

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

THERMALTAKE TECHNOLOGY CO., LTD. and
THERMALTAKE INC.,
Petitioner,
v.
CHEN, CHIEN-HAO,
Patent Owner.

IPR2024-01230

U.S. Patent No. 10,690,336 B1

**Declaration of David B. Tuckerman, Ph.D. in Support of
Patent Owner's Reply to Petitioner's Opposition to
Patent Owner's Revised Contingent Motion To Amend**

Dated: November 17, 2025

Respectfully Submitted by:

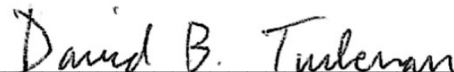

David B. Tuckerman

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I, DAVID B. TUCKERMAN, DECLARE AS FOLLOWS:

I. INTRODUCTION

1. I have been retained by the Patent Owner as a technical expert to provide my opinions regarding U.S. Patent No. 10,690,336 (the “’336 patent”) in support of Patent Owner’s Reply (“Reply”) to Petitioner’s Opposition (“Opposition”) to Patent Owner’s Revised Motion to Amend (“RMTA”) (“Declaration”).

2. It is my opinion that none of the asserted prior art, alone or in combination, renders either of the proposed substitute claims 6 and 7 in the RMTA anticipated or obvious under 35 U.S.C. §§ 102, 103. My opinions and the bases and reasons for them are set forth in this Declaration.

3. I am being compensated at the rate of \$550.00 per hour for my work on this matter. My compensation in no way depends on the outcome of this proceeding, the content of my testimony, or any issues involved in or related to this proceeding.

4. I reserve the right to modify or supplement my opinions, as well as the bases for my opinions, including based on the nature and content of the documentation, data, proof, and other evidence or testimony that Thermaltake Technology Co., Ltd. and Thermaltake Inc. (collectively “Petitioner”), or their expert(s) may present, on any additional information provided to me or found by

me in this matter, or on further instructions or orders from the Patent Trial and Appeal Board (“PTAB”).

II. BACKGROUND AND QUALIFICATIONS

5. My qualifications and experiences are set forth in Exhibit A.

Additionally, I provide the following overview of my background as it pertains to my qualifications for rendering expert opinions in this matter.

6. I have two B.S. degrees, one in Electrical Engineering and another in Physics, and an M.S. in Electrical Engineering and Computer Science, all from Massachusetts Institute of Technology, Cambridge, Massachusetts. I also have a Ph.D. in Electrical Engineering and an M.B.A. from Stanford University, Stanford, California. My Ph.D. thesis, titled “Heat-Transfer Microstructures for Integrated Circuits”, focused on developing new, high-performance liquid-cooled heat sinks for thermal management of high-speed integrated circuits, and received the Fannie and John Hertz Foundation Hertz Thesis Prize.¹ The key results in my Ph.D. thesis were published in the peer-reviewed journal IEEE Electron Device Letters with the title “High-Performance Heat Sinking for VLSI” in 1981, and this publication has so far received over 7,100 citations in the professional literature, as reported by Google Scholar.² This paper was selected by the IEEE Electron

¹ <https://www.hertzfoundation.org/hertz-fellows/awards/hertz-doctoral-thesis-prize/>

² https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=High-Performance+Heat+Sinking+for+VLSI&btnG=

Devices Society to receive the first “Paul Rappaport Award”, although this new award series was not officially approved by IEEE until 1983.³

7. I am an experienced innovator and inventor with approximately 180 issued U.S. patents, additional foreign patents, and numerous pending applications, spanning the fields of thermal management systems, heat transfer, electronic packaging and interconnect technologies, and superconducting devices and circuits, etc. More than 20 of my patents specifically describe novel electronic interconnection technologies.

8. Upon completing my Ph.D. in Electrical Engineering at Stanford University, I joined Lawrence Livermore National Laboratory (LLNL) as a physicist and later a project leader, supervising and managing advanced R&D programs in various fields including electronic packaging and interconnect. At LLNL, I developed and published novel methods for electrically connecting silicon chips to multichip module substrates.

9. I founded nCHIP, Inc. in 1989, focusing on advanced multi-chip module technologies enabling ultracompact high-performance digital systems. After I served for 6 years as its Chief Technical Officer, nCHIP was acquired by Flextronics International Ltd. in 1995. nCHIP’s technology employed novel methods for providing electrical connections between semiconductor chips using

³ <https://eds.ieee.org/awards/paul-rappaport-award>

new interconnection methods and substrates, which I published and patented during my tenure.

10. I am an experienced entrepreneur, venture capitalist, and executive leader with over 30 years of experience in founding, growing, and/or advising technology companies. While working as senior VP and CTO of Tessera Inc., I helped Tessera grow via various acquisitions, one of which led to the development of a new technology for silent air cooling of laptop computers as a replacement for fans. I also supervised the development of novel chip packaging and interconnection methods, and was an inventor on numerous patents related to electrical interconnections.

11. In 2001 I was elected by the Institute of Electrical and Electronic Engineers (IEEE) to the grade of Fellow, which is the highest membership grade, and for which selection is limited to less than 0.1% of the IEEE membership each year. I was specifically cited by the IEEE Components, Packaging and Manufacturing Technology (CPMT) Society (renamed in 2017 as the IEEE Electronics Packaging Society) “for contributions to high-performance electronic packaging and interconnection technologies, including the development of the microchannel heat sink”. In 2023 I became a “Life Fellow” of the IEEE owing to my many years of active membership.

12. I am a licensed Professional Electrical Engineer in good standing in the State of California.

13. I am currently an independent consultant through my own company Tuckerman and Associates, Inc., working on various technical and intellectual property matters in the high-tech industries. Some of my major clients have included CMEA Capital, Tessera, Intellectual Ventures, Microsoft, and Bill Gates. I consulted for Microsoft's Quantum Computing and "Cold Logic" programs for 9 years (2011-2020), including management of a 6-year research contract with Auburn University to develop high-density flexible thin-film cryogenic interconnect having optimal heat-transfer properties (*i.e.*, minimal heat leakage between temperature stages) while maintaining excellent electrical performance. A major portion of this research involved developing novel methods for making electrical connections in quantum computers and superconducting logic. I was also a consultant for the first phase of Microsoft's "Project Natick" (which implemented a demonstrative underwater datacenter off the southern California coast in 2015), including the design of the heat exchanger structures and the subsequent analysis of its actual undersea performance. I have published papers in professional journals and conference proceedings as recently as January 2025 specifically relating to novel electrical connectors and interconnection schemes, for

use with superconducting devices and flexible superconducting cables. My publications and patents have been cited over 10,000 times, per Google Scholar.⁴

14. I have attached an Appendix A listing my qualification and experience to this Declaration.

III. LEGAL PRINCIPLES

15. I understand that claim construction is an issue of law for the PTAB. I also understand that before an infringement or validity determination can be made, the claims must be construed by the PTAB.

16. I am informed that the words or phrases of a claim are generally given their plain and ordinary meanings that they would have had to a Person of Ordinary Skill in the Art (“POSITA”) at the time of the invention. To determine the meaning of a claim term, I am informed that the PTAB will look first to the claims and specification, then to the file history, and only if necessary, to extrinsic evidence such as dictionaries and treatises. I also understand that limitations generally may not be imported from the specification or any embodiment(s) into the claims.

17. It is my further understanding that the same words and phrases within a claim or claims are presumed to have the same meaning, unless it is clear from the specification and prosecution history that the terms have different meanings at different portions of the claims. It is also my understanding that different words and

⁴ <https://scholar.google.com/citations?hl=en&user=IIRI2SUAAAAJ>

phrases within a claim or claims are presumed to have different meanings. Similarly, all words in a claim have meaning, and a word or phrase in a claim should not be interpreted so as to render other words or phrases in the claim superfluous.

18. It is also my understanding that the POSITA is deemed to have read a disputed claim term or phrase being construed not only in the context of the particular claim in which the disputed term or phrase appears, but in the context of the entire patent, including the other claims, the specification, and the prosecution history.

IV. LEVEL OF ORDINARY SKILL IN THE ART

19. I understand that, to determine the appropriate level of skill of a POSITA, the following four factors may be considered: (a) the types of problems encountered by those working in the field and prior art solutions thereto; (b) the sophistication of the technology in question, and the speed with which innovations occur in the field; (c) the educational level of active workers in the field; and (d) the educational level of the inventor. I have been instructed that the level of ordinary skill in the art should be determined at the time of the invention. I have been asked to presume that the relevant date for my evaluation is December 26, 2018, based on Taiwan Application No. 107217659.

20. The field of the '336 patent relates to computer or electronic hardware components and, specifically, a computer illumination fan connectable with at least

one other illumination fan. In a prior declaration of mine, I stated that 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. Alternatively, a person with a more advanced degree in the above fields might have had less practical experience and still be deemed a POSITA. Conversely, a person with a general college background not necessarily in the above fields might also have become a POSITA by acquiring more real-world experience in designing and/or implementing hardware components for computers, servers, and/or other electronic devices.

