

SAMSUNG

**Samsung Electronics Co. Ltd. and Samsung
Electronics America, Inc.**

v.

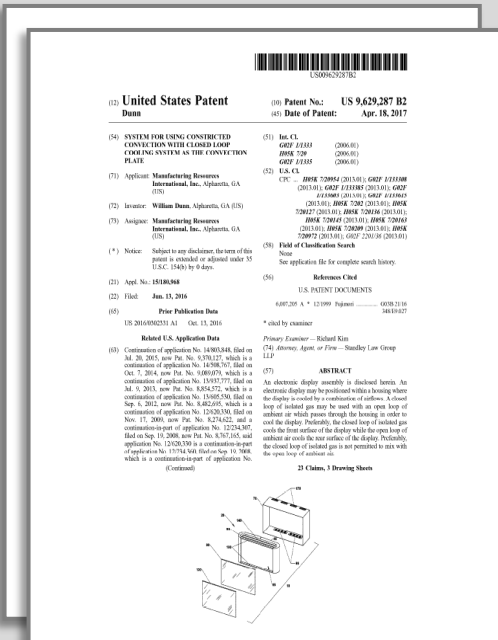
**Manufacturing Resources International,
Inc.**

IPR2023-00255

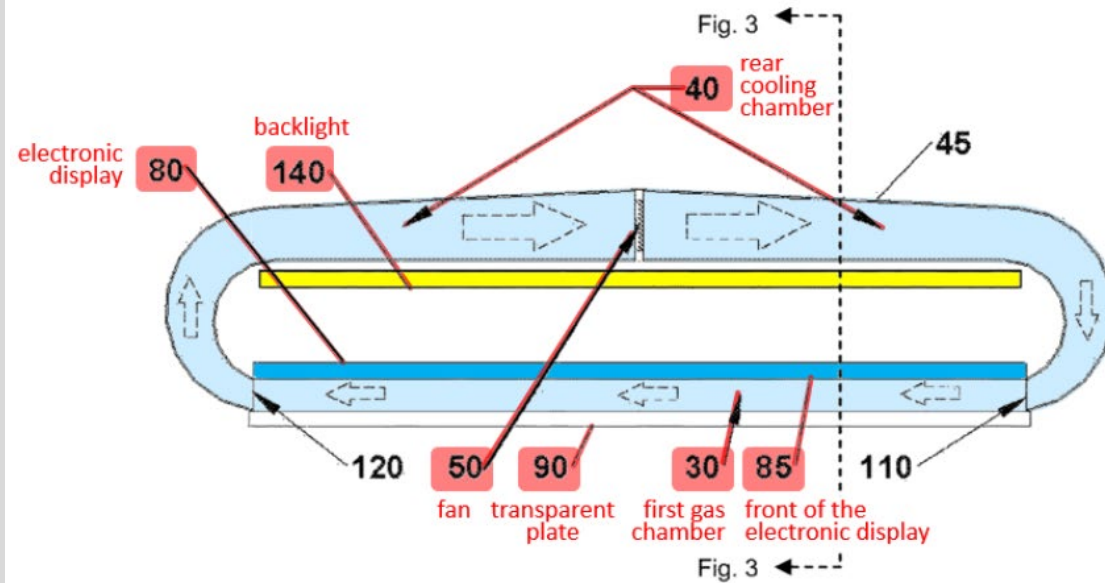
Petitioners' Hearing Demonstratives

April 24, 2024

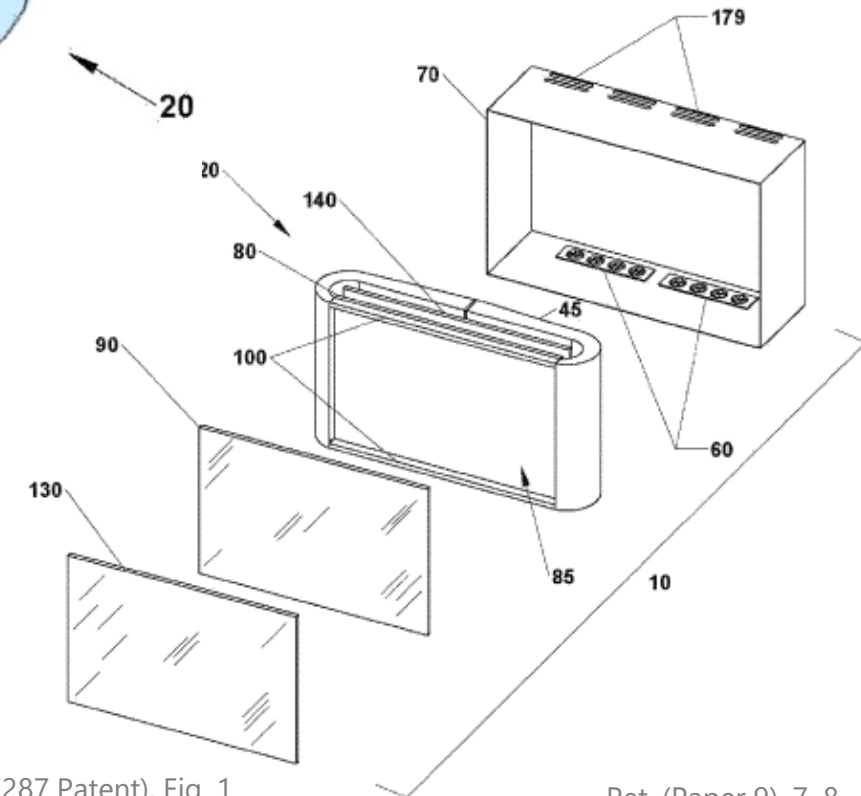
Overview of the '287 Patent



Ex. 1001 ('287 Patent)



Ex. 1001 ('287 Patent), Fig. 2 (annotated)



Ex. 1001 ('287 Patent), Fig. 1

Pet. (Paper 9), 7–8

The Challenged Claims of the '287 Patent Are Unpatentable

Ground 1: Claims 12–23 are obvious in view of Karppanen (Ex. 1006)

Ground 2: Claims 1, 4–5, 8–12, 14–17, 21–23 are obvious over Nagashima (Ex. 1007) in view of Karppanen (Ex. 1006)

Ground 3: Claims 1, 4–5, 8–23 are obvious over Ohta (Ex. 1004) in view of Marumoto (Ex. 1005)

Ground 4: Claims 1, 4–5, 8–23 are obvious over Ohta (Ex. 1004), in view of Marumoto (Ex. 1005) and in further view of Yare (Ex. 1013)

Ground 5: Claims 12–20 are obvious over Kitamura (Ex. 1017) in view of Harris (Ex. 1018)

Person of Ordinary Skill in the Art



Bachelor's degree in a pertinent discipline, such as mechanical engineering, physics, product design, or a related field. 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.



OR

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.



Claim Construction

Claim Term	Petitioners' Construction	Patent Owner's Construction
"closed loop gas cooling chamber" (Claim 1, 4–5, 8 –11) "closed loop of isolated gas" (Claim 12–20) "closed loop of cooling gas" (Claim 21–23)	"gas pathway within a display housing containing gas that is essentially isolated from external air"	"a gas pathway forming a complete loop within a display housing" ["closed loop" only]
"open loop of ambient air which passes through the housing and along the backlight" (Claim 12)	"open loop of ambient air which passes through the housing and is in thermal communication with the backlight"	Plain and ordinary meaning

Pet. (Paper 9), 9–12; POR (Paper 19), 8–10; Reply (Paper 32), 2; Sur-Reply (Paper 44), 4–5; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 75–76

Claim Construction: “Closed loop”

(57)

ABSTRACT

An electronic display assembly is disclosed herein. An electronic display may be positioned within a housing where the display is cooled by a combination of airflows. A closed loop of isolated gas may be used with an open loop of ambient air which passes through the housing in order to cool the display. Preferably, the closed loop of isolated gas cools the front surface of the display while the open loop of ambient air cools the rear surface of the display. Preferably, the closed loop of isolated gas is not permitted to mix with the open loop of ambient air.

Ex. 1001 ('287 Patent), Abstract

Referring to FIG. 2, in at least one embodiment the isolated gas cooling chamber 20 comprises a closed loop which includes a first gas chamber 30 and a rear cooling chamber 40. The first gas chamber includes a transparent plate 90. The second gas chamber comprises a cooling plenum 45. The term “isolated gas” refers to the fact that the gas within the isolated gas cooling chamber 20 is essentially isolated from external air in the housing of the display. Because the first gas chamber 30 is positioned in front of the display image, the gas should be substantially free of dust or other contaminants that might negatively affect the display image.

Ex. 1001 ('287 Patent), 4:4-15

These terms appear in asserted claims of the '572, '287, and '325 patents. Plaintiff's proposed construction impermissibly defines “closed loop” in terms of an outcome and not by its function or structure. Furthermore, Defendants' proposed construction reflects the plain and ordinary meaning of the term as reflected by the intrinsic evidence. '572 patent at 3:53-63, 5:28-32; '287 patent at 4:4-11; '325 patent at 6:55-59. At oral argument, Plaintiff indicated it was “prepared to accept [the Court's] tentative construction[.]” (D.I. 147, Tr. at 78:1-5). Therefore, the Court construes “closed loop” and “closed gaseous loop” to mean “gas pathway within a display housing containing gas that is essentially isolated from external air.”

Ex. 1012 (D. Del. Memo. Op.), 8

Claim Construction: “Closed Loop”

The IP rating is comprised of two numbers. Ex. 2024, ¶¶92; Ex. 2023. The first number represents the extent to which dust can enter the system, and the second number represents the extent to which water can enter the system. Ex. 2024, ¶¶92; Ex. 2023. A POSITA would look to an enclosure that meets at least the level 5 for the first and second digits to know it is sealed to the extent that it is “substantially free” of dust and contaminants. Ex. 2024, ¶¶92; Ex. 2023. Absent a

POR (Paper 19), 11

sealed system.”); *see also id.* at 992:5-8; RDX-0007.0086. The ’287 patent does not require the “isolated gas” of the closed loop to be completely isolated. *See* ’287 patent at 4:19-23 (“The isolated gas cooling chamber need not necessarily be hermetically sealed from the external air. It is sufficient that the gas in the chamber is isolated to the extent that dust and contaminants may not substantially enter the first gas chamber.”) The disclosures of Karppanen, including the

Ex. 1042 (FID), 244

Claim Construction: “Open Loop . . . Along the Backlight”

MRI argued, and Dr. Pokharna opined, that the aluminum plate depicted above (below the blue arrow) is a thermally conductive plate that forms the back surface of the backlight, and thus the asserted open loop passes “along the backlight.” CIB at 68-71; Tr. (Pokharna) at 457:21-458:20. Dr. Pokharna opined that in order for air to flow “along the backlight” it must be “right next to the backlight” and without “significant intervening structures between the ambient air and the backlight” (the existence of which must be determined on a case-by-case basis). Tr. (Pokharna) at 540:7-13, 542:2-13.

