

Petition for *Inter Partes* Review of
U.S. Patent No. 10,506,740

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. AND SAMSUNG ELECTRONICS
AMERICA, INC.

Petitioners,

v.

MANUFACTURING RESOURCES INTERNATIONAL, INC.

Patent Owner

U.S. Patent No. 10,506,740

Title: CONSTRICTED CONVECTION COOLING SYSTEM FOR AN
ELECTRONIC DISPLAY

Inter Partes Review No. IPR 2023-00254

PETITIONERS' CORRECTED PETITION FOR INTER PARTES REVIEW
OF
U.S. PATENT NO. 10,506,740

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P.O. Box 1450
Alexandria, VA 22313-1450

SEC et al. v. MRI
SEC Exhibit 1032.0001
IPR2023-00254

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LIST OF EXHIBITS

Exhibit No.	Description of Document
1001	U.S. Patent No. 10,506,740 (the “’740 patent”)
1002	Declaration of Robert Smith-Gillespie
1003	Curriculum Vitae of Robert Smith-Gillespie
1004	International Patent Application No. PCT/FI2006/050145 with Publication No. WO2007116116A1 (“Karppanen”)
1005	United Kingdom Patent Application No. GB 2402205A (“Yare”)
1006	U.S. Patent App. Pub. No. 2009/0145581 (“Hoffman”)
1007	U.S. Patent No. 8,758,144 (“Williams”)
1008	U.S. Patent App. Pub. No. 2008/0083527 (“Horng”)
1009	U.S. Patent No. 4,488,193 (“Davis”)
1010	U.S. Patent No. 6,392,727 (“Larson”)
1011	U.S. Patent No. 7,312,993 (“Bundza”)
1012	U.S. Patent No. 6,504,713 (“Pandolfi”)

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Exhibit No.	Description of Document
1013	U.S. Patent No. 5,991,153 (“Heady”)
1014	U.S. Patent No. 6,825,828 (“Burke”)
1015	E. Fred Schubert & Jong Kyu Kim, <i>Solid-State Light Sources Getting Smart</i> , 308 <i>Science</i> 1274 (2005) (“Schubert”)
1016	Military Handbook: Reliability Prediction of Electronic Equipment, DEPARTMENT OF DEFENSE, MIL-HDBK-217F (1991) (“MIL-HDBK-217F”)
1017	Allan Webber, <i>Calculating Useful Lifetimes of Embedded Processors</i> , TEXAS INSTRUMENTS INCORPORATED, SPRABX4 (Nov. 2014) (“Webber”)
1018	LIAN-TUU YEH & RICHARD C. CHU, THERMAL MANAGEMENT OF MICROELECTRONIC EQUIPMENT: HEAT TRANSFER THEORY, ANALYSIS METHODS, AND DESIGN PRACTICES (Dereje Agonafer ed., 2002) (“Yeh & Chu”)
1019	ALLAN W. SCOTT, COOLING OF ELECTRONIC EQUIPMENT (John Wiley & Sons, 1974) (“Scott”)
1020	DAVE S. STEINBERG, COOLING TECHNIQUES FOR ELECTRONIC EQUIPMENT (John Wiley & Sons, 1980) (“Steinberg”)
1021	U.S. Patent No. 5,748,269 to Harris et al. (“Harris”)

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1022	U.S. Patent No. 6,504,713 to Pandolfi et al. (“Pandolfi”)
1023	U.S. Patent No. 4,327,803 to Mullejeans et al. (“Mullejeans”)
1024	U.S. Patent No. 5,002,118 to Olmstead et al. (“Olmstead”)
1025	U.S. Patent No. 6,244,333 to Bergh et al. (“Bergh”)
1026	Claim Construction Order, <i>Mfg. Resource Intl., Inc. v. Civiq Smartscales, LLC</i> , Civil Action No. 17-269-RGA (D. Del. Oct. 3, 2018)
1027	U.S. Patent No. 8,854,572 to Dunn (the “’572 patent”)
1028	U.S. Patent No. 9,629,287 to Dunn (the “’287 patent”)
1029	U.S. Patent No. 9,173,325 to Dunn (the “’325 patent”)
1030	U.S. Patent Application Publication No. 2004/0135482 (“Thielemans”)
1031	File History for U.S. Patent Application No. 15/789,331
<u>1032</u>	<u>Redline of Corrected Petition</u>

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Petitioners Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (“Samsung” or “Petitioners”) seek *inter partes* review and cancellation of claims 1-3, 5-9, 11-13, 15-18, and 20 of U.S. Patent No. 10,506,740 (“the ’740 patent”) (Ex. 1001)¹. Petitioners’ request is supported by the Expert Declaration of Robert Smith-Gillespie (Ex. 1002), and other exhibits submitted herewith.

This Petition and supporting exhibits demonstrate that there is a reasonable likelihood that claims 1-3, 5-9, 11-13, 15-18, and 20 of the ’740 patent are unpatentable because each claim would have been obvious to a person of ordinary skill in the art (“POSITA”) in light of the prior art references discussed herein. Accordingly, Petitioners request that the Board institute an *inter partes* review.

¹ For purposes of this Petition, citations to patents and patent applications, including the ’740 patent, are in the form a:bb – c:dd, where “a” and “c” are column numbers, and “bb” and “dd” are line numbers.

I. MANDATORY NOTICES

A. Real Parties-in-Interest (37 C.F.R. § 42.8(b)(1))

The real parties-in-interest are Samsung Electronics Co. Ltd., Samsung Electronics America, Inc., Samsung SDS Co., Ltd., Samsung SDS America, Inc., Coates Signco Pty Limited, Coates US Inc. and Industrial Enclosure Corporation d/b/a Palmer Digital Group.

B. Related Matters (37 C.F.R. § 42.8(b)(2))

The '740 patent is at issue in *Manufacturing Resources, Inc. v. Samsung Electronics Co., Ltd., et al.*, Case No. 2:22-cv-00320, pending in the district court for the Eastern District of Texas, and in *In re Certain Outdoor and Semi-Outdoor Electronic Displays, Products Containing Same, and Components Thereof*, Investigation No. 337-TA-1331, pending before the International Trade Commission.

In both the District Court Action and the ITC Action, the Patent Owner also alleged infringement of U.S. Patent No. 8,854,595 (“the '595 patent”) by Petitioners. On November 22, 2022, Petitioners filed a petition for *inter partes* review of the '595 patent. (See *Samsung Electronics Co. Ltd. and Samsung Electronics America, Inc. v. Manufacturing Resources International, Inc.*, Case No. IPR2023-00199 (PTAB Nov. 22, 2022).) The '740 patent claims priority through a series of continuations and continuations-in-part to the '595 patent.

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In both the District Court Action and the ITC Action, the Patent Owner also alleged infringement of U.S. Patent No. 9,173,322 (“the ’322 patent”) by Petitioners. On December 5, 2022, Petitioners filed a petition for *inter partes* review of the ’322 patent. (See *Samsung Electronics Co. Ltd. and Samsung Electronics America, Inc. v. Manufacturing Resources International, Inc.*, Case No. IPR2023-00220 (PTAB Dec. 5, 2022).)

In both the District Court Action and the ITC Action, the Patent Owner also alleged infringement of U.S. Patent No. 11,013,142 (“the ’142 patent”) by Petitioners. On December 7, 2022, Petitioners filed a petition for *inter partes* review of the ’142 patent. (See *Samsung Electronics Co. Ltd. and Samsung Electronics America, Inc. v. Manufacturing Resources International, Inc.*, Case No. IPR2023-00221 (PTAB Dec. 7, 2022).)

C. Lead And Back-Up Counsel (37 C.F.R. § 42.8(b)(3))

Petitioners provide the following designation of counsel.

LEAD COUNSEL	BACK-UP COUNSEL
Sanjeet Dutta Registration No. 46,145 Goodwin Procter LLP 601 Marshall Street Redwood City, CA 94063 Email: sdutta@goodwinlaw.com Tel: (650) 752-3100 Fax: (650) 853-1038	Douglas J. Kline Reg. No. 35,574 Goodwin Procter LLP 100 Northern Avenue Boston, MA 02210 Email: dkline@goodwinlaw.com Tel: (617) 570-1000 Fax: (617) 523-1231

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	Srikanth Reddy Pro hac vice application to be filed sreddy@goodwinlaw.com Goodwin Procter LLP 100 Northern Avenue Boston, MA 02210 Tel: (617) 570 1000 Fax: (617) 523-1231
	Naomi Birbach Registration No. 67,113 Goodwin Procter LLP 620 Eighth Avenue New York, NY 10018 Email: nbirbach@goodwinlaw.com Tel. 212-813-8800 Fax 212-355-3333

D. Service Information (37 C.F.R. § 42.8(b)(4))

This Corrected Petition is being served by [email on lead and back-up counsel designated in Patent Owner's Power of Attorney, Paper 6, and by](#)
Federal Express to the attorney of record for the '740 patent, Standley Law Group.
Please direct all correspondence to counsel at the contact information above.

II. Fee Payment

Petitioners authorize the U.S. Patent & Trademark Office to charge Deposit Account No. 506989 for the fee set in 37 C.F.R. § 42.15(a) for this Petition and further authorizes any additional fees to be charged to this Deposit Account.

III. Requirements Under 37 C.F.R. §§ ~~42.204~~42.104

A. Grounds for Standing

Petitioners certify that the '740 patent is available for IPR and that Petitioners are not barred or otherwise estopped.

B. Identification of Challenge and Statement of Relief Requested

Petitioners request institution of IPR based on the following grounds:

Ground	Claims	Basis for Rejection
1	1-3, 5-9, 11-13, 15-18, and 20	Obvious over Karppanen (Ex. 1004)
2	1-3, 5, 6, 8, 9, 11-13, 15-18, and 20	Obvious over Yare (Ex. 1005)

Submitted with this Petition is the Declaration of Robert Smith-Gillespie, a qualified technical expert. (Exs. 1002, ¶¶6-17; 1003.)

~~C. List of Claims Challenged~~

~~This petition challenges 16 claims of the '740 patent. The following chart lists the claims from the '740 patent challenged by Petitioners, and their dependency upon the independent claims (the elements of which are provided letters for further reference in this Petition):~~

~~Claim Element~~	~~Limitation~~
~~1[pre]~~	~~An electronic display comprising:~~

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Claim Element	Limitation
~~1[a]~~	~~an electronic image assembly having a front portion and a rear portion;~~
~~1[b]~~	~~an open loop ambient air flow path behind the rear portion of the electronic image assembly;~~
~~1[c]~~	~~a closed loop gas circulation path about the electronic image assembly;~~
~~1[d]~~	~~a common heat exchanger located in the pathway of both the closed loop gas circulation path and the open loop ambient air flow path;~~
~~1[e]~~	~~a gas circulation device positioned to force circulating gas through the common heat exchanger; and~~
~~1[f]~~	~~an air circulation device positioned to force ambient air through the common heat exchanger.~~
~~2[a]~~	~~The electronic display of claim 1, further comprising: a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly; and~~
~~2[b]~~	~~a space defined between the rear portion of the electronic image assembly and the substantially planar surface;~~
~~2[c]~~	~~wherein the space is in gaseous communication with the open loop ambient air flow path.~~
~~3~~	~~The electronic display of claim 2, wherein the substantially planar surface is a plate.~~
~~5[a]~~	~~The electronic display of claim 1, further comprising: a front display surface spaced apart from the front portion of the electronic image assembly; and~~

Claim Element	Limitation
5[b]	~~a front channel defined by the space between the front display surface and the front portion of the electronic image assembly, the front channel forming part of the closed loop gas circulation path.~~
6	~~The electronic display of claim 1, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination devices, wiring, wiring harnesses, lights, thermo-electric devices, and switches.~~
7	~~The electronic display of claim 1, further comprising a cooling device placed near an entrance to the open loop ambient air flow path for reducing the temperature of ambient air entering the open loop ambient air flow path.~~
8[pre]	~~An electronic display comprising:~~
8[a]	~~an electronic image assembly having a front portion and a rear portion;~~
8[b]	~~a closed loop gas circulation path encircling the electronic image assembly;~~
8[c]	~~an open loop ambient air flow path behind the rear portion of the electronic image assembly;~~
8[d]	~~a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly, the space between the substantially planar surface and the rear portion of the electronic image assembly defining a rear channel;~~

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Claim Element	Limitation
8[e]	~~a common heat exchanger in gaseous communication with both the closed loop gas circulation path and the open loop ambient air flow path;~~
8[f]	~~at least one fan positioned to force circulating gas through the closed loop gas circulation path;~~
8[g]	~~at least one fan positioned to force ambient air through the open loop ambient air flow path.~~
9	~~The electronic display of claim 8, wherein the open loop ambient air flow path is also in gaseous communication with the rear channel.~~
11[a]	~~The electronic display of claim 8, wherein: the common heat exchanger includes first and second gas pathways, the first and second gas pathways being isolated from each other;~~
11[b]	~~where the first gas pathway is in gaseous communication with the open loop ambient air flow path; and~~
11[c]	~~where the second gas pathway is in gaseous communication with the closed loop gas circulation path.~~
12	~~The electronic display of claim 11, wherein the first gas pathway is also in gaseous communication with the rear channel.~~
13	~~The electronic display of claim 8, wherein the substantially planar surface is a plate.~~
15[a]	~~The electronic display of claim 8, further comprising: a front display surface spaced apart from the front portion of the electronic image assembly; and~~

Claim Element	Limitation
~~15[b]~~	~~a front channel defined by a space between the front display surface and the front portion of the electronic image assembly, the front channel forming part of the closed loop gas circulation path.~~
~~16~~	~~The electronic display of claim 8, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination devices, wiring, wiring harnesses, lights, thermo-electric devices, and switches.~~
~~17[pre]~~	~~A cooling system for an electronic image assembly, comprising:~~
~~17[a]~~	~~an open loop ambient air flow path at a rear portion of the electronic image assembly;~~
~~17[b]~~	~~a closed loop gas circulation path encircling the electronic image assembly;~~
~~17[c]~~	~~a common heat exchanger in gaseous communication with both the closed loop gas circulation path and the open loop ambient air flow path;~~
~~17[d]~~	~~a front channel defined by a space between a front portion of the electronic image assembly and a front display surface located forward of and spaced apart from the front portion of the electronic image assembly, the front channel forming a part of the closed loop gas circulation path;~~
~~17[e]~~	~~a rear channel defined by a space between the rear portion of the electronic image assembly and a substantially planar surface located~~

Claim Element	Limitation
	~~behind and spaced apart from the rear portion of the electronic image assembly, the rear channel forming a part of the open loop ambient air flow path;~~
17[f]	~~at least one fan positioned to force circulating gas through the closed loop gas circulation path and the common heat exchanger; and~~
17[g]	~~at least one fan positioned to force ambient air through the open loop ambient air flow path and the common heat exchanger.~~
18	~~The cooling system of claim 17, wherein the substantially planar surface is a plate.~~
20	~~The cooling system of claim 17, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination devices, wiring, wiring harnesses, lights, thermo-electric devices, and switches.~~

C. ~~D.~~ Considerations under 35 U.S.C. § 325(d)

This Petition does not present “the same or substantially the same prior art or arguments previously were presented to the Office.” 35 U.S.C. §325(d). The Karppanen and Yare prior art references were cited on the face of the ’740 patent as having been sent to the examiner by the applicant, but were otherwise not discussed during prosecution. As explained below, the *Advanced Bionics* framework and *Becton, Dickinson* factors favor institution. (*See infra*, §XI.)

IV. CERTIFICATION OF GROUNDS FOR STANDING

Petitioners certify pursuant to 37 C.F.R. § 42.104(a) that the '740 patent for which review is sought is available for *inter partes* review and that Petitioners are not barred or estopped from requesting an *inter partes* review challenging the patent claims on the grounds identified in this petition.

V. OVERVIEW OF THE '740 PATENT

A. Level of Ordinary Skill in the Art

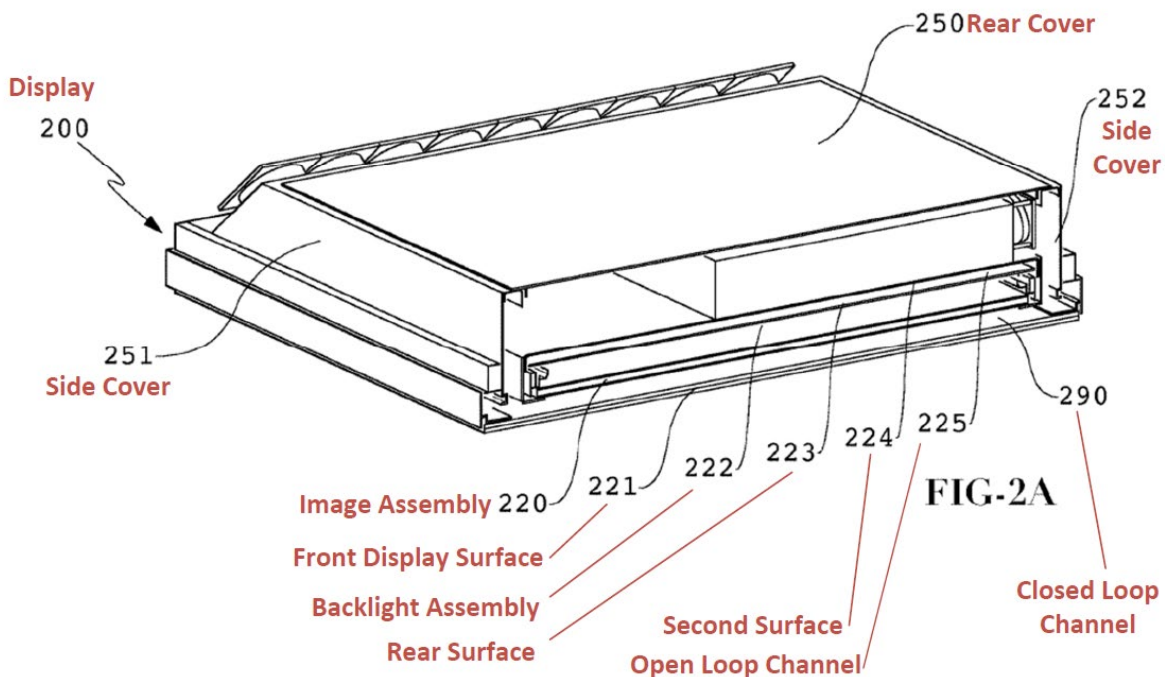
A person of ordinary skill in the art (POSA) as of March 3, 2008 would have possessed a bachelor's degree in a pertinent discipline, such as mechanical engineering, physics, product design, or a related field. (Ex. 1002, ¶39.) Such a person would also have 2–4 years of experience in working with electronic displays and have an understanding of product design issues and failure modes associated with electronic displays. (*Id.*) Alternatively, a POSITA would have had 5–7 years of experience in the field working with electronic displays and have a similar understanding of product design issues and failure modes associated with electronic displays. (*Id.*)

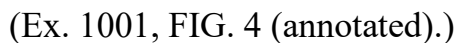
B. The '740 Patent

The '740 patent describes cooling systems for electronic displays using two separate air flow paths. (Ex. 1001, 1:55-57, 2:36-38.) The image assembly **220** can include any “flat/thin panel displays.” (*Id.*, 5:51-57, 6:10-16.)

A first cooling path is a closed loop path that “travels across [a] front surface of [an] image assembly, continues to [a] rear of the [electronic] display where it may enter a heat exchanger, [and] finally returning to [a] front surface of the image assembly.” (*Id.*, 2:40-43.) A second path is an open loop path that “may draw ambient gas (ex. ambient air) through the rear of the [electronic] display (sometimes through a heat exchanger, behind [the] image assembly, or both) and then exhausts it out.” (*Id.*, 2:43-47.) A heat exchanger can be used to “transfer heat” from the closed loop to the open loop. (Exs. 1002, ¶¶64; 1001, 2:47-48, 2:40-47, FIG. 2B.)

The electronic display **200** includes a front display surface **221** “placed in front of the image assembly **220**, defining a [closed loop] channel **290** through which [] circulating gas may flow. (Ex. 1001, 5:57-59, FIG. 2A.)





During prosecution, the Examiner rejected claims 1-20 as being obvious in light of the prior art in office actions dated October 5, 2018, and June 19, 2019. (*See*

Ex. 1003, pp.236-246, pp.54-64.) The Examiner primarily relied on U.S. Patent Publication No. 2004/0135482 (“Thielemans”). (*See id.*, pp.236-246 and pp.54-64.) In a January 7, 2019 response to the June 19, 2019 Final Office Action, the Patent Owner argued that Thielemans et al. fails to teach or suggest “the use of an open loop ambient air flow path and a close loop gas circulation path.” (*Id.*, pp.44.) No claim amendments were made during prosecution and a notice of allowance issued on September 10, 2019. (*Id.*, pp.9; Ex. 1002, ¶72.)

VI. CLAIM CONSTRUCTION

Independent claims 1, 8, and 17 of the ’740 patent recite a “closed loop” pathway for circulating gas/air. (Ex. 1001, 9:64-10:3, 10:7-9, 10:56-58, and 11:30-12:6.) The terms “closed loop” and “closed gaseous loop” recited in the claims of U.S. Patent Nos. 8,854,572 (“the ’572 patent”); 9,629,287 (“the ’287 patent”); and 9,173,325 (“the ’325 patent”), were construed by a Court in a case filed by the Patent Owner. (Ex. 1023 at 1.) The ’740 patent is related to the ’572, ’287, and ’325 patents as they all have a common ancestry, including at least, U.S. Patent Application No. 12/620,330 (the “’330 application”). (*See* Exs. 1001; 1024; 1025; 1026, face pages.) And like the ’740 patent, the subject matter in the ’572 patent, the ’287 patent and the ’325 patent each relates to cooling of electronic displays using closed and open loops. (Exs. 1002, ¶79; 1001, 2:41-44; 1024, 3:33-42, 3:53-

55, FIGs. 1 and 2; 1025, 3:51-54, 4:4-7, FIGs. 1, 2; 1026, 3:50-53, 4:56-59, 5:5-6, 7:33-36, FIGs. 1, 2C, 3C.)

The structure of the closed loops in the '740, '572, and '287 patents is similar, i.e., the closed loop pathways in all four patents surround a display element / image assembly. (Exs. 1002, ¶81; 1001, 2:44-47; 6:13-15, 6:37-38, FIGs. 2A, 2B; 1024, 3:33-35, 3:39-42, 3:53-55, FIGs. 1, 2; 1025, 3:51-54, 3:57-60, 4:4-7, FIGs. 1, 2.) The structures of the closed loops of the '740 patent and the '325 patent are even more similar, i.e., in both patents, the closed loop gas circulates around the image assembly passing via a gap between a front plate and the front of the image assembly, and also passes through a heat exchanger. (Ex. 1002, ¶83; *see* Exs. 1001, 3:22-35, FIG. 1; 1026, 4:56-62, FIGs. 2A, 2C.) Because the “subject matter” relating to the closed loop in the '740 patent is the same as in the '572 patent, '287 patent, and '325 patent, the Court’s prior construction of “closed loop” is instructive for the '740 patent. *See, e.g., E.I. du Pont De Nemours & Co. v. Unifrax I LLC*, 921 F.3d 1060, 1069 (Fed. Cir. 2019) (noting that a continuation-in-part is nonetheless intrinsic evidence where “the subject matter [of the patent-in-suit] is common to the continuation-in-part application”).

The District Court construed “closed loop” as “gas pathway within a display housing containing gas that is essentially isolated from external air.” (Ex. 1023, 1.) This is a proper construction of “closed loop” recited in the '740 patent as well, in

light of the specification and the prosecution history. (Ex. 1002, ¶90). The '740 refers to the gas/air, circulating through a closed loop as the circulating gas/air and also as the "isolated gas." (Ex. 1001, 9:64-10:3, 10:7-9, 10:56-58, 11:30-12:6 (claims reciting circulating gas/air), 3:30-29, 50-52 (specification referring to gas in the closed loop as "circulating gas" and "isolated gas"), FIG. 1.)

Moreover, as noted above, the Applicant distinguished the claims from the Thielemans prior art based on the argument that the closed loop must be separate from and in addition to the open loop. (Ex. 1022, pp. 44-45, 160 (Responses filed on 01/07/2019 and 08/05/2019).) The Court's "closed loop" construction should apply here, though Applicant notes that this claim construction does not affect the applicability of the prior art in this Petition because the art teaches the separate loops.

For the purposes of this Petition, all other claim terms from the '740 patent should be given their plain and ordinary meaning.² Petitioners reserve their right to respond to any claim construction arguments Patent Owner makes in response to

² Nothing in this Petition should be construed as an admission that the claims, read in light of the specification and the prosecution history, inform a POSITA with reasonable certainty about the scope of the invention. Petitioners reserve their rights to assert that the claims of the '740 patent are invalid for indefiniteness.

this Petition.

VII. OVERVIEW OF THE PRIOR ART

A. Karppanen

International Patent Application No. PCT/FI2006/050145 (IA-'145) (Publication No. WO2007116116A1) ("Karppanen") (Ex. 1004), entitled "Electronic Information Board" was filed on April 11, 2006 and published on October 18, 2007. Therefore, Karppanen qualifies as prior art to the '740 patent under pre-AIA 35 U.S.C. §§ 102(a) and 102(e) because the IA-'145 designated the U.S., and published in English before and was filed before the earliest claimed priority date of Mar. 3, 2008 for the '740 patent. (Ex. 1004, face page.)

Karppanen discloses an outdoor "electronic information board" that leverages an electronic "display," such as a TFT LCD. (*Id.*, Abstract.)

Karppanen explains that "the temperatures of the display devices easily rise too high" and "it is important that the temperatures at different points inside the display device can be kept as constant as possible." (*Id.*, 1:25–32; *see also id.*, 3:10–13, 5:33–37, 2:18–29.)

To address this, Karppanen discloses an electronic display with a frame, a display casing, a device casing, a flat display element (such as an LCD), and cooling equipment. (*Id.*, 1:3–5, 3:21–32, claim 23.) The display casing **10** includes a back wall **22**, a transparent front plate **46**, and edge parts which together

form a “closed” casing. (*Id.*, 7:31–38.) Karppanen circulates air within the closed display casing using fans **64**. (*Id.*, 4:32–34, 9: 3–9.) Air ducts may be “arranged between the walls of the casing and the display element for directing the circulation of air around the display element” in order to cool it. (*Id.*, 4: 34–36; Ex. 1002, ¶102.)

Karppanen discloses that the interior of the overall system contains a rear cooling space **20** and that cooling elements can conduct the heat generated by the display device into the cooling space. (Ex. 1004, 3:36–4:17.) Specifically, the back wall of the display casing (**10**) may include a “heat transfer part” and “cooling fins or conduction elements” to facilitate heat transfer from inside the display casing (**10**) to the cooling space (**20**). (*See id.*, 8:13–16, 8:29–9:3, FIG. 2; Ex. 1002, ¶103.)

Heat in the cooling space may then be transmitted to the external environment using ambient air flow and cooling fans **36**. (Ex. 1004, 8:19–22.) The cooling space **20** may have “ventilator slots or holes on opposite sides of the cooling space for enabling air flow from the outside . . . to the cooling space and from the cooling space back to the outside.” (*Id.*, 4:19–23, 7:9–19.) Figure 2 depicts an exemplary embodiment:

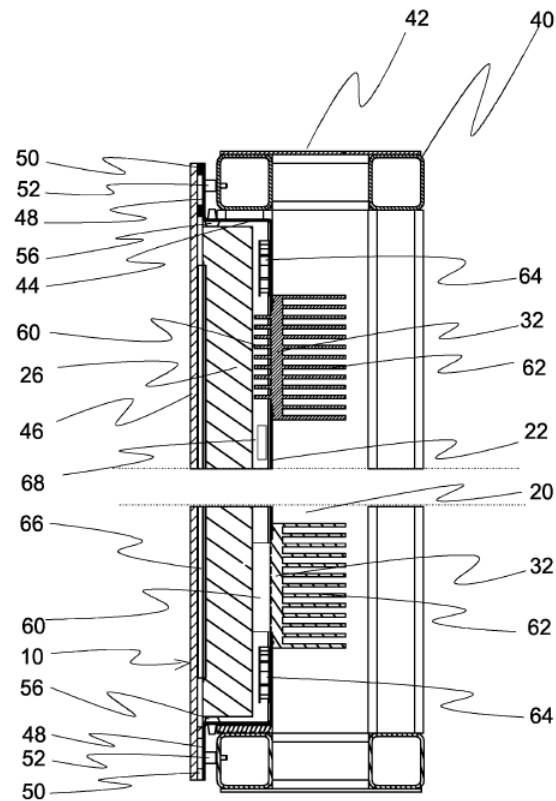


Fig. 2

(*Id.*, FIG. 2; Ex. 1002, ¶104.)

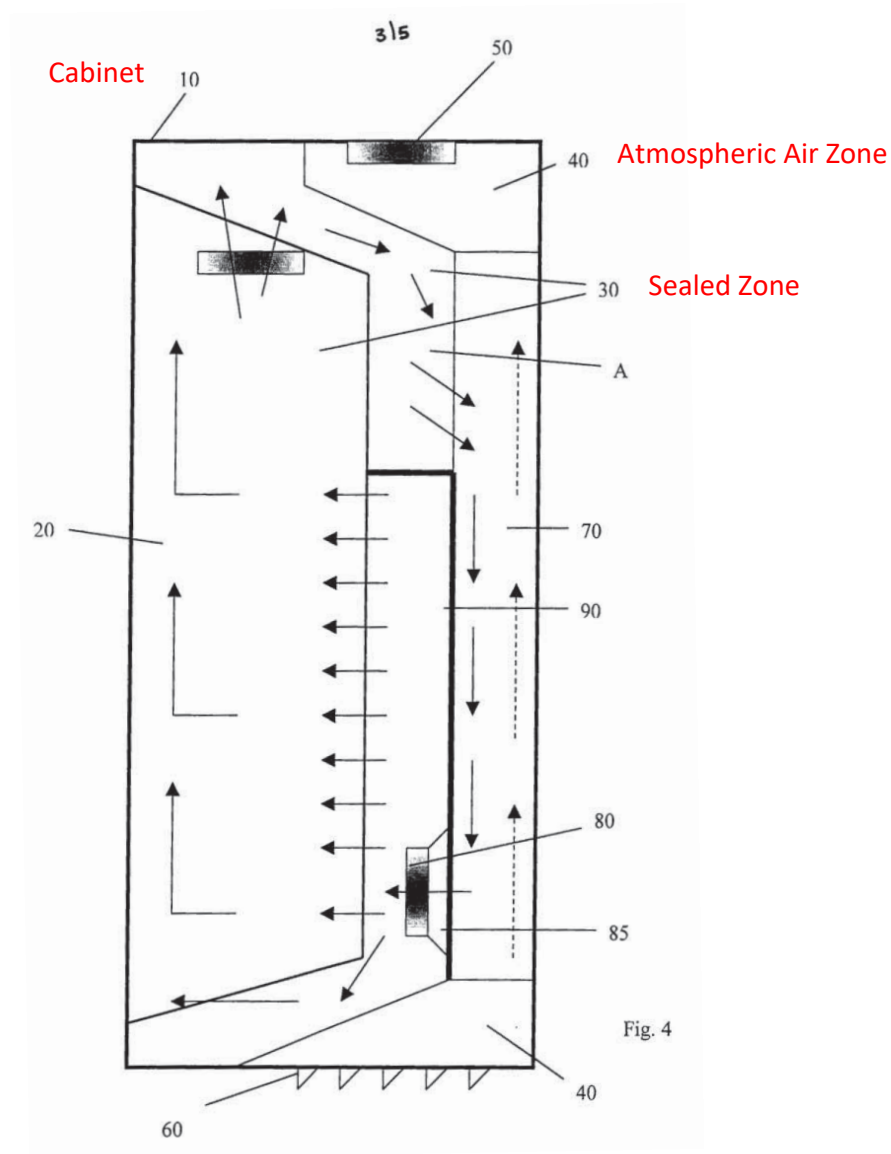
B. Yare

United Kingdom Patent Application No. GB 2402205A by Yare (“Yare”) (Ex. 1005), entitled “A Display System Cabinet and Display System Including Heat Removal Means,” published on Dec. 1, 2004. Yare qualifies as prior art to the ’740 patent under at least pre-AIA 35 U.S.C. § 102(b) because it published more than one year before the earliest claimed priority date of Mar. 3, 2008 for the ’740 patent.