21. In the Institution Decision (Paper 12) (hereinafter "Decision"), the Board provided a slightly different definition for a POSITA:

"[W]e 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."

22. I agree with the Board’s definition of the POSITA above, and have adopted and applied the Board’s definition in this declaration. Under either of the definitions, I believe that I have the relevant experience and understanding of a POSITA qualified to opine on interpretation of the ’336 patent. My opinions as expressed in my prior declarations and this declaration also would stay the same and would not change under either definition.

V. MATERIALS CONSIDERED

23. In rendering my opinions in this Declaration, I have considered the following materials:

Material	Description
Paper 1	Petition for Inter Partes Review of U.S. Patent No. 10,690,336 (“Petition”)
Paper 12	Decision Granting Institution of <i>Inter Partes</i> Review
Paper 24	Petitioner’s Opposition to Patent Owner’s Contingent Motion to Amend
Paper 25	Preliminary Guidance for Patent Owner’s Motion to Amend (“Guidance”)
Paper 28	Patent Owner’s Revised Contingent Motion to Amend (“RMTA”)
Paper 36	Petitioner’s Opposition to Patent Owner’s Revised Contingent Motion to Amend (“Opposition”)
Exhibit 1001	U.S. Patent No. 10,690,336 B1 to Chen (“’336 Patent”)
Exhibit 1002	File History of ’336 Patent
Exhibit 1004	Declaration of Dr. Andrew Wolfe (“Wolfe Decl.”)
Exhibit 1006	Japanese Publication No. 2018041147A to Tsuji et al. published March 15, 2018 (“Tsuji”)
Exhibit 1007	Certified Translation of Tsuji
Exhibit 1008	U.S. Patent No. 10,082,286 B1 to Huang issued September 15, 2018 (“Huang”)
Exhibit 1009	Pat. App. Pub. No. US 2008/0124234 A1 (“Echazarreta”)

Material	Description
Exhibit 1010	Pat. App. Pub. No. US 2008/0279694 A1 (“Chou”)
Exhibit 1011	Pat. App. Pub. No. US 2015/0233391 A1 (“Liu”)
Exhibit 1012	Pat. App. Pub. No. US 2017/0314777 A1 (“Lai”)
Exhibit 1013	Japanese Publication No. 2005051085A (“Hasegawa”)
Exhibit 1014	Certified Translation of Hasegawa
Exhibit 1031	Reply Declaration of Dr. Andrew Wolfe (“Reply Decl.”)
Exhibit 1032	Merriam-Webster’s Collegiate Dictionary Definition of “Size”
Exhibit 1044	Supplemental Reply Declaration of Dr. Andrew Wolfe (“Supp. Decl.”)
Exhibit 2002	Tuckerman Declaration in Support of Patent Owner Preliminary Response (November 22, 2024)
Exhibit 2005	Deposition Transcript of Dr. Andrew Wolfe (April 25, 2025)
Exhibit 2006	Tuckerman Declaration in Support of Patent Owner Response and Contingent Motion to Amend
Exhibit 2017	Translation of TW107217659U
Exhibit 2025	Annotated Die and Annotated FIG. 1 of ’336 Patent
Exhibit 2028	Annotated Pool/Poolside Figure and Annotated FIG. 1 of ’336 Patent
Exhibit 2032	Figures of Fans
Exhibit 2036	Annotated FIG. 1 of ’336 Patent
Exhibit 2037	Annotated FIG. 3 of ’336 Patent
Exhibit 2042	Annotated FIGS. 2-3 of ’336 Patent
Exhibit 2051	Wolfe Deposition Tr. 9/26/2025
Exhibit 2053	Wolfe Deposition Tr. 11/10/2025

VI. SUPPORT FOR REPLY TO OPPOSITION TO REVISED CONTINGENT MOTION TO AMEND

24. Dr. Wolfe (Ex-1044, ¶¶ 39-41) goes to great lengths to attempt to prove that some light directly from the LEDs in Lai may be visible to an observer. I again note that the claims in the ’336 patent say nothing about the visibility of light. Instead, the claims expressly require the **location** of the illumination area to be on the top of the illumination fan body. In any event, photographs of LEDs can be

misleading at least because, for example, a camera's sensitivity to light is different from human eyes. The photographs are also often enhanced automatically when printed on paper or shown on a monitor. Indeed, Dr. Wolfe provides no quantitative evidence of the actual amount of light, e.g., through photometric measurements where it would be possible to compare the intensity at 90 degrees vs. the intensity at 0 degrees. In fact, as was proven by the specification sheet for a representative LED supplied by Dr. Wolfe himself, the amount of light that can be expected from a near-90 degree viewing angle is negligible and approaches zero, as Dr. Wolfe admitted (*see* Ex-2051 (Wolfe Tr.) at 220:25-221:3), compared with the amount of light being emitted from viewing the LED straight on (0 degree viewing angle). Further, the fact that Lai oriented the LEDs with the peak intensity directed in the horizontal plane is clear evidence to a POSITA that Lai's intention was to illuminate the rotating fan blades, **not** the top of the illumination fan body.

25. Dr. Wolfe also continues to deny the obvious fact that "side" is a word that **must** be construed in context. Otherwise, why would his own dictionary exhibit admittedly show a dozen different definitions for "side"? It would be clear to a POSITA that connector 5 in Figures 1-3 of the '336 patent is located on the side of the body, as the phrase is used in the '336 patent. The fact that there may or may not be a small opening surrounding the border of connector 5 does not change the fact that the connector itself is on the side of the body. If it were not, it would be

impossible to make connections between two illumination fans that are placed side-by-side, an arrangement taught by the '336 patent.

26. I note that the Opposition *no longer* contends that the claimed system could not meet limitations (B) and (C) simultaneously. Instead, the Opposition incorrectly argues that *unclaimed* features must have written description support, whereas I understand that only *claimed* features need written description support. The Opposition also raises some issues Petitioner could have raised in response to Patent Owner's previous Motion to Amend but did not. The new issues also do not show that the revised substitute claims 6 and 7 fail to have written description support or are indefinite. I also note that the Opposition fails to show that prior art teaches substitute claims 6 and 7 limitation-by-limitation. The Opposition also confirms that Petitioner fails to show that the cited references, each alone or in combination, teach "the first connector is structurally distinct and separable from the power socket" or "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" in claims 6 and 7, *among others*.

27. The Opposition does not, nor can it, argue that any *claimed* features in the revised substitute claims 6 and 7 in the RMTA are unsupported by the specification. (*See generally* Opposition at 1-4.) Specifically, the Opposition no longer argues that the claimed system, which includes only "a first [and] a second

illumination fan[s]”, cannot operate as directed by both limitations (B) and (C) simultaneously. (*See generally id.*) Unable to find any flaw in the *claimed* features, the Opposition instead complains that an *unclaimed* “power supply” connected to an *unclaimed* “preceding illumination fan”, which is a third illumination fan never recited by substitute claim 6 or 7, is somehow unsupported. (*See id.*)

28. Nowhere in claims 6 and 7 is a “power supply” connected to a “preceding illumination fan” recited or otherwise claimed, as admitted by Petitioner’s expert Dr. Wolfe. (*See Ex-2053 (Wolfe Tr.)*, at 293:19-21 (“Q. Dr. Wolfe, does substitute claim 6 or 7 claim a third illumination fan? A. I don’t see that in the claim.”)) Thus, such unclaimed features do not need express written description support in my understanding.

29. Petitioner disputes that the illumination areas specified in the ’336 patent must be emitting light by claiming that there is no written support for this light emission. However, a POSITA would clearly understand that the claimed illumination area emits light. Petitioner’s own statements that an illumination area would likely include buried LEDs and diffusers (which I agree with) prove that such illumination areas were so well known to a POSITA that they required no further elaboration in the ’336 patent. The key point is that the illumination area in the ’336 patent **must be emitting light**. This is clear from the language that the illumination areas are “driven into illumination” when power is applied to the fan. If “driven into

illumination” does not mean emitting light, what else could it possibly mean?

