

U.S. Patent No. 8,223,311

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MANUFACTURING RESOURCES INTERNATIONAL, INC.,
Petitioner,
v.

SAMSUNG ELECTRONICS CO., LTD,
Patent Owner

U.S. Patent No. 8,223,311

Case No. IPR2023-01202

PATENT OWNER'S RESPONSE

TABLE OF CONTENTS

I.	Introduction.....	1
II.	Related ITC Proceeding.....	2
III.	Overview of the '311 Patent.....	3
IV.	Level of Ordinary Skill in the Art	4
V.	MRI Cannot Meet its Burden of Proof Regarding Grounds 1 and 2 and a Portion of Ground 3	5
VI.	GROUND 3: MRI Has Not Shown that Claim 1–3, 5–7, 9, 11, or 13 Is Obvious Over the Combination of Karppanen, Gromatzky, and the Knowledge of a POSITA.....	6
A.	The Prior Art of Ground 3 Does Not Disclose All Limitations of Claim 1	7
1.	The Prior Art Does Not Teach or Disclose Elements 1[d] and 1[e]	7
2.	MRI Has Not Established that a POSITA Would Have Been Motivated to Combine the Prior Art of Ground 3 to Arrive at Limitation [1c]	20
B.	The Prior Art Does Not Teach or Disclose the Additional Limitation of Claim 6	25
C.	The Prior Art Does Not Teach or Disclose 9[c].....	27
D.	The Prior Art of Ground 3 Does Not Teach or Disclose the Elements of Claims 11 and 13.....	29
1.	The Prior Art Does Not Teach or Disclose Claim 11	29
2.	The Prior Art Does Not Teach or Disclose 13[f] and 13[g]	30
VII.	GROUND 4: MRI Has Not Shown that Claim 4 or 10 Is Obvious Over the Combination of Karppanen, Gromatzky, Utsunomiya, and the Knowledge of a POSITA.....	31
A.	MRI Has Failed to Show that a POSITA Would Have Been Motivated and Had a Reasonable Expectation of Success in Combining Karppanen, Gromatzky, and Utsunomiya.....	32
B.	A POSITA Would Not Have Been Motivated To Combine Karppanen, Gromatzky, and Utsunomiya.....	33

1.	A POSITA Would Have Understood that Utsunomiya Solves Different Issues than Karppanen and Gromatzky.....	33
2.	A POSITA Would Not Have Been Motivated to Combine Karppanen and Gromatzky with Utsunomiya for its Airflow Velocity Rates.....	38
VIII.	GROUND 1: MRI Has Not Shown that Claim 1–3, 5–7, 9, 11, or 13 Is Obvious Over the Combination of Nagayama, Gromatzky, and the Knowledge of a POSITA.....	43
A.	The Prior Art of Ground 1 Does Not Disclose All Limitations of Claim 1	43
1.	MRI Has Not Established That a POSITA Would Have Been Motivated to Combine the Prior Art of Ground 1 to Arrive at Limitation 1[c]	43
2.	The Prior Art Does Not Teach or Disclose Limitations 1[d] and 1[e]	46
B.	The Prior Art Does Not Teach or Disclose Claim 6	53
C.	MRI Has Failed to Meet its Burden on Claim 9	54
D.	The Prior Art of Ground 1 Does Not Teach or Disclose the Temperature Sensor of Claims 11 and 13	55
1.	The Prior Art Does Not Teach or Disclose Claim 11	55
2.	The Prior Art Does Not Teach or Disclose 13[f] and 13[g]	56
IX.	GROUND 2: MRI Has Not Shown that Claim 4 or 10 Is Obvious Over the Combination of Nagayama, Gromatzky, Utsunomiya, and the Knowledge of a POSITA.....	56
A.	The Petition Fails to Set Forth Any Analysis of Motivation to Combine These References	57
B.	A POSITA Would Not Have Been Motivated To Combine Nagayama, Gromatzky, and Utsunomiya.....	58
1.	A POSITA Would Have Understood that Utsunomiya Solves Different Issues than Nagayama and Gromatzky	58
2.	A POSITA Would Not Have Been Motivated to Combine Nagayama and Gromatzky with Utsunomiya for its Airflow Velocity Rates	61
X.	Conclusion	63

TABLE OF AUTHORITIES

	Page(s)
CASES	
<i>American Well Corp. v. Teladoc Health, Inc.</i> , IPR2021-00748, Paper 23 (PTAB Feb. 28, 2022).....	6
<i>Apple Inc. v. MPH Techs. Oy</i> , 28 F.4th 254 (Fed. Cir. 2022)	32, 41, 62
<i>Cutsforth, Inc. v. MotivePower, Inc.</i> , 636 F. App’x 575 (Fed. Cir. 2016)	11
<i>Fid. Nat’l Info. Servs., Inc. v. DataTreasury Corp.</i> , No. IPR2014-00490, Paper 9 (PTAB Aug. 13, 2014).....	22, 45, 58
<i>Forest Lab’ys Holdings Ltd. v. Mylan Inc.</i> , 206 F. Supp. 3d 957 (D. Del. 2016).....	18
<i>In re Gal</i> , 980 F.2d 717 (Fed. Cir. 1992)	11
<i>Ex Parte Li Xiong, Chuan Hu, Arnold Overwijk, & Junaid Ahmed</i> , Appeal 2023-001797, 2023 WL 6387858 (PTAB Sept. 27, 2023).....	26, 54
<i>Metalcraft of Mayville, Inc. v. The Toro Company</i> , 848 F.3d 1358 (Fed. Cir. 2017)	42
<i>Orexo AB v. Actavis Elizabeth LLC</i> , 903 F.3d 1265 (Fed. Cir. 2018)	19
<i>Pers. Web. Techs., LLC v. Apple, Inc.</i> , 848 F.3d 987 (Fed. Cir. 2017)	16, 50
<i>Phillip Morris Prods. S.A. v. Int’l Trade Comm’n</i> , 63 F.4th 1328 (Fed. Cir. 2023)	15
<i>Polaris Industries, Inc. v. Arctic Cat., Inc.</i> , 882 F.3d 1056 (Fed. Cir. 2018)	23, 24

<i>TCL Commc’n Tech. Holdings Ltd. v. DataQuill Ltd.</i> , No. IPR2020-00746, Paper 21 (PTAB Sept. 18, 2020).....	38, 55
<i>TQ Delta, LLC v. CISCO Sys., Inc.</i> , 942 F.3d 1352 (Fed. Cir. 2019)	45
<i>Xerox Corp. v. Bytemark, Inc.</i> , IPR2022-00624, Paper 9 (PTAB Aug. 24, 2022).....	17, 23, 39, 45

TABLE OF EXHIBITS

Exhibit No.	Description of Document
2001	<i>Reserved.</i>
2002	Curriculum vitae of Bruce W. Smith, Ph.D. (Smith CV)
2003	Willem den Boer, Active Matrix Liquid Crystal Displays: Fundamentals and Applications (2005) (den Boer)
2004	<i>Reserved.</i>
2005	<i>Reserved.</i>
2006	<i>Reserved.</i>
2007	Disclaimer in Patent Under 37 C.F.R. 1.321(a) for claim 12 of U.S. Patent No. 8,223,311, filed November 8, 2023 (Disclaimer for '311)
2008	Declaration of Bruce W. Smith, Ph.D. (Smith Decl.)
2009	<i>Reserved.</i>
2010	Declaration of Srikanth K. Reddy in Support of Motion for Pro Hac Vice Admission Under 37 C.F.R. § 42.10(c)
2011	Declaration of Christine Potkay in Support of Motion for Pro Hac Vice Admission Under 37 C.F.R. § 42.10(c)
2012	Final Initial Determination on Violation of Section 337 in <i>Components for Certain Environmentally-Protected LCD Digital Displays and</i>

