

The Samsung logo is displayed in white, bold, sans-serif capital letters on a solid blue rectangular background.

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

v.

**Manufacturing Resources International,
Inc.**

IPR2023-00199

IPR2023-00220

Petitioners' Hearing Demonstratives

March 21, 2024

The Challenged Patents

U.S. Patent No. 8,854,595



US008854595B2

(12) **United States Patent**
Dunn

(10) **Patent No.:** **US 8,854,595 B2**
(45) **Date of Patent:** **Oct. 7, 2014**

(54) **CONSTRUCTED CONVECTION COOLING SYSTEM FOR AN ELECTRONIC DISPLAY**

(75) Inventor: **William Dunn**, Alpharetta, GA (US)

(73) Assignee: **Manufacturing Resources International, Inc.**, Alpharetta, GA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1282 days.

(21) Appl. No.: **12/411,925**

(22) Filed: **Mar. 26, 2009**

(65) **Prior Publication Data**
US 2009/0244472 A1 Oct. 1, 2009

Related U.S. Application Data

(63) Continuation-in-part of application No. 12/234,307, filed on Sep. 19, 2008, now Pat. No. 8,767,165, and a continuation-in-part of application No. 12/234,360, filed on Sep. 19, 2008, and a continuation-in-part of application No. 12/237,365, filed on Sep. 24, 2008, and a continuation-in-part of application No. 12/235,200, filed on Sep. 22, 2008.

(60) Provisional application No. 61/039,454, filed on Mar. 26, 2008, provisional application No. 61/095,615, filed on Sep. 9, 2008, provisional application No. 61/095,616, filed on Sep. 9, 2008, provisional application No. 61/115,333, filed on Nov. 17, 2008, provisional application No. 61/138,736, filed on Dec. 18, 2008, provisional application No. 61/152,879, filed on Feb. 16, 2009, provisional application No. 61/033,064, filed on Mar. 3, 2008, provisional application No. 61/053,713, filed on May 16, 2008, provisional application No. 61/057,599, filed on May 30, 2008, provisional application No. 61/076,126, filed on Jun. 26, 2008.

(51) **Int. Cl.**
G02F 1/1333 (2006.01)
H05K 7/20 (2006.01)

20 Claims, 10 Drawing Sheets

(52) U.S. Cl.
CPC — **H05K 7/20972** (2013.01); **G02F 1/133385** (2013.01)

USPC — 349161; 361694; 361695

(58) **Field of Classification Search**
USPC — 349/161; 38; 361/692; 694; 696; 165/104.34; 121

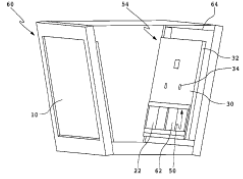
See application file for complete search history.

(56) **References Cited**
U.S. PATENT DOCUMENTS
4,093,355 A 6/1978 Kapiti et al.
4,593,978 A 6/1986 Mooney et al.
(Continued)

FOREIGN PATENT DOCUMENTS
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(Continued)

OTHER PUBLICATIONS
Zeeb, Hubing, EMC analysis of 18" LCD Monitor, Aug. 2000, 1 page.
Primary Examiner — Jerry Blevins
(74) *Attorney, Agent, or Firm* — Standley Law Group LLP

(57) **ABSTRACT**
Preferred embodiments provide a cooling system for an electronic display. A constricted convection channel is used to force cooling air against a posterior surface of the electronic display. Fans may be used to propel or pull air through the constricted convection channel in a substantially uniform manner. A refrigeration unit or thermoelectric module may be employed to cool or heat the air traveling through the constricted convection channel. Some embodiments include a closed loop which extracts heat (or adds heat) to the front display surface.



IPR199, Ex. 1001

U.S. Patent No. 9,173,322



US009173322B2

(12) **United States Patent**
Dunn

(10) **Patent No.:** **US 9,173,322 B2**
(45) **Date of Patent:** **Oct. 27, 2015**

(54) **CONSTRUCTED CONVECTION COOLING SYSTEM FOR AN ELECTRONIC DISPLAY**

(71) Applicant: **Manufacturing Resources International, Inc.**, Alpharetta, GA (US)

(72) Inventor: **William Dunn**, Alpharetta, GA (US)

(73) Assignee: **Manufacturing Resources International, Inc.**, Alpharetta, GA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/508,621**

(22) Filed: **Oct. 7, 2014**

(65) **Prior Publication Data**
US 2015/0050504 A1 Feb. 26, 2015

Related U.S. Application Data

(63) Continuation of application No. 12/411,925, filed on Mar. 26, 2009, now Pat. No. 8,854,595, and a continuation-in-part of application No. 12/234,307, filed on Sep. 19, 2008, now Pat. No. 8,767,165, said (Continued)

(51) **Int. Cl.**
G02F 1/1333 (2006.01)
G02F 1/1335 (2006.01)
H05K 7/20 (2006.01)

(52) **U.S. Cl.**
CPC — **H05K 7/20154** (2013.01); **G02F 1/133388** (2013.01); **G02F 1/133385** (2013.01); **H05K 7/202** (2013.01); **H05K 7/20972** (2013.01); **G02F 2001/133628** (2013.01)

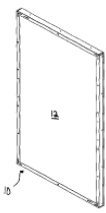
(58) **Field of Classification Search**
CPC — **G02F 1/133388**; **G02F 1/133385**; **G02F 1/133605**; **H05K 7/20154**; **H05K 7/20145**; **H05K 7/202**; **H05K 7/20972**
USPC — 349/58; 49; 161; 361/695
See application file for complete search history.

(56) **References Cited**
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4,593,978 A 6/1986 Mooney et al.
4,634,223 A 1/1987 Ham et al.
5,029,082 A 7/1991 Nash
5,088,806 A 2/1992 McCartney et al.
(Continued)

FOREIGN PATENT DOCUMENTS
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JP 01153212 7/1991
(Continued)

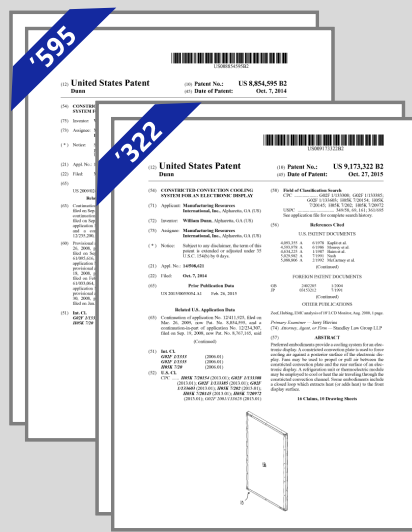
OTHER PUBLICATIONS
Zeeb, Hubing, EMC analysis of 18" LCD Monitor, Aug. 2000, 1 page.
Primary Examiner — Jerry Blevins
(74) *Attorney, Agent, or Firm* — Standley Law Group LLP

(57) **ABSTRACT**
Preferred embodiments provide a cooling system for an electronic display. A constricted convection plate is used to force cooling air against a posterior surface of the electronic display. Fans may be used to propel or pull air between the constricted convection plate and the rear surface of an electronic display. A refrigeration unit or thermoelectric module may be employed to cool or heat the air traveling through the constricted convection channel. Some embodiments include a closed loop which extracts heat (or adds heat) to the front display surface.

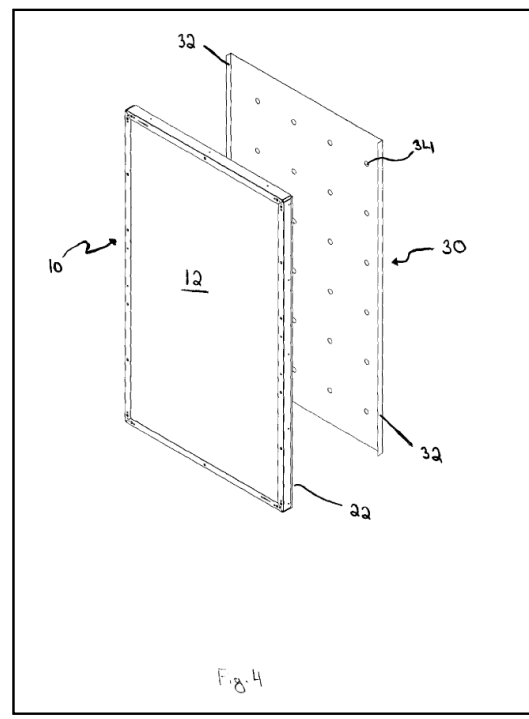


IPR220, Ex. 1001

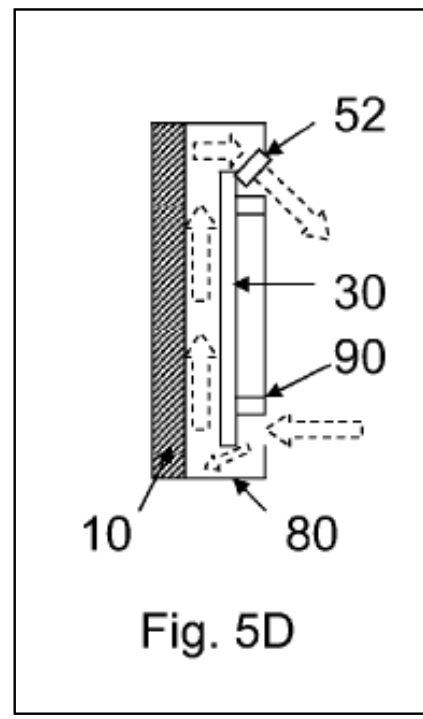
The '595 and '322 Patents



IPR199, Ex. 1001 ('595 Patent)
IPR220, Ex. 1001 ('322 Patent)



IPR199, Ex. 1001 ('595 Patent), Fig. 4
IPR220, Ex. 1001 ('322 Patent), Fig. 4



IPR199, Ex. 1001 ('595 Patent), Fig. 5D
IPR220, Ex. 1001 ('322 Patent), Fig. 5D

The Board Should Find All Challenged Claims of the '595 Patent Unpatentable Under 35 U.S.C. § 103

Ground	Claim(s) Challenged	Reference(s)
1	1	Takeuchi
2	1	Kim
3	4, 7	Kim, Hong
4	8	Kim, Hong, Takahashi
5	1	Na, Kim
6	4, 7, 8	Na, Hong

The Board Should Find All Challenged Claims of the '322 Patent Unpatentable Under 35 U.S.C. § 103

Ground	Claim(s) Challenged	Reference(s)
1	4, 7	Kim, Hong
2	5	Kim, Hong, Tachikawa
3	8	Kim, Hong, Takahashi
4	1, 2, 3	Kim, Tachikawa
5	4, 8, 9, 10, 16	Na
6	7, 12, 13	Na, Kim
7	11	Na, Tachikawa
8	9, 12, 13, 16	Kimura
9	1, 2, 3, 11	Kimura, Kochiyama
10	4, 7	Kimura, Hong
11	5	Kimura, Hong, Kochiyama
12	4, 5, 9, 10, 11	Cho

IPR220, Pet. (Paper 9), 4-5

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.



IPR199: Pet. (Paper 3), 6-7; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 34-37; Inst. Dec. (Paper 9), 9-11

IPR220: Pet. (Paper 9), 7; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 36-39; Inst. Dec. (Paper 11), 6-8

Claim Construction

Claim Term	Samsung's Construction	MRI's Construction
"constricted convection channel" ['595 Patent, Claims 1, 4, 7, 8]	"constricted channel through which air may flow to remove heat from the posterior display surface"	"no material dispute turns on that construction"
"constricted convection plate" ['322 Patent, Claims 1, 3, 4, 5, 7, 8, 9, 11, 12, 13]	"a plate configured to form part of a constricted convection channel"	
"posterior display surface" "posterior surface of the electronic display" ['595 Patent, Claim 1] ['322 Patent, Claim 9]	"rear-facing surface of the display assembly"	
"means for forcing air through the constricted convection channel" ['322 Patent, Claim 9]	§112, ¶ 6: The recited function is "forcing air through the constricted convection channel." The corresponding structure to perform this function is one or more fans or an air conditioning unit.	

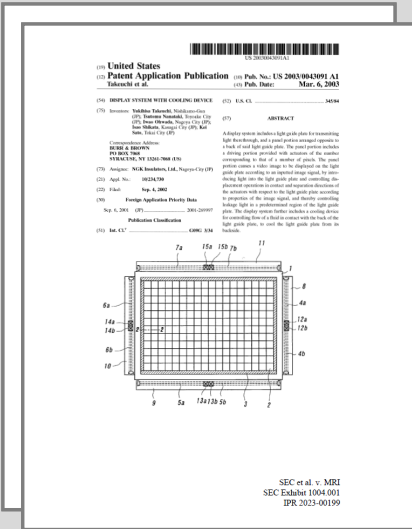
IPR199: Pet. (Paper 3), 11-12; POR (Paper 18), 8-11; Reply (Paper 30), 2-3; Ex. 1011 (*Civiq* Claim Construction Order); Ex. 2010 (ITC Claim Construction Order), 31-42

IPR220: Pet. (Paper 9), 11-13; Reply (Paper 33), 2; POR (Paper 21), 8-10; Ex. 1011 (*Civiq* Claim Construction Order); Ex. 2010 (ITC Claim Construction Order), 31-42

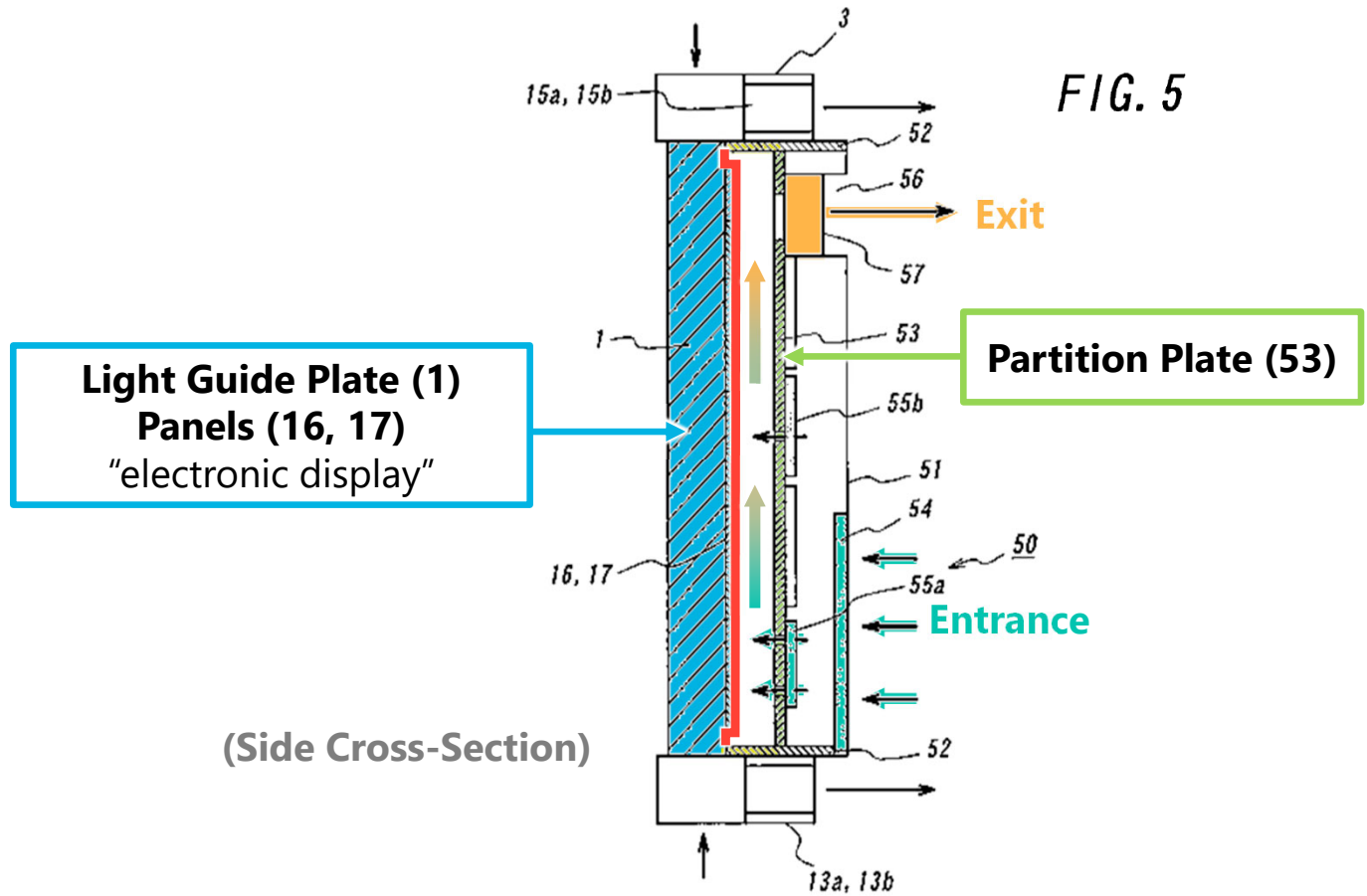
Summary of Grounds: Takeuchi (IPR199, Ex. 1004)