Yare discloses “a cabinet for mounting a display system” where the cabinet

has “improved cooling facilities” and is “particularly suitable for” providing “displays in public places.” (Ex. 1005, 1:4-6.) A display according to Yare can be an LCD. (*Id.*, 1:14-15.) Yare recognizes that such a display “can generate a lot of heat” and that “an efficient cooling system” is necessary. (*Id.*, 1:15-17; *see id.*, 1:19-23; Ex. 1002, ¶106.)

To address cooling, Yare discloses a cabinet **10** having a sealed zone **30** that is sealed from the external environment, and contains a display **20**. (Ex. 1005, 4:1-7, FIG. 1; *see id.*, 2:8-9.) The sealed zone includes fans **80**. (*Id.*, 4:31-33, FIGs. 1, 4; *see id.*, 2:9-10.) In addition, the cabinet **10** includes an atmospheric air zone **40** and a heat exchanger **70** for transferring heat from the sealed zone **30** to the atmospheric air zone **40**. (*Id.*, 4:11-22, FIGs. 1, 4; *see id.*, 2:19-29; Ex. 1002, ¶107.)



(Ex. 1005, FIG. 4.)

Air flows in the sealed and atmospheric air zones are not mixed and, instead, the heat exchanger transfers the heat. (Ex. 1002, ¶108.) The atmospheric air zone includes vents **60** and a fan/exhaust **50** for drawing ambient air into the atmospheric air zone. (Ex. 1005, 4:11-16, FIGs. 1-4; *see id.*, 2:8-9.) The heated ambient air may

then be released outside the cabinet **10** by the fan/exhaust **50**. (*Id.*, 5:2-10, 4:11-15, FIGs. 1-4.)

VIII. GROUND 1: Claims 1-3, 5-9, 11-13, 15-18, and 20 Are Obvious Over Karppanen in view of the Knowledge of a POSITA

A. Independent Claim 1

**1. Element 1

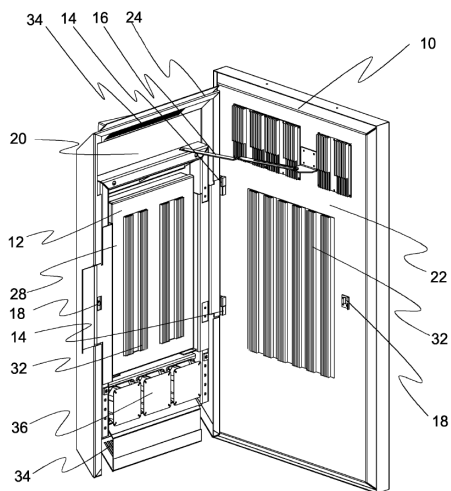
```
[pre]
```**

| | |
|--------------------------|--|
| 1<pre>[pre]</pre> | ~~An electronic display comprising:~~ |
|--------------------------|--|

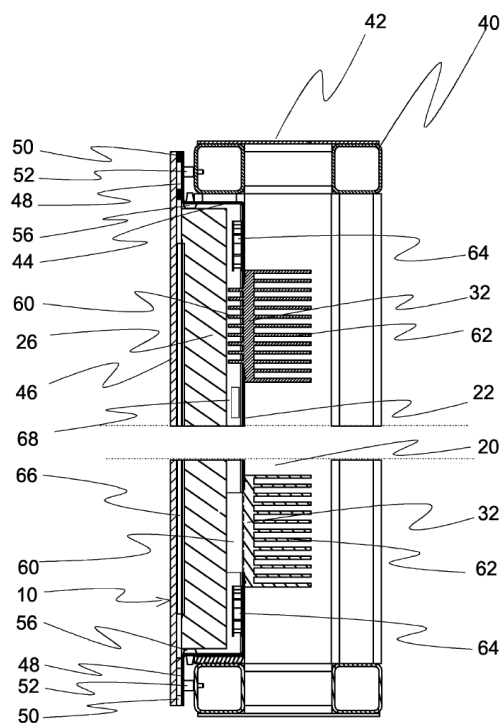
Karppanen discloses an electronic display. (Ex. 1002, ¶¶109-111.) In particular, Karppanen discloses “an electronic information board” having “a flat display element (26), such as a TFT LCD display . . . for presenting information, and electronic equipment for controlling the display element.” (Ex. 1004, Abstract.)

Karppanen also states that the “information board has a closed display casing **10**” and a “closed device casing **12**.” (*Id.*, 6:16-21, FIG. 1.) Karppanen further states: the “**display element 26** of the information board (Fig. 2) has been placed inside the display casing **10**” with the necessary electronic components. (*Id.*, 6:21-24, FIG. 1.)

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(*Id.*, FIG. 1.)



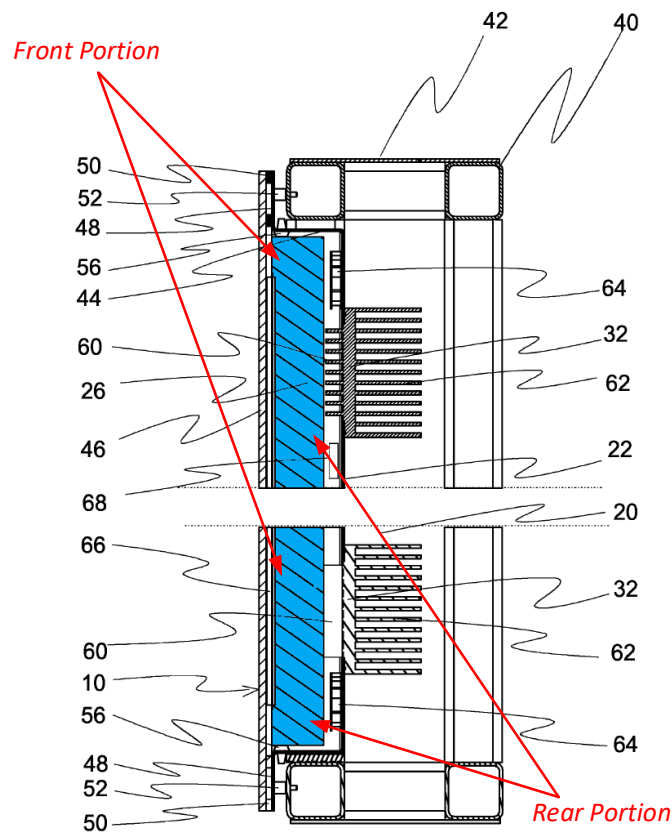
(*Id.* FIG. 2.)

Thus, Karppanen discloses an “*electronic display.*” (Ex. 1002, ¶111.)

2. Element 1[a]

| | |
|------|--|
| 1[a] | ~~an electronic image assembly having a front portion and a rear portion;~~ |
|------|--|

Karppanen discloses this claim element because Karppanen's system includes a display element **26** that may be an LCD, i.e., an “*electronic image assembly*.” (Ex. 1002, ¶¶112-116.) Karppanen states its display “is preferably a TFT LCD display.” (Ex. 1004, 8:5-9, Fig. 2.)



(Ex. 1004, FIG. 2 (annotated).) As shown, the display element **26** (highlighted blue) has a front portion and a rear portion. (Ex. 1002, ¶114.)

This is consistent with the '740 patent, which states: the “the image

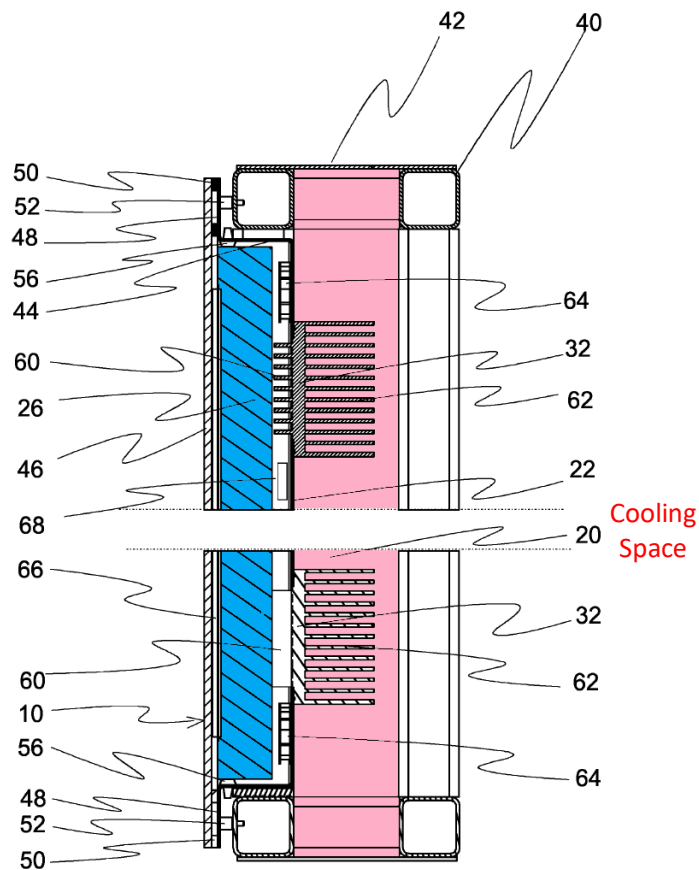
assembly **220** may comprise any form of electronic assembly for generating an image, including but not limited to: **LCD . . .** and any other **flat/thin panel displays.**” (*Id.*, ¶115; Ex. 1001, 5:51-57, FIG. 2A.)

In summary, the display element **26** individually, and also in combination with the background light, is “*an electronic image assembly having a front portion and a rear portion.*” (Ex. 1002, ¶116.)

3. Element 1[b]

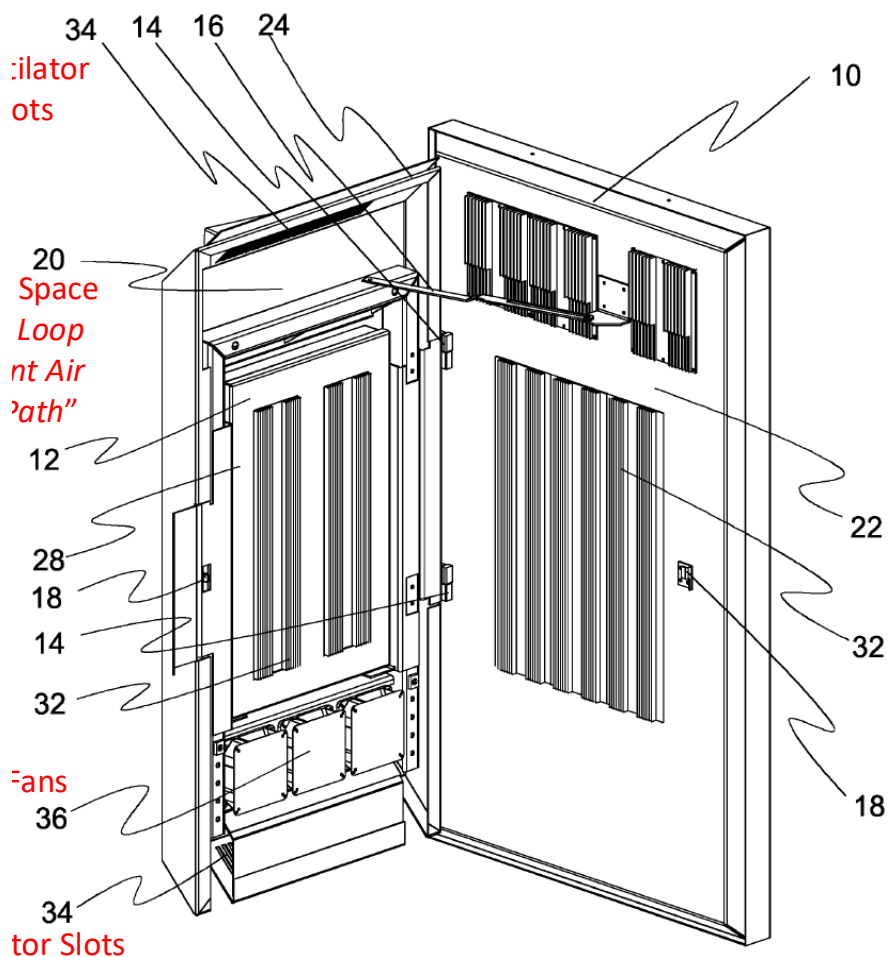
| | |
|------|---|
| 1[b] | ~~an open loop ambient air flow path behind the rear portion of the electronic image assembly;~~ |
|------|---|

Karppanen discloses this claim element because Karppanen’s system provides an open “cooling space **20**” for the flow of ambient air. (Ex. 1002, ¶¶117-119.) Karppanen discloses: “[i]n the closed position, there remains a **cooling space 20** between the display casing [**10**] and the device casing [**12**].” (Ex. 1004, 7:7-11, Fig. 2.)



(*Id.*, FIG. 2 (annotated).)

The cooling space **20** (highlighted pink) is behind the display element **26** (highlighted blue). (Ex. 1002, ¶118.) Karppanen states that “[i]n the back wall **22** of the display casing and the back cover **28** of the device casing there are cooling elements **32**, by which heat is transferred from the inside of the device casing and the display casing to the cooling air in the cooling space **20**.” (Ex. 1004, 7:11-14.) Karppanen further discloses “ventilator slots **34**, which enable the movement of air from the outside of the device to the cooling space [**20**] and from the cooling space back to the outside of the device.” (*Id.*, 7:16-22, Fig. 1.)



(*Id.*, FIG. 1 (annotated).)

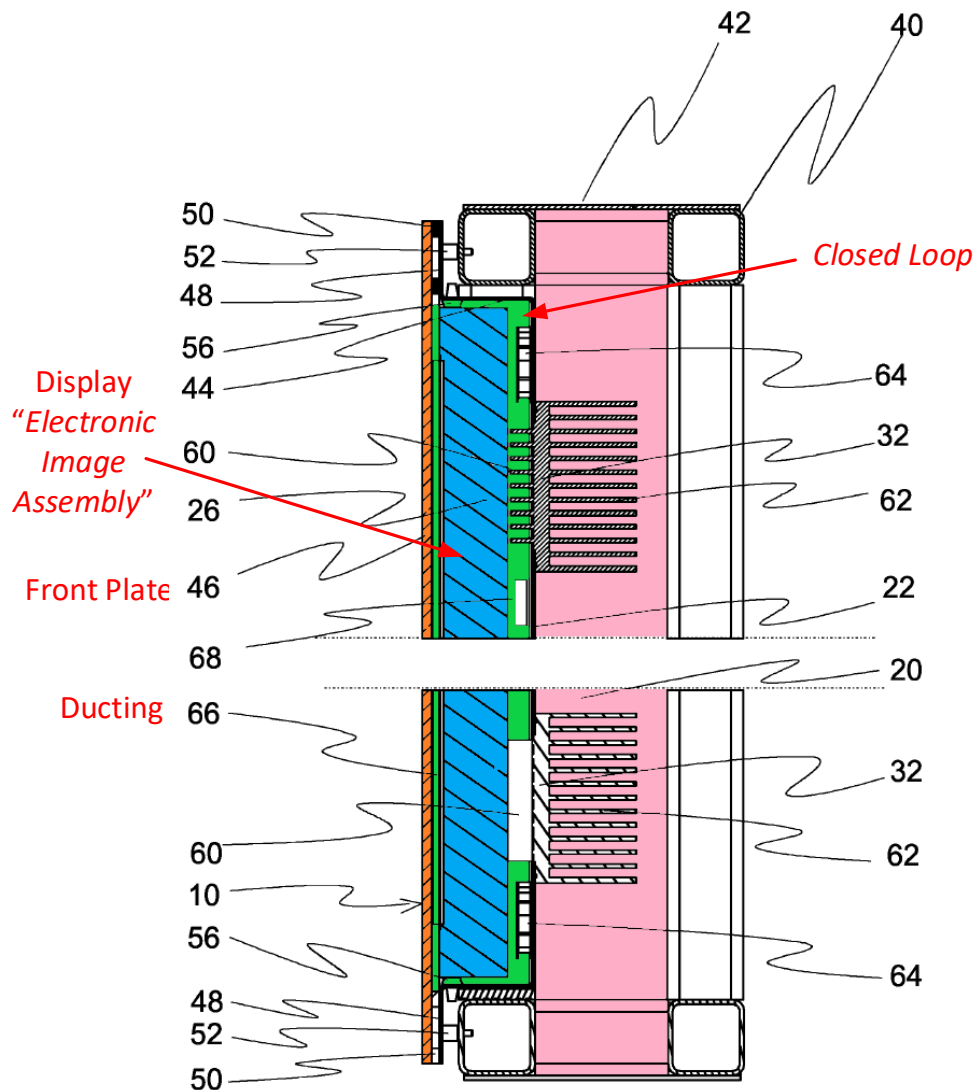
Thus, the cooling space [20] is an open flow path for ambient air, where the path is behind the display element 26. Accordingly, Karppanen teaches this claim element. (Ex. 1002, ¶119.)

4. Element 1[c]

| | |
|------|--|
| 1[c] | ~~a closed-loop gas circulation path about the electronic image assembly;~~ |
|------|--|

Karppanen discloses this claim element because Karppanen's system

includes a closed loop cooling path formed in part by ducting **66** within the display casing **10**. (Ex. 1002, ¶¶120-122.) Specifically, Karppanen’s system includes “a **closed** display casing **10**” having a back wall **22** [and] a transparent front plate **46**.” (Ex. 1004, 6:17-19, 7:31-34, FIGs. 1, 2.) “[D]ucting **66**” “between the display casing and the display element” and “fans **64**” facilitate “an air flow **circulating the display element [26]**” and “past the front plate **46** of the device.” (*Id.*, 9:3-8, FIG. 2.)



(*Id.*, FIG. 2 (annotated).)

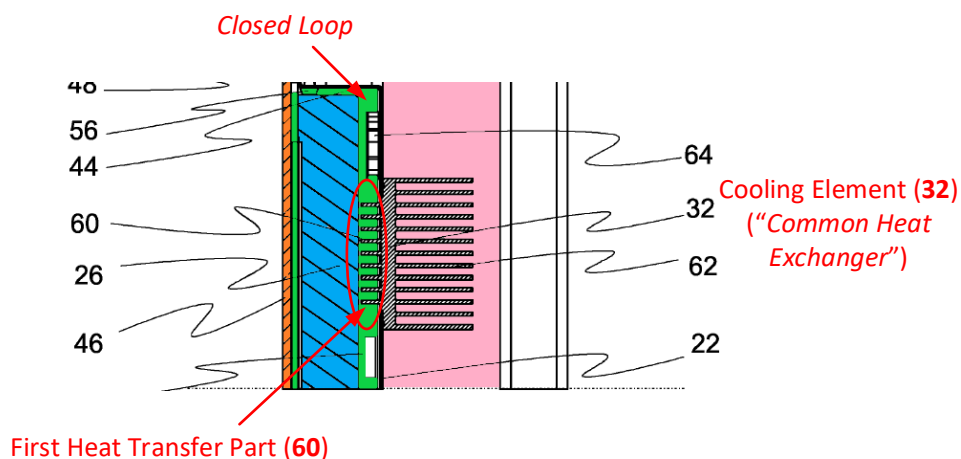
Thus, within the closed display casing **10**, there is a closed loop airflow path (highlighted green) that “circulat[es]” around the display screen **26** (highlighted blue) just as in the ’740 patent’s closed loop. The closed loop pathway is formed around the display element **26** and is thus “*a closed loop gas circulation path about the electronic image assembly.*” (Ex. 1002, ¶122.)

5. Element 1[d]

| | |
|------|---|
| 1[d] | ~~a common heat exchanger located in the pathway of both the closed loop gas circulation path and the open loop ambient air flow path;~~ |
|------|---|

Karppanen discloses this claim element. Karppanen discloses a cooling element **32**, which is a “*common heat exchanger*” because it is located in both the closed loop air path (“*the closed loop gas circulation path*”) and also in the open cooling space **20** (“*the open loop ambient air flow path*”), and transfers heat from the closed loop to the open loop. (Ex. 1002, ¶¶123-130.)

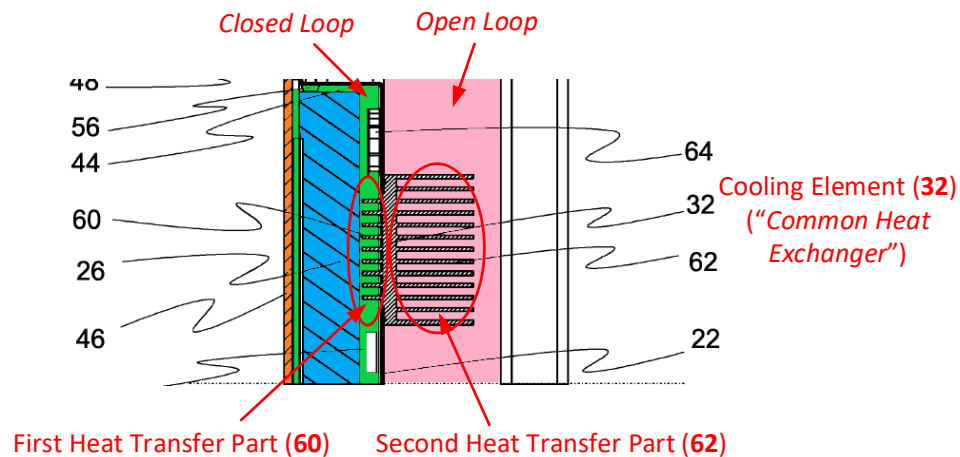
Karppanen discloses “cooling elements **32**, which have a first heat transfer part **60** extending to the inside of the display casing and a second heat transfer part **62** extending to the cooling space **20**.” (Ex. 1004, 8:13-16, FIG. 2.) “The first heat transfer part may comprise **cooling fins**.” (*Id.*, 8:29-30, 9:1-5, FIG. 2.)



(*Id.*, FIG. 2 (partial, annotated).)

As noted above there is a closed pathway (“*the closed loop gas circulation path*”) (highlighted green) through which air is circulated by fans **64**. (*Supra*, §VIII.A.4 (Element 1[c]).) The first heat transfer part **60** (having fins) of the first cooling element **32** is within the closed pathway, i.e., “*in the pathway of [] the closed loop gas circulation path.*” (Ex. 1002, ¶128.)

“The second heat transfer part [**62**] comprises a number of plate-like cooling fins” and “when the cooling air flows **between** the fins, heat is transferred from the cooling fins to the air of the cooling space [**20**].” (*Id.*, 8:16-22, FIG. 2.)



(*Id.*, FIG. 2 (partial, annotated).)

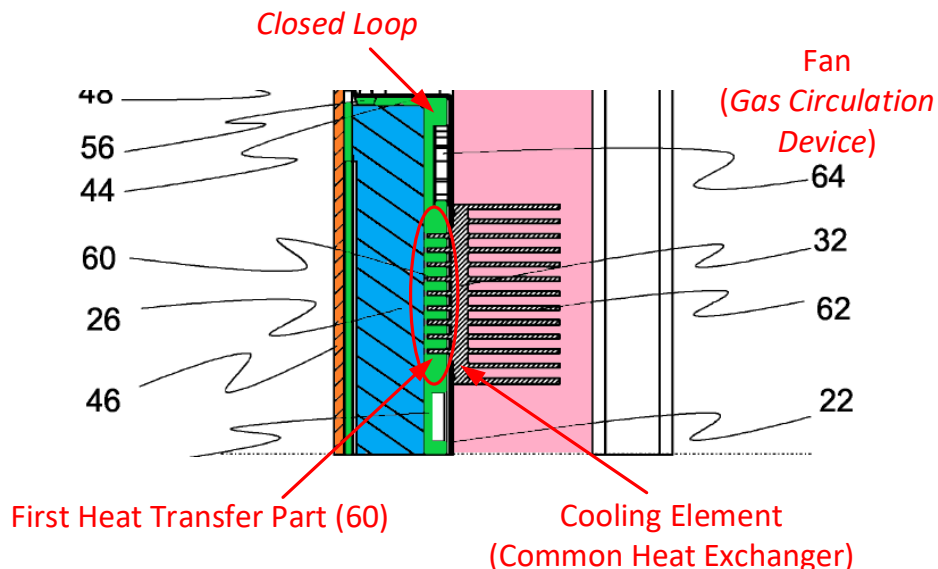
The cooling space **20**, along with ventilator slots **34**, form “*the open loop ambient air flow path.*” (*Supra*, §VIII.A.3.) The second heat transfer part **62** is within the cooling space **20**, i.e., “*in the pathway of . . . the open loop ambient air flow path.*” Thus, the cooling element **32** is “*a common heat exchanger*” with a

first part **60** located in the closed pathway, i.e., “*the pathway of [] the closed loop gas circulation path*” and a second part **62** located in the cooling space **20**, i.e., “*the open loop ambient air flow path.*” Accordingly, the cooling element **32** (“*common heat exchanger*”) has two parts – one in the closed loop path and the other in the open loop path. Therefore, Karppanen teaches this claim element. (Ex. 1002, ¶130.)

6. Element 1[e]

| | |
|------|--|
| 1[e] | ~~a gas circulation device positioned to force circulating gas through the common heat exchanger; and~~ |
|------|--|

Karppanen discloses this claim element because Karppanen’s system includes fans **64** that force the air circulating in the closed pathway, i.e., “*to force circulating gas*” through the “*closed loop.*” Furthermore, the first heat transfer part **60** of the cooling element **32** (the common heat exchanger) is located within the closed pathway (the “*closed loop*”), and the fans **64** force air **between** the fins making up heat transfer part **60**. (Ex. 1002, ¶131.) Forcing air **between the fins** is forcing air **through the fins** under the plain meaning of “through the common heat exchanger” because the air flows over and between the heat exchanger elements. (*Id.*, ¶135.)



(Ex. 1004, FIG. 2 (partial, annotated).) As such, the fans force closed loop air through part **60** (cooling fins) of the cooling element **32** (“common heat exchanger”). (Ex. 1002, ¶135.)

During prosecution the applicant did not disagree with the examiner who found that Thielemans teaches airflow “through” the heat exchanger even though Thielemans teaches “a heat sink 22 in the form of a heat transporting plate.” (Ex. 1031, p.239; Ex. 1030, ¶49.) Under the plain meaning, air flowing through the fins in Karppanen’s heat exchanger is air flow “through the common heat exchanger.”

Should “through the common heat exchanger” be interpreted to require the passage of air through the inside of a component of the heat exchanger, such heat exchangers were well known and would have been obvious alternatives for a POSITA to try in Karppanen’s cooling system. (Ex. 1002, ¶136.).

For example, a POSITA would have understood that in Karppanen's system, the fins of the part **60** extending from the base of the cooling element **32** into the closed loop could alternatively be encased within a cover plate, such that the air flow in the closed path passes through the plate and between the fins. (*Id.*, ¶137.)

Before 2008, such implementations of heat sinks and heat exchangers were common, and were known to improve the heat extraction efficiency of a heat exchanger. (Ex. 1002, ¶¶137-148 (citing Ex. 1006, ¶¶2, 108, 109, FIG. 7; Ex. 1007, 1:40-41, 1:12-14, 6:29-31, 6:49-54, 6:61-7:4 FIGs. 1C, 1D; Ex. 1008, ¶¶30, 34-35; FIGs. 2, 3; and Ex. 1009, Abstract, 1:8-11, 2:42-52, 4:49-52, 4:59-62, FIGs. 2, 3, as evidence of the knowledge of a POSITA).)

In light of such well-known heat exchanger configurations, where the fins are disposed within an enclosure, e.g., in-between bottom and top plates, and the known benefits of this structure, e.g., improved flow regulation, increased heat extraction areas, and, improved heat extraction, a POSITA would have modified Karppanen's cooling unit **32** to include a cover plate, to encase the fins of the part **60** within the cooling unit. (Ex. 1002, ¶149.)

Adding cover plates to encase the fins would have been a straightforward modification. For instance, a POSITA would have recognized it to be simply an addition of a known element (a cover plate, as evidenced by Exs. 1006-08), or a simple substitution of Karppanen's heat exchanger with one having encased fins

(as evidenced by Exs. 1006-08). (Ex. 1002, ¶150.) This modification was also well within the scope of a POSITA, because it required nothing more than affixing cover plates, which can be accomplished using commonly used techniques such as spacers and screws. (*Id.*, ¶151.) As such a POSITA would have known that this modification would succeed, and would provide the expected benefits discussed above. (*Id.*)

Karppanen discloses air circulating “through” the heat exchanger, but should “through the common heat exchanger” require the passage of air through the inside of a component of the heat exchanger, such a configuration would have been an obvious design choice. (*Id.*, ¶153.) Thus, Karppanen individually, and in view of the knowledge of a POSITA, teaches this claim element. (*Id.*, ¶154.)