Exhibit No.	Description of Document
	<i>Products Containing Same</i> , Investigation No. 337-TA-1349, dated April 16, 2024 (Public Redacted Version)
2013	Deposition Transcript of Dr. Carl D. Meinhart, dated May 7, 2024
2014	Excerpt of Respondent's <i>Markman</i> Brief, Inv. No. 337-TA-1349, dated April 12, 2023

I. Introduction

Pursuant to 37 C.F.R. § 42.120, Patent Owner Samsung Electronics Co., Ltd. (“Samsung”) submits this Response to Manufacturing Resources International, Inc.’s (“MRI”) Petition challenging claims 1–7, 9–11, and 13 (the “challenged claims”) of U.S. Patent No. 8,223,311 (“the ’311 patent”).¹

As the Board recognized in the Institution Decision, MRI has failed to meet its burden of proof with respect to certain of its asserted obviousness arguments—specifically, Grounds 1 and 2 and a portion of Ground 3—because MRI’s Petition fails to even argue the necessary elements of obviousness. As a result, MRI’s Petition fails to sufficiently allege (1) that the challenged claims are invalid in light of the combination of Nagayama and Gromatzky or (2) that claim 11 is invalid in light of any asserted ground. MRI’s arguments on these grounds must fail.

Considering MRI’s remaining arguments, however, MRI has failed to carry its burden of showing that the challenged claims are invalid. First, MRI fails to explain how the cited prior art discloses all elements of the challenged claims. The ’311 patent claims a display panel with an innovative arrangement of elements designed to maximize the removal of heat from inside the digital display. In particular, every challenged claim includes a display device comprising a liquid

¹ Claim 12 was disclaimed and is not at issue. Institution Decision (“ID”) (Paper 10), 2.

crystal panel and a protection panel with a channel therebetween. Such claims also include a temperature sensor that measures the temperature of air inside the display device, including the air discharged from the front channel. The measured temperature is relied on to operate the display's cooling system, including signaling a fan to operate such that the air in the channel is turbulent and has a flow velocity in a specific range. The prior art on which MRI relies does not disclose the elements in this claimed arrangement. Indeed, none of the prior art cited in the asserted combinations measures the temperature of air anywhere inside a display device. Second, MRI fails to establish that a person of ordinary skill in the art ("POSITA") would have been motivated to either modify the lead references Nagayama or Karppanen, or combine those references with secondary references in the manner claimed.

As explained in more detail below, MRI has failed to meet its burden of proving that any challenged claim is unpatentable.

II. Related ITC Proceeding

On April 16, 2024, Administrative Law Judge MaryJoan McNamara issued a Final Initial Determination ("FID") on Violation of Section 337 in related matter, *Components for Certain Environmentally Protected LCD Digital Displays and Products Containing Same*, Inv. No. 337-TA-1349. Ex. 2012. In that proceeding, MRI argued that claims 4, 6, and 13 of the '311 patent are invalid as obvious over

Gromatzky (Ex. 1007) in view of Karppanen (Ex. 1008), U.S. Patent No. 7,075,261 (“Burstein”), and Utsunomiya (Ex. 1010). *Id.*, 196. The ALJ held that MRI did not prove obviousness of these claims by clear and convincing evidence. *Id.*, 196–213. The ALJ credited testimony from Samsung’s expert Dr. Bruce Smith, who also submitted a declaration in this proceeding (Ex. 2008).

III. Overview of the ’311 Patent

The ’311 patent discloses an electronic display with an innovative configuration that improves heat dissipation, especially when the display is installed outdoors. In particular, the ’311 patent claims electronic display devices having a channel between the protection panel and the display and a flow control device to impart and control air flow in a channel to manage the temperature of the display. Ex. 1001 (’311 patent), 1:61–67. Air flow is controlled based on a temperature sensor that measures the temperature of air inside the display device, including the air discharged from a front channel. *Id.*, 2:40–43.

The ’311 patent further discloses that “[t]he LCD device of the present general inventive concept is configured such that the air passing through the first channel 41 can sufficiently absorb the heat incident on the front side of the liquid crystal panel 21, taking into consideration the fact that the degradation of liquid crystals occurs due to the heat incident on the front side of the liquid crystal panel 21. Thus, if the air passing through the first channel 41 is turbulent, the turbulent air flow can

considerably remove the heat incident on the front side of the liquid crystal panel 21, compared to a laminar flow.” *Id.*, 6:25–39.

The ’311 patent discloses a range of flow velocity for the front channel, explaining “the flow velocity of air must be at least 4 m/s in order to generate a turbulent flow, where the channel has the spacing distance of 0.005 m” and “regulating the flow velocity up to a maximum value of 14 m/s required to prevent degradation of liquid crystals.” *Id.*, 9:24–42. Thus, “the flow rate controller 51 regulates the flow rate of air in the cooling fan 32 according to a signal transmitted from the temperature sensor 52 such that the air in the first channel has a flow velocity ranging from 4 m/s to 14 m/s.” *Id.*, 9:42–48.

IV. Level of Ordinary Skill in the Art

The definition of the level of skill of a POSITA that MRI included in the Petition is different from the definition the parties applied, and the ALJ adopted, in the ITC proceeding.

The ALJ adopted the following definition of a POSITA for the ’311 patent:

A POSITA would have had either: (1) a bachelor’s degree in a pertinent discipline, such as mechanical engineering, electrical engineering, physics, applied physics, product design, or a related field and at least two years of experience in working with electronic displays; or (2) at least five years of experience in working with electronic displays. A POSITA’s experience working with

electronic displays would include experience working with thermal management associated with electronic displays and design issues associated with outdoor electronic displays. A POSITA would have been able to consult with person(s) skilled in other arts if necessary.

Ex. 2012 (FID), 29.

Notably, the parties' proposed definitions in the ITC required that a POSITA would need experience working specifically with electronic displays (*see, e.g.*, Ex. 2014, 2–3), but MRI's proposed definition in this proceeding omits that requirement (Petition, 7). This is likely because MRI's expert in this proceeding, Dr. Meinhart, cannot recall any experience working with electronic displays. Ex. 2013 (Meinhart Tr.), 22:2–11. Patent Owner's expert Dr. Smith, however, has experience working with electronic displays (Ex. 2008, ¶¶ 12, 15), and therefore would meet the requirements of a POSITA under either definition.

It is Patent Owner's position that the ITC's definition is the proper level of skill of a POSITA.

V. MRI Cannot Meet its Burden of Proof Regarding Grounds 1 and 2 and a Portion of Ground 3

As the Board recognized, MRI's Petition does not adequately articulate its invalidity positions for Grounds 1 and 2 because it lacks any explanation of why a POSITA would have been motivated to combine Nagayama and Gromatzky to arrive at the claimed turbulent airflow. ID, 36–37. Additionally, MRI's Grounds 1 and 3

fail to articulate an argument that claim 11 is invalid because MRI entirely failed to address the limitations of claim 10, on which claim 11 relies. ID, 32, 40.

MRI's failure of proof for these claims cannot be remedied at this stage of the proceeding. To the extent MRI seeks to introduce new expert testimony, new arguments regarding the motivation to combine Nagayama and Gromatzky, or arguments addressing the elements of claim 10 in Grounds 1 and 3, that evidence would improperly change—not supplement—the grounds that MRI initially presented in its Petition. The Board has rejected attempts to add testimony and arguments regarding issues that are wholly absent from the Petition because such modifications run counter to 35 U.S.C. § 312. *See, e.g., American Well Corp. v. Teladoc Health, Inc.*, IPR2021-00748, Paper 23, 12–13 (PTAB Feb. 28, 2022).

