

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

ERICSSON INC. and CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS,

Petitioners,

v.

PROCOMM INTERNATIONAL PTE. LTD.,

Patent Owner

Case No. IPR2024-01454

U.S. Patent No. 7,724,521

PATENT OWNER PRELIMINARY RESPONSE MERITS BRIEF
REQUESTING DENIAL OF INSTITUTION

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PATENT OWNER'S EXHIBIT LIST

EXHIBIT LIST	
2001	Docket Control Order in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.) dtd April 26, 2024 (Dkt. 23)
2002	Reserved
2003	Plaintiff's Opposition to Defendants' Motion to Stay in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.) dtd March 26, 2025 (Dkt. 56)
2004	United States District Courts—National Judicial Caseload Profile for 12-month period ending June 30, 2024; available at https://www.uscourts.gov/statistics-reports/analysis-reports/federalcourtmanagement-statistics
2005	LegalMetric District Report for Texas Eastern District Court in Patent Cases (January 2019-April 2024)
2006	Challenged Claims in IPR2025-01454
2007	Infringement contentions in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.) dtd March 20, 2024
2008	Docket Report for <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.)
2009	Invalidity Contentions in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.) dtd June 12, 2024
2010	U.S. Pat. No. 9,943,006 to Ericsson
2011	Joint Claim Construction Statement in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.) dtd March 2, 2025 (Dkt. 43)
2012	Procomm Opening Claim Construction brief in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.) dtd March 2, 2025 (Dkt. 48)
2013	Ericsson Responsive Claim Construction Brief in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.) dtd March 2, 2025 (Dkt. 54)

2014	Procomm Reply on Claim Construction in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.) dtd April 1, 2025 (Dkt. 59)
2015	U.S. Pat. No. 6,253,834 (Sternier)
2016	Comparison of Petition to Ex. 1003 (Tanbour Declaration)
2017	Declaration of Stephen Schreiner in support of Ex. 2016 compare document

I. INTRODUCTION

U.S. Pat. No. 7,724,521 (“the ’521 Patent”) is assigned to Procomm International Pte. Ltd. (“Procomm” or “Patent Owner”). The ’521 Patent is directed to cooling systems for high power electronic components that include a heatsink employing the Venturi effect.

Petitioners Ericsson Inc. and Cellco Partnership (d.b.a. “Verizon Wireless”) (“Petitioners”) filed a Petition asserting three grounds of unpatentability against Claims 1-5 and 14-20 (“Challenged Claims”). Pet., Paper, 1, 26-27. The independent claims are Claims 1, 14, and 19.

Each of Petitioners’ Grounds 1-3 fails to meet multiple limitations of the Challenged Claims. Patent Owner demonstrates herein that the combination of references in each ground fails to teach or suggest the limitations of the claims, and that there was no reason for a POSITA to combine or modify the references as proposed.

Further, the Petition is based on the declaration of Petitioners’ expert, Dr. Emad Tanbour (Ex. 1003), that is literally a *word-for-word* parroting of the Petition, as shown by the comparison in Ex. 2016. Petitioners’ expert declaration is accordingly entitled to no weight.

For these reasons, the Petition should be denied because Petitioners have failed to demonstrate a reasonable likelihood that the claims of the '521 Patent are unpatentable.

II. BACKGROUND

A. Procedural History

Procomm asserted the '521 Patent against the Petitioners in *Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.*, No. 2:24-cv-009-RWS-RSP (E.D. Tex.), which was filed on January 8, 2024. That matter is set for trial on October 20, 2025. See Ex. 2001 (Docket Control Order).

The Petition was filed on December 31, 2024, more than 11 ½ months after the Complaint was filed and more than 9 months after the infringement contentions were served. See Ex. 2001, Ex. 2007 (infringement contentions), Ex. 2008 (Docket Report).

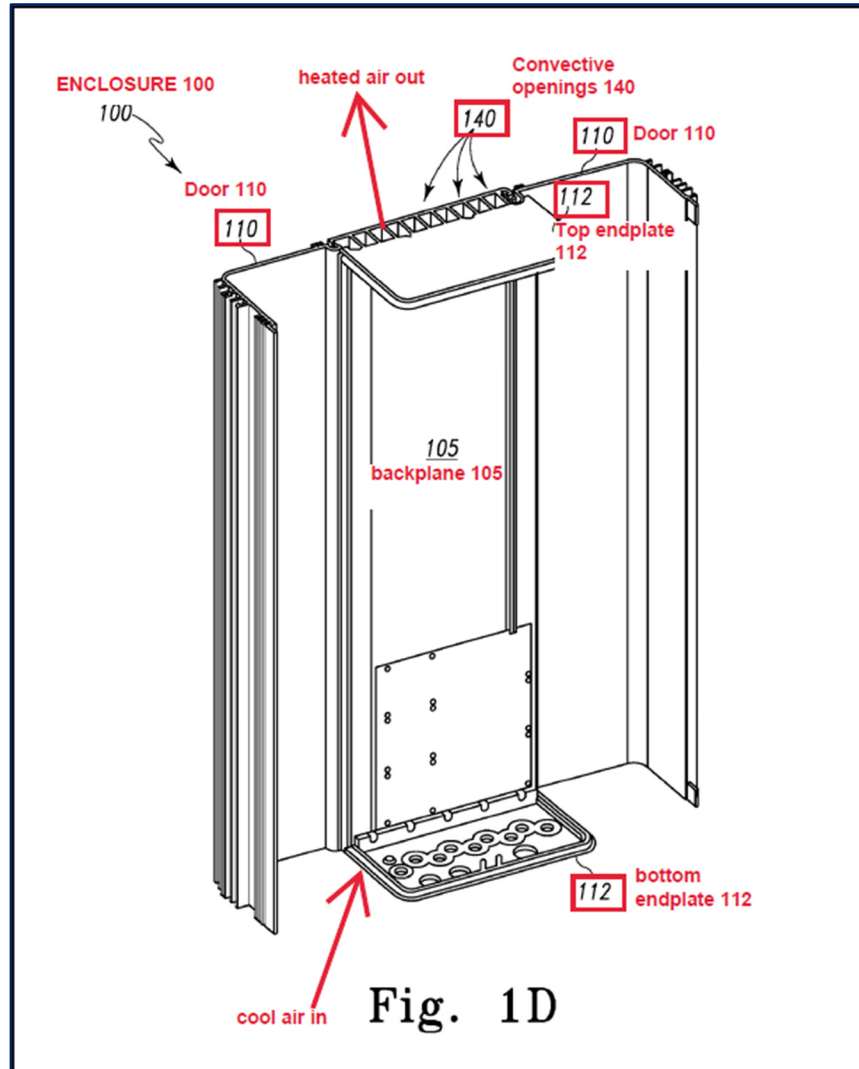
B. The '521 Patent

1. The Invention

U.S. Pat. No. 7,724,521 ("the '521 Patent") is directed to systems and methods for cooling electronic components in an enclosure. The problem of heat removal has become more pressing due to the increasingly smaller sizes of electronic components. '521 Patent, 1:66-2:14. The smaller sizes and the modularity of their designs has made heat dissipation a greater challenge. *Id.*

The '521 Patent discloses innovative systems and methods for cooling electronic components in an enclosure, including drawing a first airflow from a surrounding environment (such as cooler, ambient air) and drawing a second heated airflow from a heatsink. The second heated airflow is drawn at least in part by a Venturi effect created based on the first airflow that creates a low pressure region or vacuum that draws in the second heated airflow. '521 Figs. 2A-2D, 3.

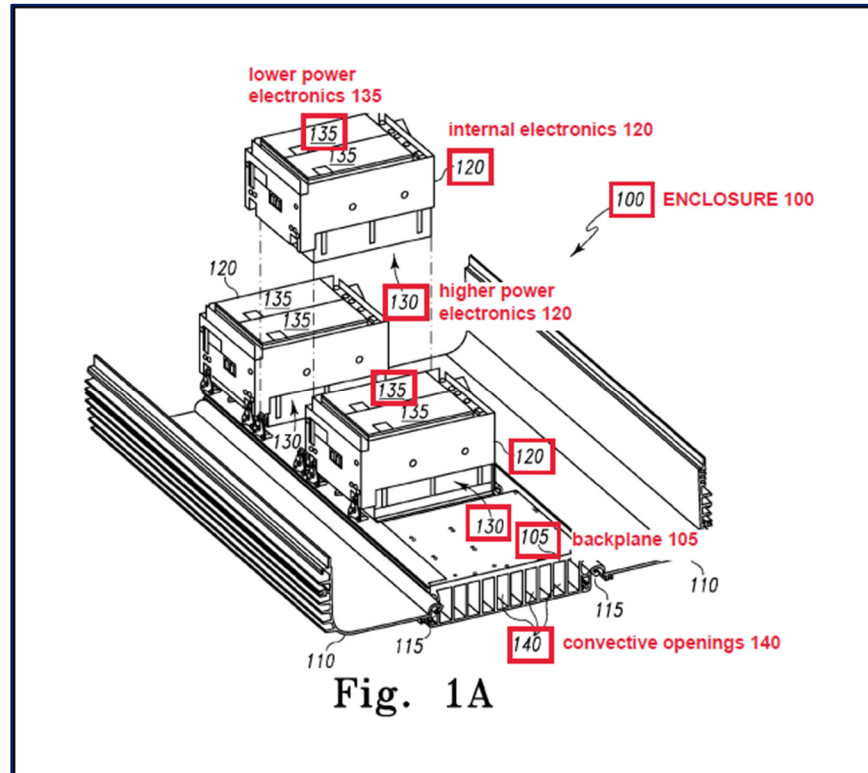
Figure 1A of the '521 Patent describes an enclosure 100 having left and right doors 110, a backplane 105, and top endplate 112 and bottom endplate 112. When the doors are closed, the enclosure 100 is a “sealed environment” that in some embodiments may be weatherproof. '521 Patent, 3:7-13. The backplane 105 can function as a heatsink and has longitudinal convective openings 140 along its length that carry heated air created by the electronics inside the enclosure and release the heated air to the outside environment. '521, 3:5-13. Figure 1D depicts enclosure 100 according to an embodiment:



'521 Patent, Fig. 1D (annotated in red), 3:5-4:9.

