

IN THE 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.

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

Issue Date: May 25, 2010

Title: SYSTEMS AND METHODS FOR VENTURI-ASSISTED COOLING

Inter Partes Review No.: IPR2024-01454

**PETITIONERS' OPPOSITION TO PATENT OWNER'S REQUEST
FOR DISCRETIONARY DENIAL OF INSTITUTION**

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PETITIONERS' EXHIBIT LIST

<i>Exhibit</i>	<i>Description</i>
1001	U.S. Patent No. 7,724,521 (the “’521 Patent”)
1002	Portions of prosecution history of the ’521 Patent (“File History”)
1003	Declaration of Petitioner’s Expert
1004	U.S. Patent No. 7,028,753 (“Stern”))
1005	U.S. Patent No. 5,894,407 (“Aakalu”)
1006	U.S. Patent No. 6,104,003 (“Jones”)
1007	U.S. Patent No. 7,027,300 (“Lord”)
1008	U.S. Patent No. 7,450,382 (“Fischer”)
1009	U.S. Patent No. 7,245,485 (“Morrell”)
1010	Dkt. 23 Docket Control Order, <i>Procomm Int’l PTE LTD v. Verizon Commc’ns, Inc. et al.</i> , Case No. 2:24-cv-009-RWS-RSP (E.D. Tex).
1011	Intentionally left blank
1012	ORDER denying Defendants’ Opposed Motion to Stay Pending <i>Inter Partes</i> Review as premature in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D.Tex.)
1013	Defendants’ Opposition to Plaintiff Procomm International Pte. LTS.’s Motion for Leave to Amend Infringement Contentions (Dkt. 52) in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D.Tex.)
1014	ORDER granting in part Procomm’s Motion for Leave to Amend Infringement Contentions (Dkt. 76) in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D.Tex.)
1015	Joint Request to Amend the Docket Control Order (Dkt. 77) in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D.Tex.)

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<i>Exhibit</i>	<i>Description</i>
1016	Second Amended Docket Control Order (Dkt. 100) in <i>Aspen Networks, Inc. v. AT&T Mobility, LLC</i> , No. 2:23-cv-00476-RWS-RSP (E.D.Tex.)

I. INTRODUCTION

Patent Owner (“Procomm”) has requested discretionary denial of institution of the Petition for *inter partes* review of the ’521 Patent (i) pursuant to *Fintiv* in view of the related district court litigation, *Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.*, No. 2:24-cv-009-RWS-RSP (E.D.Tex.) (“Related Litigation”); (ii) because the same prior art was previously presented and considered during prosecution; (iii) because the ’521 Patent issued in 2010 and has not been challenged until asserted in the Related Litigation; and (iv) because the declaration of Petitioners’ expert is too similar to the Petition it supports. Req. 1-2.

However, this Opposition demonstrates Procomm’s Request should be denied in the interest of efficiency, fairness, and patent quality.

First, the primary premise from which Procomm bases its arguments is that “[t]he district court ... has already scheduled a jury trial on the ’521 Patent ***nine months before*** the expected date of the Final Written Decision in this IPR.” Req. 1 (emphasis in original). However, this premise is no longer true, highlighting the real-world uncertainties that accompany patent “rocket docket” trial schedules. *See* EX-1016. This Opposition demonstrates that a proper analysis of the *Fintiv* factors, particularly in view of the uncertain but delayed trial schedule, Petitioners’ *Sotera* stipulation, the strength of the grounds set forth in the Petition, and

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Procomm's contribution to the timing of the Petition, shows that discretionary denial is not warranted pursuant to *Fintiv*.

Second, the Office erred in a manner material to the patentability of the challenged claims during the prosecution of the '521 Patent. While Aakalu formed the basis of a rejection that was overcome by amendment, the Examiner failed to consider the full disclosure of Aakalu as set forth in Ground 2, which demonstrates that Aakalu discloses the limitation added by amendment and argued as missing by the applicant. In addition, although the subject matter of Sterner was identified in an IDS, it was further error by the Examiner not to apply Sterner to the challenged claims as demonstrated by Ground 1 of the Petition.

Third, notwithstanding the 2010 issuance of the '521 Patent, Procomm has accused products of infringing the patent in the Related Litigation that have been on sale for at least six years free from any claim of infringement. Thus, Petitioners' settled expectation has been that it was not infringing the '521 Patent.

Finally, the Petition is properly supported by expert testimony that cites the underlying factual support.

Accordingly, Petitioners hereby respectfully request that the Director deny Procomm's Request for discretionary relief from a meritorious petition for IPR.

II. STIPULATION

Petitioners hereby present a *Sotera* stipulation. Petitioners stipulate that if the Board grants the Petition and institutes an *inter partes* review, Petitioners will not pursue in the Related Litigation the specific grounds asserted in the Petition, or any other ground that could have been reasonably raised in an IPR. See *Sotera Wireless, Inc. v. Masimo Corporation*, IPR2020-01019, Paper 12 (P.T.A.B. Dec. 1, 2020) (precedential).

III. THE DIRECTOR SHOULD NOT DENY INSTITUTION PURSUANT TO *FINTIV*

Procomm seeks discretionary denial of the Petition on the basis that “all six *Fintiv* factors favor discretionary denial.” Req. 2. However, Procomm mischaracterizes several material facts while ignoring others in seeking discretionary relief from an otherwise meritorious petition.

Importantly, the primary basis for seeking denial pursuant to *Fintiv* was the previously scheduled October 2025 trial date in the Related Litigation. However, the Court recently granted Procomm’s motion for leave to amend its infringement contentions (*See* EX-1014) which the parties in the Related Litigation have recognized will necessitate a later trial date, as reflected in the filing of a joint motion to amend the docket control order with a new trial date to be determined. *See* EX-1015. Petitioners are aware of at least one case before the same judge

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where the trial was recently rescheduled from October 2025 to April 2026 under similar circumstances, thus indicating that the trial in the Related Litigation may not be rescheduled at least until April 2026. *See* EX-1016.

In addition, Procomm contributed to the timing of the Petition by failing to seek leave to amend its infringement contentions until February 28, 2025, despite several attempts to improperly amend its contentions well beyond the March 20, 2024, deadline set by the district court, thus, introducing uncertainty and delay as to the scope of the claims asserted in the Related Litigation.

Moreover, Petitioners' *Sotera* stipulation proffered herein eliminates any overlap of issues presented in the Petition and issues to be tried in the Related Litigation.

Procomm's Request also demonstrates the strength of Petitioners' unpatentability challenges because the Request resorts to mischaracterizing the prior art and the arguments in the Petition in an attempt to traverse the grounds.

As demonstrated below, a proper *Fintiv* analysis shows that discretionary denial is not warranted in the interest of efficiency, fairness, and patent quality.

A. Factor 1: whether the court granted a stay, or evidence exists that one may be granted if a proceeding is instituted.

Factor 1 favors institution.

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The Board in *Fintiv* recognized that “[a] district court stay of the litigation pending resolution of the PTAB trial allays concerns about inefficiency and duplication of efforts” and that “[t]his fact has strongly weighed against exercising the authority to deny institution under *NHK*.” *Fintiv* 6. The Board also recognized that a denial of a motion to stay as premature pending a decision on institution “usually weighed against exercising authority to deny institution under *NHK*,” noting that the “proximity of the court’s trial date and investment of time are relevant to how much weight to give to the court’s willingness to reconsider a stay.” *Fintiv* 7.

Here, Petitioners filed a motion for a stay pending *inter partes* review that was denied by the Court as premature pending the Board’s decision on institution. *See* EX-1013. Thus, Factor 1 weighs in favor of institution.

Notably, Procomm opposed a stay pending resolution of this proceeding, which has been recognized by the Board as the mechanism that “allays concerns about inefficiency and duplication of efforts,” yet seeks to invoke the Board’s discretion to deny institution on the bases of inefficiency and duplication of efforts based on that same stay being denied. Procomm’s “heads I win, tails you lose” approach should be rejected.

B. Factor 2: proximity of the court's trial date to the Board's projected statutory deadline

Factor 2 is neutral, and to the extent it may favor denial, is heavily outweighed by the other factors.

Procomm's Request is based on the now erroneous premise that the trial in the Related Litigation was scheduled in October 2024. However, the Court recently granted Procomm's motion for leave to amend its infringement contentions (*See* EX-1014) which the parties in the Related Litigation have recognized will necessitate a later trial date, as reflected in the filing of a joint motion to amend the docket control order with a new trial date to be determined. *See* EX-1015. Petitioners are aware of at least one case before the same judge that was recently rescheduled from October 2025 to April 2026 under similar circumstances, thus indicating that the trial may not be rescheduled at least until April 2026. *See* EX-1016.

In addition, trial dates in this district court are often delayed for various reasons, as counsel in the Related Litigation is well aware. *See, e.g. Multimedia Techs. PTE Ltd. v. LG Elecs. Inc., et al.*, 2:22-cv-00494-JRG-RSP, Dkt. 273 (E.D. Tex. Mar. 18, 2025) (noting that "[t]his case has been set for trial five times: November 18, 2024, January 27, 2025, February 7, 2025, March 3, 2025, and March 17, 2025. The parties have also been notified that other cases are

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preferentially set ahead of them for the April 7, 2025, and April 21, 2025 trial settings.”).

Moreover, Petitioners filed the Petition within the window prescribed by statute. Procomm argues that “Petitioners waited until the last minute to file their IPR” (Req. 4; *See also* Req. 7) as justification for denying institution in the interest of fairness, yet Procomm’s conduct in the Related Litigation is responsible for the timing of the Petition by creating uncertainty as to the claims asserted and infringement theories that were only resolved in the last few days.

The court’s deadline for identifying asserted claims and serving infringement contentions was March 20, 2024. *See* EX-2007. In its contentions, Procomm identified the asserted claims of the ’521 Patent as Claims 1, 4, 5, and 14-16. EX-2007 2. Despite this deadline, Procomm repeatedly served proposed amended contentions, including an attempt to assert Claim 19, an additional independent claim, yet Procomm waited nearly a year to file a motion for leave to amend its infringement contentions on February 28, 2025. *See* EX-1013 9-11. Procomm knew it would need to seek leave to amend its infringement contentions to assert new claims at least as early as July 17, 2024, but rather than seeking leave to amend and resolving any doubt as to the scope of its infringement case, Procomm instead continued to attempt alter the scope of its infringement case through multiple rounds of proposed amendments. *See* EX-1013. Procomm’s conduct

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introduced uncertainty as to the scope of its infringement case and asserted claims, causing delay in Petitioners' filing, particularly since Petitioners only get only one bite at the apple when seeking an *inter partes* review.

Procomm's delay in attempting to assert independent Claim 19 by over four months past the Court's deadline to identify the asserted claims and waiting nearly a year to seek the Court's permission to add new asserted claims, caused Petitioners to conduct additional searching for prior art and to add an additional ground to the Petition to challenge Claim 19. The additional prior art searching and drafting of an additional ground caused delay in filing the Petition that is directly attributable to Procomm's conduct.

The uncertainty as to the scope of the asserted claims caused by Procomm's conduct is demonstrated by the Court's denial of its motion to assert Claim 19.

EX-1014 2. If Procomm had timely sought leave to amend its contentions to assert Claim 19, the Court's denial of a timely motion would have obviated the need for Petitioners to seek additional prior art and add an additional ground to the Petition to challenge Claim 19.

C. Factor 3: investment in the parallel proceeding by the court and the parties

Factor 3 favors institution.

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As held by the Board in *Fintiv*, “[i]f, at the time of the institution decision, the district court has not issued orders related to the patent at issue in the petition, this fact weighs against exercising discretion to deny institution under *NHK*.”

Fintiv 10. No orders have been issued or are expected to be issued by the district court.

Procomm argues that by the expected July 29, 2025, institution decision date, the *Markman* hearing will have been held in the district court. However, there are no claim construction issues regarding the '521 Patent that have been raised that have any bearing on the grounds set forth in the Petition because the prior art relied on in the Petition meets each of the claim terms under any reasonable interpretation. Pet. 21.

D. Factor 4: overlap between issues raised in the petition and in the parallel proceeding.

Factor 4 favors institution.

In view of Petitioners' *Sotera* stipulation, there will be no overlap between the issues raised in the Petition and issues to be adjudicated in the Related Litigation. In addition, Petitioners are not relying on any system art in the Related Litigation to challenge the '521 Patent.

In the Related Litigation, the Court recently denied Procomm's motion to assert Claim 19 such that only Claim 14 is asserted in the Related Litigation. EX-

1014 2. The Petition challenges Claims 1-5 and 14-20, thus only a subset of the challenged claims is asserted in the Related Litigation.

E. Factor 5: whether the petitioner and the defendant in the parallel proceeding are the same party.

Factor 5 is neutral.

Each of the Petitioners is a defendant in the Related Litigation. Nothing within *Fintiv* suggests that the same party between the proceedings weighs in favor of discretionary denial. *See HP Inc. v. Slingshot Printing LLC*, IPR2020-01084, Paper 13 at 9 (having the “same parties as parallel proceeding” makes factor 5 “neutral”)).

F. Factor 6: other circumstances that impact the Board's exercise of discretion, including merits.

1. The Merits of the Petition Are Strong

The merits of the Petition are particularly strong and warrant institution in the interest of the public benefit in strengthening the patent system by allowing the review of patents challenged with sufficiently strong merits showing unpatentability of at least one claim. Here, the Petition sets forth three grounds, each of which presents challenges that plainly demonstrate the unpatentability of the challenged claims.

a. Overview

As set forth in the Overview (Section II) of the Petition, the '521 Patent identifies “a need in the art for improved systems and methods for thermal management of telecommunications infrastructure equipment” and describes as its purported solution “systems and methods for utilizing Venturi fan-assisted cooling of electrical equipment, such as but not limited to telecommunications equipment, housed inside an enclosure.” EX-1001 2:12-14, 3:1-4. The Challenged Claims are generally directed to a method and system of cooling an enclosure housing electronic devices by (1) directing heat from the devices to a heatsink, (2) drawing a first airflow across openings of the heatsink, and (3) using a Venturi effect created by the first airflow to draw air through the heatsink. Pet. 1-2.

FIG. 3 illustrates the claimed method and FIG. 2D illustrates the system for implementing the method:

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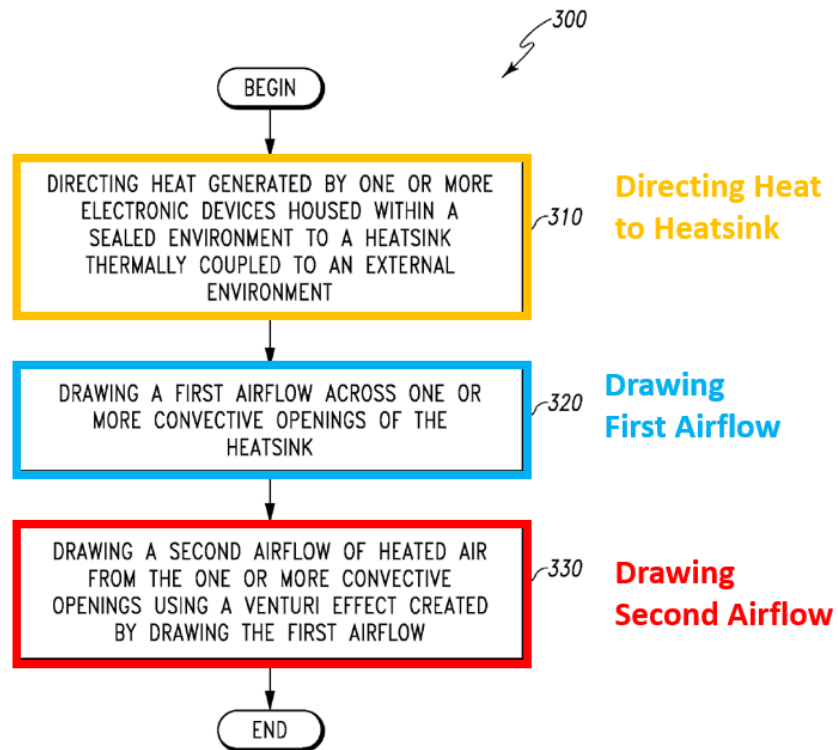
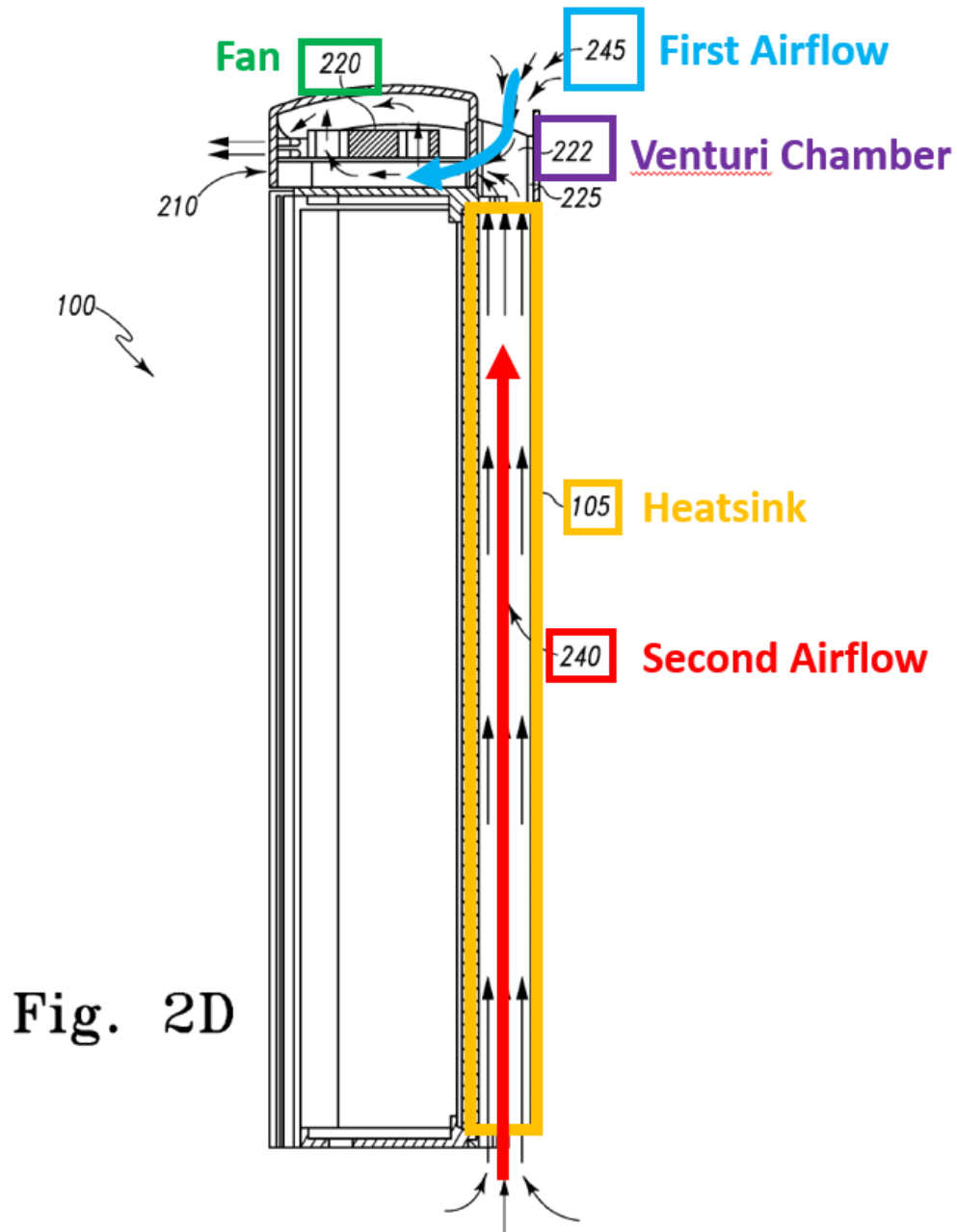


Fig. 3

Pet. 2; EX-1001 FIG. 3¹

¹ All annotations and text in color have been added to the figures.



Pet. 3; EX-1001 FIG. 2D

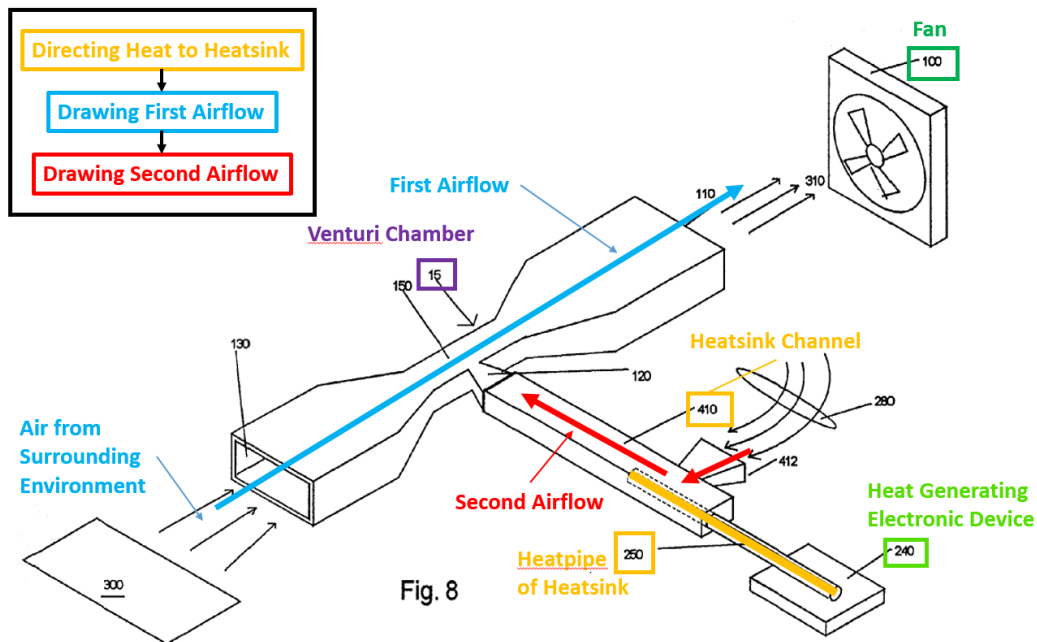
Independent Claim 14 is directed to the embodiments shown in FIGs. 2D and 3, and reads:

14. A method for cooling a sealed environment of an enclosure for housing electronics, the method comprising:
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;
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;
drawing a second airflow of heated air from the one or more convective openings using a Venturi effect created by drawing the first airflow.

Pet. 3-4; EX-1001 Claim 14.

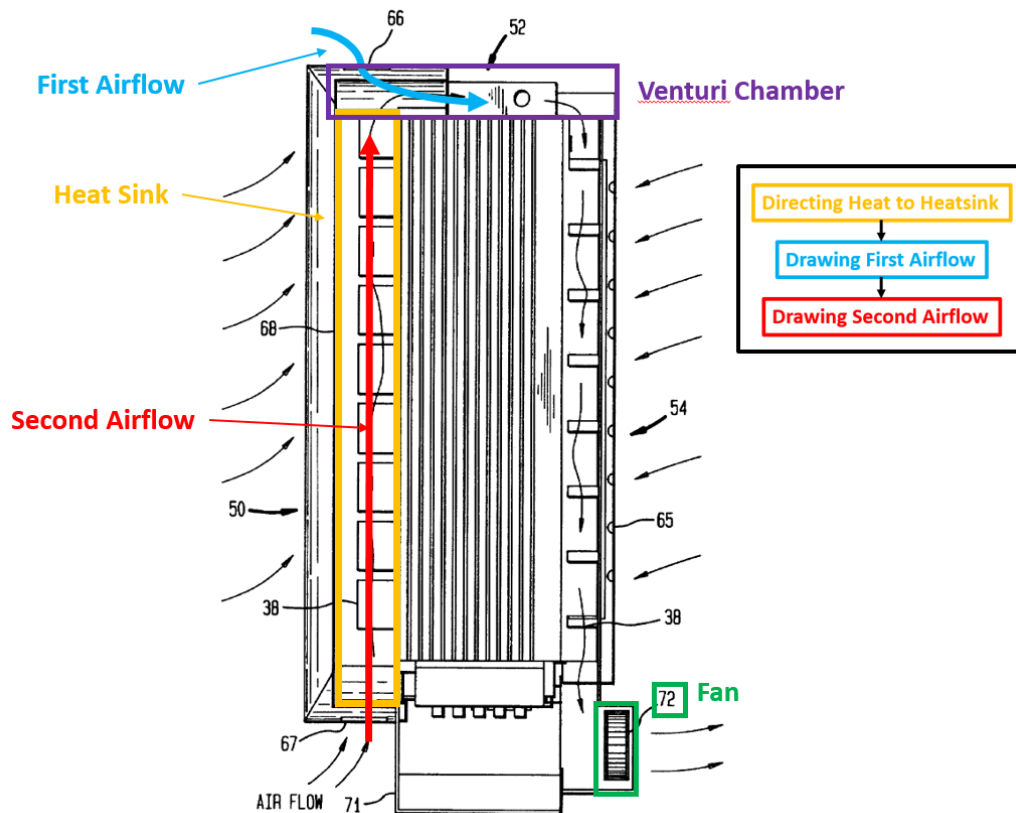
However, the Challenged Claims are merely directed to a combination of conventional components (e.g., heatsinks, fans, Venturi chambers) having known physical properties used for their intended purpose to remove heat from enclosures housing electronic devices. A comparison of U.S. Patent No. 7,028,753 (“Stern”) (EX-1004) to Claim 14 demonstrates that the claimed method and system were well-known prior to the purported invention of the ’521 Patent. FIG. 8 of Stern is annotated below to show the elements recited in Claim 14:

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Pet. 5; EX-1004 FIG. 8; EX-1003 ¶32.

U.S. Patent No. 5,894,407 (Aakalu) (EX-1005) also discloses the claimed method and the system. FIG. 10 of Aakalu is annotated below to show the elements recited in Claim 14:



Pet. 6; EX-1005 FIG. 10; EX-1003 ¶33.

Sterner and Aakalu each demonstrate that the purported invention recited in the Challenged Claims was well-known at the time of the '521 Patent and is unpatentable as set forth in Grounds 1-3 below. EX-1003 ¶34.

b. Summary of the '521 Patent

The '521 Patent is titled “Systems and Methods for Venturi Fan-Assisted Cooling” and is directed to a method for cooling enclosures housing electronic devices using a fan-driven Venturi effect to draw air through a heatsink, and a

system implementing the cooling method. Pet. 7; EX-1001 Title, Abstract, 2:18-21; EX-1003 ¶35.

The '521 Patent explains that “in the field of telecommunications, there is a trend to reduce both the size and the expenses associated with infrastructure equipment” while retaining all the functionality of legacy equipment resulting in “thermal management challenges for dissipating heat generated by telecommunications infrastructure equipment.” Pet. 7; EX-1001 1:65-2:14; EX-1003 ¶36. As a solution, the '521 Patent describes systems and methods for cooling electrical equipment housed within an enclosure having air flowing through a heatsink using a fan to both (1) draw air from openings of the heatsink and (2) draw air past the openings of the heatsink to produce a Venturi effect, the combination of which “generates an increased airflow through the heatsink which in turn draws in relatively cool air in from the bottom side ... of the heatsink.” Pet. 7-8; EX-1001 6:8-15; EX-1003 ¶36.

FIG. 3 shows a “flow chart illustrating a method 300 of one embodiment of the present invention for cooling an enclosure for housing electronics.” Pet. 8; EX-1001 5:39-41; EX-1003 ¶37.

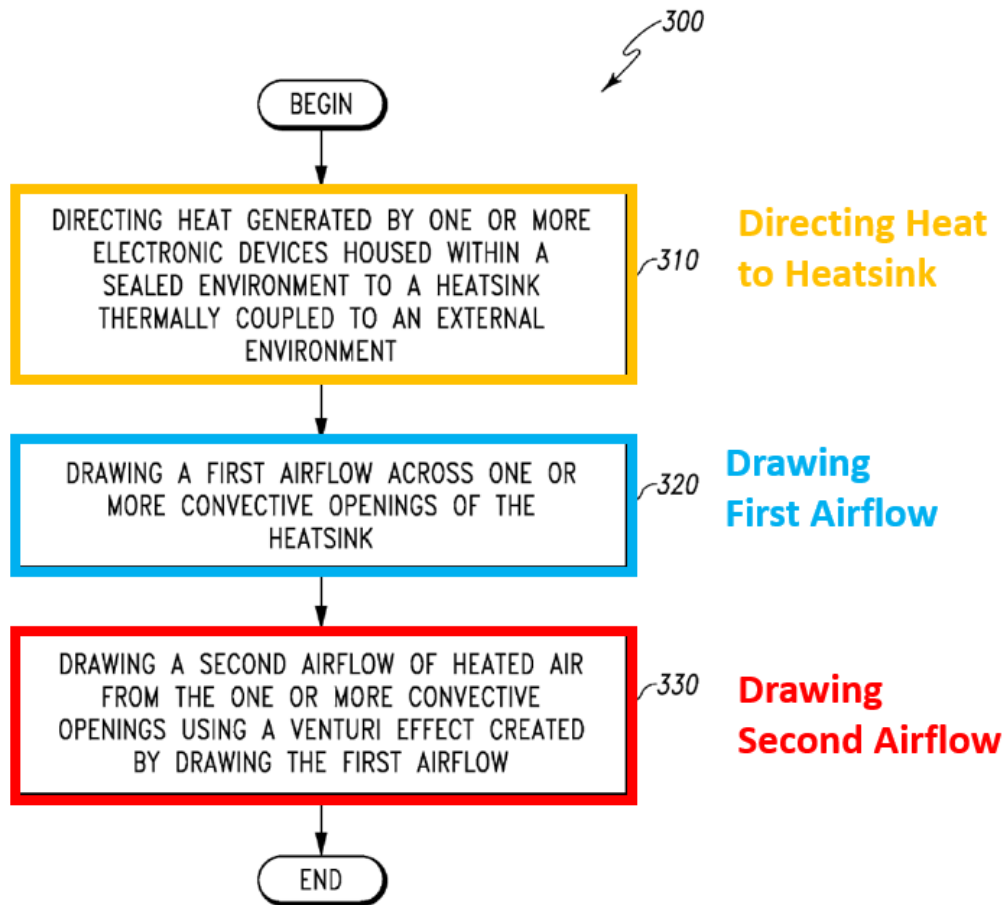


Fig. 3

Pet. 8; EX-1001 FIG. 3; EX-1003 ¶37.

The '521 Patent explains that the method begins at 310 (**gold**) with directing heat generated by one or more electronic devices to a heatsink thermally coupled to an external environment. Pet. 9; EX-1001 5:41-43; EX-1003 ¶38. The method proceeds to 320 (**blue**) with drawing a first airflow across one or more convective openings (air ducts/channels) of the heatsink, and to 330 (**red**) with drawing a second airflow of heated air from the one or more convective openings of the

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heatsink using a Venturi effect created by drawing the first airflow. Pet. 9; EX-1001 5:61-65; EX-1003 ¶38. The '521 Patent further explains that

the 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 affect [sic] which will pull in more air through the heat sink than would flow naturally due to natural convention.

* * *

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.

Pet. 9; EX-1001 5:66-6:6, 6:8-15; EX-1003 ¶38.

The Challenged Claims include independent Claims 14 and 19 directed to the method of cooling an enclosure housing electronics. A side-by-side comparison of Claims 14 and 19 is provided below:

Claim 14	Claim 19
[pre] A method for cooling a sealed environment of an enclosure for	[pre] A method for cooling a sealed environment of an enclosure for

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housing electronics, the method comprising:	housing electronics, the method comprising:
[a] 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;	[a] 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;
[b] 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;	[b] 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
[c] drawing a second airflow of heated air from the one or more convective openings using a Venturi effect created by drawing the first airflow.	[c] [draw] 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;
	[d] when the temperature does not exceed a second predetermined threshold,

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	allowing a natural circulation airflow to flow from the one or more convective openings of the heatsink by not operating the fan.
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As shown above, Claims 14 and 19 are each directed to the steps ([a], [b], and [c]) described in the flow chart of FIG. 3, with Claim 19 adding an additional step of turning the fan on/off based on temperature. The dependent method claims are directed to specifics related to the control and position of the fan. Pet. 11.