MRI, therefore, cannot carry its burden of proving that the challenged claims are invalid as obvious in light of Nagayama in view of Gromatzky and the knowledge of a POSITA, and cannot carry its burden of proving that claim 11 is invalid as obvious in light of Karppanen in view of Gromatzky and the knowledge of a POSITA.

VI. GROUND 3: MRI Has Not Shown that Claim 1–3, 5–7, 9, 11, or 13 Is Obvious Over the Combination of Karppanen, Gromatzky, and the Knowledge of a POSITA

MRI's Ground 3 asserts that the challenged claims are obvious in view of Karppanen, Gromatzky, and the knowledge of a POSITA. Petition, 38. Karppanen

and Gromatzky, however, do not disclose certain elements of the claims, and MRI cannot carry its burden of proving that a POSITA would have been motivated to combine Karppanen with Gromatzky or to modify Karppanen in view of the alleged knowledge of a POSITA to arrive at the claimed invention.

A. The Prior Art of Ground 3 Does Not Disclose All Limitations of Claim 1

1. The Prior Art Does Not Teach or Disclose Elements 1[d] and 1[e]

a. Karppanen Does Not Teach a “temperature sensor to measure the temperature of air discharged from the channel” or controlling air flow according to the “measured temperature”

Limitation 1[d] requires “a temperature sensor to measure the temperature of air discharged from the channel.” Ex. 1001 (’311 patent), claim 1. MRI admits that Karppanen “does not expressly disclose that [its] transducers measure air discharged from the channel.” Petition, 43. Instead, Karppanen’s transducers are used to measure the temperature of physical components in its display and device casing. Ex. 2008 (Smith Decl.) ¶¶ 78–79.

Karppanen discloses that its system includes a display casing 50 and device casing 60, explaining:

[i]nside the frame 40 there is a *device casing 60* fastened to the upper part of the back wall 52 of the *display casing 50*, inside of which device casing has been placed essentially all electronic equipment 52 required for

controlling the display element 30 and the whole information board, such as a computer, a control unit of the display and power supplies of the control unit and the display's background light.

Ex. 1008 (Karppanen), 6:31–7:1 (emphasis added).

Karppanen explains the following with respect to its cooling system:

circulating air flow running through the device and display casing is generated with the help on which the *temperature of the casings is maintained within desired limits*. The circulating air flow rinses the surface of the parts that warm up, such as that of the display element, whereupon the heat transfers effectively from the warming up components directly to the air flow. *Inside the device and display casing are placed transducers (not shown in the figures) that measure the temperature* and are connected to the control unit in the device casing of the information board.

Id., 9:9–16 (emphasis added). Karppanen further explains that through this cooling air circulation, “the temperatures of the inner parts of the display casing and the device casing can be standardized and the heat can be effectively transferred away from the inside of the casings.” *Id.*, 9:19–21. MRI’s expert agreed that the “inner parts of the display casing and the device casing” refers to the physical components of the display casing and device casing. Ex. 2013 (Meinhart Tr.), 42:5–21. Karppanen emphasizes that “[t]he circulation of the inner space air enables the

cooling of the edges of the display element especially in the upper parts of the display casing.” Ex. 1008 (Karppanen), 9:24–25.

Based on these disclosures, a POSITA would have understood that Karppanen’s transducers measure the temperature of the physical elements of the electronic information board rather than the temperature of any of the air inside the frame 40. Ex. 2008 (Smith Decl.) ¶¶ 78–79; *see also* Ex. 2012 (FID), 204 (finding that Karppanen’s transducers measure “the temperature of the components of the device rather than the temperature of air flow.”). Specifically, Karppanen provides that “a circulating air flow running through the device and display casing is generated with the help on which the *temperature of the casings is maintained* within desired limits . . . [i]n the device and display casing are placed transducers (not shown in the figures) that *measure the temperature* and are connected to the control unit in the device casing of the information board.” Ex. 1008 (Karppanen), 9:9–16 (emphasis added); Ex. 2013 (Meinhart Tr.), 42:5–21 (“So [Karppanen’s] talking about stabilizing temperatures of two physical components, display casing and device casing.”). Likewise, Karppanen provides that “[w]hen the information board is in operation, the display element 30 and the electronic devices 62 in the device casing warm up, whereby the temperature of the device casing 60 and the display casing 50 rises.” *Id.*, 9:4–6. Accordingly, the ALJ found that Karppanen does not disclose “a temperature sensor that measures the temperature of air discharged from

the channel between the liquid crystal panel and the protection panel as recited in claim element 1[d] of the '311 patent.” Ex. 2012 (FID), 202.

Limitation 1[e] further requires “a flow rate controller to control air flow through the channel according to the measured temperature.” Ex. 1001 ('311 patent), claim 1. Because the “measured temperature” refers to the measured temperature of air inside the display, including the temperature of air discharged from the channel, Karppanen also does not disclose 1[e].

MRI does not rely on any teaching of Gromatzky for these claim elements. *See* Petition, 42–45. MRI’s Petition, therefore, fails to point to any prior art reference that teaches or discloses these claim elements. MRI relies entirely on the knowledge of a POSITA to supply these claim elements, but as explained further below, MRI cannot meet its burden to prove that the challenged claims are unpatentable.

b. MRI Failed to Establish Motivation to Modify Karppanen to Utilize the Claimed Temperature Sensor

MRI attempts to cure the failures of the prior art regarding limitations 1[d] and 1[e] by arguing that the placement and function of the temperature sensor is merely a “design choice” (*see* Petition, 27), but as the Board recognized (ID, 22), MRI’s argument is flawed. First, the placement of the temperature sensor in the '311 patent is not a mere “design choice.” Second, MRI’s contention that the location of the temperature sensor would have merely been a “design choice” is, on its own,