Figure 1A illustrates an embodiment of the sealed enclosure 100, including electronic components 120 mounted within it. The electronic components 120 may include lower power internal electronics 135 that are preferably mounted to the front doors 110 of the enclosure, which can function as a heatsink. There are higher power internal electronics 130 that are preferably mounted to the backplane 105 acting as a

heatsink and conveying heat to air within convective openings 140 that carry the heat out of the enclosure, as depicted in the exemplary embodiment of Figure 1A:



'521 Patent, Fig. 1A (annotated in red), 3:5-4:9.

The '521 Patent describes how backplane 105 acts as a heatsink to remove heat from the high power electronics 120:

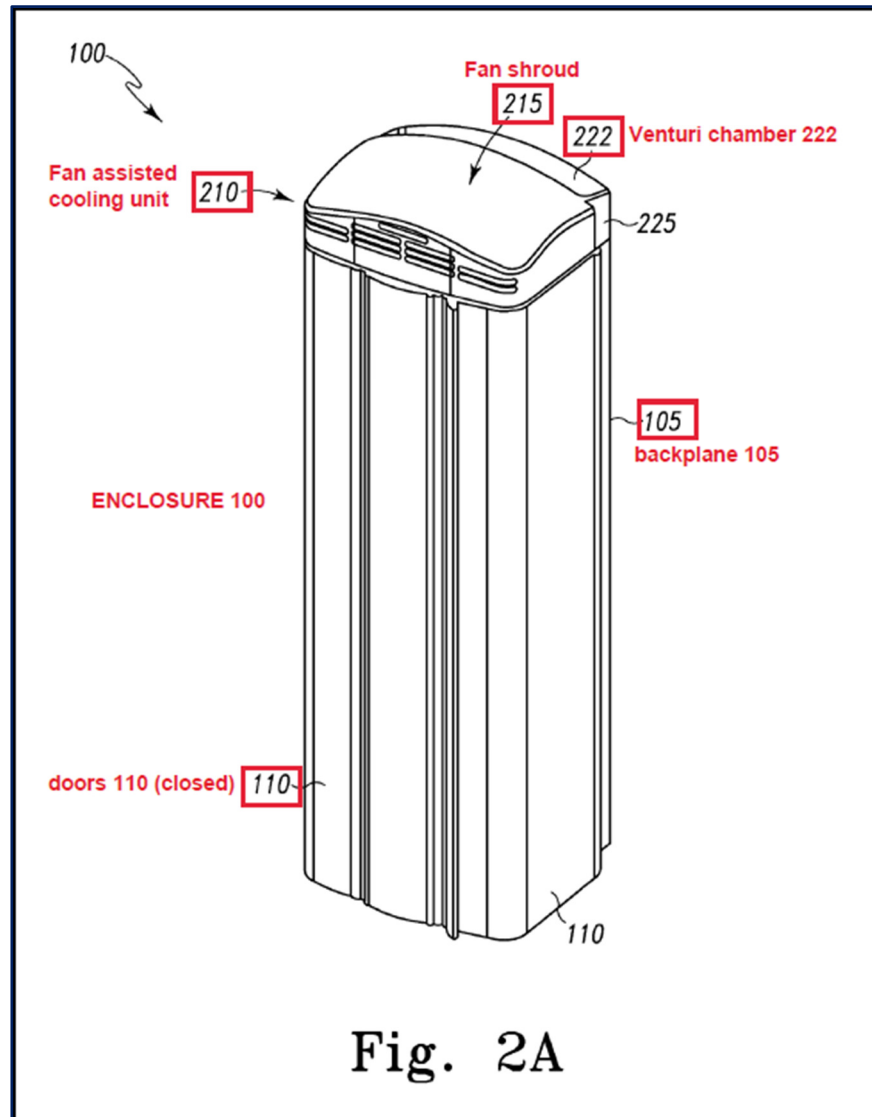
[E]lectrical components 120 are designed so that high powered internal electronics (that is, those electronics generating the most heat) (shown generally at 130) are located to maximize the conductive transfer of that heat to backplane 105 which thus acts as a heatsink for the high powered internal electronics 130. ... Backplane 105 thus functions as a high power thermal interface, or in other words a heatsink, that provides a

path for absorbing heat generated by the high powered internal electronics 130 and transferring that heat to the environment surrounding enclosure 100.

As shown in FIGS. 1A-1D, backplane 105 further includes a plurality of convective openings 140 which comprise open voids that run the length of backplane 105 which promotes a natural convective heat transfer between backplane 105 and the air of the environment surrounding enclosure 100, some of which will naturally flow through convective openings 140 (illustrated in FIG. 2C).

'521 Patent, 3:31-54.

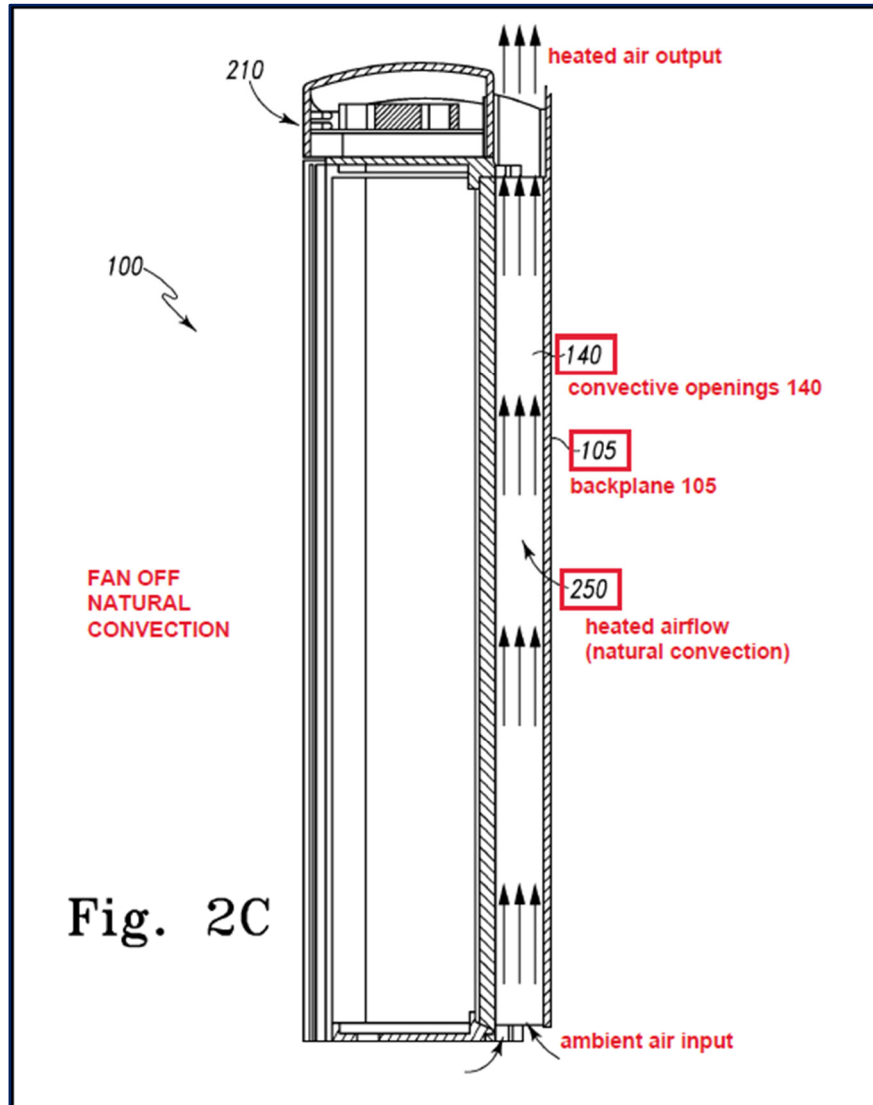
Figure 2A depicts another embodiment of the invention where a fan-assisted cooling unit 210 on top of the enclosure 100 uses a fan coupled with a Venturi chamber to draw heated air through the convective openings and output it from exhaust vents at the front of the cooling unit:



'521 Patent, Fig. 2A (annotated in red), 4:10-25.

When the fan unit 210 is turned off, the heated air 250 is carried through convective openings 140 in the backplane heatsink 105 and is released at the top. Thus, the enclosure 100 can provide for natural convection due to the

natural buoyancy of the heated air in the convective openings, as depicted in the exemplary embodiment of Figure 2C:

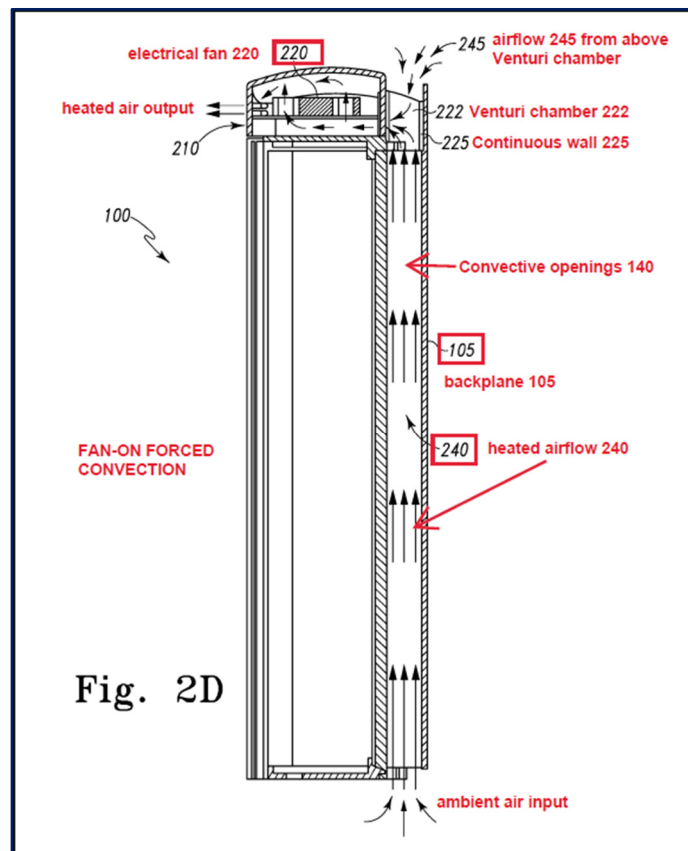


'521 Patent, Fig. 2C (annotated in red), 5:16-21, 4:28-31, 4:39-43.