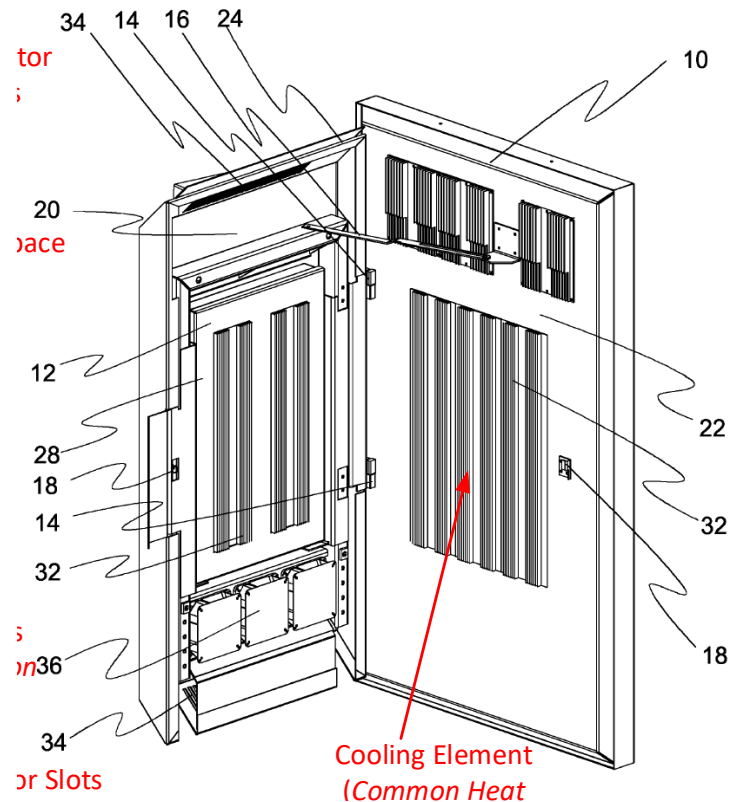
7. Element 1[f]

| | |
|------|---|
| 1[f] | ~~an air circulation device positioned to force ambient air through the common heat exchanger.~~ |
|------|---|

Karppanen discloses this claim element because Karppanen’s system includes fans **36** to force ambient air through cooling space **20**. The second heat transfer part **62** of the cooling element **32** is located within the cooling space **20**, and the fans **36** force the ambient air through the second heat transfer part **62** of the cooling element **32** (“*the common heat exchanger*”). (Ex. 1002, ¶¶155-159.)

Karppanen states that “[i]n the cover **24** there are **cooling fans 36**, by which

the circulation of air through the cooling space [20] is regulated.” (Ex. 1004, 7:21-22, FIG. 1.) The cooling space 20 is “*the open loop ambient air flow path.*” Thus, a cooling fan 36 is “*an air circulation device.*” (*Supra*, §VIII.A.3 (Element 1[b]).)



(*Id.*, FIG. 1 (annotated).)

The first cooling element 32 (“*the common heat exchanger*”) has a second heat transfer part 62 that is located within the cooling space 20. (*Supra*, §VIII.A.5.) The second heat transfer part 62, may be in the form of “cooling fins,” where “the cooling air flows **between** the fins.” (Ex. 1004, 8:13-19, FIG. 2.) As such, the fans 36 force ambient air between the fins of the second heat transfer part

62, i.e., through the part **62** of the cooling element **32** (“*the common heat exchanger*”), i.e., “*through the common heat exchanger.*” (Ex. 1002, ¶158.)

Under the plain meaning, Karppanen discloses this claim element.

As in element 1[e], if the phrase “through the heat exchanger” is interpreted more narrowly than its plain meaning, this element would have been obvious because a POSITA would have understood that in Karppanen’s system, the fins of the part **62** may be encased by a cover plate, such that the ambient air flow in the “*open loop*” passes through the plate and between the fins. (*Supra*, §VIII.A.6.)

In summary, Karppanen, individually and in view of the knowledge of a POSITA, discloses each and every element of claim 1 or, under a more narrow interpretation of “through the heat exchanger,” renders obvious claim 1. (Ex. 1002, ¶159.)

B. Dependent Claim 2

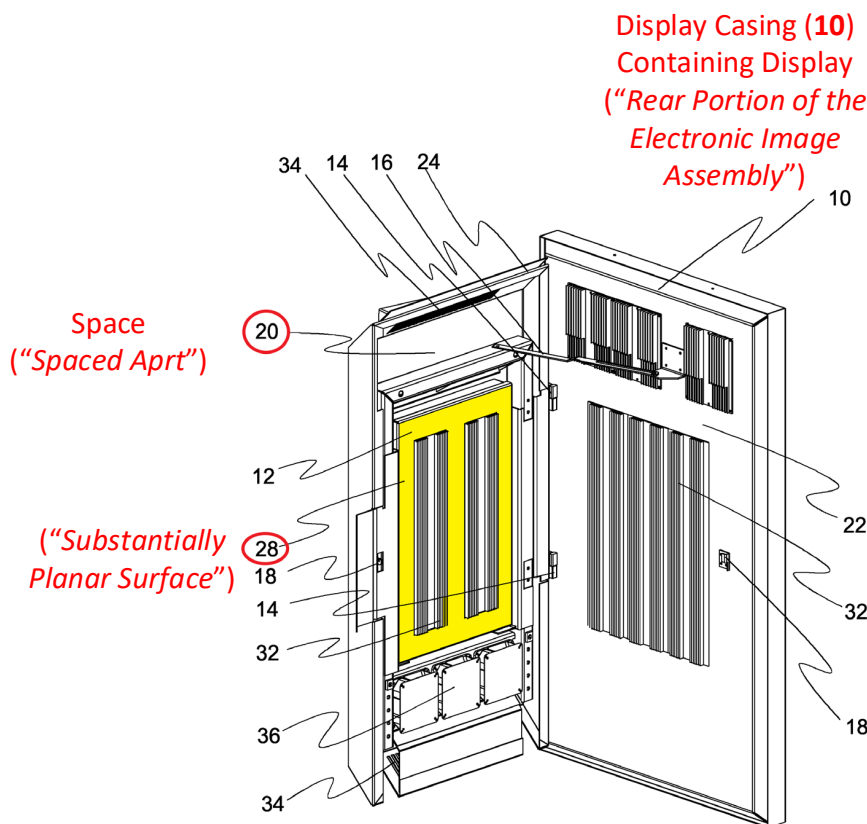
1. Element 2[a]

| | |
|------|--|
| 2[a] | ~~The electronic display of claim 1, further comprising: a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly; and~~ |
|------|--|

Karppanen teaches this claim element because Karppanen’s system includes a device casing **12** located behind the display **26** (“*the electronic image assembly*”), and the device casing **12** has a planar rear cover **28** (“*a substantially*

planar surface”). (Ex. 1002, ¶¶160-163.)

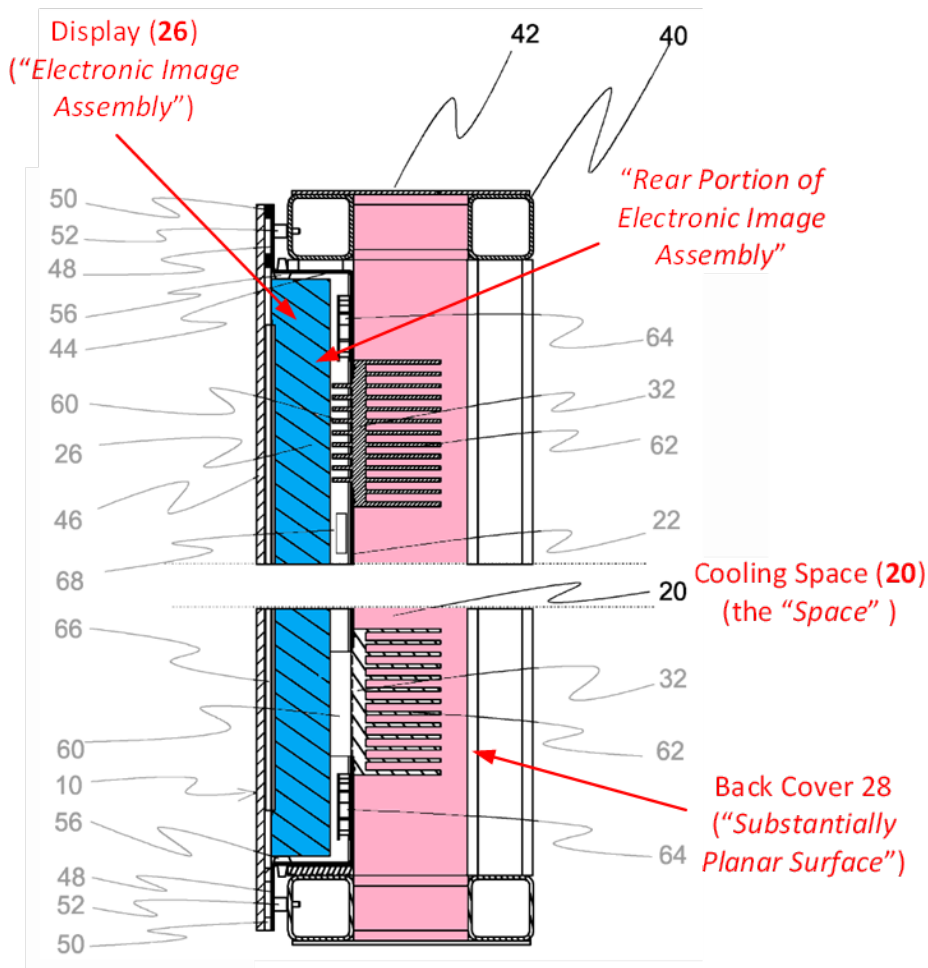
Karppanen states: “[t]he information board has a closed display casing **10**, to the back wall **22** of which a cover **24** opening on hinges **14** has been connected.” (Ex. 1004, 6:17-19, Fig. 1.) “A closed device casing **12** has been fastened to the bottom of the cover [**24**].” (*Id.*, 6:20-21, Fig. 1.) The “closed” device casing [**10**] has a “back cover **28**.” (*Id.*, 7:11-14, Fig. 1.)



(*Id.*, FIG. 1 (annotated).)

The back cover **28** (highlighted yellow) is “a substantially planar surface” behind the behind the display casing **10**. (*Id.*, 7:7-9.)

The display **26** (“*the electronic image assembly*”) is disposed within the display casing **10**. (*Supra*, § VIII.A.2.) In the closed position, the back cover **28** (“*a substantially planar surface*”) of the device casing **12** is “*located behind and spaced apart*” by the cooling space **20** “*from the rear portion of*” the display **26** (“*the electronic image assembly*”).



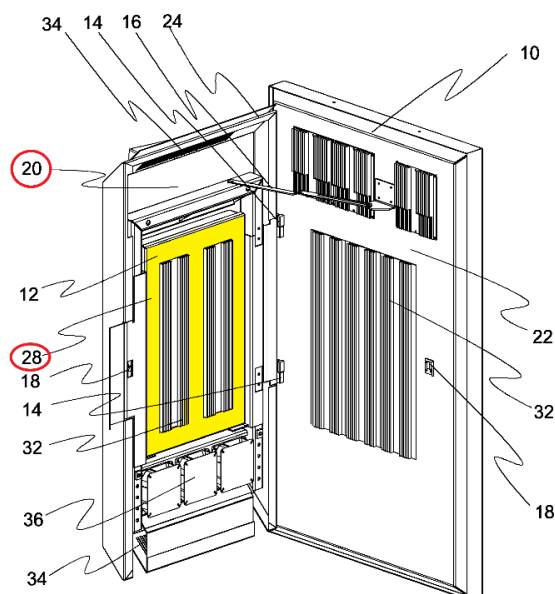
(Ex. 1004, FIG. 2 (annotated).)

Accordingly, Karppanen teaches this claim element. (Ex. 1002, ¶163.)

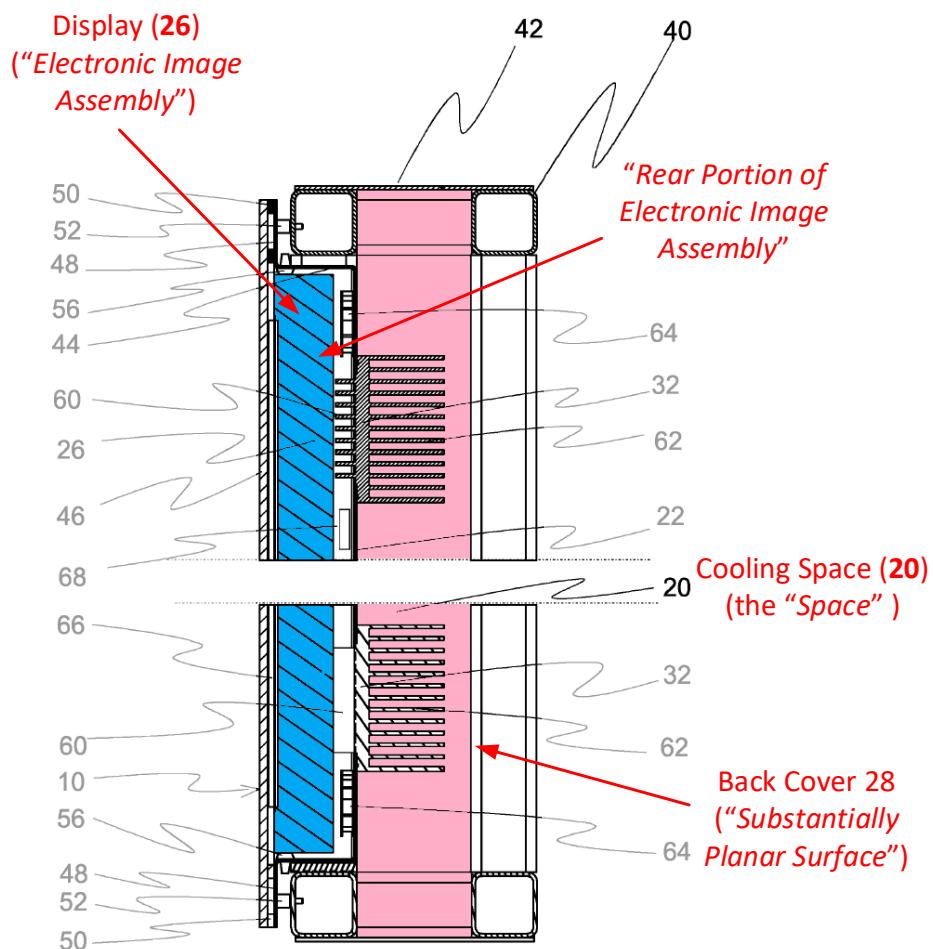
2. Element 2[b]

| | |
|------|---|
| 2[b] | a space defined between the rear portion of the electronic image assembly and the substantially planar surface; |
|------|---|

Karppanen teaches this claim element. (Ex. 1002, ¶¶164-166.) In the closed position, the back cover **28** is spaced apart from the display **26** by the cooling space **20**. (*Supra*, VIII.B.1.)



(Ex. 1004, FIG. 1 (annotated) (showing the back cover **28** (highlighted yellow) and the cooling space **20**).)



(Ex. 1004, FIG. 2 (annotated).)

Thus, at least a portion of the cooling space **20** is at least a part of the “*space defined between the rear portion of*” the display **26** “the electronic image assembly and” the back cover **28** “the substantially planar surface,” as shown below. (Ex. 1002, ¶165.)

Accordingly, Karppanen teaches this claim element. (Ex. 1002, ¶166.)

3. Element 2[c]

| | |
|------|--|
| 2[c] | ~~wherein the space is in gaseous communication with the open loop ambient air flow path.~~ |
|------|--|

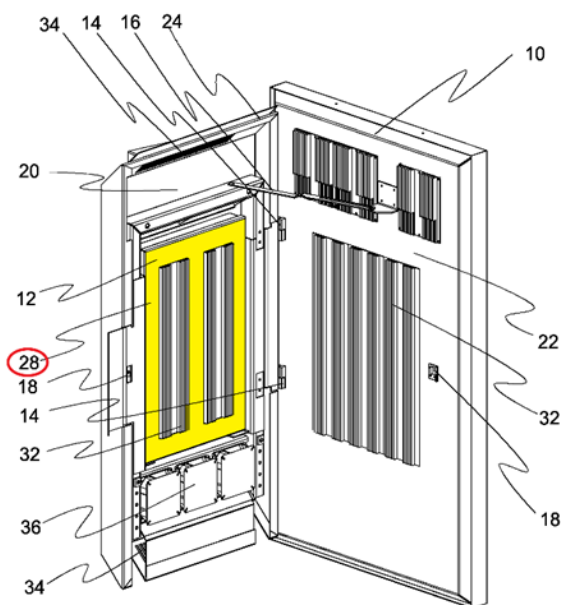
Karppanen teaches this claim element. The “*space defined*” includes at least a portion of the cooling space **20**. The cooling space **20** is the “*open loop ambient air flow path*.” (*Supra*, §§VIII.A.3, VIII.B.2.) Therefore, Karppanen teaches this claim element. (Ex. 1002, ¶167.)

In summary, Karppanen teaches the disclosures of claim 2. (*Id.*, ¶168.)

C. Dependent Claim 3

| | |
|---|--|
| 3 | ~~The electronic display of claim 2, wherein the substantially planar surface is a plate.~~ |
|---|--|

Karppanen discloses this claim element. In particular, the back cover **28** of the device casing **12** is depicted as a plate. (Ex. 1002, ¶¶169-172.)



(Ex. 1004, FIG. 1 (annotated) (back cover 28 is highlighted yellow).)

Thus, Karppanen discloses the limitation of claim 3. (Ex. 1002, ¶172.)

D. Dependent Claim 5

1. Element 5[a]

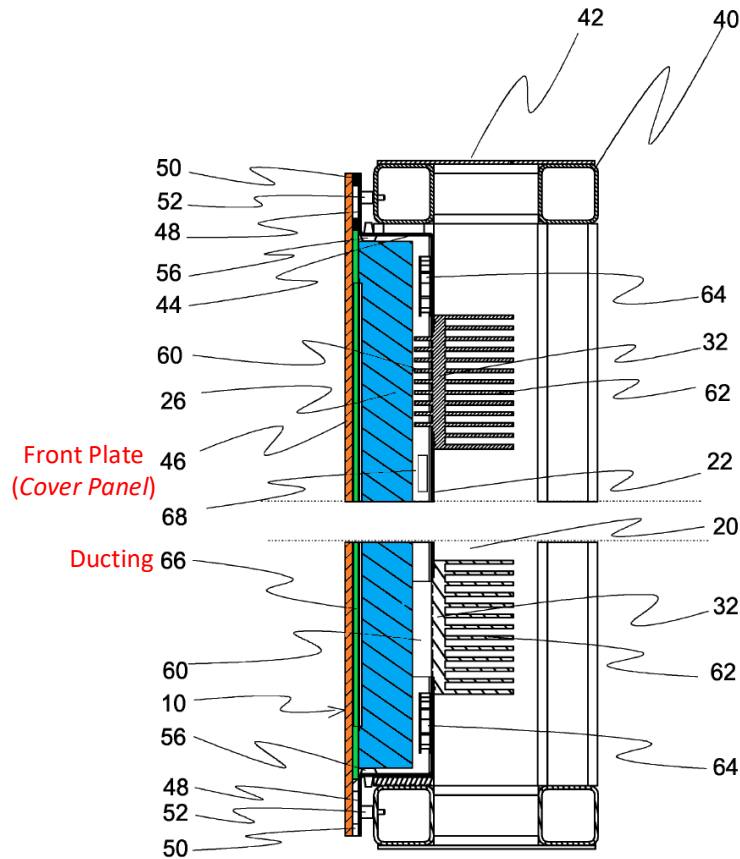
| | |
|------|---|
| 5[a] | ~~The electronic display of claim 1, further comprising: a front display surface spaced apart from the front portion of the electronic image assembly; and~~ |
|------|---|

Karppanen discloses this claim element because Karppanen’s display casing has a glass front plate (“*a front display surface*”) in front of and spaced apart from the display element 26 (“*the electronic image assembly*”). (Ex. 1002, ¶¶173-176.)

Karppanen discloses a “**transparent front plate 46.**” (Ex. 1004, 7:31-34, FIG. 2.) The “front plate is preferably made of shock-resistant glass.” (*Id.*, 7:35-

38.)

The front plate **46** is spaced from the display, considering “[s]uitable **ducting 66**” “between the display casing and the display element” facilitates “an air flow **circulating** the display element.” (*Id.*, 9:3-8, Fig. 2.)



(*Id.*, FIG. 2 (annotated).)

The front plate **46** (highlighted orange) is located in front of the display element **26** (highlighted blue), and is separated from the display element **26** (the “*electronic image assembly*”) by a gap (highlighted green). Thus, the front plate **46** is “*spaced apart from the front portion of the electronic image assembly.*”

Thus, Karppanen teaches this claim element. (Ex. 1002, ¶176.)

2. Element 5[b]

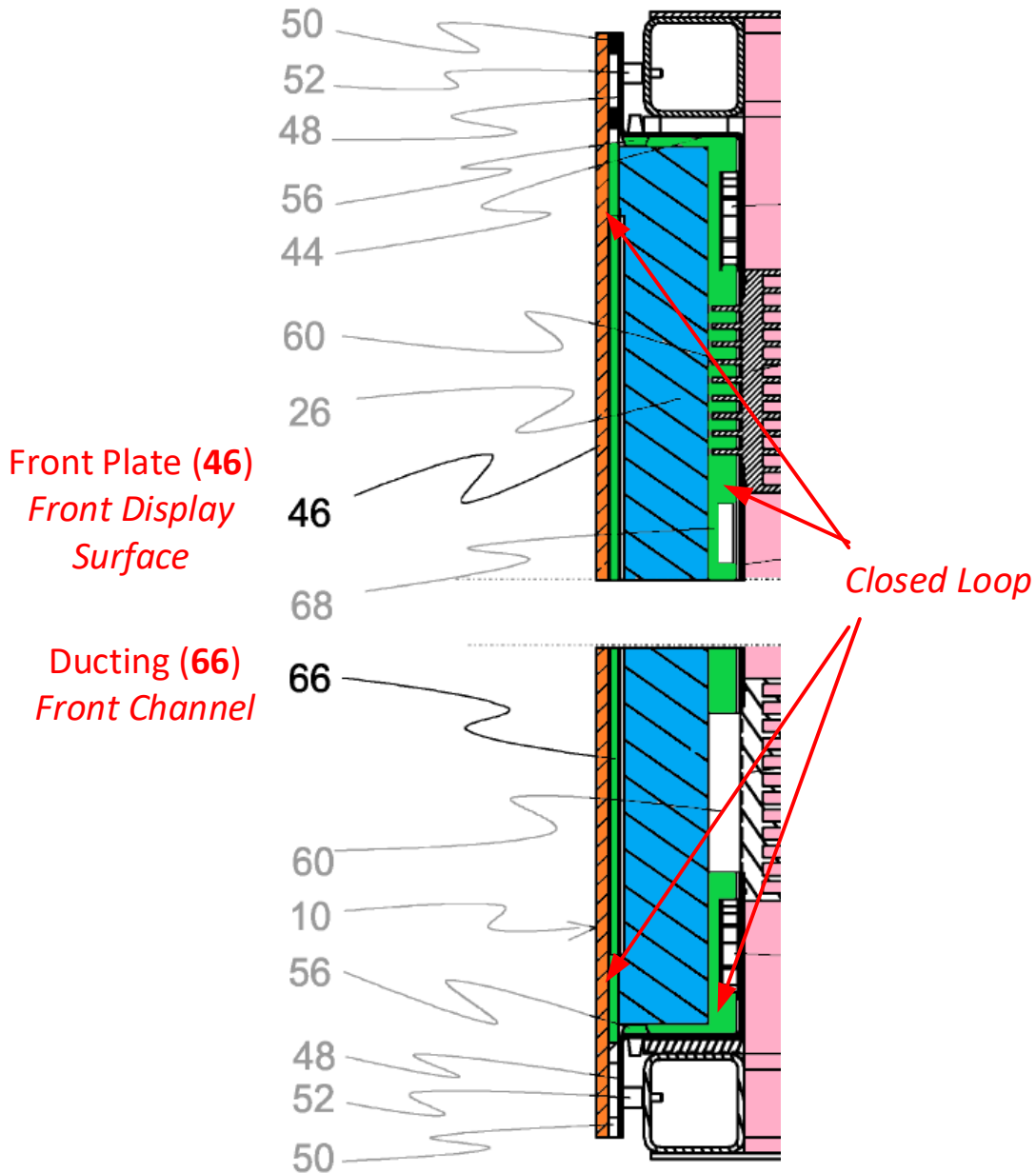
| | |
|------|---|
| 5[b] | ~~a front channel defined by the space between the front display surface and the front portion of the electronic image assembly, the front channel forming part of the closed loop gas circulation path.~~ |
|------|---|

Karppanen teaches this claim element because the gap between the front plate **46** and the front of the display **26** is a “*front channel*” formed at least in part by ducting **66**. (Ex. 1002, ¶¶177-180.)

Karppanen states that “[s]uitable **ducting 66**” “between the display casing and the display element” facilitates “an air flow **circulating** the display element,” where “fans **64 force the air** of the inner casing **to flow past the front plate 46** of the device.” (Ex. 1004, 9:3-8, Fig. 2.) Karppanen also states: “[i]nside the display casing [**10**] there is a display element **26**, which is supported at its edges by support elements **56** to the edge part of the display casing in a way that **there remains a gap** enabling the circulation of air between the walls of the display casing [**10**] and the outer surface of the display element [**26**].” (*Id.*, 4:29-32.)

A front portion of the ducting **66** (highlighted green) is disposed in the gap (a “*space*”) between the front plate **46** (highlighted orange) (“*the front display surface*”) and the front portion of the display **26** (highlighted blue) (“*the front portion of the electronic image assembly*”). Thus, the gap is “*a front channel*

defined by the space between the front display surface and the front portion of the electronic image assembly.” (Ex. 1002, ¶180.)



(Ex. 1004, FIG. 2 (partial, annotated).)

Accordingly, Karppanen teaches this claim element. (Ex. 1002, ¶180.)

E. Dependent Claim 6

| | |
|---|---|
| 6 | ~~The electronic display of claim 1, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination devices, wiring, wiring harnesses, lights, thermo electric devices, and switches.~~ |
|---|---|

Karppanen teaches this claim element because Karppanen discloses fans **64** within the closed loop pathway, and because a POSITA would have known that those fans include motors and the display screen also includes electrical components. (Ex. 1002, ¶¶181-185.)

Karppanen teaches a “closed loop gas circulation path” i.e., “the pathway of the closed loop gas circulation path” (highlighted green). (*Id.*, ¶183; *supra*, VIII.A.4 (Element 1[c]).)

“Inside the display casing on the back wall **22** there are **fans 64**, which circulate air in the space between the display element and the walls of the display casing” and further that [t]he fans **64** force the air of the inner casing to flow past the front plate **46** of the device. (Ex. 1004, 9:3-8, FIG. 2.) As such, and as seen in, Figure 2, the fans **64** are located within the “*closed loop*” (highlighted green). (Ex. 1002, ¶184.) A POSITA would have known that a fan **64** has a motor. (*Id.*, ¶185.)

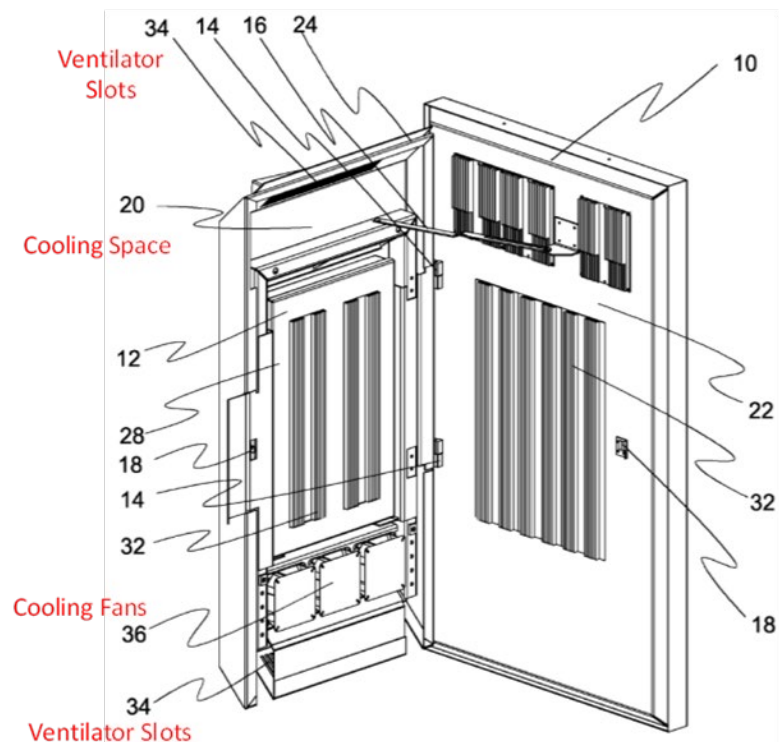
Additionally, a POSITA would understand that fans include a wiring harness to bring power to the fan motor. (*Id.*) Likewise, the display screen is in the closed loop path and it too would include electrical components. (*Id.*) Accordingly, Karppanen teaches “*at least one electronic component located in the pathway of the closed loop gas circulation path*” and thus teaches this claim element. (*Id.*)

F. Dependent Claim 7

| | |
|---|--|
| 7 | ~~The electronic display of claim 1, further comprising a cooling device placed near an entrance to the open loop ambient air flow path for reducing the temperature of ambient air entering the open loop ambient air flow path.~~ |
|---|--|

Karppanen teaches this claim element because Karppanen’s system includes cooling fans **36** (“*a cooling device*”) near ventilation slots **34** (“*an entrance*”) to the cooling space **20** (“*the open loop ambient air flow path*”). (Ex. 1002, ¶¶186-189.)

The cooling space **20**, along with the ventilator slots **34**, forms an “**open loop airflow pathway.**” (*Supra*, VIII.A.) “In the **first edge of the cover 24**” “there are **ventilator slots 34**, which enable the **movement of air from the outside of the device to the cooling space [20]**” and “[i]n the cover **24** there are **cooling fans 36**, by which the **circulation of air through the cooling space [20]** is regulated.” (Ex. 1004, 7:16-22, FIG. 1.)



(*Id.*, FIG. 1 (annotated).)

The cooling fans **34** are “*a cooling device*” that are placed near the ventilator slots **34** to the cooling space **20**, i.e., “*an entrance to the open loop ambient air flow path.*” The cooling fans **34** reduce the temperature of ambient air entering the open loop ambient air flow path. (Ex. 1002, ¶189.) Thus, Karppanen teaches this claim element. (*Id.*)

G. Independent Claim 8

1. Elementa 8[pre]-8[a]

| | |
|--------|-----------------------------------|
| 8[pre] | An electronic display comprising: |
|--------|-----------------------------------|

| | |
|------|--|
| 8[a] | ~~an electronic image assembly having a front portion and a rear portion;~~ |
|------|--|

Elements 8[pre], 8[a] are identical, respectively, to Elements 1[pre], 1[a].
Therefore, as under this Ground for 1[pre]-1[a], Karppanen teaches 8[pre]-8[a].
(Ex. 1002, ¶190; *supra* §§VIII.A.1-2.)

2. Element 8[b]

| | |
|------|---|
| 8[b] | ~~a closed loop gas circulation path encircling the electronic image assembly;~~ |
|------|---|

The difference between claim elements 8[b] and 1[c] is
insubstantial:

a closed loop gas circulation path ~~about~~encircling the electronic image
assembly;

In the difference above and throughout this Petition, additions in the claim
element at issue are marked blue and deletions from the reference claim element
are marked red.