'595 Patent IPR2023-00199	
Claim(s)	Obvious
1	Takeuchi (Ground 1)

U.S. Patent Publication No. 2003/0043091 ("Takeuchi")



IPR199, Ex. 1004
(Takeuchi)



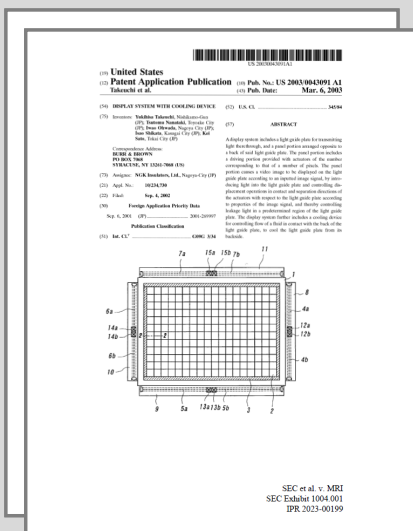
IPR199: Ex. 1004 (Takeuchi), Fig. 5 (annotated); Pet. (Paper 3), 12-14

'595 Patent, Ground 1: Claim 1 Is Obvious in View of Takeuchi

	The invention claimed is:	Takeuchi
1[pre]	1. A system for cooling an electronic display having a posterior display surface and contained within a housing, the system comprising:	
1[a]	a constricted convection plate placed posterior to the posterior display surface;	
1[b]	two side panels placed adjacent to the constricted convection plate and the posterior display surface, defining a constricted convection channel having an entrance and an exit; and	
1[c]	a fan placed to draw air from outside of the housing through the constricted convection channel.	Undisputed

IPR199, Ex. 1001 ('595 Patent), cl. 5

Takeuchi Discloses an “Electronic Display”



IPR199, Ex. 1004
(Takeuchi)

(57)

ABSTRACT

A display system includes a light guide plate for transmitting light therethrough, and a panel portion arranged opposite to a back of said light guide plate. The panel portion includes a driving portion provided with actuators of the number corresponding to that of a number of pixels. The panel portion causes a video image to be displayed on the light guide plate according to an inputted image signal, by intro-

IPR199, Ex. 1004 (Takeuchi), Abstract; *see also* ¶[0004]

11 Q. What do you mean by electronic products?

12 A. Electronic products would be products or devices
13 that have electronic components in them.

IPR199, Ex. 1041(Gershowitz Dep. Tr.), 5:11-13

IPR199: Pet. (Paper 3), 23-24; Reply (Paper 30), 3-4 Ex. 1002 (Smith-Gillespie Decl.), ¶ 105; Ex. 1041 (Gershowitz Dep. Tr.), 12:15-25, 13:6-

Neither the Claims Nor Specification Limit the Type of “Electronic Display”

1. A system for cooling an electronic display having a posterior display surface and contained within a housing, the system comprising:

IPR199, Ex. 1001 ('595 Patent), Claim 1

It is to be understood that the spirit and scope of the disclosed embodiments includes cooling of displays including, but not limited to LCDs. By way of example and not by way of limitation, the present invention may be used in conjunction with displays selected from among LCD (including TFT or STN type), light emitting diode (LED), organic light emitting diode (OLED), field emitting display (FED), cathode ray tube (CRT), and plasma displays. Furthermore, embodiments of the present invention may be used with displays of other types including those not yet discovered. In particular, it is contemplated that the present invention may be well suited for use with full color, flat panel OLED displays. While the embodiments described herein are well suited for outdoor environments, they may also be appropriate for indoor applications (e.g., factory environments) where thermal stability of the display may be at risk. Furthermore, while most of this

18 Q. Sure. The claim one does not specify the type of
19 electronic display that must be used within the claim, right?
20 MR. SANDERS: Objection to form.
21 A. That is correct.

IPR199, Ex. 1041 (Gershowitz Dep. Tr.), 7:18-21

IPR199, Ex. 1001 ('595 Patent), 4:16-31

IPR199: Ex. 1002 (Smith-Gillespie Decl.), ¶ 105 & n.7; Reply (Paper 30), 3-4

The Prosecution History Does Not Support Limiting Claim 1 to an LCD

The Examiner has rejected claims 1, 3, 9, 10, 12-14, 16, 17, and 20 as being anticipated by US 2006/0177587 to Ishizuka et al. (herein 'Ishizuka'). Applicant respectfully traverses.

Independent claims 1, 4, and 9 require a 'constricted convection plate' which may be used to cool the rear portion of an electronic display. The Examiner cites to elements 118 and 110 within Ishizuka for support of this claim limitation. (OA of 7/15/2011, page 2, 3, and 5). First, Ishizuka does not teach anything regarding the cooling of electronic displays, and **instead teaches an apparatus for producing optical compensatory sheets.** (Ishizuka, Abstract). It is respectfully asserted that Ishizuka is not even analogous art. Second, element 118 of Ishizuka is a "hot air supply unit,"

Claim 1 requires that the constricted convection plate is positioned posterior to the posterior display surface. Claim 9 requires an electronic display. The Examiner cites to element 116 within Ishizuka as support for both of these limitations. (OA of 7/15/2011, pages 2 and 3). However, this element is simply a layer of liquid crystal material which is applied as a coating on a resin film. (Ishizuka, [0194]). As well known in the art, a layer of liquid crystal material cannot produce an image on its own and clearly is not an electronic display. Several other elements are required in combination with the liquid crystal material in order to generate an image and actually comprise an electronic display. **As an example, to produce an image the liquid crystal material** requires front and rear polarizers, a backlight or reflective substrate behind the liquid crystal material, and a layer of electrically controlling elements such as a TFT array or similar (in order to orient the liquid crystal material).

IPR199, Ex. 1030 (File History for U.S. Patent Application No. 12/411,925), 1030.190-91

IPR199, Reply (Paper 30), 4-5

Takeuchi Discloses an Electronic Display “having a posterior display surface”

“posterior display surface”

=

“rear-facing surface of the display assembly”

13b; 15a, 15b. A partition plate 53 of generally flat shape is placed between the rear cover 51 and the back sides of the light guide plate 1 and the panels 16, 17. The partition plate 53 is arranged in parallel with a vertical plane so that the distance between the light guide plate 1 and the panels 16, 17, on one hand, and the partition plate 53, on the other hand, is kept constant as seen in the height direction. The partition plate 53 defines a cooling chamber on the back sides of the light guide plate 1 and the panels 16, 17, and is advantageously formed of metal material such as aluminum. An

IPR199, Ex. 1004 (Takeuchi), ¶ 40

IPR199: Pet. (Paper 3), 24-25; Reply (Paper 30), 6; Ex. 1002 (Smith-Gillespie Decl.), ¶ 106; Ex. 1041 (Gershowitz Dep. Tr.), 15:17-23

**Light Guide Plate(1)/
Panels (16, 17)**
“electronic display”

“posterior display surface”

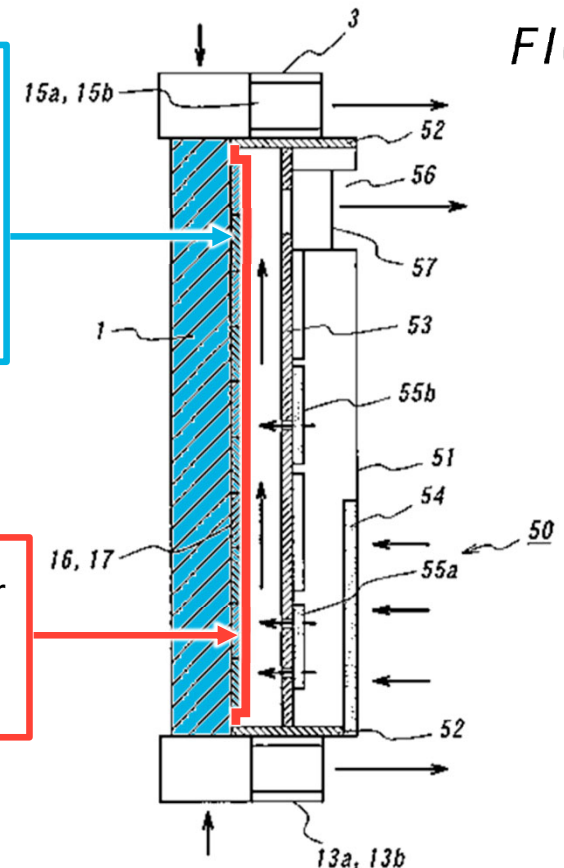


FIG. 5

IPR199, Ex. 1004 (Takeuchi), ¶¶[0037], [0047], Fig. 5 (annotated)

No Inconsistency With Samsung's ITC Positions

MRI further argues, also based solely on attorney argument, that the “posterior display surface” identified by Respondents is incorrect because it does not include light sources 7a and 7b, which MRI argues is “in line with fan 15a” and “in line with fan 13a” based on Fig. 1 of Takeuchi. *See* CIB at 131. This argument was not made by MRI in its prehearing brief and is therefore waived. *See* CPHB at 145-146; RRB at 42; Ground Rule 9.2.⁷⁰

⁷⁰ Moreover, absent expert testimony, Complainant’s arguments regarding the relative positions of various components do not appear clearly supported, and it is also unclear how Mr. Smith-Gillespie’s testimony contradicts Respondents’ non-infringement analysis.

IPR199, Ex. 1040 (Final Initial Determination), 179

IPR199, Reply (Paper 30), 6-7

Petitioners’ Demonstratives.0015

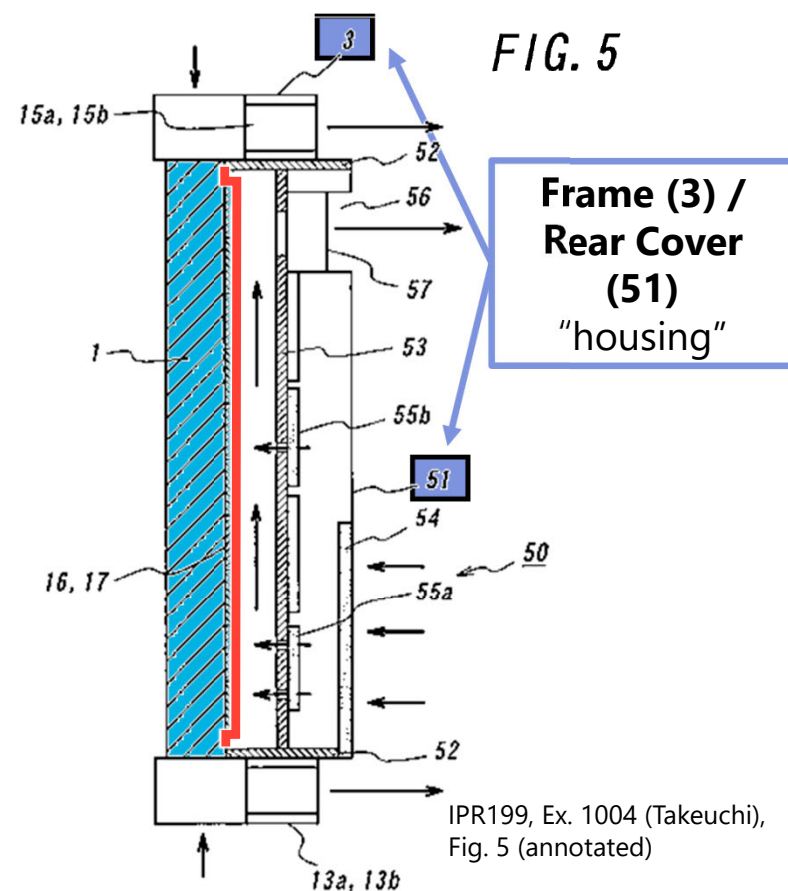
Takeuchi Discloses an Electronic Display “contained within a housing”

[0023] FIGS. 1 to 3 show one example of the display system of the type specified, to which the present invention can be suitably applied. The display system comprises a light guide plate 1, through which light introduced from each side can be transmitted, a panel portion 2 formed of a plurality of panels arranged as a matrix, a frame 3 for preventing light leakage at the periphery of the panel portion

IPR199, Ex. 1004 (Takeuchi), ¶ 23

[0040] In the cooling device according to the present embodiment, which as a whole is denoted by reference numeral 50, the back sides of the light guide plate 1 and the panels 16, 17 are completely covered by a rear cover 51. Thermal insulating materials 52 are applied to the inner surface portions of the rear cover 51 in its upper and lower

IPR199, Ex. 1004 (Takeuchi), ¶ 40



IPR199: Pet. (Paper 3), 25; Reply (Paper 30), 7-8; Ex. 1002 (Smith-Gillespie Decl.), ¶ 107

Takeuchi Discloses “a constricted convection plate” and “a constricted convection channel having an entrance and an exit”

[0011] The cooling device may comprise a partition plate for forming a flow path of the fluid in contact with the back of the light guide plate at least in a region adjacent to the back of the light guide plate. The flow path may be formed

13b; 15a, 15b. A partition plate 53 of generally flat shape is placed between the rear cover 51 and the back sides of the light guide plate 1 and the panels 16, 17. The partition plate 53 is arranged in parallel with a vertical plane so that the distance between the light guide plate 1 and the panels 16, 17, on one hand, and the partition plate 53, on the other hand, is kept constant as seen in the height direction. The partition plate 53 defines a cooling chamber on the back sides of the light guide plate 1 and the panels 16, 17, and is advantageously formed of metal material such as aluminum. An

air, such as dust. The ambient air introduced into the cooling chamber flows from the lower side toward the upper side of the chamber, cooling the light guide plate 1 and the panels 16, 17 from the back sides, and is sucked from the exhaust vent in the upper portion of the partition plate 53 into the blower 57, and then exhausted from the recess portion 56 of the rear cover 51 to outside. As a result, the light guide plate 1 and the panels 16, 17 can be effectively cooled from the back sides during operation of the display system. Incident-