Ex. 1042 (FID), 106

The Examiner Interpreted “Along the Backlight” Broadly

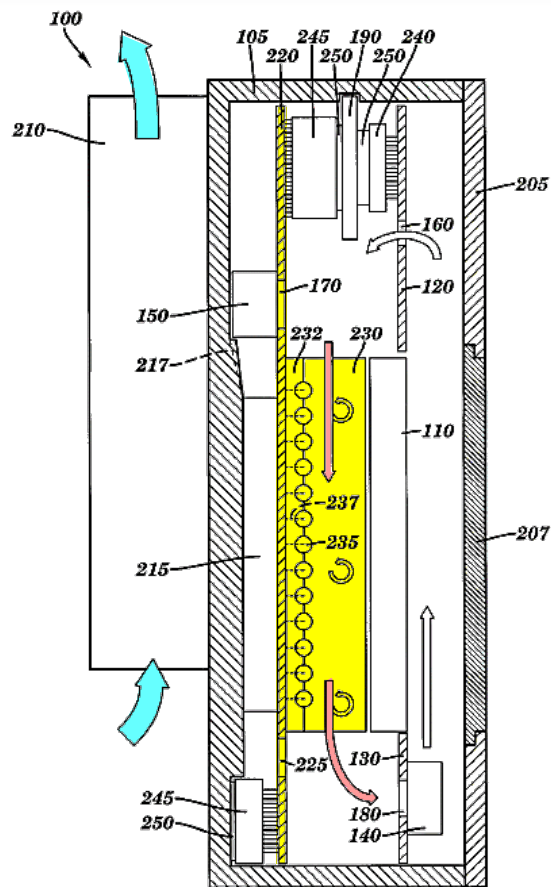


FIG. 3

Ex. 1019 (Heady), Fig. 3 (annotated)

20. Re claim 17 Heady et al. discloses a device comprising a liquid crystal stack (display 110 would have more than one layer, therefore comprising a stack) having a display surface; a backlight (220, 232, 235, 237, 230) with a thermally conductive rear surface (220) positioned posterior to the liquid crystal stack; a transparent plate (207) placed in front of the display surface, the space between the transparent plate and the display surface defining a channel; a closed loop of circulating gas positioned to surround the liquid crystal stack and backlight where circulating gas flows through the channel (Figs. 2 and 3); and an open loop of cooling air traveling along the rear surface of the backlight where the cooling air is not permitted to mix with the circulating gas. The air, illustrated by the arrows along the external fins (210) comprises an open loop of cooling air. Although the cooling air is separated from the rear surface, it travels “along” the rear surface of the backlight.

Ex. 1020 ('079 Patent, File History), 204

Pet. (Paper 9), 11–12; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 75–76

Patent Owner Amended the Claims to Require Ambient Air "Contact" the Backlight

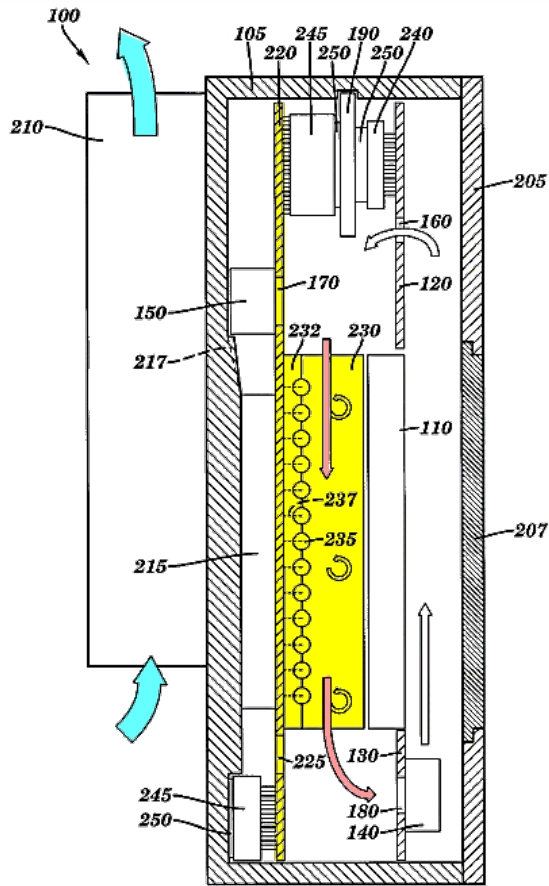


FIG. 3

Ex. 1019 (Heady), Fig. 3 (annotated)

17. **(currently amended)** A thermally regulated liquid crystal display assembly, the system comprising:

- a liquid crystal stack having a display surface;
- an LED backlight with a thermally conductive rear surface positioned posterior to the liquid crystal stack;
- a glass plate placed in front of the display surface, the space between the glass plate and display surface defining a channel;
- a closed loop of circulating gas positioned to surround the liquid crystal stack and LED backlight where circulating gas flows through the channel; and
- an open loop of cooling air contacting ~~travelling along~~ the rear surface of the LED backlight ~~where the cooling air is not permitted to mix with the circulating gas.~~

Ex. 1020 ('079 Patent, File History), 223

'287 Patent, Ground 1: Obvious in View of Karppanen

Disputes Regarding Karppanen Disclosure

Claim Term(s)	Claims
"closed loop of isolated gas"	12, 18, 22
"open loop of ambient air which passes through the housing and along the backlight"	12
"one or more electronic components for driving the LCD positioned within the rear cooling chamber"	15
"the intended direction of closed loop isolated gas flow is substantially perpendicular to the intended direction of open loop of ambient air flow"	17

Claim 12 of '287 Patent is Obvious in View of Karppanen (Ex. 1006)

12 [pre]

12 [a]

12 [b]

12 [c]

12. An electronic display assembly comprising:
a housing;
a liquid crystal display (LCD) positioned within the housing and having a backlight;
wherein the electronic display is coolable by a combination of a closed loop of isolated gas which circulates within the housing and an open loop of ambient air which passes through the housing and along the backlight.

Karppanen

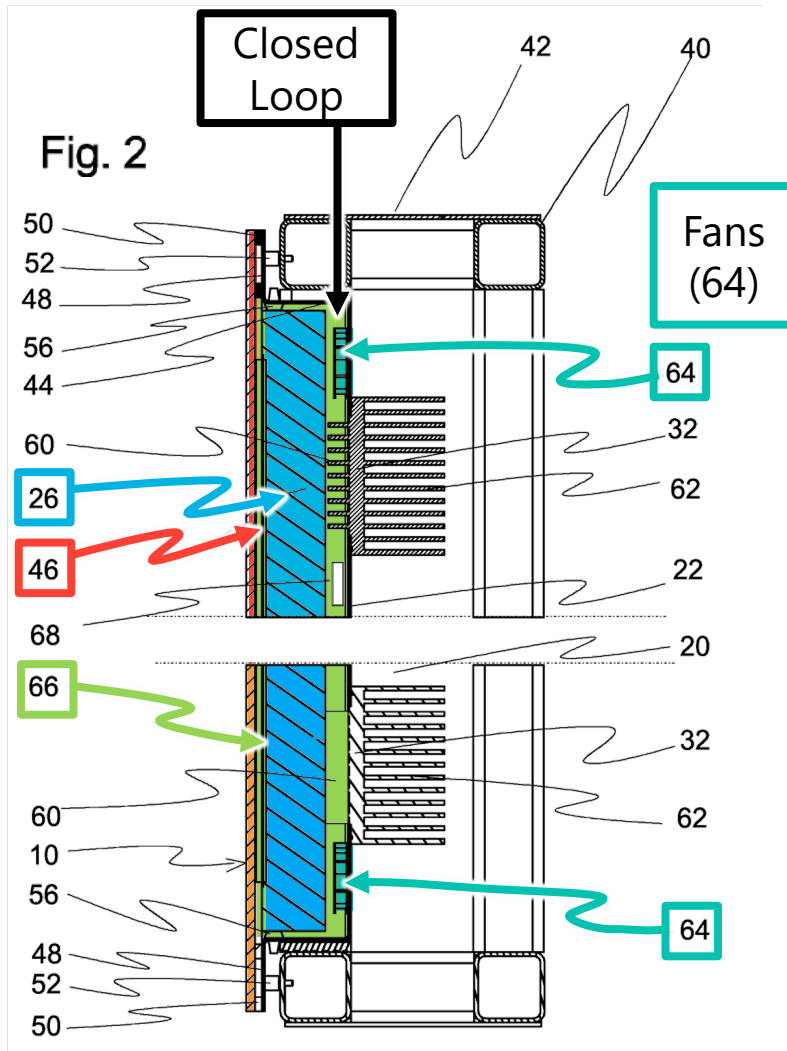
Undisputed

Undisputed

Undisputed

Ex. 1001 ('287 Patent), Claim 12

Karppanen Discloses a Closed Loop of "Isolated Gas"



Ex. 1006 (Karppanen), Fig. 2 (annotated)

ment and the display casing, and ducting has been arranged between the walls of the casing and the display element for directing the circulation of air around the display element. There may also be electrically operated warming elements in the

Ex. 1006 (Karppanen), 4:34-36

In another preferred embodiment of the invention, the display casing and the device casing have been made weatherproof for enabling the performance of updating and maintenance measures outdoors.