30. The Opposition baselessly argues that the '336 patent does not disclose that the claimed “illumination area” illuminates, *i.e.*, generates light. (Opposition at 4.) To the contrary, as I alluded to above, the '336 patent repeatedly discloses that “[t]he power socket is electrically connected with ... the illumination area” and that “[w]hen the power socket is supplied with power, ... the illumination area of the body is ... driven into ... illumination.” (Ex-1001 ('336 patent), Abstract; *accord. id.* at 1:60-65.) A POSITA would have understood that these disclosures mean the claimed “illumination area” receives power and in turn actively illuminates, *i.e.*, “gives off light,” as expressly admitted by Dr. Wolfe. (Ex-2051 (Wolfe Tr.) at 233:24-25 (“Q. Does the illumination area illuminate? A. Yes, which means it gives off light.”) This is because the illumination area is electrically connected to the power socket, which when supplied with power in turn provides power to the illumination area for it to actively illuminate. (Ex-2006, ¶ 51.) Thus, the specification supports that the “illumination area” illuminates, as a POSITA would have understood. (*Id.*) And even if the illumination area were just “an area that is illuminated” as Petitioner incorrectly contends, it is still supported expressly by the '336 patent (2:67-3:6): “The power socket 4 is electrically connected with ... the illumination area 3. As such, once the power socket 4 at a side of the body is supplied with power, ... the illumination area 3 can be *illuminated*.”) Thus, the “illumination

area” is well-supported by the ’336 patent’s specification under § 112 either way.

31. The Opposition (at 4-5) rehashes some of Petitioner’s prior arguments (Paper 24, at 9-10) that have been rejected by the Guidance (at 11, 14-15). For example, the Opposition (at 5) again complains that “[i]t is unclear from the specification how to implement or select flat surface connectors.” (*Compare* Opposition at 5 *with* Paper 24 at 9 (“the specification provides no disclosure on how to implement or select flat surface connectors”).) But as the Guidance has already found, “Patent Owner’s Motion [Paper 19] 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.’ *See* Mot. [Paper 19 at] 13–15.” (Guidance at 11.) The RMTA (at 15-17) provides the same support for the “flat surface” as before. (*Compare* RMTA at 15-17 *with* Paper 19 at 13-15.) “For example, Figs. 1–3 of the ’336 patent show that each of the first connector 5 and second connector 6 comprise (include) a flat surface disposed on the respective body side. Thus, Petitioner’s argument that ‘the specification provides no disclosure on how to implement or select flat surface connectors’ (*see* Opp. [Paper 24 at] 9) is contradicted by the cited disclosure in the Specification.” (Guidance at 11.) Petitioner’s argument that “connector 5 as depicted in Figure 1 is disposed in an *opening* in the lateral face of the body as required by claim 7, *not on the lateral face* of the body” is thus both

incorrect and irrelevant. (Opposition at 5 (emphasis original).)

32. Petitioner and Dr. Wolfe raise objection to the use of the term “flat” in proposed claims 6 and 7, and go so far as to misquote me by saying “Dr. Tuckerman testified that he did not see anything that looked flat”. As the transcript shows, what I said was “I don’t see anything there that **doesn’t** look flat.” (Ex-1045 (Tuckerman Tr.) at 196:9-12) (emphasis added). Petitioner relied on this alleged testimony of mine to argue that “[a] POSITA would understand connector 5 to be this same configuration [as that in the photographs] or at least would not find a flat surface disposed on the lateral surface of the body to be clearly disclosed.” (Opposition at 6-7.) But as mentioned above I in fact testified to the exact opposite, that “I don’t see anything there that **doesn’t** look flat” in the photographs. Thus, Petitioner’s argument crumbles for lack of evidence. Petitioner’s argument is also irrelevant because the cited photographs concern a product purportedly practicing claim 4, which does not even have the limitation “flat surface.” Petitioner further makes the claim that connector 5 “is clearly inset from the surface of the fan body in the drawing”, and cites Dr. Wolfe’s declaration as support for this claim. But any POSITA would look at Figs. 1-3 of the ’336 patent and see that connector 5 is **not** “clearly inset”.

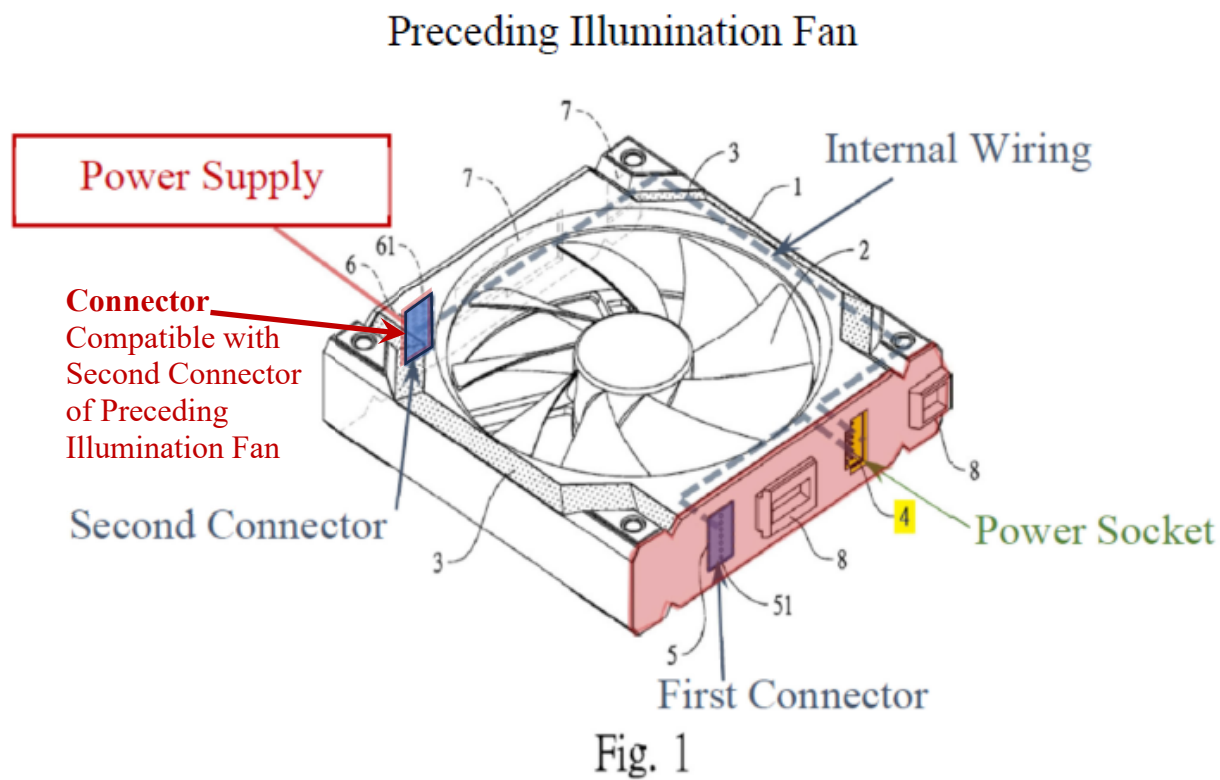
33. As discussed above, the Opposition does not dispute that all claimed features in the revised substitute claims 6 and 7, including limitations (B) and (C),

are well supported by the specification. For example, the RMTA (at 9-10) explains that the claimed “first illumination fan” can receive power via its “second connector” as supported by the specification, which the Opposition (at 1-4) does not dispute. In turn, the “power socket” of the claimed “first illumination fan” in limitation (B) can be supplied with power via the “power socket’s electrical connection with” the “second connector” of the claimed “first illumination fan” (*see* RMTA at 8), which is also undisputed (*see* Opposition at 1-4). Nothing in limitation (B) prevents the “first connector” of the claimed “first illumination fan” from connecting with a “second connector” of the claimed “second illumination fan” in limitation (C) (*see* RMTA at 10-11), which again is undisputed (*see* Opposition at 1-4). That is, it is undisputed that the claimed system in claim 6 or 7 comprising the claimed “first illumination fan” connected with the claimed “second illumination fan” thus can operate as directed by limitations (B) and (C) simultaneously. (*See generally* Opposition at 1-4).