The difference between a “path about” and a “path encircling” is
insubstantial.

Therefore, as under this Ground for 1[c], Karppanen teaches this claim
element. (Ex. 1002, ¶¶191-195; *supra* §VIII.A.4.)

3. Element 8[c]

| | |
|------|---|
| 8[c] | ~~an open loop ambient air flow path behind the rear portion of the electronic image assembly;~~ |
|------|---|

Elements 8[c] and 1[b] are identical. Therefore, as under this Ground for 1[b], Karppanen teaches this claim element. (Ex. 1002, ¶196; *supra* §VIII.A.4.)

4. Element 8[d]

| | |
|------|---|
| 8[d] | ~~a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly, the space between the substantially planar surface and the rear portion of the electronic image assembly defining a rear channel;~~ |
|------|---|

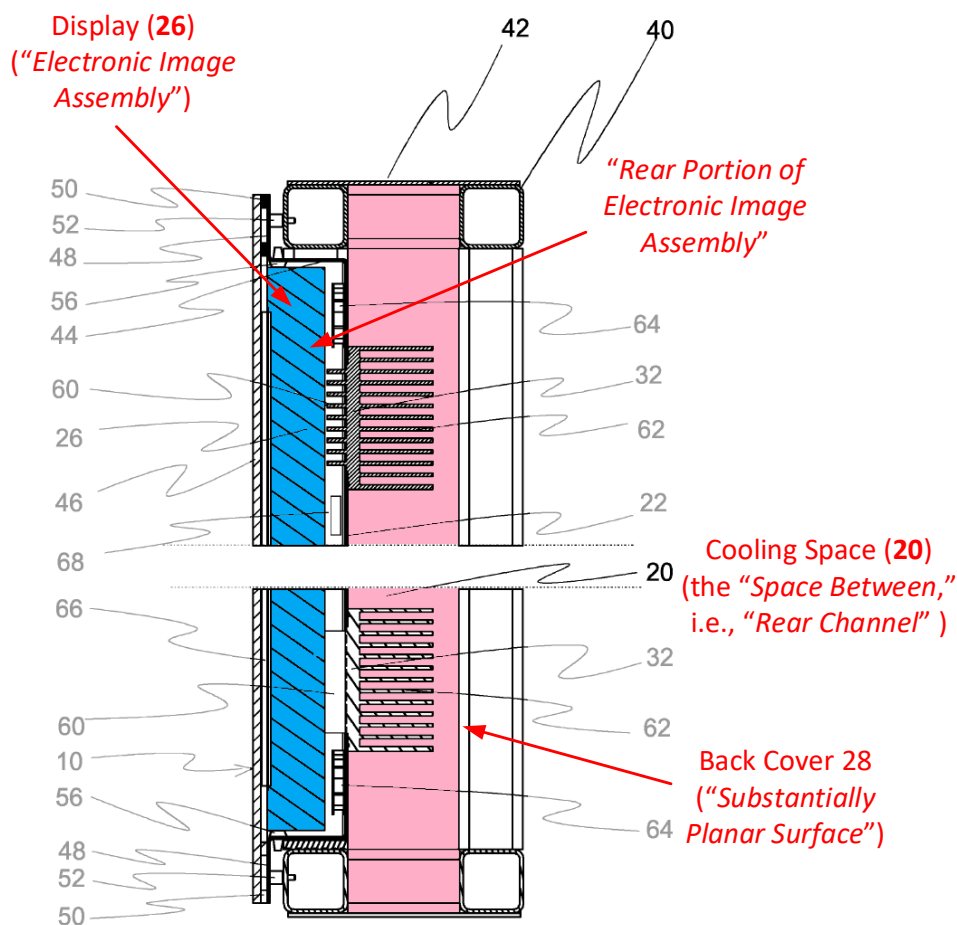
The difference between Elements 8[d] and Elements 2[a]-[b] together is insubstantial:

a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly; ~~and a, the~~ space ~~defined~~ between the substantially planar surface and the rear portion of the electronic image assembly ~~and the substantially planar surface~~ defining a rear channel;

Claim element 8[d] labels the space “*a rear channel*.”

Karppanen’s cooling space **20**, which is at least a part of “*the space between*” the device casing’s back cover **28** (“*the substantially planar surface*”) and “*the rear portion of*” the display **26** “*the electronic image assembly*” is a

channel (i.e., the “rear channel”).



(Ex. 1004, FIG. 2 (annotated).)

Thus, as under this Ground for Elements 2[a]-2[b], Karppanen teaches this claim element. (Ex. 1002, ¶¶197-200; *supra* §§VIII.B.1-2.)

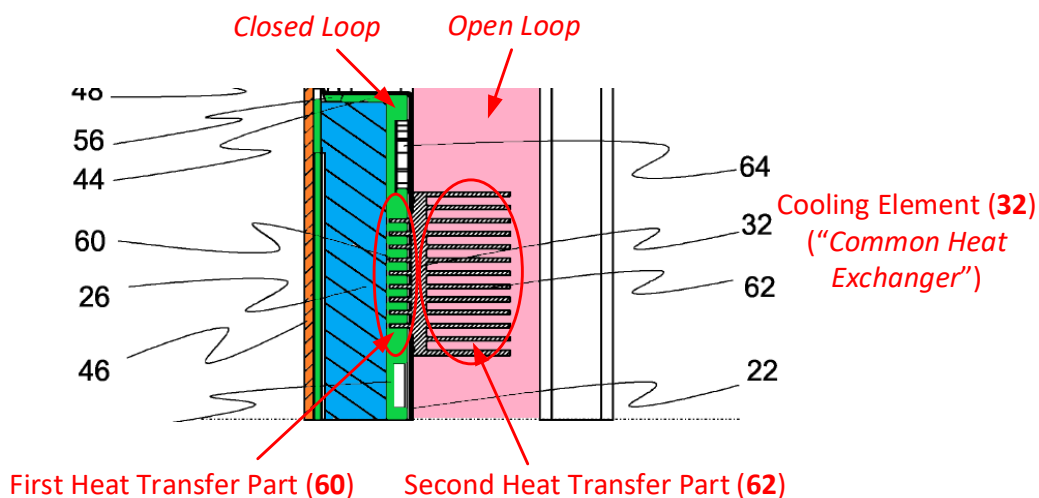
5. Element 8[e]

| | |
|------|---|
| 8[e] | ~~a common heat exchanger in gaseous communication with both the closed loop gas circulation path and the open loop ambient air flow path;~~ |
|------|---|

The difference between claim elements 8[e] and 1[d] is insubstantial:

a common heat exchanger ~~located in the pathway of~~ in gaseous communication with both the closed loop gas circulation path and the open loop ambient air flow path;

A heat exchanger “located in the pathway of” both the closed and open loops would be “in gaseous communication with” those two loops. (Ex. 1002, ¶202; *supra*, §§VIII.A.3-4.)



(Ex. 1004, FIG. 2 (partial, annotated).)

The cooling unit 32 (the “common heat exchanger”), including its first and second parts, is in gaseous communication with “both the closed loop gas circulation path and the open loop ambient air flow path.” (Ex. 1002, ¶203.)

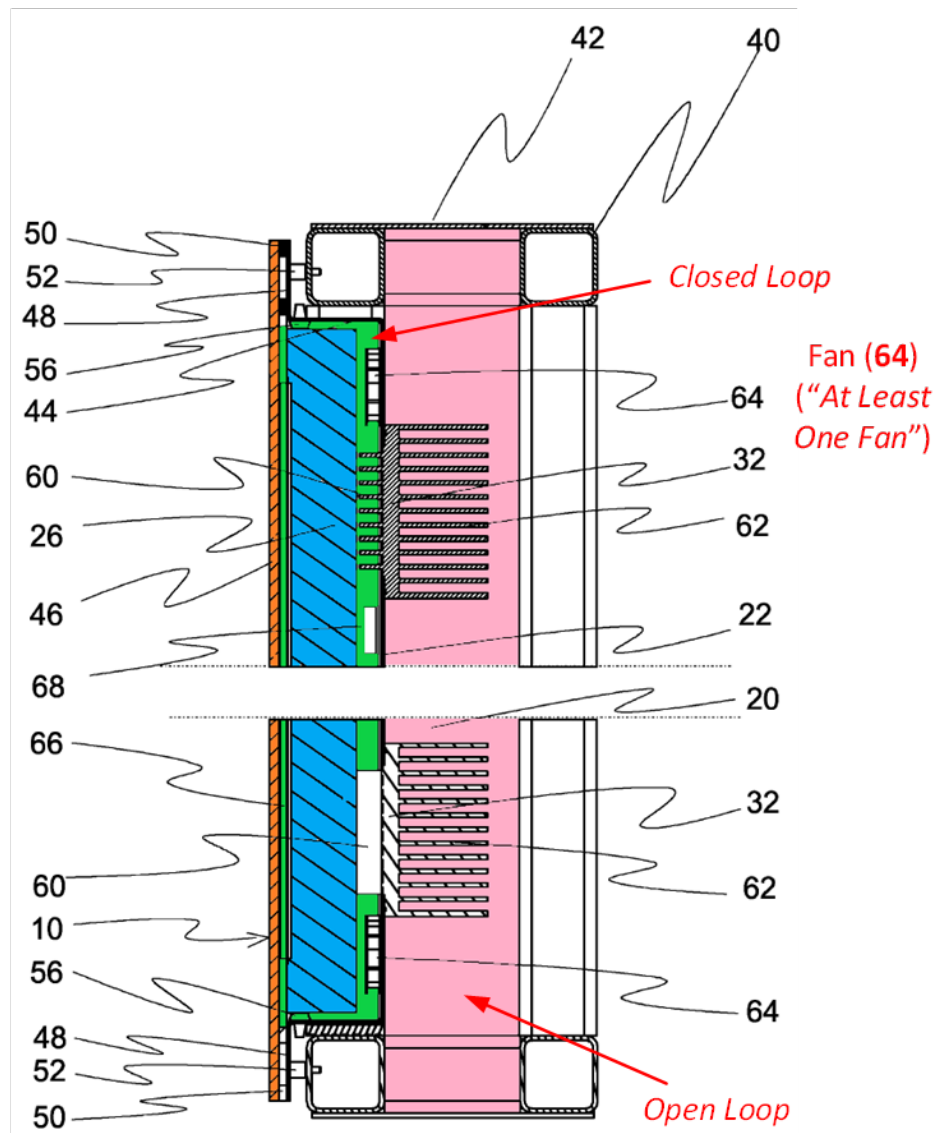
Therefore, as under this Ground for claim element 1[d], Karppanen teaches this claim element. (*Id.*, ¶204; *supra* §VIII.A.5.)

6. Element 8[f]

| | |
|------|---|
| 8[f] | ~~at least one fan positioned to force circulating gas through the closed loop gas circulation path;~~ |
|------|---|

Karppanen discloses this claim element because Karppanen’s system includes fans **64** that force the air circulating in the closed pathway (within the closed display casing **10**), i.e., “*to force circulating gas through the closed loop.*” (Ex. 1002, ¶¶205-208; *supra*, §VIII.A.3.)

The “**fans 64, which circulate air** in the space between the display element [26] and the walls of the display casing” provide “**an air flow circulating the display element**” where “[t]he **fans 64 force the air**” “to flow past the front plate **46** of the device.” (Ex. 1004, 9:3-8, FIG. 2.)



(*Id.*, FIG. 2 (annotated).)

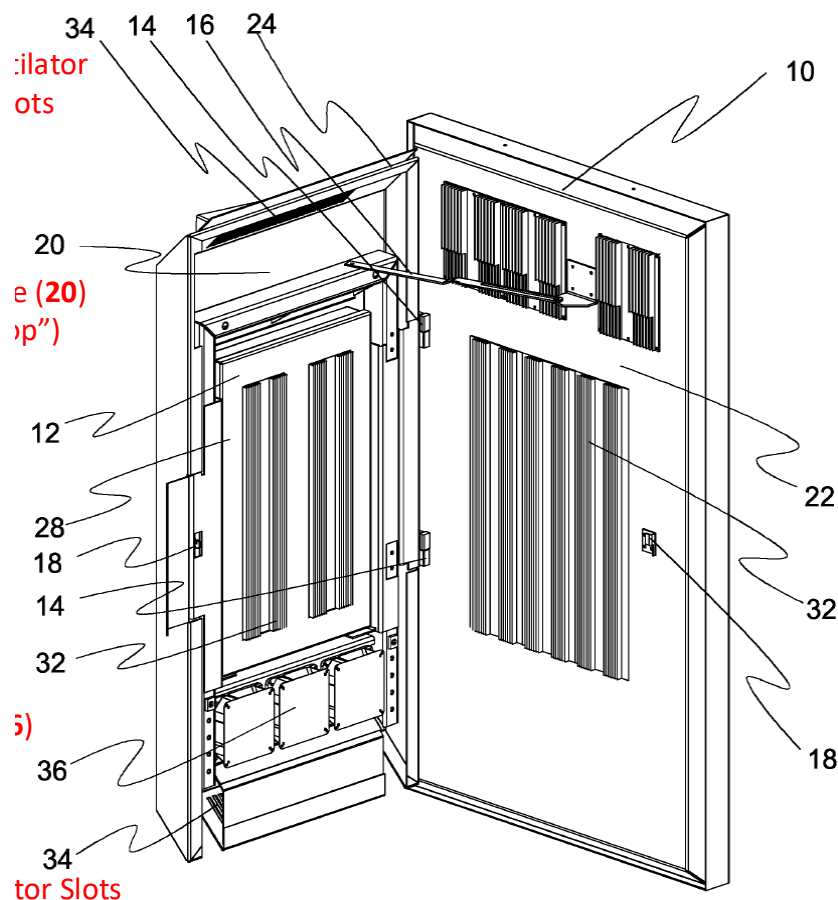
Thus, the fans **64** (“*at least one fan*”) are “*positioned to force circulating*” air, i.e., “*gas through*” the space between the display element [26] and the walls of the display casing and through the ducting 66, i.e., “*the closed loop gas circulation path.*” Accordingly, Karppanen teaches this claim element. (Ex. 1002, ¶208.)

7. Element 8[g]

| | |
|------|---|
| 8[g] | ~~at least one fan positioned to force ambient air through the open loop ambient air flow path~~ |
|------|---|

Karppanen teaches this claim element because Karppanen's system includes fans **36** to force ambient air through cooling space **20**. (Ex. 1002, ¶209-213.)

The cooling space **20** is "*the open loop ambient air flow path.*" (*Supra*, §VIII.A.3.)



(Ex. 1004, FIG. 1 (annotated).)

Karppanen further discloses: “[i]n the cover **24** there are cooling fans **36**, by which the circulation of air through the cooling space **[20]** is regulated.” (*Id.*, 7:16-22, FIG. 1.)

Thus, the cooling fans **36** are “*at least one fan positioned to force ambient air through the open loop ambient air flow path,*” and thus, Karppanen teaches this claim element. (Ex. 1002, ¶212.)

In summary, Karppanen discloses each and every element of claim 8. (*Id.*, ¶213.)

H. Dependent Claim 9

| | |
|---|---|
| 9 | ~~The electronic display of claim 8, wherein the open loop ambient air flow path is also in gaseous communication with the rear channel.~~ |
|---|---|

The difference between claim 9 and Element 2[c] is insubstantial::

wherein the ~~space is in gaseous communication with the open loop ambient air flow path~~ is also in gaseous communication with the rear channel.

Therefore, as under this Ground for Element 2[c], Karppanen teaches this claim. (*Id.*, ¶¶214-216; *supra* §VIII.B.3.)

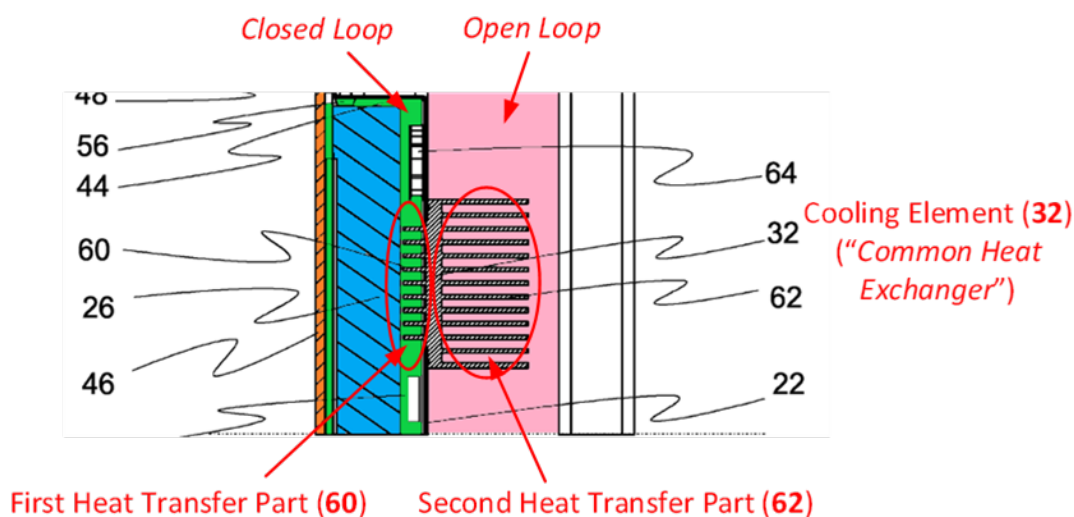
I. Dependent Claim 11

1. Element 11[a]

| | |
|-------|--|
| 11[a] | ~~The electronic display of claim 8, wherein: the common heat exchanger includes first and second gas pathways, the first and second gas pathways being isolated from each other;~~ |
|-------|--|

Karppanen teaches this claim element because Karppanen’s cooling element **32** (“*the common heat exchanger*”) includes two parts, namely, the first and second heat transfer parts, that provide two pathways that are isolated from each other. (Ex. 1002, ¶¶217-221.)

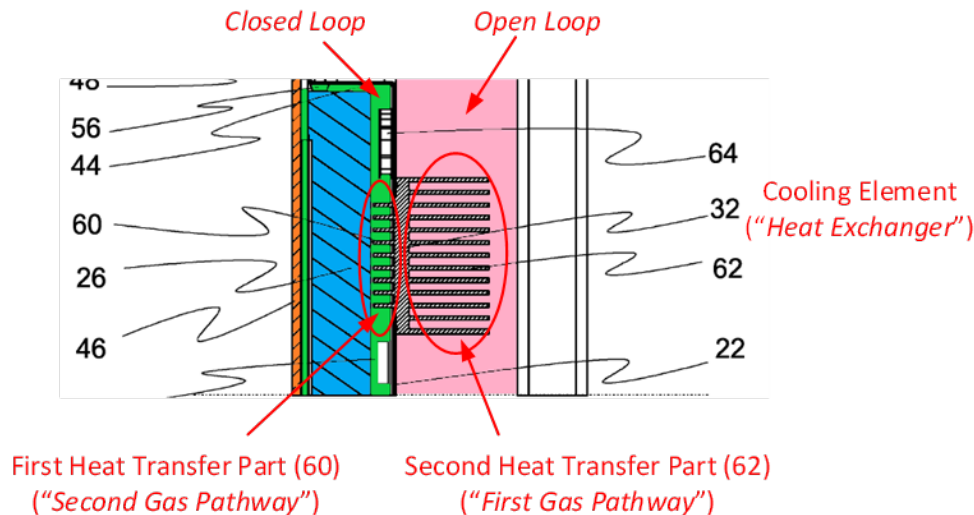
Karppanen’s system includes a cooling element **32** that has a “first heat transfer part **60**” and a “second heat transfer part **62**,” each of which may have “cooling fins.” (*Supra*, §VIII.A.5; Ex. 1004, 8:16-19, 8:29-30, FIG. 2.)



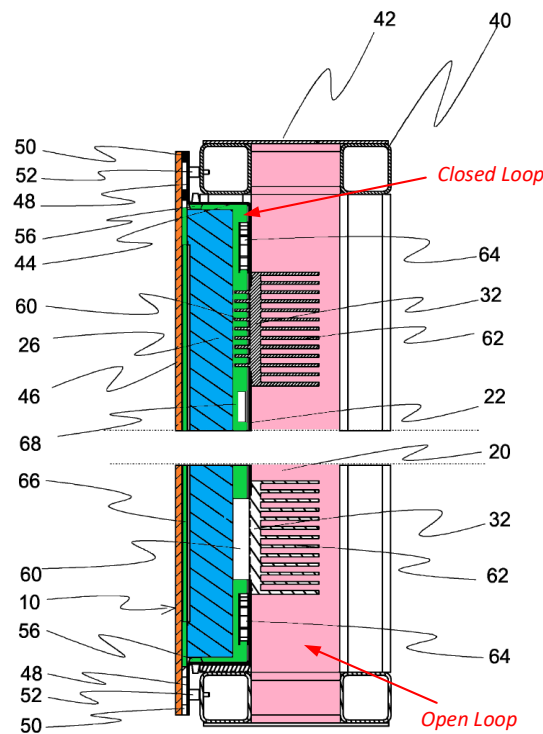
(Ex. 1004, FIG. 2 (partial, annotated).)

Within Karppanen's closed display casing **10**, the space between the display element **26** (highlighted blue) and the back wall **22**, and the ducting **66** form the "closed loop gas circulation path" (highlighted green). (*Supra*, §VIII.A.4 (Element 1[c]).) The cooling space **20**, along with the ventilator slots **34**, forms "the open loop ambient air flow path," (highlighted pink) (*Supra*, §VIII.A.3.)

The fins of the part **62** extending into the open loop (highlighted pink), and the fins of the part **60** extending into the closed loop (highlighted green), respectively define a first air (i.e., gas) pathway, within the cooling space **20**, i.e., the open loop, and a second air (i.e., gas) pathway, within the closed loop. (Ex. 1002, ¶1220.)



(Ex. 1004, FIG. 2 (annotated).)



(*Id.*, FIG. 2 (annotated).)

The closed loop pathway (highlighted green) is within the display casing 10, which is “closed” and may be “weatherproof.” (*Supra*, §VIII.A.4; Ex. 1004, Abstract, 4:6-8, 6:17-19, claim 6.) Therefore, the closed loop within the closed display casing **10** is isolated from the cooling space **20** (the “*open loop*”). (Ex. 1002, ¶221.) Therefore, the first gas pathway formed within the cooling space **20** (“open loop”), is isolated from the second gas pathway formed within the closed loop. Accordingly, Karppanen teaches this claim element. (*Id.*)

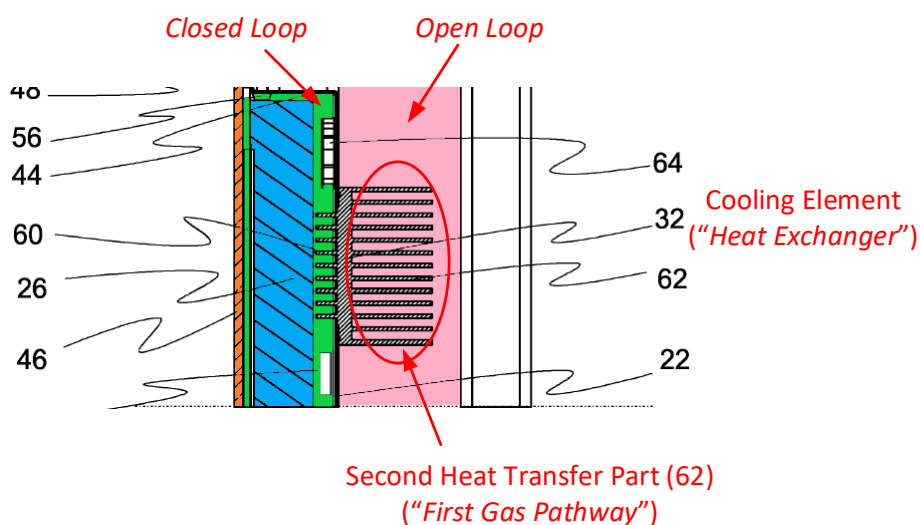
2. Element 11[b]

11[b]

where the first gas pathway is in gaseous communication with the open

| | |
|--|---|
| | ~~loop ambient air flow path; and;~~ |
|--|---|

Karppanen teaches this claim element. (Ex. 1002, ¶222-223.) The first gas pathway formed by the fins of the second part **62** is formed within the cooling space **20**, i.e., within the “*open loop ambient air flow path*.” (*Id.* ¶222; Ex. 1004, FIG. 2; *supra*, §VIII.I.1.)



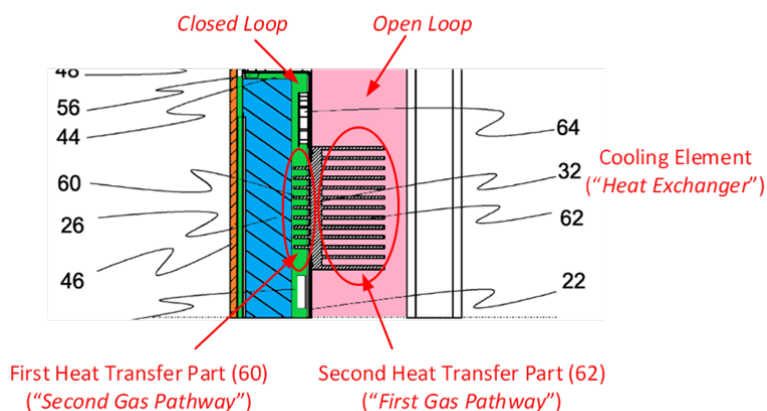
(Ex. 1004, FIG. 2 (partial, annotated).)

Thus, “the first gas pathway is in gaseous communication with the open loop ambient air flow path.” Accordingly, Karppanen teaches this claim element. (Ex. 1002, ¶223.)

3. Element 11[c]

| | |
|-------|--|
| 11[c] | ~~where the second gas pathway is in gaseous communication with the closed loop gas circulation path.~~ |
|-------|--|

Karppanen teaches this claim element. (Ex. 1002, ¶¶224-225.) The second gas pathway formed by the fins of the first part **60** is formed within the “*closed loop gas circulation path.*” (*Id.*, ¶224; Ex. 1004, FIG. 2; *supra*, §VIII.I.1.)



(Ex. 1004, FIG. 2 (partial, annotated).)

Thus, “the second gas pathway is in gaseous communication with the closed loop gas circulation path.” Accordingly, Karppanen teaches this claim element.

(Ex. 1002, ¶225.)

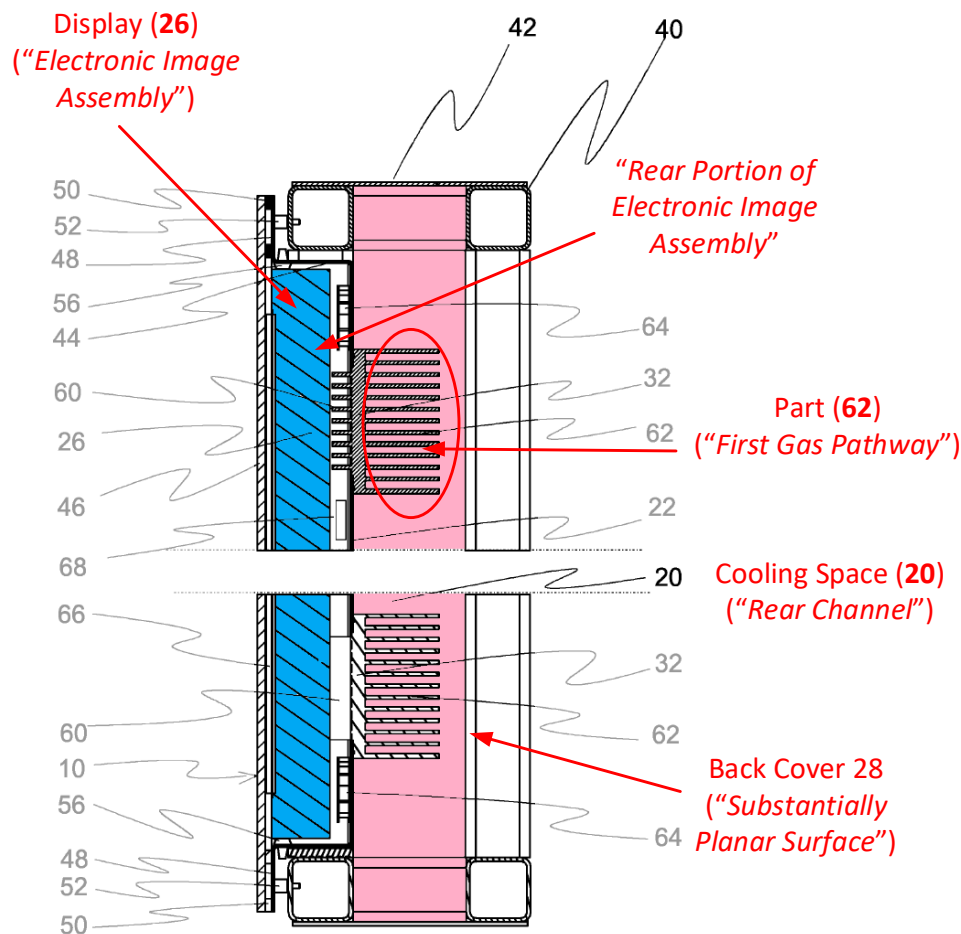
J. Dependent Claim 12

| | |
|----|--|
| 12 | ~~The electronic display of claim 11, wherein the first gas pathway is also in gaseous communication with the rear channel.~~ |
|----|--|

Karppanen discloses this claim element. (Ex. 1002, ¶¶226-229.) The “*rear channel*” is defined by the space between the rear portion of the display **26** and the back cover **28** of the device casing **12**, and at least a portion of the cooling space

20 is included in the “*rear channel*.” (*Supra*, §§VIII.B.1-2, VIII.G.4 (Elements 8[d], 2[a], and 2[b]).)

The cooling space **20** is the “*open loop ambient air flow path*,” the first gas pathway defined by the fins of the part **62** is within the cooling space **20**, and in gaseous communication with the “*open loop ambient air flow path*.” (*Supra*, §§VIII.A.3, VIII.I.2.) Thus, the cooling space **20** is part of both the “*first gas pathway*” and the “*rear channel*,” and as such, “*the first gas pathway is also in gaseous communication with the rear channel*.”



(Ex. 1004, FIG. 2 (annotated).)

Accordingly, Karppanen teaches this claim. (Ex. 1002, ¶229.)

K. Dependent Claim 13

| | |
|----|--|
| 13 | ~~The electronic display of claim 8, wherein the substantially planar surface is a plate.~~ |
|----|--|

Claim 13 is identical to claim 3. Therefore, as under this Ground for claim 3, Karppanen discloses the limitations of claim 13. (*Id.*, ¶231; *supra* §VIII.C.)