The '521 Patent also describes an apparatus for implementing the method. FIGs. 1A–1D are provided as “diagrams illustrating an enclosure 100 of one embodiment of the present invention.” EX-1001 3:5-6; EX-1003 ¶41. FIG. 1D illustrates the enclosure with the doors open showing the area where the electronic devices are housed:

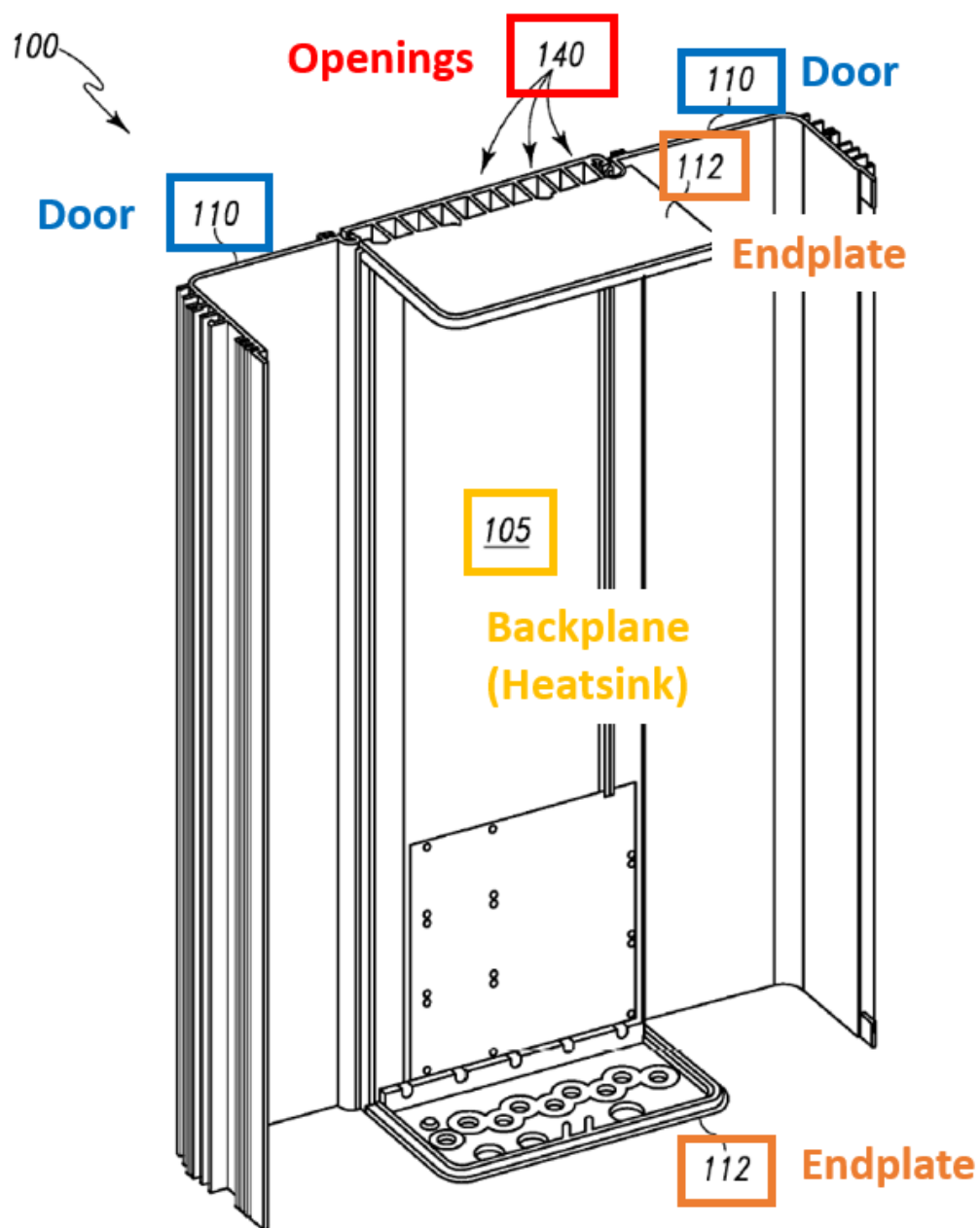
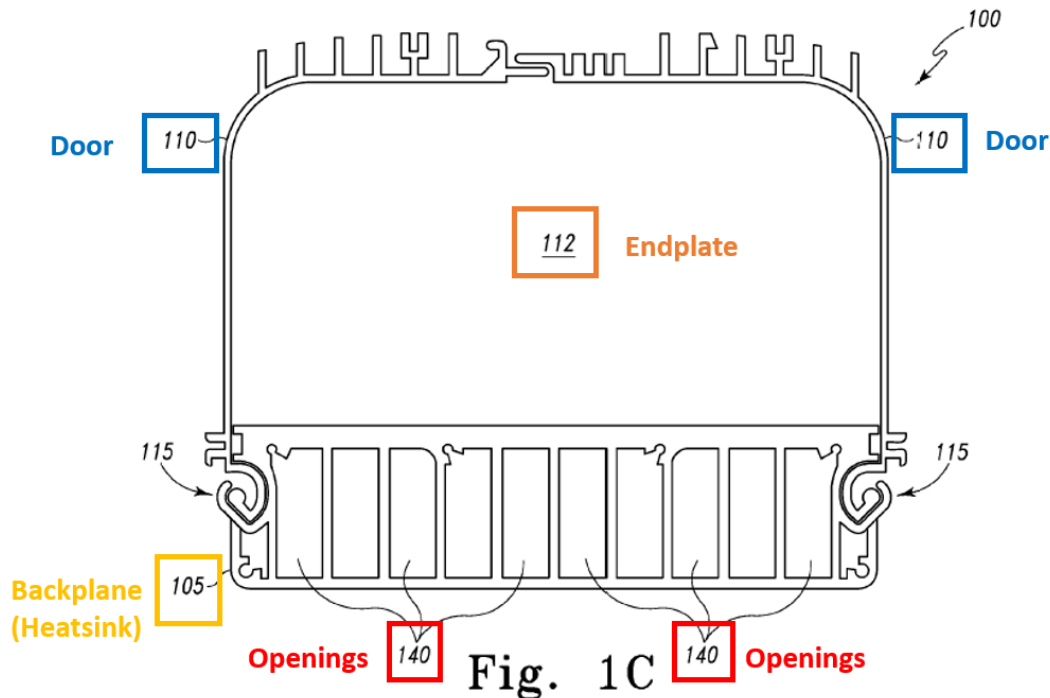


Fig. 1D

Pet. 12; EX-1001 FIG. 1D; EX-1003 ¶41

FIG. 1C illustrates an end view of the enclosure shown in FIG. 2D, but with the doors closed:



Pet. 13; EX-1001 FIG. 1C; EX-1003 ¶42

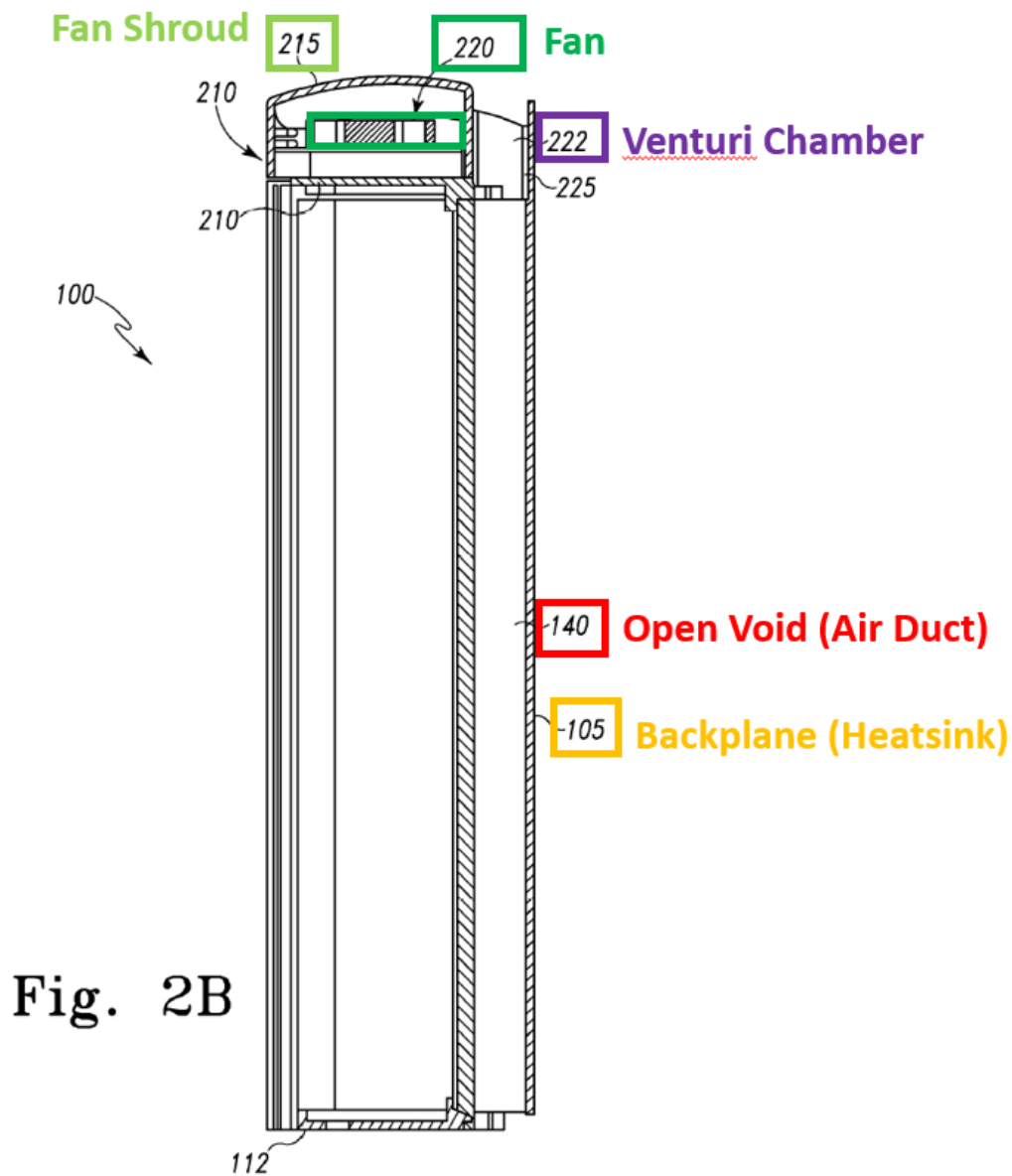
The '521 Patent explains that enclosure 100 comprises a structural backplane 105 (gold), two doors 110 (blue) that each pivot around respective hinges 115, and two endplates 112 (orange) attached respectively to the ends of structural backplane 105 so that when doors 110 are closed (as illustrated in FIG. 1C), a sealed environment is created within enclosure 100. The '521 Patent discloses that in in some embodiments, the sealed environment is not

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weatherproof, but in alternate embodiments, a weatherproof sealed environment is provided. Pet. 13; EX-1001 3:4-13; EX-1003 ¶43.

The '521 Patent further explains that backplane 105 functions as a heatsink for internal electronics 130 (shown in FIGs. 1A and 1B) housed within enclosure 100. EX-1001 3:29-44. Backplane 105 includes a plurality of convective openings 140 (**red**) forming open voids (air ducts) that run the length of backplane 105. EX-1001 3:48-54; EX-1003 ¶44.

The '521 Patent provides FIGs. 2A-2E as illustrating “a Venturi assisted cooling unit for the enclosure of one embodiment of the present invention.” Pet. 14; EX-1001 2:44-46; EX-1003 ¶45. FIG. 2B illustrates a cutaway view of the embodiment:



Pet. 15; EX-1001 FIG. 2B; EX-1003 ¶45.

The '521 Patent explains that a fan assisted cooling unit 210 may be positioned at the top of enclosure 100. Fan assisted cooling unit 210 comprises fan shroud 215 (**light green**) and at least one electrical fan 220 (**green**). EX-1001 4:11-16. Cooling unit 210 further comprises a Venturi chamber 222 (**purple**)

formed from continuous wall 225 connected on each end to fan shroud 215. As illustrated in FIG. 2C, fan 220 is placed in an offset position outside of Venturi chamber 222 so as to not impede the natural circulation of air through convective openings 140 when fan 220 is not operating. Pet. 16; EX-1001 4:28-31; EX-1003 ¶46.

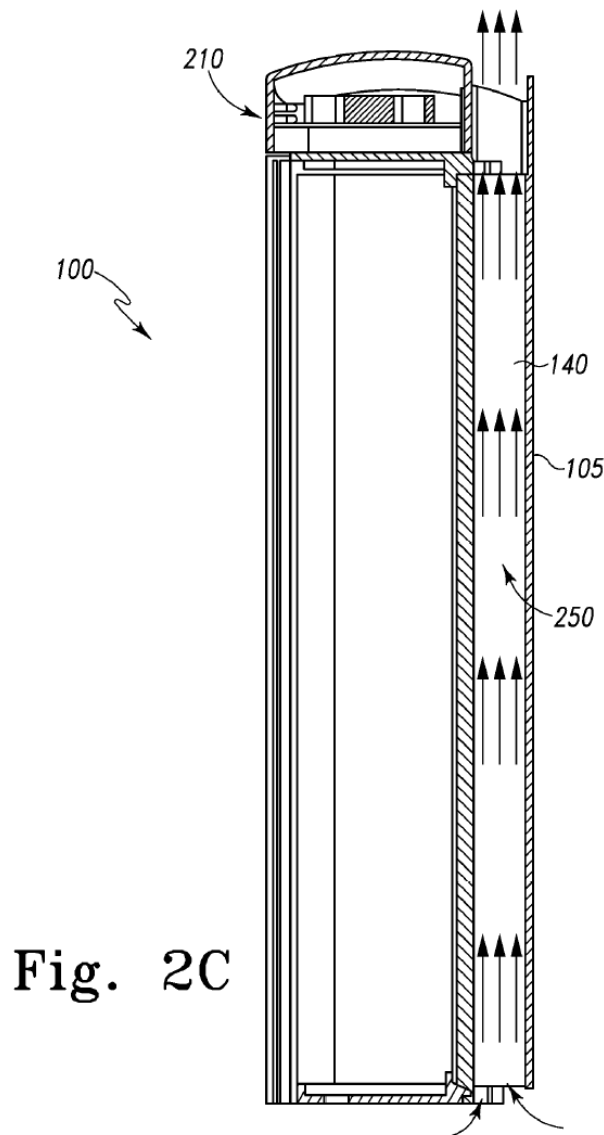
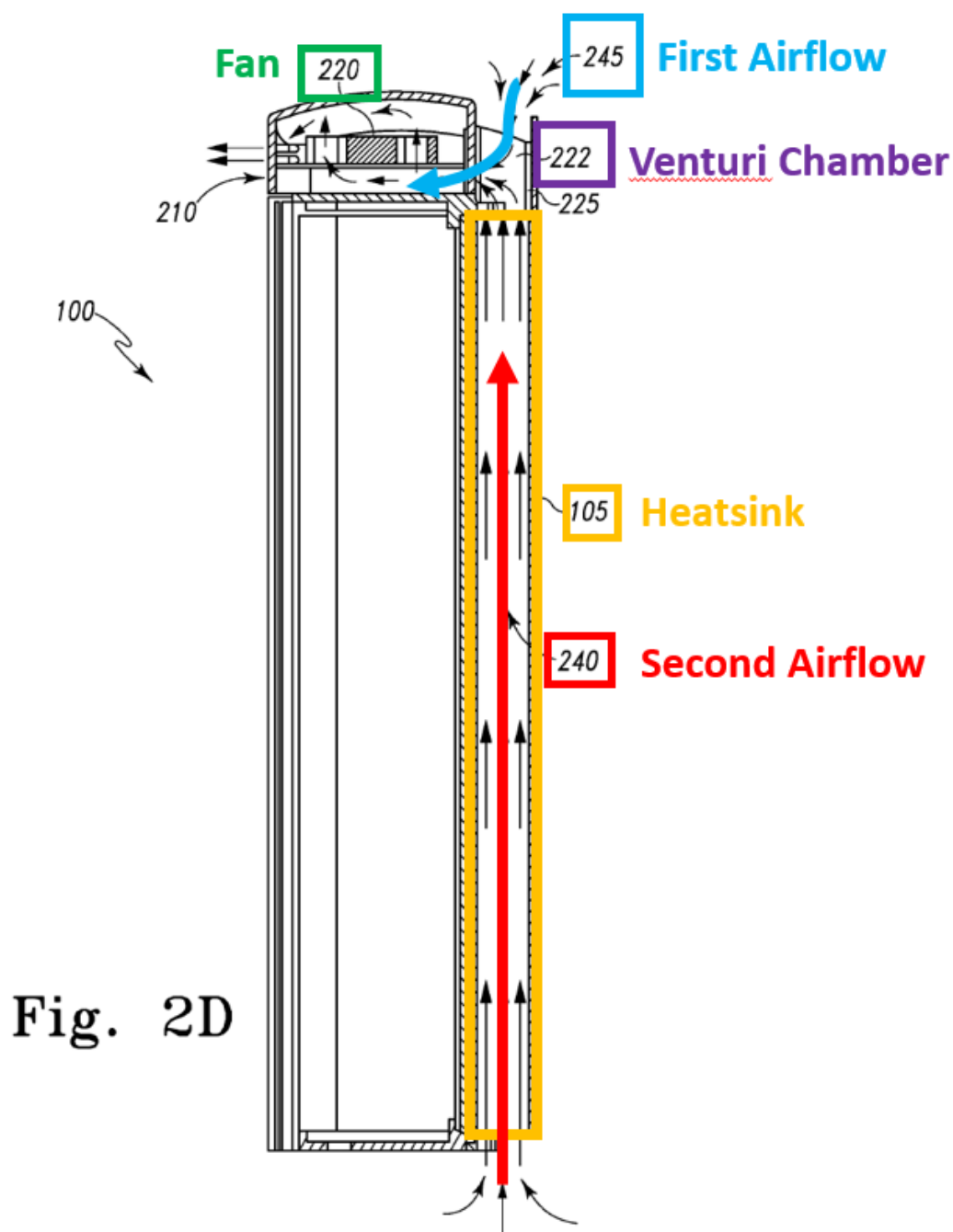


Fig. 2C

Pet. 16; EX-1001 FIG. 2C; EX-1003 ¶46.

FIG. 2D illustrates the air flow during operation of fan 220:



Pet. 17; EX-1001 FIG. 2D; EX-1003 ¶47.