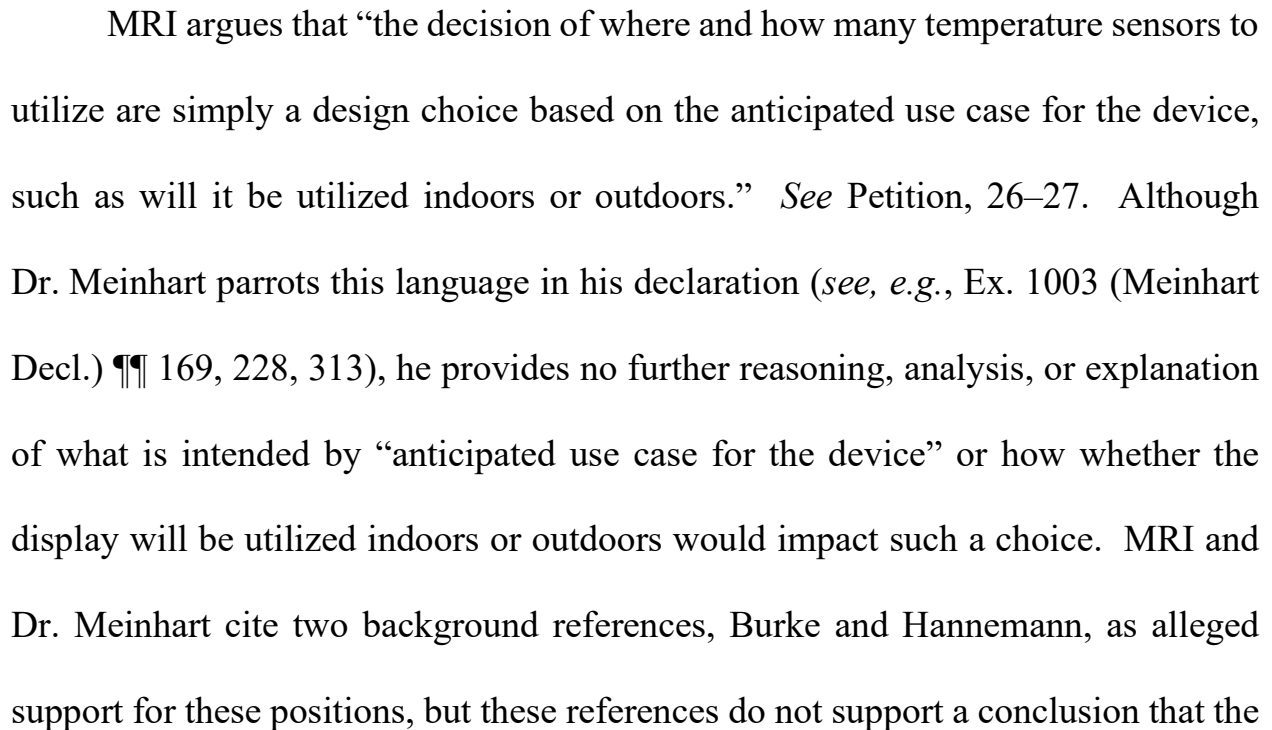
insufficient to show obviousness. *Cutsforth, Inc. v. MotivePower, Inc.*, 636 F. App'x 575, 578 (Fed. Cir. 2016) (“Merely stating that a particular placement of an element is a design choice does not make it obvious. The Board must offer a reason for why a [POSITA] would have made the specific design choice . . .”). As described further below, MRI has provided no motivation for this proposed modification to Karppanen outside the hindsight of the invention of the '311 patent.

i. The Claimed Temperature Sensor Is Not a Mere “Design Choice”

As the Board recognized in its Institution Decision (at 22), the placement of the temperature sensor, which impacts the function of the system, is not simply a design choice in the '311 patent (Ex. 2008 (Smith Decl.) ¶¶ 85–86), and therefore, an obviousness argument based on “design choice” must fail. The Federal Circuit has explained that a claimed feature that performs a different function than the prior art cannot be found to be an obvious design choice. *In re Gal*, 980 F.2d 717, 719–20 (Fed. Cir. 1992) (finding of obvious design choice reversed where claimed structure and function differed from the prior art). MRI has not, and cannot, point to a prior art reference in which the temperature sensor is performing the same function as the claimed sensor.

Here, the '311 patent discloses that its invention is directed to the removal of heat from the front side of a liquid crystal panel to address challenges in utilizing LCD devices outdoors where they are exposed to sunlight for long periods of time.

See Ex. 1001 ('311 patent), 1:48–52 (“[T]he present general inventive concept is directed [at] an LCD device with a heat dissipation structure to remove or release heat incident on a front side of a liquid crystal panel.”). As illustrated below in annotated Figures 2 and 10 of the '311 patent, the “temperature sensor 52” is placed in a location within the display device to “determine[] the temperature when the air absorbed heat as much as possible while passing through the first to third channels.” *Id.*, 8:65–9:2. The specification further describes that “the flow rate controller 51 regulates the flow rate of air in the cooling fan 32 according to a signal transmitted from the temperature sensor 52” *Id.*, 9:45–47. Thus, the specification discloses that the benefit of the claimed temperature sensor is that its location and function enables measurement of the maximum temperature of the display unit, taking into consideration the temperature of air in the display, including the temperature of air in front of the display (which is exposed to sunlight). *See* Ex. 2008 (Smith Decl.) ¶ 86. That temperature information then helps determine the operation of the fan that allows for the effective removal of heat incident on the front side of the liquid crystal panel. *Id.* The claimed temperature sensor is thus critical to the function of the '311 patent's invention. *Id.* The temperature sensor is shown in Figures 2 and 10 as annotated below:



placement of the temperature sensor is a mere “design choice.” MRI cites to the following disclosure from Hannemann:

[t]he interior temperature is monitored by at least one temperature sensor that is advantageously arranged in the upper region of the display unit. The number of the temperature sensors and their physical location within the display unit can vary without modifying the spirit of the invention. Said sensors can also be used to regulate the cooling or heating.

Petition, 27 (citing Ex. 1013 (Hannemann), [0019]).

MRI additionally cites to the following disclosure from Burke:

As shown in the exemplary embodiment depicted in FIG. 5, the controller 500 also monitors the temperature in the backlit LCD monitor through temperature sensors 502. Multiple temperature sensors 502 may be used in the backlit LCD monitor. For example, one temperature sensor 502 may monitor the temperature in the electronics chamber and another temperature sensor 502 may monitor ambient temperature in the closed air space, or backlight chamber, between the backlight assembly 100 and the cooling assembly 300.

Petition, 26–27 (citing Ex. 1011 (Burke), 6:24–33).

These disclosures, if anything, suggest that a POSITA would have many possible options available for the placement of temperature sensors (Ex. 2008 (Smith

Decl.) ¶ 90) and that this is not an instance where there would have been only a few known, predictable solutions. *See, e.g., Phillip Morris Prods. S.A. v. Int’l Trade Comm’n*, 63 F.4th 1328, 1346–48 (Fed. Cir. 2023) (claimed feature was not an “obvious design choice” where there was no evidence to support that there were only three possible locations and there were a multitude of design considerations such that it was not a case “in which there were only a few known, predictable solutions available”). Indeed, MRI argues that “it was well known at the time of the alleged invention that temperature sensors could be placed in a *variety* of locations” (Petition, 26) (emphasis added), and has not provided any evidence or support that a POSITA would have been working from a “narrow list of known and available design choices.” *See Phillip Morris*, 63 F.4th at 1345. Dr. Meinhart likewise acknowledges that the temperature sensor could “be varied as needed to allow for thermal regulation” (Ex. 1003 (Meinhart Decl.) ¶ 228), and testified at deposition that a POSITA’s determination as to “where to put the temperature sensor” would be “based on many factors,” including “the temperature they are most interested in,” and is dependent “upon the specific design, and the operating conditions” (Ex. 2013 (Meinhart Tr.), 45:15–47:7).

Thus, MRI’s reliance on “design choice” for its obviousness argument related to the location and function of the temperature sensor must fail.

ii. MRI Has Not Established Any Reason a POSITA Would Have Modified Karppanen's Temperature Sensor

Absent the ability to rely on a “design choice,” MRI must prove that a POSITA would have had a specific motivation to make the alleged modifications to arrive at the claimed invention. MRI's Petition, however, does not point to any prior art with a temperature sensor in the claimed location and provides only conclusory statements to support its asserted modification. MRI has thus failed to establish a motivation to modify Karppanen to place its transducers to measure the temperature of air discharged from the channel as claimed.

First, MRI's arguments that “a POSITA would recognize that the transducers *could be* positioned in a different location within the display casing” and that “a POSITA *could position* the transducers to measure air temperature of air flowing in the casing” (Petition, 43) (emphasis added) suggest an improper hindsight analysis and fail to show the claim is unpatentable, because the Petition has not set forth sufficient evidence of *why* a POSITA would have done so. *Pers. Web. Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017) (“obviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”) (citation omitted) (emphasis in original). Dr. Meinhart's deposition testimony is illustrative of this same error in his own analysis. *See, e.g.*, Ex. 2013 (Meinhart Tr.), 37:7–11 (“And based upon my analysis, it would be obvious that one *could* readily

place the temperature sensor near the exit. I don't know if Karppanen specifically does that.") (emphasis added).