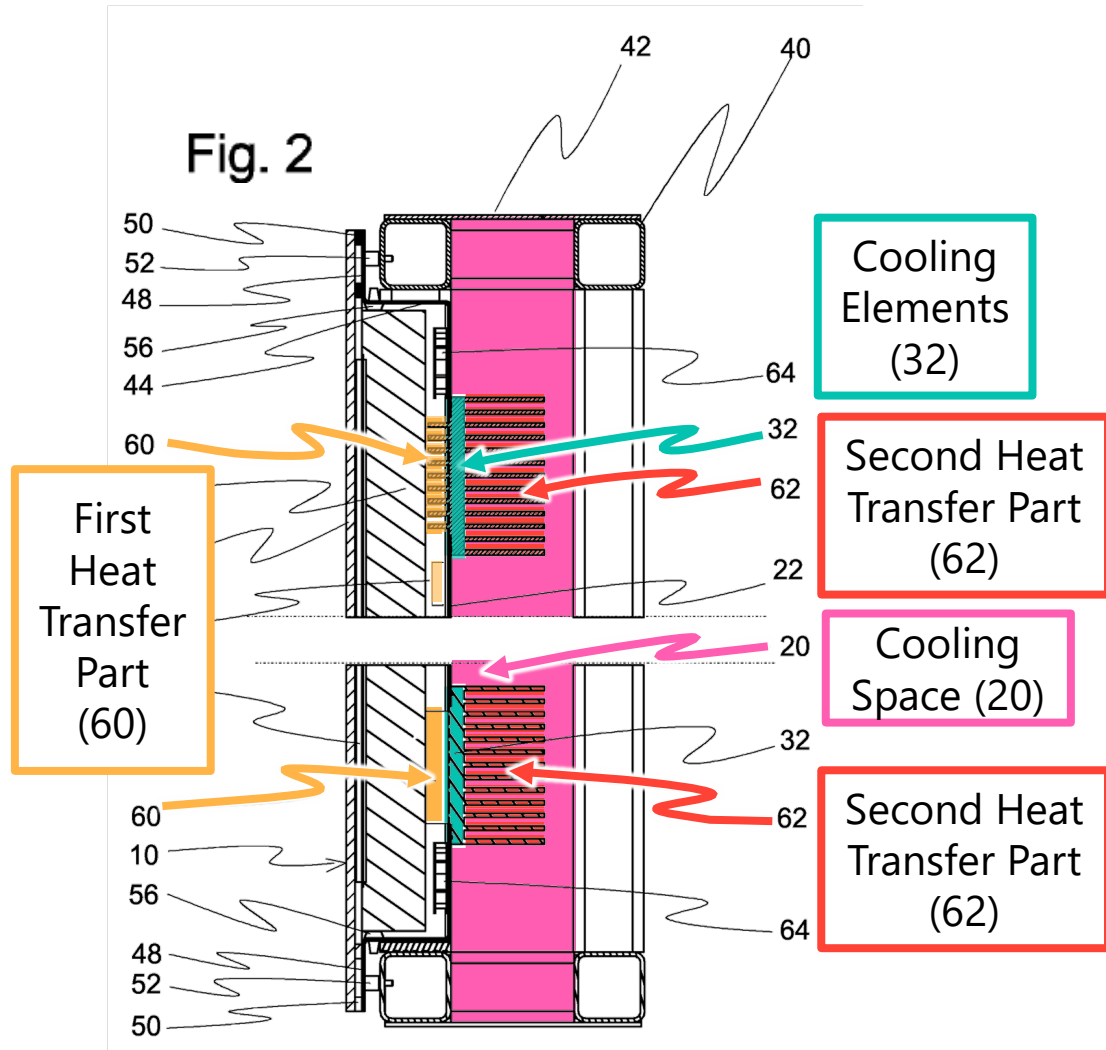
Ex. 1006 (Karppanen), 4:6-8

of aluminium or steel. A display casing 10 comprising a back wall 22, a transparent front plate 46 and an edge part 44 having a flange-like fastening collar 48 running in the direction of the front plate has been fastened to the frame by fastening means 52. Preferably, the back plate and the edge parts have been formed of one plate-like part by some known plate machining method, such as pressing. The transparent front plate has been fastened to the fastening collar of the edge parts by means of flexible, vibration attenuating sealing elements 50 so that the edge parts of the front plate and the back wall form a closed display casing. The front

Ex. 1006 (Karppanen), 7:31-38

Pet. (Paper 9), 28-29; Reply (Paper 32), 2-4; Ex. 1002 (Smith-Gillespie Decl.), ¶ 118

Karppanen Discloses an "Open Loop of Ambient Air Which Passes Through the Housing and Along the Backlight" (Claim 12)



Ex. 1006 (Karppanen), Fig. 2 (annotated)

side of the casings. In the closed position, there remains a **cooling space 20** between the display casing and the device casing, delimited by the cover 24 and the display casing (Fig. 2). In the back wall 22 of the display casing and the back

Ex. 1006 (Karppanen), 7:9-11

The first heat transfer part may comprise cooling fins or conduction elements or both. A conduction element is a fixed body conducting heat well, which is placed so that it touches the heat source, whereby the heat is transferred from the heat source to the cooling element by conduction. Preferably, the conduction element has been fastened to the heat source, such as the surface of the display element, by flexible fastening paste, which fills up the irregularities of the surface of the heat source well and promotes the transfer of heat from the heat source to the conduction element.

Ex. 1006 (Karppanen), 8:29-36

Pet. (Paper 9), 29-32, 44; Reply (Paper 32), 4-6; Ex. 1002 (Smith-Gillespie Decl.), ¶ 119-123, 184

Claim 15 Does Not Require the “Rear Cooling Chamber” Contain the Closed Loop

12. An electronic display assembly comprising:
a housing;
a liquid crystal display (LCD) positioned within the housing and having a backlight;
wherein the electronic display is coolable by a combination of a closed loop of isolated gas which circulates within the housing and an open loop of ambient air which passes through the housing and along the backlight.

Ex. 1001 ('287 Patent), Claim 12

14. The electronic display assembly of claim 12 further comprising:
a rear cooling chamber positioned behind the LCD and containing the closed loop of isolated gas; and
wherein the open loop ambient air will contact an exterior surface of the chamber, but is not permitted to enter the chamber.

Ex. 1001 ('287 Patent), Claim 14

15. The electronic display assembly of claim 12 further comprising:
one or more electronic components for driving the LCD positioned within the rear cooling chamber.

Ex. 1001 ('287 Patent), Claim 15

Karppanen Renders Obvious “One or More Electronic Components for Driving the LCD Positioned Within the Rear Cooling Chamber” (Claim 15)

maintenance and updating of the device. The information board has its own display casing for the display element and a device casing for the electronic equipment needed for controlling the display element. Cooling elements have also been arranged in the display casing for transferring heat from the display casing to the outside of the display casing. Preferably, the device casing contains at least the control unit of the information board, the power supply of the control unit and the power supply of the background light of the display.

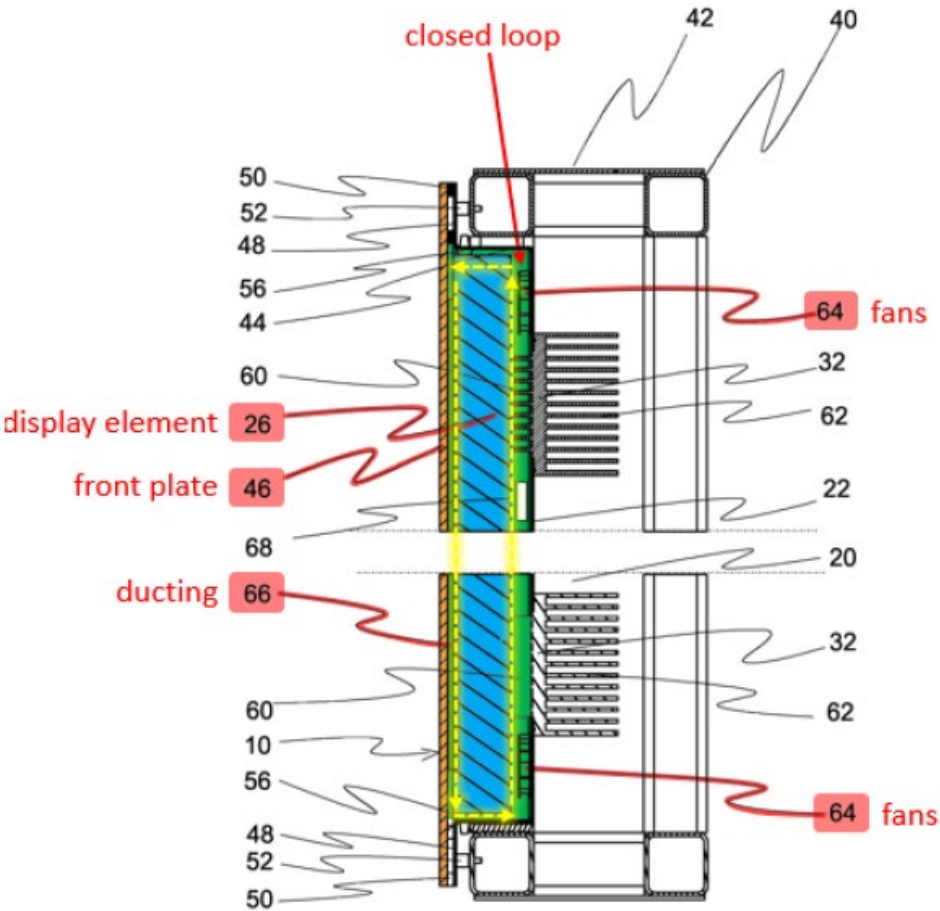
Ex. 1006 (Karppanen), 3:28–34

the power supply of the background light of the display.” (*Id.*, 3:32–34.) A POSITA would understand this disclosure to imply that the driver for the backlight is located in the display casing. A driver located on the rear surface of the display element 26 would be in the rear cooling chamber. Further, a POSITA would understand that the most common placement of LCD drivers on an LCD module would be on the rear casing, as close to the LCD panel as practical to reduce electronic noise and signal degradation.

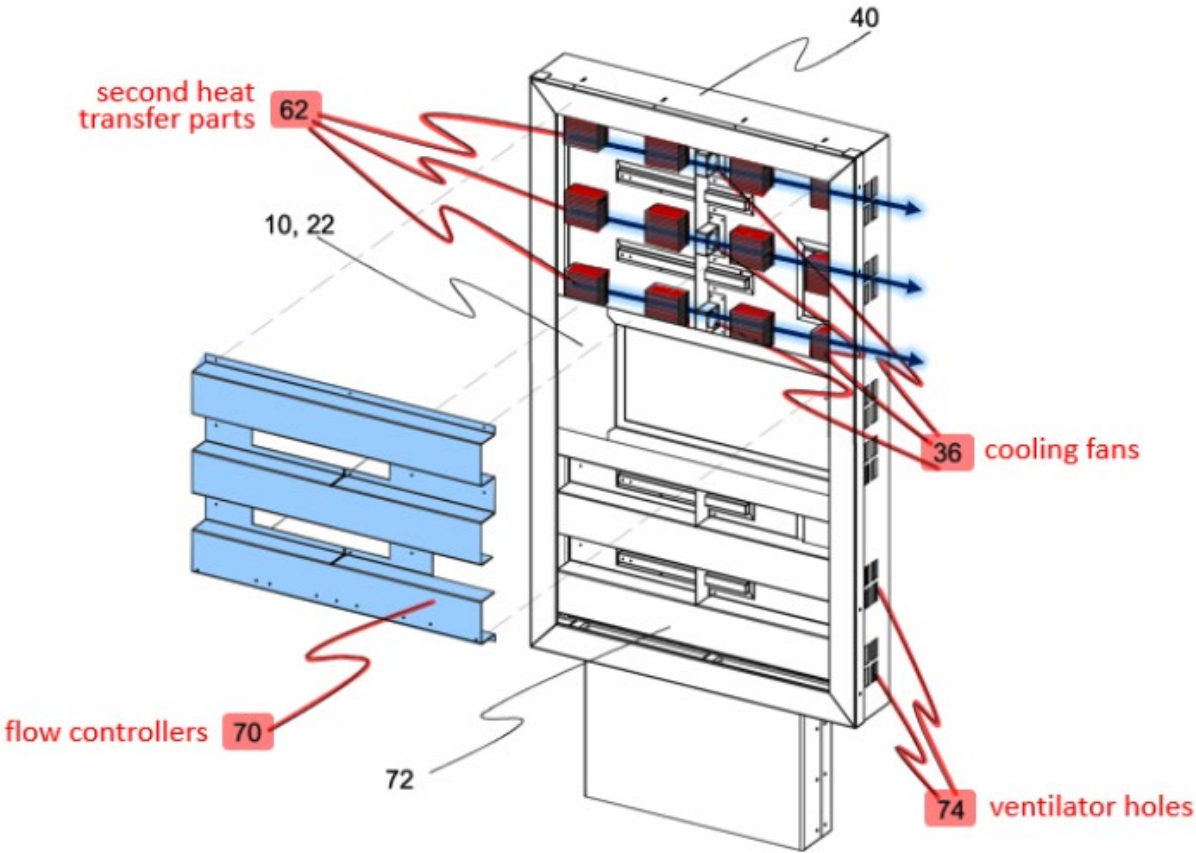
Ex. 1002 (Smith-Gillespie Decl.), ¶ 136

Pet. (Paper 9), 26–32 (Claim 12), 35 (Claim 15); Reply (Paper 32), 5; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 135–37

Karppanen Renders Obvious a Closed Loop Airflow “Substantially Perpendicular” to the Open Loop Airflow (Claim 17)



Ex. 1006 (Karppanen), Fig. 2 (annotated)



Ex. 1006 (Karppanen), Fig. 3 (annotated)

Pet. (Paper 9), 37–39; Reply (Paper 32), 6; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 141–42

Patent Owner's Expert Admits that Karppanen Discloses Horizontal Airflow in the Open Loop

Q. The intended direction of the ambient airflow is the horizontal direction across the cooling space located behind the display, correct?