IPR199, Ex. 1004 (Takeuchi), ¶¶ 11, 40, 41

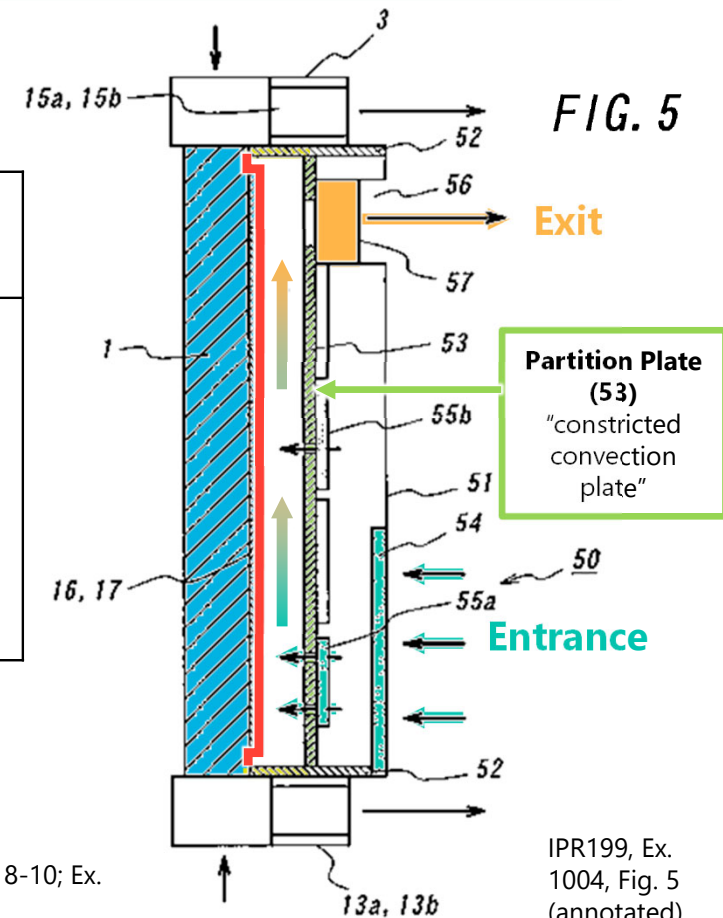
Samsung's Construction

“constricted convection channel”

=

“constricted channel through which air may flow to remove heat from the posterior display surface”

IPR199: Pet. (Paper 3), 25-30; Reply (Paper 30), 8-10; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 109-122



IPR199, Ex. 1004, Fig. 5 (annotated)

Takeuchi Discloses a “Constricted Convection” Plate and Channel

12 Q. Okay. But you agree that Takeuchi discloses arrows
13 showing airflow in a single direction from the entrances to
14 the exhaust of the cooling chamber shown in figure 5?

15 MR. SANDERS: Objection to form.

16 A. I agree it's shown that the airflow is from the
17 entrances, plural, to the exit. Correct.

IPR199, Ex. 1041 (Gershowitz Dep. Tr.), 22:12-17

15 Q. Okay. And you don't dispute that Takeuchi discloses
16 a cooling chamber, correct?

17 A. I believe in the words of Takeuchi, he describes an
18 area of his invention as being the cooling chamber.

23 Q. The word chamber typically refers to an enclosed
24 space, correct?

25 MR. SANDERS: Objection to form.

1 A. I would -- I would think that in general, a chamber
2 would be enclosed or to some degree enclosed. And again,
3 Takeuchi described the words cooling chamber in his -- in his
4 documentation.

IPR199, Ex. 1041 (Gershowitz Dep. Tr.), 26:15-18, 26:23-27:4

It is also undisputed that the constricted convection plate of the '595 Patent

may include access apertures through which some air may pass. POR 66-67.

IPR199, Sur-Reply (P-39), 11

IPR199, Reply (Paper 30), 8-10

Takeuchi Discloses or Renders Obvious “two side panels placed adjacent to the constricted convection plate and the posterior display surface . . .”

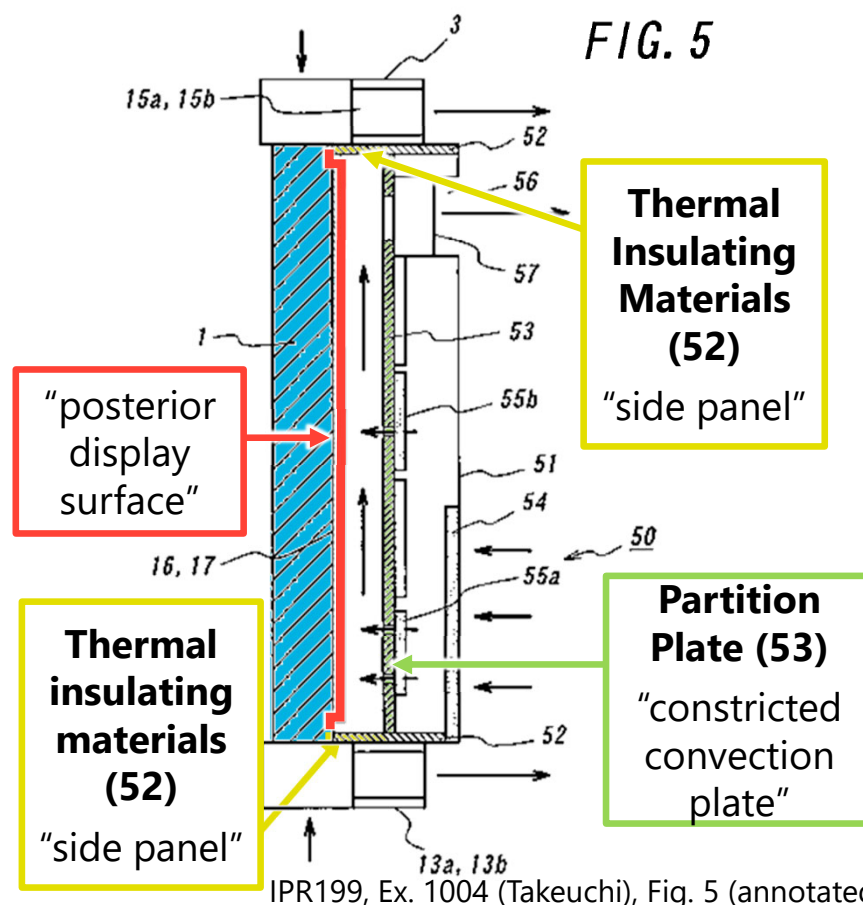
Thermal insulating materials 52 are applied to the inner surface portions of the rear cover 51 in its upper and lower regions adjacent to the light sources and cooling fans 13a, 13b; 15a, 15b. A partition plate 53 of generally flat shape is placed between the rear cover 51 and the back sides of the light guide plate 1 and the panels 16, 17. The partition plate

IPR199, Ex. 1004 (Takeuchi), ¶ 40

specified, so as to introduce ambient air into the cooling chamber defined by the partition plate 53 through the filters 54, 55a, 55b while removing foreign matters in the ambient air, such as dust. The ambient air introduced into the cooling

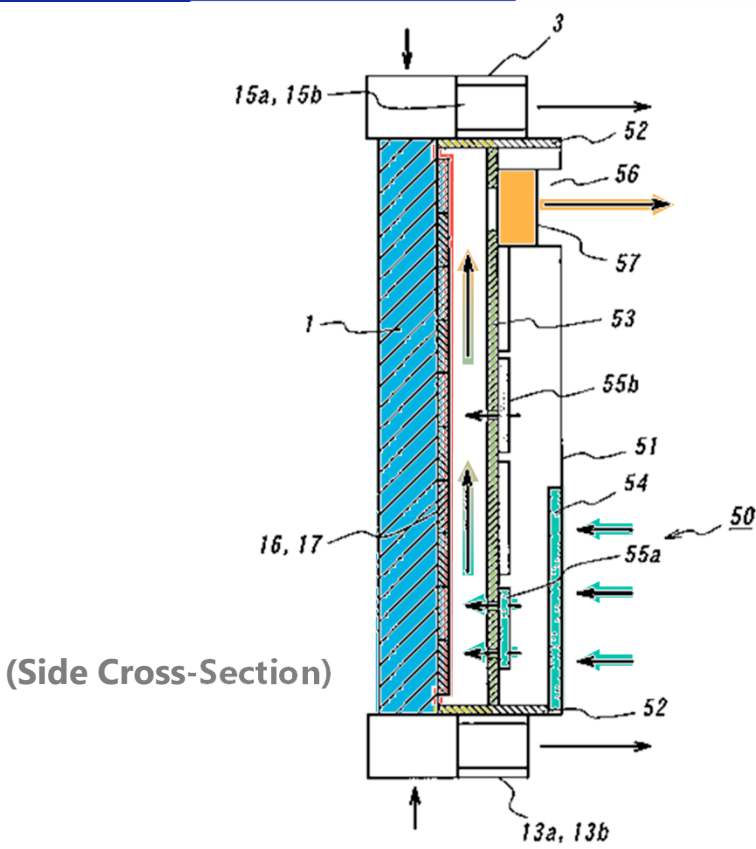
IPR199, Ex. 1004 (Takeuchi), ¶ 41

IPR199: Pet. (Paper 3), 27-29; Reply (Paper 30), 10-12;
Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 117-122



Takeuchi and the '595 Patent

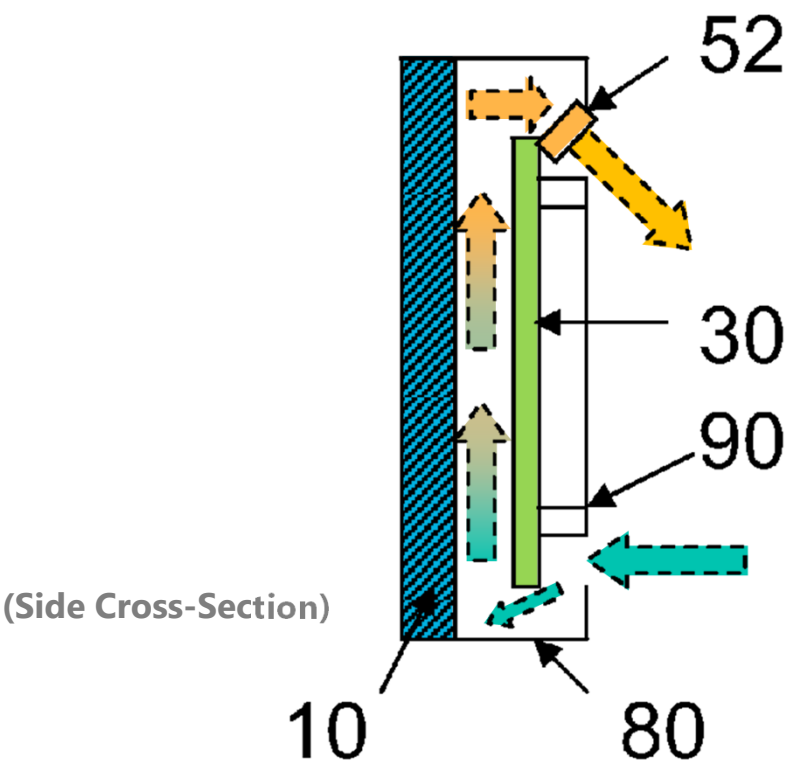
Takeuchi, Fig. 5



(Side Cross-Section)

IPR199, Ex. 1004 (Takeuchi), Fig. 5 (annotated)

'595 Patent, Fig. 5D



(Side Cross-Section)

IPR199, Ex. 1001 ('595 Patent), Fig. 5D (annotated)

Claim 1 of '595 Patent Is Obvious in View of Takeuchi

		Takeuchi
1[pre]	The invention claimed is: 1. A system for cooling an electronic display having a posterior display surface and contained within a housing, the system comprising:	✓
1[a]	a constricted convection plate placed posterior to the posterior display surface;	✓
1[b]	two side panels placed adjacent to the constricted convection plate and the posterior display surface, defining a constricted convection channel having an entrance and an exit; and	✓
1[c]	a fan placed to draw air from outside of the housing through the constricted convection channel.	✓

IPR199: Petition (Paper 3), 23-31; Reply (Paper 30), 6-12; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 103-128

Summary of Grounds: Kim (IPR199/220, Ex. 1005)

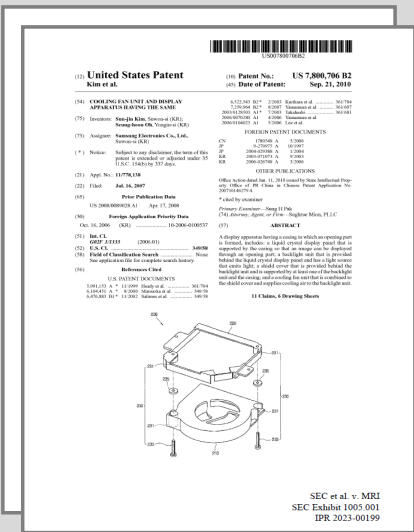
'595 Patent IPR2023-00199

Claim(s)	Obvious
1	Kim (Ground 2)
4, 7	Kim + Hong (Ground 3)
8	Kim + Hong + Takahashi (Ground 4)

'322 Patent IPR2023-00220

Claim(s)	Obvious
1-3	Kim + Tachikawa (Ground 4)
4, 7	Kim + Hong (Ground 1)
8	Kim + Hong + Takahashi (Ground 3)
5	Kim + Hong + Tachikawa (Ground 2)

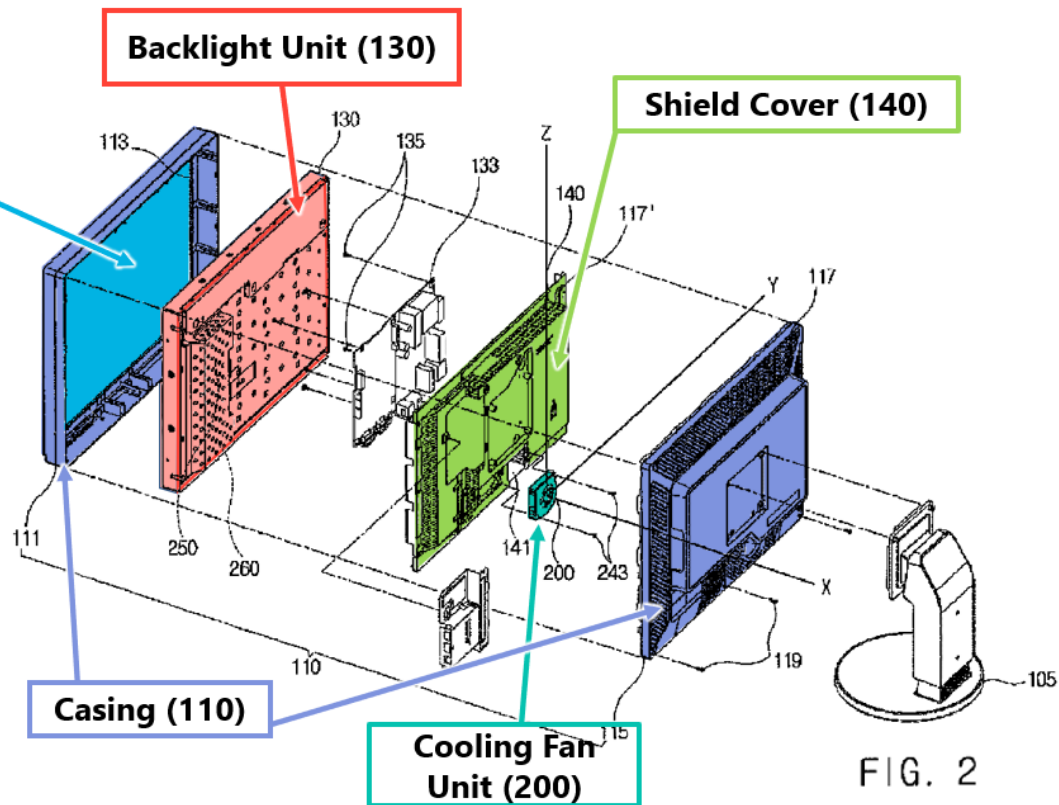
U.S. Patent No. 7,800,706 ("Kim") (IPR199/220, Ex. 1005)