The '521 Patent explains that fan 22 (**green**) draws air from Venturi chamber 222 (**purple**), and due to the positioning 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 second airflow 240 (**red**)), or drawn in from the ambient environment above Venturi chamber 222 (shown generally by first airflow 245 (**blue**)). The second airflow 240 (**red**) flowing through the openings 140 of backplane (heatsink) 105 (**gold**) is heated by the heat dissipated from high powered internal electronics (130). The '521 Patent further explains that fan 220 pulls in the hot buoyant air off the top of backplane 105 and at the same time also pulls in ambient air from the top of Venturi chamber 222 such that the ambient air coming in from the top of Venturi chamber 222 is directed across the heated airflow drawn from backplane 105. According to the '521 Patent, drawing the first airflow 245 (**blue**) from above into Venturi chamber 222 and through fan 220 produces a Venturi effect increasing airflow in the heated second airflow 240 (**red**) through backplane (heatsink) 105. Pet. 17-18; EX-1001 4:35-45; EX-1003 ¶48.

The Challenged Claims include independent Claim 1 directed to a cooling unit for an enclosure housing electronics:

Claim 1
[pre] A cooling unit for an enclosure housing electronics, the cooling unit comprising:
[a] a fan shroud having at least one electrical fan; and
[b] a Venturi chamber having
[b.1] a first inlet for receiving a heated airflow from a heatsink,
[b.2] a second inlet for receiving an airflow from a surrounding environment, and
[b.3] an outlet coupled to the fan shroud, the fan drawing air from the Venturi chamber via the outlet when the fan is on;
[b.4] 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.

As shown above, Claim 1 recites a cooling device having [a] a shroud and fan, and [b.1–b.4] a specific configuration of a Venturi chamber. The dependent claims are directed to various configurations of the cooling unit.

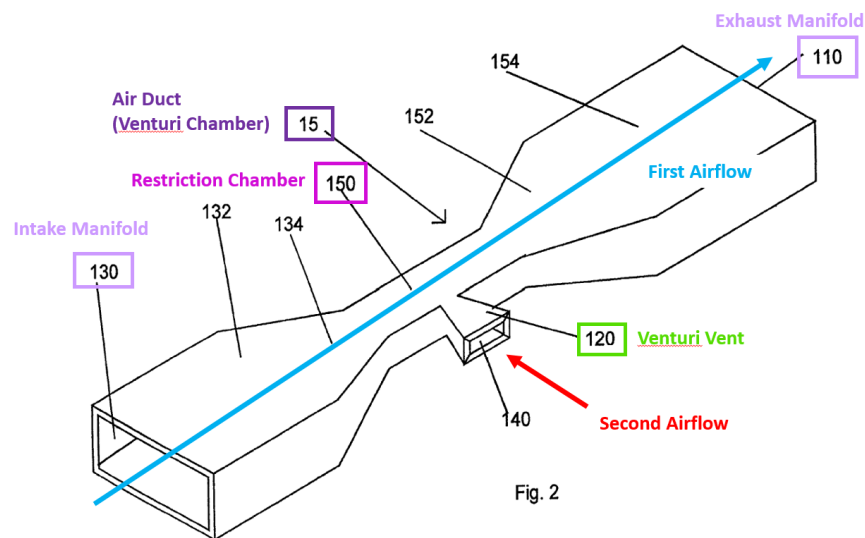
c. State of the Art

The following section describes the state of the art in cooling systems for electronics housed in enclosures as of the filing of the '521 Patent. EX-1003 ¶55. The prior art references, and the discussions of what was known to a POSA, provide the factual support for the general description of the state of the art and

provide additional motivation to modify or combine the references. Accordingly, these references should be considered by the Board.

i. The Venturi Effect and Its Use in Cooling Electronics

The purported invention of the '521 Patent is the use of a fan-driven Venturi effect to draw an airflow in a forced convection cooling system for electronic enclosures. A POSA understood the Venturi effect was a well-known observation that the rate of fluid flow in a closed system, such as a pipe, increases as the fluid encounters a constricted region, and that this Venturi effect is based on Bernoulli's principle. EX-1003 ¶56. A POSA also understood that it was common and well-known to use the Venturi effect to increase the airflow used to cool electronics. For example, Sterner illustrates an air duct (Venturi chamber) used in drawing an airflow to cool electronics.



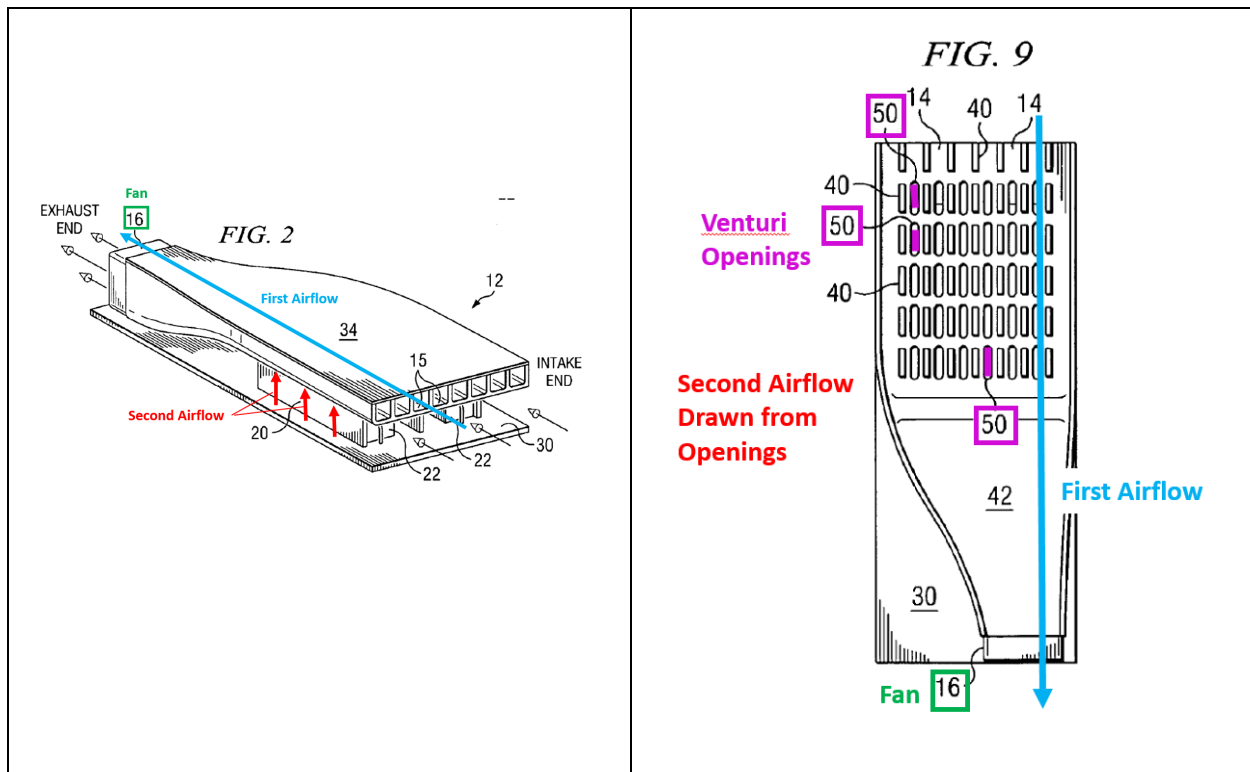
Pet. 23; EX-1004 FIG. 2; EX-1003 ¶56

With reference to FIG. 2, Sterner explains this well-known phenomenon and how it is used in its cooling device for electronics. EX-1004 3:10-33; EX-1003 ¶57. *See also* § VII.A.2 [1.3] below. A POSA understood from Sterner that air within the first volume is forced to increase its velocity as it leaves the intake manifold 130 and is coupled with first coupling 134 into restriction chamber 150. As the air velocity increases, its pressure must decrease to conserve the energy of air mass moving through the air duct 15 according to the principle of conservation of energy and Bernoulli's principle. When the velocity increases in the restriction chamber 150, the air pressure against the sidewalls of the air duct 15 in restriction chamber 150 reduces. This reduction in pressure as the air velocity increases is known as the Bernoulli principle, which is another form of the principle of conservation of energy or the simple form of the first law of thermodynamics. EX-1004 3:10-24. Sterner also explains that:

The restriction chamber 150 further has an opening or optionally a flared opening 140 on at least one sidewall to create a venturi vent 120. This venturi vent 120 then allows air outside of the air duct 15 to enter the opening thus allowing air outside of air duct 15 to mix with the air entering the intake manifold 130.

EX-1004 3:28-33; EX-1003 ¶57.

Further by way of example, Lord also used a fan-driven Venturi effect to draw an airflow in a forced convection cooling system for electronic enclosures. Specifically, Lord discloses an electronics plenum wherein “[a]ir communicating through the passageways defined by the fins removes heat from the fins, and also creates a venturi effect to remove heat from within a housing via the openings to further cool the portable electronic device.” EX-1007 Abstract; EX-1003 ¶58.



Pet. 25; EX-1007 FIGS. 2, 9; EX-1003 ¶58.

Lord explains that:

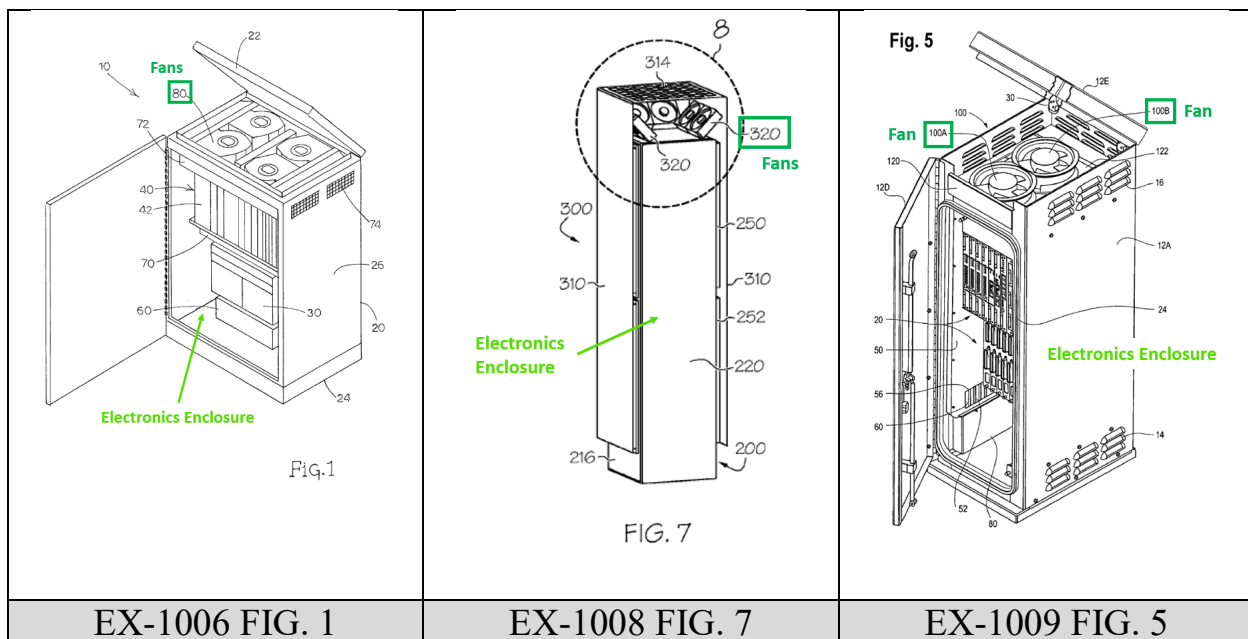
Openings 50 extend through the generally planar intake end of unitary base 38, each opening into the cavity 26 of device 10 proximate the heat generating components 22, as well as other electrical components 28 shown in FIG. 1. Advantageously, as air flows across each of these

openings 50, a venturi effect is created, which venturi effect draws the heating [sic] air from within cavity 26 into the passageways 14 for exhausting via fan 16.

Pet. 25; EX-1007 3:53-63; EX-1003 ¶59.

ii. Forced Convection Cooling With Fan/Shroud Above Enclosure

In forced convection cooling systems for electronics enclosures, it was well-known to position one or more fans and the associated fan shrouds above the enclosure such that air is drawn in at the bottom of the heat sink(s) and exhausted at the top. For example, each of Jones (EX-1006), Fischer (EX-1008), and Morrell (EX-1009) disclose such a fan/shroud arrangement:



A POSA understood that it was common to put a fan above a heat sink since warm air naturally rises and thus exposing the warm air to the suction side of a fan

facilitates the amount of airflow being drawn from the heatsink and exhausted by the fan. Pet. 25-26; EX-1003 ¶61.

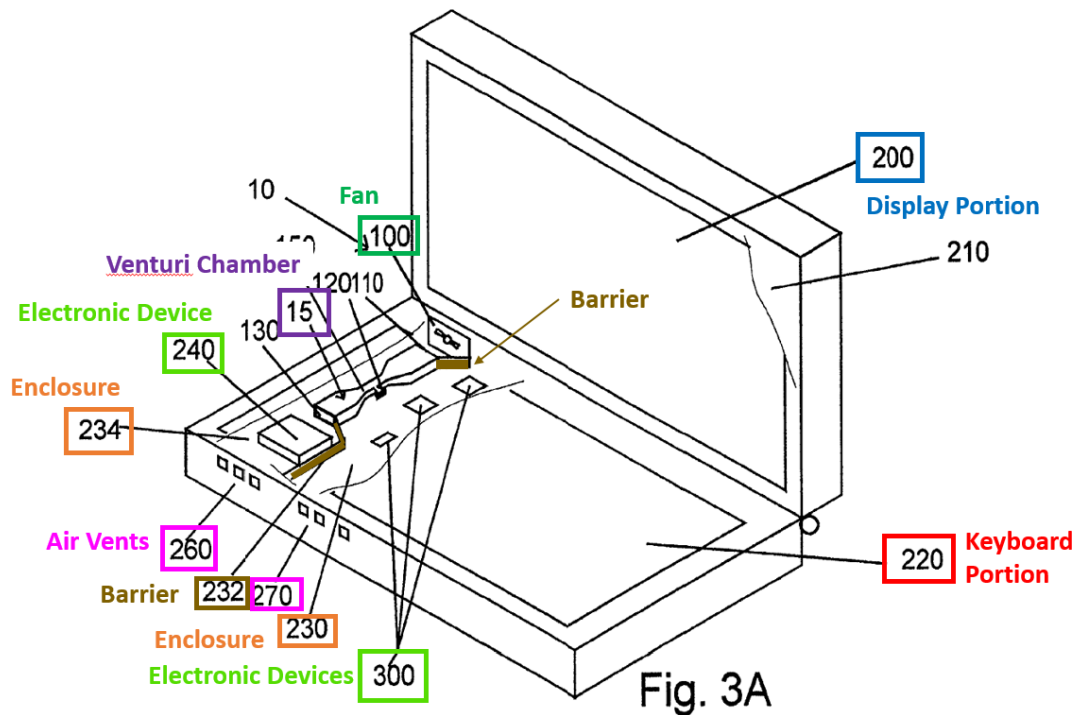
**d. Ground 1 Plainly Demonstrates that at Least
Independent Claims 1 and 14 are Unpatentable**

Under Ground 1, the Petition challenges Claims 1, 3-5, and 14-16 as obvious over Sterner (US 2002/0179286)(EX-1004). As set forth in the Petition and reiterated below, Ground 1 plainly demonstrates that at least independent Claims 1 and 14 are obvious in view of Sterner. The strength of Ground 1 is confirmed by Procomm's mischaracterizations of the Petition and the plain disclosure of Sterner in its attempt to traverse the grounds.

i. The Sterner Reference

Sterner is titled "Apparatus to Enhance Cooling of Electronic Device" and, like the '521 Patent, is directed to a method for cooling electronic devices using a fan-driven Venturi effect to draw air through a heatsink, and a system implementing the cooling method. EX-1004 Title, Abstract. Specifically, Sterner identifies the field of invention as "a heat transfer system ... using a venturi to create separate air flows in an electronic device to cool components." EX-1004 1:10-12; EX-1003 ¶65.

FIG. 3A as illustrates an embodiment.



Pet. 29; EX-1004 FIG. 3; EX-1003 ¶66.

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; EX-1004 3:45-4:7; EX-1003 ¶67.

FIG. 8 illustrates one embodiment of the arrangement and operation of components for removing heat generated by components 240, 300 within enclosures 230, 234 respectively.