MR. ALEMANNI: Same objection.

A. Yes.

Ex. 1043 (Pokharna Dep.), 28:23-29:2

casing and its relationship (if any) to the ambient air passing through the cooling space 20. *See* Ex. 2024, ¶106-110. Karppanen describes horizontal ducts for the cooling space in only one of its embodiments. *Id.* ¶106. There is insufficient

POR (Paper 19), 19

Reply (Paper 32), 6; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 141-42

'287 Patent, Ground 2: Obvious in View of Nagashima and Karppanen

Disputes Regarding Nagashima and Karppanen Disclosures

Claim Term(s)	Claims
"closed loop" of "isolated gas"	4, 12, 22
"coolable by a combination of"	1, 12, 21
"intended direction of closed loop isolated gas flow is substantially perpendicular to the intended direction of open loop of ambient air flow"	17, 5

Nagashima Discloses a “Closed Loop” of “Isolated Gas”

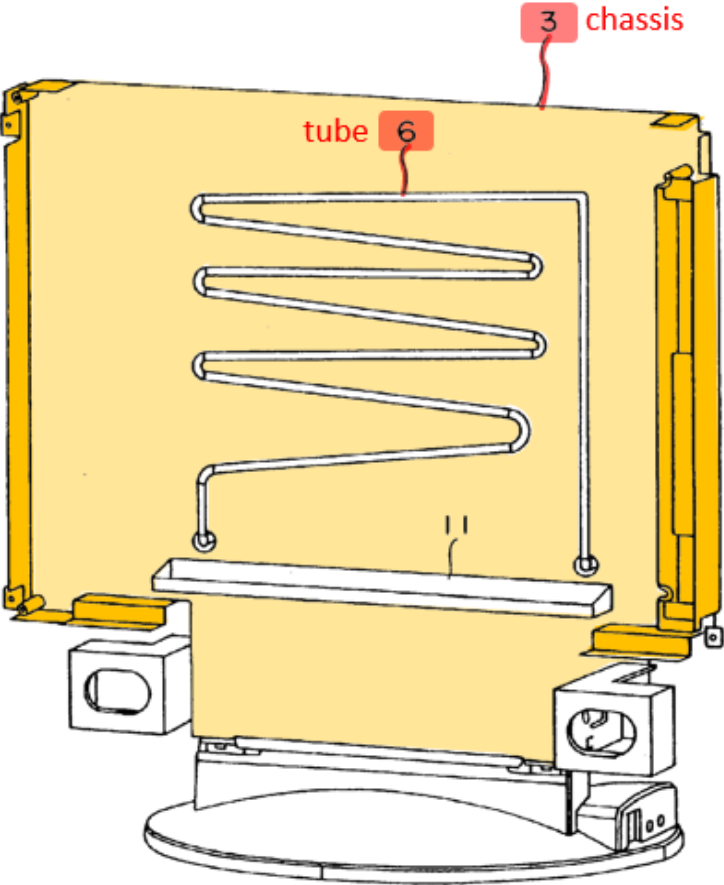


FIG. 2

Ex. 1007 (Nagashima), Fig. 2
(annotated)

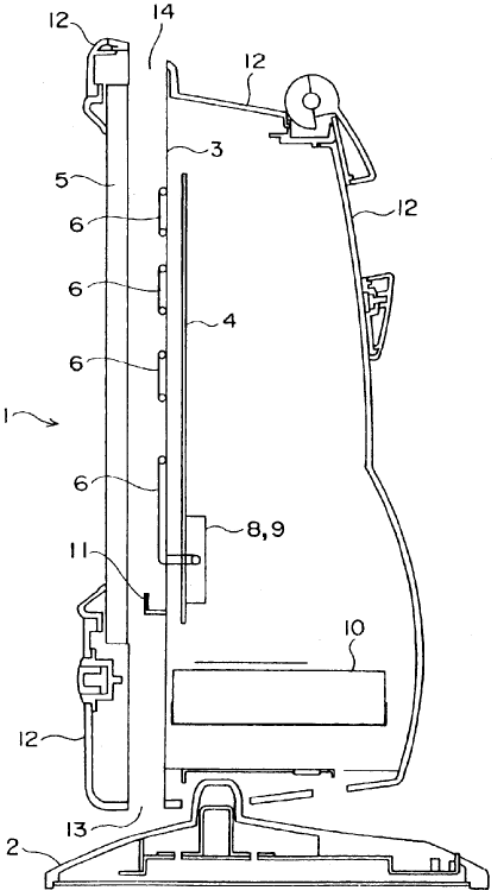


FIG. 1

Ex. 1007 (Nagashima), Fig. 1

Pet. (Paper 9), 48–51; Reply (Paper 34), 6–7; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 212–19

Motivation to Combine Nagashima With Karppanen



As Nagashima recognizes, ambient air may contain contaminants, which could damage vital electronic components



Modifying Nagashima with Karppanen's sealed closed loop cooling chamber advantageously constrains the flow of air and ensures proper circulation of air within the chamber



Combination includes using known techniques (using a fan to move heated air) according to known methods (employing a closed loop in a sealed chamber) to obtain predictable results of reliable energy, temperature, and pressure efficiency

Pet. (Paper 9), 64; Reply (Paper 34), 7; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 216, 287–91; Ex. 1007 (Nagashima), 6:11–16

Nagashima Discloses that the LCD is “Coolable By a Combination” of the Open and Closed Loops

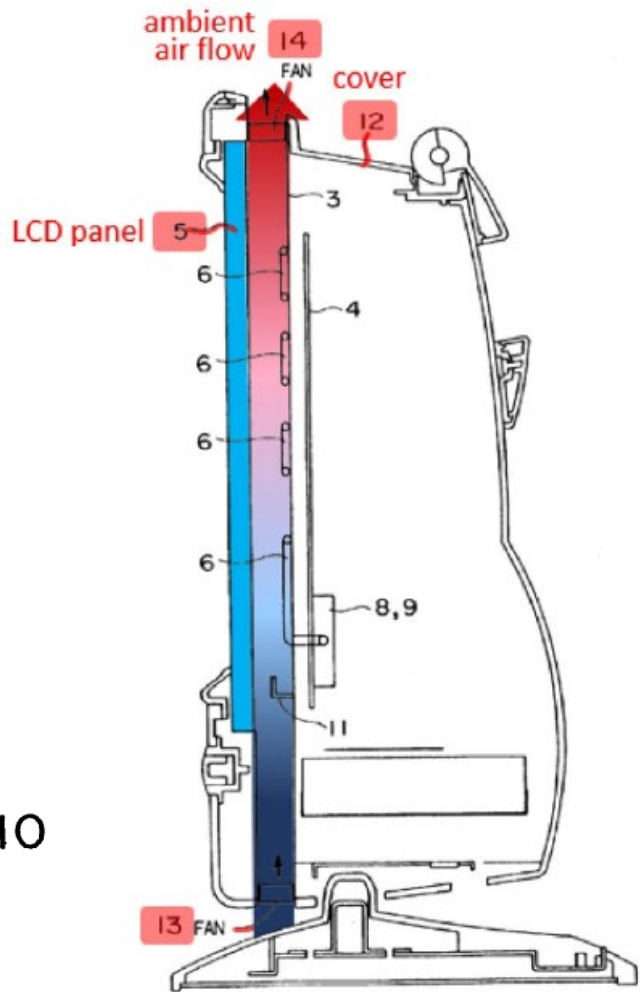


FIG. 10

Ex. 1007 (Nagashima), Fig. 10 (annotated)

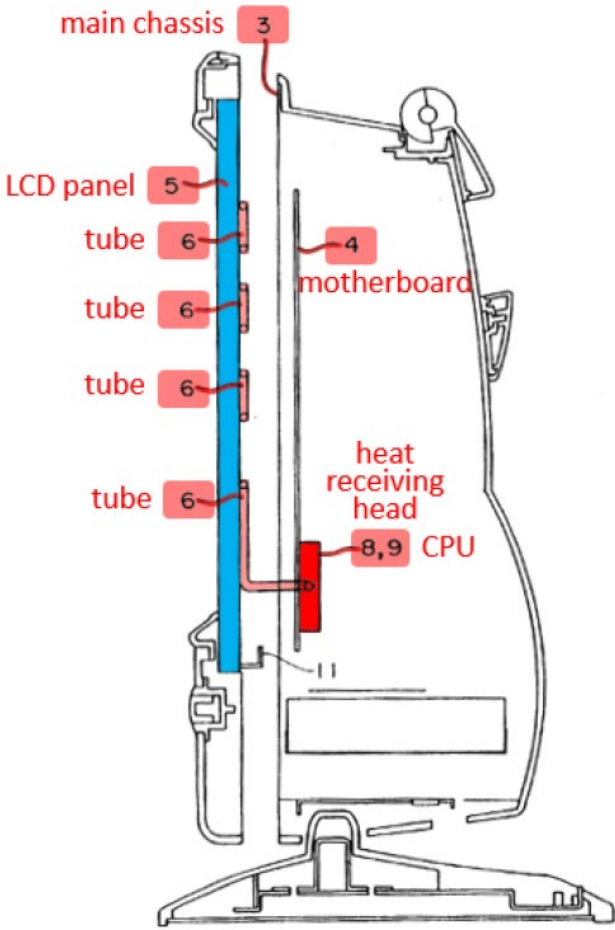
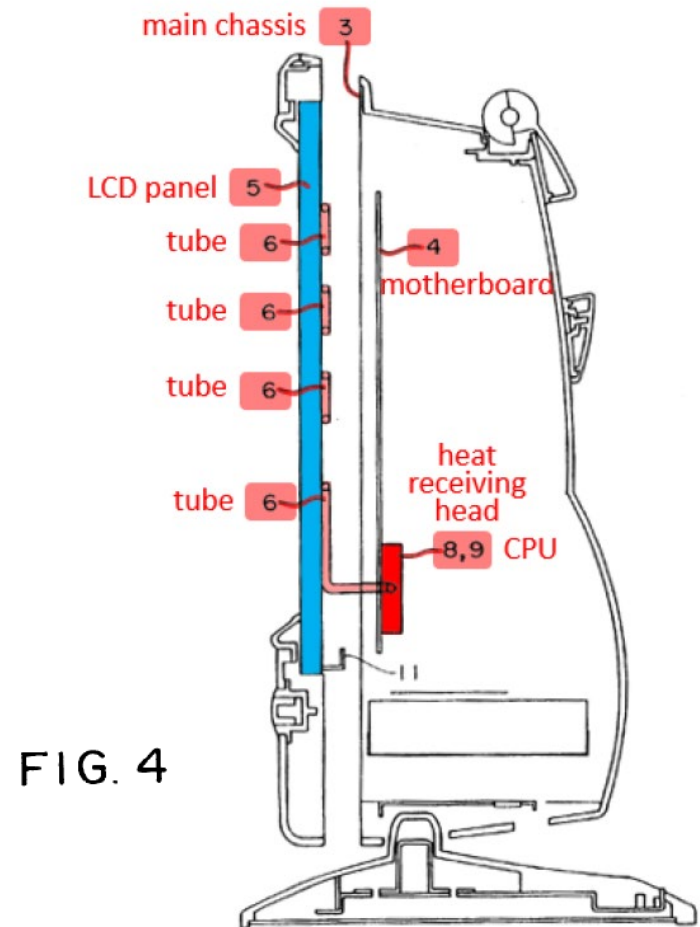


FIG. 4

Ex. 1007 (Nagashima), Fig. 4 (annotated)

Pet. (Paper 9), 53–55; Reply (Paper 34), 8–10; Ex. 1002 (Smith-Gillespie Decl.) ¶¶ 226–29

Nagashima Discloses that the LCD is "Coolable By a Combination" of the Open and Closed Loops



Ex. 1007 (Nagashima), Fig. 4 (annotated)

Q. Now, if we can go back to Nagashima and take a look at Figure 4, please.

Now, as we've discussed, sir, in Figure 4, the tubes connect from the heat receiving head to the LCD display in this embodiment, correct?