34. Having not disputed any *claimed* features’ written description support, the Opposition’s contention that the alleged inability of a POSITA to “understand how power is supplied to the second connector of the [unclaimed] preceding illumination fan” would cause indefiniteness is perplexing and meritless. (Opposition at 7.) As an initial matter, the Opposition relies on Dr. Wolfe’s *prior* declaration (Ex-1031, ¶ 90) **not** addressing the revised substitute claims 6 and 7 in

the RMTA nor any “preceding illumination fan” to baselessly contend indefiniteness. Specifically, Dr. Wolfe’s *prior* declaration (Ex-1031, ¶ 90) did not consider the new limitation that the power socket is supplied with power “via the power socket’s electrical connection to the second connector” of the claimed “first illumination fan.” That is, the Opposition never addresses *why* any *claimed* features are still purportedly indefinite in view of the new limitation in the revised substitute claims 6 and 7 specifying how the power socket is supplied with power. (Opposition at 7-8.) The Opposition merely makes a conclusory statement citing no support concerning the *revised* substitution claims 6 and 7 having the new limitation. (*Id.*) Thus, the Opposition’s indefiniteness argument in this regard is baseless and should be rejected. Further, a POSITA who has reviewed the ’336 patent in its entirety would clearly understand that it **must** be possible to supply power to operate any illumination fan through its second connector of that fan. This is because as soon as the first connector of an illumination fan that is already operating (i.e., receiving power) is connected to the second connector of another illumination fan, that another illumination fan also receives power and becomes fully operational. That is, **the another illumination fan must be receiving its power through its second connector.** This is true in both the Fig. 2 and Fig. 3 embodiments. If an illumination fan can receive the power needed for its operation through its second connector by virtue of that second connector’s contact with a prior illumination fan’s

first connector, it follows that any other connector that is designed to mate to the second connector of an illumination fan can supply power to that illumination fan, including (for example) one having a cable that is connected to a power supply. A POSITA would understand that the illumination fans described in the '336 patent **must** be able to accept power from their second connectors as one method of powering the illumination fans, otherwise the connection recited in claim 1 and further illustrated in Figures 2 and 3 could not work. The fact that this power **could** be supplied from the first connector of a prior illumination fan tells a POSITA that the power can be supplied from a compatible connector having a power cable connected to a power supply, as shown below:



35. The Opposition’s argument that “a POSITA would not be able to understand how power is supplied to the second connector of the [unclaimed] preceding illumination fan” is therefore suspect and appears disingenuous. (Opposition at 7.) Even assuming *arguendo* a POSITA somehow lacked such understanding of this *unclaimed* feature, the Opposition (at 7) does not explain why it would cause any *claimed* features to become indefinite. Moreover, the specification makes clear that the second connector of the unclaimed preceding illumination can receive power. (*See, e.g.*, Ex-1001 at 3:7-16.) A POSITA would have readily understood that the source of such power supplied to the second connector of the unclaimed preceding illumination can be a power supply without undue experimentation. In sum, it does not matter whether a POSITA would be able to understand how power is supplied to the second connector of the preceding illumination fan with respect to indefiniteness because the preceding illumination fan is unclaimed. And even if it did matter, which it does not, a POSITA would have readily understood how to connect the second connector of the preceding illumination fan to a power source such as a power supply.

36. The Opposition (at 8) again fashions the same prior arguments almost verbatim that the Guidance (at 14) has already rejected. For example, citing to the same paragraph of Dr. Wolfe’s *prior* declaration (Ex-1031, ¶ 91), the Opposition (at 8) again argues that “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” and 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.” (*Compare* Opposition at 8 *with* Paper 24 at 10-11 (“[T]he term ‘flat’ does not appear in the specification, and the specification provides no disclosure on how to implement or select flat surface connectors. For example, 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.”) (citing to Ex-1031, ¶ 91).) But in response to the same argument, the Board has already found that “the scope of the subject matter embraced by the claimed ‘a 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, in light of the Specification, have understood such connectors to include a flat surface.” (Guidance, at 14.) Indeed, a POSITA would have understood the scope for the “flat surface” of the connectors as shown in FIGS. 1 and 2 to allow the connection between each two adjacent illumination fans as shown in FIG. 3.

37. With respect to prior art, I understand the burden to establish unpatentability lies only with Petitioner. The Opposition fails to show prior art teaches claims 6 and 7 ***limitation-by-limitation***. (See generally Opposition 8-25.)

Thus, Petitioner fails to show that claims 6 and 7 are obvious.

38. The Opposition rehashes the same rejected argument that having a first connector structurally distinct and separable from the power socket both on the same side of the body of the first illumination fan is merely a “design choice.” (Opposition at 10.) As the Board has explained, “[t]his contention ... lacks an underlying factual basis, as it merely relies on Dr. Wolfe’s unsupported declaration testimony—which asserts the same without any supporting evidence.” (Guidance at 21.) Critically, the Opposition fails to explain *why* and *how* a POSITA would have modified the prior art to have a first connector structurally distinct and separable from the power socket both on the same side of the first illumination fan’s body merely as an “obvious design choice” (Opposition 8-25).

39. The “power socket” of the first “illumination fan” in substitute claims 6 and 7 has different functions than the mapped structure(s) in the prior art: the claimed “power socket” receives power from the “second connector” and distributes power to the “center fan,” the “illumination area,” and the “first connector.” In contrast, for example in Tsuji, the purported power socket CNA/CNB does not function to, and as explained below, in fact *cannot*, receive power from the purported second connector CND of the same fan body 10.

40. Similarly, in Lai, the purported power socket, single input 111, also

does not function to receive power from the purported second connector, single output 112, of the same fan body 10. Thus, the “power socket” being structurally distinct and separable from the “first connector” both on the same side of the body of the “first illumination fan” is not just a design choice.

41. With respect to the Tsuji-Huang combination, as the Board has pointed out, “Tsuji ... specifically requires power connectors CNA and CNB [the purported ‘power socket’] to have *openings disposed on different faces (front and rear faces) of the fan than the faces (end sides) where inter-fan connectors CNC and CND are disposed*, in order to selectively provide power at connectors CNA/CNB to each of multiple interlocked fans, hot-swap individual fans, and associate each fan’s address with the fan’s individual power connection position in the daisy chain.” (Guidance at 19-20 (emphasis original).) To the extent it relies on Ground 1 in the Petition (at 34), the Opposition does not explain why or how a POSITA **would have** modified Tsuji to place CNA/CNB (the purported “power socket”) and CNC (the purported “first connector”) on the same side of the fan body.

42. The Opposition, instead, provides merely a conclusory statement, that “[a]lternatively, a POSITA would have been motivated to combine Tsuji and Huang with the teaching of one or more of the references discussed below [*e.g.*, ‘SATA,’ ‘Thermaltake rgb fan manual 2017,’ and ‘NZXT AER RGB120 manual’] in order to use two connector housings for the connector pins disclosed for CNC.”

(Opposition at 10-17.) But the Opposition never explains why or how these references **would have** been combined with Tsuji and Huang by a POSITA to teach a first connector structurally distinct and separable from the power socket both on the same side of the first illumination fan's body, as required by claims 6 and 7. Indeed, as admitted by Dr. Wolfe, he had never combined these references with the art cited in the Petition. (*See, e.g.*, Ex-2053 (Wolfe Tr.) at 303:17-24 (“Q. Dr. Wolfe, in your declaration, did you combine the SATA connector with any of the prior art in rendering your opinion? THE WITNESS: No, I used it to illustrate what a POSITA would have known at the time and to corroborate that.”); *see also id.* at 358:20-22 (“Q. Have you seen any illumination fan using both the SATA data and power connections? A. I don't ever recall seeing that.”); *see also id.* at 344:10-13 (“Dr. Wolfe, did you combine the NZXT fan with any other prior art references in your declaration, which is Exhibit 1044? A. No, I did not.”) The Opposition (at 10) also never explains why or how a POSITA **would have** “use[d] two connector housings for the connector pins disclosed for CNC.”

43. In any event, Petitioner incorrectly deems that a POSITA would find it obvious to split the pins for power and signal into two separate connectors, which allegedly would constitute the power socket and the first connector claimed in the '336 patent. Petitioner uses an analogy of SATA connectors to support this argument. But this completely misunderstands the functionality of the connectors

in the '336 patent. **All three of the claimed connectors in the '336 patent (the power socket, first connector, and second connector) must be configured to convey power;** this configuration is clearly disclosed in the specification which says that they are all “electrically connected”. But they all have different housings at least because they serve different functions. For example, the second connector receives power from an external source and supplies power to the power socket, which distributes power to the center fan, the illumination area, and the first connector, which connects with the second connector of another illumination fan to give it power.

44. The combination of power and signals in a single multi-conductor connection was well known and is used, for example, in the Lai patent disclosure. Indeed, Lai repeatedly emphasizes that input 111 and output 112 are “single.” The fact that no one in the industry, to the best of my knowledge and belief, ever separates the power and signal connections of an illumination fan into separate connectors, would seem clear evidence that this is an undesirable and uneconomic configuration that no POSITA would be motivated to implement. For example, Lai emphasized in his patent application the use of a “single cable” to transmit both power and signals.

45. The analogy of using SATA as motivation for splitting power and signals fails because SATA is an entirely different application with unique electrical

requirements. The signals on SATA cables employ low-voltage differential signaling and operate at multiple Gbit/second data rates. The power supply cables for SATA feed much higher voltages and currents than do the signal cables. The signal and power cables are kept separate for multiple reasons, a most important one being that there is a risk of electrical interference from power supply noise coupling to the low-voltage signal lines if integrated into the same cable. In contrast, an illumination fan would have no need to change color or intensity any faster than a few milliseconds (i.e., a few hundred Hz), because the human eye cannot resolve changes any faster than that. In other words, the data rates for signals controlling an illumination fan would be the order of a **million times slower** than are used in SATA cables. As such, the low-speed signals in an illumination fan are not subject to disruption by power supply noise in the same way that high-speed signals are, so there is no need (and hence no motivation) to use separate cables to power and control an illumination fan. Which is why no one does that.

