

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 Revised Contingent Motion To Amend**

Dated: October 3, 2025

Respectfully Submitted by:

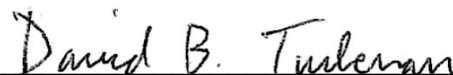

David B. Tuckerman

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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 Revised Motion to Amend (“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 Revised Motion to Amend 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 7,000 citations in the professional literature, as reported by Google Scholar.² This paper was selected by the IEEE Electron Devices Society to receive the first “Paul Rappaport Award”, although this new award series was not officially approved by IEEE until 1983.³

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=

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

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 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

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

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 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 my prior declaration, 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 declaration 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” or “IPR”)
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”)
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”)
Exhibit 1010	Pat. App. Pub. No. US 2008/0279694 A1 (“Chou”)

Material	Description
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 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

VI. SUPPORT FOR REVISED CONTINGENT MOTION TO AMEND

24. Petitioner’s Opposition (p. 9) and Dr. Wolfe’s Reply Declaration (paragraph 90) allege, without evidence, that “there is no space between the first side of the first illumination fan and the second side of the second illumination fan for supplying power to the claimed power socket located on the first side of the first

illumination fan”. But as shown below, the reality is that the ’336 patent’s FIG. 3 shows there is space (annotated in yellow) between every two joined fans:

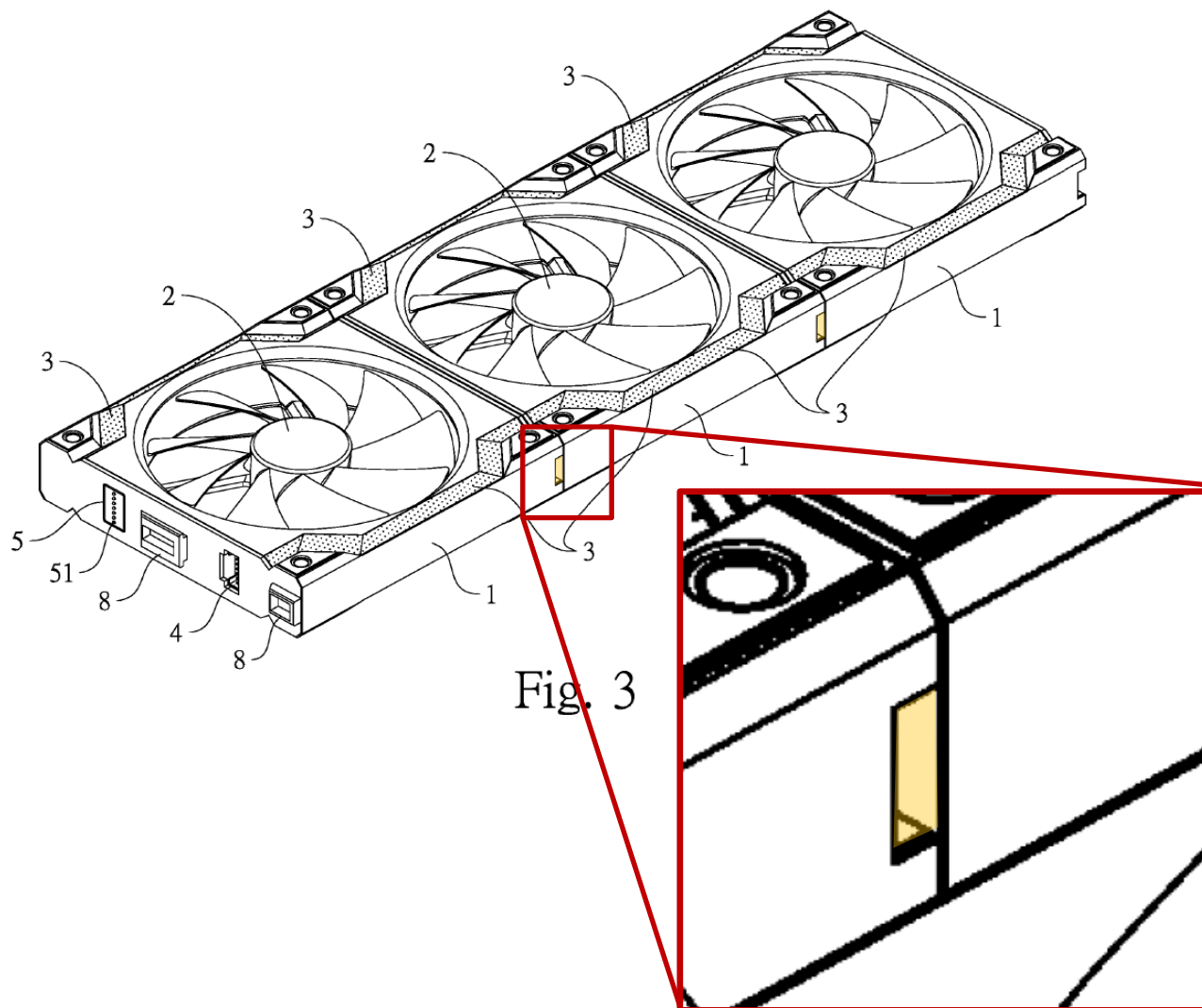
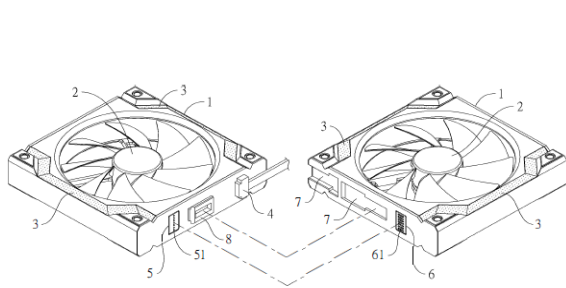
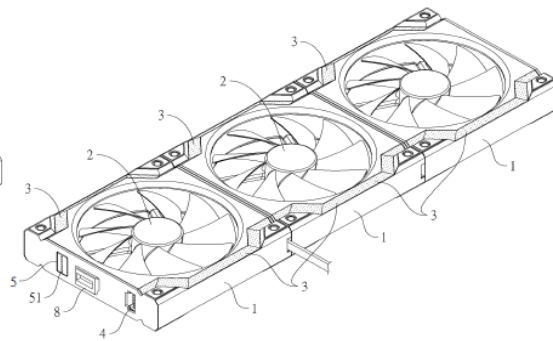


Fig. 3

25. As can be seen above, FIG. 3 of the ’336 patent shows that there is clearly an open slot between two adjacent fans. Thus, it is entirely possible to have a power cable inserted between two fans, provided that a suitable groove or slot is built into at least one of the fans, as shown below:

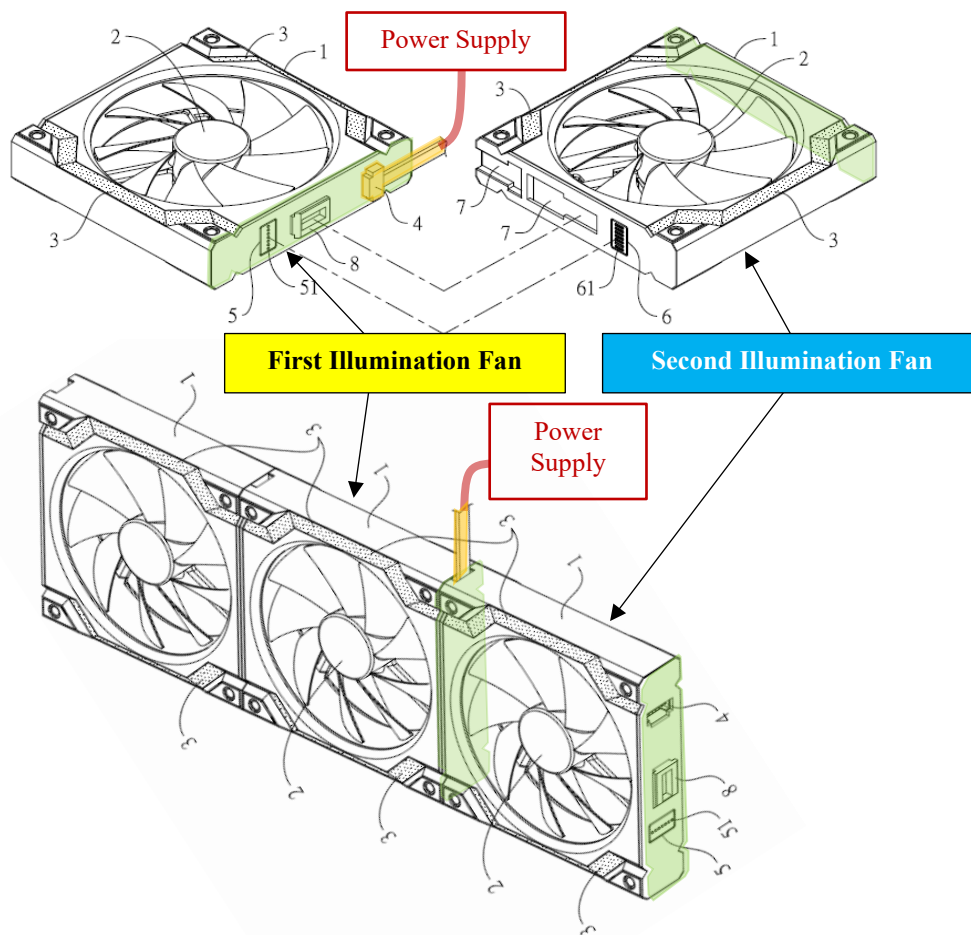


第 4 圖



第 5 圖

(See Ex-2032.)



Ex. 2 (LL-Thermaltake-0003663 to -0003664) (annotated)

(See Ex-2042, which is an annotated version of Ex-2032 reproduced further above).

26. Dr. Wolfe agrees that claim 1 of the '336 patent reads on the above configuration:

So my question to you is that, based on your earlier analysis of Exhibit 2032, agreeing that it is actually within the scope of Claim 1, do you agree that adding the power supply as shown in Exhibit 2042 does not change the fact that Claim 1 reads on the devices in Exhibit 2042?

THE WITNESS: Again, I think if we apply all the assumptions you asked me to apply and I apply all of the claims scoped the way I've applied it with respect to the prior art, then I think that that would fall within the scope of Claim 1.

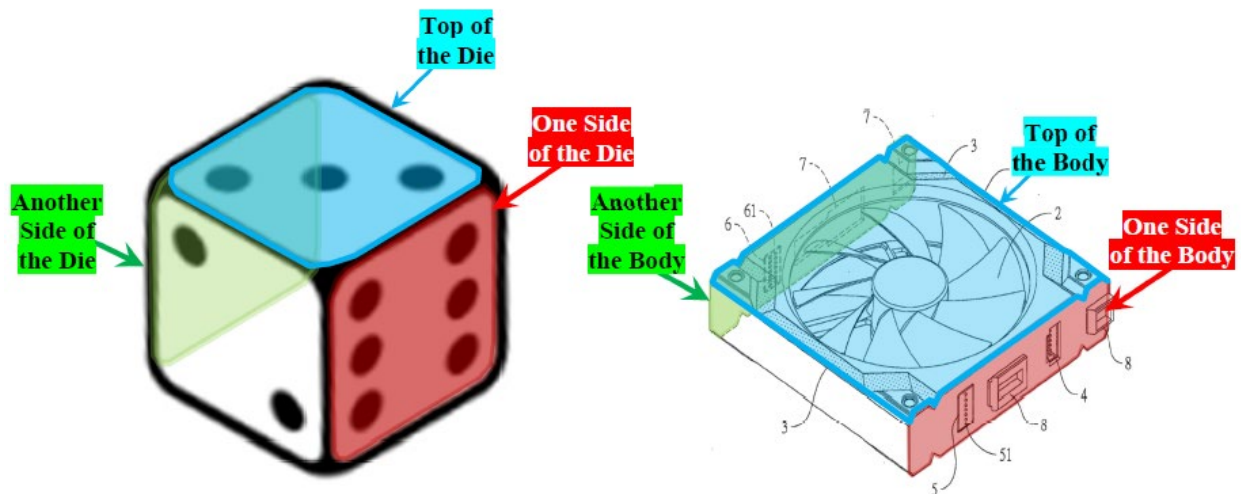
(Ex-2051 (Wolfe Tr.) at 166:3-15; *see also id.* at 158:13-159:6 (establishing the assumptions).)

27. An opening of the power socket in the front that is never used in one configuration is appropriate because the inventor desires to allow different configurations. Being plugged in through the power socket of the illumination fan at one end of a set of daisy-chained illumination fans is merely one configuration; being plugged in through the second connector of the illumination fan at the other end of the chain is another configuration; being plugged in from an intermediate point between two adjacent illumination fans is yet a third configuration. The invention enhances design flexibility by allowing all these configurations.