A. Yes.

Q. And the tubes are exposed in the channel that's formed between the LCD display and the main chassis, correct?

A. Yes.

Q. And Nagashima teaches that an open loop fan can be located in that channel located between the LCD display and the chassis, correct?

MR. ALEMANNI: Objection, form.

A. Yes, in one of his embodiments, he does that.

Q. So if an open loop fan is added to Figure 4, ambient air is then flowing over the tube that's located between the LCD and the main chassis, correct?

A. That's correct.

Patent Owner's Expert Conceded That Nagashima's Open Loop Air Flows Vertically

Q. So -- and just to kind of -- since you mentioned it, let's take a look at Figure 10 in Nakashima.

So in figure 10 in Nagashima, it's teaching that the ambient airflow located between the LCD display and the main chassis moves in a vertical direction, correct?

A. Yes.

Q. And you would agree that the intended direction taught in Nagashima for the ambient airflow is vertical direction, correct?

MR. ALEMANNI: Objection, form, scope.

A. Yes, between the chassis 3 and the display, it's flowing in the vertical direction, from bottom to top.

Ex. 1043 (Pokharna Dep. Tr.), 40:8-19

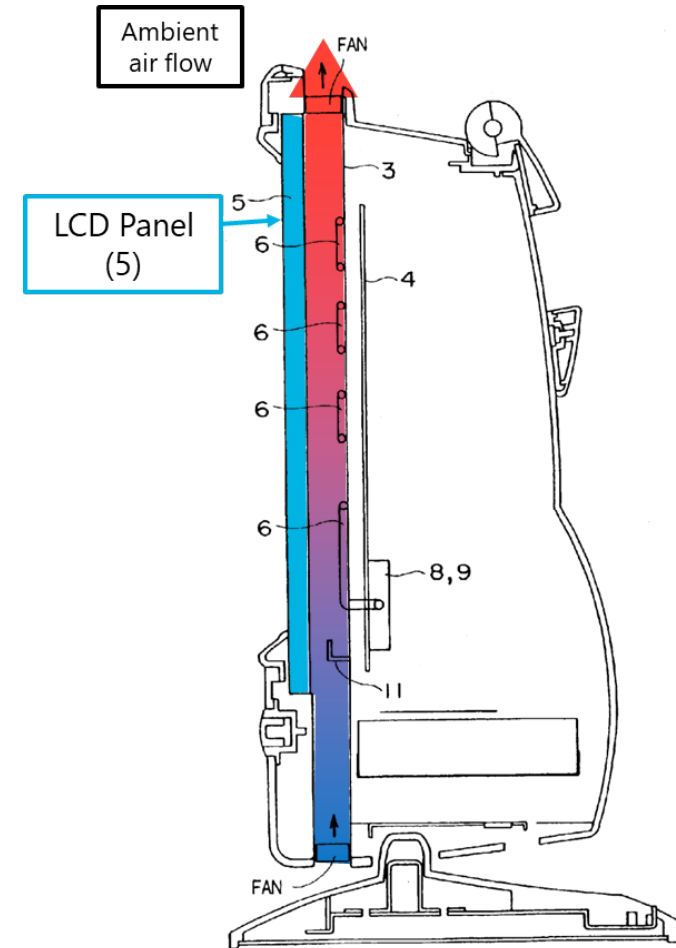
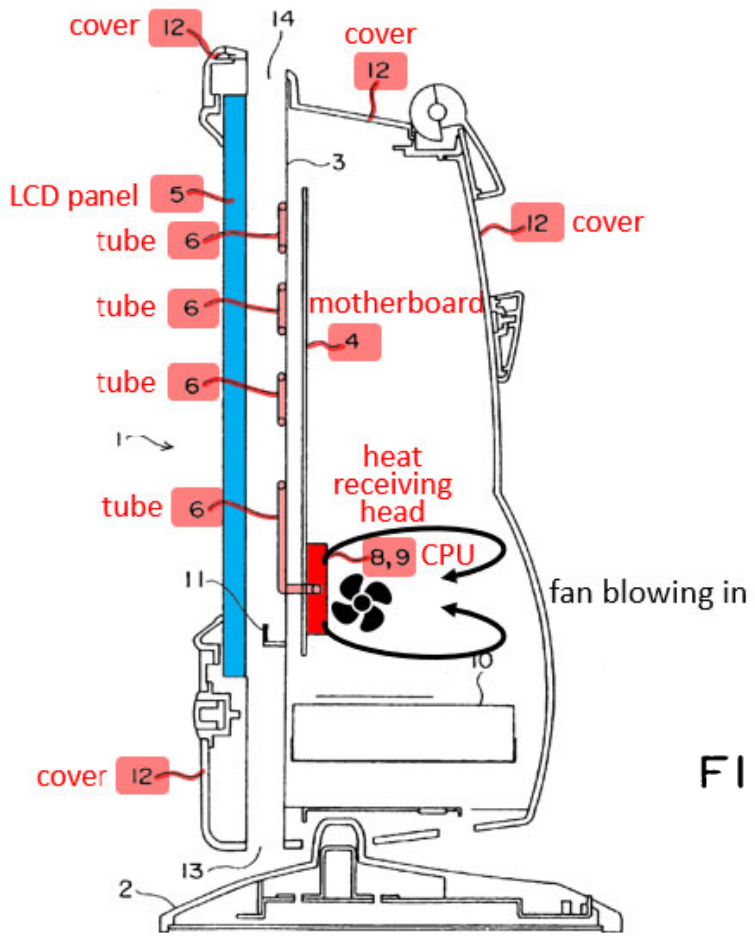


FIG. 10

Ex. 1007 (Nagashima), Fig. 10 (annotated)

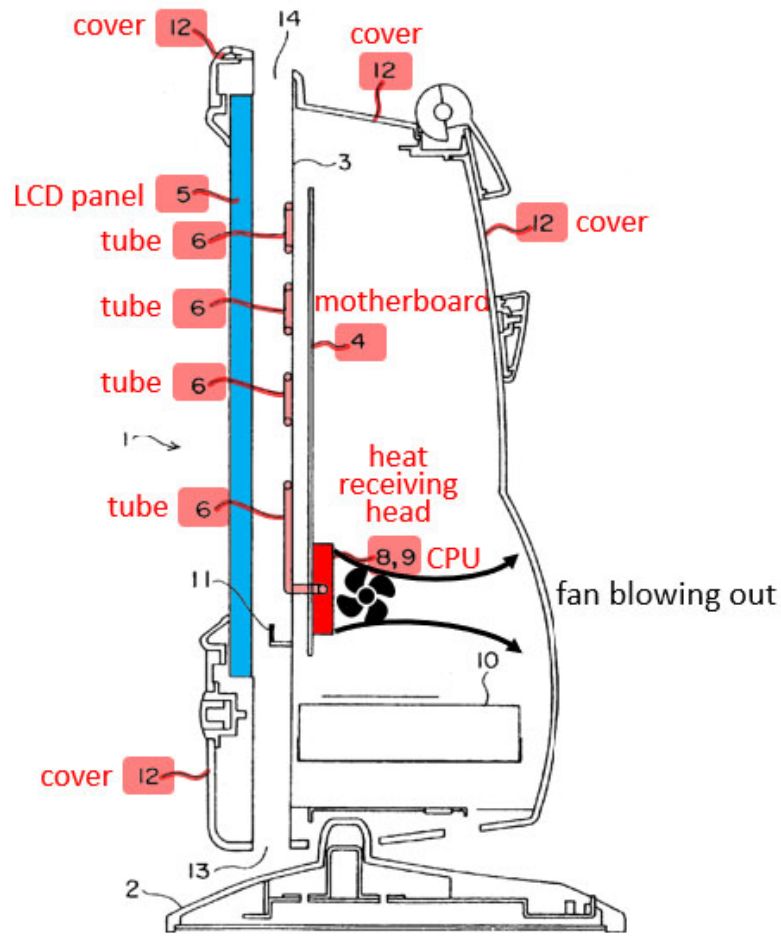
Pet. (Paper 9), 55-56; Reply (Paper 32), 10

Nagashima's Closed Loop Air Flows Substantially in a Horizontal Direction



Ex. 1007 (Nagashima), Fig. 1 (annotated)

FIG. 1



Ex. 1007 (Nagashima), Fig. 1 (annotated)

Pet. (Paper 9), 56; Reply (Paper 32), 10; Ex. 1002 (Smith-Gillespie Decl.), ¶ 232

'287 Patent, Ground 3: Obvious in View of Ohta and Marumoto

Disputes Regarding Ohta and Marumoto Disclosures

Claim Term(s)	Claim(s)
"housing"	1, 12, 18, 21
"closed loop" of "isolated gas"	1, 12, 22
"a liquid crystal display (LCD) positioned within the housing and having a backlight"	12
"an open loop of ambient air which passes through the housing and along the backlight"	12
"coolable by a combination of [the closed loop and open loop]"	1, 12, 21
"one or more electronic components for driving the LCD positioned within the rear cooling chamber"	15, 9
"the intended direction of closed loop isolated gas flow is substantially perpendicular to the intended direction of open loop of ambient air flow"	17, 5

Ohta Renders Obvious a “Housing” (Claims 1, 12, 18, 21)

(0030) FIG. 5 is a lateral cross-section of embodiment example 5 of the cooling device for plasma display panel according to the present invention.