L. Dependent Claim 15

1. Elements 15[a]-[b]

| | |
|-------|---|
| 15[a] | ~~The electronic display of claim 8, further comprising: a front display surface spaced apart from the front portion of the electronic image assembly; and~~ |
| 15[b] | ~~a front channel defined by a space between the front display surface and the front portion of the electronic image assembly, the front channel forming part of the closed loop gas circulation path.~~ |

Claim elements 15[a] and 15[b] are identical, respectively, to Elements 5[a] and 5[b]. Therefore, as under this Ground for Elements 5[a] and 5[b], Karppanen teaches claim elements 15[a] and 15[b]. (Ex. 1002, ¶232; *supra* §VIII.D.)

M. Dependent Claim 16

| | |
|----------------|---|
| ~~-16~~ | ~~The electronic display of claim 8, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination devices, wiring, wiring harnesses, lights, thermo-electric devices, and switches.~~ |
|----------------|---|

Claim 16 is identical to claim 6. Therefore, as under this Ground for claim 6, Karppanen discloses the limitations of claim 16. (Ex. 1002, ¶234; *supra* §VIII.E.)

N. Independent Claim 17

**1. Element 17

```
[pre]
```**

| | |
|--------------------------------|---|
| ~~-17<pre>[pre]</pre>~~ | ~~A cooling system for an electronic image assembly, comprising:~~ |
|--------------------------------|---|

To the extent the preamble is limiting, Karppanen discloses this claim element. As explained, Karppanen is a cooling system for displays, including LCDs, i.e., an “*electronic image assembly*.” (*Supra*, §VIII.A.1-4.)

Thus, Karppanen discloses “[a] *cooling system for an electronic image assembly*.” (Ex. 1002, ¶¶235-241.)

2. Element 17[a]

| | |
|-------------------|---|
| ~~-17[a]~~ | ~~an open loop ambient air flow path at a rear portion of the electronic~~ |
|-------------------|---|

| | |
|--|----------------------------|
| | ~~image assembly;~~ |
|--|----------------------------|

The difference between claim elements 17[a] and 1[b] is insubstantial³:

an open loop ambient air flow path ~~behind the~~at a rear portion of the electronic image assembly;

Karppanen’s “cooling space **20**” is an “*open loop ambient air flow path*.”

(*Supra*, §VIII.A.3 (Element 1[b]).) The flow of ambient air through the cooling space **20** occurs behind, i.e., “*at a rear portion of*” the display **26** (“*the electronic image assembly*”). (Ex. 1002, ¶243.) This is consistent with the ’740 patent. (Ex. 1002, ¶¶243-247; Ex. 1001, 6:35-41, 7:45-52, FIGs. 2A, 2B, 4.)

Therefore, as under this Ground for Element 1[b], Karppanen teaches this claim element. (Ex. 1002, ¶247.)

3. Elements 17[b]-17[c]

| | |
|-------|---|
| 17[b] | ~~a closed loop gas circulation path encircling the electronic image assembly;~~ |
| 17[c] | ~~a common heat exchanger in gaseous communication with both the closed loop gas circulation path and the open loop ambient air flow path;~~ |

Elements 17[b]-17[c] are identical, respectively, to Elements 8[b], 8[e].

Therefore, as under this Ground for 8[b], 8[e], Karppanen teaches 17[b]-17[c].

(Ex. 1002, ¶248; *supra* §§VIII.G.2, VIII.G.5.)

4. Element 17[d]

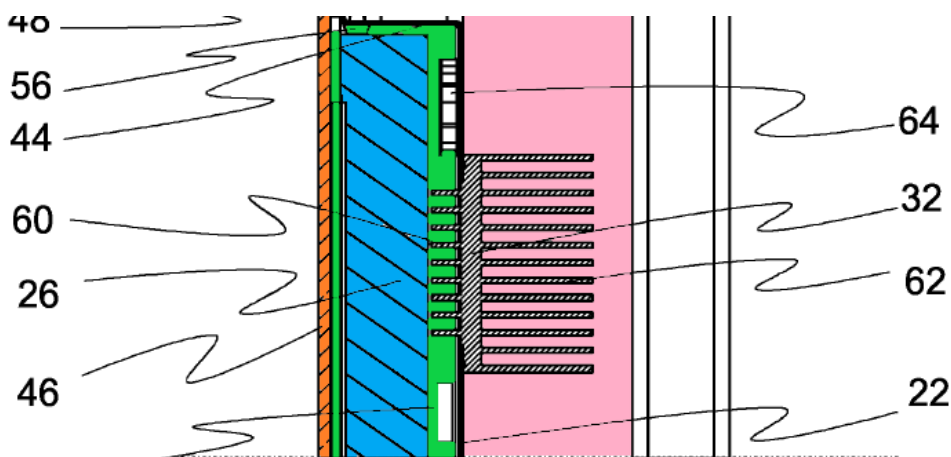
| | |
|-------|---|
| 17[d] | ~~a front channel defined by a space between a front portion of the electronic image assembly and a front display surface located forward of and spaced apart from the front portion of the electronic image assembly, the front channel forming a part of the closed loop gas circulation path;~~ |
|-------|---|

~~A side-by-side comparison of the limitations of Element 17[d] and Elements 5[a]-5[b] is shown below:~~

| ~~Limitations of 17[d]~~ | ~~Limitations of 5[a] and 5[b]~~ |
|--|--|
| ~~“a front channel defined by a space between a front portion of the electronic image assembly and a front display surface”~~ | ~~5[b] “a front channel defined by the space between the front display surface and the front portion of the electronic image assembly,”~~ |
| ~~“the front channel forming a part of the closed loop gas circulation path;”~~ | ~~5[b] “the front channel forming part of the closed loop gas circulation path.”~~ |
| ~~“a front display surface <u>located forward of and</u> spaced apart from the front portion of the electronic image assembly”~~ | ~~5[a] “a front display surface spaced apart from the front portion of the electronic image assembly”~~ |

The differences between the corresponding limitations are insubstantial.

(Ex. 1002, ¶250.) “[A] front display surface spaced apart from the front portion of the electronic image assembly” recited in Element 5[a] would be “located forward of” the electronic image assembly.



(Ex. 1004, FIG. 2 (annotated).)

Therefore, as under this Ground for Elements 5[a]-5[b], Karppanen discloses this Element 17[d]. (Ex. 1002, ¶252; *supra* §VIII.D.)

5. Element 17[e]

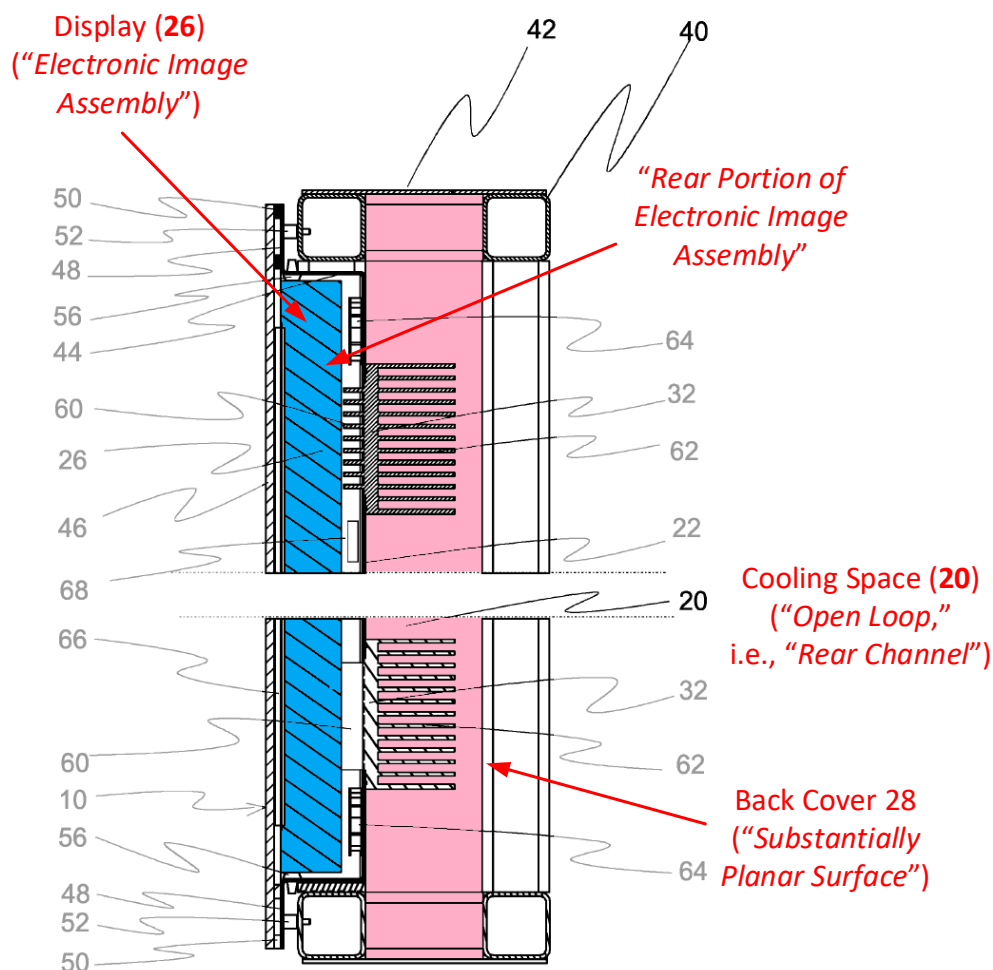
| | |
|-------|---|
| 17[e] | ~~a rear channel defined by a space between the rear portion of the electronic image assembly and a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly, the rear channel forming a part of the open loop ambient air flow path;~~ |
|-------|---|

The difference between claim elements 17[e] and 8[d] is shown below

(where, in addition to blue/red markings, the green phrases indicate a location shift):

a rear channel defined by a space between the rear portion of the electronic image assembly and a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly, the ~~space between the substantially planar surface and the rear portion of the electronic image assembly defining a~~ rear channel forming a part of the open loop ambient air flow path;

Other than the addition of the limitation “*rear channel forming a part of the open loop ambient air flow path*” the rest of the differences are simply reordering of the claim terms and are thus insubstantial. (Ex. 1002, ¶254.) Karppanen’s cooling space **20** is both the “*open loop ambient airflow path*,” and the “*rear channel*.” (*Supra*, §§VIII.A.3, VIII.G.4.)



(*Id.*, Fig. 2 (annotated).)

Therefore, Karppanen teaches this claim element. (Ex. 1002, ¶¶253-255.)

6. Element 17[f]

| | |
|-------|---|
| 17[f] | ~~at least one fan positioned to force circulating gas through the closed loop gas circulation path and the common heat exchanger; and~~ |
|-------|---|

The difference between claim elements 17[f] and 8[f] is shown below:

at least one fan positioned to force circulating gas through the closed loop

gas circulation path and the common heat exchanger; and

Element 17[f] recites forcing the circulating gas through “the common heat exchanger.” But, Element 1[e] recites “*a gas circulation device positioned to force circulating gas through the common heat exchanger.*” Karppanen’s “gas circulation device” is fans **64**, (*supra*, §VIII.A.6; Ex. 1004, FIG. 2), i.e., “*at least one fan.*” Therefore, as under this Ground for Elements 8[f] and 1[e], Karppanen discloses this claim element. (Ex. 1002, ¶257.)

7. Element 17[g]

| | |
|-------|--|
| 17[g] | ~~at least one fan positioned to force ambient air through the open loop ambient air flow path and the common heat exchanger.~~ |
|-------|--|

The difference between claim elements 17[g] and 8[g] is shown below:

at least one fan positioned to force ambient air through the open loop ambient air flow path- and the common heat exchanger.

Element 17[g] additionally recites forcing the circulating gas through “*the common heat exchanger.*” But, Element 1[f] recites “*an air circulation device positioned to force ambient air through the common heat exchange.*” Karppanen’s “air circulation device” is fans **36**, (*supra*, §VIII.A.7; Ex. 1004, FIG. 1)), i.e., “*at least one fan.*” Therefore, as under this Ground for Elements 8[g] and 1[f], Karppanen discloses this claim element. (Ex. 1002, ¶259; *supra* §§VIII.A.7, VIII.G.7.)

In summary, Karppanen discloses all of the elements of claim 17, and renders claim 17 unpatentable as obvious. (Ex. 1002, ¶260.)

O. Dependent Claims 18 and 20

| | |
|----|--|
| 18 | ~~The cooling system of claim 17, wherein the substantially planar surface is a plate.~~ |
| 20 | ~~The cooling system of claim 17, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination devices, wiring, wiring harnesses, lights, thermo-electric devices, and switches.~~ |

Claims 18 and 20 are identical, respectively, to claims 3 and 6. Therefore, as under this Ground for claims 3 and 6, Karppanen discloses the limitations of claims 18 and 20. (Ex. 1002, ¶¶261-264; *supra* §§VIII.C, VIII.E.)

IX. GROUND 2: CLAIMS 1-3, 5, 6, 8, 9, 11-13, 15-18, and 20 Are Obvious Over Yare in View of the Knowledge of a POSITA

A. Independent Claim 1

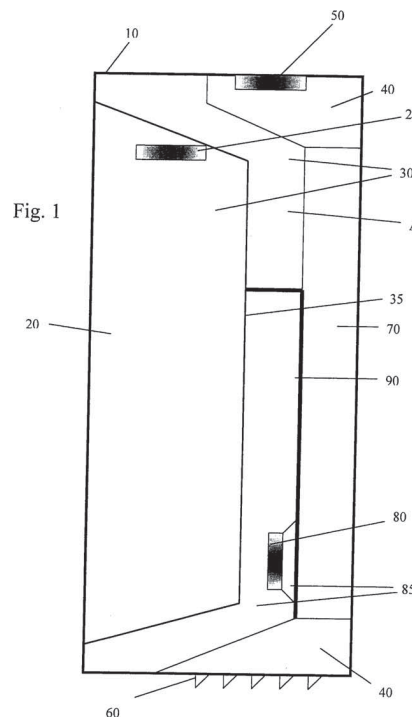
1. Element 1[pre]

| | |
|--------|--|
| 1[pre] | ~~An electronic display comprising:~~ |
|--------|--|

Yare discloses an “*electronic display*.” To the extent it is limiting, Yare

teaches the preamble because Yare discloses a cabinet **10** having “improved cooling facilities” and a display **20** (e.g., an LCD). (Ex. 1002, ¶¶265-268.)

Yare discloses “[a] cabinet **10** is arranged to contain a **display 20** for displaying information, advertisements or other visual media.” (Ex. 1005, 4:4-5, FIGs. 1, 4.)



(*Id.*, FIG. 1.)

Yare states that “[v]arious forms of display system may be used, for example plasma, **LCD**, TFT, CRT, LED, rear projection or any similar technology.” (*Id.*, 6:31-32.)

Accordingly, Yare’s cabinet **10** including its components is an “electronic display” and thus Yare teaches the preamble of claim 1. (Ex. 1002, ¶268.)

2. Element 1[a]

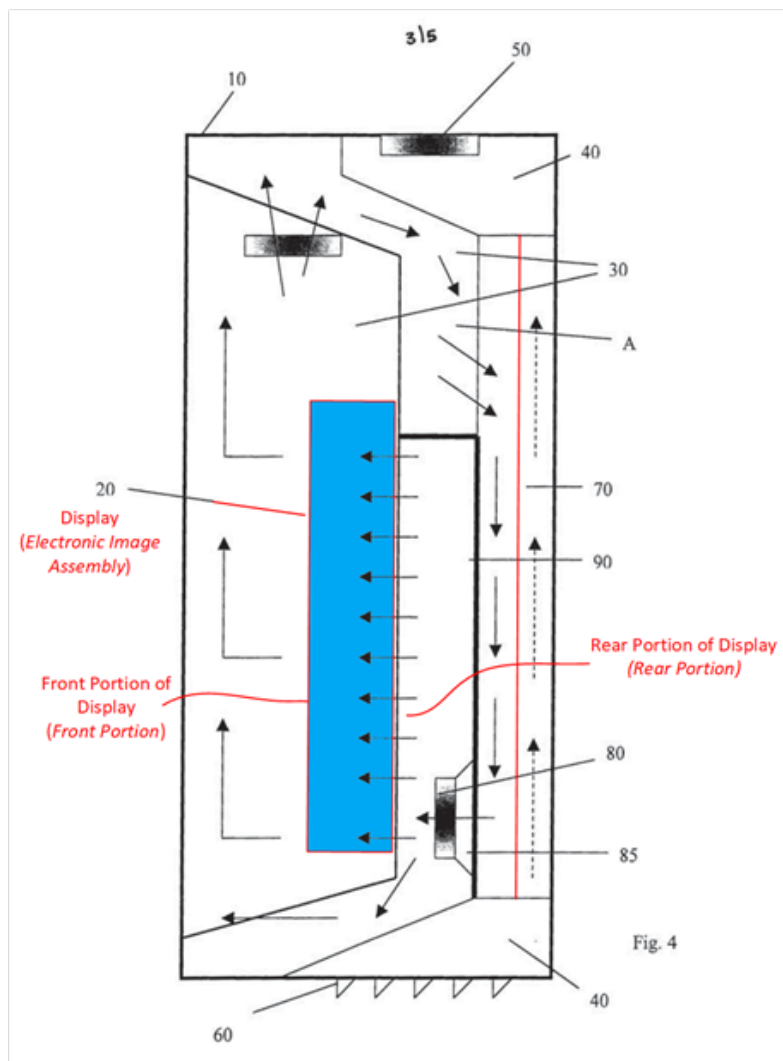
| | |
|------|--|
| 1[a] | ~~an electronic image assembly having a front portion and a rear portion;~~ |
|------|--|

Yare individually and in view of the knowledge of a POSITA discloses this claim element because Yare’s system includes a display 20 that may be an LCD. A POSITA would have known that a typical LCD includes a liquid crystal panel and a backlight. (Ex. 1002, ¶269.) Therefore, Yare’s LCD **20** is an “*electronic image assembly*.” (*Id.*)

“A cabinet **10** is arranged to contain a **display 20** for displaying information, advertisements or other visual media” and the “display [**20**] is sealed within the cabinet in a sealed zone **30**.” (Ex. 1005, 4:4-6, FIGs. 1, 4.) An exemplary LCD **20** is “*an electronic image assembly*.” This is consistent with the ’740 patent, as discussed for this claim element under Ground 1. (Ex. 1002, ¶270.)

Moreover, a POSITA would have known that an LCD has a liquid crystal panel (“*front portion*”) and a backlight (*rear portion*). (Ex. 1002, ¶271 (citing Ex. 1010, 1:22-27, FIG. 1).)

Yare’s LCD **20** has a “*front portion*” and a “*rear portion*,” as shown in annotated Figure 4 below. (Ex. 1002, ¶272.)



(Ex. 1005, FIG. 4 (annotated).)

Thus, Yare individually, and in view of the knowledge of a POSITA, teaches this claim element. (Ex. 1002, ¶273.)

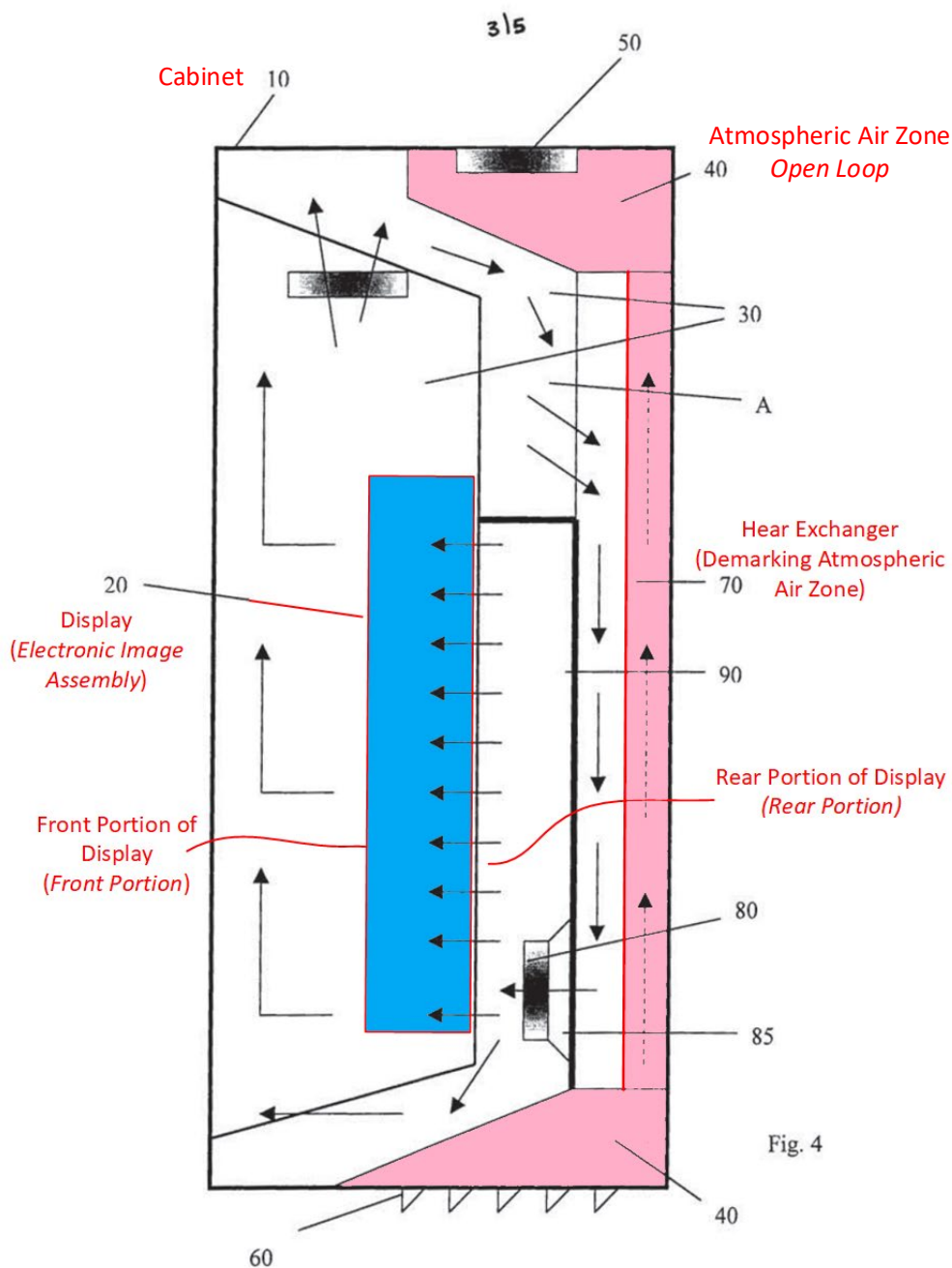
3. Element 1[b]

| | |
|------|---|
| 1[b] | ~~an open loop ambient air flow path behind the rear portion of the electronic image assembly;~~ |
|------|---|

Yare teaches this claim element because Yare's system includes an atmospheric air zone **40** for the flow of ambient air, which is located behind the display **20**. (Ex. 1002, ¶¶274-277.)

Yare's cabinet **10** "includes an **atmospheric air zone 40**" where "[a]ir from the outside of the cabinet **10** is drawn through vents **60** into the atmospheric air zone **40** by fans **50**" passes therethrough, and is "then expelled from the cabinet **10** through the fans **50**". (Ex. 1005, 4:11-16, FIGs. 1-4.) Thus, the atmospheric air zone **40** is "*an open loop ambient airflow path.*" (Ex. 1002, ¶276.)

In Yare's Figure 4, the "[d]otted arrows show movement of air in the **atmospheric air zone 40**." (Ex. 1005, 4:24-27, FIG. 4.)



(*Id.*, FIG. 4 (annotated).)

In annotated Figure 4 above, the display 20 is highlighted blue and the atmospheric air zone 40 (“an open loop ambient airflow path”) is highlighted pink.

It can be seen in annotated Figure 4 that the atmospheric air zone **40** is behind the display **20** (“*said electronic image assembly*”). Thus, Yare teaches this claim element. (Ex. 1002, ¶277.)

4. Element 1[c]

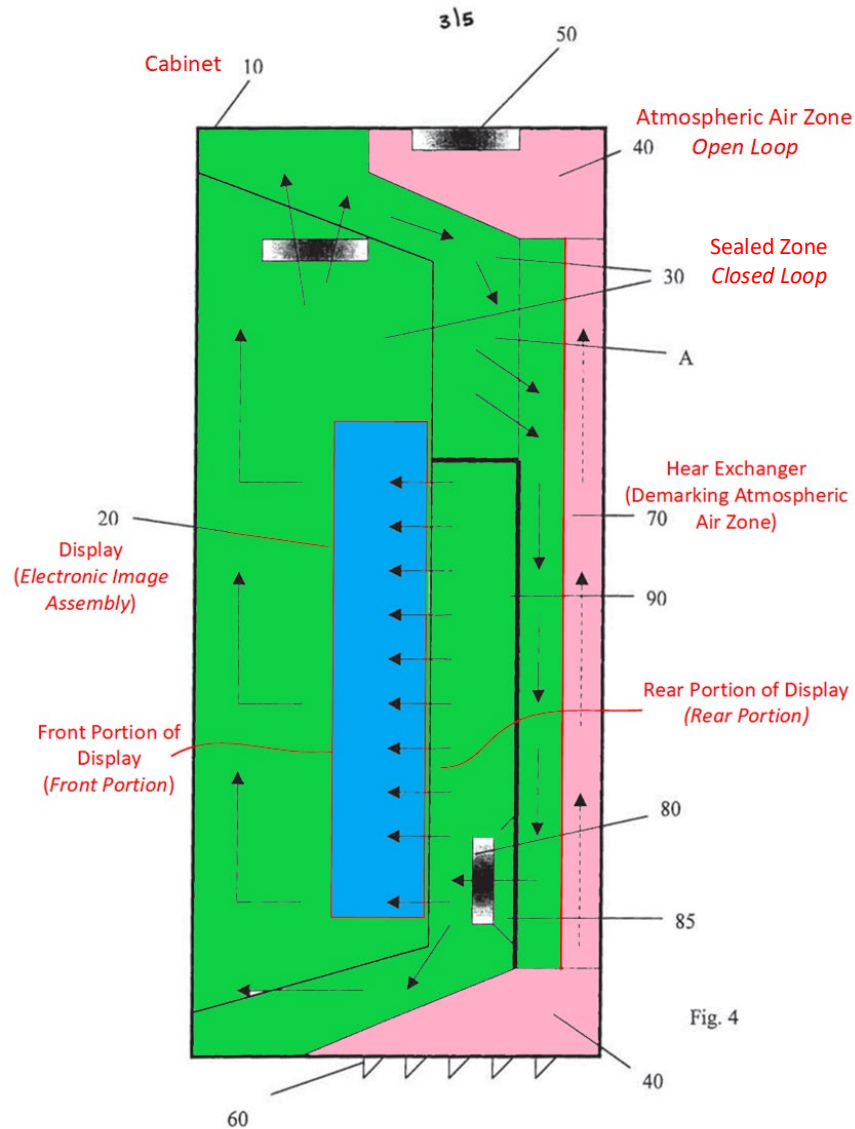
| | |
|------|--|
| 1[c] | ~~a closed loop gas circulation path about the electronic image assembly;~~ |
|------|--|

Yare discloses this claim element because Yare’s system includes a sealed zone **30** wherein air is circulated within the sealed zone and around the display **20**. (Ex. 1002, ¶¶278-285.)

Yare discloses “[a] cabinet **10** [] arranged to contain a display **20**” that “is sealed within the cabinet in a **sealed zone 30**” where “[v]ents and other venting means (not shown) allow air to travel through a rear portion **35** of the display **20**, although **the air is sealed within the sealed zone 30.**” (Ex. 1005, 4:4-9, FIGs. 1, 4.)

“[T]he sealed zone **30** is cooled without the ingress of atmospheric air” (*id.*, 6:1-2), and “[t]he **sealed zone 30 and atmospheric air zone 40, are sealed from each other** to prevent the passage of air, dirt and the like.” (*Id.*, 4:19-20, FIGs. 1, 4). Per Yare, “[a]ir is circulated within the sealed zone **30** due to operation of the fans **80** within the cabinet and fans **25** within the display **20.**” (*Id.*, 5:1-2.) Yare also states that the “**solid arrows show movement of air in the sealed zone 30.**”

(*Id.*, 4:24-27, Figure 4.)



(*Id.*, FIG. 4 (annotated).)

In annotated Figure 4 above, the display **20** is highlighted blue but is not actually illustrated in Figure 4. However, a POSITA would know that this is the most logical location for the display. (Ex. 1002, ¶282.)

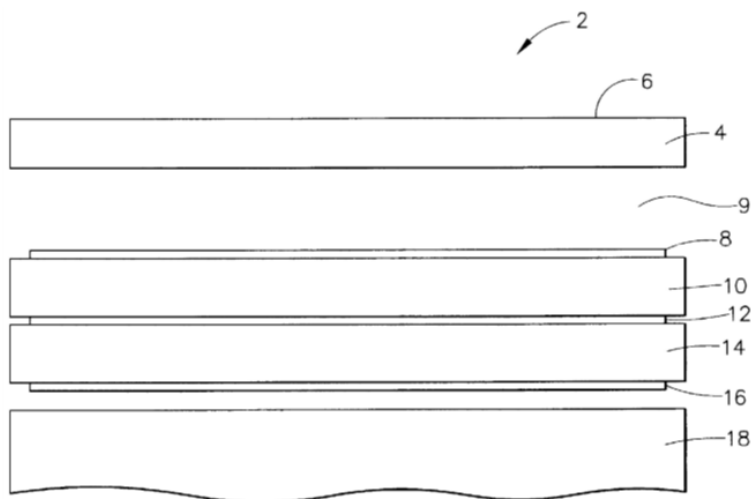
From a design perspective this is seemingly the best, if not the only, option for where the unpictured LCD would be placed. Indeed, the front of the screen can be the hottest part of the display and thus the cooling space that is created in Yare would be intentionally designed to flow over the front of the screen, as it does in Karppanen above (disclosed in ground 1). Likewise, the screen could fog if placed directly adjacent to the front of the cabinet. A POSITA in 2008 would know that the LCD in Yare is placed within the cabinet at least some distance away from the front of the cabinet. Nevertheless, it would have also been obvious to do so in view of the predictable results above. (*Id.*)

The airflow pathway within the sealed zone **30** is highlighted green. This airflow pathway is “*a closed loop gas circulation path.*” (*Id.*, ¶283.)

The solid arrows depicted in the original Figure 4 show the flow of air within the sealed zone **30**. (*Id.*, ¶284; Ex. 1005 4:24-27, FIG. 4.) In particular, the “L”-shaped arrows show that the air flows in front of the display, in the space between the transparent outer surface of the cabinet **10** and the front of where display **20** would be located. Thus, the flow of air within the sealed zone **30** encircles the display **20**. (Ex. 1002, ¶284.)

As noted, Yare does not explicitly draw display **20**. In addition to the design demands of the system, it is clear from prior art that this understood location is proper. For example, Larson discloses a “conventional” LCD with “**a gap 9**

typically filled with air” between the cover glass **4** and the front layer of the LCD stack. (Ex. 1010, 1:22-28, FIG. 1.)