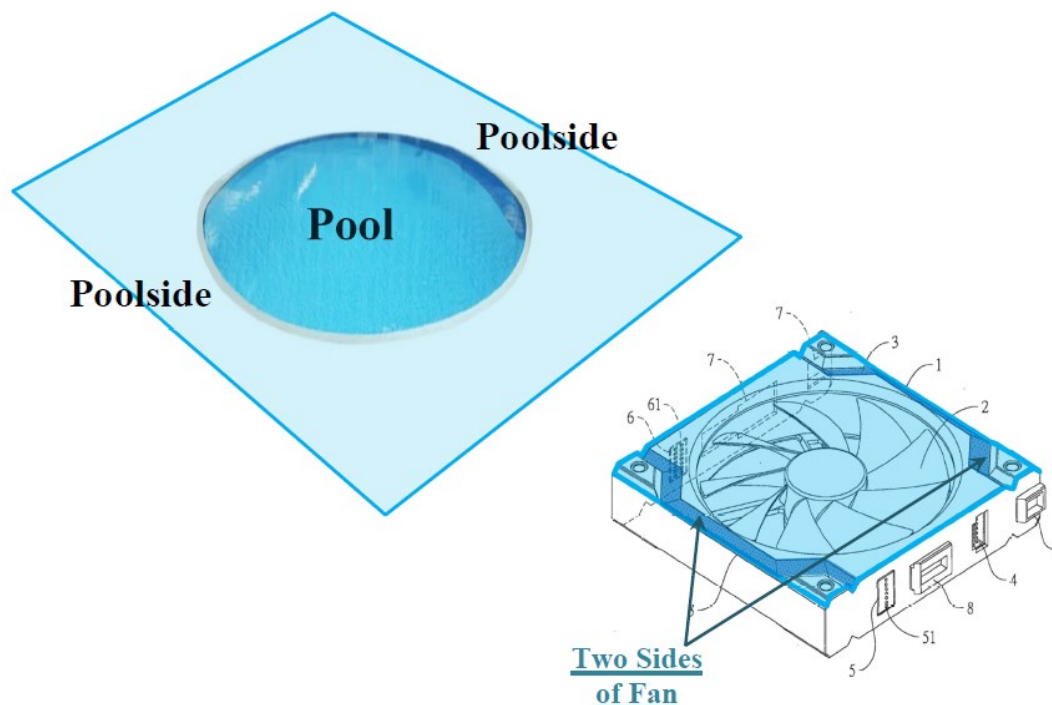
28. Petitioner's opposition (p. 15) and Dr. Wolfe's Reply Declaration (Paragraph 127) allege that it would have been obvious to a POSITA to employ flat connectors "based on Lai's disclosure that the fan bodies should be places [sic] adjacent to one another so that their sides touch". But Lai makes no such disclosure, as Fig. 3 of his patent application clearly shows non-adjacent fans connected by cables, not by direct connections between abutting faces.

29. Dr. Wolfe's Reply Declaration (Ex-1031, Section 3.1) refers to "side" as a stand-alone claim term, and I understand he has applied this definition throughout his Reply Declaration including the portions supporting Petitioner's opposition to Patent Owner's original contingent motion to amend. (Ex-2051 (Wolfe Tr.) at 114:19-115:12.). Dr. Wolfe argues that the term "side" must have the same meaning throughout the '336 patent, but he chooses a cherry-picked definition from a dictionary (Ex-1032, Definition "2" for "side": "a place, space, or direction with respect to a center or to a line of division (as of an aisle, river, or street)") that makes no sense. This is at least because the '336 patent is not directed to anything like "an aisle, river, or street" for which the term "side" is used in the dictionary (Ex-1032). And by Dr. Wolfe's own admission, there are "more than a dozen definitions for side", which makes clear that the word "side" can only be understood in the context of what it is referring to. (Ex-1031 at paragraph 15.)

30. The '336 patent uses the term “side(s)” in two different contexts: “side of the body” and “two sides of the fan”. As I have discussed at length in my prior testimony, a POSITA would have understood “side of the body” to refer to one of the four lateral faces of the illumination fan body, i.e., either the lateral face containing the power socket and first connector, or the lateral face containing a second connector, or either of the two remaining lateral faces. Based on the same dictionary definition excerpt (Ex-1032) provided by and relied upon by Dr. Wolfe, I believe the meaning of “side” in the phrase, “side of the body,” as would have been understood by a POSITA, should be closer to Definition “3 b”: “a line or surface forming a border or face of an object <a die has six [side]s>”, as shown in a side-by-side comparison below:



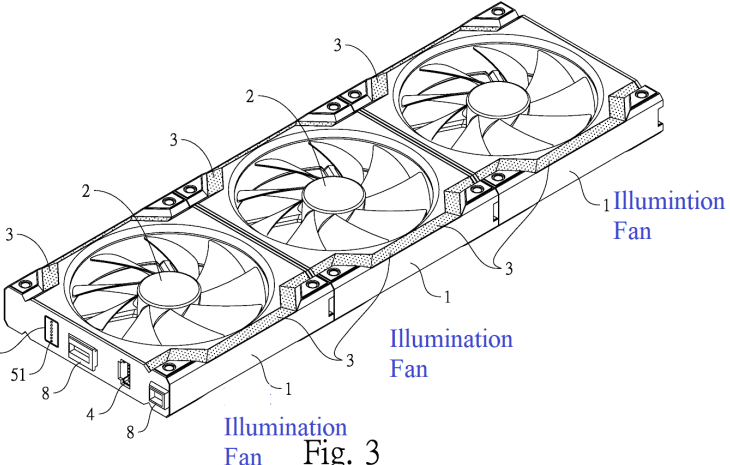
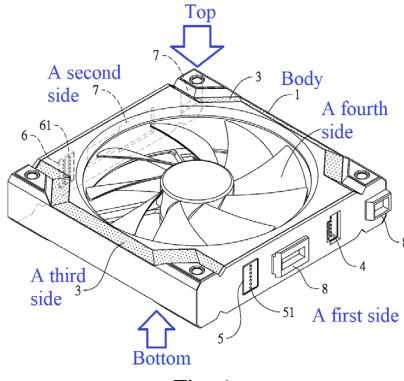
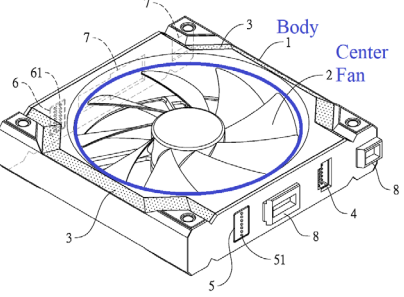
(Ex-2025.) On the other hand, I believe that in the phrase, “sides of the fan,” the term “sides” should have a meaning closer to the definition “4 b”, as a POSITA would have understood it: “an area next to something – usu. used in combination <a poolside interview>”, as shown in the side-by-side comparison below:

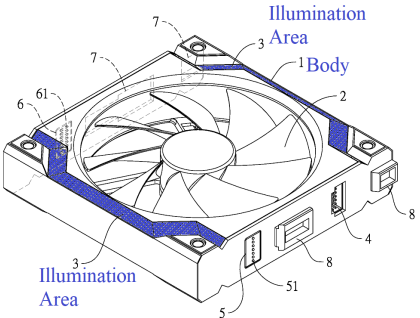
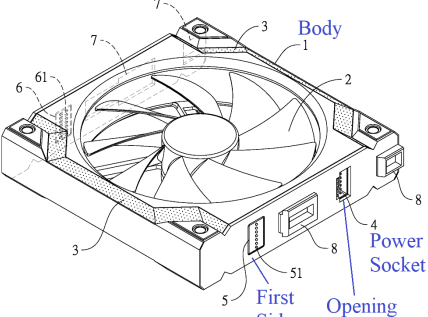
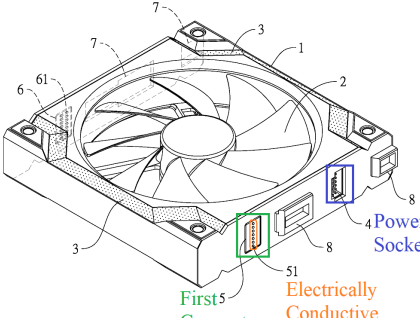