The '521 also describes a forced convection embodiment where fans assist in drawing air through convective openings 140. As described in the '521 Patent, the fan assisted cooling unit 210 at the top includes a Venturi chamber 222 having a

continuous wall 225 connected on each end to the fan shroud. The wall 225 encircles the convective openings 140 in the backplane 105 that functions as a heatsink. Air drawn by fan 220 includes a first airflow 245 that is from air above the Venturi chamber 222. Air drawn by fan 220 includes a second heated airflow 240 which flows from the top openings of convective openings 140. Ambient air input is received at the bottom openings of convective openings 140.

The forced convection process is illustrated in the exemplary embodiment of Figure 2D below:



'521 Patent, Fig. 2D (annotated in red), 4:10-5:38.

The first airflow 245 drawn into the Venturi chamber creates a Venturi effect which increases velocity and lowers pressure to draw in the second heated airflow 240 from the top of the convective openings. The combination of the first airflow 245 and the second heated airflow 240 is output at the exhaust, as shown on the left of the cooling unit 210 in Figure 2D. '521 Patent, 4:35-61.

The '521 Patent describes the embodiment of Figure 2D as follows:

As shown in FIG. 2D, because of the placement of wall 225, air drawn into fan 220 must flow into Venturi chamber 222 either through the convective openings 140 of backplane 105 (shown generally by airflow 240), or drawn in from above Venturi chamber 222 (shown generally by airflow 245). The airflow 240 flowing up from backplane 105 will be heated by the heat dissipated from high powered internal electronics (130) and thus will be significantly more buoyant than the ambient air of airflow 245. As a result, fan 220 will draw in more air from backplane 105 than it is going to draw in from the top of Venturi chamber 222. Fan 220 pulls in the hot buoyant air off the top of backplane 105 and at the same time air from the top of Venturi chamber 222. The air coming in from the top of Venturi chamber 222 is directed across the heated airflow from the heatsink by wall 225 and the draw of fan 222. The combination of drawing both the heated airflow 240 from backplane 105 and the ambient airflow 245 from above into Venturi chamber 222 and through fan 220 produces a Venturi effect. That is, the ambient airflow 245 flowing over the top of wall 225 generates an increased airflow in

the heated airflow 240 coming from below such as when air flows over the top of an open straw. With this configuration, cooling unit 210 works very efficiently as a pump to draw the hot air from the top openings of the convective openings 140 of backplane 105 which in turn draws in relatively cool ambient air in from the bottom openings of convective openings 140.

'521 Patent, 4:35-61.

Figure 3 describes a method for cooling an enclosure containing heat-producing electronics. '521, 5:38-6:15. Step 310 provides for directing heat generated by electronic devices housed within a sealed environment to a heatsink thermally coupled to an external environment. For example, Figures 1A-1D describe how heat generated by high powered electronics 130 within the sealed enclosure 100 is directed to the backplane heatsink 105 that is thermally coupled to the outside environment.

Step 320 provides for drawing a first airflow across one or more convective openings of the heatsink. For example, Figures 1A-1D and Figure 2D describe a first airflow 245 drawn into the Venturi chamber 222 and across convective openings 140 at the top of backplane heatsink 105.

Step 330 provides for drawing a second airflow of heated air from the one or more convective openings using a Venuri effect created by drawing the first airflow.

For example, Figure 2D describes drawing a second heated airflow 240 from the convective openings 140 based on a Venturi effect associated with the first airflow 245 from above Venturi chamber 222.

The '521 Patent describes the Venturi effect associated with Figure 3 as follows:

[T]he airflow flowing up from the heatsink's convective openings will be heated by the heat dissipated from high powered internal electronics and thus will be significantly more buoyant than the ambient first airflow. As a result, drawing the first airflow across the convective openings of the heatsink will establish a Venturi [e]ffect which will pull in more air through the heat sink than would flow naturally due to natural convection. In one embodiment, a fan draws in air from the top of a Venturi chamber to establish the first airflow. The first airflow is directed across the heated airflow from the heatsink by a wall of the Venturi chamber and the draw of the fan. The combination of drawing both the heated airflow from the heatsink and the ambient airflow from above is what produces the Venturi effect that generates an increased airflow through the heatsink which in turn draws in relatively cool ambient air in from the bottom side convective openings of the heatsink. '521 Patent, 5:65-6:15.

2. Prosecution History

The application leading to the '521 Patent was filed on June 11, 2008, with Claims 1-20. Ex. 1002, 0102-0140 ('521 Patent, Cover, 22). The independent claims were Claims 1, 14, and 19.

The application for the '521 Patent was subjected to rigorous examination. In the first non-final Office Action ("NFOA") dated September 29, 2009, the Examiner rejected Claims 1, 3, 3-8, and 14-20. Ex. 1002, 0049-0050. The Examiner rejected Claims 14-20, including independent Claims 14 and 20, as obvious based on Aakalu (U.S. Pat. No. 5,894,407) in view of Dellapi (U.S. Pat. No. 6,142,595). Ex. 1002 (NFOA), 0052. The Examiner indicated that independent Claim 1 would be allowable if amended to resolve an indefiniteness rejection.

Ex. 1002 (NFOA), 0053.

In its response filed December 15, 2009 (the "Response"), the applicant corrected the informalities related to the indefiniteness rejection. Ex. 1002 (Response), 0025, 0027-0028.

The applicant addressed the art rejection by amending independent Claims 14 and 19 to add the limitation of "wherein the first airflow does not flow into the one or more convective openings of the heatsink." Ex. 1002 (Response), 0028-0029. The

applicant explained how the amendment distinguished Aakalu. Ex. 1002 (Response), 0034.

Following the Response, the application was issued a Notice of Allowance on February 23, 2010, and it issued as U.S. Pat. No. 5,894,407 on April 13, 1999. Ex. 1002, 0007-0011; Ex. 1001, 001 (Cover).

III. CLAIM CONSTRUCTION

Petitioners submit that the claim terms can be accorded their plain and ordinary meaning. Pet., 21.

In the underlying district court proceedings, the parties submitted a Joint Claim Construction Statement, Ex. 2011. Patent Owner Procomm submitted an opening brief on claim construction. Ex. 2012. Petitioners Ericsson and Verizon Wireless submitted a responsive claim construction brief. Ex. 2013. Patent Owner Procomm submitted a reply brief on claim construction. Ex. 2014.

In the Joint Claim Construction Statement, the parties agreed that the term “Venturi effect” means “the lowering of a fluid’s (gas or liquid) pressure and rising of the fluid’s speed as it moves through a flow constriction.” Ex. 2011, 7 (App. A, page 3).

The parties disagreed on the construction of “convective opening.” Patent Owner Procomm indicated that no special construction was necessary, and it could

be accorded its plain and ordinary meaning as informed by the intrinsic evidence.

Petitioners submitted that the term means an “opening at the end of a structure configured to receive a convective fluid flow.” *Id.*

The parties also disagreed on the construction of “a sealed environment.” Patent Owner Procomm indicated that no special construction was necessary, and it could be accorded its plain and ordinary meaning as informed by the intrinsic evidence. Petitioners submitted that it means “a closed environment that does not need to be weatherproof.” Ex. 2011, 8 (App. A, page 4).

For purposes of this Preliminary Response to the Petition, other than for the agreed-up construction of “Venturi effect,” Patent Owner submits that the claim terms can be interpreted according to their plain and ordinary meaning in view of the surrounding claim language and other intrinsic evidence. Patent Owner does not believe any special constructions are needed for this IPR but reserves the right to propose constructions in any future papers, such as in a Patent Owner Response or in papers submitted in the district court litigation.

Patent Owner believes that the independent claims are demonstrably patentable over the references cited in Grounds 1-3 even if Petitioners’ constructions are applied. Put another way, there are no disputes on claim construction that are material for the grounds presented in this IPR.

As discussed in the analysis of the references on their merits, there are instances where the Petitioners appear to have interpreted and applied the claim language in a manner that departs from its plain and ordinary meaning in the context of the intrinsic evidence. Patent Owner addresses those issues in the analysis of the claims set forth below.

IV. PERSON OF ORDINARY SKILL IN THE ART

Petitioners submit that a person of ordinary skill in the art (“POSITA”) would have been “familiar with thermal management of electronic devices, including devices housed within a sealed enclosure.” Pet., 21. Petitioners assert that a POSITA “would have gained knowledge of these concepts through a mixture of training and work experience, such as by having a Bachelor’s degree [in] mechanical engineering and four years of experience; or by obtaining a Master’s degree in mechanical engineering, but having only one to two years of experience; or by having no formal education but experience in such systems of at least eight years.” Pet., 21-22.

Patent Owner believes that the Petitioners’ proposal is a bit more complicated than necessary, setting forth three categories of experience (2 years, 4 years, and 8 years). Patent Owner also believes that the level of skill is overly restrictive insofar it requires experience with thermal management including devices “housed within a

sealed enclosure.” Unlike Claims 14 and 19, Claim 1 recites a “*cooling unit*” without requiring that be a sealed enclosure.

Nevertheless, the Patent Owner will not dispute the definition of the POSITA for purposes of this Preliminary Response. Patent Owner reserves the right to define the level of skill of a POSITA in any future papers in this IPR. Patent Owner submits that institution should be denied regardless of the POSITA definition.

For purposes of this Preliminary Response, Patent Owner agrees that the priority date of the ’521 Patent is June 11, 2008. See Pet., 21.

V. RELEVANT LEGAL STANDARDS

The objective standard for determining obviousness under 35 U.S.C. § 103, as set forth in *Graham v. John Deere Co.*, 383 U.S. 1 (1966), requires a factual determination to ascertain: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; and (3) the differences between the claimed subject matter and the prior art. Based on these factual inquiries, it must then be determined, as a matter of law (4) whether or not the claimed subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the alleged invention was made. *Id.* at 17. If appropriate, secondary considerations of nonobviousness, sometimes called “objective indicia,” should be considered, such as commercial success, long-felt but unsolved need, failure of others, unexpected results, copying,

and so forth. *Id.* at 17.

A finding of obviousness requires a showing that as of the date of the invention (a) the prior art teaches or suggests each of the limitations of the claim; (b) there exists an apparent reason to combine and/or modify the prior art as proposed; and (c) a person of ordinary skill would have a reasonable expectation of success that the proposed combination and/or modification of the prior art would operate for its intended purpose. See *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007); *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007); *Regents of Univ. of California v. Broad Institute, Inc.*, 903 F.3d 1286, 1291 (Fed. Cir. 2018).