(*Id.*, FIG. 1.)

Therefore, as shown in annotated Figure 4 above, a POSITA would have understood that in Yare’s system the air flow path within the sealed zone 30 (“*a closed loop gas circulation path*”) encircles the display **20**. Thus the air flow within the sealed zone is about the display **20** (“*about the electronic image assembly*”). The closed pathway is formed around the display **20** and is thus “*a closed loop gas circulation path about the electronic image assembly.*”

Accordingly, Yare individually or in view of the knowledge of a POSITA (as evidenced, e.g., by Larson) teaches this claim element. (Ex. 1002, ¶286.)

5. Element 1[d]

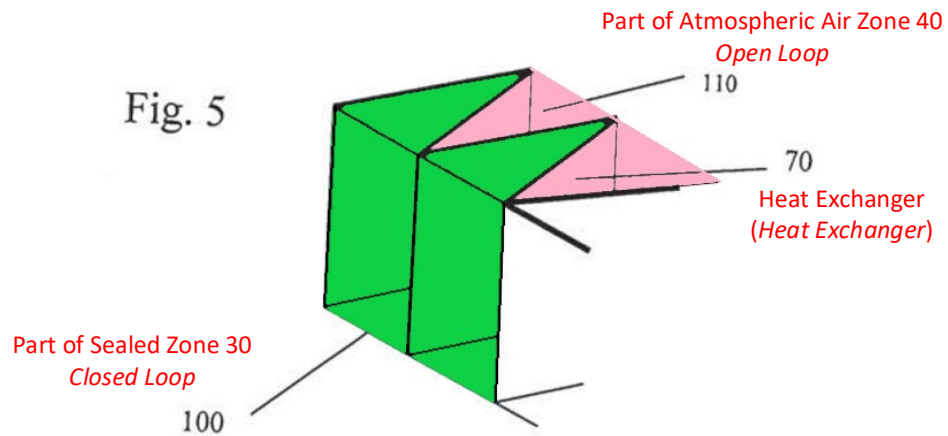
1[d]

a common heat exchanger located in the pathway of both the closed

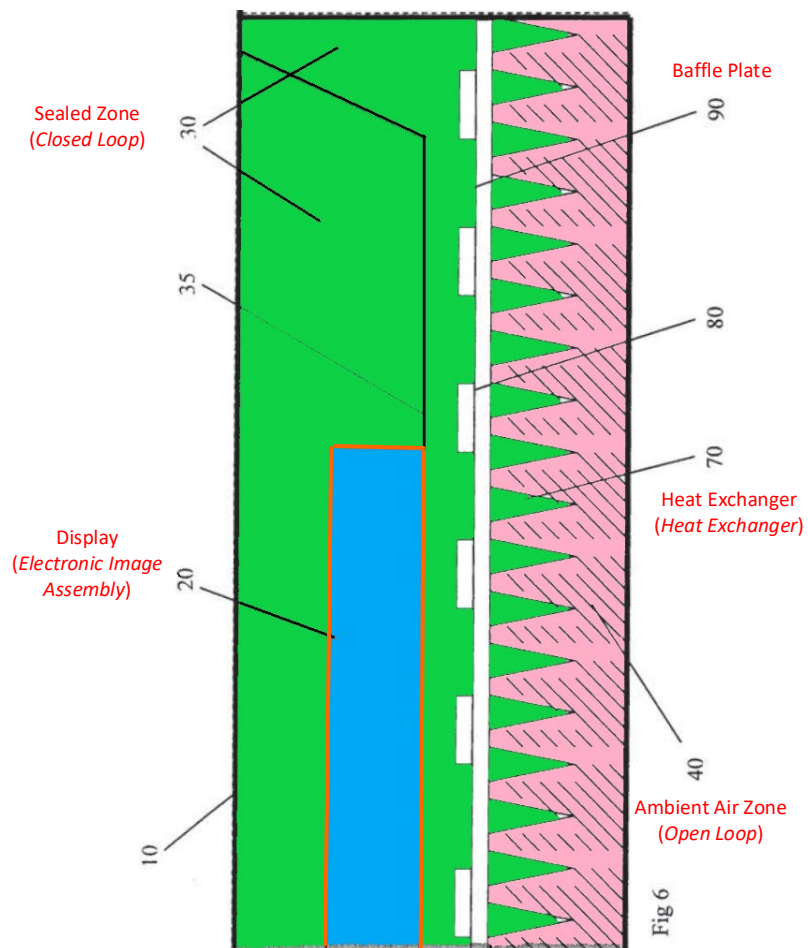
~~loop gas circulation path and the open loop ambient air flow path;~~

Yare discloses this claim element because Yare's system includes a heat exchanger **70**. The heat exchanger **70** is a "*common heat exchanger*" because on its front side it forms a pathway in the sealed zone **30**, i.e., forms "*the closed loop gas circulation path*"). Additionally, on its rear side, the heat exchanger **70** forms a pathway in the ambient air zone **40**, i.e., forms "*the open loop ambient air flow path*." (Ex. 1002, ¶¶287-290.)

Yare states that "[t]he cabinet **10** includes a **heat exchanger 70 mounted on a baffle plate 90**." (Ex. 1005, 4:18, FIGs. 1, 4, 6.) "[T]he **heat exchanger 70** is formed from corrugated metal, thereby increasing the surface area **in contact with both the atmospheric air zone 40 and the sealed zone 30**. The heat exchanger is sealed at the top and the bottom on the inner side to **prevent atmospheric air 110 and the re-circulating air 100 within the sealed zone [30] from mixing**." (*Id.*, 6:7-11, FIGs. 5, 6.)



(*Id.*, FIG. 5 (annotated).)



(*Id.*, FIG. 6 (annotated).)

The front (left) part of the corrugated heat exchanger **70** defines in part a boundary of the air pathway within the sealed zone **30** (highlighted green) (“*the closed loop gas circulation path*”). The rear (right) part of the corrugated heat exchanger **70** defines in part a boundary of the ambient air pathway, i.e., the atmospheric air zone **40** (highlighted pink) (“*the open loop ambient air flow path*”). Accordingly, the heat exchanger **70** (the “*common heat exchanger*”) is “*located in the pathway of both the closed loop gas circulation path and the open loop ambient air flow path.*” Thus, Yare teaches this claim element. (Ex. 1002, ¶290.)

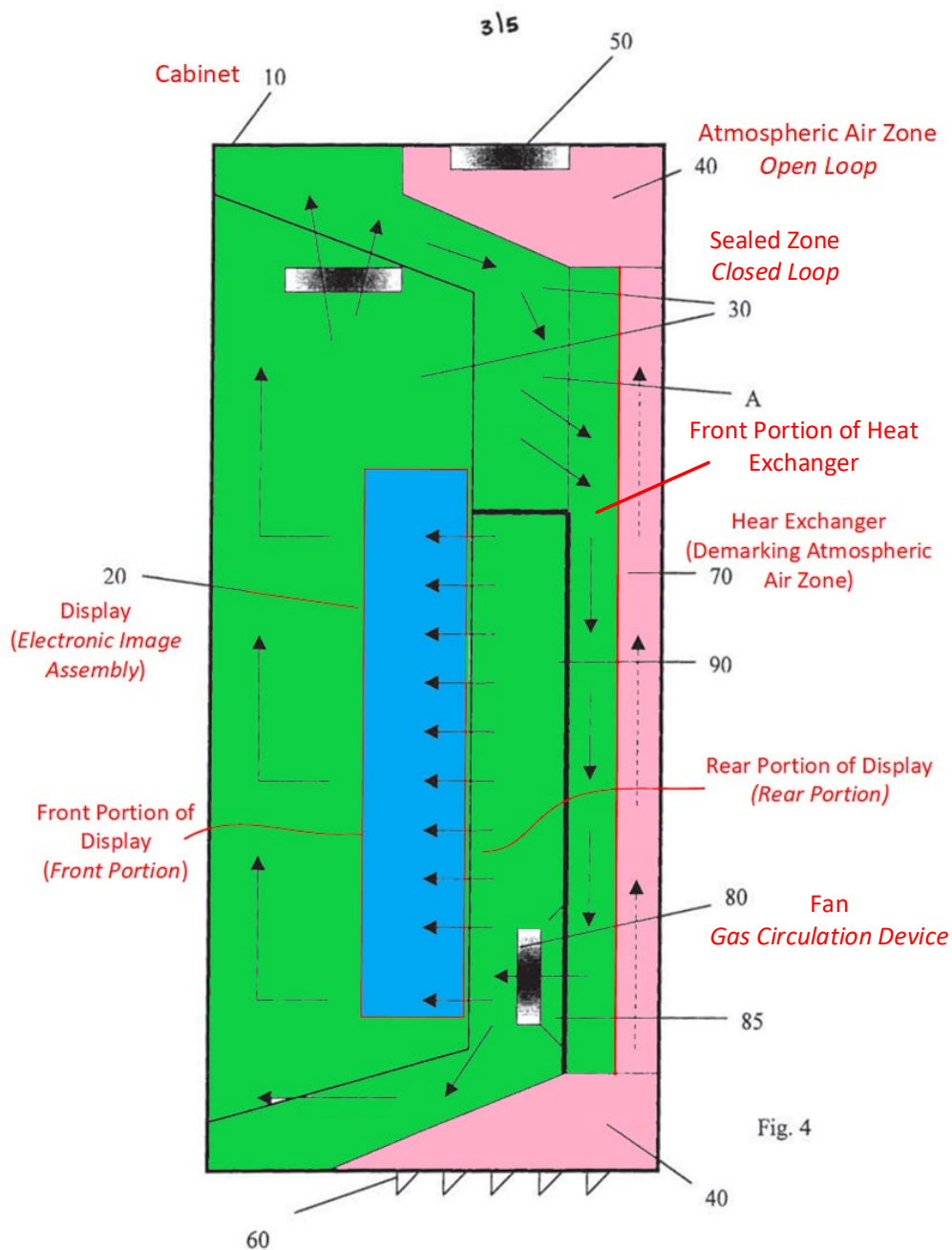
6. Element 1[e]

| | |
|------|--|
| 1[e] | ~~a gas circulation device positioned to force circulating gas through the common heat exchanger; and~~ |
|------|--|

Yare discloses this claim element because Yare’s system includes fans **80** that force the air circulating in the closed loop pathway through the front side of the heat exchanger **70** (“*the common heat exchanger*”). (Ex. 1002, ¶¶291-302.)

Yare states: “[t]he cabinet **10** includes a heat exchanger **70** mounted on a baffle plate **90**. Also mounted on the baffle plate **90** are **fans 80**.” (Ex. 1005, 4:18-19, FIGs. 1, 4.) Yare further states that “[a]ir is circulated **within the sealed zone 30 due to operation of the fans 80** within the cabinet and **fans 25** within the

display 20.” (*Id.*, 5:1-2.)



(*Id.*, FIG. 4 (annotated).)

Because “[a]ir is circulated within the sealed zone 30 due to operation of the

fans **80**” (*id.*, 5:1-2), and because air is a gas, a fan **80** is “*a gas circulation device positioned to force circulating gas*” through the closed pathway within the sealed zone **30** (highlighted green) (“*the closed loop gas circulation path*”). (Ex. 1002, ¶293.)

To the extent “through the common heat exchanger” is interpreted consistent with its plain meaning, the closed loop gas passing between and through the fins of what Yare calls its heat exchanger satisfies this claim limitation. (*Id.*, ¶¶294-296.) In fact, during prosecution the applicant did not disagree with the examiner who found that Thielemans teaches airflow “through” the heat exchanger even though Thielemans teaches “a heat sink **22** in the form of a heat transporting plate.” (Ex. 1022, p.239; Ex. 1030, ¶49.)

To the extent a more narrow definition of the claims is required to show a heat exchanger structure that matches the ’740 embodiments, Yare’s configuration meets this more narrow definition as well. As discussed for claim element 1[d], the front (left) part of the corrugated heat exchanger **70** defines in part a boundary of the air pathway within the sealed zone **30** (“*the closed loop gas circulation path*”). Therefore, the fan **80** is “*positioned to force circulating gas through [the front portion of] the common heat exchanger,*” as shown in annotated Figure 4 above. (Ex. 1002, ¶¶300-301.)

Additionally, “[t]he baffle plate **90** on the side of the sealed zone **30** divides

air expelled from the rear portion **35** of the display **20** and ensures air flows properly in the desired direction, along the heat exchanger towards the fans **80**.” (*Id.*, ¶302; Ex. 1005, 5:29-32, FIG. 4.) Yare’s constraining of the air to “flow[] properly in the desired direction, along the heat exchanger” constitutes “*forc[ing] [the] circulating gas through the common heat exchanger*” even under a more narrow interpretation than plain meaning. (Ex. 1002, ¶302.)

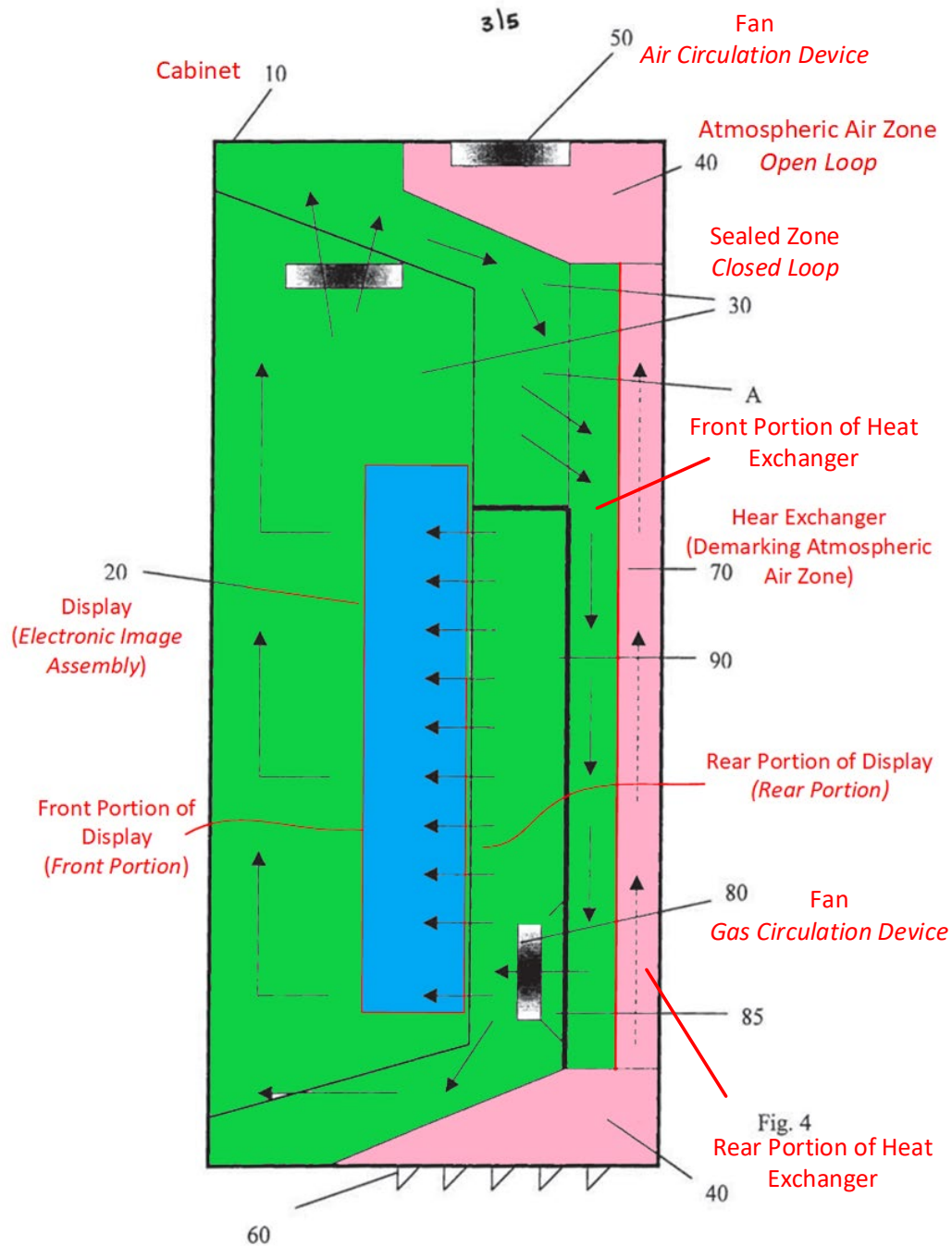
Accordingly, Yare teaches this claim element. (*Id.*)

7. Element 1[f]

| | |
|------|---|
| 1[f] | ~~an air circulation device positioned to force ambient air through the common heat exchanger.~~ |
|------|---|

Yare teaches this claim element because Yare’s system includes fans **50** to force ambient air through the atmospheric air zone **40**, and through the heat exchanger **70** (“*the common heat exchanger*”). (Ex. 1002, ¶¶303-310.)

Yare’s cabinet **10** “includes an atmospheric air zone **40**” where “[a]ir from the outside of the cabinet **10** is drawn through vents **60** into the atmospheric air zone **40** by fans **50**,” forced therethrough” and “is then expelled from the cabinet **10** through the fans **50**.” (Ex. 1005, 4:11-16, Figures 1-4.)



(*Id.*, FIG. 4 (annotated).)

Yare's atmospheric air zone 40 is "*an open loop ambient air flow path.*"

(*Supra*, §IX.A.3.)

The rear (right) part of the corrugated heat exchanger **70** defines in part a boundary of the atmospheric air zone **40** (“*the open loop ambient airflow path*”). (*Supra*, §IX.A.5.) Therefore, the fan **50** is “*positioned to force circulating gas through [the rear portion of] the common heat exchanger,*” as shown in annotated Figure 4 above. (Ex. 1002, ¶306.)

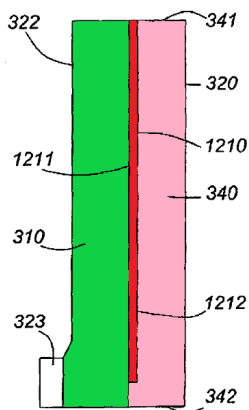
Thus, on the open loop side of the heat exchanger, air blows by and between the fins created by the corrugated structure and is thus flowing “through” the heat exchanger as required by the claims under their plain meaning.

Nevertheless, to the extent a more narrow definition of “through the heat exchanger” is applied, it would have also been obvious to include a second baffle plate in the open air loop to further increase the surface area over which air touches the heat exchanger. This would have been a simple design choice well within the knowledge in the art in 2008. (*Id.*, ¶307.) Indeed, it would yield the predictable result of increasing cooling using the known method of using a baffle plate, which is expressly illustrated in Yare with respect to the closed loop. (*Id.*)

Disposing a heat exchanger within an enclosure, would have also been available and known in the art. (*Id.*, ¶307 (citing Ex. 1011, Abstract, 4:60-67, 5:1-2, 5:7-11, 5:15-20, 5:27-32, 5:43-45, FIGS. 9, 13.) Providing the corrugated heat exchanger **70** within an enclosure would have been a straightforward modification.

A POSITA would have recognized it to be simply an addition of a known element (an enclosure encasing a corrugated heat exchanger, as evidenced by Ex. 1011), or a simple substitution of Yare's heat exchanger with one having an enclosure (as evidenced by Ex. 1011). (Ex. 1002, ¶307) This modification was also well within the scope of a POSITA, because it required noting more than providing an enclosure, which can be accomplished using a number of common techniques such as using nuts-and-bolts, screws, etc., or by affixing an improved heat exchanger to the baffle plate **90** in the same way the heat exchanger **70** is affixed. As such a POSITA would have known that this modification would succeed, and would provide the expected benefits discussed above. (*Id.*)

A POSITA would have known the structure of Yare's heat exchanger **70** to be substantially similar to that of Bundza's (Ex. 1011) heat exchanger **320**. Bundza's Figure 13 shows that its heat exchanger **320** includes an outer casing that contains the core **1210** (highlighted red), where the outer loop duct 340 (highlighted pink) passes through the heat exchanger **320**, along the core **1210** that may be corrugated. (Exs. 1011, FIG. 13; 1002, ¶307.)



(Ex. 1011, FIG. 13 (annotated).)

A POSITA would have understood that the air circulated through the open pathway in the atmospheric air zone **40**, and along the rear (right) side of the heat exchanger **70** having a corrugated core, (Ex. 1005, 4:11-16), passes through the rear (right) side of the heat exchanger **70**. (Ex. 1002, ¶308.)

Accordingly, Yare individually, and in view of the knowledge of a POSITA (as informed, e.g., by Bundza) teaches this claim element. (*Id.*, ¶309.)

In summary, Yare in view of the knowledge of a POSITA discloses each and every element of claim 1, and renders obvious claim 1. (*Id.*, ¶310.)

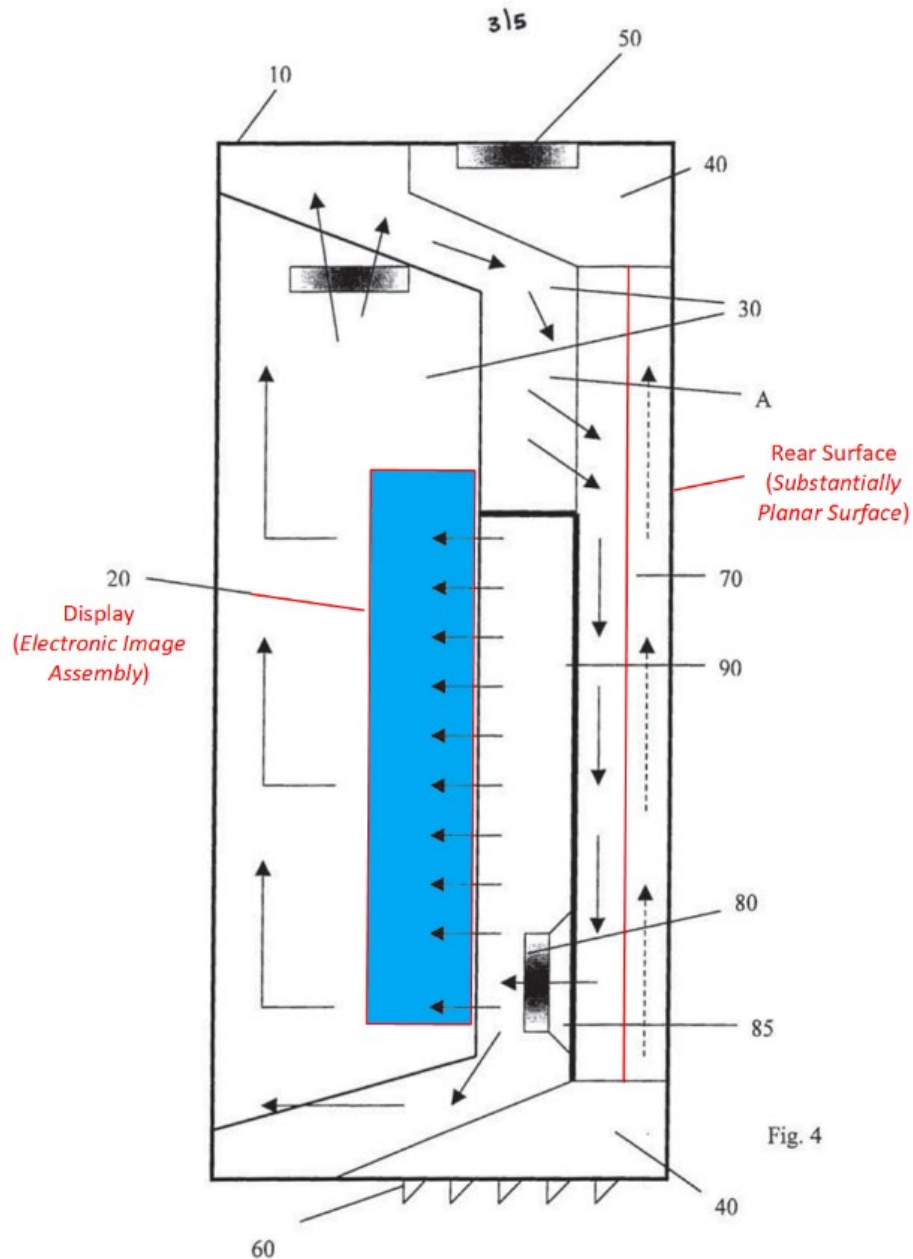
B. Dependent Claim 2

1. Element 2[a]

| | |
|------|--|
| 2[a] | ~~The electronic display of claim 1, further comprising: a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly; and~~ |
|------|--|

Yare teaches this claim element because Yare's cabinet **10** has a rear surface (“*a substantially planar surface*”) that is located behind and spaced apart from the display **20** (“*the electronic image assembly*”). (Ex. 1002, ¶¶311-313.)

Yare states that “Figure 1 is a cross section of a display system,” (Ex. 1005, 3:25-26, Figure 1), that “depicts the cabinet **10** and its components. (*See id.*, 4:4-11, FIG. 1.) Because Figure 1 is a cross-section, the rear (right) edge of the cabinet **10** that is depicted in Figure 1 indicates a rear surface, i.e., “*a substantially planar surface*,” of the cabinet **10**. (Ex. 1002, ¶312.)



(*Id.*, FIG. 1 (annotated).)

As discussed for claim element 1[a], the display **20** (“*the electronic image assembly*”) is disposed within the sealed zone **30** within the cabinet **10**. (*Supra* §IX.A.2.) As shown in Figure 1, that the rear surface of cabinet **10** (“*a*

substantially planar surface”) is located behind and spaced apart from the display

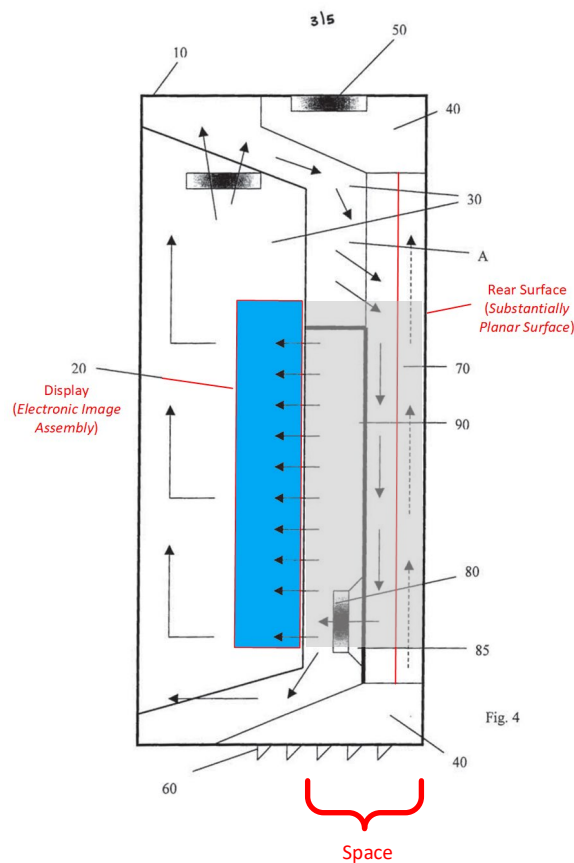
20 (“*the electronic image assembly*”). Accordingly, Yare teaches this claim

element. (Ex. 1002, ¶313.)

2. Element 2[b]

| | |
|------|--|
| 2[b] | ~~a space defined between the rear portion of the electronic image assembly and the substantially planar surface;~~ |
|------|--|

Yare teaches this claim element. As shown in annotated Figure 1 below, the rear portion of the display **20** and the rear surface of the cabinet **10** (“*the substantially planar surface*”) are spaced apart. (Ex. 1002, ¶314.)



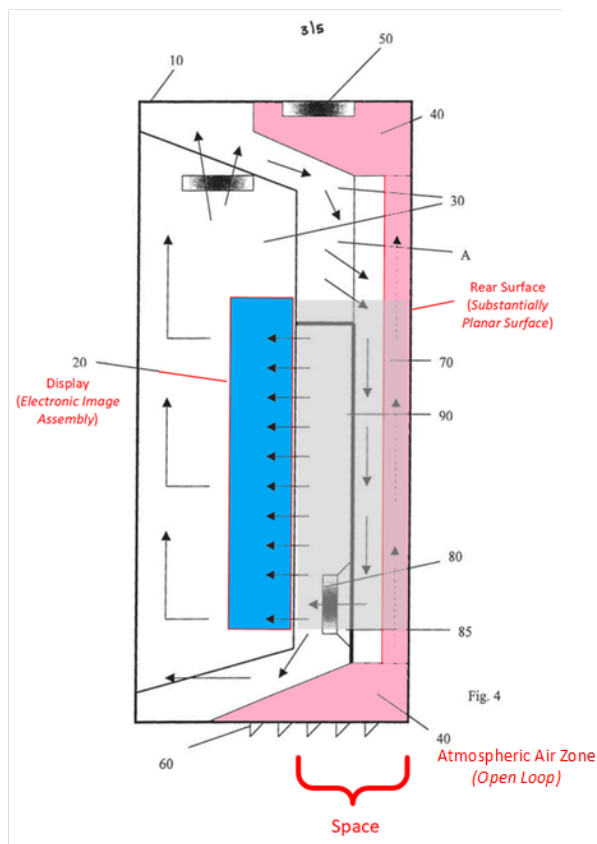
(Ex. 1005, FIG. 1 (annotated).)

Thus, “*a space is defined between*” the rear portion of the display **20** (“*the rear portion of the electronic image assembly*”) and the rear surface of the cabinet **10** (“*substantially planar surface*”). In annotated Figure 1 above, that space is highlighted gray. Accordingly, Yare teaches this claim element. (Ex. 1002, ¶315.)

3. Element 2[c]

| | |
|------|--|
| 2[c] | ~~wherein the space is in gaseous communication with the open loop ambient air flow path.~~ |
|------|--|

Yare teaches this claim element. As discussed for claim element 1[b], the atmospheric air zone **40** is the “*open loop ambient air flow path.*” (*Supra* §IX.A.3.) As shown in annotated Figure 1 below, the “*space defined*” (highlighted gray) between the rear portion of the display **20** and the rear surface of the cabinet **10** includes a portion of the atmospheric air zone **40** (highlighted pink). (Ex. 1002, ¶316.)



(Ex. 1005, FIG. 1 (annotated).)

As such, the “space defined” “is in gaseous communication with” the atmospheric air zone **40** (“the open loop ambient air flow path”). Therefore, Yare teaches this claim element. (Ex. 1002, ¶317.)

In summary, Yare teaches all of the elements of claim 2, and renders claim 2 obvious. (*Id.*, ¶318.)