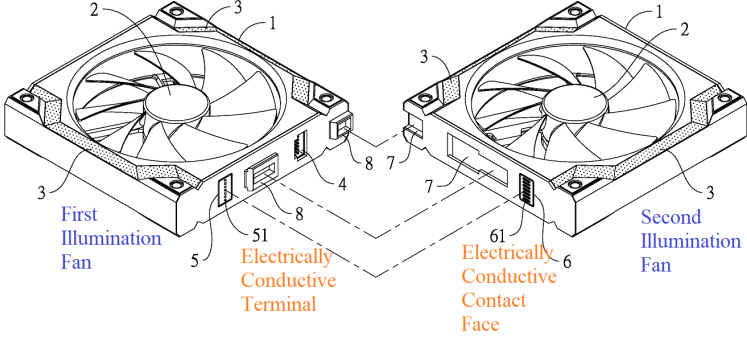
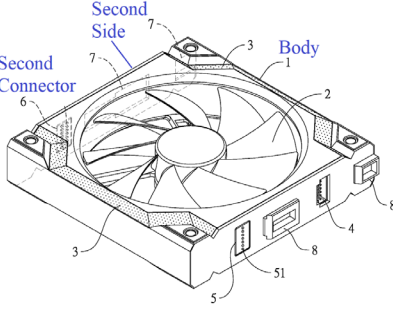
(Ex-2028.) This is because the “two sides of the fan” that the illumination area 3 in all embodiments in the ’336 patent are located on are next to the fan and are not part of the fan, as shown above. Dr. Wolfe agrees. Ex-1031 at paragraph 16.

A. Proposed Substitute Claim 6

31. Claim 6 includes all the limitations of claim 1, plus additional limitations supported by Figures 1-3 and the corresponding text of the ’336 patent and its priority application.

Claim / Limitation	Written Description Support
6. A system comprising a first illumination fan for a computer connected with a second illumination fan for the computer, wherein:	FIG. 3 shows a system of illumination fans for a computer comprising at least a first illumination fan connected with a second illumination fan:  (See Ex-1001 at FIGS. 1-3, 1:50-52, 2:38-46, 2:57-60, 3:7-8; Ex-1002 at FIGS. 1-3 (pp. 59-61), pp. 55-57; Ex-2017 at pp. 24-27 (FIGS. 1-3) and pp. 19-22 (text corresponding that of Ex-1002).)
(A) the first illumination fan comprises: (i) a body comprising a top, a bottom, and adjacent sides, wherein the sides include at least a first side and a second side;	FIG. 1 shows a first illumination fan comprising a body (1) having a top, a bottom, and adjacent sides, with the sides including a first side and a second side. (See Ex-1001 at FIG. 1, 2:38-40, 2:61-67; Ex-1002 at FIG. 1 (p. 59), pp. 56-57; Ex-2017 at FIG. 1 (p. 25), pp. 21-22.) 
(ii) a center fan located in a center of the body;	FIG. 1 shows a first illumination fan comprising a center fan (2) located in the center of the body (1). (See Ex-1001 at FIG. 1, 2:68-3:3; Ex-1002 at FIG. 1 (p. 59), p. 57; Ex-2017 at FIG. 1 (p. 25.), pp. 21-22.) 

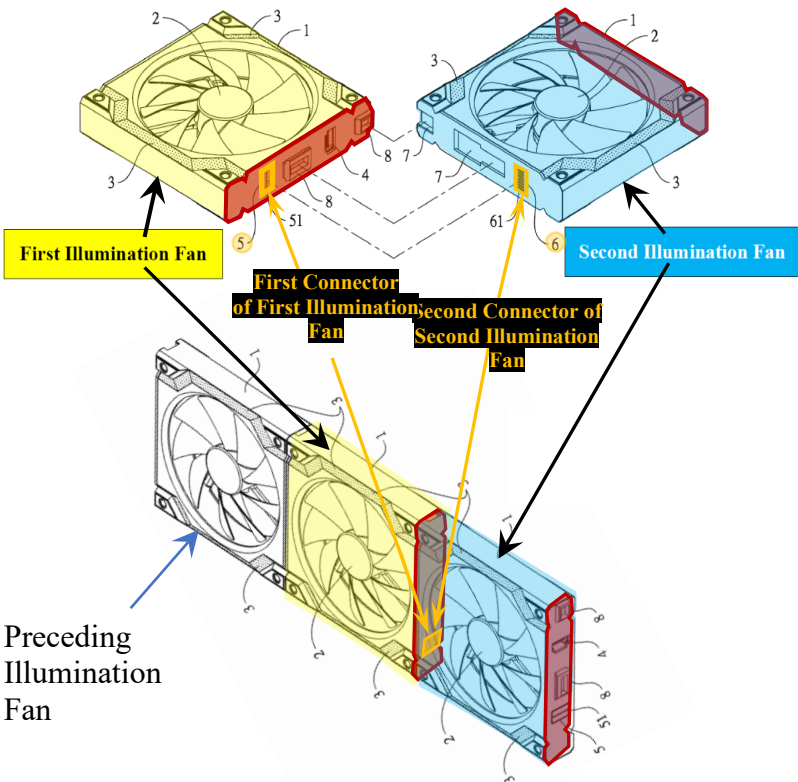
Claim / Limitation	Written Description Support
(iii) an illumination area located at the top of the body and disposed on at least two sides of the center fan;	FIG. 1 shows a first illumination fan comprising an illumination area (3) located at the top of the body (1) and disposed on at least two sides of the center fan (2). (See Ex-1001 at FIG. 1, 2:64-65; Ex-1002 at FIG. 1 (p. 59), p. 57; Ex-2017 at FIG. 1 (p. 25.), pp. 21-22.)  Fig. 1
(iv) a power socket comprising an opening disposed on the first side of the body;	FIG. 1 shows a first illumination fan comprising a power socket (4) comprising an opening disposed on a first side of the body (1). (See Ex-1001 at FIG. 1, 2:64-65; Ex-1002 at FIG. 1 (p. 59), p. 57; Ex-2017 at FIG. 1 (p. 25.), pp. 21-22.)  Fig. 1
(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 terminal configured to electrically connect with a second electrical terminal of the second	FIG. 1 shows a first illumination fan comprising a first connector (5) disposed on the first side of the body (1), wherein the first connector (5) is structurally distinct and separable from the power socket (4), and wherein the first connector (1) comprises a first electrical terminal (51). FIG. 2 shows that the first electrical terminal (51) is configured to electrically connect with a second electrical terminal (61) of the second  Fig. 1