MRI does not have any evidence to support its proposed modification beyond Dr. Meinhart's conclusory testimony that one "option" would be to monitor the temperature of air flowing past the panel, which "would provide an accurate indication of the temperature of the LCD panel because the air would have passed over a larger portion of the panel." Ex. 1003, ¶¶ 314; *see* Petition, 44 (citing Ex. 1003, ¶¶ 313–14). Dr. Meinhart testified at his deposition that the only support for his opinion is the general knowledge of a POSITA. Ex. 2013 (Meinhart Tr.), 66:16–17. His conclusion, however, is not supported by any evidence in the record outside of the hindsight teachings of the '311 patent itself. This is insufficient to establish a motivation to modify the location and type of temperature sensor. *See Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9, 15–16 (PTAB Aug. 24, 2022) (precedential) (verbatim recitations of the assertions in the petition without additional technical support "is particularly problematic in cases where, like here, expert testimony is offered not simply to provide a motivation to combine prior-art teachings, but rather to supply a limitation missing from the prior art."); *see also* Ex. 2012 (FID), 204 (upon a similar record at the ITC, finding prior art "is either ambiguous with respect to when and where temperature is measured, or teaches that

a different temperature than the temperature of air discharged from the channel is measured.”).

Further, contrary to Dr. Meinhart’s contentions, the “option” of monitoring the temperature of air flowing past the panel does not “align[] with Karppanen’s express description.” *See* Ex. 1003 (Meinhart Decl.) ¶ 314. There is no dispute that Karppanen discloses that its airflow is counterclockwise around the display element. *Id.*, ¶ 161. Placing the temperature sensor in a location to measure the temperature of air “after air has flown past the display” as Dr. Meinhart contends (*id.*, ¶ 314) would therefore place the sensor at the bottom of Karppanen’s display casing. Karppanen, however, in addition to disclosing that its transducers measure the temperature of components in the display casing, emphasizes that heat accumulates in the *upper* parts of the display. Ex. 2008 (Smith Decl.) ¶ 100. Specifically, Karppanen discloses that the “transparent window” causes “a significant rise of temperature in the upper parts of the display especially on the visible side of the display.” Ex. 1008 (Karppanen), 2:19–21. Therefore, according to Karppanen, “the temperatures of the upper parts set a limit to the highest possible operating temperature allowed for the whole display device.” *Id.*, 2:31–33. Thus, there is no support in Karppanen for the modification that MRI proposes, and rather, Karppanen’s disclosure contradicts it. *See, e.g., Forest Lab’ys Holdings Ltd. v. Mylan Inc.*, 206 F. Supp. 3d 957, 989 (D. Del. 2016) (failure to offer “any

meaningful explanation as to why one skilled in the art would have made this particular combination . . .” merits a finding of non-obviousness “especially . . . where the alleged modification specifically contradicts the very teaching of the reference.” (citing *Daiichi Sankyo Co., Ltd. v. Matrix Labs., Ltd.*, 619 F.3d 1346, 1356 (Fed. Cir. 2010)). Finally, MRI’s citation of Burke and Hannemann (Petition, 43–44) does not resolve these deficiencies because Burke and Hannemann do not disclose or suggest measuring the temperature of air discharged from the channel. Ex. 2008 (Smith Decl.) ¶ 90. Burke does not disclose a channel in front of an LCD, instead disclosing exemplary locations for a temperature sensor in its system, including in its electronics chamber and in its backlight chamber. Ex. 1011 (Burke), 6:24–33. Hannemann likewise does not disclose a temperature sensor to measure the temperature of air in a channel in front of an LCD; it merely discloses generally the use of temperature sensors in a display unit. Ex. 1013, [0019]. Indeed, MRI does not rely on these references as teaching any location of a temperature sensor. Petition, 43–44; Ex. 2013 (Meinhart Tr.), 62:15–20; 65:20–66:15. MRI’s argument is essentially that these exemplary temperature sensor locations would make *any* location of a temperature sensor obvious, but MRI’s evidence does not support such a broad conclusion, and it has not otherwise provided evidence to support a finding of motivation to modify Karppanen in this specific way. *Orexo AB v. Actavis Elizabeth LLC*, 903 F.3d 1265, 1272 (Fed. Cir. 2018)

(“The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification.”) (quotation omitted); *see also* Ex. 2012 (FID), 200 (“Hanneman neither teaches nor suggests that the temperature sensor measures the temperature of air discharged from the ‘volumetric flow channel.’”).

Ultimately, MRI provides no support in the prior art for its contention that it would have been obvious to modify Karppanen’s temperature sensor, outside the hindsight of the ’311 patent. Therefore, MRI has not established that a POSITA would have been motivated to combine Karppanen, Gromatzky, and the knowledge of a POSITA to arrive at limitations 1[d] and 1[e].

2. MRI Has Not Established that a POSITA Would Have Been Motivated to Combine the Prior Art of Ground 3 to Arrive at Limitation [1c]

Limitation 1[c] requires “a flow control device to impart turbulence to an air flow in the channel.” Ex. 1001 (’311 patent), claim 1. MRI relies exclusively on Gromatzky for this limitation. Petition, 41–42. The Petition, however, fails to establish a motivation to combine Gromatzky with Karppanen to arrive at the claimed invention and fails to establish that a POSITA would have had a reasonable expectation of success for this combination. Further, Gromatzky would not have motivated a POSITA to utilize turbulent airflow in a display system.

a. The Petition Fails to Establish Motivation to Use, and Reasonable Expectation of Success in Utilizing, Turbulent Airflow in Karppanen’s System

It is undisputed that Karppanen does not “expressly disclose using fans to ‘impart turbulence to an air flow.’” Petition, 42. Instead, MRI appears to rely on the disclosures of Gromatzky for this limitation. *Id.*

The entirety of MRI’s analysis of motivation to combine Karppanen and Gromatzky (*id.*, 19–21) to utilize turbulent airflow, however, is MRI’s conclusory statements that “a POSITA would recognize that Karppanen’s fans could be used to generate turbulent air flow, and using those fans to generate turbulent air flow would have been a simple design choice” and “[a] POSITA would recognize that turbulent air flow is an efficient air flow for removing heat in certain applications” (*id.*, 21). As support, MRI cites solely to paragraph 85 of the Meinhart declaration (*id.*), but paragraph 85 does not provide any analysis of this issue (or mention Karppanen) (*see* Ex. 1003 (Meinhart Decl.) ¶ 85). MRI’s lack of clarity in its arguments requires Samsung—and the Board—to wade through the record to determine what specific arguments MRI is making.²

² The Board noted that the citations to the Meinhart declaration in the section of the Petition titled “Motivation to Combine Karppanen with Gromatzky” appeared incorrect and cited to paragraphs 60–62 of the Meinhart declaration. ID, 17 n. 5.

MRI's analysis of limitation 1[c] fails to address what disclosure of Karppanen MRI contends, as modified by Gromatzky, would teach this limitation. *See* Petition, 41–42. MRI vaguely refers to Karppanen's teachings regarding the use of fans in its cooling system, but does not explain why or how a POSITA would have modified Karppanen's fans based on Gromatzky and has not set forth why a POSITA would have had a reasonable expectation of success in doing so. *See* Petition, 41–42. MRI again cites to paragraphs of the Meinhart declaration on page 42 (citing Ex. 1003, ¶¶ 309–10), but fails to discuss any information provided by Dr. Meinhart. *See* Petition, 42. To the extent the Petition cites the declaration without discussing the significance of any such information (*see id.*), the Board should disregard those citations. *Fid. Nat'l Info. Servs., Inc. v. DataTreasury Corp.*, No. IPR2014-00490, Paper 9, 9–10 (PTAB Aug. 13, 2014) (“Under our rules, the Petition must contain a ‘full statement of the reasons for the relief requested, including a detailed explanation of the significance of the evidence . . .’ [w]e, therefore, decline to consider information presented in a supporting declaration, but not discussed sufficiently in a petition . . .”) (quoting 37 C.F.R. § 42.22(a)(2)).