IPR199, Ex. 1005 (Kim)
IPR220, Ex. 1005 (Kim)

SEC et al. v. MRI
SEC Exhibit 1005.001
IPR 2023-00199

IPR199/220, Ex. 1005
(Kim), Fig. 2 (annotated)



IPR199, Pet. (Paper 3), 14-17;
IPR220, Pet. (Paper 9), 13-15
Petitioners' Demonstratives.0023

'595 Patent, Ground 2: Claim 1 Is Obvious in View of Kim

	The invention claimed is:	Kim
1[pre]	1. A system for cooling an electronic display having a posterior display surface and contained within a housing, the system comprising:	Undisputed
1[a]	a constricted convection plate placed posterior to the posterior display surface;	
1[b]	two side panels placed adjacent to the constricted convection plate and the posterior display surface, defining a constricted convection channel having an entrance and an exit; and	
1[c]	a fan placed to draw air from outside of the housing through the constricted convection channel.	Undisputed

IPR199, Ex. 1001 ('595 patent), cl. 1

Kim Discloses “a constricted convection plate” and “constricted convection channel having an entrance and an exit”

comprises a fan support 141. The shield cover 140 may have a plurality of air slits 117' through which flowing air produced by the cooling fan 210 comes in and out. The shield cover 140 may be formed in diverse shapes such that the flowing air produced by the cooling fan 210 can be efficiently guided.

IPR199/220, Ex. 1005 (Kim), 4:59-63

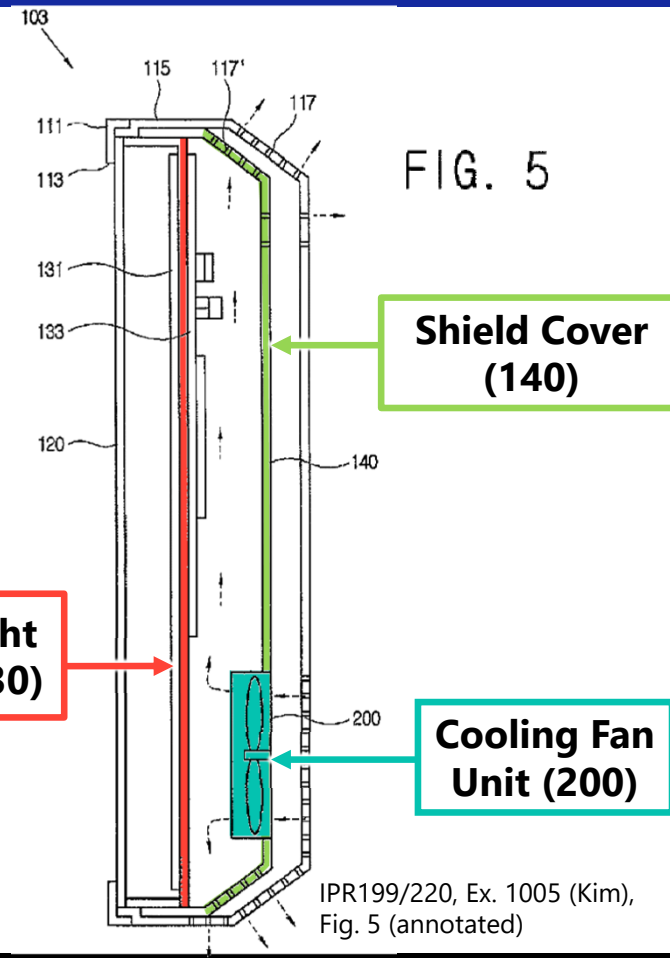
Thus, the cooling air generated by the cooling fan 210 can efficiently cool the LEDs widely distributed on the plane of the backlight unit 130 and the circuit board 133 while the cooling air flows through a space between the shield cover 140 and the backlight unit 130. FIGS. 2 and 5 show the

IPR199/220, Ex. 1005 (Kim), 5:34-38

IPR199: Pet. (Paper 3), 35-41; Reply (Paper 30), 12-14; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 137-149;

IPR220: Pet. (Paper 9), 33-34; Reply (Paper 33), 3-5; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 130-131

Samsung's Construction
“constricted convection channel” = “constricted channel through which air may flow to remove heat from the posterior display surface”



Kim Discloses Directional Air Flow

Patent Owner Response

As explained above in Section V.C.1, the claimed “channel” must be enclosed on four sides so that cooling air flows through it directionally from an entrance to an exit consistent with the plain and ordinary meaning of “channel” and the embodiments.

Because air exits Kim’s shield covers in all directions, Kim does not teach a constricted convection plate that defines a channel with an entrance and an exit as required by claim 1. Ex. 2006, ¶¶ 88-93.

IPR199, POR (Paper 18), 39-40

MRI’s Expert

17 Q. Okay. And this air flows directionally from the
18 entrance through fan 200 to the exits which are slits 117
19 prime, correct?

20 MR. SANDERS: Objection to form.

21 A. That is what's shown in the figure.

22 Q. And this air removes heat from the backlight unit
23 130, correct?

24 A. That is correct.

IPR199, Ex. 1041 (Gershowitz Dep. Tr.), 42:17-24

IPR199, Reply (Paper 30), 12-13; IPR220, Reply (Paper 33), 4-5

MRI's Positions Are Inconsistent

MRI Sur-Reply

It is also undisputed that the constricted convection plate of the '595 Patent *may* include access apertures through which some air may pass. POR 66-67.

IPR199 Sur-Reply (Paper 39), 11

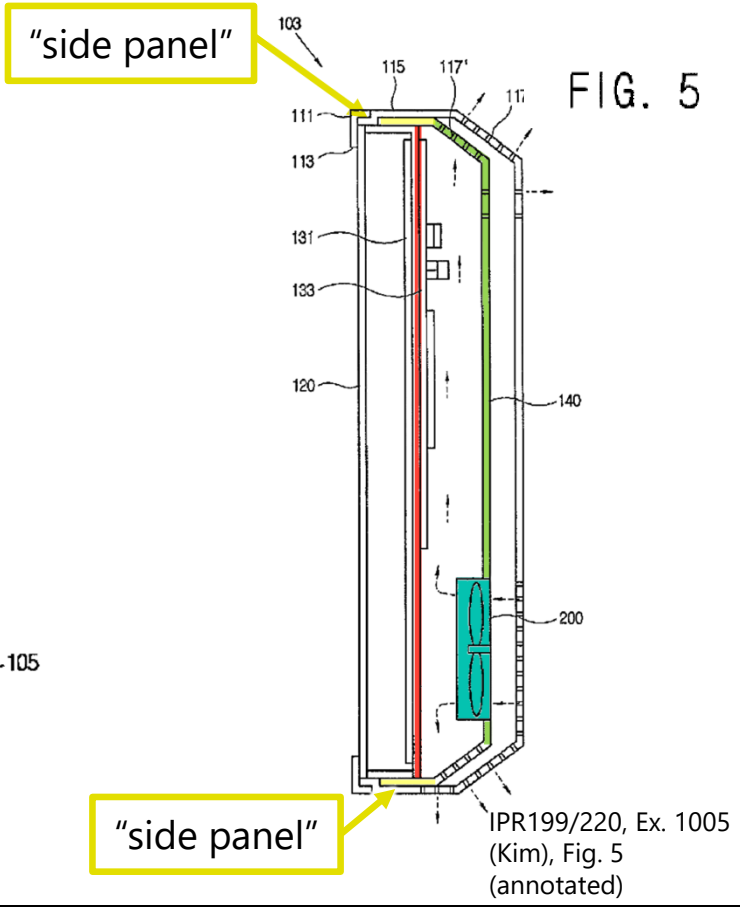
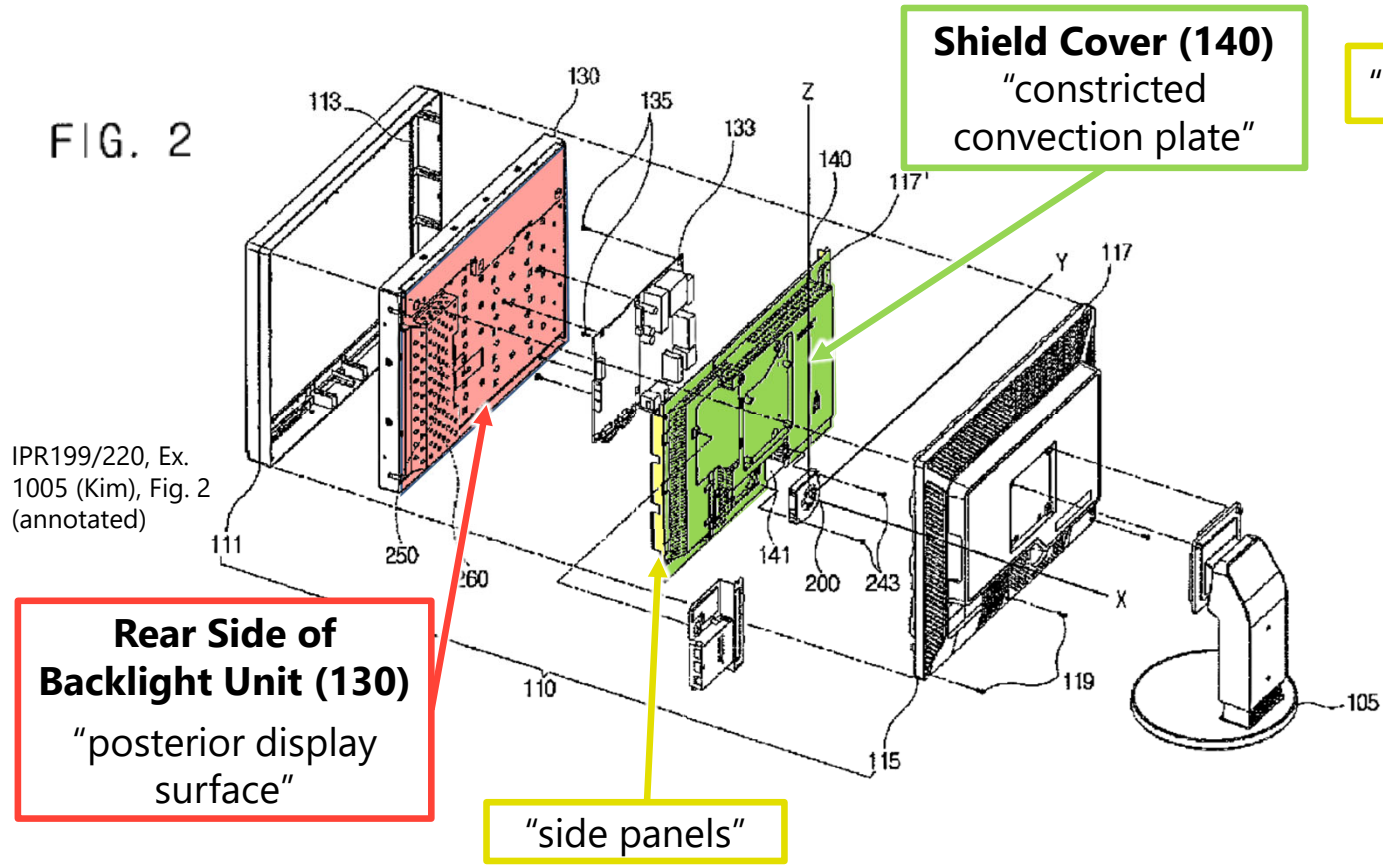
ITC Final Initial Determination

⁷⁴ Moreover, even if the airflow occurs as shown as Complainant sets forth in CRB at 60 (providing an annotated Fig. 2 of Kim), this airflow is still constrained in the area between the shield cover and backlight unit. As discussed above regarding infringement by the Accused Large-Sized Products of claim 4 of the '595 patent (and as argued by MRI), certain holes in the plate do not necessarily preclude coverage by this limitation.

IPR199, Ex. 1040 (FID), 192-93

IPR199, Reply (Paper 30), 13-14; IPR220, Reply (Paper 33), 5-6

Kim Discloses "two side panels placed adjacent to the constricted convection plate and the posterior surface . . ."