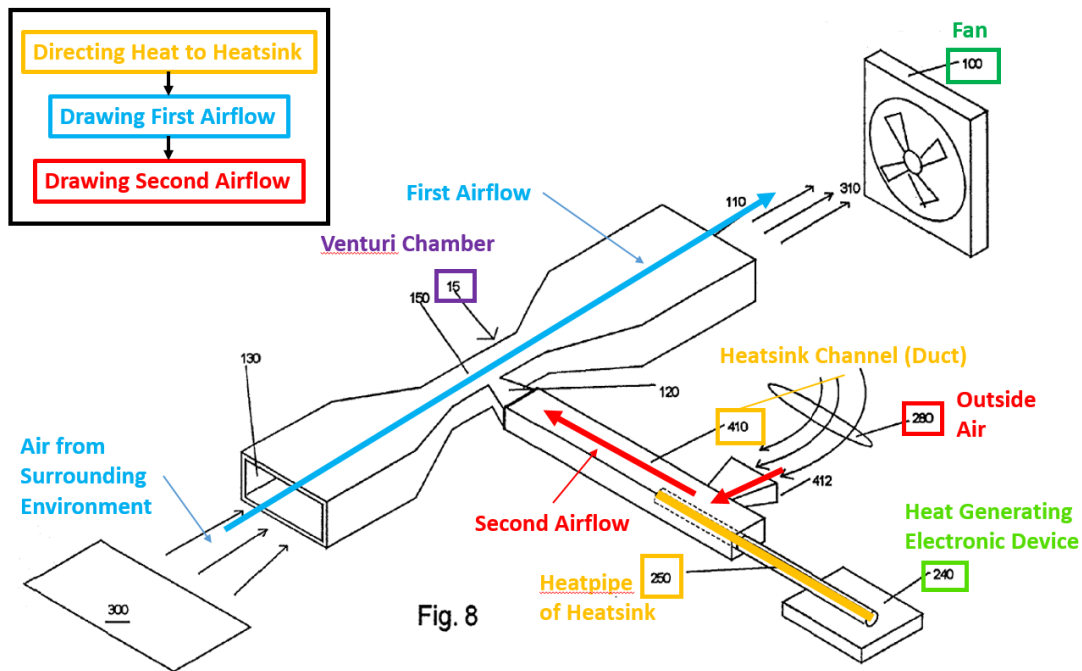


Fig. 8

Pet. 30; EX-1004 FIG. 8; EX-1003 ¶68.

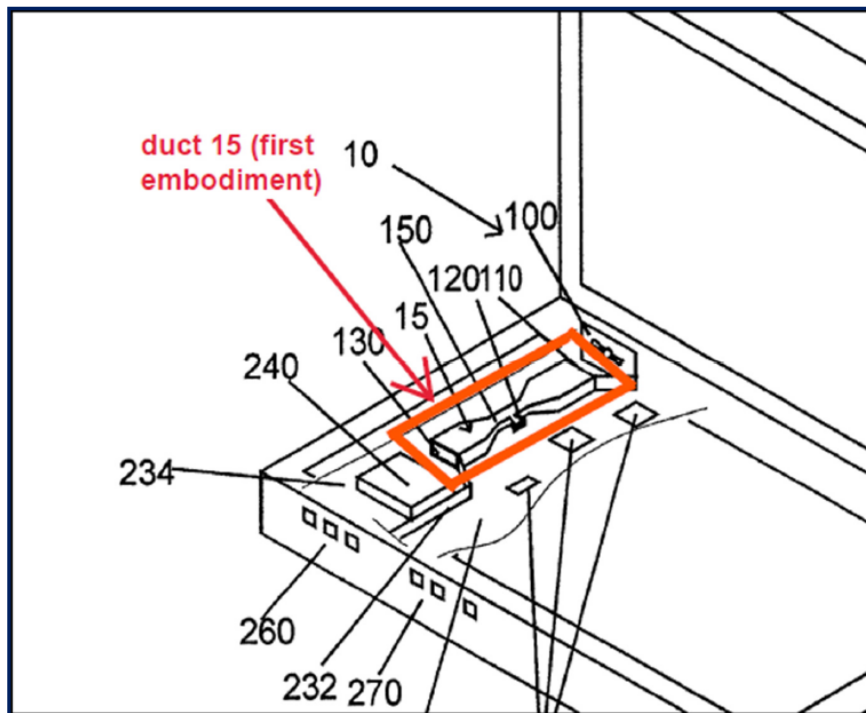
Sterner explains that heatpipe 250 (gold) is thermally coupled to heat producing component 240 (green). Heatpipe 250 (gold) is further coupled to second duct 410 (gold) forming a heatsink. Fan 100 (dark green) draws a first airflow (blue) through the air duct (venturi chamber) 15 (purple) by pulling an exhaust air flow 310 from exhaust manifold 310 to thereby create an airflow into intake manifold 130. A low pressure region is created by drawing air through the restriction chamber 150. The restriction chamber is coupled to second duct 410

(which is coupled to the condensing end of a heat pipe 250) through venturi vent 120. Second duct 410 has an opening 412 used to draw in outside air 280, which is air external from electronic device 10 (FIG. 3A). Thus, a second airflow (**red**) is drawn through the second duct 410 using a venturi effect created by drawing the first airflow (**blue**) through air duct (venturi chamber) 15 (**purple**) to remove heat from heatsink 250 (**gold**) using the outside air 280. EX-1004 5:14-30; EX-1003 ¶69.

ii. Claim 1

In its attempt to distinguish Claim 1 from Sterner, Procomm argues that “Petitioners rely on multiple embodiments distinct embodiments from Sterner ’753 without even attempting to establish that a POSITA would have an apparent reason to combine those embodiments.” Req. 16. Procomm’s argument mischaracterizes the Petition and the plain disclosure of Sterner.

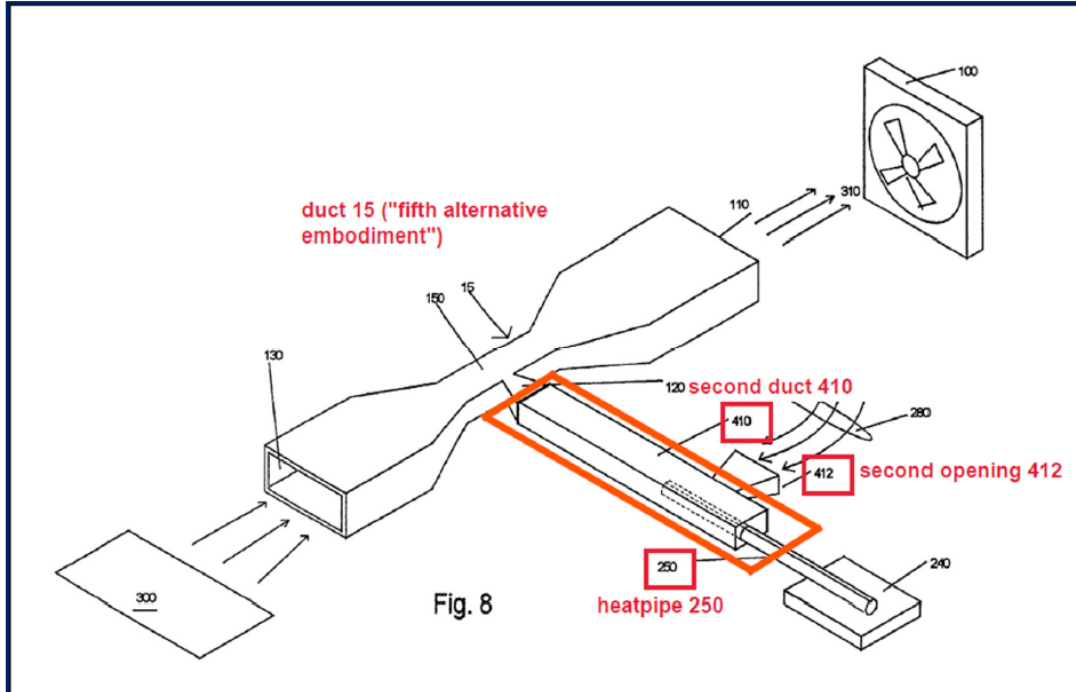
The absurdity of Procomm’s argument is demonstrated by its own illustrations. Procomm asserts that “Figure 3A uses a standard air duct 15” and provides the following annotated Figure 3A:



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

Req. 19.

Procomm then provides an annotated Figure 8:



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

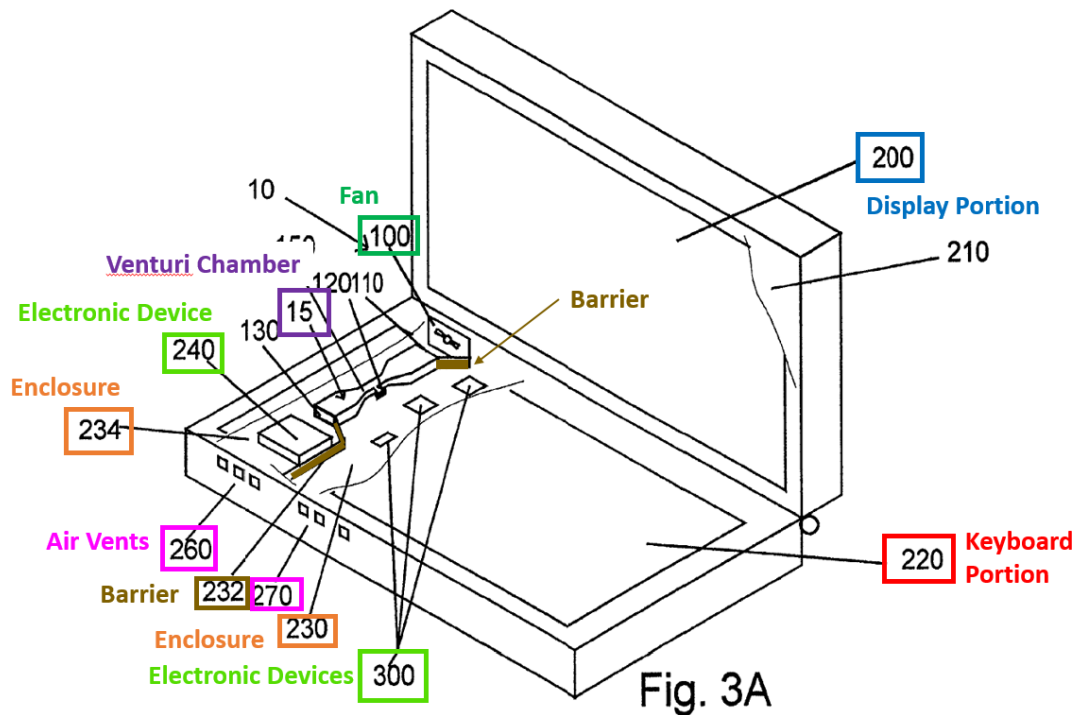
Req. 20.

Procomm then bases its patentability argument as “Petitioners never even attempt to establish an apparent reason for a POSITA to combine the Figure 3A ‘preferred embodiment’ with the Figure 8 ‘fifth alternative embodiment’ of Sterner.” Req. 20. However, in making this argument, Procomm completely ignores that Sterner itself teaches the combination as plainly illustrated in Procomm’s own annotated Figure 8 – showing air duct 15 configured in combination with second duct 410. If Figure 8 alone is not clear enough for Procomm, Sterner also describes the combination with reference to Figure 8:

The vacuum air flow created in restriction chamber 150 **[of air duct 15]** is coupled to a second duct 410, which is preferably further coupled to the condensing end of a heat pipe 250. Heatpipe 250 is thermally coupled to heat producing component 240, which is preferably separated from system components 300 by a cavity or enclosure (not shown). The second duct 410 further has an opening 412 used to draw in outside air 280, which is air external from electronic device 10 (FIG. 3A). When using heat pipe 250, the outside air 280 removes heat from the condensing end of the heat pipe before being drawn into venturi vent 120. Otherwise, if no heat pipe is used, the outside air flows over heat producing component 240 before entering opening 412.

EX-1004 5:18-30 (emphasis added).

Sterner is titled “Apparatus to Enhance Cooling of Electronic Device” and identifies the field of invention as “a heat transfer system ... using a venturi to create separate air flows in an electronic device to cool components.” Pet. 31; EX-1004 Title, Abstract, 1:10-12; EX-1003 ¶70. FIG. 3A illustrates the invention embodied in device 10, such as a laptop computer:



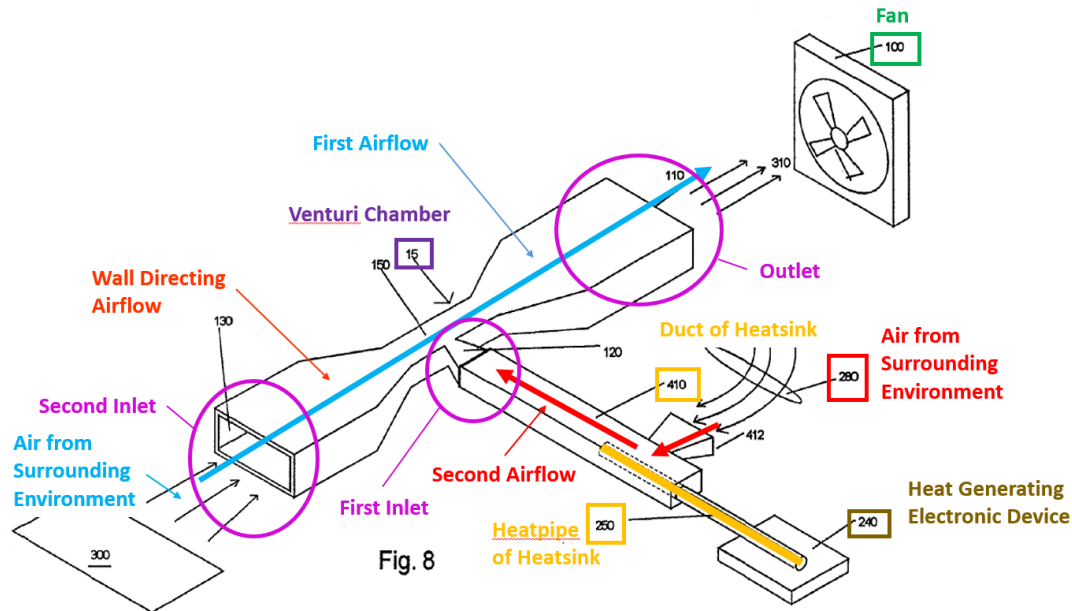
Pet. 32; EX-1004 FIG. 3A; EX-1003 ¶71.

Sterner discloses that laptop computer 10 includes barrier 232 (**brown**), fan 100 (**dark green**) and air duct 15 (**purple**) [collectively, the *cooling device*] that provides cooling for enclosures (cavities) 234, 230 (**orange**) [*enclosure*] housing electronic devices 240, 300 (**green**) [*electronics*]. A POSA understood that device 10 includes a cooling unit that provides cooling to an enclosure housing electronics.

In FIG. 8, Sterner illustrates one embodiment of the arrangement and operation of components for removing heat generated by electronic devices 240,

300 within the enclosures 230, 234 of the laptop computer 10 illustrated in FIG.

3A:



Pet. 35-36; EX-1004 FIG. 8; EX-1003 ¶77

A POSA understood that the teachings of Sterner with reference to FIG. 3A as referenced in the Petition apply to the device having the arrangement of components illustrated in FIG. 8.

Procomm further argues that Sterner “does not teach or suggest limitation 1.2(b) of Claim 1 for a *Venturi chamber having ... a second inlet for receiving an airflow from a surrounding environment.*” Req. 15 (emphasis in original).

Procomm’s argument fails for several reasons. First, Procomm does not dispute that the airflow drawn into the second inlet is not drawn from the surrounding environment, only that the airflow from the surrounding environment passes over

components 300 before being received by the second inlet. However, limitation 1.2(b) requires only that the airflow be drawn from the surrounding environment and does not preclude such an airflow from passing over component 300.

Second, Procomm ignores the alternative embodiment where Sterner expressly teaches that “[o]ptionally, 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 to mix with the air stream 72 from across heat producing component 240 in order to cool the air before it exits the electronic device 10, thereby making the exhaust air flow 310 more comfortable to the user.” Pet. 37; EX-1004 4:20-26.

iii. Claim 14

Procomm argues that Sterner does not disclose a *sealed environment* as recited in Claim 14. Procomm bases its argument on the disclosure by Sterner with reference to FIG. 3A that “the cavities 230/234 are connected to air vents 260/270.” Req. 21. However, in making this argument, Procomm ignores the disclosure in Sterner that the electronic device 240 is housed in cavity/enclosure 230 thus separating the device from system components 300, and that cavity/enclosure is sealed by drawing outside air directly into duct 410 rather than drawing outside air into the cavity through an air vent. Specifically, the Petition sets forth that Sterner provides FIG. 8 as illustrating one embodiment of the

arrangement and operation of components for removing heat generated by components 240, 300 within enclosures 230, 234 respectively. EX-1003 ¶104.