VI. THE TANBOUR EXPERT DECLARATION SHOULD BE ASSIGNED NO WEIGHT BECAUSE IT PARROTS THE PETITION WORD-FOR-WORD

The Petition should be treated as pure attorney argument. This is because the substance of the expert declaration of Dr. Emad Tanbour (Ex. 1003) is a *word-for-word* copy of the arguments in the Petition. The purpose of an expert declaration is to provide an explication of the arguments and evidence presented in the Petition so that the Board (and the opposing party) can understand them better. An expert declaration that merely parrots the Petition does not serve that purpose and should be disregarded.

The Federal Circuit has held that expert declarations that merely parrot the

petition should be disregarded. *Bell Semiconductor LLC v. NXP B.V.*, 2024 WL 4984053 at *3 (Fed. Cir. 2024) (unpub.) (“Board accurately characterized NXP’s expert testimony as conclusory and correctly pointed out that the only evidence in NXP’s petition was a citation of their expert’s declaration that parrots the language of the petition.”); *Garmin International, Inc. v. LoganTree, LP*, 825 Fed.Appx. 894, 898 n.5 (Fed. Cir. 2020) (unpub.) (“The Board, however, correctly found that Garmin’s expert merely parroted attorney argument without any supporting evidence or reasoning.”).

The Board, including the Director on Director Review, has repeatedly held that expert declarations like the Tanbour Declaration—which parrots the Petition word-for-word—should be disregarded. *See, e.g., Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 12 (Director Review: Feb. 10, 2023) (precedential), 5 (“the declaration copies, **word-for-word**, Petitioner’s conclusory assertions ... as though they are facts, rather than setting forth facts and evidence in support of Petitioner’s assertions”) (emph. added); *Halliburton Energy Services, Inc. v. Schlumberger Tech. Corp.* IPR2017–02072, Paper 11, 2018 WL 1891086 (PTAB Apr. 12, 2018) (decision denying institution) at *7 (“Mr. Todd’s testimony, which, again, merely parrots the conclusory statement ... is entitled to little, if any, weight”); *Free-Flow Packaging Int’l, Inc. v. Automated Packaging Sys., Inc.*, IPR2016-00447, Paper 7

(PTAB June 22, 2016), 10 (“Dr. Kimmel’s declaration...does nothing more than parrot the language of the Petition word for word”).

The Tanbour Declaration presented here parrots the Petition verbatim. Ex. 2016 is a comparison of the Tanbour Declaration (Ex. 1003) to the Petition. As can be seen, *all* of the opinions in paragraphs 65-190 of the Tanbour Declaration addressing Grounds 1-3 are *verbatim copies* of pages 28-86 of the Petition. See Ex. 2016 (comparing Ex. 1003, Tanbour Decl., to the Petition), 73-204. See Ex. 2017 (Schreiner Decl. in support of Ex. 2016). Accordingly, the Tanbour Declaration should be given no weight. *Xerox Corp. v. Bytemark, Inc.*, Paper 12, IPR2022-00624 (Director Review: Feb. 10, 2023) (precedential), 5.

For example, the Petition describes the Sterner ’753 Reference of Ground 1 as follows:

Sterner explains that electronic device 10, such as a notebook computer, includes a keyboard portion 220 (**red**) and a display portion 200 (**blue**). The keyboard portion 220 includes barriers 232 (**brown**) forming isolated enclosures or cavities 234, 230 (**orange**) that house heat producing electronic devices 240, 300 (**green**) respectively. A cooling device comprising air-moving device 100 (**dark green**), such as a fan or blower, and air duct (venturi chamber) 15 (**purple**) is

positioned in enclosure 234. Air is drawn into the enclosures 234, 230 (orange) through vents 260, 270 (pink) respectively to remove heat produced by components 240, 300 housed within the enclosures.

Pet., 29. The Tanbour Declaration parrots that passage verbatim, *right down to the color coding*. See Tanbour Dec., ¶ 67.

The Petition describes the Aakalu '407 reference as follows:

Aakalu explains that enclosure 10 (referred to as a microcell) comprises housing 12 (blue) and solar shield 14 (orange). A plurality of electronic components 16 (green) are mounted to the interior of housing 12.

Housing 12 comprises front panel 18 (gold), rear panel 20 (gold), and two side panels 22, 24 (gold), each of which form heat sinks for absorbing and dissipating heat generated by electronic components 16 (green).

Pet., 52. Once again, the Tanbour Declaration parrots that passage verbatim, right down to the color coding. See Tanbour Dec., ¶ 118.

Expert testimony is supposed to explain the arguments and evidence in a manner that helps the Board understand the Petition. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 12 (Director Review: Feb. 10, 2023) (precedential), 5. An expert declaration like this one, which merely parrots the Petition word-for-word throughout, does not help the Board, nor does it provide meaningful evidentiary support for the arguments in the Petition. Additionally, this expert declaration repeatedly makes *ipse dixit* assertions without linking them to evidentiary support, as

pointed out in Sections VII-IX below. This expert declaration should be disregarded.

VII. THE CHALLENGED CLAIMS ARE NOT UNPATENTABLE BASED ON STERNER '753 (GROUND 1)

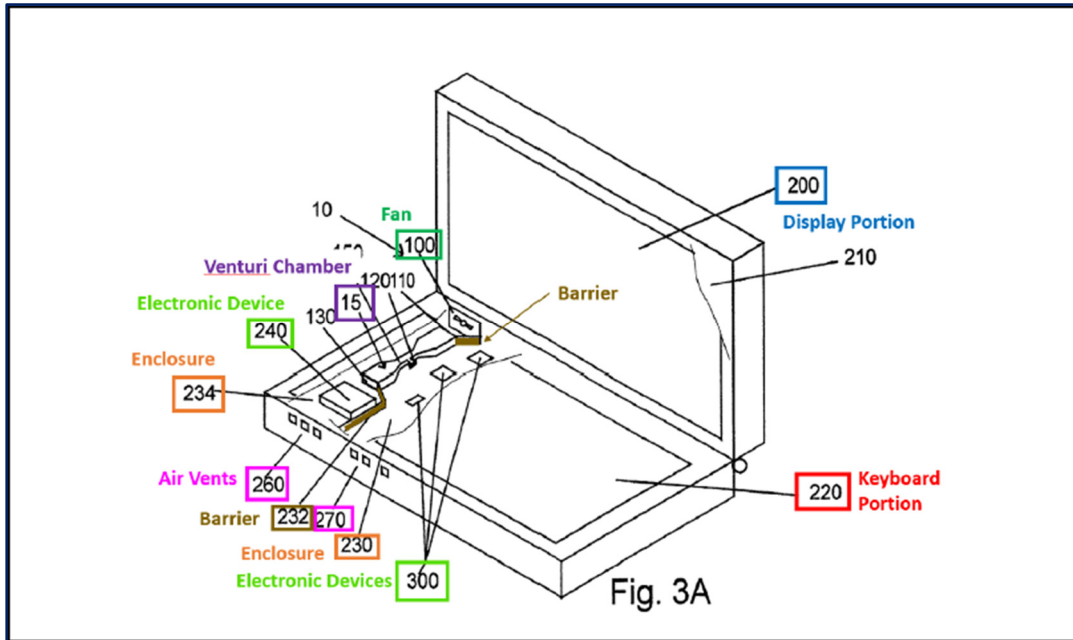
The Petition fails to show that the claims are obvious over the references because each of Grounds 1-3 fails to meet one or more limitations of the Challenged Claims.

Ground 1 asserts obviousness of Claims 1, 3-5, and 14-16 based on Sterner '753 (Ex. 1004). Pet., 27.

A. Independent Claim 1 is Patentable Because the Petitioners Do Not Even Attempt to Establish a Reason to Combine the Figure 3A “Preferred Embodiment” with the Figure 8 “Fifth Alternative Embodiment” (Limitations 1.0-1.2)

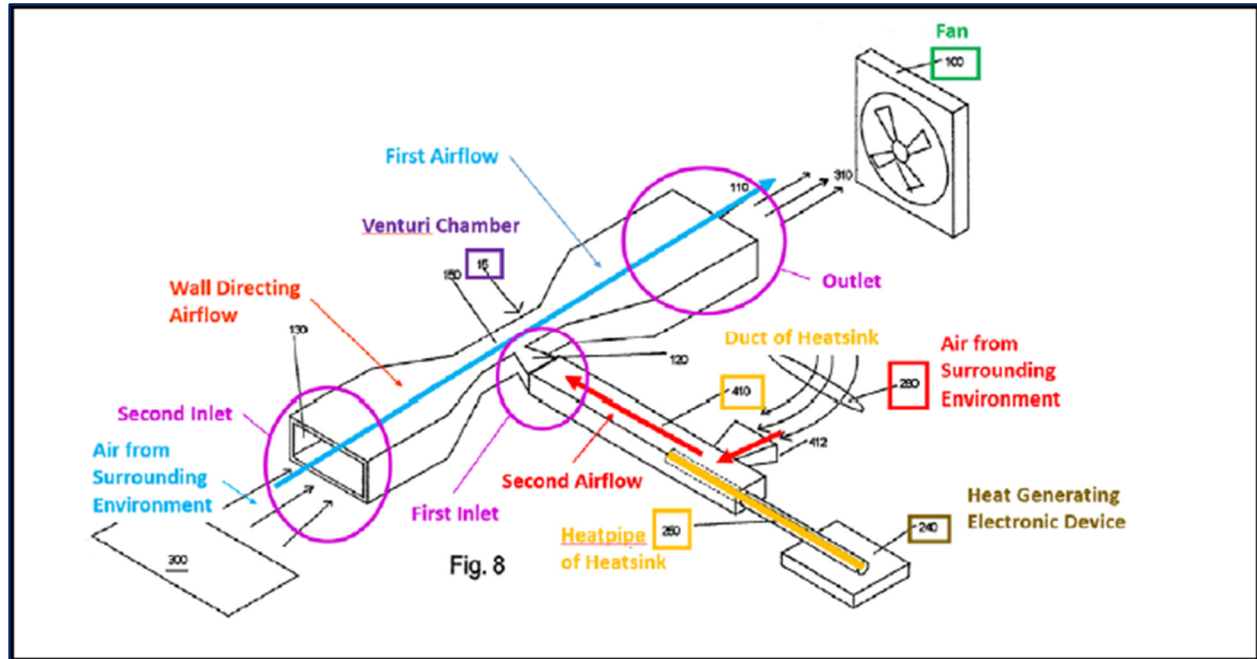
In their analysis of Claim 1, Petitioners rely on multiple distinct embodiments from Sterner '753 without even trying to establish that a POSITA would have a reason to combine those embodiments, or that there would be a reasonable expectation of success in combining those embodiments. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007); *Regents of Univ. of California v. Broad Institute, Inc.*, 903 F.3d 1286, 1291 (Fed. Cir. 2018).

