in limitation (B)). *See* RMTA Sur-reply 1. We also reviewed the text of the ’336 patent for references to a “second connector.” The ’336 patent describes that a second connector of a fan is connectable to a first connector of another fan. *See* Ex. 1001, 2:7–10, 3:12–15. The discussion concerning the “second connector” in the ’336 patent, however, does not disclose that *a fan’s second connector supplies power to the fan’s power socket* (as required by limitation (B) of claims 6 and 7).

Patent Owner asserts that the ’336 patent in Figure 2 and column 3, lines 4–16, indicates that “[t]he power socket 4 of the embodiment shown in Figure 1 . . . can be supplied with power in various ways” including “a non-limiting configuration, [in which] the power socket 4 . . . can be supplied with power via internal wiring from the second connector 6, which can receive power from a prior [i.e., preceding] illumination fan’s first connector 5.” *See* RMTA 8–11 (citing Ex. 2006 ¶ 27). But, Patent Owner relies on Dr. Tuckerman’s testimony to support “the first illumination fan’s power socket is supplied with power via the first illumination fan’s second connector,” and not an express, implicit, or inherent disclosure from the ’336 patent. *See* RMTA 8, 10, 12–14 (citing Ex. 2006 ¶ 27; Ex. 2002 ¶ 27).

Patent Owner’s additional argument that the power-providing arrangement recited in limitation (B) is a “configuration as permitted and supported by the specification” (*see* RMTA 13) does not identify the required support in the ’336 patent. *See also id.* (reasoning that, “[g]iven that

the ‘power socket 4’ is a connector that can be connected to a power supply, there is no reason why a POSITA would not have been able to connect a power supply to the second connector 6 of an illumination fan in the ‘336 patent”).

The test for sufficiency of a written description is whether the disclosure “clearly allow[s] persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351–52 (Fed. Cir. 2010) (en banc) (quoting *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1562–63 (Fed. Cir. 1991)). To provide written description support, the originally-filed specification “must do more than merely disclose that which would render the claimed invention obvious.” *ICU Med., Inc. v. Alaris Med. Sys., Inc.*, 558 F.3d 1368, 1377 (Fed. Cir. 2009). Patent Owner’s arguments and evidence, at best, show that it may have been obvious to supply power to the power socket through in second connector, but do not describe, expressly or inherently, this feature. Rather, the Specification only describes supplying power directly to the power socket from the computer power supply. *See* Ex. 1001, 3:29–36.

Patent Owner’s additional arguments regarding *unclaimed* features (e.g., of a power supply connected to a third/preceding illumination fan) not needing express written description support (*see* RMTA Reply 1–3) do not remedy a lack of written description support for features that are *claimed*. *See* RMTA Sur-reply 2. A first illumination fan that is energized “when the [fan’s] power socket . . . is supplied with power via the power socket’s electrical connection with the [fan’s] second connector” is a *claimed* feature in the proposed substitute claims, for which Patent Owner does not identify adequate support. *See id.*

Based on the parties' arguments and evidence, we find that Patent Owner has not shown that there is sufficient written description of the first illumination fan being energized "when the [fan's] power socket on the first side of the body is supplied with power via the power socket's electrical connection with the [fan's] second connector," as recited in proposed substitute claims 6 and 7.

b) First and second connectors comprising "flat surface(s)"

Although we have determined that the proposed substitute claims contain new matter and thus do not comply with the statutory and regulator arguments, we address these additional features for completeness. We do not find persuasive Petitioner's argument that claim 7's two connectors on sides of the body with each connector comprising a "flat surface" lack written description support. *See Opp. RMTA 4–7.*

Patent Owner's Revised Motion to Amend has set forth adequate written description support for "a first connector comprising a first flat surface disposed on the first side of the body" and "a second connector comprising a second flat surface disposed on the second side of the body" recited in proposed substitute claim 7. *See RMTA 15–17.* For example, Figures 1–3 of the '336 patent show that each of the first connector 5 and second connector 6 of a fan comprise(include) a flat surface disposed on a respective body side. *See Ex. 1001, Figs. 1–3.*

c) Conclusion

We conclude that Patent Owner's Revised Motion to Amend adds new subject matter that is not supported by the written description of the '336 patent. Thus the revised motion to amend violates the prohibition of adding new subject matter set forth in 35 U.S.C. § 316(d)(3) and 37 C.F.R.

§ 42.121(a)(2)(ii). Accordingly, we deny Patent Owner’s Revised Motion to Amend on this basis.

D. Patentability of Proposed Substitute Claims

Although, we determine that Patent Owner has not met its burden to show that the proposed substitute claims meet the statutory and regulatory requirements due unsupported new matter, we address Petitioner’s patentability arguments addressing the same limitations for completeness. The Board must assess the patentability of proposed substitute claims “without placing the burden of persuasion on the patent owner.” *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1328 (Fed. Cir. 2017) (en banc); *see also Lectrosonics*, Paper 15 at 3–4. The petitioner must prove that the proposed substitute claims are unpatentable by a preponderance of the evidence. *Bosch Auto. Serv. Sols., LLC v. Matal*, 878 F.3d 1027, 1040 (Fed. Cir. 2017); *Lectrosonics*, Paper 15 at 3–4.