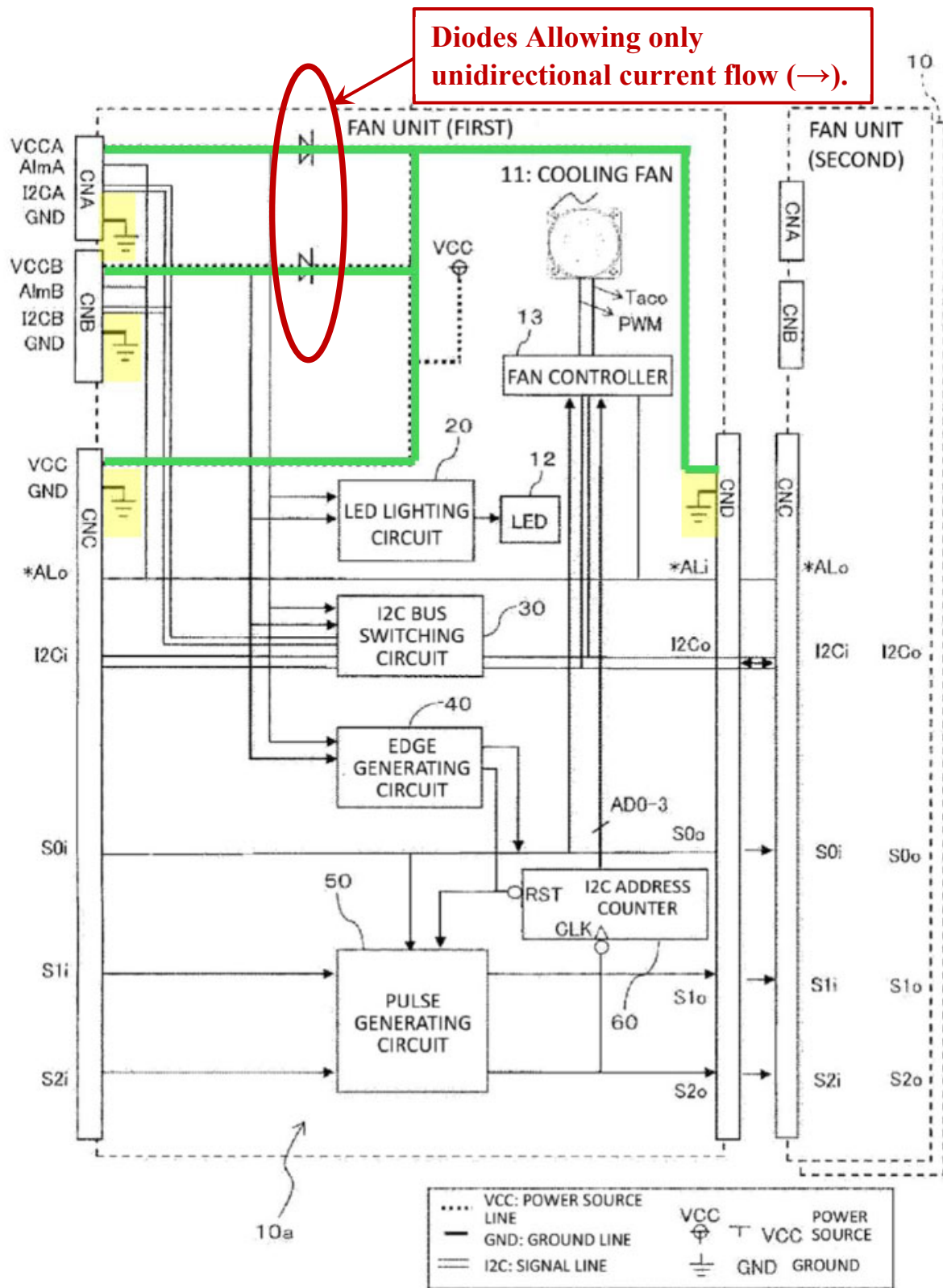
46. As an additional argument, Petitioner showed an NZXT AER RGB120 fan which showed two sockets (“IN” and “OUT”) on the same side of the fan. That fan is designed to be connected using a cable from a controller to the “IN” socket (which would contain both power and control signals). The second “OUT” socket permits daisy-chaining of a second fan, again **using cables**. There is no suggestion that fans can be connected directly (without cables) as taught in the ’336 patent;

among other things, there is no connector on the opposite side of the NZXT fan. Moreover, the embodiments in the '336 patent teach that there are both a power socket and a first connector on the same side, which may have physically different structures (for example, the first connector is not a socket). The inventive leap from the NZXT fan (two sockets on one side connected with cables, and no connectors on the opposite side) to the '336 patent (one socket and one flat connector on one side of the body, and a second flat connector on another side of the body, permitting direct connection between fans) would have been a non-obvious improvement from a POSITA's perspective at the time of the '336 patent application.

47. With respect to Lai-Hasegawa, the Opposition (23-24) again fails to explain why or how a POSITA would have modified the combination to reach a first connector structurally distinct and separable from the power socket both on the same side of the first fan body. The Board, however, has found that “[a]s both Lai and Hasegawa show power connectors and inter-fan connectors disposed in a single physical connector at the surface of the fan (*see* connector 111 in Lai’s Fig. 2, connections 12 or 13 in Lai’s Fig. 3, and connector 25 in Hasegawa’s Figs. 29–32), Petitioner’s argument regarding the Lai-Hasegawa combination does not explain why the combination would have prompted an ordinarily skilled artisan to modify the unitary connectors of these references to present a first connector “structurally distinct and separable” from a power socket (as required by the proposed substitute

claims).” (Guidance at 28; *see also id.* at 26 (“Lai ... specifically seeks an arrangement of fans 10 that improves ‘the entire appearance’ by providing each ‘LED fan 10 . . . *only . . . with windows of a single input 111* and a single output 112 [so] that all the addressable RGB LEDs 16 can be controlled’ and linking ‘LED fans 10 . . . together *using a single transmission line 12.*”) (emphasis original); *accord. id.* at 24-25.)

48. In response to the Guidance, the RMTA added a new limitation to require that the power socket be supplied with power “via the power socket’s electrical connection with the second connector” of the first illumination fan. (*See, e.g.,* RMTA at 19.) Critically, in Tsuji, the purported power socket CNA/CNB does not meet this limitation because it cannot receive power from the purported second connector CND of the same fan body 10. As any POSITA would know and as illustrated in Tsuji’s Figure 14, the VCCA and VCCB power supply connections through CNA/CNB include diodes that will allow current to **only** flow from CNA/CNB to CND, and **will prevent any current flowing from CND to CNA/CNB**. That is, in Tsuji’s system, it is **impossible** for the purported power socket CNA/CNB to “be supplied with power via the power socket’s electrical connection to the [purported] second connector [CND]” as required by substitute claims 6 and 7:



Ex[1007] Figure 14 (annotated)

49. There is no wonder this is the case because, as shown by Petitioner's mappings, the purported second connector CND (in **purple** boxes) of the purported "**first illumination fan**" is never in a position to supply power to the purported power socket CNA/CNB (nor CNC in **blue** boxes, if mapped to include a power socket):