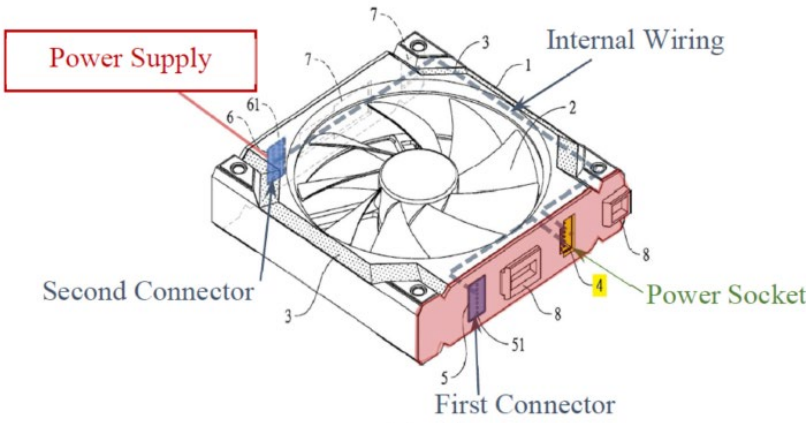
Claim / Limitation	Written Description Support
illumination fan; and	 Fig. 2 (See Ex-1001 at FIGS. 1-2, 2:64-65; Ex-1002 at FIGS. 1-2 (pp. 59-60), p. 57; Ex-2017 at FIGS. 1-2 (pp. 25-26), pp. 21-22.)
(vi) a second connector disposed on the second side of the body;	FIG. 1 shows a first illumination fan comprising a second connector (6) disposed on a second side of the body (1). (See Ex-1001 at FIG. 1, 2:64-65; Ex-1002 at FIG. 1 (p. 59), p. 57; Ex-2017 at FIG. 1 (p. 25), p. 21-22.)  Fig. 1
(B) the power socket is electrically connected with the first connector, the second connector, the center fan and the illumination area,	The text of the specification describes that “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],” as shown below: “In order to achieve the above and other objects, the present invention provides an illumination fan connectable with at least one illumination fan for a computer, which may include a body, provided with a fan in a 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, <u>wherein the power socket is electrically connected with the first connector, the second connector, the fan and the illumination</u>

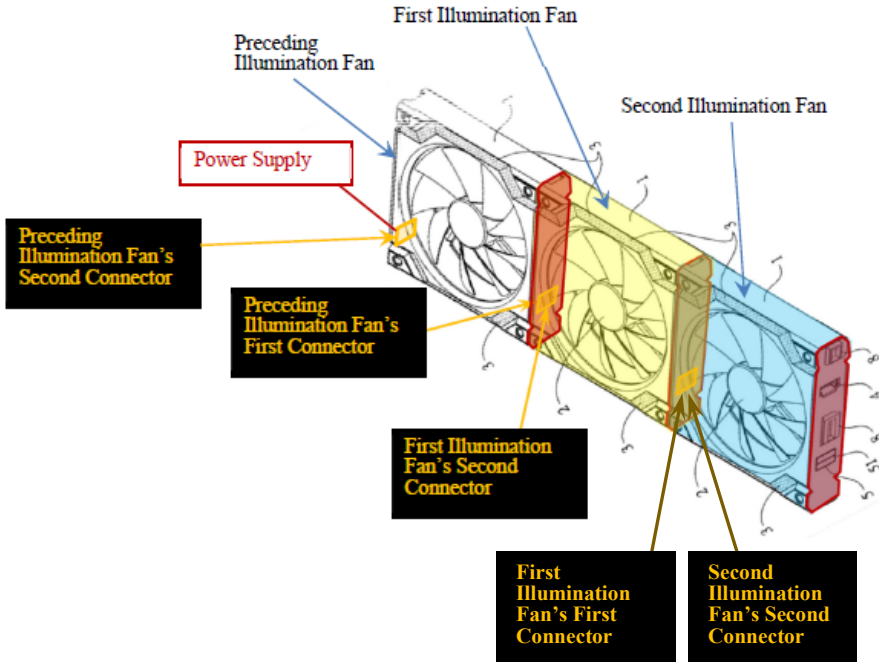
Claim / Limitation	Written Description Support
	<u>area, such that when the power socket on the one side of the body is supplied with power, the fan and the illumination area of the body can be respectively driven into rotation and illumination ...”</u> (See Ex-1001 at 1:53-2:2; Ex-1002 at p. 55; Ex-2017 at p. 20.) The configuration disclosed above is shown in an annotated FIG. 1 below: First Illumination Fan Internal Wiring Second Connector 6 Illumination Area 3 Power Socket 4 First Connector 5 Fig. 1 (See Ex-1001, FIG. 1 (annotations added); see also Ex-2006, ¶ 27 (“The power socket 4 of the embodiment shown in Figure 1 above can be supplied with power in various ways. For example, in a non-limiting configuration, the power socket 4 (highlighted in yellow above) can be supplied with power via internal wiring from the second connector 6, which can receive power from a prior [<i>i.e.</i>, preceding] illumination fan’s first connector 5 in the manner as shown in Figure 2 (which illustrates the exemplary connections between any two adjacent illumination fans).”)) Given that “the power socket [of the first illumination fan] is electrically connected with ... the second connector [of the first illumination fan],” the specification further

Claim / Limitation	Written Description Support
	supports that the first illumination fan can be connected with a <i>preceding illumination fan</i> that comes <i>before</i> the first illumination fan, such that the preceding fan's first connector can be connected with the first illumination fan's second connector to supply power, as illustrated below in an annotated FIG. 3: Preceding Illumination Fan (corresponding to “a body 1”) First Illumination Fan (corresponding to “another body 1”) Preceding Illumination Fan's First Connector First Illumination Fan's Second Connector (Ex-1001, FIG. 3 (annotations added).) The annotated FIG. 3 above exemplarily illustrates the configuration described in the text of the specification below, wherein “a body 1” corresponds to the preceding illumination fan indicated above and “another body 1” corresponds to the first illumination fan above: • “If at least two bodies 1 [of, respectively, the preceding illumination fan and the first illumination fan] are joined together to form multiple sets of fans (as shown in FIGS. 2 and 3), the first connector 5 is provided with an electrically conductive terminal 51, and the second connector 6 is provided with an electrically conductive contact face 61 to be electrically connected with the electrically conductive terminal 51, so that <i>when</i>

Claim / Limitation	Written Description Support
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	<i>the first connector 5 of a body 1 [of the preceding illumination fan] is connected to the second connector 6 of another body 1 [of the first illumination fan], the fan 2 of the another body 1 can be driven into rotation and the illumination area 3 can be illuminated.”</i> (See Ex-1001 at 3:7-16; Ex-1002 at p. 57; Ex-2017 at p. 27.) As shown above, because the first illumination fan's second connector can receive power from the preceding illumination fan's first connector and is electrically connected with the first illumination fan's power socket, the first illumination fan's power socket can thus be “supplied with power via the power socket's electrical connection with the second connector” of the first illumination fan. And because the first illumination fan's power socket is supplied with power via the first illumination fan's second connector and electrically connected with the first illumination fan's center fan and illumination area, the first illumination fan's center fan and illumination area can be supplied with power by the power socket and driven into rotation and illumination, respectively. (See Ex-1001 at 3:4-6; see also Ex-2006, ¶ 27 (“As such, once the power socket 4 on the same side of the body 1 as the first connector 5 is supplied with power, the fan 2 of the body 1 can be driven into rotation and the illumination area 3 into illumination.”))
(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	The text of the specification describes the limitations of (C), as shown below: • <u>“[W]hen the first connector of the body [of the first illumination fan] is connected with a second connector of a body of [the second, i.e.,] another illumination fan, a fan and an illumination area of the body of [the second, i.e.,] another illumination fan can be respectively driven into rotation and illumination.”</u>