C. Dependent Claim 3

| | |
|---|--|
| 3 | ~~The electronic display of claim 2, wherein the substantially planar surface is a plate.~~ |
|---|--|

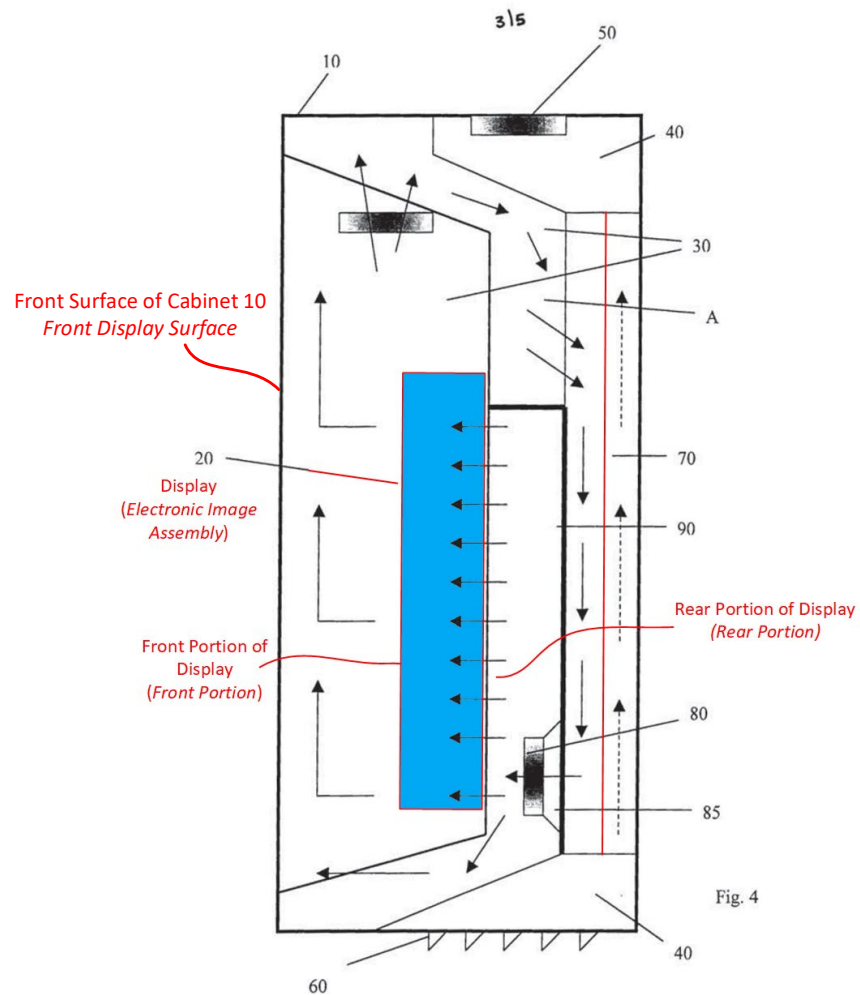
Yare discloses this claim element because well before 2008 it was well-known to use metal plates to form the outer surfaces of an outdoor cabinet holding electronic displays modules, as such LCDs. The rear surface of the cabinet **10** (the “*substantially planar surface*”) would be a metal plate. Thus, Yare discloses or at least suggests, in view the knowledge of a POSITA, the limitation of claim 3. (Ex. 1002, ¶320.)

D. Dependent Claim 5

1. Element 5[a]

| | |
|------|---|
| 5[a] | ~~The electronic display of claim 1, further comprising: a front display surface spaced apart from the front portion of the electronic image assembly; and~~ |
|------|---|

Yare individually, and in view of the knowledge of a POSITA, discloses this claim element because Yare’s cabinet **10** has a transparent front surface (“*a front display surface*”) to allow viewing images displayed by the display **20**. The cabinet’s front surface is spaced apart from the front portion of the display **20** (“*the electronic image assembly*”). (Ex. 1002, ¶321; *supra*, §IX.A.4.)



(*Id.*, FIG. 4 (annotated).)

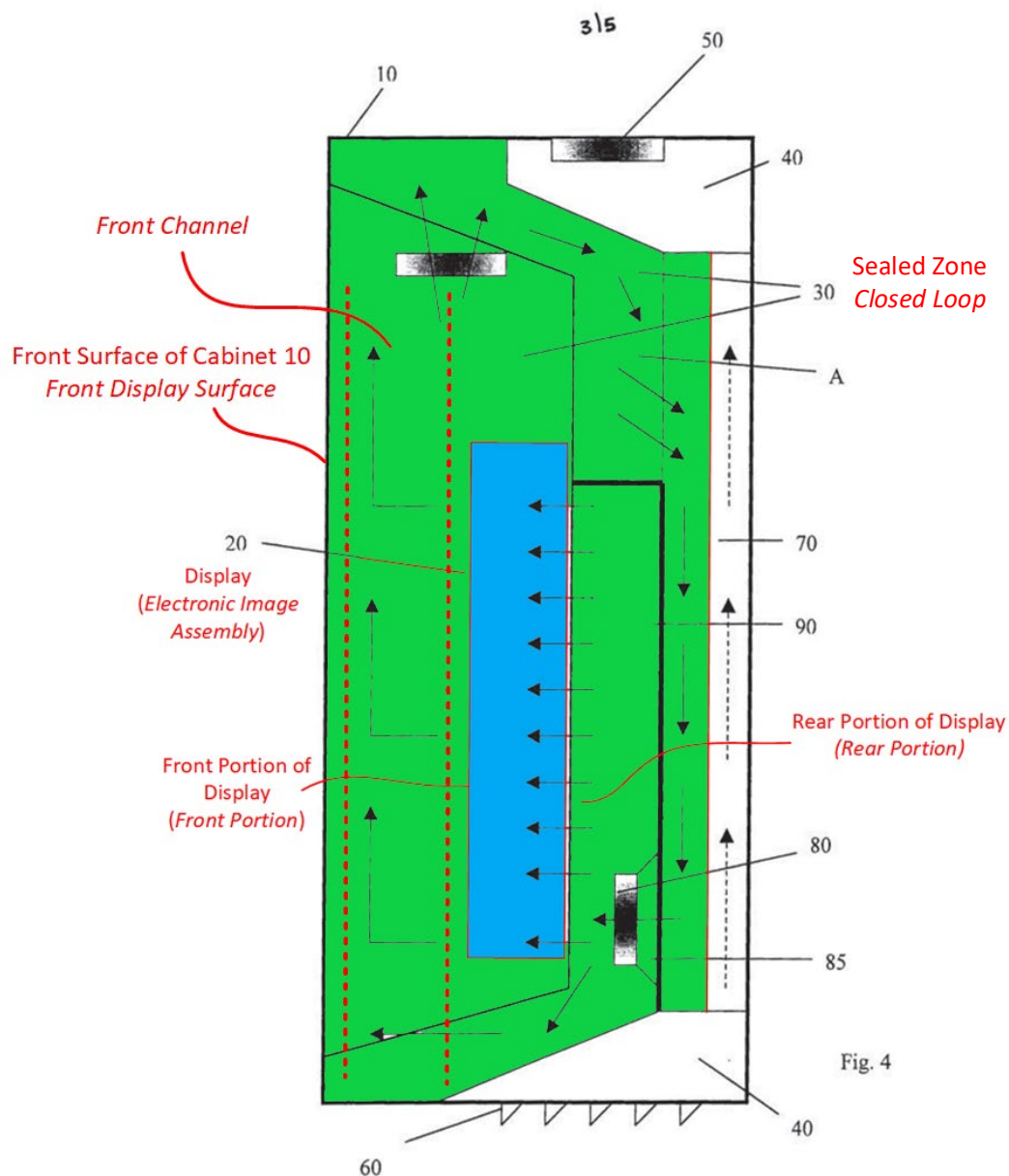
Therefore, as shown in annotated Figure 4 above, a POSITA would have understood that in Yare's system the front surface of cabinet **10** ("*a front display surface*") is "*spaced apart from*" the front portion of display **20** ("*the front portion of the electronic image assembly*"). Thus, Yare individually, and in view of the knowledge of a POSITA, teaches this claim element. (Ex. 1002, ¶330.)

2. Element 5[b]

| | |
|------|---|
| 5[b] | ~~a front channel defined by the space between the front display surface and the front portion of the electronic image assembly, the front channel forming part of the closed loop gas circulation path.~~ |
|------|---|

Yare individually, and in view of the knowledge of a POSITA, teaches this claim element because in Yare’s system, the gap between the transparent front surface of cabinet **10** and the front of the display **20** is a “*front channel*.” Yare also shows that the closed loop path of air flow within the sealed chamber **30** (the “*closed loop gas circulation path*”) passes through the gap, so that it forms a “*part of the closed loop gas circulation path*.” (Ex. 1002, ¶331; *see supra*, §IX.A.4.)

As discussed above for claim element 1[c], Yare discloses, and a POSITA would have understood, that there is spacing between the cabinet’s front surface (“*front display surface*”) and the front of the display **20** (“*front portion of the electronic image assembly*”). As Figure 4 shows, air flow within the closed loop passes in front of the display **20** via that spacing. (Ex. 1005, 4:24-27 (stating that “solid arrows” including “L”-shaped arrows “show movement of air in the sealed zone 30), FIG. 4.) Therefore, the spacing is “*a front channel*.” (Ex. 1002, ¶¶332-333.)



(*Id.*, FIG. 4 (annotated).)

Annotated Figure 4 above shows that the spacing between the front surface of cabinet **10** and the front of the display **20** (the “*front channel*”) is part of the “*closed loop gas circulation path.*” Accordingly, Yare individually and in view of

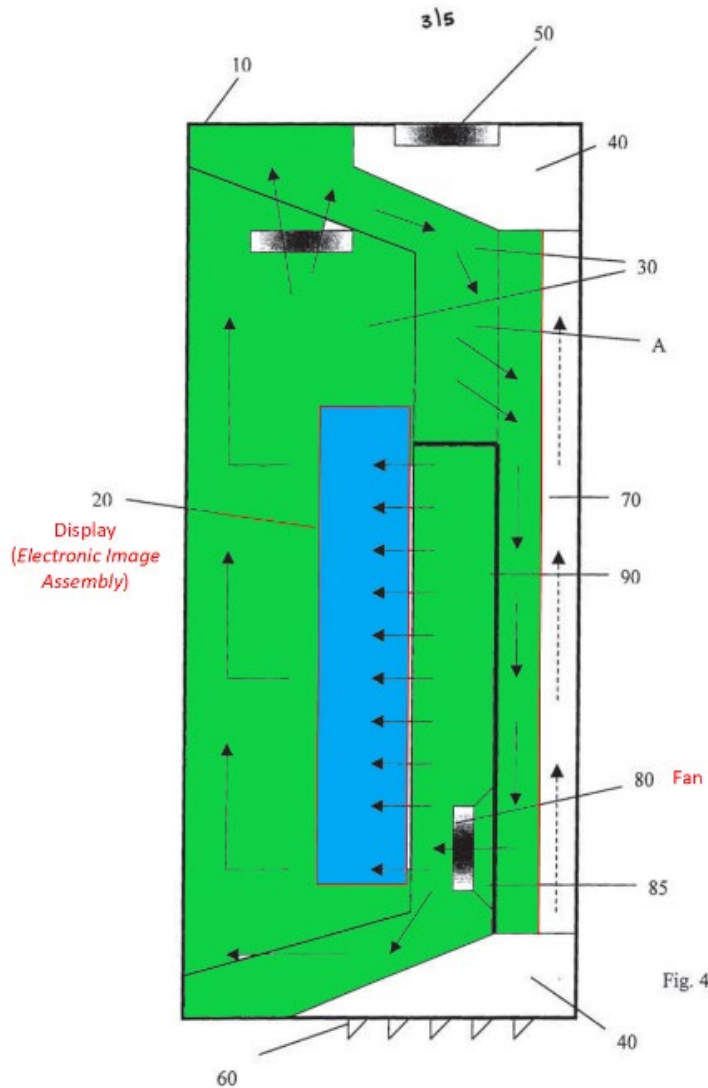
the knowledge of a POSITA, teaches this claim element. (Ex. 1002, ¶333.)

E. Dependent Claim 6

| | |
|---|---|
| 6 | ~~The electronic display of claim 1, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination devices, wiring, wiring harnesses, lights, thermo-electric devices, and switches.~~ |
|---|---|

Yare teaches this claim element because Yare discloses fans **80** within the closed loop pathway, and because a POSITA would have known that those fans include their motors as does the display within the sealed zone. (Ex. 1002, ¶¶334-337.)

As discussed above for claim element 1[c], an air pathway within the sealed zone **30** is the “closed loop gas circulation path” i.e., “the pathway of the closed loop gas circulation path.” Yare states: “[t]he cabinet **10** includes a heat exchanger **70** mounted on a baffle plate **90**. Also mounted on the baffle plate **90** are fans **80**.” (Ex. 1005, 4:18-19, FIGs. 1, 4.) “Air is circulated **within the sealed zone 30 due to operation of the fans 80** within the cabinet and fans **25** within the display **20**.” (*Id.* 5:1-2.)



(*Id.*, FIG. 4 (annotated).)

Thus, Yare discloses that fans **80**, which have motors, are located in the sealed zone **30** on a baffle plate **90**. Thus, the fans **80** and their motors are located in the “*the pathway of the closed loop gas circulation path.*” Further, the electronic display in the sealed zone has numerous electric components. (Ex. 1002, ¶337.) Accordingly, Yare teaches “*at least one electronic component*

located in the pathway of the closed loop gas circulation path” and this teaches this claim element. (*Id.*)

F. Independent Claim 8

1. Elementa 8[pre]-8[a]

| | |
|--------|--|
| 8[pre] | ~~An electronic display comprising:~~ |
| 8[a] | ~~an electronic image assembly having a front portion and a rear portion;~~ |

Elements 8[pre], 8[a] are identical, respectively, to Elements 1[pre], 1[a]. Therefore, as under this Ground for 1[pre]-1[a], Yare teaches 8[pre]-8[a]. (Ex. 1002, ¶338; *supra* §§IX.A.1-2.)

2. Element 8[b]

| | |
|------|---|
| 8[b] | ~~a closed loop gas circulation path encircling the electronic image assembly;~~ |
|------|---|

As shown in Ground 1, the difference between claim elements 8[b] and 1[c] is insubstantial.

Therefore, as under this Ground for claim element 1[c], Yare individually, or in view of the skill in the art, teaches this claim element. (Ex. 1002, ¶341; *supra* §IX.A.4.)

3. Element 8[c]

| | |
|------|---|
| 8[c] | ~~an open loop ambient air flow path behind the rear portion of the electronic image assembly;~~ |
|------|---|

Elements 8[c] and 1[b] are identical. Therefore, as under this Ground for 1[b], Yare teaches this claim element. (Ex. 1002, ¶342; *supra* §IX.A.3.)

4. Element 8[d]

| | |
|------|---|
| 8[d] | ~~a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly, the space between the substantially planar surface and the rear portion of the electronic image assembly defining a rear channel;~~ |
|------|---|

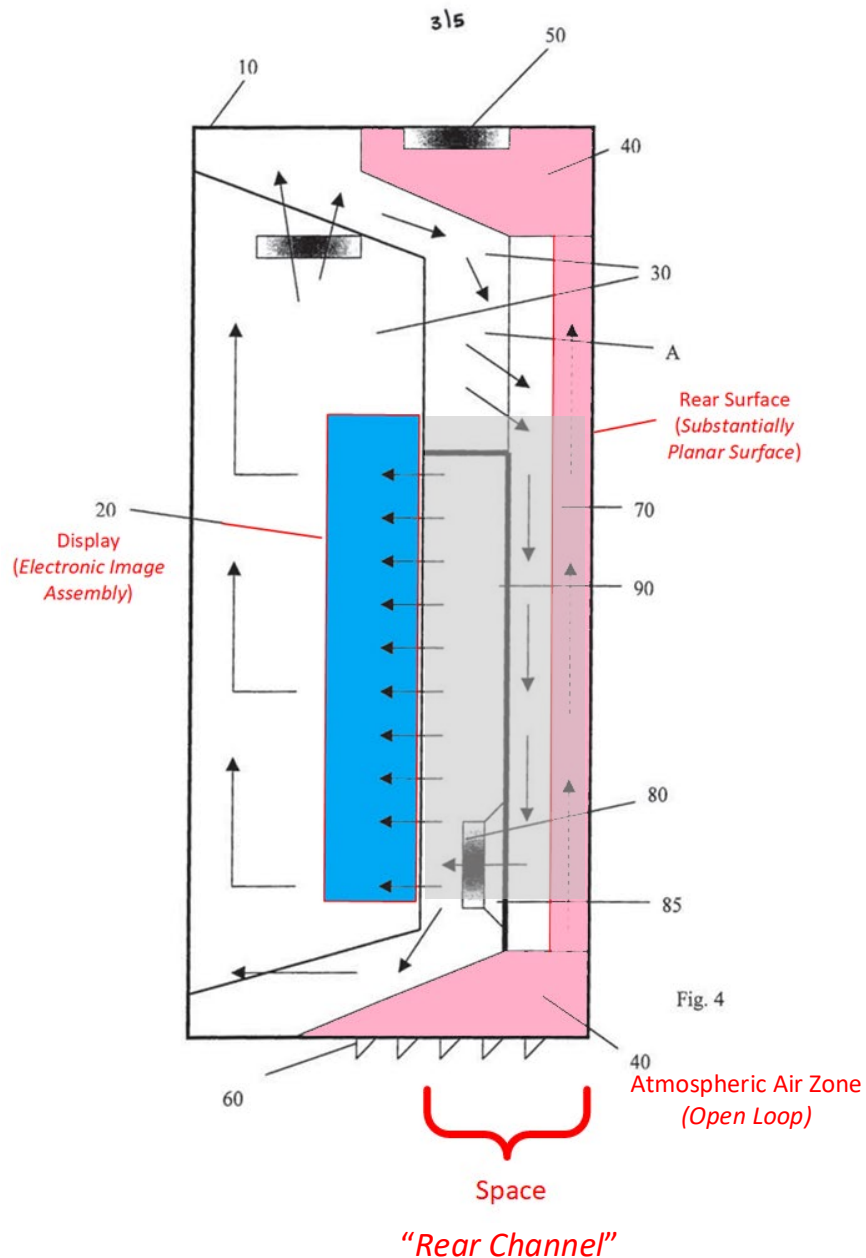
The difference between Elements 8[d] and Elements 2[a]-[b] together is insubstantial:

a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly;~~and a, the~~ space ~~defined~~ between the substantially planar surface and the rear portion of the electronic image assembly ~~and the substantially planar surface~~defining a rear channel;

Claim element 8[d] labels the space “*a rear channel*.”

Claim element 2[b] discloses that the atmospheric air zone 40 is included in “*the space between*” the cabinet’s back surface (“*the substantially planar surface*”) and “*the rear portion of*” the display 20 “*the electronic image assembly*.” Ambient

air flows through the atmospheric zone **40**. (Ex. 1005, 4:16-19 (stating that “[a]ir from the outside . . . is drawn . . . into the atmospheric air zone **40** by fans **50**,” is “draw[n] . . . through the atmospheric air zone **40**” and “is then expelled . . . through the fans **50**”).) Therefore, “*the space between*” is a “*rear channel*.”



(Ex. 1005, FIG. 4 (annotated).)

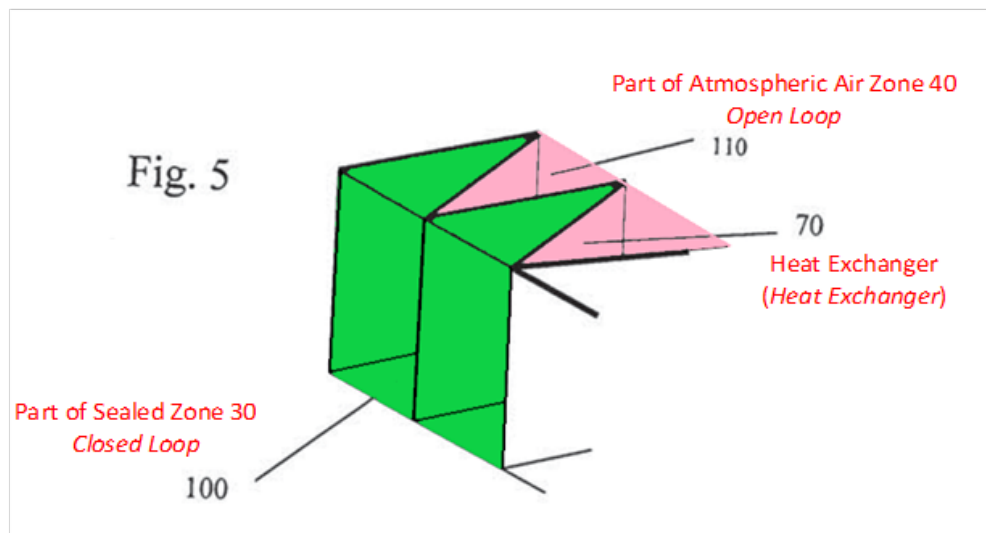
Thus, as under this Ground for Elements 2[a]-2[b], Yare teaches this claim element. (Ex. 1002, ¶¶343-346; *supra* §§IX.B.1-2.)

5. Element 8[e]

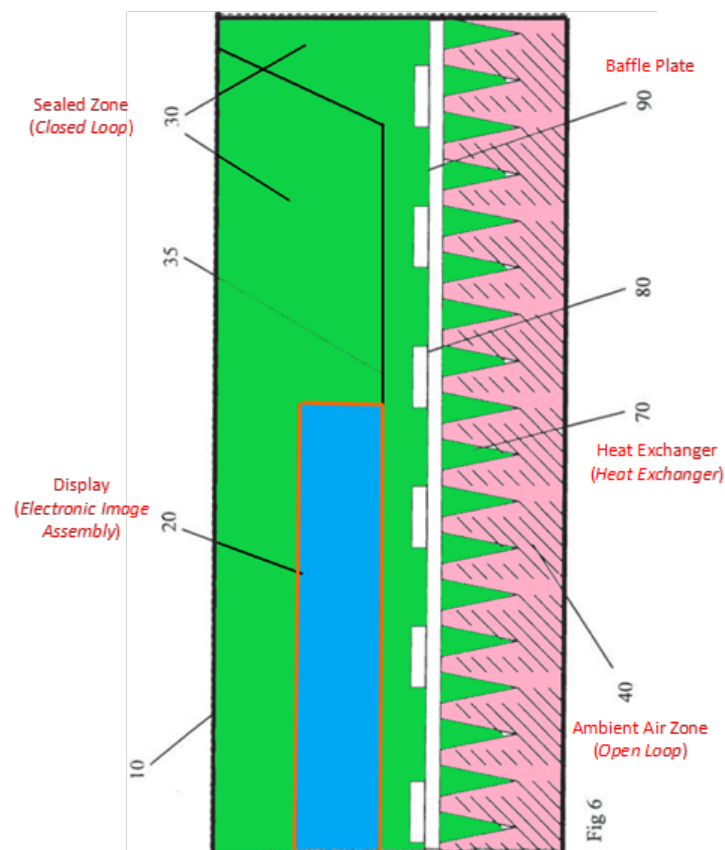
| | |
|------|---|
| 8[e] | ~~a common heat exchanger in gaseous communication with both the closed loop gas circulation path and the open loop ambient air flow path;~~ |
|------|---|

As shown in Ground 1, the difference between claim elements 8[e] and 1[d] is insubstantial.

The heat exchanger **70** “*located in the pathway of*” both the closed and open loops is “*in gaseous communication with*” those two loops. (Ex. 1002, ¶348.) As discussed for claim elements 1[b], 1[c], and 1[d] Yare’s closed and open loops both circulate air, which is a gas, through the corrugated heat exchanger **70** (the “*common heat exchanger*”) on both the open and closed loop sides. (*Id.*, ¶348; *supra*, §§IX.A.3-5.)



(Ex. 1005, FIG. 5 (annotated).)



(*Id.*, FIG. 6 (annotated).)

Therefore, for the reasons provided under this Ground for claim element 1[d], Yare teaches this claim element. (Ex. 1002, ¶351; *supra* IX.A.5.)

6. Element 8[f]

| | |
|------|---|
| 8[f] | ~~at least one fan positioned to force circulating gas through the closed loop gas circulation path;~~ |
|------|---|

Yare discloses this claim element because Yare’s system includes fans **80** that force the air circulating in the closed pathway formed in the sealed zone **30**, i.e., “*to force circulating gas through the closed loop.*” (Ex. 1002, ¶¶352-354.)

As discussed above for claim element 1[c], the “*closed loop gas circulation path*” (highlighted green) is formed around the display **20** within the sealed zone **30**. (*Supra* §IX.A.4.) “Air is circulated **within the sealed zone 30 due to operation of the fans 80** within the cabinet and **fans 25** within the display **20**.” (Ex. 1005, 5:1-2.)

Thus, the fans **80** (“*at least one fan*”) are “*positioned to force circulating*” air, i.e., “*gas through*” the closed pathway within the sealed zone **30**, i.e., “*the closed loop gas circulation path.*” Accordingly, Yare teaches this claim element. (Ex. 1002, ¶354.)

7. Element 8[g]

| | |
|------|---|
| 8[g] | ~~at least one fan positioned to force ambient air through the open loop~~ |
|------|---|

| | |
|--|----------------------------------|
| | ~~ambient air flow path~~ |
|--|----------------------------------|

Yare teaches this claim element because Yare’s system includes fans **50** to force ambient air through the atmospheric air zone **40**. (Ex. 1002, ¶¶355-358.)

As discussed for claim element 1[b], the atmospheric air zone **40** is “*the open loop ambient air flow path.*” (*Supra* §IX.A.3.) Yare further discloses: “[a]ir from the outside of the cabinet **10** is drawn through vents **60** into the atmospheric air zone **40** by fans **50**” forced through the atmospheric air zone **40**, and “is then expelled from the cabinet **10** through the fans **50**.” (Ex. 1005, 4:11-16, Figures 1-4.)

Thus, the fans **50** are “*at least one fan positioned to force ambient air through*” the atmospheric air zone **40** (“*the open loop ambient air flow path,*”) and thus, Yare teaches this claim element. (Ex. 1002, ¶357.)

In summary, Yare discloses each and every element of claim 8, and renders claim 8 obvious. (*Id.*, ¶358.)

G. Dependent Claim 9

| | |
|--------------|---|
| ~~9~~ | ~~The electronic display of claim 8, wherein the open loop ambient air flow path is also in gaseous communication with the rear channel.~~ |
|--------------|---|

As shown in Ground 1, the difference between claim 9 and Element 2[c] is insubstantial. Therefore, as under this Ground for Element 2[c], Yare teaches this

claim. (*Id.*, ¶361; *supra* §IX.B.3.)

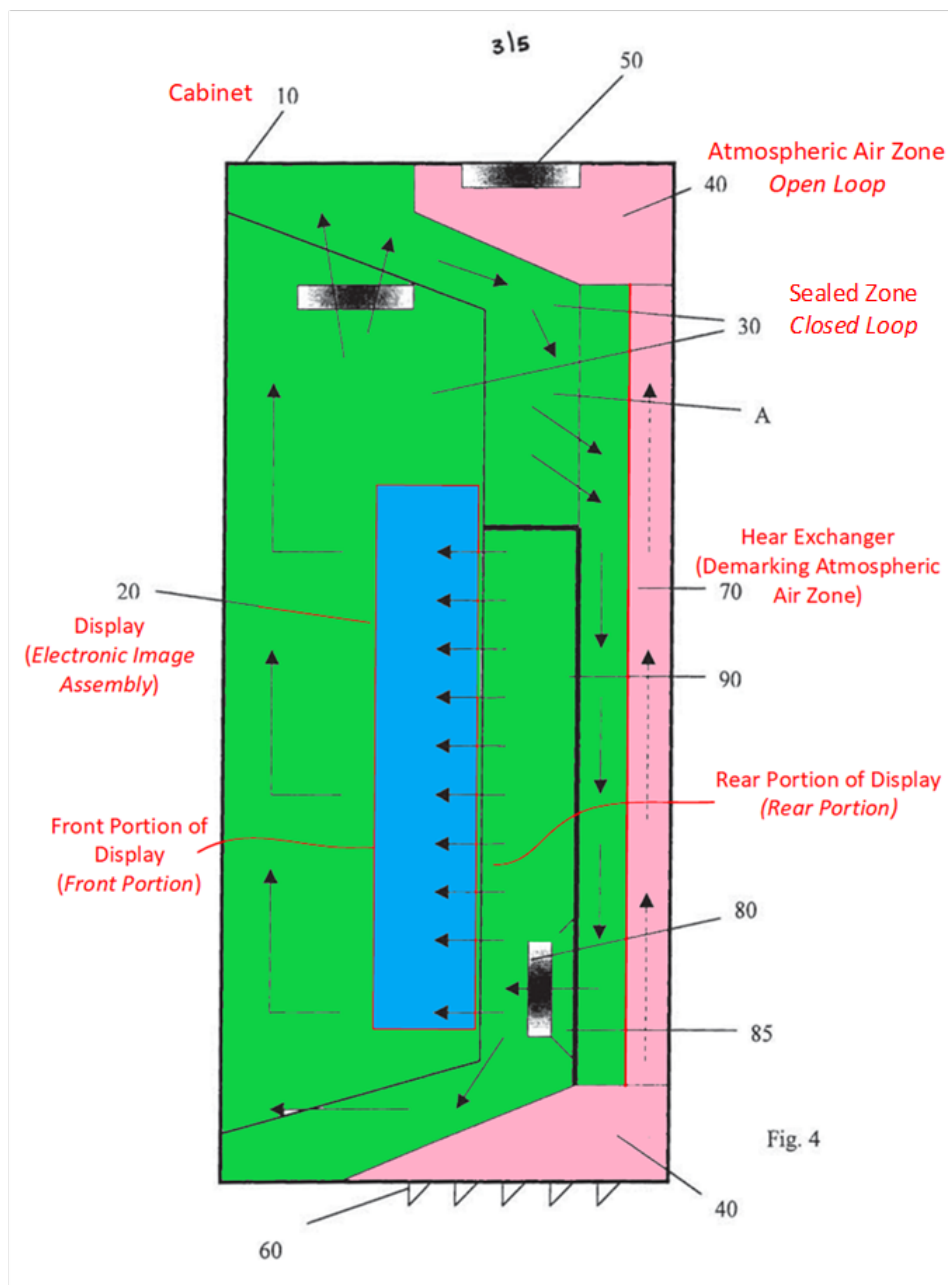
H. Dependent Claim 11

1. Element 11[a]

| | |
|-------|--|
| 11[a] | ~~The electronic display of claim 8, wherein: the common heat exchanger includes first and second gas pathways, the first and second gas pathways being isolated from each other;~~ |
|-------|--|

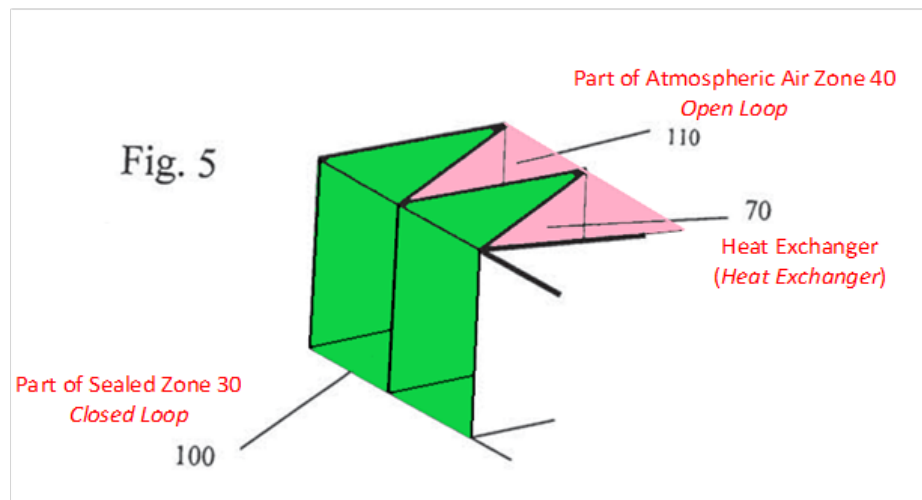
Yare teaches this claim element because Yare’s heat exchanger **70** (“*the common heat exchanger*”) includes a first, rear part and a second, front part that provide two pathways that are isolated from each other. (Ex. 1002, ¶¶362-367.)