IPR199: Pet. (Paper 3), 37-40; Reply (Paper 37), 14-15; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 144-46

'595 Patent, Ground 2: Claim 1 Is Obvious in View of Kim

		Kim
1[pre]	The invention claimed is:	
	1. A system for cooling an electronic display having a posterior display surface and contained within a housing, the system comprising:	✓
	1[a] a constricted convection plate placed posterior to the posterior display surface;	✓
	1[b] two side panels placed adjacent to the constricted convection plate and the posterior display surface, defining a constricted convection channel having an entrance and an exit; and	✓
1[c]	a fan placed to draw air from outside of the housing through the constricted convection channel.	✓

IPR199: Pet. (Paper 3), 32-42; Reply (Paper 30), 12-15

'595 Patent, Ground 3: Claims 4, 7 Are Obvious in View of Kim and Hong

		Kim + Hong
4[pre]	4. A liquid crystal display (LCD) comprising:	Undisputed
4[a]	a liquid crystal stack;	Undisputed
	a backlight assembly behind the liquid crystal stack and comprising:	
	a metal core printed circuit board (PCB) having front and back sides;	
4[b]	a plurality of LEDs mounted on the front side of the PCB;	Undisputed
	a posterior surface on the rear side of the PCB;	Undisputed
4[c]	a constricted convection plate placed behind the posterior surface of the PCB, defining a constricted convection channel having an entrance and an exit; and	
4[d]	a fan positioned to draw air through the constricted convection channel.	Undisputed

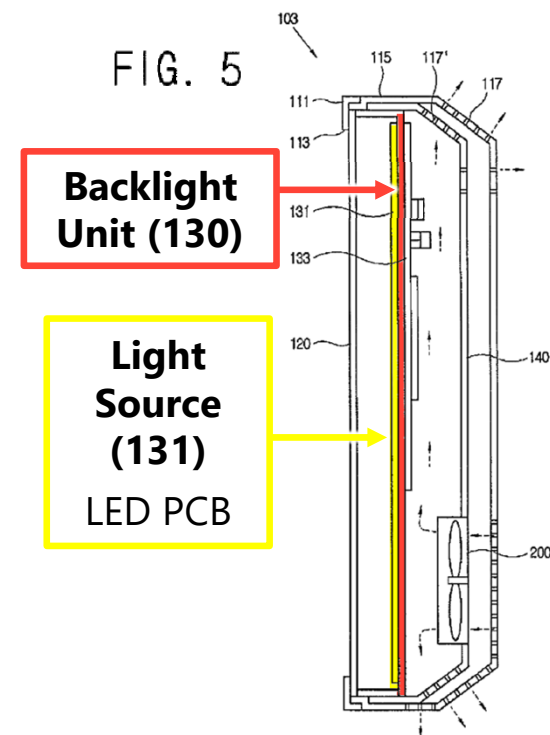
Kim Discloses a Backlight Unit with a PCB Having Front and Back Sides and a Plurality of LEDs Mounted on the Front Side

The backlight unit 130 comprises a plurality of light emitting diodes (LEDs) as a light source 131 (see FIG. 5) that generates light. The backlight unit 130 may further comprise

IPR199/220, Ex. 1005 (Kim), 4:33-35

Thus, the cooling air generated by the cooling fan 210 can efficiently cool the LEDs widely distributed on the plane of the backlight unit 130 and the circuit board 133 while the

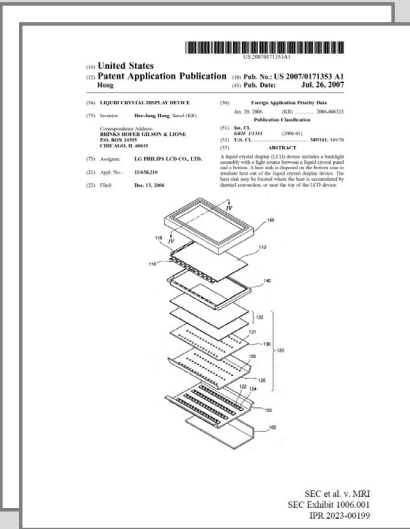
IPR199/220, Ex. 1005 (Kim), 5:34-38



IPR199/220, Ex. 1005 (Kim), Fig. 5 (annotated)

IPR199: Pet. (Paper 3), 44-47, Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 164-66

U.S. Patent No. 2007/0171353 A1 ("Hong") (IPR199, Ex. 1006)



IPR199, Ex. 1006
(Hong)

[0029] The backlight assembly 120 includes a plurality of LEDs 124, a reflecting sheet 126, a light guide plate 130, and optical sheets 132 such as a prism sheet and/or a diffusion sheet. The LEDs 124 may be arranged on a plurality of base PCBs 122. The base PCBs 122 are arranged in parallel on the bottom case 150. The base PCB 122 may contact or be coupled with the bottom case 150. The base PCB 122 may include a MCPCB (metal core printed circuit board) which may effectively absorb and transfer heat produced at the LED 124.

IPR199, Ex. 1006 (Hong), ¶ 29

IPR199: Pet. (Paper 3), 47-50; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 167-70

Motivation to Combine Kim and Hong



Kim discloses all limitations of Claim 4 except use of MCPCB, which is disclosed by Hong



POSITA would have been motivated to use MCPCB to improve heat transfer



Use of MCPCB would have been a well-known design choice subject to technical and cost considerations

IPR199: Pet. (Paper 3), 53–55; Reply (Paper 30), 15–17; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 54, 181–85;
Ex. 1041 (Gershowitz Dep. Tr.), 53:14–54:14, 55:1–11

Motivation to Combine Kim and Hong



MCM Portfolio LLC v. Hewlett-Packard Co.

“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference . . . Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”

812 F.3d 1284, 1294 (Fed. Cir. 2015)



Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC

“A given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”

825 F.3d 1373, 1381 (Fed. Cir. 2016)

Ground 3: Claim 4 of the '595 Patent Is Obvious in View of Kim and Hong

		Kim + Hong
4[pre]	4. A liquid crystal display (LCD) comprising:	✓
4[a]	a liquid crystal stack;	✓
	a backlight assembly behind the liquid crystal stack and comprising:	
4[b]	a metal core printed circuit board (PCB) having front and back sides;	✓
	a plurality of LEDs mounted on the front side of the PCB;	
	a posterior surface on the rear side of the PCB;	
4[c]	a constricted convection plate placed behind the posterior surface of the PCB, defining a constricted convection channel having an entrance and an exit; and	✓
4[d]	a fan positioned to draw air through the constricted convection channel.	✓

IPR199, Pet. (Paper 3), 43-55; Reply (Paper 30), 15-17; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 155-177, 181-185

'595 Patent, Claim 7: Kim Discloses that "the fan is placed near the exit of the constricted convection channel"

140 and the backlight unit 130. FIGS. 2 and 5 show the cooling fan unit 200 placed in a lower central portion of the shield cover 140. As an alternative, the cooling fan may be placed in a central portion or an upper portion of the shield cover 140, if necessary. The cooling fan 210 may draw in the

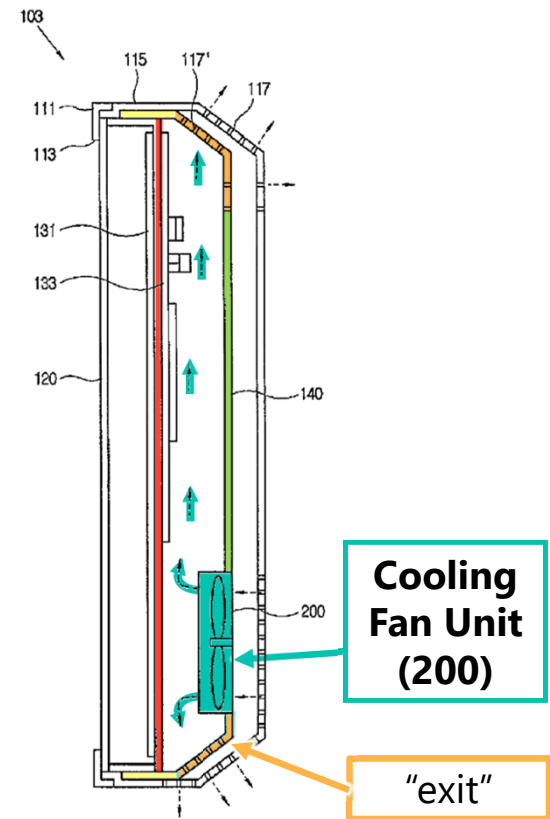
IPR199, Ex. 1005 (Kim), 5:38-42

generating parts is emitted. The intake and discharge directions of the air through the cooling fan 210 may be changed in various ways according to the arrangement of the heat generating parts, the number of cooling fans 210, etc. With this course, the cooling air evenly contacts the plane of the backlight unit 130 while flowing in a wide area of the backlight

IPR199, Ex. 1005 (Kim), 7:62-67

IPR199, Pet. (Paper 3), 55-56; Reply (Paper 30), 17; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 178-180

FIG. 5



IPR199, Ex. 1005 (Kim), Fig. 5 (annotated)

Ground 1: Claim 4 of '322 Patent Is Obvious in View of Kim and Hong For Similar Reasons as Nearly Identical Claim 4 of '595 Patent

Claim 4 of '322		Claim 4 of '595		Kim + Hong
4 [pre]	4. A liquid crystal display (LCD) comprising: a liquid crystal stack; a backlight assembly behind the liquid crystal stack and comprising: a printed circuit board (PCB) having front and back sides; a plurality of LEDs mounted on the front side of the PCB; a posterior surface on the rear side of the PCB;	4 [pre]	4. A liquid crystal display (LCD) comprising: a liquid crystal stack; a backlight assembly behind the liquid crystal stack and comprising: a metal core printed circuit board (PCB) having front and back sides; a plurality of LEDs mounted on the front side of the PCB; a posterior surface on the rear side of the PCB;	
4 [a]		4[a]		
4 [b]		4 [b]		
4 [c]		4 [c]		
4 [d]	a constricted convection plate placed behind and substantially parallel with the posterior surface of the PCB; and a fan positioned to draw air between the constricted convection plate and the posterior surface.	4 [d]	a constricted convection plate placed behind the posterior surface of the PCB, defining a constricted convection channel having an entrance and an exit; and a fan positioned to draw air through the constricted convection channel.	IPR220: Pet. (Paper 9), 27-37; Reply (Paper 33), 3-7, Ex. 1002 (Smith-Gillespie Decl.) ¶¶ 112-141

'322 Patent, Ground 1: Kim in View of Hong Discloses the Claimed PCB

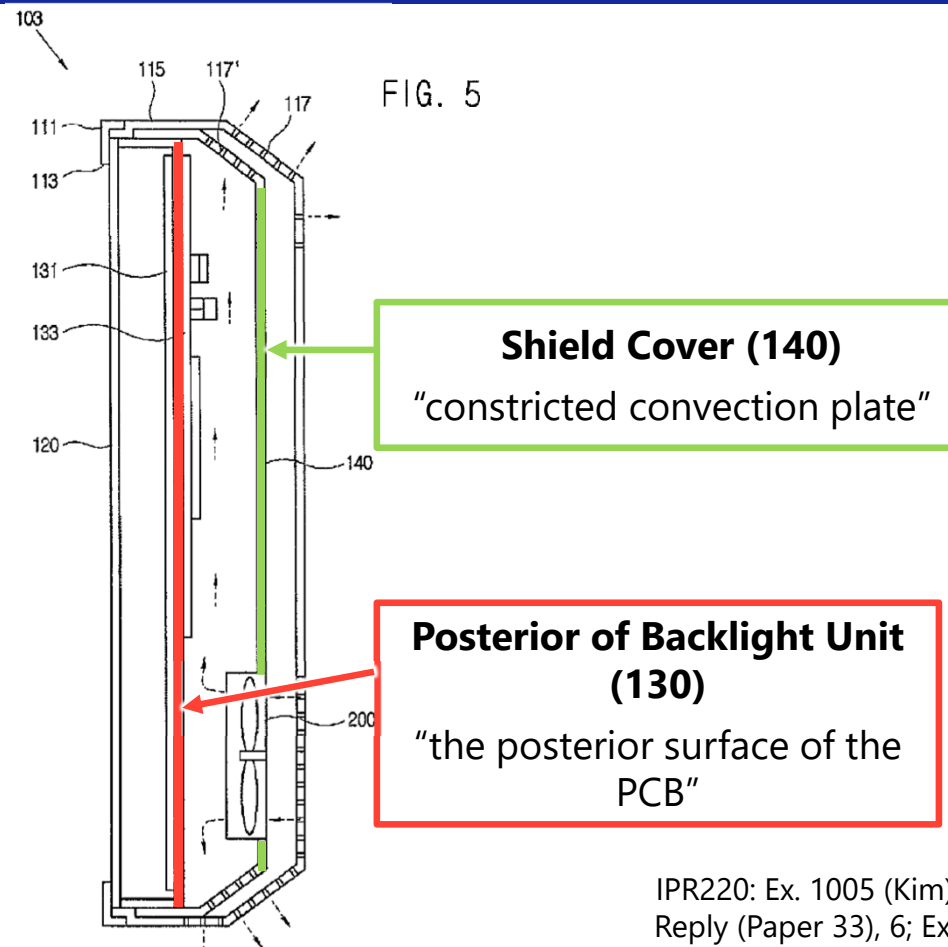
Hong likewise discloses a “**printed circuit board (PCB) having front and back sides**” with “**a plurality of LEDs mounted on the front side of the PCB.**” (Ex. 1002, ¶¶125-126.) Hong discloses that “[t]he backlight assembly 120 includes a plurality of LEDs 124” that “may be arranged on a plurality of base PCBs 122.” (Ex. 1029, ¶[0029].) “[T]he base PCB 122 is placed on an inner surface of the bottom case 150.” (*Id.*, ¶[0033].) As shown in Figure 5, a POSITA would have understood that LEDs 124 are mounted on the “**front side of the PCB**” and that the “**back side**” of the PCB faces bottom case 150:

[0029] The backlight assembly 120 includes a plurality of LEDs 124, a reflecting sheet 126, a light guide plate 130, and optical sheets 132 such as a prism sheet and/or a diffusion sheet. The LEDs 124 may be arranged on a plurality of base PCBs 122. The base PCBs 122 are arranged in parallel on the bottom case 150. The base PCB 122 may contact or be coupled with the bottom case 150. The base PCB 122 may include a MCPCB (metal core printed circuit board) which may effectively absorb and transfer heat produced at the LED 124.

IPR220, Pet. (Paper 9), 32; *see also* IPR220, Reply (Paper 33), 6-7

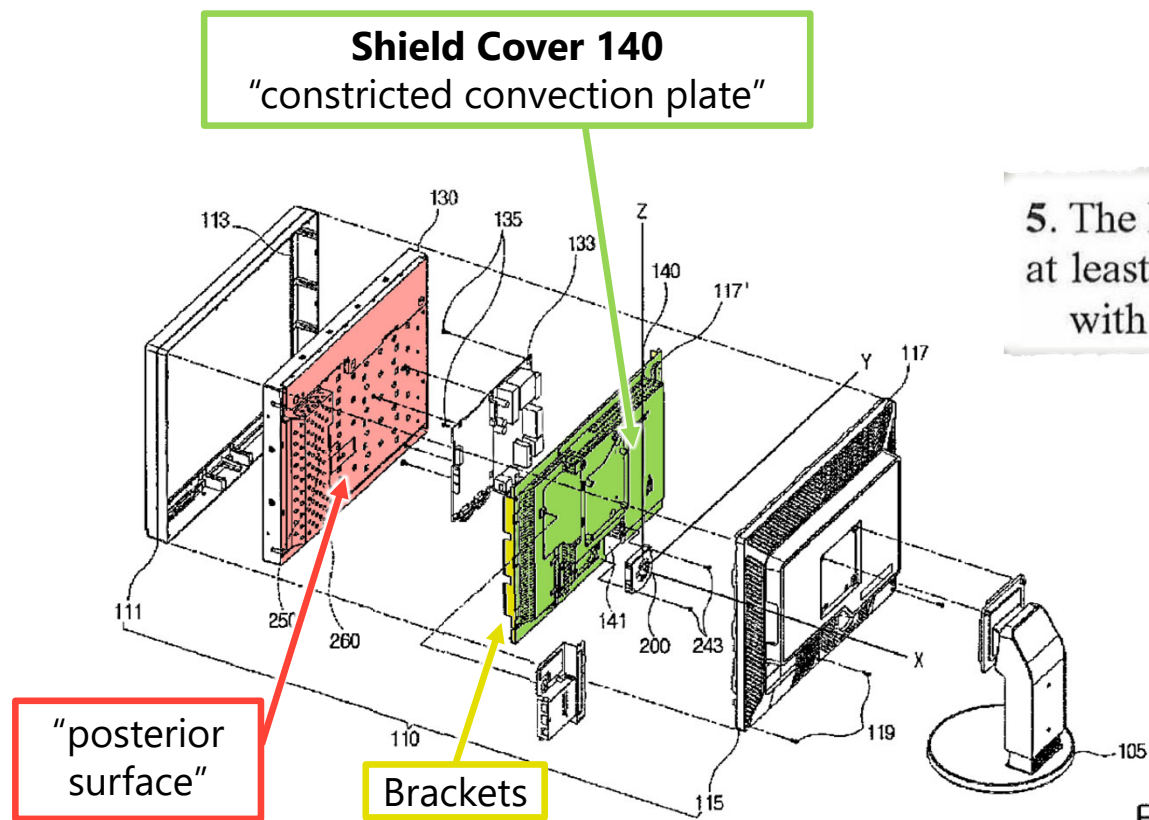
IPR220, Ex. 1029 (Hong), ¶ 29

'322 Patent, Ground 1: Kim's "constricted convection plate" is substantially parallel" to "the posterior surface of the PCB"



IPR220: Ex. 1005 (Kim), Fig. 5 (annotated); Pet. (Paper 9), 33-34; Reply (Paper 33), 6; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 132-133

'322 Patent, Ground 5: Kim Renders Obvious Claim 5's "bracket which connects the posterior surface with the constricted convection plate"



5. The LCD from claim 4 further comprising:
at least one bracket which connects the posterior surface
with the constricted convection plate.