As set forth for element [1.2], Sterner discloses that heat producing electronic device 240 (**green**) [*electronics*] is housed in cavity 230 (shown in FIG. 3A) and “is preferably separated from system components 300 by a cavity or enclosure (not shown [in FIG. 8])” and that heat producing electronic device 240 is thermally coupled to heatpipe 250 (**gold**) which is thermally coupled to duct 410 [*directing heat generated by one or more electronic devices housed within a sealed environment of an enclosure to a heatsink*]. EX-1004 5:20-28. During operation, the second airflow (**red**) is drawn into duct 240 through opening 412 from outside air 280, drawn into air duct 15 (**purple**) through venturi vent 120, and discharged from device 10 to the external environment by fan 100 (**dark green**) as part of exhaust air flow 380. Thus, a POSA understood that heatpipe 250 and duct 410 constitute *a heatsink thermally coupled to an external environment* as recited in element [6.1]. EX-1003 ¶105. Hence, Sterner discloses element [14.1].

Procomm also argues that Sterner fails to disclose limitations 14.0-14.3 on the basis that “the Petition does not establish an apparent reason to combine the disparate embodiments of Figure 3A and Figure 8 of Sterner.” Req. 22.

Procomm’s arguments fail for the same reasons as set forth for Claim 1 above.

**e. Ground 2 Plainly Demonstrates That At Least
Independent Claims 1 and 14 Are Unpatentable**

Under Ground 2, the Petition challenges Claims 1, 2, 4-5, and 14-17 as obvious over Aakalu (US 5,894,407)(EX-1005). As set forth in the Petition and reiterated below, Ground 2 plainly demonstrates that at least independent Claims 1 and 14 are obvious in view of Aakalu.

i. The Aakalu Reference

Aakalu is titled “Enclosures for Heat Producing Devices” and, like the ’521 Patent, is directed to a method for cooling electronic devices housed in an enclosure using a fan-driven Venturi effect to draw air upward through a heat sink, and a system implementing the cooling method. EX-1005 Title, 3:30-34; EX-1003 ¶113.

Aakalu explains that, as of the late 1990’s, “in the development of wireless communication networks, it is desirable to provide a number of small base stations, called microcells” and that “[o]ne implementation of such microcells involves the packaging of electronic components associated with the base stations into small outdoor enclosures” but that “most enclosures tend to trap heat which may be detrimental to the electronic components, particularly to integrated circuits and microprocessor chips.” EX-1005 1:12-20; EX-1003 ¶114. Aakalu further explains

that “outdoor enclosures containing any electronic components are subject to two forms of heat: heat generated by the electronic components and solar heat” and that it was known to dissipate the component generated heat using heat sinks and convection, and to cover the enclosures with a solar shield to shelter the enclosure from solar heat. EX-1005 1:21-34; EX-1003 ¶114.

Aakalu then notes that “using the solar shields in combination with the heat sinks, in most cases, can significantly decrease the overall efficiency of the convection process. Accordingly, there exist a need for an enclosure with a cooling scheme for heat producing devices that shelters the enclosures from solar heat without significantly decreasing the efficiency of the convection process associated with heat sinks.” EX-1005 1:34-44; EX-1003 ¶115.

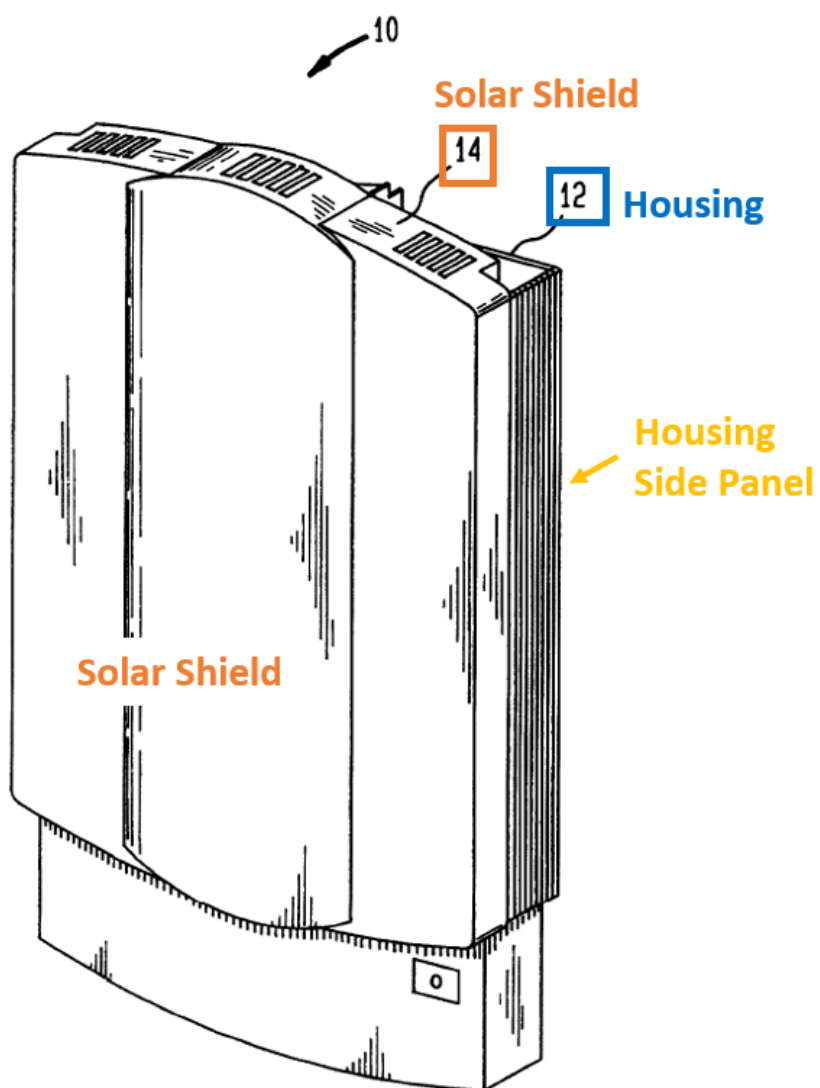
Aakalu summarizes its solution as “an enclosure cooling scheme for cooling heat producing devices, such as electronic components, contained within the enclosure” wherein, in an embodiment, “[t]he enclosure comprises a housing and a solar shield.” EX-1005 1:48-56; EX-1003 ¶116. Aakalu further describes the enclosure:

The housing includes a plurality of heat sinks for absorbing and dissipating heat generated by the devices. Each heat sink has an interior side to which the devices are mounted and an exterior side with a plurality of fins that form first and second channels. In one embodiment, the first channels are aligned longitudinally with the

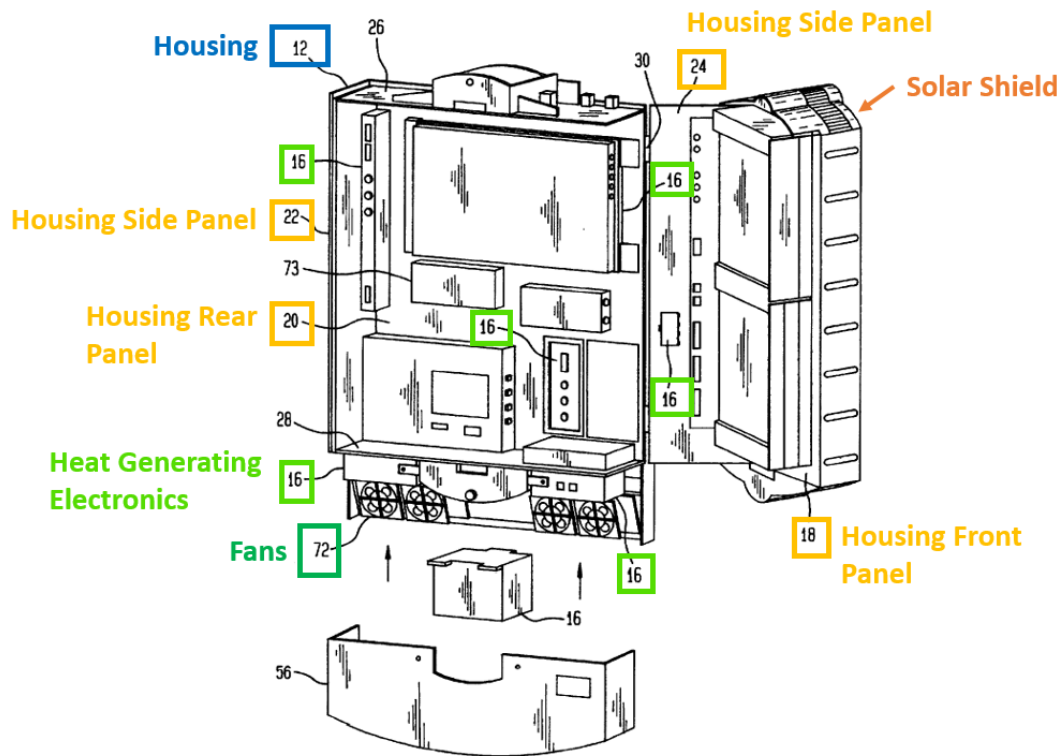
prevalent direction of airflow, and the second channels are aligned in a contrasting manner to the first channels to allow fresh air to be drawn into the first channels (through the second channels) during the convection process. Positioned over the heat sinks is the solar shield for sheltering the housing from solar heat. The solar shield includes ventilators which align with the first and second channels for allowing the passage of air into the heat sinks and heat absorbed by the heat sinks to be dissipated.

EX-1005 1:56-2:3; EX-1003 ¶116.

Aakalu provides FIGs. 1 and 2 depicting the enclosure in the closed (FIG. 1) and open (FIG. 2) positions.



EX-1005 FIG. 1; EX-1003 ¶117

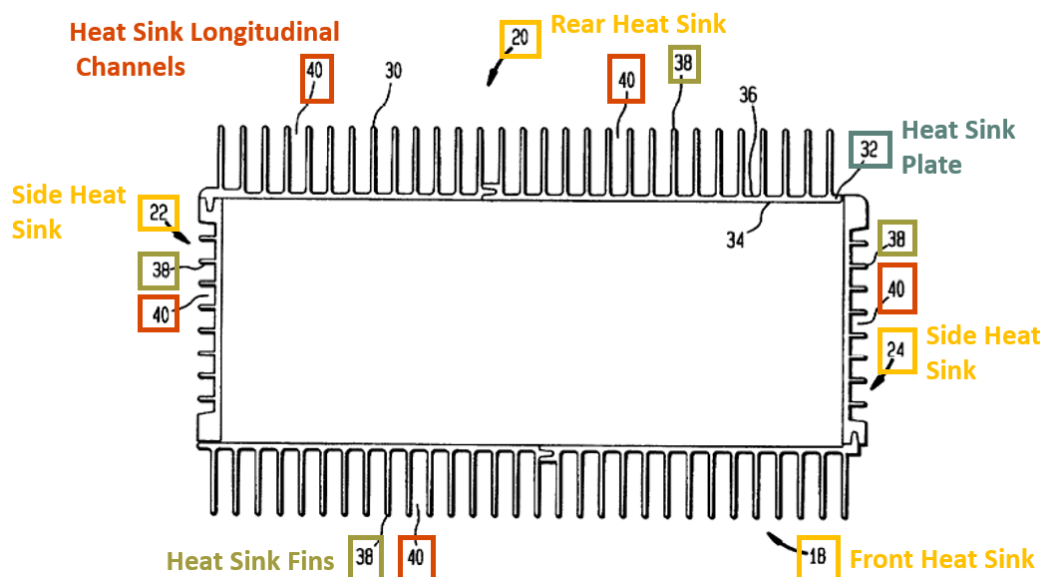


EX-1005 FIG. 2; EX-1003 ¶117

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). EX-1005 2:59-3:9; EX-1003 ¶118.

Aakalu illustrates a top view of enclosure 10 with the solar shield removed in FIG. 5:

FIG. 5



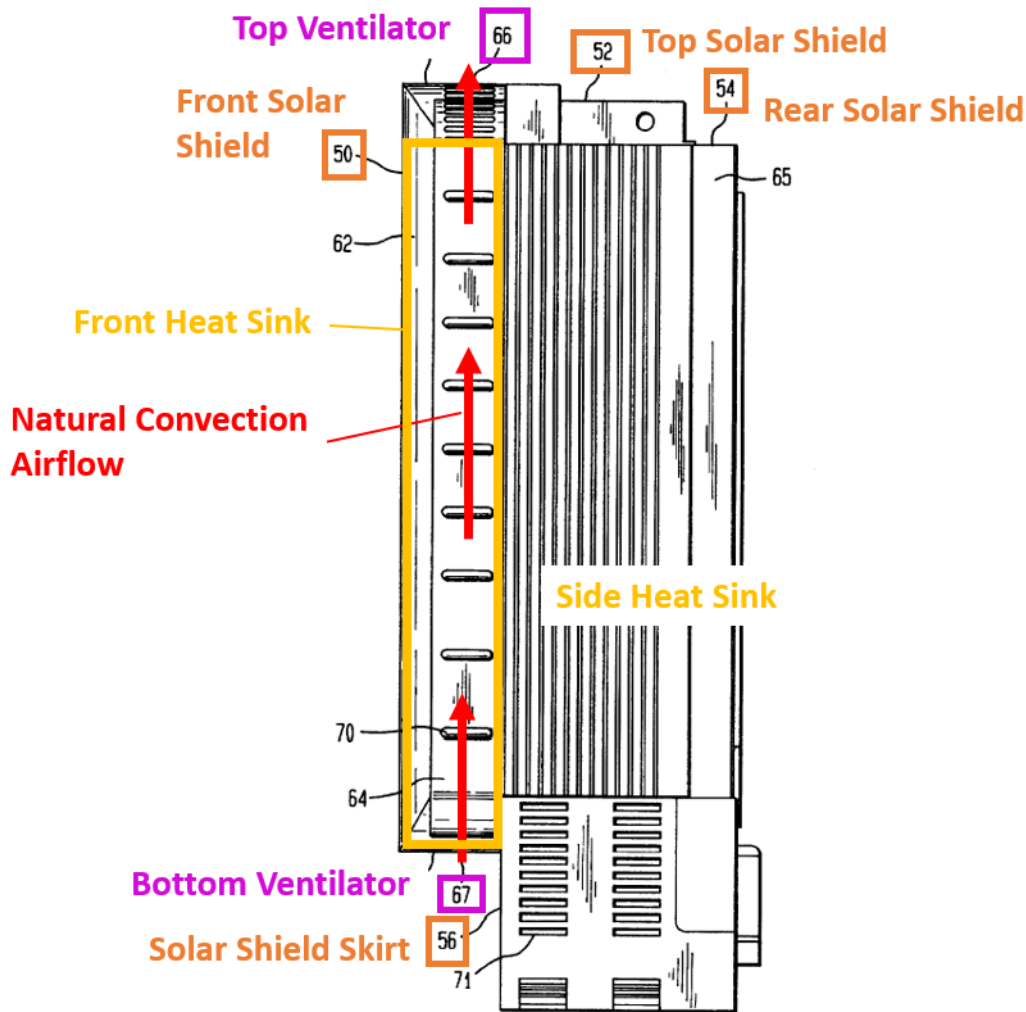
EX-1005 FIG. 5; EX-1003 ¶119.

Aakalu explains that “[p]referably, the heat sinks [(gold)] are formed from a highly heat conductive material” and that each comprises “a heat sink plate 32 [(teal)] having an interior side 34 to which the base station electronic components 16 are mounted and an exterior side 36 having a plurality of fins 38 [(bronze)]” wherein “[t]he fins 38 project laterally outward from the exterior side 36 and form channels 40 [(red-orange)] (referred to herein as longitudinal channels) between through which cooling air may pass.” EX-1005 3:9-20; EX-1003 ¶120.

Aakalu further explains that “solar shield 14 [(orange) (FIGs. 1, 2)] shelters the microcell 10 from solar heat” and “is adapted to fit over the front, rear, top and

bottom panels 18, 20, 26, 28 of the housing 12.” EX-1005 3:49-53; EX-1003

¶121. FIG. 7 illustrates a side view of enclosure 10 with the solar shield installed.