For limitations 1.0 and 1.1, Petitioners rely on the embodiment of Figure 3A of Sterner:



Pet., 31-32 (relying on Sterner, Fig. 3A, annotated by Petitioners, for limitation 1.0),
34 (relying on excerpted Fig. 3A, for limitation 1.1).

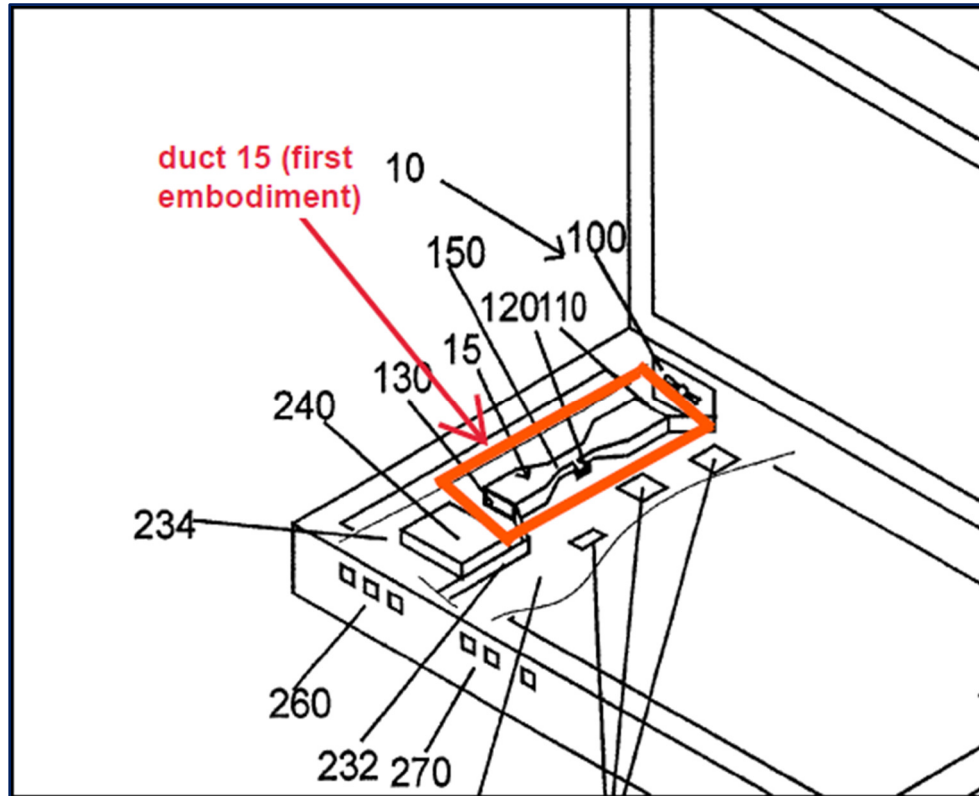
On the other hand, Petitioners rely on the embodiment of Figure 8 of Sterner
for limitation 1.2:



Pet., 36 (relying on Fig. 8 for limitation 1.2). See Pet., 36-38 (analysis of limitation 1.2).

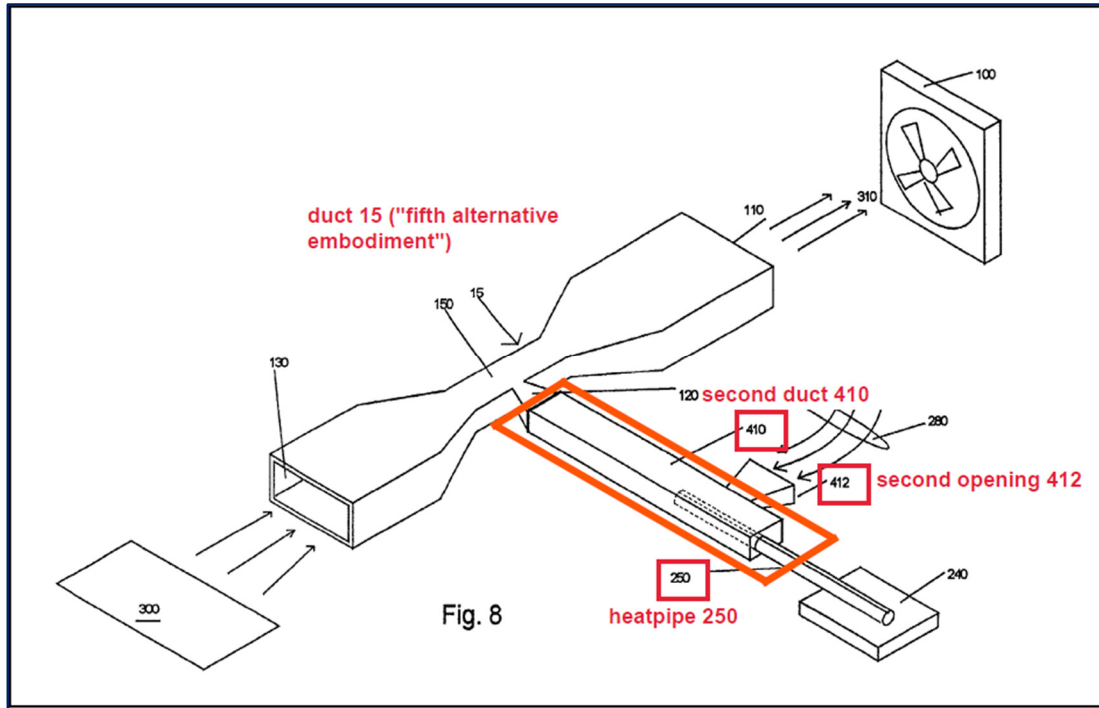
Figure 3A and Figure 8 are distinct embodiments in Sterner. The reference identifies them as distinct embodiments: Sterner identifies Figure 3A as the “*preferred embodiment* of the invention,” whereas it identifies Figure 8 as “a *fifth alternative embodiment* of the invention.” Ex. 1004 (Sterner), 2:31-33, 2:46-48, 3:45-46, 8:14-15 (emph. added).

Additionally, a POSITA would readily understand that Figures 3A and 8 are distinct embodiments. Figure 3A uses a standard air duct 15 (see Figure 2):



Ex. 1004 (Sterner), Fig. 3A (excerpted and annotated by PO).

On the other hand, the fifth alternative embodiment of Figure 8 uses a modified air duct 15 that adds a second air duct 410, a heatpipe 250, and a second opening 412, as depicted below:



Ex. 1004 (Sterner), Fig. 8 (annotated by PO in red).

Petitioners commit the fundamental error of never attempting to establish an apparent reason for a POSITA to combine the Figure 3A “preferred embodiment” with the Figure 8 “fifth alternative embodiment” of Sterner. See Pet., 31-38.

Although it is not required to defeat this Petition, Patent Owner can affirmatively demonstrate that a POSITA would not have reason to combine the air duct 15 of Figure 8 into the Figure 3A embodiment. The embodiment of Figure 8 connects the high heat producing electronic components 240 to the **Venturi vent 120**. See Ex. 1004 (Sterner), Fig. 8 (240, 120). On the other hand, the preferred embodiment of Figure 3A connects the high heat producing electronic components

240 to the **intake manifold 130** on the other side of air duct 15, not to the Venturi vent 120. The two embodiments operate in the opposite way. A POSITA would plainly see that the principle of operation of Figure 8 is incompatible with that of Figure 3A. *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984); *Ex Parte Derek J. Webb*, 2012 WL 417450 at *3-4 (BPAI: February 7, 2012). *see also McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1354 (Fed. Cir. 2001) (“references taken in combination would produce a ‘seemingly inoperative device’”).

Accordingly, a POSITA would not have an apparent reason to combine the embodiments of Figures 3A and 8 as proposed by Petitioners. See Pet., 31-38. And, as discussed above, the Petitioners do not present an argument, let alone submit evidence supporting one, that a POSITA would combine the disparate embodiments of Figures 3A and 8 of Sterner. *See id.*

Additionally, the Petition does not address whether a POSITA would have a reasonable expectation of success in combining the embodiment of Figure 3A with the distinct embodiment of Figure 8. See Pet., 31-38. For the very same reasons as to why a POSITA would not make the combination—namely, that it would not work—a POSITA would not have a reasonable expectation of success in combining these disparate embodiments.

Accordingly, limitations 1.0-1.2 are not satisfied because a POSITA would not have reason to make the proposed combination.

B. Claim 1 is Patentable Because Sterner '753 Does Not Teach or Suggest Limitation 1.2(b) For A *Venturi Chamber Having ... a Second Inlet for Receiving an Airflow from a Surrounding Environment*

As illustrated in the claims listed in the Appendix of this brief and in Ex. 2006, limitation 1.2 sets forth:

[1.2] *a Venturi chamber having [a] a first inlet for receiving a heated airflow from a heatsink, [b] a second inlet for receiving an airflow from a surrounding environment, and [c] an outlet coupled to the fan shroud, the fan drawing air from the Venturi chamber via the outlet when the fan is on.*

'521 Patent, Cl. 1.

Petitioners argue that the claimed *second inlet for receiving an airflow from a surrounding environment* of limitation 1.2(b) is met by the intake manifold 130 of Figure 8. Pet., 37.

However, a POSITA would readily recognize that the airflow received by intake manifold 130 is **heated air** that absorbs heat from the electronic components 300 before it enters intake manifold 130 (the alleged *second inlet*), as illustrated in Figure 8. Sterner discloses: “FIG. 8 illustrates a fifth alternative embodiment in which the [electronic] system components 300 *are cooled* by creating an air flow into

intake manifold 130 by air-moving device 100.” Ex. 1004 (Stern), 5:14-16. A POSITA would thus understand that the air entering manifold 130 is not “air from a surrounding environment,” as Petitioners assert in their annotated Figure 8. See Pet., 36. Instead, the air entering manifold is **heated air**. By way of contrast, Figure 2D of the ’521 Patent illustrates a first inlet at the top that receives air 245 from the surrounding environment above Venturi chamber 222. ’521 Patent, Fig. 2D (245), 4:35-61. See Section II.B.1, *supra*.

Accordingly, Stern does not teach or suggest limitation 1.2(b).