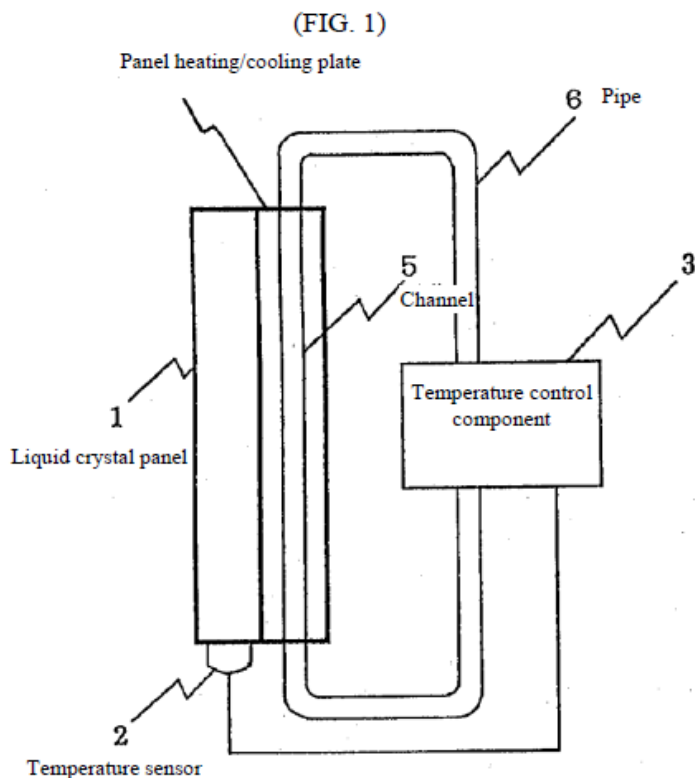
(0031) A plasma display panel 1 is incorporated with a housing 11 having an integrally formed front face plate 3 that maintains an appropriate distance between itself and the display face of the plasma display panel 1. Here, the front face plate 3 is colored to achieve roughly 50% permeability to visible light. A gap is provided at the bottom end of the plasma display panel 1 and the housing 11, making it possible for outside air to be blown into the space between the plasma display panel 1 and the front face plate 3 in the housing 11. Slits are provided behind the ventilation fan of the housing 11 to allow the intake of outside air. The ventilation fan 10 is furnished with a

Ex. 1004 (Ohata), ¶¶ [0030]–[0031]

300. While a housing is not explicitly disclosed in Ohta’s “embodiment example 3,” a POSITA in March 2008 would have understood that, based on the teaching in Ohta’s “embodiment example 5” that the electronic display and cooling systems taught in Ohta could be included in the same housing. Moreover, a POSITA in March 2008 would have been motivated to contain the display and its accompanying cooling system in a single housing to protect both from the environment during outdoor use and to facilitate easier transfer.

Ex. 1002 (Smith-Gillespie Decl.), ¶ 300

Ohta and Marumoto Renders Obvious a “[LCD] Positioned Within the Housing and Having a Backlight” (Claim 12)



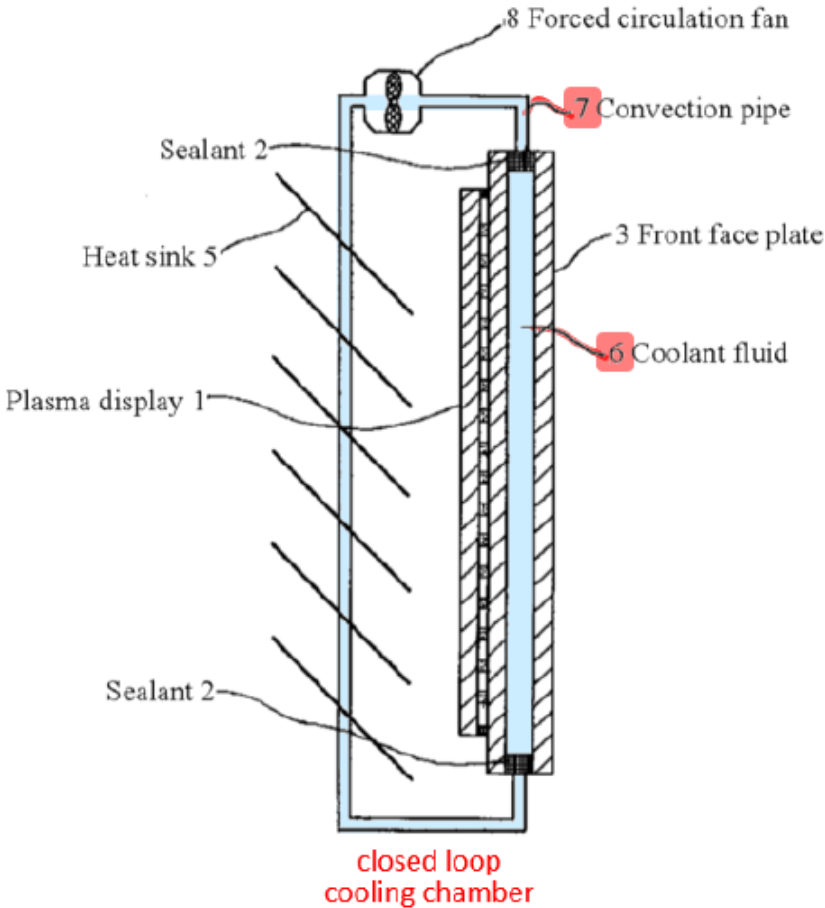
Ex. 1005 (Marumoto), Fig. 1

411. A POSITA in March 2008 would have been motivated to modify the display assembly in Ohta by replacing the plasma display with an LCD display and placing the closed loop cooling chamber on the rear side of the display as in Marumoto. As noted in Ohta, plasma displays suffer from poor contrast due to reflection of external light onto the display. (Ex. 1004, ¶[0013].) To address this, Ohta resorts to dyeing the cooling fluid or coloring a face plate in order to reduce permeability to visible light. (*Id.*, ¶¶[0022]-[0023].) The use of such techniques, however, have the downside of darkening the images being shown on the display. In contrast, the liquid crystal panel in Marumoto provides strong contrast without the need for colored equipment or dyed fluids. A POSITA in March 2008 would thus have been motivated to replace the plasma display in Ohta with an LCD display as in Marumoto.

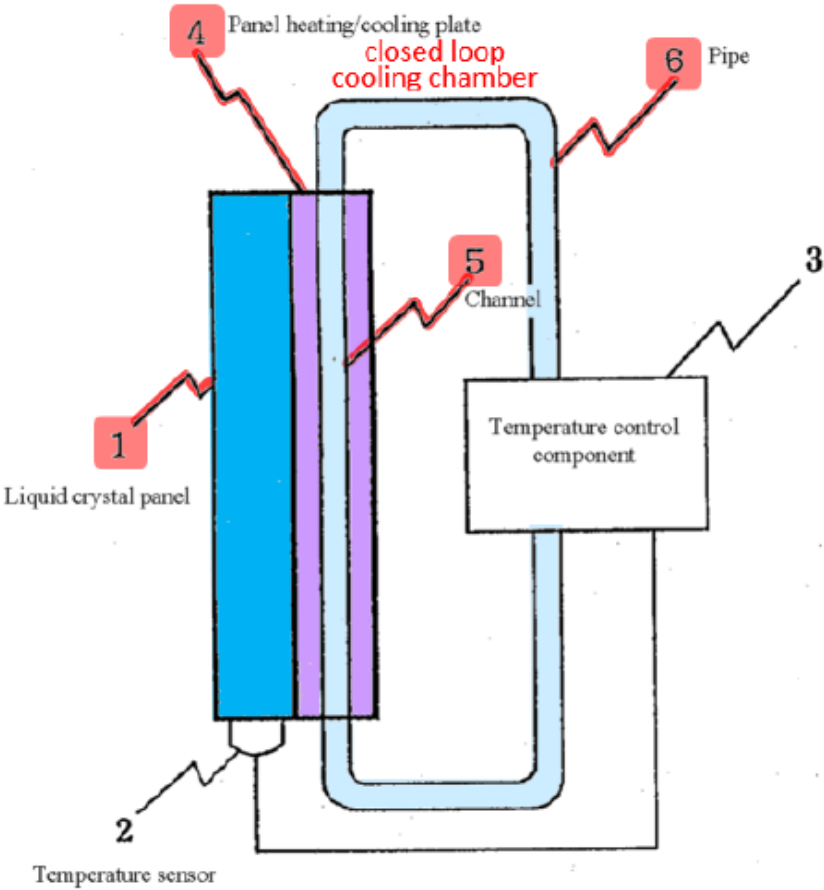
Ex. 1002 (Smith-Gillespie Decl.), ¶ 411

Pet. (Paper 9), 74–75, 84–85; Reply (Paper 32), 19; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 351, 409–12

Ohta and Marumoto Renders Obvious a “Closed Loop” of “Isolated Gas” (Claims 1, 12, 22)



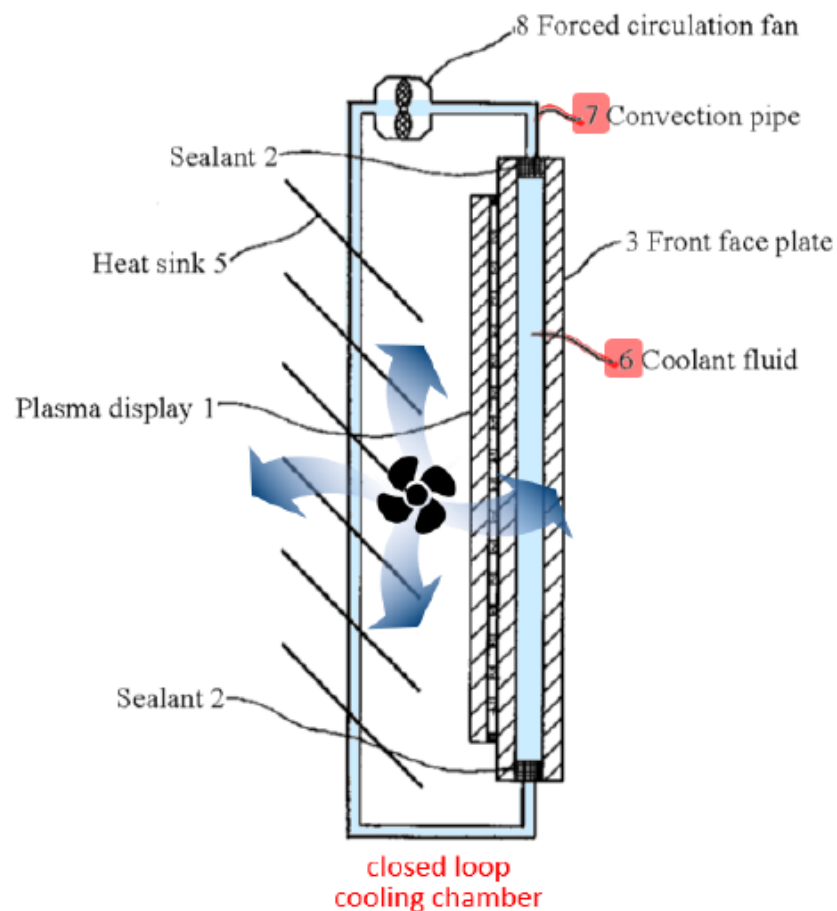
Ex. 1004 (Ohta), Fig. 3 (annotated), ¶¶ [006], [0021]



Ex. 1005 (Marumoto), Fig. 1 (annotated), ¶¶ [006]-[007]

Pet. (Paper 9), 66–67, 83–84; Reply (Paper 32), 13–15; Ex. 1002 (Smith-Gillespie Decl. ¶¶ 319–21

Ohta and Marumoto Renders Obvious an “Open Loop of Ambient Air Which Passes Through the Housing and Along the Backlight” (Claim 12)



Ex. 1004 (Ohta), Fig. 3 (annotated)

355. In my opinion, a POSITA in March 2008 would have understood that in Ohta as modified by Marumoto, the backlight in the liquid crystal panel is located between the electronic display and heat sink 5. The very name “backlight” suggests that this element is behind the liquid crystal panel part of the LCD. Additionally, as noted above in conjunction with the discussion of claim 1[d], Ohta discloses an open loop of ambient air which cools the heat sink 5. (*Supra*, §IX.A.5.) In my opinion, in March 2008 it would have been obvious to a POSITA to modify the open loop of ambient air to direct the fan along the backlight in Ohta display as modified by Marumoto because, like the heat sink 5, the backlight generates heat. In this configuration, Ohta’s open loop of ambient air passes through the housing and is in thermal communication with the backlight.