Claim / Limitation	Written Description Support
area of the body of the second illumination fan are respectively driven into rotation and illumination.	(See Ex-1001 at 1:53-2:2; Ex-1002 at p. 55; Ex-2017 at p. 20.)  (See Ex-1001, FIGS. 2-3 (annotations added).) Note that limitations (B) and (C) can be concurrently met by the above embodiment because the first illumination fan's power socket 4 can receive power from the first illumination fan's second connector 6, which can receive power from the preceding illumination fan's first connector 5, as discussed above in limitation (B). (See Ex-1001, 3:4-16.) A person of ordinary skill in the art ("POSITA") would have understood that, in a similar manner as the first illumination fan's second connector receiving power from the preceding illumination fan, the preceding illumination

Claim / Limitation	Written Description Support
	fan's second connector can receive power from a power supply, as shown below: Preceding Illumination Fan  Fig. 1 (See Ex-2036 (Ex-1001, FIG. 1 (annotated)); <i>see also</i> Ex-2002, ¶ 27 (“The power socket 4 of the embodiment shown in Figure 1 above can be supplied with power in various ways. For example, as shown above, the second connector [6] may receive power from a power supply, and the exemplary power socket 4 highlighted in yellow in the reproduced Figure 1 above can be supplied with power from behind by the second connector [6] that is electrically connected to the power socket through internal wiring of the illumination fan. The power socket 4 electrically connected with the first connector 5 can in turn supply power to the first connector 5 ‘so that when the first connector 5 of [an illumination fan’s] body 1 is connected to the second connector 6 of another [illumination fan’s] body 1, the fan 2 of the another [illumination fan’s] body 1 can be driven into rotation and the illumination area 3 [of the another illumination fan’s body 1] can be illuminated’.”); <i>see also</i> Ex-2051 (Wolfe Tr.) at 174:5-11 (“[Q.] Do you agree that the 336 specification does not exclude power connections on the first and second connectors? THE WITNESS: The 336 specification does not exclude having power connections on the first and second connectors.”) (emphasis added) (objection omitted); <i>see also id.</i> at 204:20-205:2 (“Q. Dr. Wolfe, does

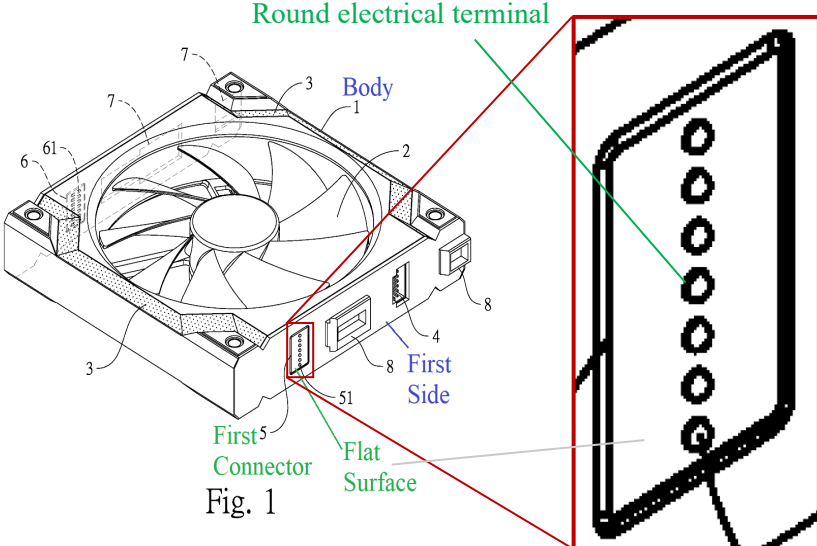
Claim / Limitation	Written Description Support
	the 336 patent exclude the second connector of the preceding illumination fan as labeled in Exhibit 2036 from connecting to a power supply? THE WITNESS: If by ‘exclude’ you only mean does it have an explicit statement saying that it’s impossible, then no.”) (objection omitted)). Indeed, Dr. Wolfe repeatedly referred to the “power socket 4” in the ’336 patent as “connector 4.” (<i>See, e.g.</i>, Ex-2051 (Wolfe Tr.) at 148:24-149:2, 149:22-24, 158:22-24, 161:14-18.) Given 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. In sum, a POSITA would have understood that, as a result, the overall configuration as permitted and supported by the specification is as follows:  (<i>See</i> Ex-2037; <i>see also</i> Ex-2002, ¶ 27.) It is noted that, because the exemplary power supply directly connected to the preceding illumination fan’s second connector as shown above is not being claimed, such direct power

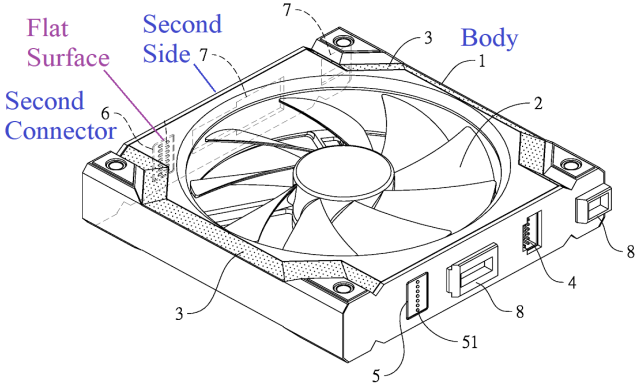
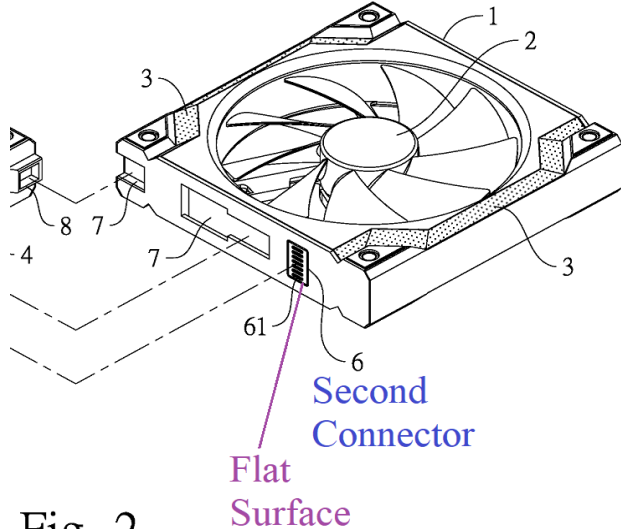
Claim / Limitation	Written Description Support
	connection on the second connector of the preceding illumination fan does not need to be expressly disclosed or taught by the '336 patent so long as this power connection is permitted and is not excluded thereunder. (<i>See</i> Ex-2051 (Wolfe Tr.) at 174:5-11 and 204:20-205:2.)