Petitioners recognize that Stern has a gap for limitation 1.2(b) and thus provide this back-up argument:

If PO argues that the air drawn into intake manifold 130 is not “drawn from the surrounding environment” because it passes over component 300, Stern discloses that optionally air can be drawn directly from outside the device rather than drawing air over component 300 in order to cool the exhaust air. EX-1004 4:20-26. A POSA understood that this optional embodiment applies to the embodiment of FIG. 8 as well as the embodiment of FIG. 4.

Pet., 37.

However, the cited passage at 4:20-26 relates to a different embodiment of Stern Figure 3B where the system components 300 are at the Venturi vent 120 side of the air duct, not at the intake manifold input 130 of the air duct as in relied-upon

Figure 8. For Figure 3B, Sterner states: “Optionally, rather than pulling air across system components 300, vacuum air flow 82 can be drawn in to the venturi vent 120 from outside the electronic device 10.” Ex. 1004 (Sterner), 4:20-26. Thus, the cited passage teaches that the air intake **at the Venturi vent side 120** can be directly from the surrounding environment. It does not teach that the air intake at **the intake manifold side 130** can be directly from the surrounding environment, as Petitioners suggest, and as is required for their argument on limitation 1.2(b) that is based on the Figure 8 embodiment. See Pet., 36-37 (relying on Fig. 8 for limitation 1.2(b)).

Thus, Petitioners’ interpretation of the passage of 4:20-26 is incorrect. Further, Petitioners do not provide an apparent reason why a POSITA might apply that teaching at 4:20-26 for the Figure 3B embodiment to modify the different air duct embodiment of Figure 8 that Petitioners rely on for limitation 1.2(b).¹ See Pet., 37.

¹ Figure 3B and Figure 8 are distinct embodiments. Figure 3B is “another embodiment of the invention.” Ex. 1004 (Sterner), 2:34-36. Figure 8 is “a fifth alternative embodiment of the invention.” Ex.1004, (Sterner), 2:46-48.

Further, Petitioners' cited evidence from the Tanbour Declaration at paragraphs 80-82 is entitled to no weight as it merely parrots the Petition verbatim. *Compare* Tanbour Decl., ¶¶ 80-82, *with* Pet., 37. See Section VI above.

Accordingly, Sterner does not teach or suggest limitation 1.2(b).

C. Independent Claim 14 is Patentable Because the Petitioners Fail to Establish a Reason to Combine the Figure 3A “Preferred Embodiment” with the Figure 8 “Fifth Alternative Embodiment” (Limitations 14.0-14.3).

Just like their argument for Claim 1 (see Section VII.A above), the Petitioners' obviousness theory for Claim 14 relies on multiple distinct embodiments from Sterner '753 without ever attempting to establish that a POSITA would have a reason to combine them, or that there would be a reasonable expectation of success in combining them. *KSR*, 550 U.S. at 418; *Regents of Univ. of California*, 903 F.3d at 1291.

For example, the Petition relies on the “preferred embodiment” of Figure 3A and the “fifth alternative embodiment” of Figure 8 for limitations 14.0 and 14.1. See Pet., 43-46. Ex. 1004 (Sterner), 2:31-33 (Figure 3A is the “*preferred embodiment* of the invention), 2:46-48 (Figure 8 is “a *fifth alternative embodiment* of the invention.”). See Ex. 1004 (Sterner), 3:45-46 (same), 8:14-15 (same). The Petition relies on the Figure 8 embodiment for limitation 14.2 and for limitation 14.3. See Pet., 46-47.

In addition to Sterner expressly identifying Figures 3A and 8 as different embodiments, a POSITA would readily recognize that they are distinct embodiments. As explained above in Section VII.A, a POSITA would recognize Figure 3A as using a first embodiment of an air duct 15, whereas Figure 8 uses a different embodiment of an air duct 15 adding a second duct, heatpipe, and second opening. *Compare* Ex. 1004 (Sterner), Fig. 3A, *with* Fig. 8.

For the same reasons explained above in Section VII.A, a POSITA also would not have reason to combine the Figure 8 embodiment with the Figure 3A embodiment because the combination would not work.

Thus, limitations 14.0-14.3 are not satisfied because the Petition does not establish that a POSITA would have an apparent reason to make the combination, and, furthermore, the Patent Owner has affirmatively established that a POSITA would not make the combination.

For the same reasons set forth in Section VII.A, limitations 14.0-14.3 are also not satisfied because the Petition fails to establish that a POSITA would have a reasonable expectation of success that the combination of the Figure 3A embodiment and the Figure 8 embodiment would work for its intended purpose. See Pet., 43-47. Patent Owner has also affirmatively demonstrated that there would be no reasonable

expectation of success because the combination would not work. See Section VII.A, *supra*.

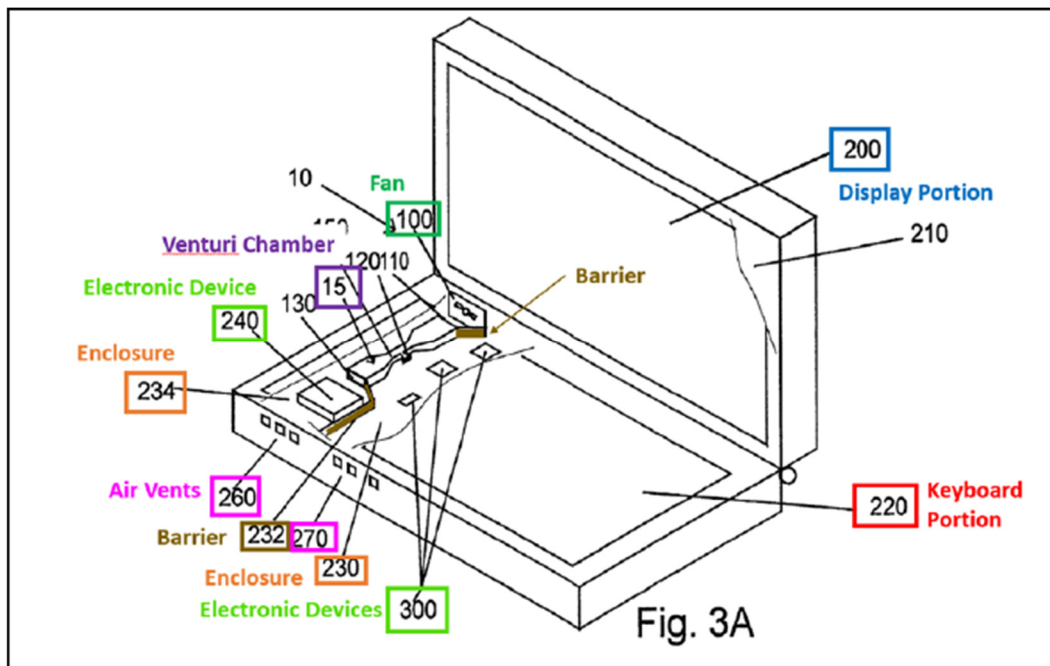
Accordingly, limitations 14.0-14.3 are not satisfied by Sterner.

D. Claim 14 is Patentable Because the Petitioners Fail to Establish Limitation 14.1 for *Electronic Devices Housed Within a Sealed Environment*

Limitation 14.0 recites *cooling a sealed environment*, and limitation 14.1 recites directing heat generated by *electronic devices house within a sealed environment*.

The Petition argues that the cavities 230 and 234 in Figure 8 of Sterner are *sealed environments* housing electronic devices 240 and 300. Pet., 44.

Petitioners provide this mark-up of Figure 3A in support of this assertion:



Pet., 45 (Petitioners' annotated Fig. 3A of Sterner).

However, as illustrated in Figure 3A and elsewhere expressly disclosed by Sterner, the cavities 230/234 are connected to air vents 260/270. Ex. 1004 (Sterner), 3:60-66.

Accordingly, a POSITA would understand that the cavities of Sterner are not *sealed environments* as claimed.²

The expert testimony from the Tanbour Declaration is entitled to no weight because it parrots the Petition verbatim. *Compare* Tanbour Declaration, ¶¶ 100-105, *with* Petition, 43-46. See Section VI, *supra*.

Accordingly, limitation 14.1 is not satisfied by Sterner.

² In contrast to Sterner, the '521 Patent discloses an embodiment having a sealed environment in Figure 2D. There, the electronics are contained within the sealed enclosure 100 (see Figures 1A, 1D) and the air vents (see arrows at the top and bottom of Figure 2D) are separate from that enclosure. See '521 Patent, 3:7-13, Fig. 2D.

VIII. THE CHALLENGED CLAIMS ARE NOT UNPATENTABLE BASED ON AAKALU (GROUND 2)

A. Independent Claim 1 is Patentable Because Aakalu Does Not Teach or Suggest Limitation 1.2 for a *Venturi Chamber*

Ground 2 asserts obviousness of Claims 1-2, 4-5, and 14-17 based on Aakalu (Ex. 1005). Pet., 27.

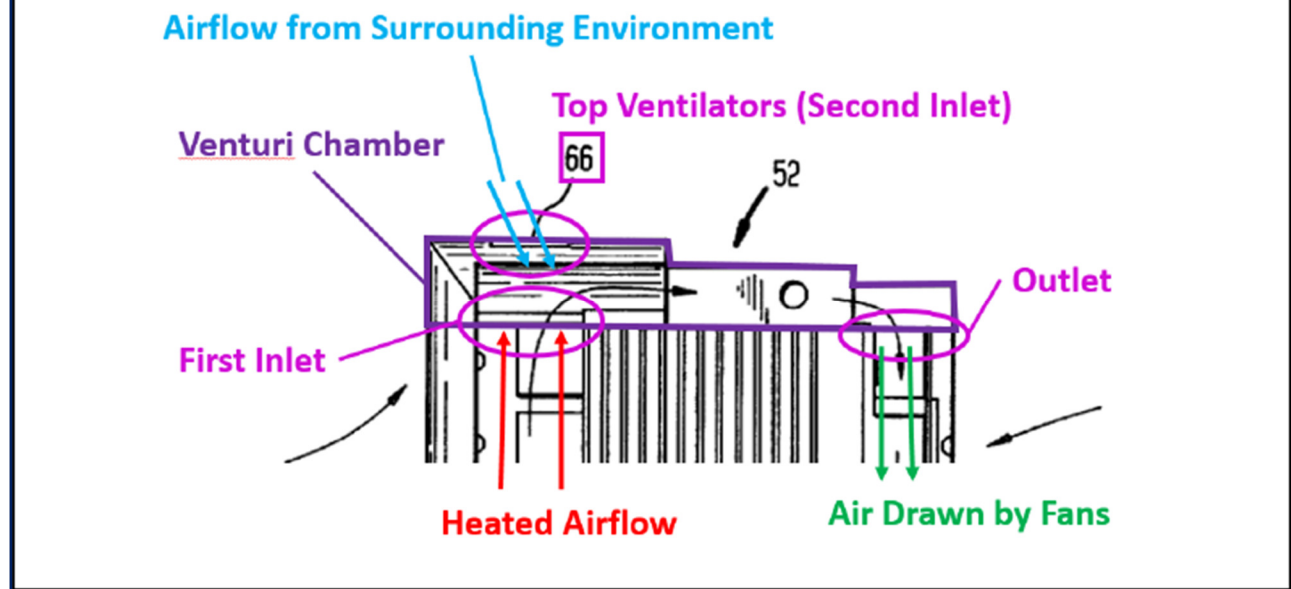
As illustrated in the claims listed in the Appendix and in Ex. 2006, limitation 1.2 sets forth:

[1.2] *a Venturi chamber having [a] a first inlet for receiving a heated airflow from a heatsink, [b] a second inlet for receiving an airflow from a surrounding environment, and [c] an outlet coupled to the fan shroud, the fan drawing air from the Venturi chamber via the outlet when the fan is on.*

'521 Patent, Cl. 1.