FIGURE 6

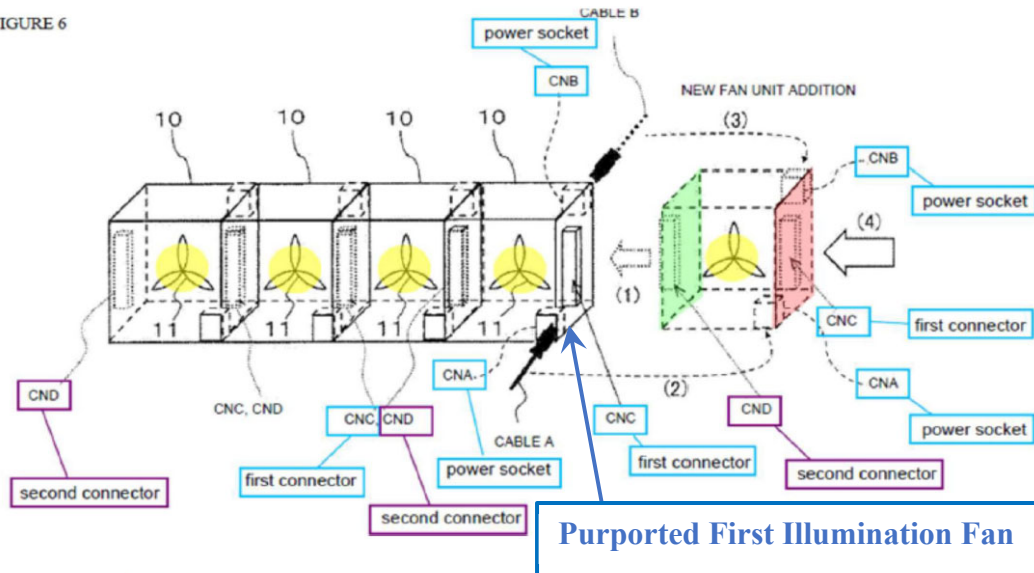
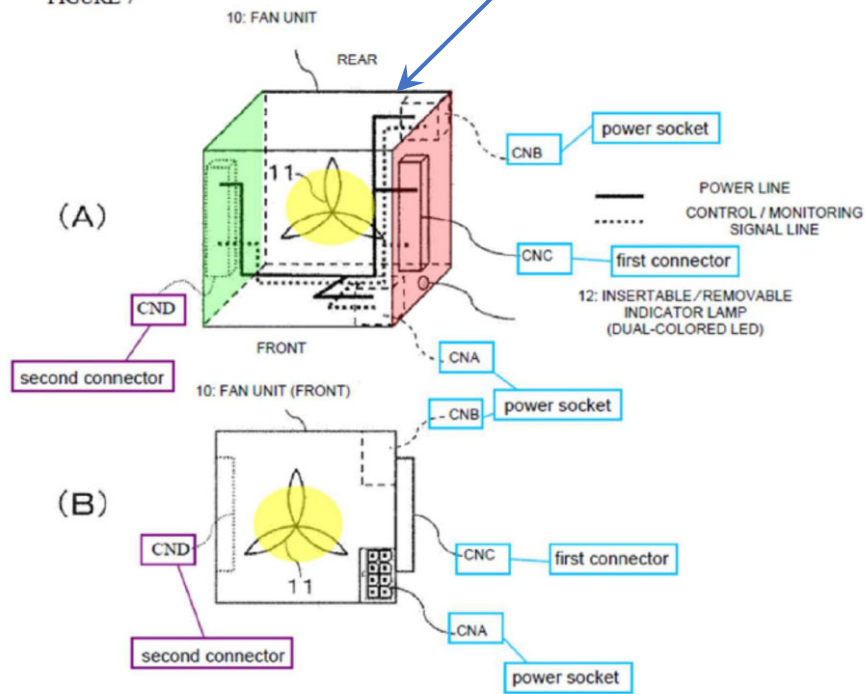
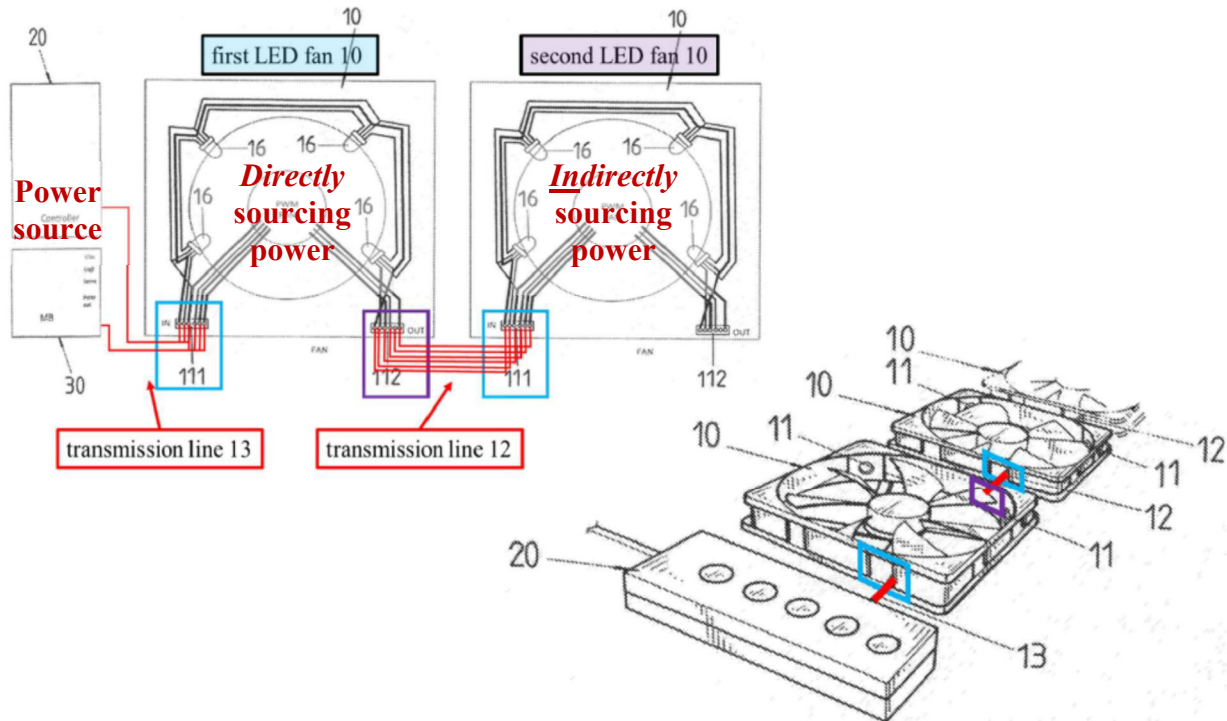


FIGURE 7



50. Similarly, in Lai, the purported power socket, single input **111** (in blue box), also does not receive power from the purported second connector, single output **112** (in purple box), of the same fan body 10, as shown below:



51. In fact, the mappings by Petitioner show *exactly the opposite*, that the purported power socket **111** *supplies* power *to* the purported second connector **112**, and can *never* be “*supplied with* power via the [purported] power socket’s [111] electrical connection to the [purported] second connector [112],” as in contrast required by substitute claims 6 and 7.

52. Thus, the prior art fails to teach substitute claim 6 or 7’s requirement that the power socket be supplied with power “via the power socket’s electrical

connection with the second connector” of the first illumination fan.

53. In response to the Guidance, the RMTA added a new limitation to require that the flat surface of the first connector comprise a round electrical terminal. (*See, e.g.*, RMTA at 14-15.) The Opposition does not challenge that this new limitation is supported by the specification and fails to show that it is obvious. As an initial matter, the round electrical terminal is “configured to electrically connect with a second electrical terminal of the second illumination fan.” The round shape of the electrical terminal is not ornamental, but is to provide better contact with the second electrical terminal of the second illumination fan, which may be flat. Thus, this limitation is not just a matter of a design choice. The Opposition (at 18-22, 24-25) fails to show why or how a POSITA *would have* been motivated to modify either the Tsuji-Huang or the Lai-Hasegawa combination to reach this limitation in view of the cited prior art purportedly disclosing round electrical terminals.

54. For at least the above reasons, proposed substitute claims 6 and 7 patentably define over the prior art of Lai, Hasegawa, Tsuji, and Huang.

VII. RIGHT TO SUPPLEMENT

55. I reserve the right to amend, supplement, or otherwise modify my opinions, whether in a further written declaration or otherwise. I also reserve the right to reply to positions taken by Dr. Wolfe.

56. I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001.

**APPENDIX A:
QUALIFICATIONS AND EXPERIENCE**

David B. Tuckerman, Ph.D, P.E., FIEEE

12724 128th Ave NE
Lake Stevens, WA 98258
Cell: 415-298-4040
d.tuckerman@comcast.net

EXPERIENCE:

Tuckerman and Associates, Inc., 2009-present: Independent consultant on a variety of technical and IP matters in high-tech industries. Major clients have included CMEA Capital, Tessera, Intellectual Ventures, Microsoft, and Bill Gates. Consultant to Microsoft from 2011 through 2020 in the fields of quantum computing and superconducting devices, including management of a 6-year research contract with Auburn University to develop high-density flexible thin-film superconducting interconnection technologies for quantum computing applications.

Tessera Inc., 2003-2009: Senior Vice President and Chief Technical Officer. Member of the executive team that executed a successful IPO in November 2003, with a market capitalization that later exceeded \$1 billion. Responsible for managing R&D activities and generating intellectual property in electronic packaging and related technologies, and for formulating a strategy for growth by acquisition. Identified numerous targets that were successfully acquired (North, Shellcase, Digital Optics, Eyesquad, Viewmagic, DBlur, Kronos); these acquisitions established Tessera in two new lines of business: “Imaging and Optics” (ultraminiature camera modules incorporating extended-depth-of-field wafer-scale optics; this ‘OptiML WLC’ technology was winner of an R&D 100 Award) and “Silent Air Cooling” (fanless, electrostatically driven air cooling, enabling quiet ultra-thin laptop computers).