As discussed for claim element 1[d], Yare’s corrugated heat exchanger **70** (the “*common heat exchanger*”) has two parts: a first (rear, right) part through which the air in the atmospheric air zone **40** passes; and a second (front, left) part through which the air in the sealed zone **30** passes. (Ex. 1005, 6:7-11, FIGs. 4-6; *supra* §IX.A.5.)

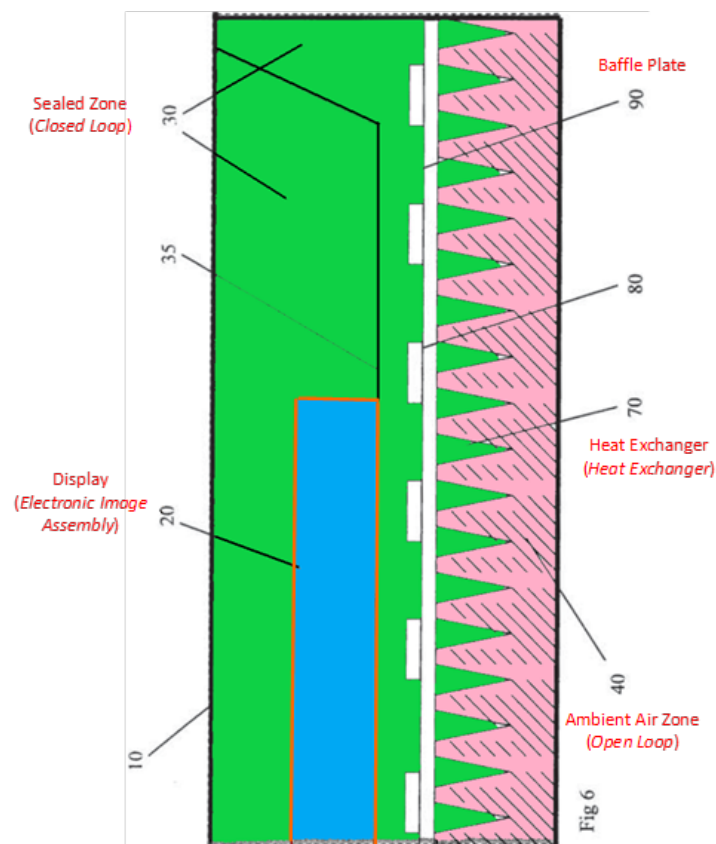


(Ex. 1005, FIG. 4 (annotated).)

“The **heat exchanger 70** is formed from corrugated metal, thereby increasing the surface area **in contact with both the atmospheric air zone 40 and the sealed zone 30.**” (*Id.*, 6:7-11, FIGs. 5, 6.)



(*Id.*, FIG. 5 (annotated).)



(*Id.*, FIG. 6 (annotated).)

As seen in annotated Figures 4-6, the first (rear, right) part allows the passage of the ambient air, a gas, in the atmospheric air zone **40**, and forms the first gas pathway therewithin, i.e., within the “*open loop ambient air flow path*” (highlighted pink). The second (front, left) part allows the passage of the air, a gas, in the closed path within the sealed zone **30**, and thus forms a second gas pathway therewithin, i.e., within the “*the closed loop gas circulation path*” (highlighted green). (Ex. 1002, ¶365.)

In addition, Yare states that “[t]he heat exchanger is sealed at the top and the bottom on the inner side to **prevent atmospheric air 110 and the re-circulating air 100 within the sealed zone [30] from mixing.**” (*Id.*, 6:9-11, FIG. 5.) Thus, the heat exchanger **70** (“*the common heat exchanger*”) “*includes first and second gas pathways, the first and second gas pathways being isolated from each other.*” Accordingly, Yare teaches this claim element. (Ex. 1002, ¶366.)

2. Element 11[b]

| | |
|-------|---|
| 11[b] | ~~where the first gas pathway is in gaseous communication with the open loop ambient air flow path; and;~~ |
|-------|---|

Yare teaches this claim element. (*Id.*, ¶368.) As discussed for claim element 11[a] and as shown in annotated Figures 4-6 above, in the heat exchanger **70**, the first gas pathway (rear, right) allows the passage of the ambient air, a gas, in the atmospheric air zone **40**, i.e., the “*open loop ambient air flow path*”

(highlighted pink). Thus, “*the first gas pathway is in gaseous communication with the open loop ambient air flow path.*” Accordingly, Yare teaches this claim element. (*Id.*)

3. Element 11[c]

| | |
|-------|--|
| 11[c] | ~~where the second gas pathway is in gaseous communication with the closed loop gas circulation path.~~ |
|-------|--|

Yare teaches this claim element. (*Id.*, ¶369.) As discussed for claim element 11[a] and as shown in annotated Figures 4-6 above, in the heat exchanger **70**, the second gas pathway (front, left) allows the passage of the air, a gas, in the closed path within the sealed zone **30**, i.e., the “*the closed loop gas circulation path*” (highlighted green). Thus, “*the second gas pathway is in gaseous communication with the closed loop gas circulation path.*” Accordingly, Yare teaches this claim element. (*Id.*)

I. Dependent Claim 12

| | |
|----|--|
| 12 | ~~The electronic display of claim 11, wherein the first gas pathway is also in gaseous communication with the rear channel.~~ |
|----|--|

Yare discloses this claim element. (*Id.*, ¶¶370-372.) As discussed for claim elements 8[d], 2[a], and 2[b], the “*rear channel*” is defined by the space between the rear portion of the display **20** and the back surface of the cabinet **10**. (*Supra*

§§IX.B.1-2, IX.F.4.) As also discussed for claim elements 8[d], 2[a], and 2[b], the atmospheric air zone **40** is included in the “*rear channel*.” (*Id.*)

As discussed for claim element 1[b], the atmospheric air zone **40** is the “*open loop ambient air flow path*.” (*Supra* §IX.A.3.) Finally, as discussed for claim element 11[b], the first, rear gas pathway forms a part of the atmospheric air zone **40**, and hence, is in gaseous communication with the “*open loop ambient air flow path*.” (*Supra* §IX.H.2.) Thus, the atmospheric air zone **40** is part of both the “*first gas pathway*” and the “*rear channel*,” and as such, “*the first gas pathway is also in gaseous communication with the rear channel*.” Accordingly, Yare teaches this claim. (Ex. 1002, ¶372.)

J. Dependent Claim 13

| | |
|----|--|
| 13 | ~~The electronic display of claim 8, wherein the substantially planar surface is a plate.~~ |
|----|--|

Claim 13 is identical to claim 3. Therefore, as under this Ground for claim 3, Yare discloses the limitations of claim 13. (*Id.*, ¶374; *supra* §IX.C.)

K. Dependent Claim 15

1. Elements 15[a]-[b]

| | |
|-------|---|
| 15[a] | ~~The electronic display of claim 8, further comprising: a front display surface spaced apart from the front portion of the electronic image assembly; and~~ |
|-------|---|

| | |
|------------------|---|
| ~~15[b]~~ | ~~a front channel defined by a space between the front display surface and the front portion of the electronic image assembly, the front channel forming part of the closed loop gas circulation path.~~ |
|------------------|---|

Claim elements 15[a] and 15[b] are identical, respectively, to Elements 5[a] and 5[b]. Therefore, as under this Ground for Elements 5[a] and 5[b], Yare teaches claim elements 15[a] and 15[b]. (Ex. 1002, ¶375; *supra* §IX.D.)

L. Dependent Claim 16

| | |
|----------------|---|
| ~~-16~~ | ~~The electronic display of claim 8, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination devices, wiring, wiring harnesses, lights, thermo electric devices, and switches.~~ |
|----------------|---|

Claim 16 is identical to claim 6. Therefore, as under this Ground for claim 6, Yare discloses the limitations of claim 16. (Ex. 1002, ¶377; *supra* §IX.E.)

M. Independent Claim 17

1. Element 17[pre]

| | |
|--------------------|---|
| ~~17[pre]~~ | ~~A cooling system for an electronic image assembly, comprising:~~ |
|--------------------|---|

To the extent it is limiting, Yare teaches the preamble because Yare discloses a cabinet **10** having “improved cooling facilities” (i.e., a “cooling

system”) and a display **20**, e.g., an LCD (“*an electronic image assembly*”). (Ex. 1002, ¶378; *supra*, §§IX.A.1-4.)

Thus, Yare discloses “[a] *cooling system for an electronic image assembly*.” (Ex. 1002, ¶381.)

2. Element 17[a]

| | |
|------------------|---|
| ~~17[a]~~ | ~~an open loop ambient air flow path at a rear portion of the electronic image assembly;~~ |
|------------------|---|

As shown in Ground 1, the difference between claim elements 17[a] and 1[b] is insubstantial.

As explained in connection with claim element 1[b], Yare’s “atmospheric air zone **40**” is an “*open loop ambient air flow path*.” The flow of ambient air through the atmospheric air zone **40** occurs behind, i.e., substantially “*at a rear portion of*” the display **20** (“*the electronic image assembly*”). (Ex. 1002, ¶383.)

This is consistent with the ’740 patent, as discussed for this claim element under Ground 1. (*Supra* §VIII.N.2.) Therefore, for the reasons provided under this Ground for claim element 1[b], Yare teaches this claim element. (Ex. 1002, ¶384; *supra* §IX.A.3.)

3. Elements 17[b]-17[c]

| | |
|------------------|---|
| ~~17[b]~~ | ~~a closed loop gas circulation path encircling the electronic image~~ |
|------------------|---|

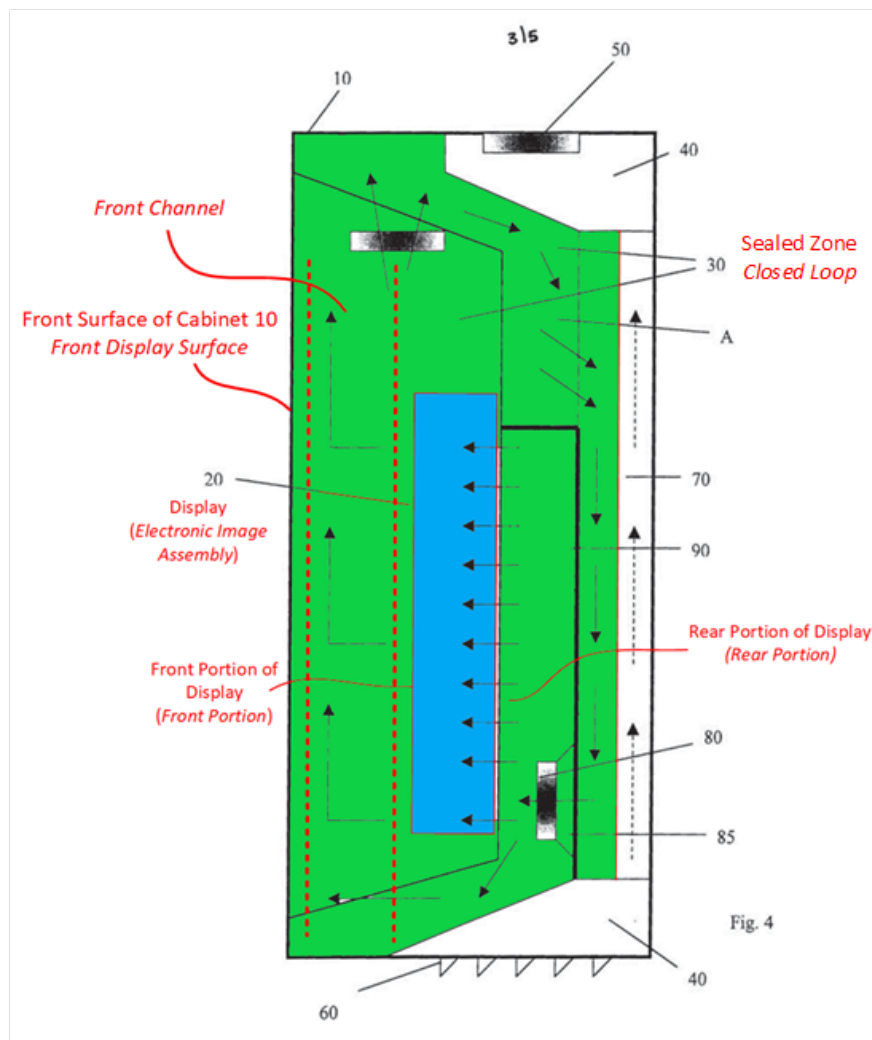
| | |
|-------|---|
| | assembly; |
| 17[c] | ~~a common heat exchanger in gaseous communication with both the closed loop gas circulation path and the open loop ambient air flow path;~~ |

Elements 17[b]-17[c] are identical, respectively, to Elements 8[b], 8[e]. Therefore, as under this Ground for 8[b], 8[e], Yare teaches 17[b]-17[c]. (Ex. 1002, ¶385; *supra* §§IX.F.2, IX.F.5.)

4. Element 17[d]

| | |
|-------|---|
| 17[d] | ~~a front channel defined by a space between a front portion of the electronic image assembly and a front display surface located forward of and spaced apart from the front portion of the electronic image assembly, the front channel forming a part of the closed loop gas circulation path;~~ |
|-------|---|

Yare individually, and in view of the knowledge of a POSITA, teaches this claim element. (Ex. 1002, ¶¶386-388.) As shown in Ground 1, the differences between the corresponding limitations of Element 17[d] and Elements 5[a]-5[b] are insubstantial.



(Ex. 1005, FIG. 4 (annotated).)

Therefore, for the reasons provided under this Ground in connection with claim elements 5[a] and 5[b], Yare individually, and in combination with Larson, teaches this claim element. (Ex. 1002, ¶388; *supra* §IX.D.)

5. Element 17[e]

| | |
|-------|---|
| 17[e] | a rear channel defined by a space between the rear portion of the |
|-------|---|

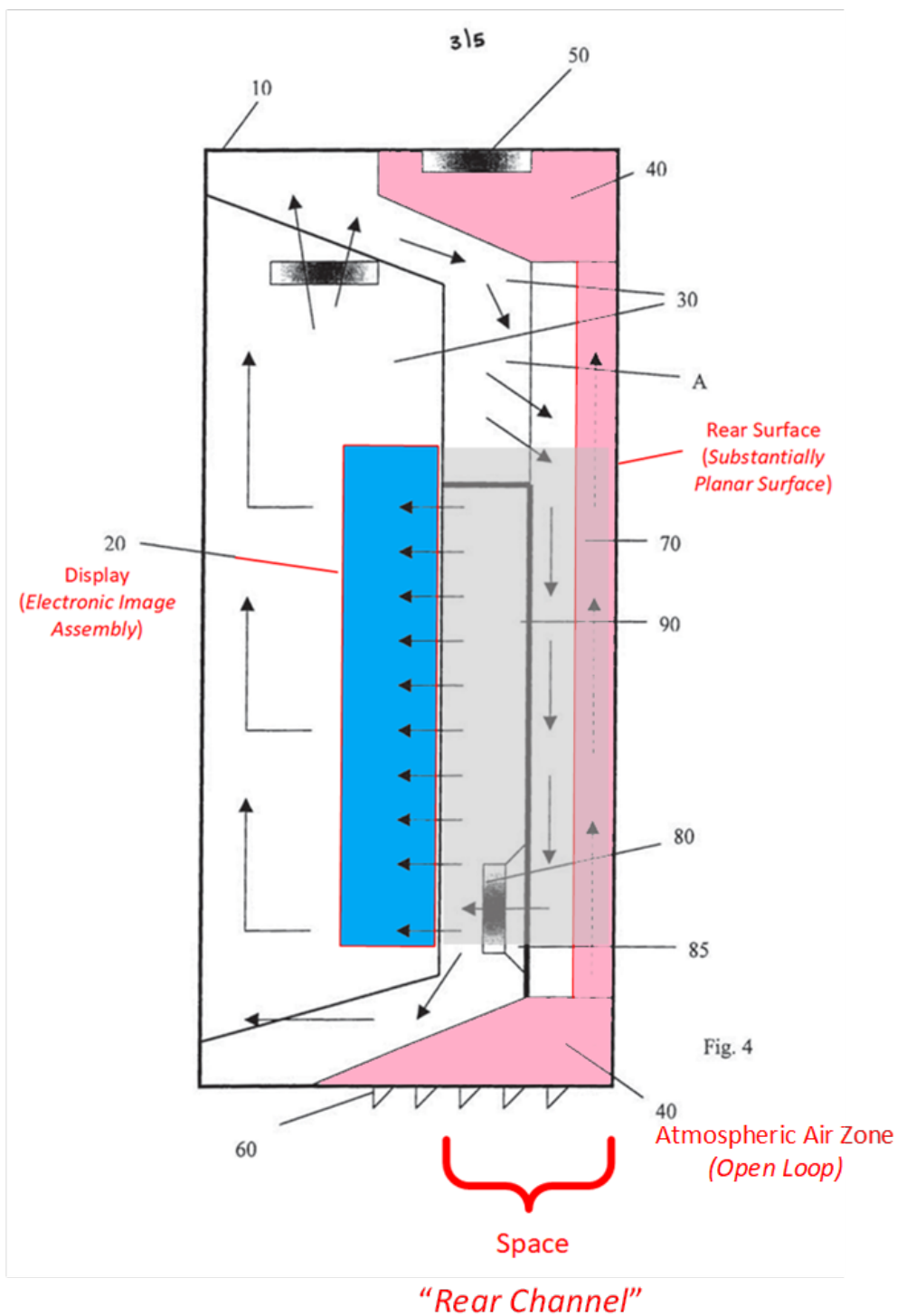
| | |
|--|---|
| | ~~electronic image assembly and a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly, the rear channel forming a part of the open loop ambient air flow path;~~ |
|--|---|

The difference between claim elements 17[e] and 8[d] is shown below:

a rear channel defined by a space between the rear portion of the electronic image assembly and a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly, the ~~space between the substantially planar surface and the rear portion of the electronic image assembly defining a~~ rear channel forming a part of the open loop ambient air flow path;

Other than the addition of the limitation “*rear channel forming a part of the open loop ambient air flow path*” the rest of the differences are simply reordering of the claim terms and are thus insubstantial. (Ex. 1002, ¶390.)

Yare’s atmospheric air zone **40** is both the “*open loop ambient airflow path*,” and form the “*rear channel*.” (*Id.*, ¶391; *supra*, §§IX.A.3, IX.F.4.)



(Ex. 1005., FIG. 4 (annotated).)

Therefore, Yare teaches this claim element. (Ex. 1002, ¶392.)

6. Element 17[f]

| | |
|-------|---|
| 17[f] | ~~at least one fan positioned to force circulating gas through the closed loop gas circulation path and the common heat exchanger; and~~ |
|-------|---|

The difference between claim elements 17[f] and 8[f] is shown below:

at least one fan positioned to force circulating gas through the closed loop gas circulation path and the common heat exchanger; and

Claim element 17[f] additionally recites forcing the circulating gas through “*the common heat exchanger.*” But, claim element 1[e] recites “a gas circulation device positioned to force circulating gas through the common heat exchanger.” As discussed for claim elements 1[e], Yare’s “*gas circulation device*” is fans **80**, (see Ex. 1005, FIGs. 1, 4), i.e., “*at least one fan.*” (*Supra* §IX.A.6.) Therefore, for the reasons provided under this Ground for claim elements 8[f] and 1[e], Yare teaches this claim element. (Ex. 1002, ¶394; *supra* §§IX.A.6, IX.F.6.)

7. Element 17[g]

| | |
|-------|--|
| 17[g] | ~~at least one fan positioned to force ambient air through the open loop ambient air flow path and the common heat exchanger.~~ |
|-------|--|

The difference between claim elements 17[g] and 8[g] is shown below:

at least one fan positioned to force ambient air through the open loop

ambient air flow path- and the common heat exchanger.

Claim element 1[f] recites “*an air circulation device positioned to force ambient air through the common heat exchange.*” As discussed for claim element 1[f] Yare discloses this. Therefore, for the reasons provided under this Ground for claim elements 8[g] and 1[f], Yare teaches this claim element. (Ex. 1002, ¶396; *supra* §§IX.A.7, IX.F.7.)

In summary, Yare in view of the knowledge of a POSITA discloses all of the elements of claim 17, and renders claim 17 unpatentable as obvious. (Ex. 1002, ¶397.)

N. Dependent Claims 18 and 20

| | |
|----|--|
| 18 | ~~The cooling system of claim 17, wherein the substantially planar surface is a plate.~~ |
| 20 | ~~The cooling system of claim 17, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination devices, wiring, wiring harnesses, lights, thermo-electric devices, and switches.~~ |

Claims 18 and 20 are identical, respectively, to claims 3 and 6. Therefore, as under this Ground for claims 3 and 6, Yare discloses the limitations of claims 18

and 20. (Ex. 1002, ¶¶398-401; *supra* §§IX.C, IX.E.)

X. SECONDARY CONSIDERATIONS

Petitioners are not aware of any evidence of secondary considerations of nonobviousness. (Ex. 1002, ¶¶401-414.)

XI. *ADVANCED BIONICS* FRAMEWORK FAVORS INSTITUTION

The prior art relied upon was not relied upon by the examiner or otherwise used. “The Board frequently holds that a reference that ‘was neither applied against the claims nor discussed by the Examiner ***does not weigh in favor*** of exercising . . . discretion under § 325(d) to deny a petition.” *Amazon.com, Inc. v. M2M Sols. LLC*, IPR2019-01205, Paper 14 at 16 (PTAB Jan. 27, 2020). The spirit of that finding resonates here considering the arguments above are particularly strong and the two references that were cited during prosecution were included among hundreds of references with no indication that the Examiner meaningfully considered them. Notably, in the related application that led to the patent that is subject to IPR No. 2023-00221, faced with the same magnitude of cited prior art, the examiner faulted the applicant for citing “a mountain of largely irrelevant [material] . . . [and indicated] that only a cursory review was made of the cited references.” *Samsung Elecs. Co. Ltd., & Samsung Elecs. Am., Inc. v. Mfg. Res. Int’l, Inc.*, IPR2023-00221, Petition for *Inter Partes* Review at 127 (PTAB Dec. 7, 2022) . Neither Karppanen nor Yare was used by the Examiner in rejecting any claims.

The combinations differ from those previously considered. During prosecution, the only reference meaningfully relied upon by the examiner was Thielemans, which the applicant insisted “fails to teach or suggest the simultaneous presence and use of an open loop ambient air flow path and a closed loop gas circulation path as is recited in the rejected claims.” (Ex. 1031, 45.) As explained above, both Karppanen and Yare clearly teach an isolated closed loop path that encircles the LCD **and separately** an open loop ambient air flow path behind a heat exchanger.

Because the art was not meaningfully considered and because it is materially different than the art that the examiner did consider, the Board need not reach part 2 of the *Advanced Bionics* framework. Nonetheless, each of *Becton*, *Dickinson* factors (c), (e), and (f) favor Petition at least because if the examiner had meaningfully considered these references, the patent would not have issued. The arguments in this Petition are compelling in that regard for both Grounds.

XII. CONCLUSION

For the reasons set forth above, Petitioners respectfully submit that they have established a reasonable likelihood of success of showing that the challenged claims are unpatentable, and hence should be cancelled.

Petition for *Inter Partes* Review of
U.S. Patent No. 10,506,740

Date: ~~December 13~~ May 9,
~~2022~~ 2023

Respectfully submitted,

/Sanjeet Dutta/

Sanjeet Dutta

Registration No. 46,145

Goodwin Procter LLP

601 Marshall Street

Redwood City, CA 94063

Email: sdutta@goodwinlaw.com

Tel: (650) 752-3100

Fax: (650) 853-1038

XIII. CLAIM APPENDIX OF THE CHALLENGED CLAIMS

- 1[pre] An electronic display comprising:
- 1[a] an electronic image assembly having a front portion and a rear
portion;
- 1[b] an open loop ambient air flow path behind the rear portion of the
electronic image assembly;
- 1[c] a closed loop gas circulation path about the electronic image
assembly;
- 1[d] a common heat exchanger located in the pathway of both the
closed loop gas circulation path and the open loop ambient air flow
path;
- 1[e] a gas circulation device positioned to force circulating gas through
the common heat exchanger; and
- 1[f] an air circulation device positioned to force ambient air through
the common heat exchanger.
- 2[a] The electronic display of claim 1, further comprising: a
substantially planar surface located behind and spaced apart from
the rear portion of the electronic image assembly; and
- 2[b] a space defined between the rear portion of the electronic image
assembly and the substantially planar surface;

- 2[c] wherein the space is in gaseous communication with the open loop ambient air flow path.
- 3 The electronic display of claim 2, wherein the substantially planar surface is a plate.
- 5[a] The electronic display of claim 1, further comprising: a front display surface spaced apart from the front portion of the electronic image assembly; and
- 5[b] a front channel defined by the space between the front display surface and the front portion of the electronic image assembly, the front channel forming part of the closed loop gas circulation path.
- 6 The electronic display of claim 1, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination devices, wiring, wiring harnesses, lights, thermo-electric devices, and switches.
- 7 The electronic display of claim 1, further comprising a cooling device placed near an entrance to the open loop ambient air flow

path for reducing the temperature of ambient air entering the open
loop ambient air flow path.

8[pre] An electronic display comprising:

8[a] an electronic image assembly having a front portion and a rear
portion;

8[b] a closed loop gas circulation path encircling the electronic image
assembly;

8[c] an open loop ambient air flow path behind the rear portion of the
electronic image assembly;

8[d] a substantially planar surface located behind and spaced apart
from the rear portion of the electronic image assembly, the space
between the substantially planar surface and the rear portion of the
electronic image assembly defining a rear channel;

8[e] a common heat exchanger in gaseous communication with both
the closed loop gas circulation path and the open loop ambient air
flow path;

8[f] at least one fan positioned to force circulating gas through the
closed loop gas circulation path;

8[g] at least one fan positioned to force ambient air through the open
loop ambient air flow path.

- 9 The electronic display of claim 8, wherein the open loop ambient air flow path is also in gaseous communication with the rear channel.
- 11[a] The electronic display of claim 8, wherein: the common heat exchanger includes first and second gas pathways, the first and second gas pathways being isolated from each other;
- 11[b] where the first gas pathway is in gaseous communication with the open loop ambient air flow path; and
- 11[c] where the second gas pathway is in gaseous communication with the closed loop gas circulation path.
- 12 The electronic display of claim 11, wherein the first gas pathway is also in gaseous communication with the rear channel.
- 13 The electronic display of claim 8, wherein the substantially planar surface is a plate.
- 15[a] The electronic display of claim 8, further comprising: a front display surface spaced apart from the front portion of the electronic image assembly; and
- 15[b] a front channel defined by a space between the front display surface and the front portion of the electronic image assembly, the front channel forming part of the closed loop gas circulation path.

16 The electronic display of claim 8, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination devices, wiring, wiring harnesses, lights, thermo-electric devices, and switches.

17[pre] A cooling system for an electronic image assembly, comprising:

17[a] an open loop ambient air flow path at a rear portion of the electronic image assembly;

17[b] a closed loop gas circulation path encircling the electronic image assembly;

17[c] a common heat exchanger in gaseous communication with both the closed loop gas circulation path and the open loop ambient air flow path;

17[d] a front channel defined by a space between a front portion of the electronic image assembly and a front display surface located forward of and spaced apart from the front portion of the electronic

- image assembly, the front channel forming a part of the closed loop gas circulation path;
- 17[e] a rear channel defined by a space between the rear portion of the electronic image assembly and a substantially planar surface located behind and spaced apart from the rear portion of the electronic image assembly, the rear channel forming a part of the open loop ambient air flow path;
- 17[f] at least one fan positioned to force circulating gas through the closed loop gas circulation path and the common heat exchanger;
and
- 17[g] at least one fan positioned to force ambient air through the open loop ambient air flow path and the common heat exchanger.
- 18 The cooling system of claim 17, wherein the substantially planar surface is a plate.
- 20 The cooling system of claim 17, further comprising at least one electronic component located in the pathway of the closed loop gas circulation path, the at least one electronic component selected from the group consisting of transformers, circuit boards, resistors, capacitors, batteries, power modules, motors, inductors, illumination

devices, wiring, wiring harnesses, lights, thermo-electric devices, and
switches.

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that this Petition for *Inter Partes* Review complies with the type-volume limits of 37 C.F.R. § 42.24(a)(1)(i) because it contains ~~13,940~~13,909 words according to the word-processing system used to prepare this Petition, excluding the words in the Table of Contents, Table of Authorities, List of Exhibits, Mandatory Notices, Certification Under § 42.24(d), and Certificate of Service, as set forth in 37 C.F.R. § 42.24(a)(1).

Date: ~~December 13~~May 9,
~~2022~~2023

/Sanjeet Dutta /
Sanjeet Dutta
Registration No. 46,145
Goodwin Procter LLP
601 Marshall Street
Redwood City, CA 94063
Email: sdutta@goodwinlaw.com
Tel: (650) 752-3100
Fax: (650) 853-1038

CERTIFICATE OF SERVICE

The undersigned certifies that a true and correct copy of the foregoing
Corrected Petition together with ~~all exhibits identified in the above Table of~~
~~Exhibits and Petitioner's Power of Attorney, have~~ Exhibit 1032 has been served on
the Patent Owner via Federal Express Next Business Day Delivery ~~on the below~~
~~date,~~ at the following address:

STANDLEY LAW GROUP LLP
6300 Riverside Drive
Dublin, OH 43017

and has been served by email upon the following:

John C. Alemanni – jalemanni@kilpatricktownsend.com
Carl Sanders – csanders@kilpatricktownsend.com
Michael T. Morlock – mmorlock@kilpatricktownsend.com
Courtney Dabbieri – cdabbieri@kilpatricktownsend.com

Respectfully submitted,
GOODWIN PROCTER LLP

Date: ~~December 13~~ May 9,
~~2022~~ 2023

By: /Sanjeet Dutta/
Sanjeet Dutta