Pet. (Paper 9), 75; Reply (Paper 32), 15–16; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 351–56

Ohta and Marumoto Renders Obvious “Coolable By a Combination of” a Closed Loop and Open Loop (Claims 1, 12, 21)

(0021) When this plasma display panel with cooling device is operated, the temperature of the panel increases primarily due to Joule heat. When the temperature setting of the thermostat is exceeded, the forced circulation fan 8 activates, causing the cooling fluid 6 to circulate within the interior of the airtight container formed between the front face plate 3 and the display face of the plasma display panel 1 and within the interior of the convection tube, such that the heat from the plasma display panel 1 is expelled to the exterior from the heat sink 5, thereby cooling the panel. Whereas the panel display temperature of a plasma display panel without a cooling device can attain up to roughly 60 °C, the increase in the display face temperature of the plasma display panel with cooling device of this embodiment example was suppressed to no greater than roughly 40 °C.

Ex. 1004 (Ohta), ¶ [0021]

317. As noted above in conjunction with the requirement of claim 1[d], Ohta's heat sink 5 is cooled using an open loop ambient air pathway. (*Supra*, §IX.A.5.) In addition, in March 2008 it would have been obvious to a POSITA to position the open loop fan used to cool the heat sinks in a direction that would also allow the fans to cool the rear surface of the LCD display in Ohta as modified by Marumoto. The electronic display is thus coolable by a combination of the closed loop and open loop.

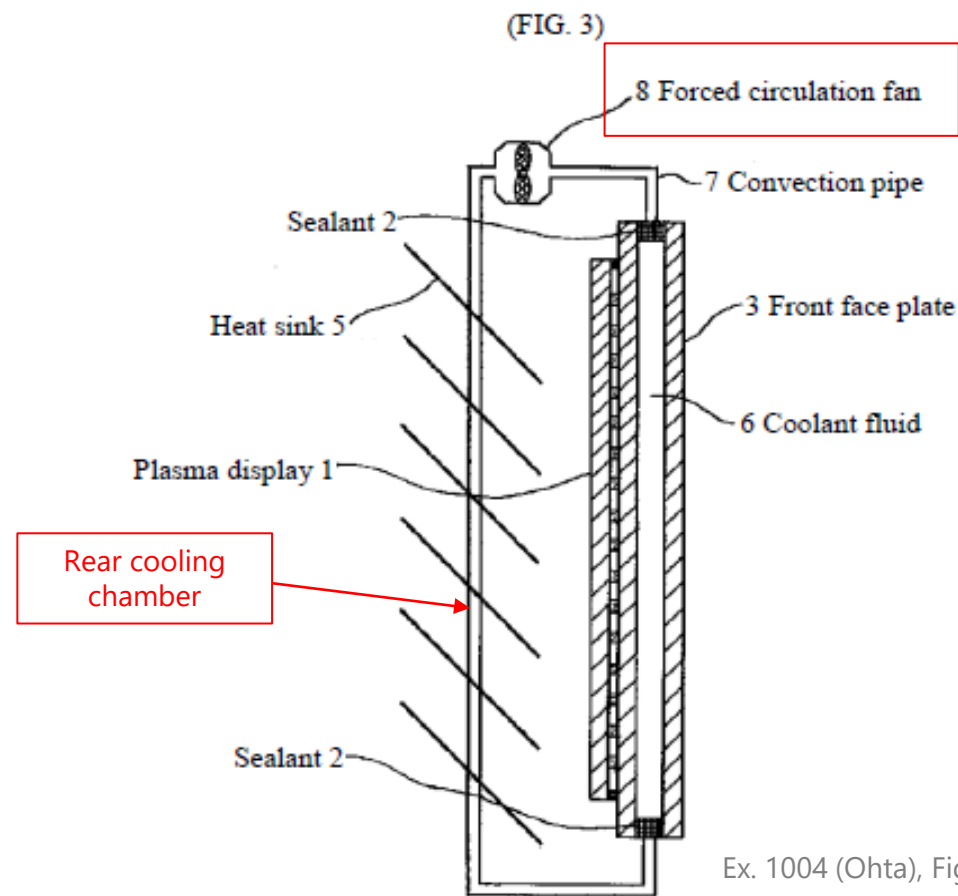
Ex. 1002 (Smith-Gillespie Decl.), ¶ 317

Pet. (Paper 9), 69–70; Reply (Paper 32), 16; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 316–17

Ohta and Marumoto Renders Obvious “Electronic Components for Driving the LCD Positioned Within the Rear Cooling Chamber” (Claims 15, 9)

(0019) As in the case of embodiment example 1, a front face plate 3 with sufficient permeability to visible light is integrated with a plasma display panel 1 by interposing sealant 2 also serving as spacer therebetween along the edges, so as to form an airtight container between the same and the display face of the plasma display panel 1. The top and bottom ends of the interior of the airtight container formed between the front face plate 3 and the display face of the plasma display panel 1 are connected by means of a convection tube 7, and heat sinks 5 and a forced circulation fan 8 are formed along the length of the convection tube 7. The forced circulation fan 8 is furnished with a temperature detection device such as a thermostat or the like to detect the temperature of the plasma display panel 1 and an external power supply (which may be shared with the drive circuit of the plasma display panel) to drive the fan (not shown in the drawing). The interior of the airtight container

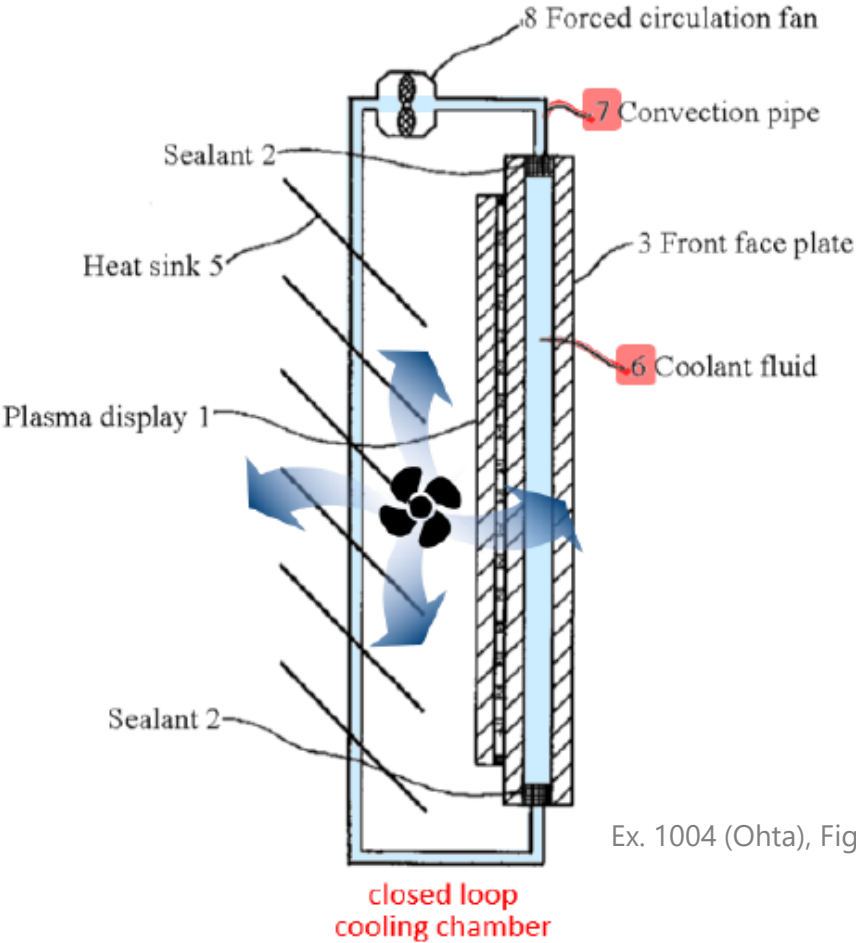
Ex. 1004 (Ohta), ¶ [0019]



Ex. 1004 (Ohta), Fig. 3 (annotated)

Pet. (Paper 9), 78, 73; Reply (Paper 32), 16–17; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 367, 330–32

Ohta and Marumoto Render Obvious an “Intended Direction” of “Substantially Perpendicular” Airflow (Claims 5, 17)



Ex. 1004 (Ohta), Fig. 3 (annotated)

Pet. (Paper 9), 70–72 (Cl. 5), 78 (Cl. 17); Reply (Paper 32), 17–18; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 323–24, 371

Motivation to Combine Ohta with Marumoto



A POSITA would have been motivated to replace the liquid cooling medium in Ohta with gas as taught by Marumoto in order to:

- Reduce maintenance costs
- Prevent leakage of liquid cooling fluid
- Reduce energy costs



A POSITA would have been motivated to replace Ohta's plasma display with an LCD as taught by Marumoto because:

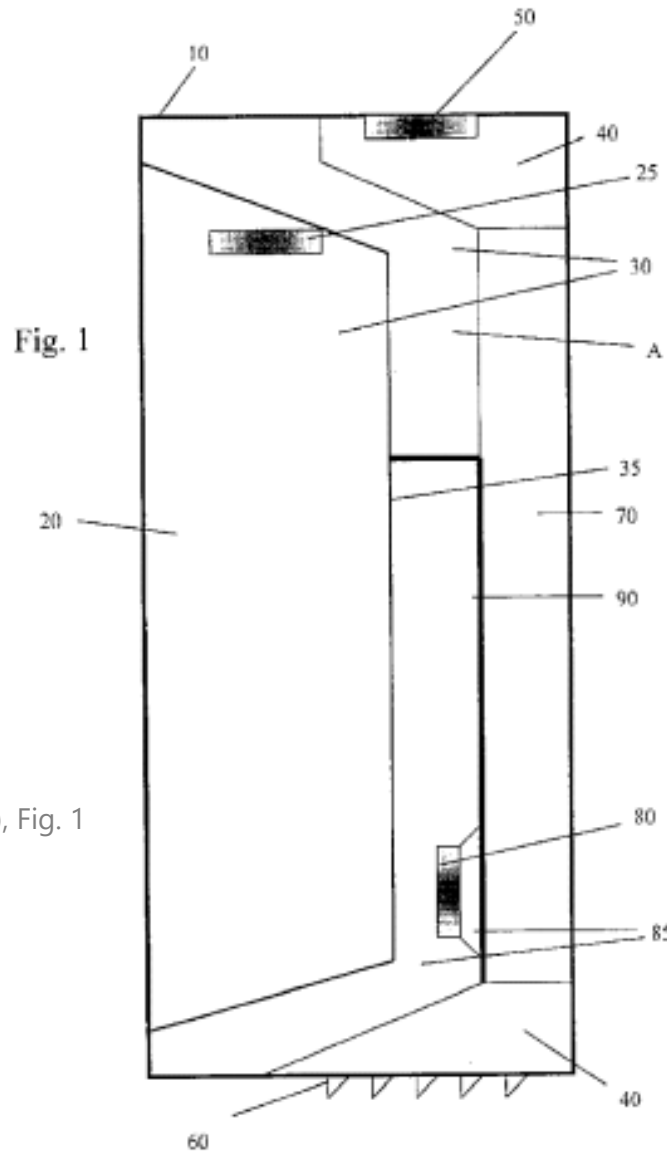
- Plasma displays suffer from poor contrast
- LCD provides strong contrast without need for colored equipment or dyed fluids



A POSITA would have had a reasonable expectation of success

'287 Patent, Ground 4: Obvious in View of Ohta, Marumoto, and Yare

Ohta and Marumoto in view of Yare Renders Obvious a "Housing"



Ex. 1013 (Yare), Fig. 1

Field of the Invention

The present invention relates to a cabinet for mounting a display system, the cabinet having improved cooling facilities and which is particularly suitable for use in providing large scale displays in public places.