Petitioner, supported by a Supplemental Declaration of Andrew Wolfe, Ph.D. (Ex. 1044), asserts the following grounds of unpatentability (RMTA Opp. 1–25) in regards to the proposed substitute claims. Patent Owner, supported by Declarations from David. B. Tuckerman, Ph.D. (Exs. 2052 and 2054), opposes. *See* RMTA Reply; RMTA.

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
6, 7	112	Written Description
6, 7	112	Indefiniteness
6, 7	103	Tsuji, Huang
6, 7	103	Lai, Hasegawa

1. Written Description

Petitioner asserts that proposed claims 6 and 7 are unpatentable for lacking written description support under 35 U.S.C. § 112(a). *See* RMTA Opp. 1–4; RMTA Sur-reply 1–3. As discussed above, under Section IV.C.

“New Matter,” with respect to the procedural requirements associated with a motion to amend, the portions of the ’336 patent cited by Patent Owner are not adequate to satisfy the written description requirement with respect to limitation (B) in proposed substitute claims 6 and 7. We therefore ultimately agree with Petitioner’s § 112(a) arguments regarding limitation (B). *See* RMTA Opp. 1–7; RMTA Sur-reply 1–3.

2. *Indefiniteness*

Petitioner, supported by Dr. Wolfe (Ex. 1044), asserts that proposed substitute claims 6 and 7 are unpatentable as indefinite under 35 U.S.C. § 112(b). RMTA Opp. 7–8. Patent Owner, supported by Dr. Tuckerman (Ex. 2054) opposes. RMTA Reply 5–7.

First, Petitioner argues that proposed substitute claim 6 is indefinite because

a POSITA would not be able to understand, with reasonable certainty, what it means in the context of the ’336 Patent specification: (a) for the power socket and the first connector to be on a first side of a first illumination fan; (b) when the first connector of the body is connected with a second connector of a body of the second illumination fan, a center fan and an illumination area of the body of the second illumination fan are respectively driven into rotation and illumination; and (c) when the first connector of the body is connected with a second connector of a body of the second illumination fan, a center fan and an illumination area of the body of the second illumination fan are respectively driven into rotation and illumination. Ex[1031], ¶90. PO’s reliance on the second connector of a preceding connector does not provide more clarity because a POSITA would not be able to understand how power is supplied to the second connector of the preceding illumination fan.

RMTA Opp. 7.

We do not agree with Petitioner's indefiniteness arguments for the following reasons.

As to the claimed limitation that *the power socket and the first connector are on a first side of a first illumination fan*, claim 6 (and the similar claim 7) informs, with reasonable certainty, those skilled in the art about the scope of this limitation. In particular, claim 6 recites that the first illumination fan comprises “a power socket comprising an opening disposed on the first side of the body” and “a first connector disposed on the first side of the body.” *See* RMTA 35. We determine that one having ordinary skill in the art would understand how *a power socket comprising an opening could be disposed on a side of an illumination fan where a first connector is also disposed* and therefore, find no lack of clarity in the claim limitation directed to “a power socket comprising an opening . . . [and] a first connector disposed on the first side of the body.”

The next limitations referenced in Petitioner's indefiniteness argument reproduced *supra*, are identical (both reference the phrase “when the first connector of the body is connected with a second connector of a body of the second illumination fan, a center fan and an illumination area of the body of the second illumination fan are respectively driven into rotation and illumination”). *See* RMTA Opp. 7. To the extent Petitioner's argument includes an unintentional typographical error whereby Petitioner actually intended to reference limitations (B) and (C) of claim 6 (instead of the repeated limitation (C)), we are unpersuaded that the scope of the subject matter embraced by limitations (B) and (C) is unclear. Petitioner's indefiniteness argument simply refers to “Section I.A., above” (*see* RMTA Opp. 7)—which is the Opposition's section on lack of written description

support. However, lack of adequate written description support for a limitation is not the same as indefiniteness.

Here, we find that a skilled artisan would have understood the scope of limitation (C) that requires a second illumination fan to be powered via its second connector's coupling to another (first) fan's connector. We also find that a skilled artisan would have understood the scope of limitation (B), which requires an illumination fan to be powered via an energized second connector that is internally electrically connected (thereby providing electricity) to a power socket. That the '336 patent itself does not disclose such an embodiment does not render limitation (B) unclear. Rather, a skilled artisan would have understood what Patent Owner is attempting to claim via limitation (B). Petitioner, too, appears to have understood the meaning of limitations (B) and (C) when describing the asserted prior art grounds. *See* RMTA Opp. 8–11.