IPR220, Ex. 1001 ('322 patent)

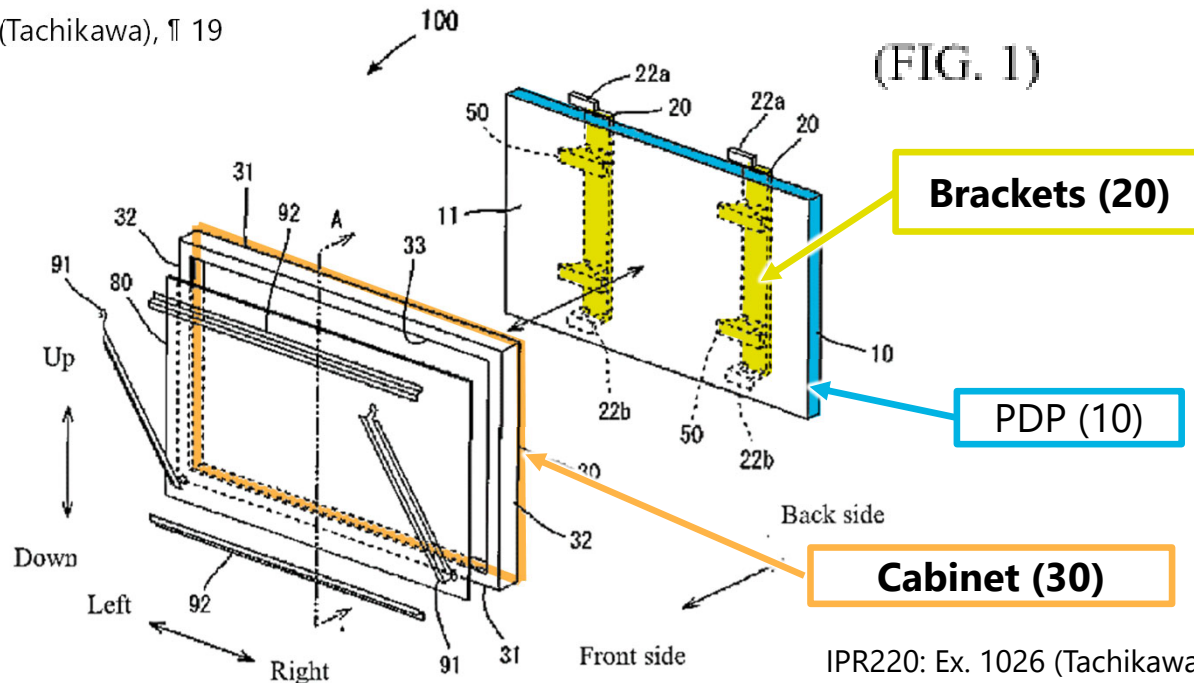
FIG. 2

IPR220, Ex. 1005 (Kim), Fig. 2 (annotated); Pet. (Paper 9), 39-40; Reply (Paper 30), 8-9; Ex. 1002 (Smith-Gillespie Decl.), ¶ 150

'322 Patent, Ground 5: Tachikawa Discloses Brackets

The PDP 10 is housed in the cabinet 30 in a state of being supported by two brackets 20 on the rear side. Specifically, the attachment 50 is fixed at four positions on the upper, lower, left, and right sides of the PDP 10, and each set of the attachment 50 divided into two sets of left and right is fixed to each of the one brackets 20. Each of the two brackets 20 is connected to a stand member (not shown) which stands substantially perpendicular from an installation surface of the plasma television 100, thereby supporting substantially the entire plasma television 100 at a predetermined height.

IPR220, Ex. 1026 (Tachikawa), ¶ 19



IPR220: Ex. 1026 (Tachikawa), Fig. 1 (annotated); Pet. (Paper 9), 40-41 ; Ex. 1002 (Smith-Gillespie Decl.) ¶¶ 152-154

Motivation to Combine Kim and Tachikawa



Improve Kim's serviceability



Improve structural strength of Kim's display assembly, especially in larger-size applications



Use of known technique (Tachikawa's brackets) to improve similar devices (Kim's display system) in the same way

IPR220: Pet. (Paper 9), 42-43; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 155-163; Reply (Paper 33), 9-10

'322 Patent, Ground 4: Claims 1-3 Are Obvious in View of Kim and Tachikawa

'322 Patent: Claims 1 + 3	Corresponding '322 Patent Claim Elements	Kim + Tachikawa
1[pre]: "A system for cooling an electronic display having a posterior display surface and contained within a housing, the system comprising:	See '595 patent, claim 1 preamble	✓
1[a]: "a constricted convection plate placed posterior to the posterior display surface covering the majority of the posterior display surface"	1[a]: "a constricted convection plate placed posterior to the posterior display surface"	✓
1[b]: "at least one bracket which connects the posterior display surface with the constricted convection plate;	5: "at least one bracket which connects the posterior surface with the constricted convection plate."	✓
1[c]: "a fan placed to draw ambient air between the constricted convection plate and the rear posterior."	4[d]: "a fan positioned to draw air between the constricted convection plate and the posterior surface."	✓
[2]: "the posterior display surface comprises the rear surface of a backlight assembly."	4[b]: "a backlight assembly . . . comprising . . . A posterior surface on the rear side of the PCB"	✓
3: "the constricted convection plate is substantially parallel to the posterior display surface"	4[c]: "a constricted convection plate placed behind and substantially parallel with the posterior surface of the PCB"	✓

IPR220: Pet. (Paper 9), 48-50; Reply (Paper 33), 11; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 174-187

Claim 8 of '595 Patent (Ground 4) and Claim 8 of '322 Patent (Ground 3) Are Obvious in View of Kim, Hong, and Takahashi

Claim 8 of '595 Patent

8. The LCD from claim 4 further comprising:
a plurality of access apertures through the constricted convection plate.

Claim 8 of '322 Patent

8. The LCD from claim 4 further comprising:
a plurality of access apertures on the constricted convection plate.

Kim + Hong +
Takahashi



IPR199: Pet. (Paper 3), 56-61; Reply (Paper 30), 17-18; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 187-198
IPR220: Pet. (Paper 9), 43-48; Reply (Paper 33), 10-11; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 164-173

Takahashi (Ex. 1008) Discloses Access Apertures

【0004】

【Means for solving the problem】 In order to solve the problem described above, the present invention is a heat dissipation structure for electronics in which an attachment screw hole is provided on the rear of a partition plate that divides the front part of the housing for mounting display components, which has an air exhaust located at the rear of the top surface and is open on at least the back side, from the back part for the mounting of substrates including the control board and the power board for mounting heat-emitting components; the substrates are fastened by threading a

IPR199: Ex. 1008 (Takahashi), ¶¶ 4, 7; Pet. (Paper 3), 56-61; Reply (Paper 30), 17-18; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 189-191

IPR220: Ex. 1008 (Takahashi), ¶¶ 4, 7; Pet. (Paper 9), 43-46; Reply (Paper 33) 10-11; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 164-166

【Embodiment of the invention】 As described above, in the heat dissipation structure for electronics of the present invention, a through-hole is provided on the aforesaid air guide plate in a location corresponding to the aforesaid insertion hole, which through-hole is provided with an air leak prevention part consisting of a hollow body having an open end and an insertion hole formed in the base thereof, such that the aforesaid substrate attachment screw is able to penetrate through the open side of this air leak prevention part, and the aforesaid substrates are fastened by threading this screw through the insertion hole into the aforesaid screw hole via the insertion hole in the aforesaid substrate. Consequently, in the event of maintenance or inspection, it is possible to remove the substrate attachment screw from the opening in the aforesaid air leak prevention part without needing to remove the air guide plate, thereby making it possible to unmount the substrate by moving it downward.

Summary of Grounds: Na (IPR199/220 Ex. 1010)

'595 Patent IPR2023-00199

Claim(s)	Obvious
1	Na + Kim (Ground 5)
4, 7, 8	Na + Hong (Ground 6)

'322 Patent IPR2023-00220

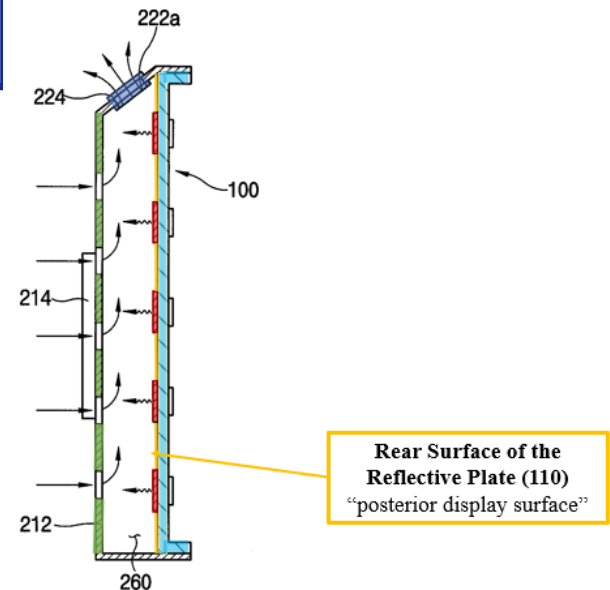
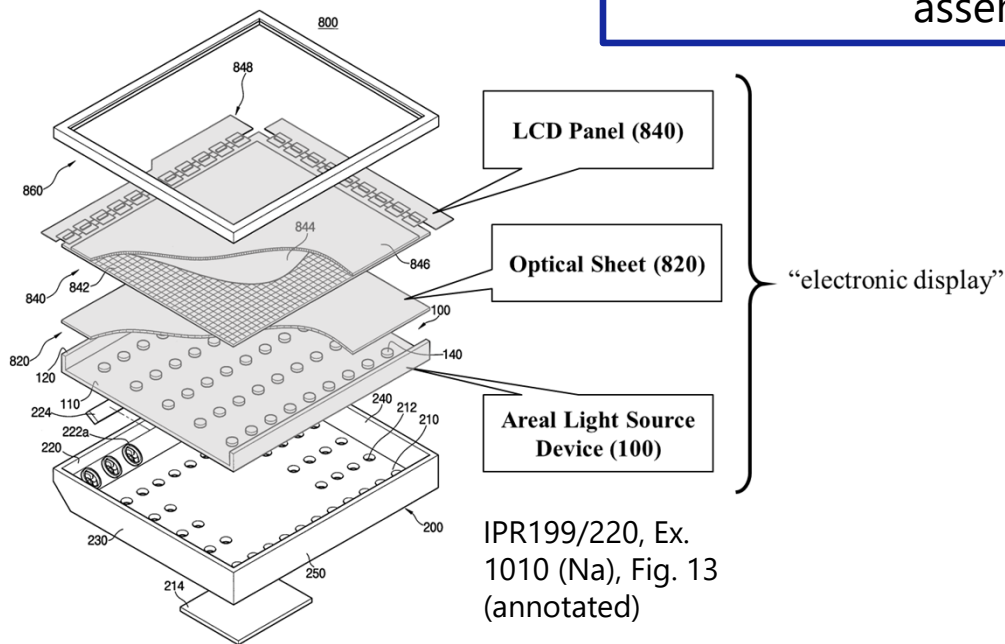
Claim(s)	Obvious
4, 8-10, 16	Na (Ground 5)
7, 12, 13	Na + Kim (Ground 6)
11	Na+ Tachikawa (Ground 7)

Disputes Regarding Na Disclosures

Claim Term	Claims/Grounds
"posterior display surface" / "posterior surface of the display"	'595 Patent, claim 1: Ground 5 (Na + Kim) '322 Patent, claims 9, 16: Ground 5 (Na)
"posterior surface on the rear side of the PCB"	'595 Patent, claim 4: Ground 6 (Na + Hong) '322 Patent, claim 4: Ground 5 (Na)
"two side panels placed adjacent to the constricted convection plate and the posterior display surface, defining a constricted convection channel having an entrance and an exit" / "constricted convection channel having an entrance and an exit" / "constricted convection plate"	'595 Patent, claim 1: Ground 5 (Na + Kim) '595 Patent, claim 4: Ground 6 (Na + Hong) '322 Patent, claims 4, 9: Ground 5 (Na)
"plurality of access apertures"	'595 Patent, claim 8: Ground 6 (Na + Hong)

Na Discloses a “posterior display surface”

“posterior display surface” =
“rear-facing surface of the display
assembly”



IPR199/220, Ex. 1010 (Na), Fig. 3 (annotated)

In an exemplary embodiment, the display posterior 22 may be the posterior surface of a backlight assembly. The backlight assembly may comprise a printed circuit board (PCB) with a plurality of LEDs mounted to the anterior surface. The

IPR199, Ex. 1001 (‘595 patent), 4:52-55

IPR199: Pet. (Paper 3), 63-65; Reply (Paper 30), 18-19; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 199-203

IPR220: Pet. (Paper 9), 54; Reply (Paper 33), 12-13; Ex. 1002 (Smith-Gillespie Decl.), ¶ 220

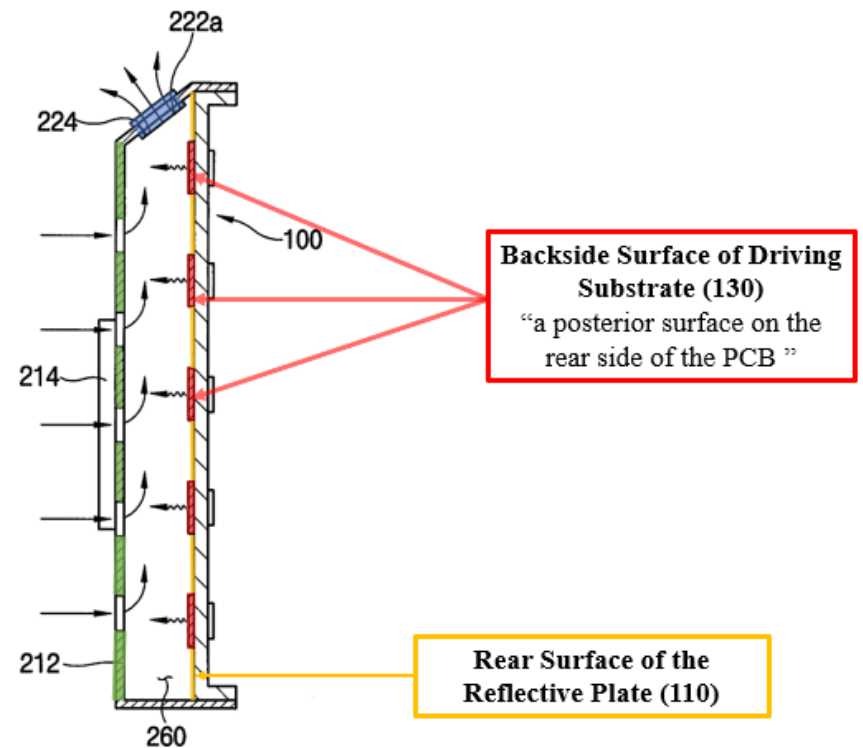
Na Discloses a “posterior surface on the rear side of the PCB”

by air within the constricted convection channel. The PCB may comprise a metal core PCB and the posterior surface of the PCB may be metallic so that air within the constricted convection channel may cool the metallic posterior surface (and subsequently the backlight assembly) more easily and efficiently.