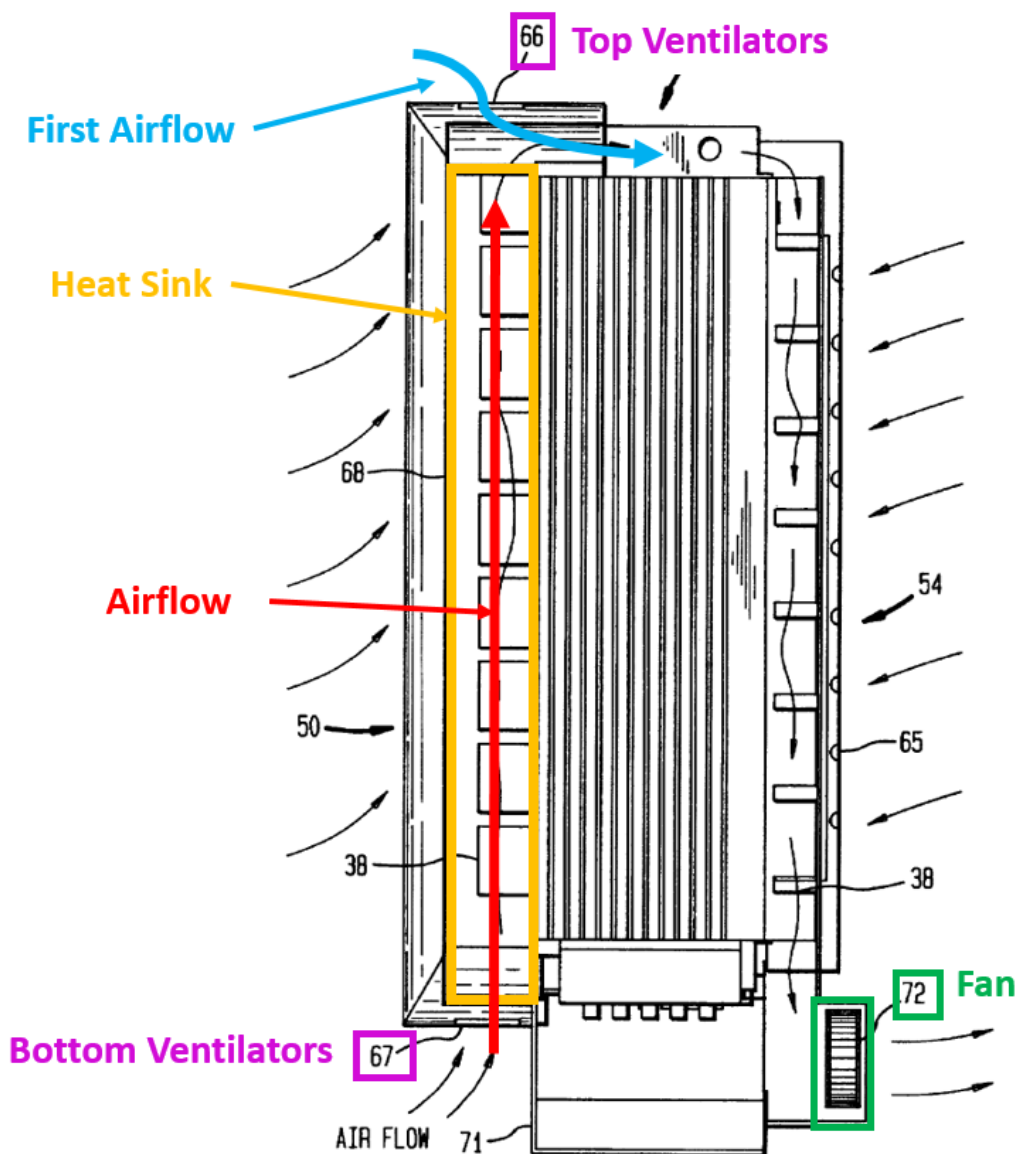


EX-1005 FIG. 7; EX-1003 ¶121.

Solar shield 14 comprises front, top, rear, and skirt solar shields 50, 52, 54, 56 (**orange**). Front solar shield 50 top and bottom ventilators 66, 67 (**red-purple**) such as slots that align with the longitudinal channels 40 (**red-orange**) (FIG. 5) of

the front heat sink (gold) to thereby allow airflow passage (red) upward through the heat sink due to natural convection. EX-1005 3:63-4; EX-1003 ¶122.

FIG. 10 depicts “a side cross-sectional view of microcell 10 illustrating the path of airflow through the microcell using forced convection” – i.e., by operating fans 72. EX-1005 4:56-58; EX-1003 ¶123.



EX-1005 Fig, 10; EX-1003 ¶123.

Aakalu explains that when fans 72 are operating during forced convection cooling of enclosure 10, “fresh air is drawn in through the top ventilators 66 and mixed with the old air as it passes over the top panel 26 and enters the longitudinal channels of the rear panel” and that “the fans draw air in through the ventilators.” EX-1005 4:64-67, 6:59-60. The air drawn in through the top ventilators 66 (**red-purple**) is depicted as the first airflow (**blue**). EX-1003 ¶124. Air is also drawn in through the bottom ventilators 67 (**red-purple**) and “travels through the longitudinal channels dissipating heat absorbed by the heat sink (of the front panel)” as depicted by the second airflow (**red**). EX-1005 4:57-60; EX-1003 ¶124. Aakalu further explains that the amount of air drawn up through the front heat sink (**second (heated) airflow**) is determined by the amount of air drawn in through the top ventilators 66 (**first airflow**) during the forced convection cooling operation. EX-1005 5:4-9; EX-1003 ¶124.

A POSA understood that as the air is drawn in through the top ventilators (**first airflow**) flows into the constricted volume bounded by top panel 26 and top solar shield 52, the flow rate increases and the pressure decreases, and that this Venturi effect will increase the airflow upward through the front heatsink (**second (heated) airflow**). EX-1003 ¶125.

Aakalu also discloses that the cooling device may include a regulation device to automatically control the size of the ventilators to control the volume of air flowing through the microcell and hence control the temperature of the components housed within the microcell. EX-1005 5:21-29; EX-1003 ¶126.

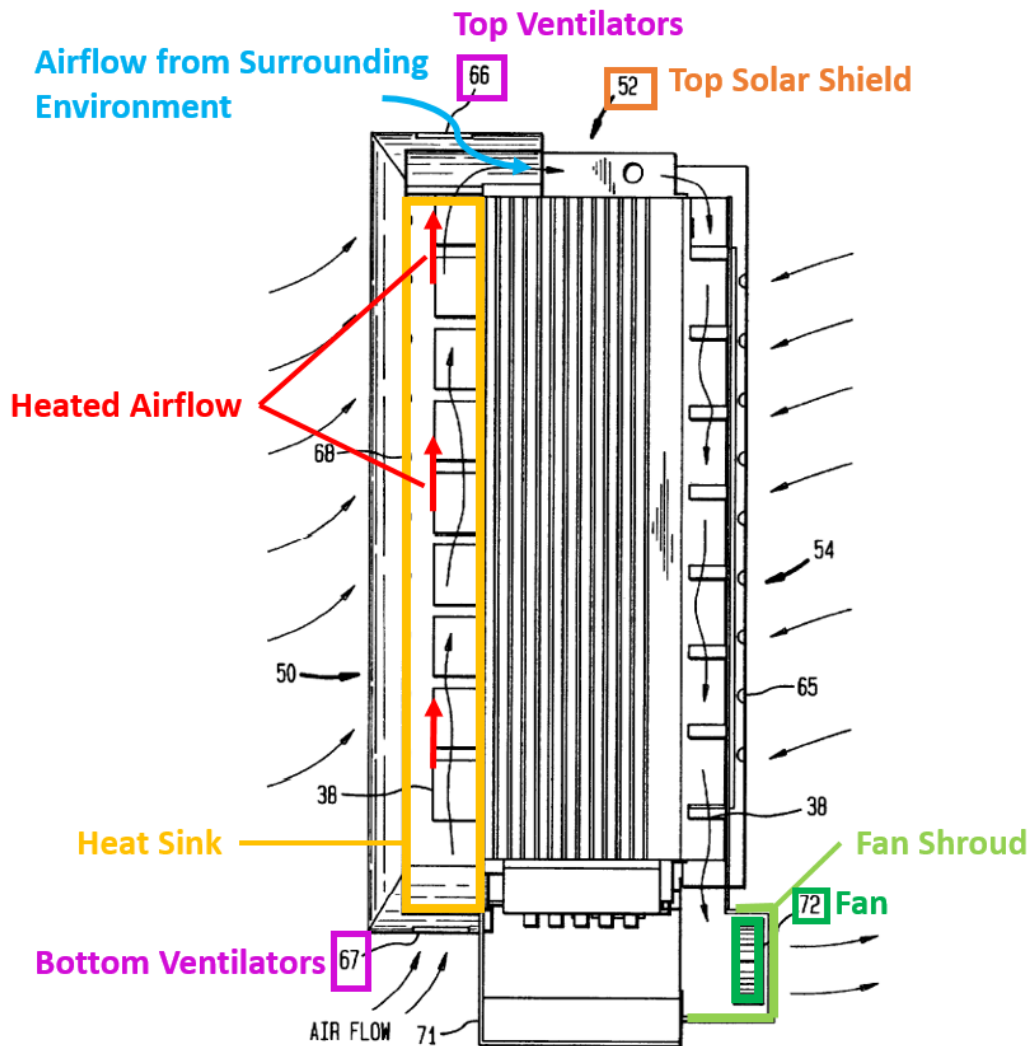
ii. Claim 1

Procomm argues that the Petition fails to show that Aakalu teaches or suggests a *Venturi chamber* as recited in limitation [1.2] on the basis that the testimony of Petitioners' expert, Dr. Tanbour, relied upon in the Petition is “pure *ipse dixit* unsupported by any evidence showing that there is a Venturi effect within Aakalu.” Req. 24. In making this argument, Procomm ignores the factual basis set forth in the Petition and relied upon by Dr. Tanbour in demonstrating how limitation [1.2] reads on the structure of Aakalu.

Procomm also argues that Aakalu does not disclose *an outlet coupled to the fan shroud* as recited in limitation [1.2(c)].

Limitation [1.2] recites a structure, called a Venturi chamber, having a first and second inlet for receiving air into the chamber, and an outlet coupled to a fan shroud for drawing air from the chamber. The Petition sets forth in detail with specific reference to the teaching of Aakalu and the understanding of a POSA set forth in the State of the Art section. *See* Pet. 59-64. Specifically, Aakalu discloses that “forced convection is used to dissipate the heat absorbed by the heat sink” and

that “microcell 10 includes fans 72 which facilitate the flow of air through the heat sinks,” and further that “the fans draw air in through the ventilators.” EX-1005 3:30-34, 6:59-60. FIG. 10 illustrates “the path of the airflow through the microcell using forced convection.” EX-1005 2:32-34; EX-1003 ¶132.



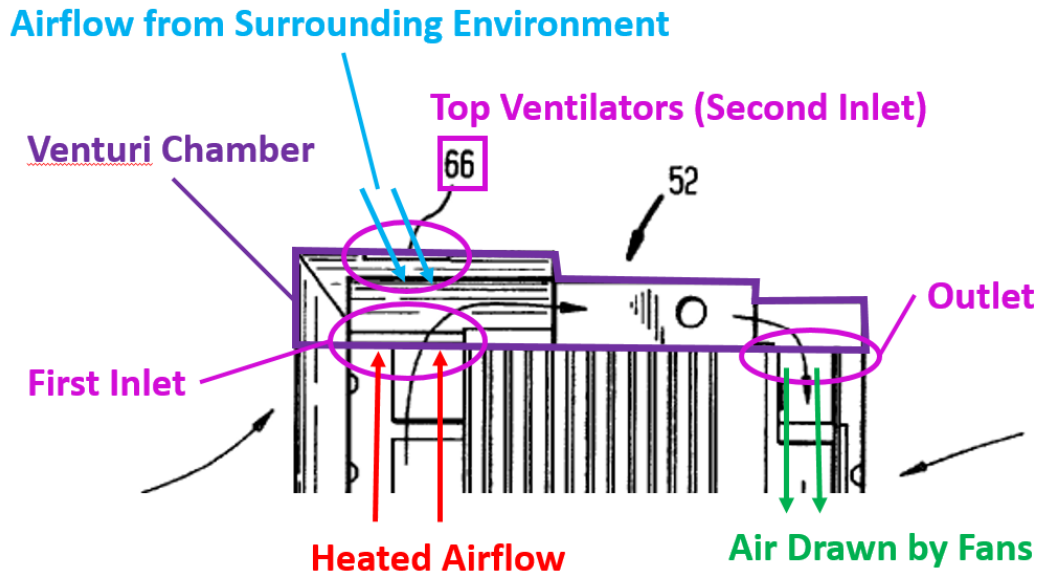
EX-1005 FIG. 10; EX-1003 ¶132.

Aakalu explains that when fans 72 (**dark green**) are operating during forced convection cooling of enclosure 10, “fresh air is drawn in through the top

ventilators 66 and mixed with the old air as it passes over the top panel 26 and enters the longitudinal channels of the rear panel.” EX-1005 4:64-67. A POSA understood that the air drawn in through the top ventilators 66 (**red-purple**) constitutes an *airflow from a surrounding environment* (**blue**) as recited in element [1.2]. EX-1003 ¶133.

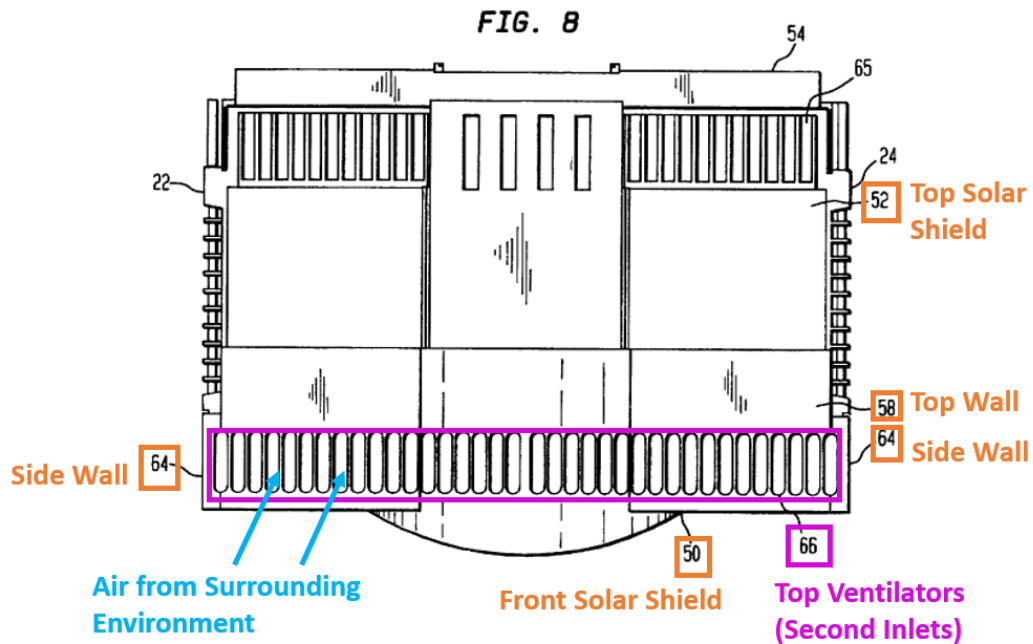
Air is also drawn in through the bottom ventilators 67 (**red-purple**) and “travels through the longitudinal channels dissipating heat absorbed by the heat sink (of the front panel).” EX-1005 4:57-60. A POSA understood that the airflow traveling through the heat sink (**gold**) constitutes a *heated airflow* (**red**) as recited in element [1.2]. EX-1003 ¶134.

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:

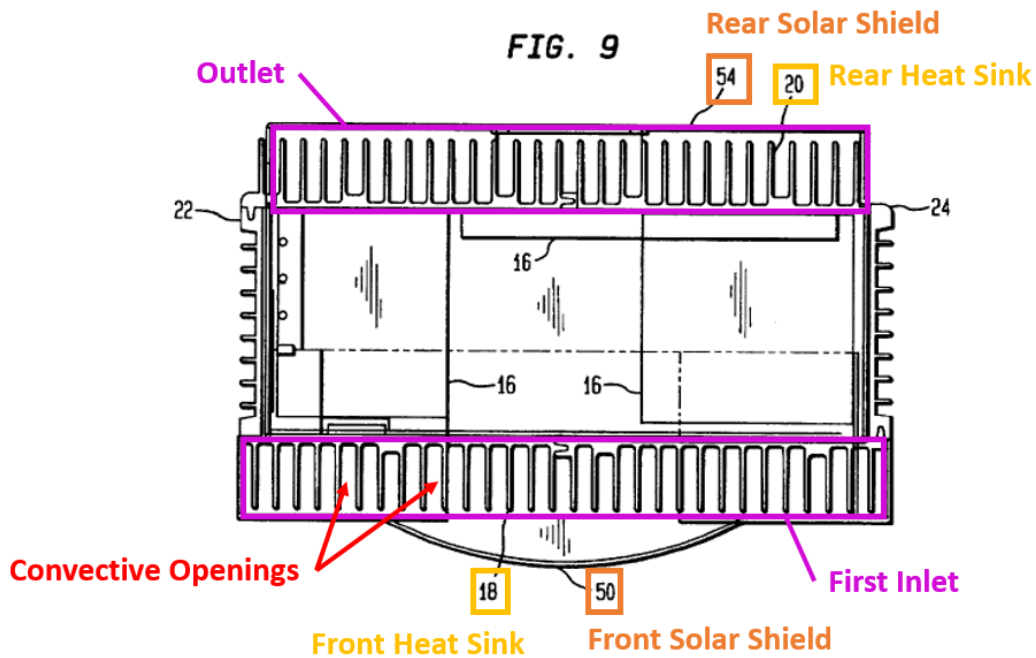


EX-1005 FIG. 10 (partial blow-up); EX-1003 ¶135.

FIGs. 8 and 9 depict a top and top cross-sectional view:



EX-1005 FIG. 8; EX-1003 ¶136.



EX-1005 FIG. 9; EX-1003 ¶136.