Petitioner's second asserted point of indefiniteness pertains to the connectors comprising flat surfaces recited in proposed substitute claim 7. *See* RMTA Opp. 8. In particular, Petitioner contends that “the term ‘flat surface’ is indefinite” because “the term ‘flat surface’ does not appear in the specification, and the specification provides no disclosure on how to implement or select flat surface connectors” such that “this term may encompass two flat surfaces without any springs or other structures to maintain contact that would be an unreliable connection mechanism to a POSITA.” *Id.*

We do not find persuasive Petitioner's argument that the claimed term “flat surface(s)” in proposed substitute claim 7 renders the claim indefinite. Petitioner refers to its previous argument that the Specification lacks written

description support for the claimed flat surfaces. *See* RMTA Opp. 8. As discussed *supra*, we are not persuaded by Petitioner’s argument that the Specification provides no disclosure of connectors including flat surfaces. Here, the scope of the subject matter embraced by the claimed “first connector comprising a first flat surface disposed on the first side of the body” and “second connector comprising a second flat surface disposed on the second side of the body” in proposed substitute claim 7 is clear, as one having ordinary skill in the art would have understood such connectors to simply include some flat surfaces. *See, e.g.*, Ex. 1001, Figs. 1–4 (showing connectors that include flat surfaces).

That the claimed flat surface(s) “may encompass two flat surfaces without any springs” or provide an “unreliable connection mechanism” (or that no “‘objective boundaries’ [are disclosed] for measuring the scope or degree of flatness”) as Petitioner contends (*see* RMTA Opp. 8), does not render the claimed term indefinite. It just renders it broad, but merely claiming broadly does not render a claim indefinite as long as its meaning is clear. *See In re Gardner*, 427 F.2d 786, 788 (CCPA 1970) (“Breadth is not indefiniteness.”); *see also Ultimex Cement Mfg. Corp. v. CTS Cement Mfg. Corp.*, 587 F.3d 1339, 1352 (Fed. Cir. 2009) (merely claiming broadly does not prevent public from understanding claim scope).

Thus, we determine that Petitioner has not established that limitations (B) and (C) and the references to “flat surface(s)” in proposed substitute claims 6 and 7 would render the claims unclear.

Therefore, Petitioner has not shown that proposed substitute claims 6 and 7 fail to comply with the definiteness requirement.

3. *Obviousness*

Petitioner asserts that proposed substitute claims 6 and 7 are unpatentable as obvious over the prior art under 35 U.S.C. § 103. *See* RMTA Opp. 8–25. We found above that Patent Owner failed to meet its burden of showing that proposed substitute claims 6 and 7 do not add new matter. In addition, we find that Petitioner met its burden to show proposed substitute claims 6 and 7 are unpatentable for lacking written description support.

Because Patent Owner has not met the requirements for the Revised Motion to Amend for the reasons discussed above, and Petitioner met its burden of showing unpatentability of all of the proposed substitute claims based on a lack of written description support, we do not reach the remainder of Petitioner’s arguments regarding the alleged unpatentability of the proposed substitute claims under 35 U.S.C. § 103.

V. CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1–5 of the ’336 patent are unpatentable.¹¹ In addition, we determine that Petitioner has demonstrated by a preponderance of the evidence that proposed substitute claims 6 and 7 are unpatentable. Our determinations are summarized below.

¹¹ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this 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).

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–3	103	Tsuji, Huang		1–3
4	103	Tsuji, Huang, Echazarreta		4
5	103	Tsuji, Huang, Chou		5
5	103	Tsuji, Huang, Liu		5
1–2	103	Lai, Hasegawa	1–2	
3	103	Lai, Hasegawa, Huang	3	
4	103	Lai, Hasegawa, Echazarreta	4	
5	103	Lai, Hasegawa, Chou	5	
5	103	Lai, Hasegawa, Liu	5	
Overall Outcome			1–5	

Revised Motion to Amend Outcome	Claim(s)
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	6, 7
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	6, 7
Substitute Claims: Not Reached	

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–5 of the ’336 patent have been proven to be *unpatentable*;

FURTHER ORDERED that Patent Owner's Revised Motion to Amend requesting to issue substitute claims 6 and 7 is *denied*; and

FURTHER ORDERED that the stay of Reexamination Control No. 90/019,565 is lifted;

FURTHER ORDERED that, no later than one week after entry of this Decision, Patent Owner shall file a copy of this Decision in Reexamination Control No. 90/019,565; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2024-01230
Patent 10,690,336 B1

FOR PETITIONER:

Robert Perez
Jaclyn Schade
Christopher Kao
PILLSBURY WINTHROP SHAW PITTMAN LLP
robert.perez@pillsburylaw.com
jaclyn.schade@pillsburylaw.com
christopher.kao@pillsburylaw.com

FOR PATENT OWNER:

Heath Briggs
James Ryerson
GREENBERG TRAURIG, LLP
briggsh@gtlaw.com
ryersonj@gtlaw.com