Even turning to the declaration, Dr. Meinhart's analysis does not resolve the deficiency in the Petition. Rather, Dr. Meinhart merely states without supporting evidence or reasoning, that “it would have been obvious to try a fan that generates turbulent air.” Ex. 1003 (Meinhart Decl.) ¶ 310. Again, Dr. Meinhart's declaration

oversimplifies the issue and does not provide the Board with sufficient explanation of how or *why* a POSITA would have implemented turbulent airflow in Karppanen's system. Whether the use of turbulent airflow was a design choice alone does not make the invention of the '311 patent obvious. *Polaris Industries, Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1067–70 (Fed. Cir. 2018) (“The Board must offer a reason for why a person of ordinary skill in the art would have made the specific design choice . . .”). The Petition does not set forth sufficient evidence to support *why* a POSITA would have utilized turbulent airflow in Karppanen's system. Dr. Meinhart's statements do not provide additional explanation that would assist the Board with its analysis and instead provide only the precise type of conclusory testimony that the Board has cautioned against. *Xerox*, IPR2022-00624, Paper 9, 15.

Therefore, MRI has not established that Karppanen, Gromatzky, and the knowledge of a POSITA teach limitation 1[c].

b. Gromatzky Does Not Motivate the Use of Turbulent Airflow in a Display System

As Dr. Smith explains, a POSITA would not have been motivated by Gromatzky's disclosure to use turbulent airflow in Karppanen's display system. Ex. 2008 (Smith Decl.) ¶¶ 66–68. Gromatzky discloses that laminar airflow is preferred over turbulent airflow in a thin-depth enclosure. *Id.* Gromatzky explains:

[a] laminar flow fan 32 creates a sheet of air, rather than turbulent air, across the LCD module 26. *The laminar airflow is more efficient than turbulent airflow* for moving air and transferring heat from the front of the LCD module 26 to the rear portion 16 of the enclosure 12.

A more efficient fan 32 allows selection of a fan 32 that is smaller in size since it may require less rotations of the fan 32 to move an amount of air desired and/or move the same amount of air in a smaller airflow path 30. Each of these factors contributes to a smaller fan 32 size that in turn contributes to a thinner depth enclosure 12.

Ex. 1007 (Gromatzky), 5:4–15 (emphasis added).

As such, if anything, a POSITA would have been motivated to use laminar airflow in a display system based on Gromatzky's disclosure that laminar airflow is more efficient and allows for a thinner depth enclosure. Ex. 2008 (Smith Decl.) ¶¶ 65–68; Ex. 2013 (Meinhart Tr.), 88:8–15.

MRI has not provided any explanation in the Petition for why, based on Gromatzky's disclosures, a POSITA would nonetheless be motivated to utilize turbulent airflow in Karppanen's system. *Polaris Indus.*, 882 F.3d at 1069 (“even if a reference is not found to teach away, its statements regarding preferences are relevant to a finding regarding whether a skilled artisan would be motivated to

combine that reference with another reference.”). While Gromatzky contemplates using turbulent airflow in its system, Gromatzky does not describe any advantages or benefits of doing so; rather, Gromatzky describes that laminar airflow is preferred. Ex. 1007 (Gromatzky), 5:4–14. As Dr. Meinhart testified, there are engineering trade-offs between laminar and turbulent airflow, “and it very much depends upon the situation” and “specifics that are far beyond this paragraph [of Gromatzky].” Ex. 2013 (Meinhart Tr.), 84:17–22, 90:10–91:5. MRI and Dr. Meinhart have not done any analysis to account for these considerations in Karppanen’s display system and have therefore failed to establish that a POSITA would have been motivated to combine Karppanen and Gromatzky to utilize turbulent airflow in Karppanen’s system. *See Hamilton Beach Brands, Inc. v. f’real Foods, LLC*, 908 F.3d 1328, 1341–43 (Fed. Cir. 2018) (finding that “even if the prior art discloses the limitations Hamilton Beach identifies . . . the prior art does not identify a reason *why* a POSITA would have been motivated to combine those limitations,” explaining that while a prior art reference “contemplates that components can be cleaned without necessarily being removed from the machine, [it] provides no incentive or motivation or even commentary on why that would be desirable.”).

B. The Prior Art Does Not Teach or Disclose the Additional Limitation of Claim 6

As explained above, MRI has failed to show that claim 1 would have been obvious (*supra* § VI.A), and as such, has also failed to show claim 6 would have

been obvious. Even assuming MRI's showing regarding claim 1 is sufficient, however, MRI has not proven that the prior art combination discloses the additional element of claim 6, which requires that "the width of the channel is in a range of 5 to 25 mm."

MRI admits that Karppanen does not disclose claim 6. Petition, 48. Instead, MRI relies on Gromatzky and argues that "it would have been obvious to apply this specific distance to the display element and front plate of Karppanen to protect the display element and to allow air to flow in the front channel for thermal management." *Id.* MRI's analysis, however, is incomplete. Claim 6, which depends from claim 1, requires both a "flow control device to *impart turbulence*" to a channel (Ex. 1001 ('311 patent), claim 1), and a specific channel width "in a range of 5 to 25 mm" (*id.*, claim 6).

Although Gromatzky discloses a sole embodiment in which the depth of a channel is 9.4 millimeters, Gromatzky does not teach or suggest that a channel of that size is compatible with turbulent air flow. Ex. 2008 (Smith Decl.) ¶ 67. To the contrary, as explained above regarding claim element 1[c], Gromatzky teaches that laminar airflow is preferred over turbulent airflow because a fan generating laminar airflow is more efficient. Ex. 1007 (Gromatzky), 5:9–14. Neither MRI nor its expert engage with these disclosures, and MRI's cherry picking of elements from Gromatzky is insufficient to establish obviousness. *Ex Parte Li Xiong, Chuan Hu*,

Arnold Overwijk, & Junaid Ahmed, Appeal 2023-001797, 2023 WL 6387858, at *5 (PTAB Sept. 27, 2023) (“It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” (citation omitted)).

Therefore, MRI has not established that Karppanen, Gromatzky, and the knowledge of a POSITA teach claim 6.

C. The Prior Art Does Not Teach or Disclose 9[c]

Limitation 9[c] requires, in part, “a flow control device to detect temperature variation caused by heat incident on a front side of the liquid crystal panel” Ex. 1001 (’311 patent), claim 9. MRI relies solely on Karppanen for this claim limitation, but has not shown, and cannot show, that Karppanen teaches this limitation. The Petition does not allege that Karppanen explicitly discloses a temperature sensor configured as claimed, but seems to argue that this limitation would have been an obvious modification of Karppanen. The Petition consists only of MRI’s conclusory assertion that “a POSITA would recognize that Karppanen[] [’125’s] device is configured to detect temperature variation caused by heat incident on a front side of the liquid crystal panel, and to control a flow rate of air blowing toward a channel, i.e. the gap between display element 30 and front plate 54, based on that temperature measurement.” Petition, 50–51.