CMEA Capital, 1997 – 2013: Venture Partner at a venture capital firm that has over \$1 billion under management. Responsible for sourcing and screening deals, performing due diligence, facilitating syndication, and making ongoing strategic and operational contributions to portfolio companies (including participating in Board meetings), for all deals having to do with physical technologies (electronics, optics, materials, energy, etc.). Primarily investing in technologies related to energy and advanced materials since 2008. Currently on Board of Directors of Reel Solar (electroplated CdTe photovoltaic technology).

nCHIP, Inc., 1989-1997: Founder, Sr. VP, and Chief Technical Officer. Developed advanced multi-chip module technologies enabling ultracompact high-performance digital systems. Responsible for all technical development activities prior to transfer to manufacturing. nCHIP was financed by venture capital from three top-tier venture funds: Kleiner Perkins, Mohr Davidow, and Mayfield. nCHIP grew to approximately \$12 million in annualized revenues, and was sold to **Flextronics International Ltd.** in 1995 for \$38 million. Venture investors who held their Flextronics stock received up to 40x their initial investment.

Lawrence Livermore National Laboratory, 1983-1989: Project Leader, Physics Department. Managed advanced R&D programs in laser processing, electronic packaging and interconnect, X-ray optics, and other national-defense related programs.

IBM T. J. Watson Research Center, 1977-1980 (MIT Co-op program): Member of the Josephson junction computer project (superconducting logic circuit design, simulation, and testing). Designed and demonstrated ultrahigh-performance sampling circuitry for on-chip diagnostics of superconducting logic.

EDUCATION:

M.I.T., B.S. Electrical Engineering, 1980.

M.I.T., B.S. Physics, 1980.

M.I.T., M.S. Electrical Engineering & Computer Science, 1980.

Stanford, Ph.D. Electrical Engineering, 1984.

Stanford, MBA, 1998.

PUBLICATIONS:

See attached list. 10,000+ citations in the professional literature (per Google Scholar)

PATENTS:

~180 issued U.S. patents, plus various foreign patents and numerous pending applications.

MAJOR HONORS:

Life Fellow of the IEEE

Licensed Professional Engineer (Electrical), California

IEEE Paul Rappaport Award

Fannie and John Hertz Foundation Outstanding Ph.D. Thesis

Consulting Associate Professor of E.E., Stanford University (late 1980's/early 1990's)
(co-supervised two PhD theses on 'laser planarization')

Best Paper Award, VLSI Multilevel Interconnection Conference, 1989

Technical Program Chair, IEEE Multichip Module Conference, 1995

General Chair, IEEE Multichip Module Conference, 1996

Plenary speaker, ASME 9th International Conference on Nanochannels, Microchannels, and Minichannels, 2011.

PRIOR EXPERT WITNESS EXPERIENCE:

Asetek Danmark A/S v. Coolit Systems Inc. (Northern District of California, 3:19-cv-00410-EMC)

Expert for Plaintiff Asetek Danmark A/S, engaged by Finnegan Henderson Farabow Garrett & Dunner, LLP

***Asetek Danmark A/S v. Corsair Gaming, Inc. et al* (Northern District of California,
3:20-cv-06541-EMC)**

Expert for Plaintiff Asetek Danmark A/S, engaged by Finnegan Henderson Farabow
Garrett & Dunner, LLP

Selected Publications

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 - A. Shah, S. Peek, B. Yelamanchili, V. Gupta, D. Tuckerman, C. Cantaloube, J. Sellers, M. Hamilton, “Superconducting Molybdenum Multi-Chip Module Approach for Cryogenic and Quantum Applications”, *IEEE 72nd Electronic Components and Technology Conference (ECTC)*, 276-282, 2022.
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David B. Tuckerman, Ph.D. - List of granted patents

1	US-4450472-A	Method and means for improved heat removal in compact semiconductor integrated circuits and similar devices utilizing coolant chambers and microscopic channels
2	US-4567505-A	Heat sink and method of attaching heat sink to a semiconductor integrated circuit and the like
3	US-4573067-A	Method and means for improved heat removal in compact semiconductor integrated circuits
4	US-4674176-A	Planarization of metal films for multilevel interconnects by pulsed laser heating
5	US-4681795-A	Planarization of metal films for multilevel interconnects
6	US-4814578-A	Planarization of metal films for multilevel interconnects
7	US-4992847-A	Thin-film chip-to-substrate interconnect and methods for making same
8	US-5017509-A	Stand-off transmission lines and method for making same
9	US-5046656-A	Vacuum die attach for integrated circuits
10	US-5134539-A	Multichip module having integral decoupling capacitor
11	US-5214844-A	Method of assembling integrated circuits to a silicon board
12	US-5274270-A	Multichip module having SiO ₂ insulating layer
13	US-5397997-A	Burn-in technologies for unpackaged integrated circuits
14	US-5541524-A	Burn-in technologies for unpackaged integrated circuits
15	US-5804004-A	Stacked devices for multichip modules
16	US-7224056-B2	Back-face and edge interconnects for lidded package
17	US-7262368-B2	Connection structures for microelectronic devices and methods for forming such structures
18	US-7298030-B2	Structure and method of making sealed capped chips
19	US-7351641-B2	Structure and method of forming capped chips
20	US-7449779-B2	Wire bonded wafer level cavity package
21	US-7462936-B2	Formation of circuitry with modification of feature height
22	US-7485956-B2	Microelectronic package optionally having differing cover and device thermal expansivities
23	US-7566853-B2	Image sensor employing a plurality of photodetector arrays and/or rear-illuminated architecture
24	US-7593636-B2	Pin referenced image sensor to reduce tilt in a camera module
25	US-7632708-B2	Microelectronic component with photo-imageable substrate
26	US-7709968-B2	Micro pin grid array with pin motion isolation
27	US-7793414-B2	Methods for forming connection structures for microelectronic devices
28	US-7816251-B2	Formation of circuitry with modification of feature height
29	US-7858445-B2	Wire bonded wafer level cavity package
30	US-8035258-B2	Systems and methods for assessing standoff capabilities of in-service power line insulators
31	US-8174270-B2	Systems and methods for assessing standoff capabilities of in-service power line insulators
32	US-8248080-B2	Systems and methods for assessing standoff capabilities of in-service power line insulators
33	US-8253525-B2	Smart link coupled to power line
34	US-8310036-B2	Chips having rear contacts connected by through vias to front contacts
35	US-8391934-B1	Customized hardware selection for a mobile phone
36	US-8405196-B2	Chips having rear contacts connected by through vias to front contacts
37	US-8425965-B2	Method for heating or sterilizing a liquid stream
38	US-8426736-B2	Maintaining insulators in power transmission systems
39	US-8427800-B2	Smart link coupled to power line
40	US-8460814-B2	Fluid-surfaced electrode
41	US-8531039-B2	Micro pin grid array with pin motion isolation
42	US-8563867-B2	Smart link coupled to power line
43	US-8595037-B1	Systems and methods for insurance based on monitored characteristics of an autonomous drive mode selection system
44	US-8673219-B2	Nasal passage insertion device for treatment of ruminant exhalations
45	US-8692226-B2	Materials and configurations of a field emission device

46	US-8735205-B2	Chips having rear contacts connected by through vias to front contacts
47	US-8776145-B2	In-transit electronic media with location-based content
48	US-8810131-B2	Field emission device with AC output
49	US-8810161-B2	Addressable array of field emission devices
50	US-8865361-B2	Instrumented fluid-surfaced electrode
51	US-8872022-B2	Phase-change cooling of subterranean power lines
52	US-8884813-B2	Surveillance of stress conditions of persons using micro-impulse radar
53	US-8889312-B2	Instrumented fluid-surfaced electrode
54	US-8897116-B1	Systems and methods for atomic film data storage
55	US-8907529-B2	Smart link coupled to power line
56	US-8909307-B2	Customized hardware selection for a mobile phone
57	US-8928228-B2	Embodiments of a field emission device
58	US-8946992-B2	Anode with suppressor grid
59	US-8958786-B2	Mobile device that activates upon removal from storage
60	US-8965288-B2	Cost-effective mobile connectivity protocols
61	US-8968903-B2	Fluid-surfaced electrode
62	US-8969848-B2	Materials and configurations of a field emission device
63	US-8970113-B2	Time-varying field emission device
64	US-8971043-B2	Management of exterior temperatures encountered by user of a portable electronic device in response to an inferred user contact with the portable electronic device
65	US-8971868-B2	Mobile device that activates upon removal from storage
66	US-8971869-B2	Mobile device that activates upon removal from storage
67	US-8971969-B2	Customized hardware selection for a mobile phone
68	US-8974939-B2	Fluid-surfaced electrode
69	US-9013564-B2	Controllable lenticular lenslets
70	US-9019149-B2	Method and apparatus for measuring the motion of a person
71	US-9024814-B2	Tracking identities of persons using micro-impulse radar
72	US-9055166-B2	Customized hardware selection for a mobile phone
73	US-9056556-B1	System and method for configuration and management of an energy storage system for a vehicle
74	US-9069067-B2	Control of an electronic apparatus using micro-impulse radar
75	US-9077815-B1	Customized hardware selection for a mobile phone
76	US-9079505-B1	System and method for management of a fleet of vehicles having an energy storage system
77	US-9083819-B2	Customized hardware selection for a mobile phone
78	US-9106764-B2	Customized hardware selection for a mobile phone
79	US-9140499-B2	Phase-change cooling of subterranean power lines
80	US-9143605-B2	Customized hardware selection for a mobile phone
81	US-9149010-B2	Harvesting and grafting of trees
82	US-9158908-B2	Power source for in-transit electronic media
83	US-9171690-B2	Variable field emission device
84	US-9177592-B2	Systems and methods for atomic film data storage
85	US-9177600-B2	Systems and methods for atomic film data storage
86	US-9191489-B2	Customized hardware selection for a mobile phone
87	US-9193068-B2	Structural assessment, maintenance, and repair apparatuses and methods
88	US-9193402-B2	Structural assessment, maintenance, and repair apparatuses and methods
89	US-9199193-B2	Treatment of ruminant exhalations
90	US-9207270-B2	Method and apparatus for measuring negawatt usage of an appliance
91	US-9216133-B2	Using a 3D display to train a weak eye
92	US-9230442-B2	Systems and methods for adaptive vehicle sensing systems
93	US-9269268-B2	Systems and methods for adaptive vehicle sensing systems
94	US-9270808-B2	Customized hardware selection for a mobile phone