IPR199, Ex. 1001 ('595 patent), 4:60-65

IPR199: Pet. (Paper 3), 83; Reply (Paper 30), 20; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 243-44

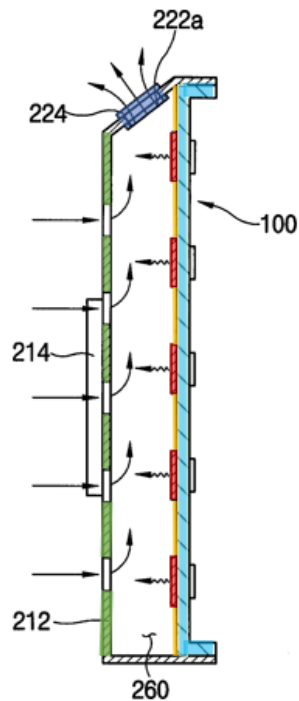
IPR220: Pet. (Paper 3), 57-60; Reply (Paper 33), 12-13; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 202



IPR199/220, Ex. 1010 (Na), Fig. 3 (annotated)

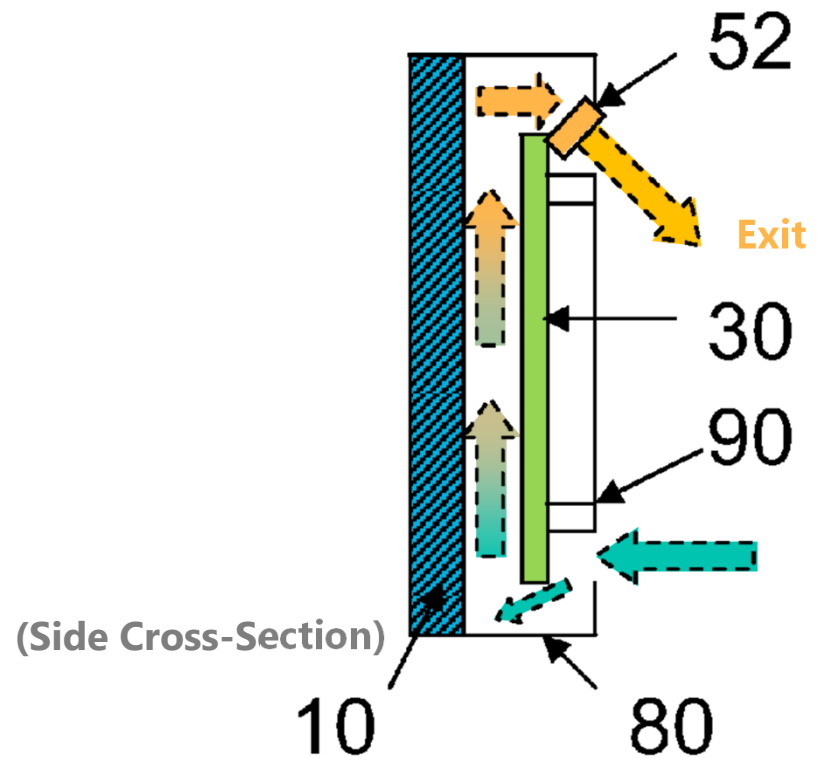
Na and the '595/'322 Patents

Na Figure 5



IPR199/220, Ex. 1010 (Na), Fig. 3 (annotated)

'595/'322 Patent Figure 5D



IPR199, '595 Patent (Ex. 1001), Fig. 5D (annotated)

IPR220, '322 Patent (Ex. 1001), Fig. 5D (annotated)

MRI's Characterization of Mr. Smith-Gillespie's Testimony Is Misleading

MRI Sur-Reply

well as “storage container 200.” *See e.g.*, Ex. 1010, 4. Petitioner’s expert, Mr. Smith-Gillespie testified that the “posterior surface of the electronic display”² comprises “the most posterior portion” of the display assembly. Ex. 2013, 930:23-

IPR220, Sur-Reply (Paper 41), 11

Mr. Smith-Gillespie's Testimony

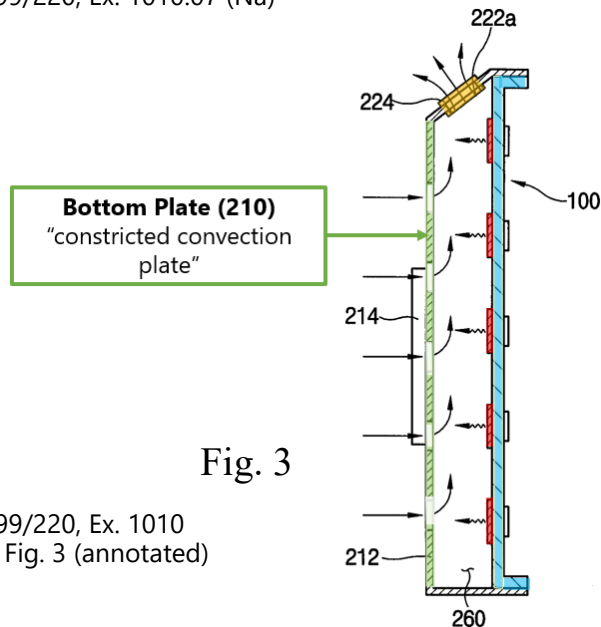
20 Q. What did the Court conclude?
21 A. A posterior display surface is a rear-facing
22 surface of the display assembly. And here Takeuchi
23 discloses a light guide plate and panels 16 and 17. Panels
24 16 and 17 are the most posterior portion, so I have
25 highlighted those in red as the posterior display surface.

IPR220, Ex. 2013 (Smith-Gillespie Dep. Tr.), 930:20-25

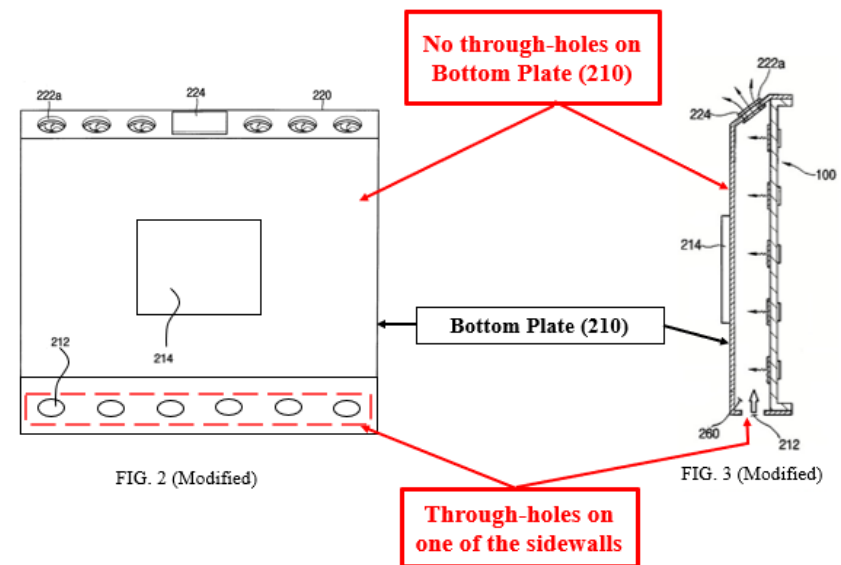
Na Discloses “a constricted convection plate . . . defining a constricted convection channel having an entrance and exit”

In the present exemplary embodiment, the through-holes are formed on a bottom plate, but the through-holes may be additionally formed in the first to fourth sidewalls, or may be formed only in the first to fourth sidewalls. That is, the through-holes may be formed on the bottom plate and in any one or more of the first to fourth sidewalls.

IPR199/220, Ex. 1010.07 (Na)



IPR199/220, Ex. 1010
(Na), Fig. 3 (annotated)



IPR199/220, Ex. 1010 (Na), Figs. 2
& 3 (modified)

IPR199: Pet. (Paper 3), 66-72; Reply (Paper 30), 19; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 208-217; Ex. 2006 (Gershowitz Decl.), ¶ 124
IPR220: Pet. (Paper 9), 56-57; Reply (Paper 33), 13; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 205-206

'595 Patent, Ground 6: Motivation to Combine Na and Hong



Na discloses all limitations of Claim 4 except use of MCPCB, which is disclosed by Hong



POSITA would have been motivated to use MCPCB to improve heat transfer



Use of MCPCB would have been a well-known design choice subject to technical and cost considerations

IPR199: Pet. (Paper 3), 88-91; Reply (Paper 30), 20; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 267-71

'322 Patent, Ground 6: Motivation to Combine Na and Kim



POSITA would have understood that LCD typically contained in housings, such as the one disclosed by Kim



Na's driving circuits are exposed to ambient air



Use of known technique (Kim's housing) to improve similar devices (Na's display system) in the same way

IPR220: Pet. (Paper 9), 65-67; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 241-247, '322 Reply (Paper 33), 14

'322 Patent, Ground 7: Motivation to Combine Na and Tachikawa



Na does not disclose how its LCD is mounted for use



Tachikawa's brackets allow for easy removal of rear cabinet and provide enhanced mounting stability



Use of known technique (Tachikawa's brackets) to improve similar devices (Na's display system) in the same way

IPR220: Pet. (Paper 9), 70-71; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 257-260, '322 Reply (Paper 33), 14-15

Summary of Grounds: Kimura (IPR220 Ex. 1004)

'322 Patent IPR2023-00220	
Claim(s)	Obvious
9, 12, 13, 16	Kimura (Ground 8)
1, 2, 3, 11	Kimura and Kochiyama (Ground 9)
4, 7	Kimura and Hong (Ground 10)
5	Kimura, Hong, and Kochiyama (Ground 11)

'322 Patent, Ground 8: Claim 9 Is Obvious in View of Kimura

		Kimura
9 [pre]	9. A system for cooling an electronic display comprising:	Undisputed
9 [a]	an electronic display comprising a front display surface and a posterior surface where no electronics are mounted to the posterior surface of the electronic display;	Undisputed
9 [b]	a constricted convection plate behind the posterior surface of the display covering a majority of the posterior display surface; and	
9 [c]	a means for forcing air between the constricted convection plate and the posterior surface of the electronic display.	

IPR220, Ex. 1001 ('322 patent), cl. 9

Kimura Discloses “a constricted convection plate behind the posterior surface covering a majority of the posterior display surface”

“constricted convection plate”

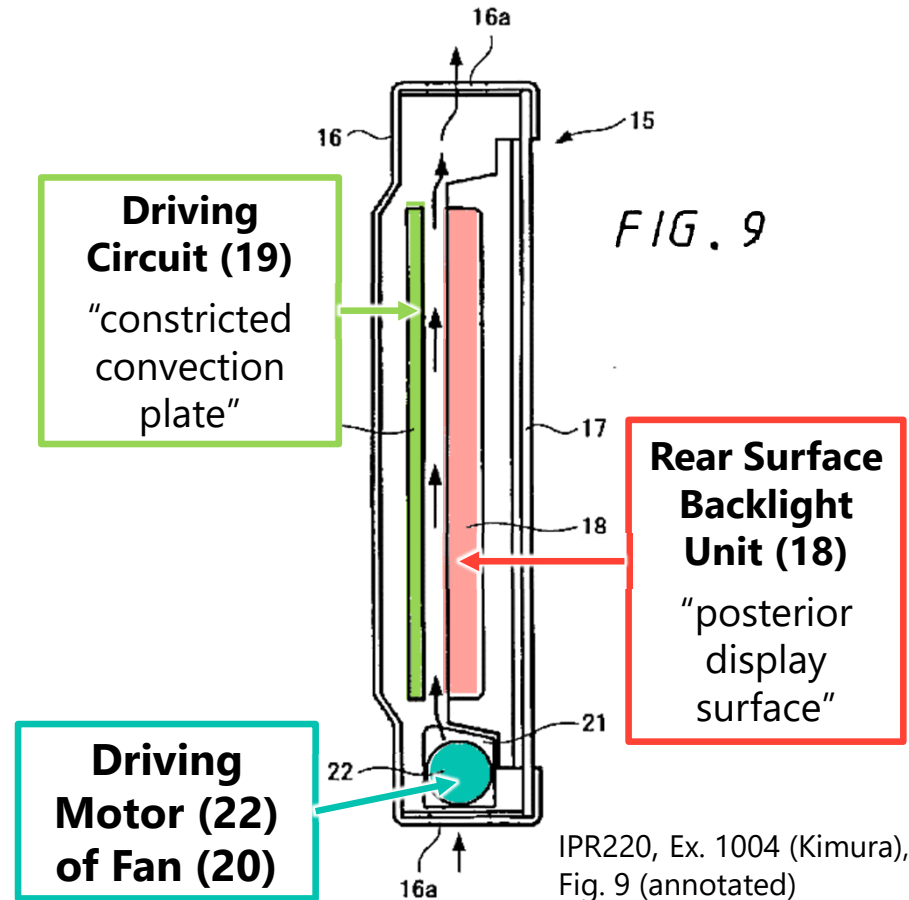
=

a plate configured to form part of a constricted convection channel

behind the liquid crystal panel 17. A driving circuit 19 for the flat panel display is disposed behind the backlight unit 18. A cooling fan 20 according to the present invention is installed inside a gap 21 that is around 20 mm square and 700 mm long that is produced at a lower part of the panel due to the construction of the flat panel display. By circulating a wind generated by rotationally driving the cooling fan 20 in the form of a “film” to the rear surface of the backlight unit 18, the entire backlight unit 18 is cooled uniformly. It should be

IPR220, Ex. 1004 (Kimura), ¶ 78

IPR220: Pet. (Paper 9), 74-75; Reply (Paper 33), 15-18; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 273-275; Ex. 1049 (Gershowitz Dep. Tr.), 61:12-62:1



Kimura Renders Obvious “a constricted convection plate behind the posterior surface covering a majority of the posterior display surface”

274. The air flow design of Kimura allows simultaneous cooling of the backlight unit **18** and the driving circuit **19**, which a POSITA would have understood to be the two primary heat generating elements in an LCD display. The length of cooling fan **20**, which runs across the entire width of the LCD panel, is indicative of the size of both the driving circuit **19** and the backlight unit **18**. Thus, a POSITA would have understood that Kimura’s airflow design facilitates a driving circuit **19** that covers “**a majority of the posterior display surface**” without generating overheating issues for the display. In the alternative, a POSITA would have been inclined to optimize the display cooling capability by enlarging Kimura’s “**driving circuit 19**” to cover the entire rear surface of the display so that “**the entire backlight is cooled uniformly.**” (*Id.*, ¶[0078].)