B. Proposed Substitute Claim 7

32. Claim 7 includes all the limitations of claims 1 and 6, plus additional limitations relating to a flat surface of each of the first and second connectors, with the flat surface of the first connector comprising round electrical terminals as supported by Figures 1-3 and the corresponding text of the '336 patent and its priority applications.

Claim / Limitation	Written Description Support
7. A system comprising a first illumination fan for a computer connected with a second illumination fan for the computer, wherein:	This limitation is identical to claim 6, and thus has written description support for the same reasons provide above relative to claim 6.
(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;	This limitation is identical to claim 6, and thus has written description support for the same reasons provide above relative to claim 6.
(ii) a center fan located in a center of the body;	This limitation is identical to claim 6, and thus has written description support for the same reasons provide above relative to claim 6.

Claim / Limitation	Written Description Support
(iii) an illumination area located at the top of the body and disposed on at least two sides of the center fan;	This limitation is identical to claim 6, and thus has written description support for the same reasons provide above relative to claim 6.
(iv) a power socket comprising an opening disposed on the first side of the body;	This limitation is identical to claim 6, and thus has written description support for the same reasons provide above relative to claim 6.
(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	This limitation is identical to claim 6, except it further requires the first connector to have “a first flat surface.” FIG. 1 illustrate a first connector (5) with a first flat surface disposed on the first side of the body (1) and comprising a round electrical terminal.  (See Ex-1001 at FIG. 1, 2:61-3:16 Ex-1002 at FIG. 1 (p. 59), p. 57; Ex-2017 at FIG. 1 (p. 25), pp. 21-22.) The remainder of this limitation is the same as that of claim 6 and thus has written description support for the same reasons provide above relative to claim 6.

Claim / Limitation	Written Description Support
(vi) a second connector comprising a second flat surface disposed on the second side of the body;	This limitation is identical to claim 6, except it further requires the second connector to have “a second flat surface.” FIG. 1 illustrates a second connector (6) with a second flat surface disposed on the second side of the body (1). FIG. 2 also shows the arrangement of a second connector (6) of an illumination fan having a flat surface.  Fig. 1  Fig. 2 (See Ex-1001 at FIGS. 1-2, 2:61-3:16, Ex-1002 at FIGS. 1-2 (pp. 59-60), p. 57; Ex-2017 at FIGS. 1-2 (pp. 25-26), pp. 21-22.)

Claim / Limitation	Written Description Support
(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	This limitation is identical to claim 6, and thus has written description support for the same reasons provide above relative to claim 6.
(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.	This limitation is identical to claim 6, and thus has written description support for the same reasons provide above relative to claim 6.

33. Proposed substitute claims 6 and 7 are supported by the specification and patentable over the cited prior art. I first address the §112 issues raised by the Board in the Guidance:

- (a) written description support for two illumination fans operating at the same time (limitations (B) and (C) when the first illumination fan's power socket is covered by the second illumination fan (Guidance at 7-11)) ;
- (b) indefiniteness relating to (a) (Guidance at 13-14); and
- (c) indefiniteness as to whether the system claim requires one illumination fan or two (*id.*).

34. As it relates to item (c), I understand Patent Owner has amended the preamble of the proposed substitute claims to clarify that at least two fans (first and second) are required. Thus, I submit that item (c) has been addressed.

35. As it relates to items (a) and (b), I understand that the claims have been amended to require:

“wherein ... (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;”

36. As the Background of '336 patent explains:

“[F]ans are usually provided during assembly to dispel heat accumulated inside a housing to the outside. However, *each fan has to be connected to the power supply through an independent power cable, so the number of fans that can be assembled is limited by the finite number of connections available on the power supply*. This in turn limits the efficiency of heat dissipation. Furthermore, the additional wire inside the housing makes cable routing and managing much more cumbersome.”

(Ex-1001 at 1:32-40.)

37. The '336 patent further explains:

“As a result, 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 power supply and eliminates cumbersome routing due to large number of wires*. With the combinational design of the present invention, the efficiency of heat dissipation at any location in a computer can be greatly improved.”

(Ex-1001 at 3:29-39.)

38. In this regard, the '336 patent proposes that a preceding illumination fan supplies power to another illumination fan (adjacently joined with the preceding

illumination fan) by connecting the terminals of a first connector of the preceding illumination fan to the terminals of a second connector of the another illumination fan as follows:

“[W]hen the first connector of the body of the [preceding] illumination fan is connected with the second connector of the body of another illumination fan, **the fan and the illumination area of the body of [the] another illumination fan can be respectively driven into rotation and illumination.**”

(*Id.* at 3:7-16; Ex-1002 at p. 57; Ex-2017 at p. 27.)

39. Thus, a power socket or connector of any one illumination fan among the interconnected illumination fans may be supplied with power from a preceding illumination fan, *i.e.*, it is not a requirement that any power socket or connector of an illumination fan be *directly* connected with the power supply to receive power. Indeed, a POSITA would have understood that the above text discloses embodiments in which a power socket of an illumination fan is supplied with power from a power supply *indirectly*.

40. In the context of limitations (B) and (C), the Guidance stated “when first connector 5 of a first illumination fan is connected with second connector 6 of a second illumination fan (as in limitation (C)), the first fan’s power socket 4 is covered by the second fan such that the power socket does not appear to be accessible to be supplied with power.” (Guidance at 9.) In response, it is noted that the text of

the specification states that “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.” Ex-1001, 3:30-34 (emphasis added).

41. A POSITA would have understood that there is no requirement that the power socket be directly connected with any power supply, and that the power socket can be supplied with power through its electrical connection with the second connector that can be connected with a preceding illumination fan or a power supply to receive power. That is, even if the opening of the power socket appears to be covered and inaccessible when the first connector of the first illumination fan is connected with the second connector of the second illumination fan, the power socket of the first illumination fan can nonetheless be supplied with power via the power socket’s electrical connection with the first illumination fan’s second connector, which can receive power from a first connector of a preceding illumination fan, which can receive power again directly or indirectly from a power supply, as disclosed by the ’336 patent. Thus, I submit that proposed substitute claims 6 and 7 are §112 compliant.

42. I have read Patent Owner’s Revised Contingent Motion to Amend in its entirety and analyzed the proposed substitute claims 6 and 7 against the prior-art references, including Lai, Hasegawa, Tsuji, and Huang. In my opinion, the proposed

independent claims 6 and 7 are both patentable over these prior-art references.

43. In the Guidance (at 16-29), the Board has preliminarily found a failure by Petitioner to show a reasonable likelihood that the proposed substitute claims 6 and 7 are obvious over Lai in view of Hasegawa and Tsuji in view of Huang. I agree with the Board.