MRI cites to the Meinhart declaration in support of this contention (*id.* (citing Ex. 1003, ¶¶ 341–43)), but Dr. Meinhart’s opinions do not provide adequate support for MRI’s argument. In particular, Dr. Meinhart’s opinion that a POSITA would have understood Karppanen to disclose the limitation of claim 9 relies in part on his unsupported opinion that “it would have been obvious to locate the temperature sensor in a region of air flow immediately downstream from the display element, after air has flown past the display.” Ex. 1003 (Meinhart Decl.) ¶ 342. As described above for claim limitation 1[d] (*supra* § VI.A.1.a), Dr. Meinhart (and MRI) has not made that showing; rather, Karppanen’s disclosures indicate that temperature of the physical casings is measured and emphasize the removal of heat from the physical casings themselves. MRI makes no attempt at establishing that a POSITA would have had a motivation to modify Karppanen to relocate the temperature sensor in the manner of claim 9. Further, the Petition does not discuss any modifications to Karppanen that would meet this claim, let alone any motivation to make such modifications. *See* Petition, 50–51.

Therefore, MRI has not established that Karppanen, Gromatzky, and the knowledge of a POSITA teach claim 9.

D. The Prior Art of Ground 3 Does Not Teach or Disclose the Elements of Claims 11 and 13

1. The Prior Art Does Not Teach or Disclose Claim 11

Claim 11 depends from claim 10 and additionally requires “the flow control device further include a temperature sensor to detect a temperature variation of the air having passed through the channel, and the flow rate controller is operated according to a signal transmitted from the temperature sensor.” Ex. 1001 (’311 patent), claim 11. As explained above, and as the Board recognized (ID, 28), MRI has not put forth any evidence regarding whether the prior art cited in Ground 3 discloses or teaches the elements of claim 10, and therefore any arguments that claim 11 is unpatentable must fail.

Even setting aside MRI’s failure of proof regarding claim 10, MRI has also failed to prove the additional limitation of claim 11 would have been obvious. As described above for claim 1 (*supra* § VI.A), the transducers of Karppanen measure the temperature of the physical casings rather than the temperature of the air having passed through the channel, and MRI has failed to establish a motivation to modify Karppanen to achieve the claimed invention. MRI sets forth no separate arguments for claim 11, instead solely referring back to its arguments regarding claim elements 1[d] and 1[e]. Petition, 51.

For the same reasons described above for claim 1 (*supra* § VI.A), MRI has not established that Karppanen, Gromatzky, and the knowledge of a POSITA render claim 11 unpatentable.

2. The Prior Art Does Not Teach or Disclose 13[f] and 13[g]

Claim 13 requires, in part, a display device comprising “a temperature sensor to measure the temperature of air discharged from the channel” and “a flow rate controller [to] control the fan according to the measured temperature to regulate the flow rate of the air in the channel.” Ex. 1001 ('311 patent), claim 13. As described above for claim 1 (*supra* § VI.A), the transducers of Karppanen measure the temperature of the physical casings rather than the temperature of air discharged from the channel, and MRI has failed to establish a motivation to modify Karppanen to achieve the claimed invention. MRI sets forth no separate arguments for 13[f] and 13[g], instead solely referring back to its arguments regarding claim elements 1[d] and 1[e]. Petition, 53.

For the same reasons described above for claim 1 (*supra* § VI.A), MRI has not established that Karppanen, Gromatzky, and the knowledge of a POSITA render claim 13 unpatentable.

VII. GROUND 4: MRI Has Not Shown that Claim 4 or 10 Is Obvious Over the Combination of Karppanen, Gromatzky, Utsunomiya, and the Knowledge of a POSITA

MRI's Ground 4 asserts that claims 4 and 10 are obvious in view of Karppanen, Gromatzky, Utsunomiya, and the knowledge of a POSITA. As explained above, MRI has failed to show that claim 1, from which claim 4 indirectly depends, and claim 9, from which claim 10 directly depends, would have been obvious in view of Karppanen and Gromatzky. As such, MRI has also failed to show claims 4 and 10 would have been obvious.

Even assuming that MRI's showing regarding claims 1 and 9 is sufficient, however, MRI cannot show that the prior art disclosed the additional elements of claims 4 and 10. Claim 4 requires that the airflow in the channel have "a velocity in a range of 4 to 14 m/s," and claim 10 requires "a flow velocity of not less than 4 m/s when the channel . . . has a spacing distance in a range of 5 to 25 mm." Ex. 1001 ('311 patent), claims 4, 10. Karppanen and Gromatzky do not disclose these additional elements. MRI relies on a third reference, Utsunomiya, but MRI has not adequately articulated a reason why a POSITA would have been motivated to combine Karppanen, Gromatzky, and Utsunomiya to arrive at the claimed invention.

A. MRI Has Failed to Show that a POSITA Would Have Been Motivated and Had a Reasonable Expectation of Success in Combining Karppanen, Gromatzky, and Utsunomiya

The Petition fails to set forth why a POSITA would allegedly be motivated to combine Karppanen, *as modified* by Gromatzky, with Utsunomiya. *See* Petition, 17–18, 54–55. MRI addresses an alleged motivation to combine Karppanen with Utsunomiya, but does not address how or why a POSITA would have combined Karppanen as modified by Gromatzky with Utsunomiya. *See id.* MRI contends that a POSITA would have modified Karppanen to employ a specific channel width from an embodiment of Gromatzky, as well as turbulent airflow from a separate disclosure of Gromatzky. *See id.*, 48, 53–55. MRI then separately argues that a POSITA would have utilized the airflow velocities described by Utsunomiya in Karppanen’s front channel. *Id.*, 54–55. MRI fails to address why a POSITA would have been motivated to combine the airflow velocities of Utsunomiya with the system of Karppanen as modified by Gromatzky in the manner alleged and how or why a POSITA would have had a reasonable expectation of success in doing so. The section of the Meinhart declaration addressing this combination of prior art consists solely of conclusory assertions lacking factual support that does not resolve these deficiencies in the Petition. *See* Ex. 1003 (Meinhart Decl.) ¶¶ 64–65; *see also Apple Inc. v. MPH Techs. Oy*, 28 F.4th 254, 262 (Fed. Cir. 2022) (finding substantial evidence for PTAB’s rejection of expert testimony regarding motivation to combine

because it was “conclusory and was, as a whole, improperly guided by hindsight”). Thus, MRI has failed to establish motivation to combine and reasonable expectation of success for this combination of prior art.

B. A POSITA Would Not Have Been Motivated To Combine Karppanen, Gromatzky, and Utsunomiya

1. A POSITA Would Have Understood that Utsunomiya Solves Different Issues than Karppanen and Gromatzky

Even if MRI has adequately raised this obviousness argument, a POSITA would not have been motivated to combine Karppanen, Gromatzky, and Utsunomiya due to fundamental differences in the devices disclosed by these references and the problems intended to be addressed by each. Ex. 2008 (Smith Decl.) ¶¶ 115–19.

First, a POSITA would have recognized that the projector device of Utsunomiya is not the same as the viewable displays of Karppanen and Gromatzky. *Id.*; see also Ex. 1008 (Karppanen), Abstract, 2:31–33; Ex. 1010 (Utsunomiya), 4:12–18. Karppanen generally relates to an “electronic information board comprising a frame, a flat display element for presenting information and electronic equipment for controlling the operation of the information board.” Ex. 1008 (Karppanen), 1:3–5. Gromatzky generally relates to a “thermal management system for an LCD display having a thin depth enclosure.” Ex. 1007 (Gromatzky), 1:7–9. Thus, Karppanen and Gromatzky relate to backlit LCD displays, whereas, Utsunomiya relates to high-intensity lamp projectors used to project images onto

screens placed at a distance away from the projector. Ex. 1010 (Utsunomiya), 1:8–14, 4:12–18. Utsunomiya’s projector has a 0.8" lens and is intended to be used indoors. *Id.* Exemplary figures depicting the devices of Karppanen and Utsunomiya are below.