The Petition vaguely alleges that some unspecified “upper portions” of the solar shield 14 and housing 12 constitute a Venturi chamber. Petitioners make the following assertion:

A POSA further understood that the upper portions of the solar shields 50, 52 (**orange**) and top panel 26 of the enclosure form a Venturi chamber (**purple**) as shown in the partial blow up of FIG. 10 below:



Pet., 61 (Petitioners' annotated excerpt of Aakalu, Fig. 10).

First, there is no teaching or suggestion by Aakalu that the marked areas are a Venturi chamber. Indeed, Aakalu does *not even mention* the term “Venturi chamber” or “Venturi effect.”

Second, the stipulated meaning of the Venturi effect is that a fluid's velocity increases as it moves through a constricted section. See Section III, *supra*. Aakalu does not teach or suggest that there is an increase in the velocity of the airflow in the section that Petitioners allege to be a *Venturi chamber* as claimed.

The Petition asserts that “as air is drawn in through the top ventilators 66 [] it is subject to a **reduction in volume formed in the restriction chamber** that guides the air to the outlets thereby producing [V]enturi effect.” Pet., 63-64 (emph. added). However, this reasoning is circular and unsupported by evidence. Aakula does not teach or suggest the existence of a “restriction chamber” (constricted section), and the Petition does not establish there is one in Aakula. Indeed, a POSITA would not understand Figure 10 of Aakula as teaching or suggesting such a restriction chamber.

For this limitation, the Petition only sets forth unsupported attorney argument—which is facially insufficient to establish the limitation—because cited paragraph 140 of the expert declaration parrots the Petition word-for-word as to the alleged “restriction chamber.” *Compare* Petition 63-64, *with* Tanbour Declaration, ¶ 140. Further, paragraph 140 of the Tanbour Declaration is pure *ipse dixit* that is not tied to any evidence. *TQ Delta, LLC v. CISCO Systems, Inc.*, 942 F.3d 1352, 1360 (Fed. Cir. 2019) (disregarding *ipse dixit* assertion “untethered to any supporting evidence”).

Petitioners’ expert also asserts: “A POSA further understood that the upper portions of the solar shields 50, 52 (orange) and top panel 26 of the enclosure form a Venturi chamber (purple).” Ex. 1003, ¶ 135. The expert provides no explanation as to *why* or *how* this portion of Aakalu’s device constitutes a Venturi chamber. For

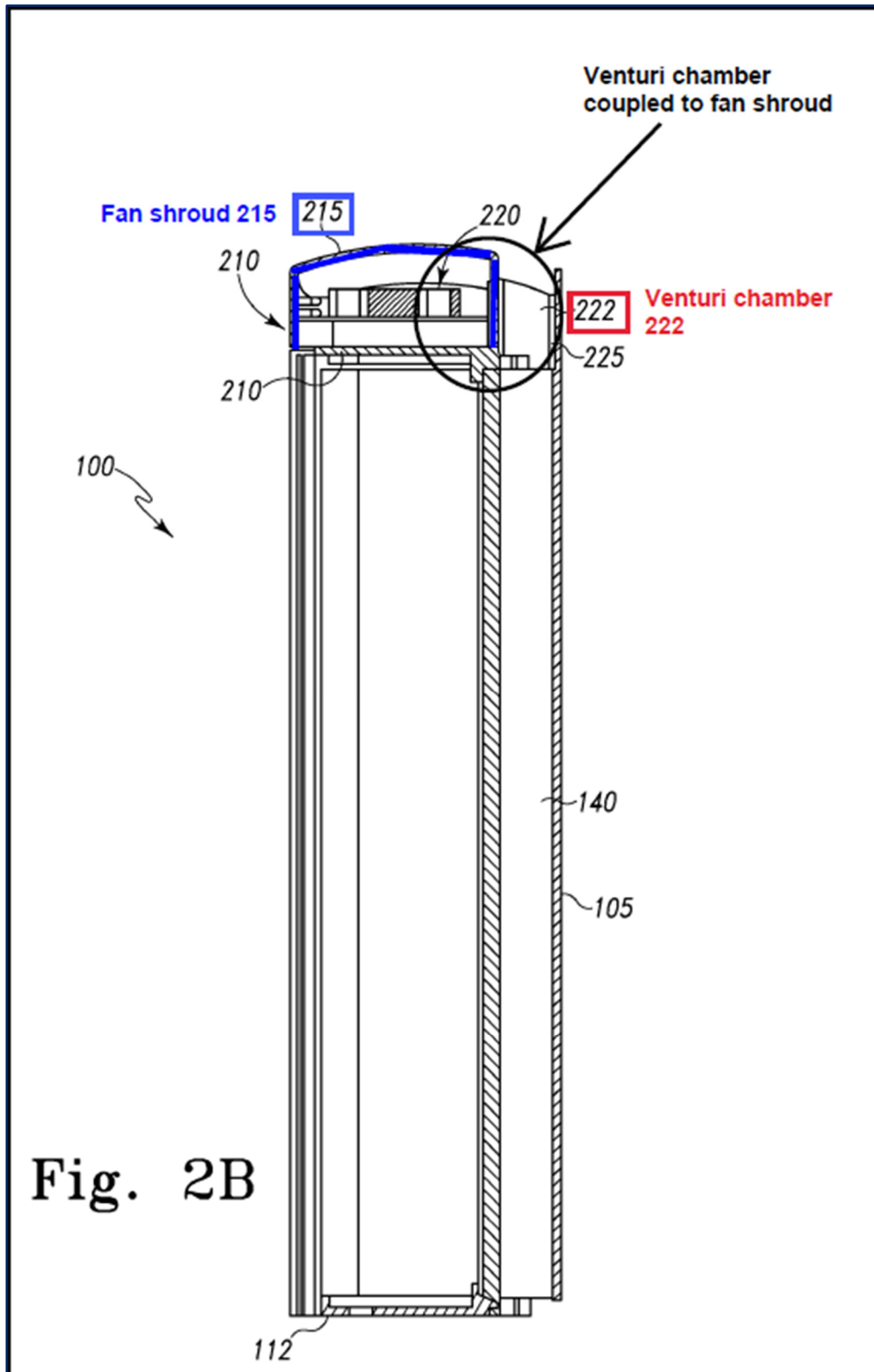
example, he does not assert that the velocity of the airflow increases, let alone explain how or why the velocity of the airflow increases. In short, the expert provides *no reasoning* as to why there is a Venturi chamber. And, once again, the expert cites *no evidence* in support of this *ipsi dixit* assertion that is entitled to no weight. *TQ Delta*, 942 at 1360.

Accordingly, Aakalu does not teach or suggest a *Venturi chamber* to meet limitation 1.2.

B. Claim 1 is Patentable Because Aakalu Does Not Teach or Suggest Limitation 1.2 for A *Venturi Chamber Having ... an Outlet Coupled to the Fan Shroud*

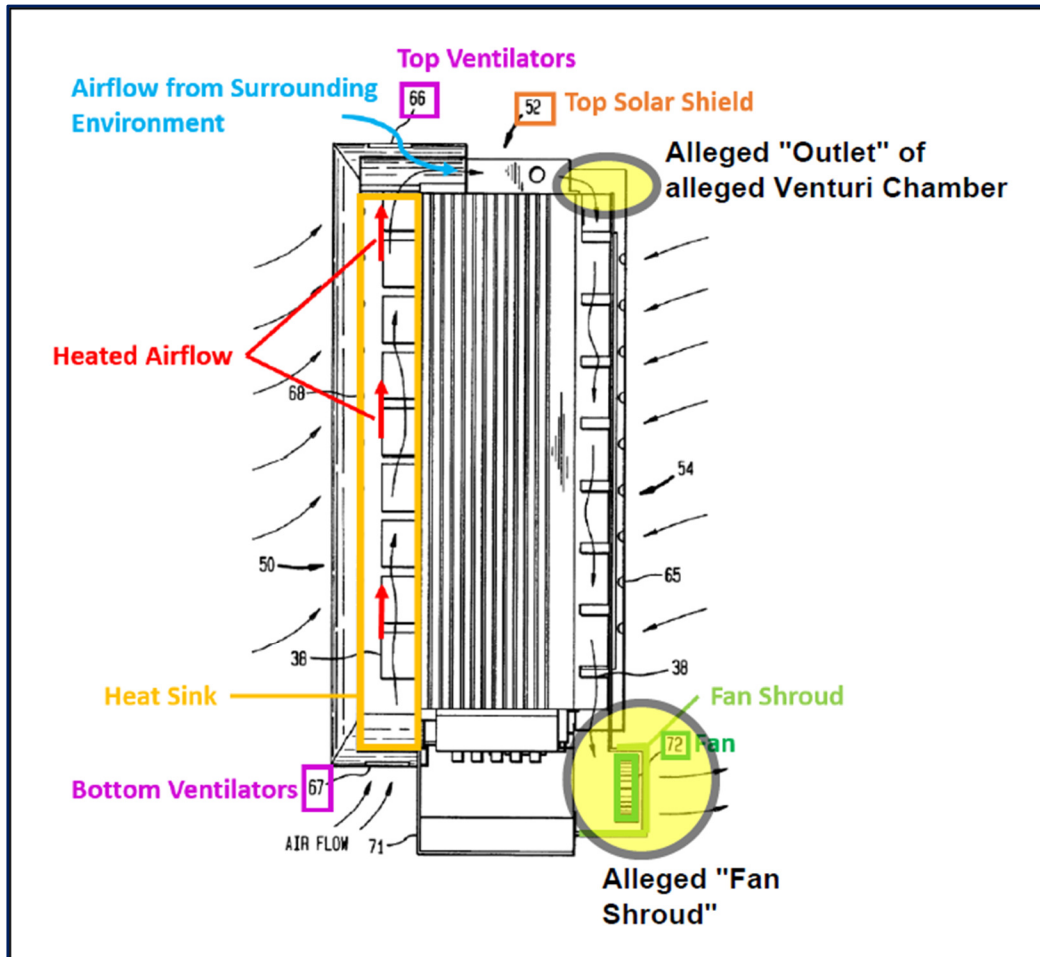
Petitioners' read of Claim 1 onto Aakalu fails to meet limitation 1.2(c) providing that the Venturi chamber has *an outlet coupled to the fan shroud*.