44. Proposed substitute independent claims 6 and 7 both require “(A)(iv) a power socket comprising an opening located on the first side of the body” and “(A)(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,” which are not taught by any of the cited prior art. As can be seen below, Lai discloses (at best) a *single* connector on each of the two opposite sides of a fan body”:

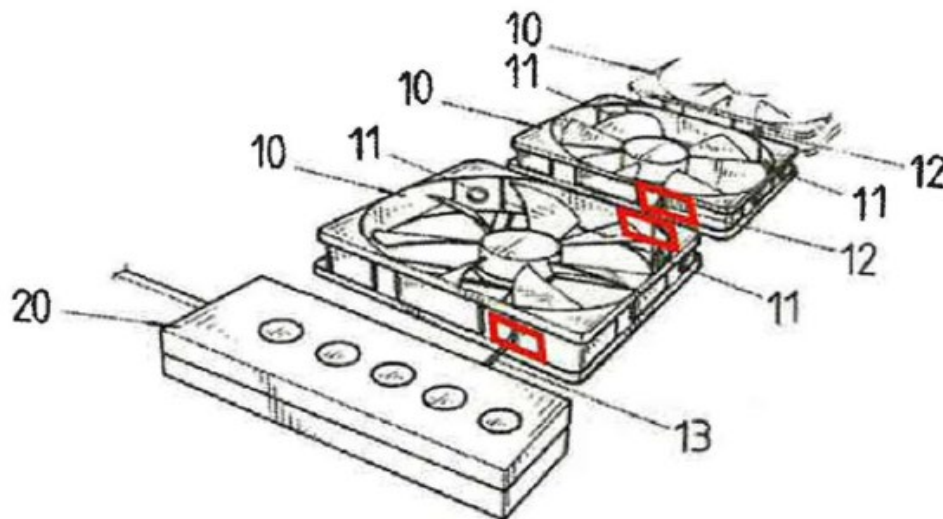
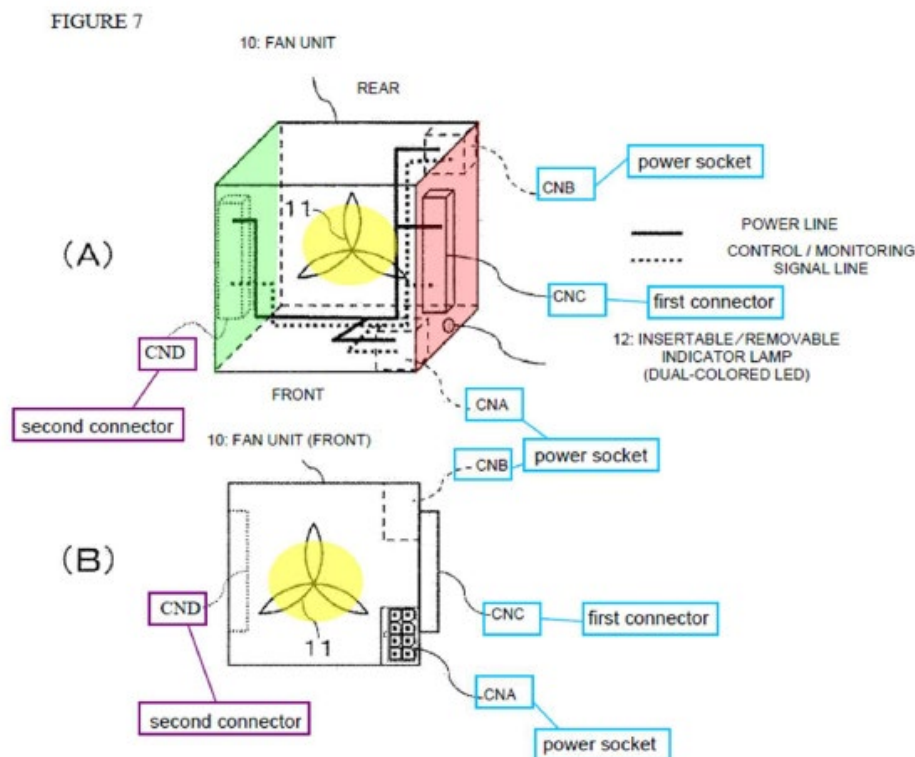


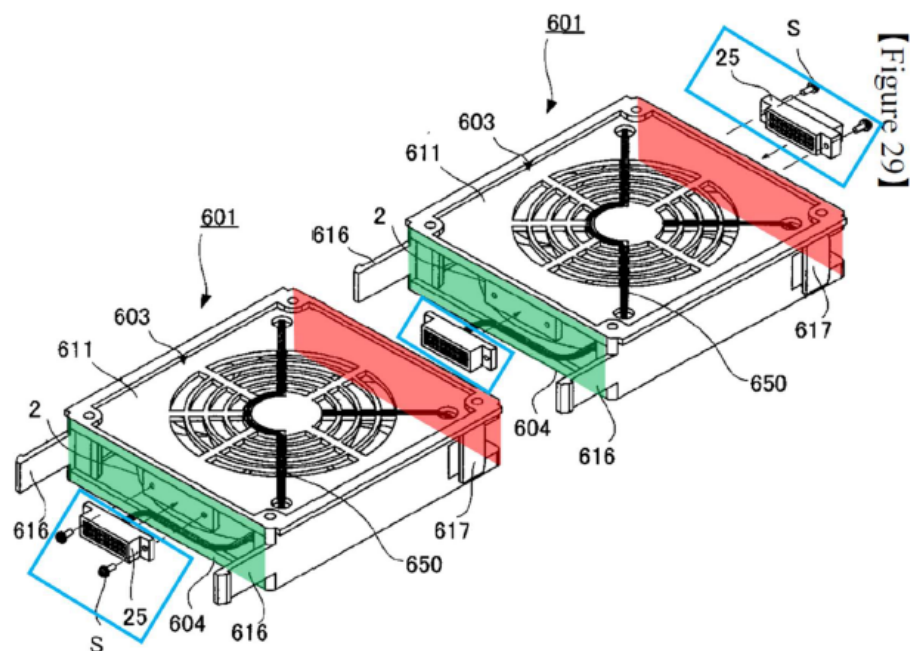
FIG. 3 of Lai (modified to position connectors on sides of the LED fan 10 body as shown in red boxes)

45. Similarly, Tsuji (below) discloses either a CNC connector having a protrusion or a CND connector having an opening only, but not *both* a power socket having an opening on the fan body's first side and a distinct first connector located on the *same* first side.



46. Further, neither the CNC connector nor the CND connector of Tsuji has a flat surface comprising any round electrical terminal as required by claim 7.

47. As shown below, Hasegawa (JP 2005051085 A) similarly fails to teach or suggest any of these requirements by having only a single connector (boxed in blue or purple) on each side (green or red) of the body without any round electrical terminal on a flat surface:



48. Huang also fails to disclose any of the above-mentioned requirements in claims 6 and/or 7 and thus cannot cure the deficiencies of Lai, Tsuji, and/or Hasegawa.

49. 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

50. 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.

51. 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

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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

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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