Ex. 1013 (Yare), 1:4–6

be appreciated that these areas are much easier to clean than in prior systems facilitating reduced downtime and maintenance costs. Furthermore, separation of the display system 20 from dirt and the like results in a longer life for the display system and a more efficient heat transfer.

Thermal fuses may be provided in the atmospheric zone and in the sealed zone to disable the display system (and possibly fans) in the event that a predetermined temperature (for example 40°C) indicative of an air blockage in atmospheric zone, failure of the heat exchanger, fan failure, a fire or the like. Advantageously, since air within the sealed zone is limited, should a fire occur in the sealed zone, any smoke created would be contained and the fire should burn out very quickly due to lack of oxygen. Obviously if it is desired, the air within the sealed zone can be replenished or

Pet. (Paper 9), 105–07; Reply (Paper 32), 18; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 416–21

Ex. 1013 (Yare), 7:8–20

Secondary Considerations

No Secondary Considerations of Nonobviousness

Long-Felt but Unmet Need

Failure of Others

Copying

Commercial Success

Industry Praise and Licensing

No Long-Felt but Unmet Need or Failure of Others

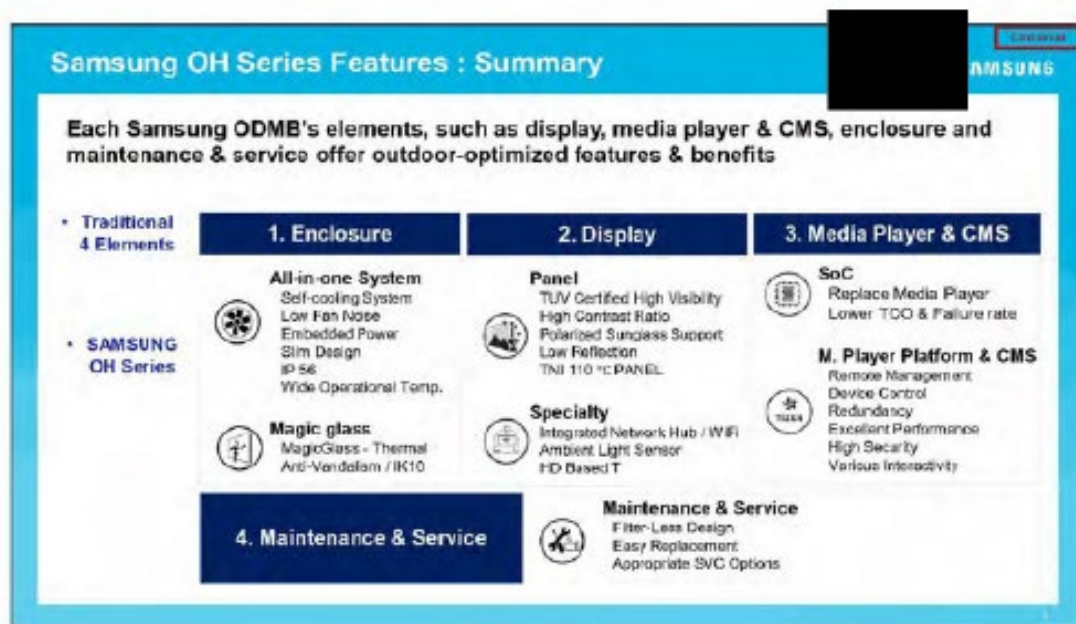
- No evidence exists that Patent Owner's alleged invention met any long-felt need
 - Samsung's 2015 White Paper identifies other companies that "for years" were "designing and building screens built to run and last outdoors" (Ex. 2025 at 2)
- Prior art such as Karppanen (Ex. 1006) and Yare (Ex. 1013) disclosed cooling systems for outdoor displays
- No evidence that Samsung failed
 - *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1313 (Fed. Cir. 2006) ("With respect to 'failures of others,' Align has submitted evidence that, prior to the introduction of the successful Invisalign and RW & B products, other orthodontists had tried and failed to develop a functional, invisible orthodontic system. Again, the evidence does not suggest that these prior attempts failed because the devices lacked the claimed features.")

No Copying

- Infringement is not copying
 - *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) (“Not every competing product that arguably falls within the scope of a patent is evidence of copying. . . Rather, copying requires the replication of a specific product”).
- No evidence that Samsung ever sought to *replicate* any product features

No Commercial Success

- Presumption of nexus does not apply
 - Coextensiveness requires more than a showing that claims cover a product that practices the patent
 - ALJ found no infringement of Claim 12
- No evidence that claimed features of the cooling system drive sales



Ex. 2038, 7; Reply (Paper 32), 24–26

No Industry Praise or Licensing

- None of Patent Owner's cited evidence establishes industry praise tied to the features of the alleged invention
 - Ex. 2001: Romulus Stoain of SDS's generic email does not identify any specific product
 - Ex. 2025: Samsung's White Paper does not mention Patent Owner
 - Ex. 2032: Palmer testimony does not indicate that specific features of Samsung's cooling system leads customers to request Samsung displays
- No evidence that the licenses (Exs. 2049, 2051–52) were taken based on the merits of the alleged invention of the '287 Patent

'287 Patent: Challenged Claims

Independent Claim 1

1. An electronic display assembly comprising:
an electronic display housing;
a gas-containing closed loop gas cooling chamber located within the electronic display housing;
an electronic display positioned within the electronic display housing but outside of the closed loop gas cooling chamber; and
an open loop ambient air pathway through the electronic display housing;
wherein the electronic display is coolable by a combination of gas circulation within the closed loop gas cooling chamber and ambient air flow through the open loop ambient air pathway in the electronic display housing.

Claim 4

4. The electronic display assembly of claim 1 wherein:
the gas within the closed loop gas cooling chamber is isolated from the open loop of ambient air.

Claim 5

5. The electronic display assembly of claim 1 wherein:
the closed loop gas cooling chamber and the ambient air pathway are configured such that gas circulation within the gas cooling chamber will occur in a direction that is substantially perpendicular to the direction that ambient air will flow through the electronic display housing.

Claim 8

8. The electronic display assembly of claim 1 wherein:
the closed loop gas cooling chamber is partially defined by a sealed rear plenum that prevents ambient air from entering the plenum.

Claim 9

9. The electronic display assembly of claim 8 further comprising:
one or more electronic devices for operating the electronic display positioned within the sealed plenum.

Claim 10

10. The electronic display assembly of claim 1 wherein:
the electronic display is selected from the group consisting of a liquid crystal display, a light emitting diode display, an organic light emitting diode display, a field emitting display, a cathode ray tube display, and a plasma display.

Claim 11

11. The electronic display assembly of claim 1 further comprising:
a gas-circulating fan for circulating the gas within the closed loop gas cooling chamber, and a fan for producing a flow of ambient air through the open loop ambient air pathway in the electronic display housing.

'287 Patent: Challenged Claims

Independent Claim 12

12. An electronic display assembly comprising:
a housing;
a liquid crystal display (LCD) positioned within the housing and having a backlight;
wherein the electronic display is coolable by a combination of a closed loop of isolated gas which circulates within the housing and an open loop of ambient air which passes through the housing and along the backlight.

Claim 13

13. The electronic display assembly of claim **12** wherein: the isolated gas will cool a front surface of the LCD.

Claim 14

14. The electronic display assembly of claim **12** further comprising:
a rear cooling chamber positioned behind the LCD and containing the closed loop of isolated gas; and
wherein the open loop ambient air will contact an exterior surface of the chamber, but is not permitted to enter the chamber.

Claim 15

15. The electronic display assembly of claim **12** further comprising:
one or more electronic components for driving the LCD positioned within the rear cooling chamber.

Claim 16

16. The electronic display assembly of claim **12** wherein: the open loop of ambient air will contact an exterior surface of the rear cooling chamber while the closed loop of isolated gas will contact an interior surface of the rear cooling chamber.

Claim 17

17. The electronic display assembly of claim **12** wherein: the intended direction of closed loop isolated gas flow is substantially perpendicular to the intended direction of open loop of ambient air flow.

'287 Patent: Challenged Claims

Independent Claim 18

18. An electronic display assembly comprising:
a housing;
an electronic display positioned within the housing;
a rear cooling chamber positioned behind the electronic display and containing an electrical component which is electrically connected to the electronic display;
a front surface on the electronic display which faces an intended viewer and a rear surface on the electronic display which opposes the front surface;
wherein the front surface of the electronic display is coolable by a closed loop of isolated gas and the rear surface of the electronic display is coolable by an open loop of ambient air.

Claim 19

19. The electronic display assembly of claim **18** wherein: the open loop of ambient air is prohibited from mixing with the closed loop of isolated gas when it passes through the housing.

Claim 20

20. The electronic display assembly of claim **18** wherein: the open loop of ambient air will pass between the rear surface of the electronic display and an exterior surface of the rear cooling chamber.

'287 Patent: Challenged Claims

Independent Claim 21

21. An electronic display assembly comprising:
an electronic display housing;
a closed loop of cooling gas adapted for circulation within the electronic display housing;
an open loop ambient air pathway through the electronic display housing; and
an electronic display positioned within the electronic display housing such that the electronic display is isolated from the closed loop of cooling gas but contactable by ambient air flowing through the open loop ambient air pathway;
wherein the electronic display is coolable by a combination of closed loop cooling gas circulation within the electronic display housing, and ambient air flow through the open loop ambient air pathway in the electronic display housing.

Claim 22

22. The electronic display assembly of claim **21** wherein: the closed loop of cooling gas is isolated within a continuous loop gas cooling chamber, and the open loop ambient air pathway is configured to direct the ambient air over an exterior surface of the gas cooling chamber when it flows through the electronic display housing.

Claim 23

23. The electronic display assembly of claim **22** further comprising:
a fan located within the electronic display housing, the fan configured and oriented to move air located within the housing between a surface of the continuous loop gas cooling chamber and a rear surface of the electronic display.

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) the undersigned hereby certifies that on April 18, 2024 (per party agreement) and April 22, 2024 “**PETITIONERS’ HEARING DEMONSTRATIVES**” were served upon lead counsel for Patent Owner, pursuant to Patent Owner’s agreement to accept such service by email as set forth in Patent Owner’s Mandatory Notices.

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Dated: April 22, 2024

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