95	US-9291297-B2	Multi-layer phononic crystal thermal insulators
96	US-9291399-B2	Management of exterior temperatures encountered by user of a portable electronic device
97	US-9291400-B2	Management of exterior temperatures encountered by user of a portable electronic device using multiple heat-rejection elements
98	US-9305737-B2	Liquid filament for incandescent lights
99	US-9320174-B2	Management of exterior temperatures encountered by user of a portable electronic device in response to an inferred user contact with the portable electronic device
100	US-9321357-B2	Method and apparatus for supplying auxiliary electrical power to an electric or hybrid vehicle
101	US-9341065-B2	Dual element turbine blade
102	US-9349562-B2	Field emission device with AC output
103	US-9373870-B2	Battery damage indicator
104	US-9396810-B2	Systems and methods for acoustic wave enabled data storage
105	US-9396814-B2	Systems and methods for acoustic wave enabled data storage
106	US-9424893-B2	Systems and methods for acoustic wave enabled data storage
107	US-9435320-B2	Mitigating wind turbine blade noise generation in view of a minimum power generation requirement
108	US-9437849-B2	Battery damage indicator
109	US-9451394-B2	Cost-effective mobile connectivity protocols
110	US-9452281-B2	Tattooing systems and methods
111	US-9456648-B2	Systems and methods for helmet liner evaluation
112	US-9457666-B2	Method and apparatus for supplying auxiliary electrical power to an electric or hybrid vehicle
113	US-9486386-B2	Using a 3D display to train a weak eye
114	US-9488670-B2	Systems and methods for detecting overhead line motion
115	US-9490097-B2	Liquid filament for incandescent lights
116	US-9511634-B2	Systems and methods for anticipatory tire pressure control
117	US-9512580-B2	Systems and methods for deicing
118	US-9514653-B2	Systems, methods, and devices for providing assistance to an unmanned aerial vehicle
119	US-9531864-B2	Customized hardware selection for a mobile phone
120	US-9548507-B2	Systems and methods for hydrogen fuel storage and hydrogen powered vehicles
121	US-9549406-B1	Automatically adjustable radiofrequency link
122	US-9553959-B2	Customized hardware selection for a mobile phone
123	US-9562704-B2	Phase-change cooling of subterranean power lines
124	US-9599407-B2	System and structure for heating or sterilizing a liquid stream
125	US-9602650-B2	Customized hardware selection for a mobile phone
126	US-9602673-B2	Systems and methods for monitoring sound during an in-building emergency
127	US-9648309-B2	Controllable lenticular lenslets
128	US-9653128-B2	Systems and methods for acoustic wave enabled data storage
129	US-9681557-B2	Metastable gas heating
130	US-9688402-B2	Systems, methods, and devices for unmanned aerial vehicle dispatch and recovery
131	US-9691500-B2	Casimir effect memory cell
132	US-9696119-B2	Camouflage for transmission towers and lines
133	US-9714494-B2	Systems and methods for deicing
134	US-9719902-B2	Systems and methods for helmet liner evaluation
135	US-9723702-B2	Liquid filament for incandescent lights
136	US-9751207-B2	Structural assessment, maintenance, and repair apparatuses and methods
137	US-9751812-B2	Taggant for cement authentication
138	US-9759196-B2	Mitigating wind turbine blade noise generation in response to an atmospheric variation
139	US-9772062-B2	Multi-layer phononic crystal thermal insulators
140	US-9776632-B2	Systems and methods for adaptive vehicle sensing systems
141	US-9781664-B2	Cost-effective mobile connectivity protocols

142	US-9788195-B2	Mobile device that activates upon removal from storage
143	US-9800738-B2	Systems and methods for monitoring sound during an in-building emergency
144	US-9801313-B2	Underwater container cooling via integrated heat exchanger
145	US-9805763-B2	Systems and methods for atomic film data storage
146	US-9810819-B2	Camouflage for transmission towers and lines
147	US-9819184-B2	Balancing power grid parameters using distributed energy control
148	US-9824845-B2	Variable field emission device
149	US-9826534-B2	Automatically adjustable radiofrequency link
150	US-9832628-B2	Cost-effective mobile connectivity protocols
151	US-9844167-B2	Underwater container cooling via external heat exchanger
152	US-9844983-B2	Systems and methods for anticipatory tire pressure control
153	US-9876762-B2	Cost-effective mobile connectivity protocols
154	US-9878631-B2	System and method for predictive control of an energy storage system for a vehicle
155	US-9878786-B2	System and method for operation and management of reconfigurable unmanned aircraft
156	US-9878787-B2	System and method for operating unmanned aircraft
157	US-9902491-B2	Reconfigurable unmanned aircraft system
158	US-9919797-B2	System and method for operation and management of reconfigurable unmanned aircraft
159	US-9924642-B2	Harvesting and grafting of trees
160	US-9930898-B2	Pasteurization system and method
161	US-9989077-B2	Systems and methods for selective control of fuel tanks
162	US-10015931-B2	Production of electricity from plants
163	US-10015971-B2	Articles and methods for administering CO2 into plants
164	US-10017392-B2	Articles and methods for administering CO2 into plants
165	US-10052469-B2	Tattooing systems and methods
166	US-10072503-B2	Dual element turbine blade
167	US-10074879-B2	Instrumented fluid-surfaced electrode
168	US-10119592-B2	Vehicle drivetrain with active magnetic bearings
169	US-10135302-B2	Mobile phone having a wireless power module
170	US-10136437-B2	Automatically adjustable radiofrequency link
171	US-10141493-B2	Thermal management for superconducting interconnects
172	US-10146222-B2	Driver training in an autonomous vehicle
173	US-10171677-B2	Systems and methods for monitoring sound during an in-building emergency
174	US-10184867-B2	Systems and methods for helmet liner evaluation
175	US-10348884-B2	Customized hardware selection for a mobile phone
176	US-10453592-B1	Reducing losses in superconducting cables
177	US-10651362-B2	Method of forming superconducting apparatus including superconducting layers and traces
178	US-10763013-B2	Reducing losses in superconducting cables
179	US-11114602-B2	Method of forming superconducting layers and traces
180	US-11211722-B2	Superconductor interconnect system
181	US-12027361-B2	High temperature superconductor-based interconnect systems with a lowered thermal load for interconnecting cryogenic electronics with non-cryogenic electronics
182	AU-2011326765-B2	Treatment of ruminant exhalations
183	AU-2018341994-B2	Fabrication of apparatus including superconducting wiring layers and interconnects
184	AU-2019265449-B2	Reducing losses in superconducting cables
185	CA-2057744-C	Multichip module
186	EP-2638389-B1	Treatment of ruminant exhalations
187	EP-2801102-B1	Anode with suppressor grid
188	EP-2920548-B1	Systems and methods for detecting overhead line motion
189	EP-3210279-B1	Wireless power receiver in a mobile device
190	EP-3610519-B1	Thermal management for superconducting interconnects

191	EP-3688796-B1	Fabrication of apparatus including superconducting wiring layers and interconnects
192	EP-3745481-B1	Thermal management for superconducting interconnects
193	EP-3791432-B1	Reducing losses in superconducting cables
194	TW-I317555-B	Image sensor employing a plurality of photodetector arrays and/or rear-illuminated architecture
195	TW-I333247-B	Method of forming a microelectronic connection component