This limitation is supported by Figure 2B of the '521 Patent where the outlet of the Venturi chamber is coupled to fan shroud 215:



'521 Patent, Fig. 2B (annotated by PO). See Abstract, 2:24-28.

On the other hand, as demonstrated by the Petitioners' mark-up of Aakalu, the alleged *outlet* of the alleged Venturi chamber is not coupled to the alleged *fan shroud* pursuant to limitation 1.2(c):



Pet., 60 (Petitioners annotated Fig. 10 of Aakalu, further annotated in black/yellow highlight by PO).

Accordingly, Aakalu does not teach or suggest limitation 1.2(c) for *an outlet coupled to the fan shroud*.

C. Independent Claim 14 is Patentable Because Aakalu Does Not Teach or Suggest Limitation 14.3 for *Drawing a Second Airflow of Heated Air ... Using a Venturi Effect*

Limitation 14.3 recites *drawing a second airflow of heated air ... using a Venturi effect created by drawing the first airflow*.

For the *Venturi effect* of limitation 14.3, Petitioners rely entirely on their argument for limitation 1.3 regarding the *Venturi chamber*. Pet., 76.

Patent Owner responds that Aakalu does not teach or suggest the *Venturi effect* of limitation 14.3 for at least the same reasons explained for the *Venturi chamber* above in Section VIII.A.

Additionally, the Petitioners again rely on an opinion from their expert in paragraph 163 that is entitled to no weight because it merely parrots the Petition, and it is not linked to any evidence. See Pet., 76; Ex. 1003, ¶ 163. *TQ Delta*, 942 at 1360 (*ipse dixit*).

Accordingly, Aakula does not teach or suggest limitation 14.3.

IX. THE CHALLENGED CLAIMS ARE NOT UNPATENTABLE BASED ON AAKULA IN VIEW OF JONES (GROUND 3)

Ground 3 asserts obviousness of Claims 3, 18, 19, and 20 based on Aakalu in view of Jones (Ex. 1006). Pet., 27.

A. Independent Claim 19 is Patentable Because the Combination of Aakalu and Jones Does Not Teach or Suggest Limitation 19.2 for *Draw[ing] a Second Airflow of Heated Air ... Using a Venturi Effect*

Limitation 19.2 of Claim 19 provides for *operating a fan to draw a first airflow across one or more convective openings of the heatsink and a second airflow of heated air from the one or more convective openings of the heatsink using a Venturi effect created by drawing the first airflow.*

The Petition relies entirely on its analysis of Claim 14 for the element in limitation 19.2 for *draw[ing] ... a second airflow of heated air from the one or more convective openings ... using a Venturi effect created by drawing the first airflow.* See Pet., 85 (emph. added).

Patent Owner responds that Aakalu does not teach or suggest the claimed *Venturi effect* of limitation 19.2 for at least the same reasons explained in Section VIII.C above for limitation 14.3, and for the same reasons set forth for the *Venturi chamber* in Section VIII.B.

The Petition does not rely on Jones for this element of limitation 19.2. Jones does not even mention the Venturi effect. See Ex. 1006 (Jones).

Accordingly, Aakula does not teach or suggest *draw[ing] ... a second airflow of heated air from the one or more convective openings ... using a Venturi effect created by drawing the first airflow* pursuant to limitation 19.2.

B. Independent Claim 19 is Patentable Because the Combination of Aakalu and Jones Does Not Teach or Suggest Limitation 19.3 that *When the Temperature Does Not Exceed a Second Predetermined Threshold, Allowing a Natural Circulation Airflow to Flow ... By Not Operating the Fan*

Limitation 19.3 of Claim 19 provides that *when the temperature does not exceed a second predetermined threshold, allowing a natural circulation airflow to flow from the one or more convective openings of the heatsink by not operating the fan.*

The Petition relies entirely on its analysis from limitation 14.3 based on Aakalu alone and its analysis of Claim 18 based on Aakula in view of Jones. See Pet., 85-86.

However, Petitioners' analysis for limitation 14.3 and Claim 18 ***does not address*** turning the fan off to enable natural circulation when the temperature falls below a second threshold.

For example, the analysis of limitation 14.3 does not address natural circulation (natural convection) at all, nor turning a fan off, nor the temperature falling below a threshold. See Pet., 76.

The analysis of Claim 18 argues that Jones can turn the fans on. But it does not address turning a fan off to allow natural convection when the temperature falls below a threshold. See Pet., 82-85. Specifically, the Petition argues that Jones

allegedly turns the fans on if “temperature ris[es] above a predetermined threshold.” See Pet., 83. But the Petition does not address turning the fans off if the temperature falls below a temperature threshold.

Accordingly, the Petition makes no showing that limitation 19.3 is met by Aakalu in view of Jones.

X. CONCLUSION

For the reasons set forth above, the Petition fails to demonstrate a reasonable likelihood that any of challenged Claims 1-5 and 14-20 of the '521 Patent are unpatentable.

Dated: April 29, 2025

Respectfully submitted,

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XI. CLAIMS APPENDIX³

Claim 1

[1.0] 1. A cooling unit for an enclosure housing electronics, the cooling unit comprising:

[1.1] a fan shroud having at least one electrical fan; and

[1.2] a Venturi chamber having [a] a first inlet for receiving a heated airflow from a heatsink, [b] a second inlet for receiving an airflow from a surrounding environment, and [c] an outlet coupled to the fan shroud, the fan drawing air from the Venturi chamber via the outlet when the fan is on;

[1.3] wherein the Venturi chamber comprises a wall for directing the airflow air from the surrounding environment in from the second inlet and across the heated airflow from the heatsink in a manner to as to draw the heated airflow through the heatsink using a Venturi effect, when the fan is on.

³ The claim limitations are numbered as they are in the petition filed in IPR2024-01454, except brackets [a]-[c] have been added to limitation 1.2.

Claim 2

2. The cooling unit of claim 1, wherein the fan shroud is offset from the Venturi chamber such that when the fan is not on, the fan shroud does not obstruct a natural circulation airflow entering the first inlet and exiting the second inlet of the Venturi chamber.

Claim 3

3. The cooling unit of claim 1, wherein the at least one electrical fan includes a primary fan and a backup fan that becomes operational upon a failure of the primary fan.

Claim 4

4. The cooling unit of claim 1, wherein the Venturi chamber first inlet encircles one or more convective openings of the heatsink.

Claim 5

5. The cooling unit of claim 1, wherein the airflow from the surrounding environment is cooler than the heated airflow.

Claim 14

[14.0] 14. A method for cooling a sealed environment of an enclosure for housing electronics, the method comprising:

[14.1] directing heat generated by one or more electronic devices housed within a sealed environment of an enclosure to a heatsink thermally coupled to an external environment;

[14.2] drawing a first airflow across one or more convective openings of the heatsink, wherein the first airflow does not flow into the one or more convective openings of the heatsink;

[14.3] drawing a second airflow of heated air from the one or more convective openings using a Venturi effect created by drawing the first airflow.

Claim 15

[15.0] The method of claim 14

[15.1] wherein drawing the first airflow further comprises drawing the first airflow into a Venturi chamber;

[15.2] wherein drawing the second airflow further comprises drawing the second airflow into the Venturi chamber;

[15.3] the method further comprising operating a fan to pull the first airflow and the second airflow out of the Venturi chamber.

Claim 16

16. The method of claim 14, further comprising operating a fan to draw the first airflow and the second airflow.

Claim 17

17. The method of claim 15, wherein the fan is located offset with respect to the Venturi chamber to not impede a natural circulation of airflow through the Venturi chamber when the fan is not in operation.

Claim 18

18. The method of claim 15, further comprising operating the fan when a temperature exceeds a predetermined threshold.

Claim 19

[19.0] A method for cooling a sealed environment of an enclosure for housing electronics, the method comprising:

[19.1] directing heat generated by one or more electronic devices housed within a sealed environment of an enclosure to a heatsink thermally coupled to an external environment;

[19.2] when a temperature exceeds a first predetermined threshold, operating a fan to draw a first airflow across one or more convective openings of the heatsink and a

second airflow of heated air from the one or more convective openings of the heatsink using a Venturi effect created by drawing the first airflow, wherein the first airflow does not flow into the one or more convective openings of heatsink;
[19.3] when the temperature does not exceed a second predetermined threshold, allowing a natural circulation airflow to flow from the one or more convective openings of the heatsink by not operating the fan.

Claim 20

20. The method of claim 19, wherein the fan is located such as to not impede the natural circulation airflow when the fan is not in operation.

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Patent Owner Preliminary Response Merits Brief Requesting Denial of Institution consists of 7,209 words, excluding table of contents, table of authorities, certificate of service, this certificate, or table of exhibits. The Response complies with the type-volume limitation of 14,000 words as set forth in 37 C.F.R. § 42.24. In preparing this certificate, counsel has relied on the word count of the word-processing system used to prepare the paper (Microsoft Word).

Dated: April 29, 2025

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CERTIFICATE OF SERVICE

I hereby certify that on April 29, 2025, I caused a true and correct copy of the foregoing Patent Owner Preliminary Response Merits Brief Requesting Denial of Institution to be served on the following counsel for Petitioners by electronic mail to the following email addresses:

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