The Venturi chamber (**purple**) in the device of Aakalu includes a first inlet (**red-purple**) positioned adjacent the convective openings (**red**) at the top of the longitudinal channels of the front heat sink (**gold**) such that the heated airflow (**red**) flowing upward through the front heat sink is received into the Venturi chamber through the first inlet and flows over the top panel 26 [*a first inlet for receiving a heated airflow from a heat sink*]. EX-1005 4:57-67; EX-1003 ¶137.

The Venturi chamber also includes a plurality of top ventilators 66 (**red-purple**) forming an inlet where fresh air is drawn in from the surrounding environment (**blue**) [*a second inlet for receiving an airflow from a surrounding environment*]. EX-1005 4:64-5:10; EX-1003 ¶138.

*Petitioners' Opposition to Patent Owner's
Request for Discretionary Denial of Institution*

Aakalu further discloses that air is drawn from the Venturi chamber by the operating fan(s) (**dark green**) through an outlet (**red-purple**) and downward through the longitudinal channels of the rear heat sink 20 to be exhausted by fan(s) 72 [*the fan drawing air from the Venturi chamber via the outlet when the fan is on*]. EX-1005 4:63-5:4; EX-1003 ¶139. A POSA understood that the outlet (**red-purple**) is coupled to the fan shroud (**light green**) by rear heat sink 20 and rear solar shield 54 [*outlet coupled to the fan shroud*]. EX-1003 ¶139.

As discussed in the State of the Art section, a POSA understood that as air is drawn in through the top ventilators 66 (**red-purple**) it is subject to a reduction in volume formed in the restriction chamber that guides the air to the outlets thereby producing venturi effect that draws heated air into the chamber from the convective openings of the heat sink. Thus, Aakalu discloses element [1.2]. EX-1003 ¶140.

Moreover, Procomm ignores the factual basis set forth in the Petition demonstrating how limitation [1.3] reads on Aakalu, including how a POSA understood how the structure of Aakalu draws airflow through the heatsink using a Venturi effect when the fan is on. See Pet. 64-67. Specifically, the Petition states that “[w]hile While Aakalu does not expressly use the term “Venturi effect” to describe the interaction between the airflow (**blue**) drawn in through ventilators 66 [*second inlet*] and the heated airflow (**red**), a POSA understood from Aakalu that

the airflow (**blue**) is drawn across the convective openings (**red**) of the heat sink in a manner so as to draw the heated airflow through the heat sink using a Venturi effect. EX-1003 ¶141.

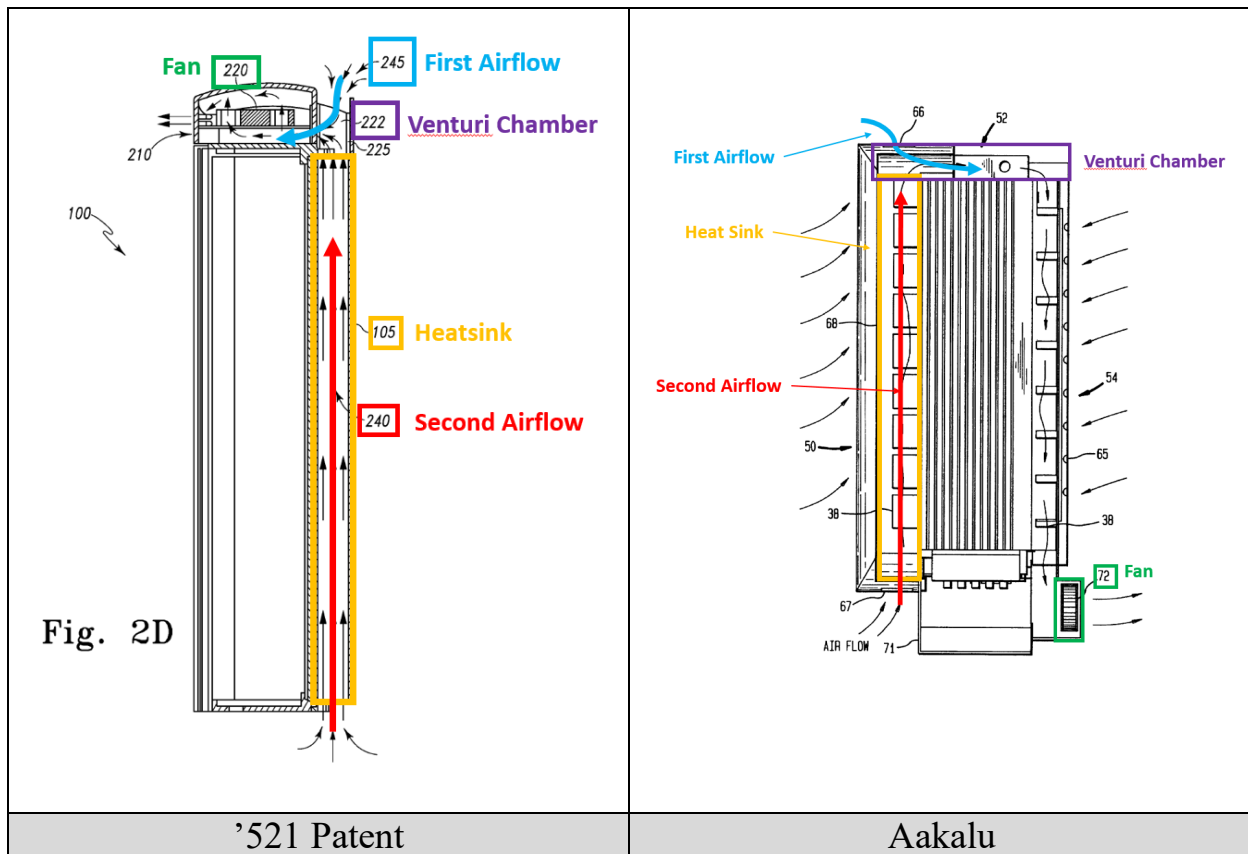
Aakalu explains that fan(s) 72 draw the airflow (**blue**) in through the ventilators 66, and that the amount of air drawn up through the front heat sink (**heated airflow**) is determined by the amount of air drawn in through the ventilators 66 (**first airflow**) during the forced convection cooling operation:

the top ventilators 66 also functions as a metering device for airflow during forced convection. The amount of fresh air drawn into the microcell during forced convection can be controlled by the size of the top ventilators 66 and the speed of the fans 72. In other words, the ratio of air drawn in through the front solar shield 50 is determined, in part, by the size of the slots 66.

EX-1005 5:4-9; EX-1003 ¶142.

A POSA understood that in order for the amount of airflow (**blue**) drawn in through ventilators 66 to “meter” the heated airflow (**red**) that the heated airflow is drawn through the heat sink using a Venturi effect caused by the first airflow. EX-1003 ¶143.

Indeed, the configuration of the enclosure of Aakalu is functionally similar to that of the enclosure of the '521 Patent. A side-by-side comparison of the devices illustrating the airflow during operation of the fan is provided below:



The '521 Patent describes the operation of the cooling device with the fan operating:

the 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 affect which will pull in more air through the heat sink than would flow naturally due to natural convention.

* * *

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.

EX-1001 5:66-6:6, 6:8-15; EX-1003 ¶145.

Like the operation of the '521 Patent, a POSA understood in Aakalu that the combination of drawing both the heated airflow from the heatsink (gold) and the ambient airflow from above (blue) 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, Specifically, as the air drawn in through the top ventilators 66 (first airflow) flows into the constricted volume bounded by top panel 26 and top solar shield 52, the flow rate increases and the pressure decreases, and that this Venturi effect will increase the airflow upward through the front heatsink (second (heated) airflow). EX-1003 ¶146.

iii. Claim 14

Procomm argues only that Aakalu does not disclose limitation [14.3] for the same reasons explained for limitation [1.2]. Petitioners contend that Aakalu

discloses limitation [14.3] for the same reasons set forth above demonstrating that Aakalu discloses limitations [1.2] and [1.3].

**f. Ground 3 Plainly Demonstrates That At Least
Independent Claim 19 is Unpatentable**

Under Ground 3, the Petition challenges Claims 3 and 18-20 as obvious over Aakalu in view of Jones (US 6,104,003)(EX-1006). As set forth in the Petition and reiterated below, Ground 3 plainly demonstrates that at least independent Claim 19 is obvious in view of Aakalu and Jones.

Procomm argues only that Aakalu does not disclose limitation [19.2] for the same reasons explained for limitation [1.2]. Petitioners contend that Aakalu discloses limitation [19.2] for the same reasons set forth above demonstrating that Aakalu discloses limitations [1.2] and [1.3].

As demonstrated, the strong merits of each of Grounds 1-3 weigh heavily in favor of institution.

**IV. THE DIRECTOR SHOULD NOT DENY INSTITUTION PURSUANT
TO SECTION 325(D)**

Procomm requests the Director to deny institution “because the references forming the bases for the grounds were already presented to and considered by the Examiner during prosecution of the ’521 Patent.” Req. 27.

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When determining whether to exercise discretion under § 325(d), “the Board uses the following two-part framework: (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of the challenged claims.” *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6, p. 8 (Feb. 13, 2020) (designated: March 24, 2020).

Here, the Office erred in a manner material to the patentability of the challenged claims during the prosecution of the '521 Patent. Ground 1 demonstrates that the Examiner erred by not applying Sterner '834 to the Challenged Claims despite the reference being disclosed in an IDS. Grounds 2 and 3 demonstrate that, while Aakalu formed the basis of a rejection that was overcome by amendment, the Examiner failed to consider the full disclosure of Aakalu which teaches limitation added by amendment and argued as missing by Applicant.

Denial under § 325(d) is not warranted because the challenges presented in this Petition are neither cumulative nor redundant to the prosecution of the Challenged Claims.

A. Sterner

The subject matter of Sterner was disclosed by the applicant in an IDS, but the Examiner did not cite nor discuss Sterner during prosecution. Thus, Sterner was not materially considered by the Office. As set forth in Ground 1, Sterner discloses all of the elements recited in at least independent Claims 1 and 14. Thus, it was error for the Examiner to not apply Sterner as demonstrated by Ground 1 in this Petition.

B. Aakalu

In a first Office Action, Claims 14-20, directed to a method of cooling electronics, were rejected as obvious over Aakalu in view of Dellapi (US6142595). EX-1002 52-53. In response, the applicant amended independent Claims 14 and 19:

14. (Currently Amended) A method for cooling a sealed environment of an enclosure for housing electronics, the method comprising:

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;

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;

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

EX-1002 28

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19. (Currently Amended) A method for cooling a sealed environment of an enclosure for housing electronics, the method comprising:

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;

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;

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.

EX-1002 29

In its Remarks, the applicant referenced an interview with the Examiner wherein the Examiner agreed that the amendments to Claims 14 and 19 would overcome the obviousness rejection. EX-1002 31-35. The Examiner subsequently issued a Notice of Allowance, and the Challenged Claims issued in the '521 Patent as amended.

In rejecting Claims 14-20 as obvious, the Examiner stated:

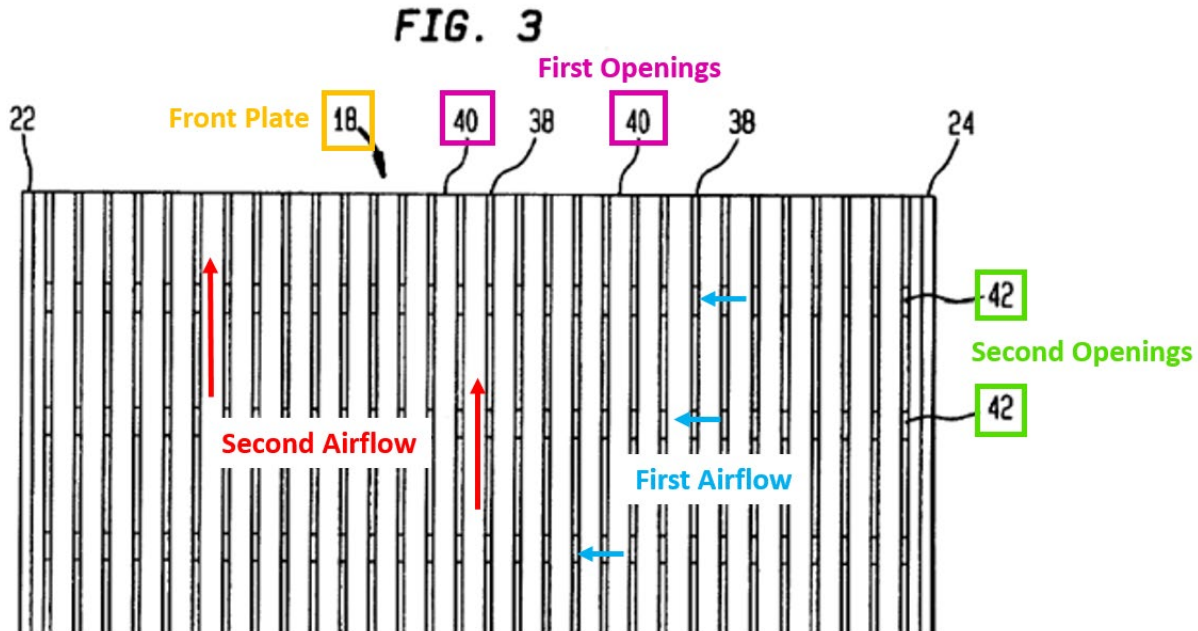
Aakalu teaches the broad method for cooling an enclosure 10 for housing electronics, the method comprising: ... drawing a first airflow [blue] across (as air flow crosses into the channel/opening 40 through channel 42 [*second opening (green)*] as seen in Fig. 3) one or more convective channels/openings 40 of the heat sink/plate 32 (rear wall

20)²; drawing a second airflow [**red**] (the airflow coming up through the channel/opening 40 [*first opening* (**pink**)]) from the bottom of the plate 32/rear wall 20 in Fig. 3) of heated air from (heated air goes out the top of the channel(s)/opening(s) 40) the one or more convective channels/openings 40 using a Venturi effect created by drawing the first airflow. The Venturi chamber is considered the channel(s)/opening(s) [i.e., *first opening(s)* 40 (**pink**) and *second opening(s)* 42 (**green**)] with the offset fan being one of the fans 72 to force the first and second airflow out of the Venturi chamber.

EX-1002 53-54.

The Examiner's application of Aakalu to the claims is illustrated in annotated FIG. 3 below:

² The Examiner appears to mistakenly reference front wall 18 depicted in FIG. 3 as rear wall 20.



EX-1005 FIG. 3 (upper portion)

In response, the applicant amended independent Claims 14 and 19 to add the limitation “*wherein the first airflow does not flow into the one or more convective openings of the heatsink*” and specifically argued Aakalu is deficient in teaching this newly added limitation. EX-1002 33-34.

The Examiner subsequently withdrew the rejection and allowed the claims. EX-1002 10-11.

However, even after the amendment, the claims still read on Aakalu as set forth in Ground 2. It was error for the Examiner not to consider the full teachings of Aakalu as set forth in Ground 2, which demonstrates that Aakalu discloses the limitation added by amendment that the applicant argued was missing in Aakalu.

It was further error for the Examiner to conclude that Aakalu does not teach a sealed enclosure. As set forth in Ground 2, Claim 14, Aakalu discloses this element.

Thus, even though the art presented in Ground 2 was before the examiner, the arguments (and supporting testimonial evidence) presented in the Petition were not before the Examiner, demonstrating that the Examiner erred in his interpretation of the art.

The Director should not deny institution under Section 325(d).

V. OTHER CONSIDERATIONS

A. The Settled Expectations of the Parties

Procomm argues that the '521 Patent has been in force since May 2010 and that Petitioners could have challenged the patent long ago but did not. However, Procomm ignores the fact that the products it accuses of infringing the '521 Patent in the Related Litigation had been on sale for at least six years free from any claim of infringement of the '521 Patent, or any other patent. Thus, Petitioners had no reason to challenge the '521 Patent prior to the Related Litigation. The Board should institute review to allow Petitioners to challenge a patent that was asserted six years after it began selling the accused products because Petitioners' settled expectation has been that it was not infringing the '521 Patent.

**B. The Petition is Properly Supported by Expert Testimony That
Cites the Underlying Factual Support**

The Request asserts that Dr. Tanbour's Declaration shows that the Declaration is merely a word-for-word copy of the Petition's arguments. However, Dr. Tanbour's declaration contains factual support for all of his opinions, and it is necessary that such opinions and factual citations be included in the Petition pursuant to 37 § 42.6(a)(3) which states that "arguments must not be incorporated by reference from one document into another document."

Thus, the Petition is properly supported by expert testimony that cites the underlying factual support.

VI. CONCLUSION

For the foregoing reasons, the Director should deny Procomm's request for discretionary denial of institution.

Respectfully submitted,

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Dated: May 28, 2025

CERTIFICATION OF SERVICE

I hereby certify that on May 28, 2025, a copy of Petitioners' Opposition to Patent Owner's Request for Discretionary Denial of Institution was filed by filing this document through the PTACT's System as well as delivering a copy via electronic mail upon the following:

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