IPR220, Ex. 1002 (Smith-Gillespie Decl.) ¶ 274

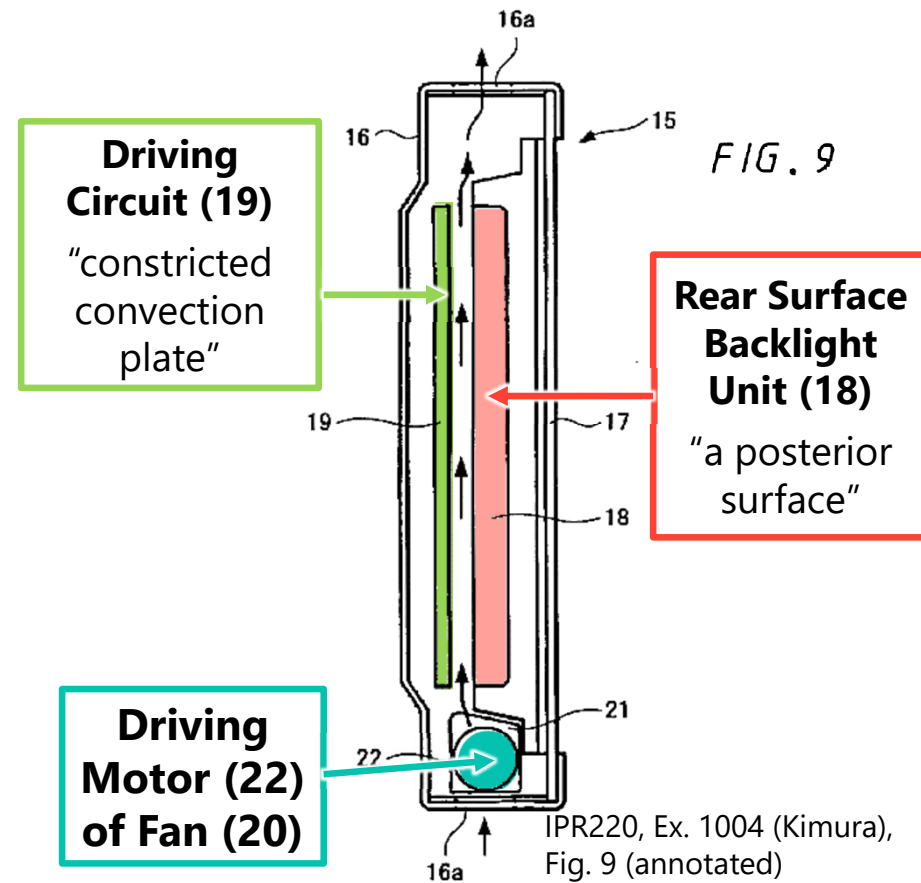
Kimura Discloses “a means for forcing air . . .”

Phrase	Agreed Construction
“means for forcing air through the constricted convection channel” ('322 Patent: claim 9)	§112, ¶ 6: The recited function is “forcing air through the constricted convection channel.” The corresponding structure to perform this function is one or more fans or an air conditioning unit.

behind the liquid crystal panel 17. A driving circuit 19 for the flat panel display is disposed behind the backlight unit 18. A cooling fan 20 according to the present invention is installed inside a gap 21 that is around 20 mm square and 700 mm long that is produced at a lower part of the panel due to the construction of the flat panel display. By circulating a wind generated by rotationally driving the cooling fan 20 in the form of a “film” to the rear surface of the backlight unit 18, the entire backlight unit 18 is cooled uniformly. It should be

IPR220, Ex. 1004 (Kimura), ¶ 78

IPR220: Pet. (Paper 9), 75-77; Reply (Paper 33), 19-20; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 276-280

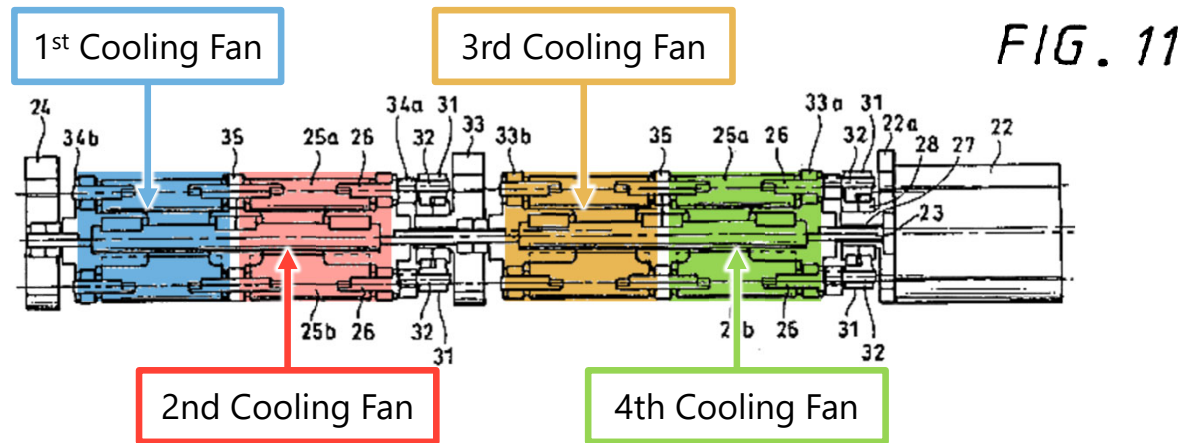
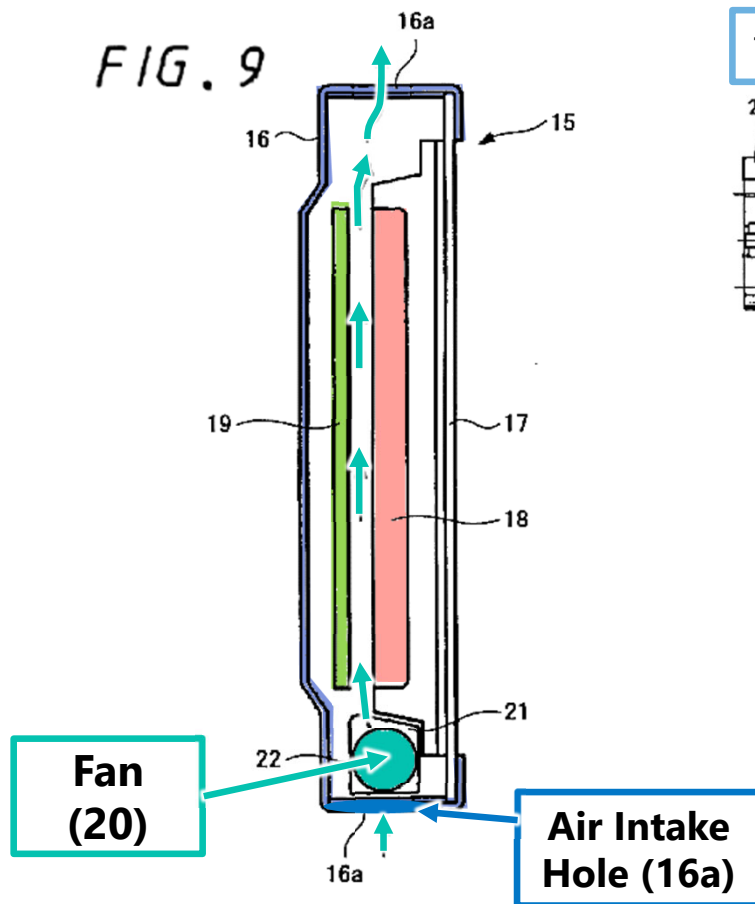


Claim 9 of '322 Patent Is Obvious in View of Kimura

		Kimura
9 [pre]	9. A system for cooling an electronic display comprising:	✓
9 [a]	an electronic display comprising a front display surface and a posterior surface where no electronics are mounted to the posterior surface of the electronic display;	✓
9 [b]	a constricted convection plate behind the posterior surface of the display covering a majority of the posterior display surface; and	✓
9 [c]	a means for forcing air between the constricted convection plate and the posterior surface of the electronic display.	✓

IPR220: Pet. (Paper 9), 71-77; Reply (Paper 33), 15-20; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 261-280

Claim 13 of '322 Patent: Kimura Renders Obvious "a plurality of fans placed near the entrance aperture"



[0088] Also, in the case of the cooling fan shown in FIG. 11, the vanes that have been divided into two are further divided into two by the support frames 35. This is in response to deformation of the vanes due to centrifugal force calculated from the cross-sectional form of the vanes, material hardness, specific gravity, rotational speed, rotational radius, and the like.

IPR220: Ex. 1004 (Kimura), ¶ 88, Figs. 1 & 9 (annotated); Pet. (Paper 9), 78-80; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 290-294

'322 Patent, Ground 10: Motivation to Combine Kimura and Hong



POSITA would have recognized that Kimura's LEDs need to be mounted on a first side of a PCB to operate as intended



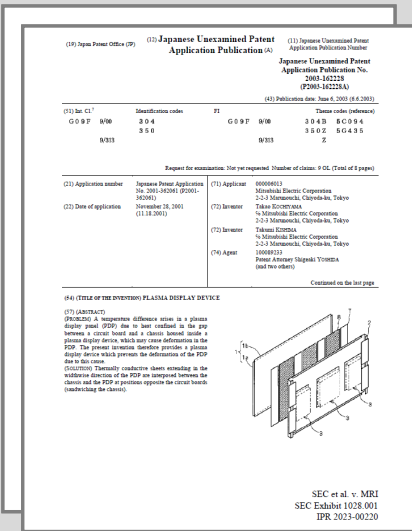
Hong provides an example of a typical LED backlight



The combination would have amounted to no more than the use of a known technique to improve Kimura's backlight to obtain predictable results

IPR220: Pet. (Paper 9), 89; Reply (Paper 33), 20-21; Ex. 1002 (Smith-Gillespie Decl.), ¶¶ 343-344

'322 Patent, Grounds 9 and 11: Kochiyama (IPR220, Ex. 1028)



IPR220, Ex. 1028
(Kochiyama)

(0019) <Embodiment 1> FIG. 1 is an exploded perspective view illustrating the configuration of a plasma display device of this embodiment, and FIG. 2 is a cross-sectional view thereof. A PDP 1 consists of a front glass substrate 1a and a back substrate 1b, and a video image is projected by inducing an electrical discharge between both glass substrates (1a and 1b). A chassis 2 having a heat radiating function holds the PDP 1 on one main surface side and holds circuit boards 3 required to display a video image (drive-related boards, power supply boards, and the like) on the other main surface side. The respective circuit boards are arranged in the lengthwise direction of the PDP 1 near the center of the widthwise direction of the PDP 1. Here, as illustrated in FIG. 3, each circuit board 3 consists of a board body 3a and a group of parts 3b welded to the board body 3a. The method of fixing the circuit board 3 to the chassis 2 is to fix the circuit board with screws 6 through a chassis support 5, for example, so that there is a gap 4 between the chassis 2 and the board body 3a.

IPR220, Ex. 1028 (Kochiyama), ¶ 19

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

- No evidence exists that MRI's alleged invention met any long-felt need for outdoor displays
- Samsung's 2015 White Paper does not evidence an unmet need met by MRI's alleged invention:

"I think we'll see the day, pretty quickly, where even Mom and Pop stores are replacing the printed posters with digital posters in their windows, because the prices and ease of doing it will reach that point," says Nick Lee, Experimental Engineer with Yesco, a Las Vegas-based specialty display company that has, for years, been designing and building screens built to run and last outdoors.

IPR199/220, Ex. 205 (Samsung White Paper), 2

Understanding, from experience and advice, the many challenges of outdoor displays has limited the number of companies that have chosen to focus on this specialized integration work. There's now a short list of top tier integrators, like Yesco and Vertigo, delivering products and services around the globe.

IPR199/220, Ex. 205 (Samsung White Paper), 6

IPR199, Reply (Paper 30), 21; IPR220, Reply (Paper 33), 21

No Failure of Others

- No evidence of Samsung's failure
 - Development timeline alone insufficient to prove "failure"
- No evidence that any products "failed" because they lacked the claimed features
 - *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.")

IPR199, Reply (Paper 30), 21; IPR220, Reply (Paper 33), 22

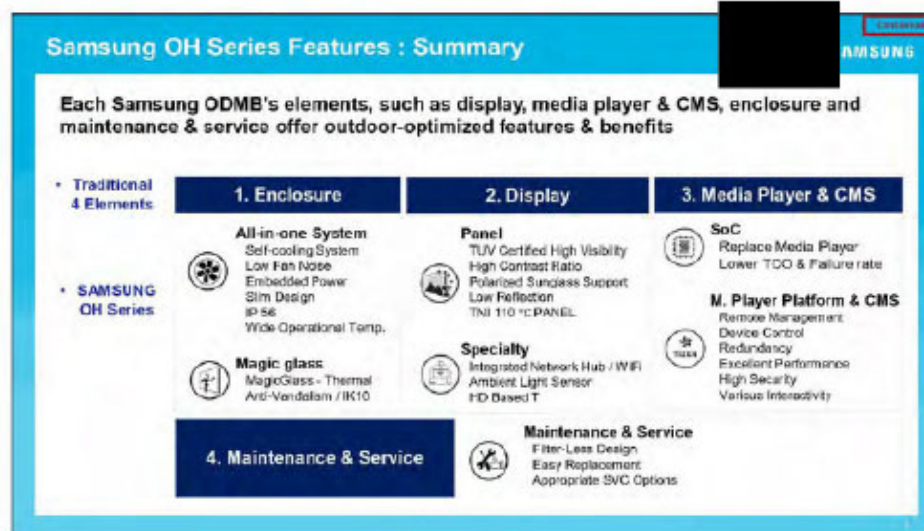
No Copying

- Samsung did not do any competitive analysis until after its products had already been developed
- No evidence that Samsung ever sought to replicate any MRI product features
- 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. Otherwise every infringement suit would automatically confirm the nonobviousness of the patent. Rather, copying requires the replication of a specific product”).

IPR199, Reply (Paper 30), 22; IPR220, Reply (Paper 33), 22-23

No Commercial Success

- Presumption of nexus does not apply
 - Coextensiveness requires more than a showing that claims cover a product that practices the patent
- No evidence that cooling systems drive sales where products have numerous unclaimed features



IPR199, Reply (Paper 30), 22-23; IPR220, Reply (Paper 33), 23-24; IPR199/220, Ex. 2038, 7

No Industry Praise or Licensing

- None of MRI's cited evidence establishes industry praise:
 - Romulus Stoain of SDS's generic email (Ex. 2001) does not identify any specific MRI product, let alone one coextensive with the Challenged Claims
 - Samsung's 2015 White Paper (Ex. 2025) does not even mention MRI, despite identifying other "top tier" companies in the industry producing outdoor displays
 - Palmer testimony (Ex. 2032) does not indicate whether it is features of Samsung's cooling system, as opposed to other aspects, that leads customers to request Samsung displays
- As to licensing, MRI fails to establish a nexus between any of its licenses (Exs. 2049, 2051-52) and the Challenged Claims

IPR199, Reply (Paper 30), 24-25; IPR220, Reply (Paper 33), 25

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) the undersigned hereby certifies that on March 13, 2024 (per party agreement) and March 18, 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: March 18, 2024

/Sanjeet K. Dutta/

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