Fig. 1 of Karppanen, shown on the left, shows “a cross-sectional drawing of an electronic information board.” Ex. 1008 (Karppanen), 6:1–2. Figure 1 of Utsunomiya, shown on the right, includes “schematic diagrams of the configuration of a liquid crystal projector apparatus of a background related art, where Fig. 1(a) illustrates the appearance . . . and Fig. 1(b) illustrates the internal structure . . .” Ex. 1010 (Utsunomiya), 12:13–16, Fig. 1.

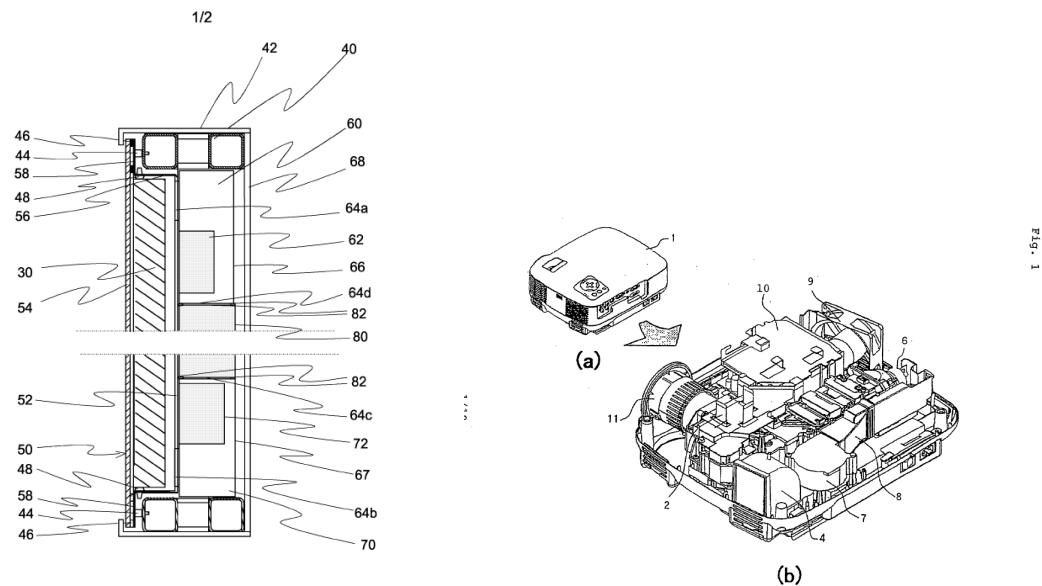


Fig. 1

The issues and challenges that confront large format LCD displays versus small LCD projectors differ, and a POSITA looking to modify Karppanen to

improve its temperature control would not look to Utsunomiya for this reason alone. Ex. 2008 (Smith Decl.) ¶ 119.

The problems that Karppanen and Utsunomiya seek to address are also different. Karppanen is directed to management of internal and external heat (*e.g.*, sunlight) in sealed displays operated in outdoor environments well above 25°C and much larger in size than liquid crystal projectors. Ex. 1008 (Karppanen), Abstract, 2:31–33, 2:19–26, 9:6–9. Karppanen describes a problem in the art that “[i]n addition to the own heat production of the devices also the ambient circumstances of the casings, such as the temperature of the location in which they are placed and sunshine, affect their warming up.” *Id.*, 9:6–9. Karppanen further explains:

[T]he present solutions have the problem of temperature control caused by the integration of the electronics controlling the display and the actual display. As a result, there are often situations in which heat is cumulated in certain parts of the device when components that are warming increase the temperatures of each other. If the design has not been critically checked, temperatures may become too high locally.

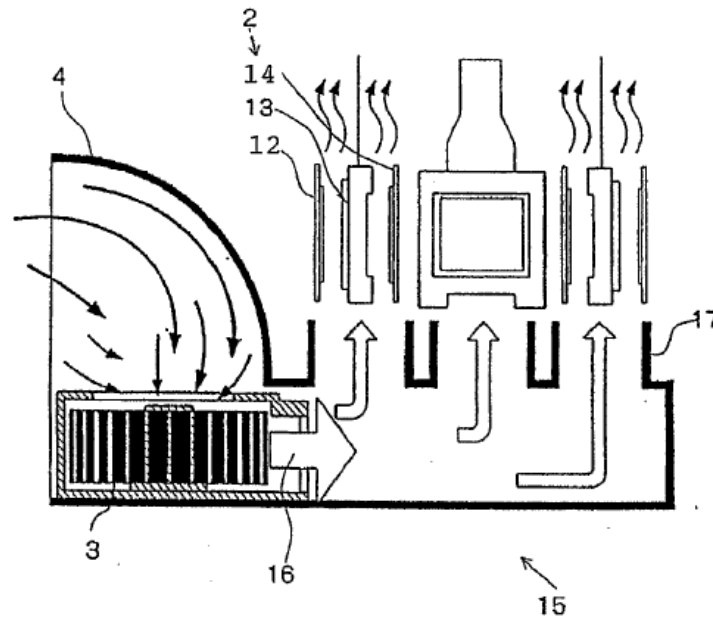
Id., 2:21–26. Karppanen explains that the “transparent window” in the front of the display causes “a significant rise of temperature in the upper parts of the display especially on the visible side of the display.” *Id.*, 2:19–21. Therefore, according to

Karppanen, “the temperatures of the upper parts set a limit to the highest possible operating temperature allowed for the whole display device.” *Id.*, 2:30–33.

By contrast, Utsunomiya generally relates to a small projector device and seeks to address the issue of heat generated by its indoor, high power lamp. The flow velocities recorded in Utsunomiya’s Figure 4 show the relationship between panel cooling air velocity and panel temperature for the 0.8" lens in indoor conditions of 25°C. Whereas the heat Karppanen seeks to manage is both internal heat from components and external heat from sunlight, Utsunomiya only seeks to manage increasing internal heat sources from “an increase in lamp power and a reduction in size of display device. . . .” Ex. 1010 (Utsunomiya), 4:12–18.

In particular, Utsunomiya describes that “[i]n Fig. 3B, liquid crystal unit 2 including incident-side polarizing plate 12, liquid crystal panel 13, and exit-side polarizing plate 14 is provided ... and air cooling device 15 including cooling fan 3 and cooling air duct 4 is disposed therebelow.” *Id.*, 4:3–6. Fig. 3B of Utsunomiya is shown below:

Fig. 3B



Id., Fig. 3B. Utsunomiya further describes that “air 16 from cooling fan 3 is fed into spaces among incident-side polarizing plate 12, liquid crystal panel 13, exit-side polarizing plate 14, which include each liquid crystal unit 2, from the lower end of liquid crystal unit 2 through discharge port 17 provided in cooling air duct 14 to perform forced air cooling.” *Id.*, 4:7–11.

MRI does not explain how a POSITA would have understood the cooling system of Utsunomiya, including the recorded airflow velocities, to compare to Karppanen’s system. To the contrary, a POSITA would have understood that the thermal management for heat sources from different locations puts different components at risk of damage, and accordingly require cooling different locations. Ex. 2008 (Smith Decl.) ¶ 119.

2. A POSITA Would Not Have Been Motivated to Combine Karppanen and Gromatzky with Utsunomiya for its Airflow Velocity Rates

MRI asserts that it “would have been obvious to combine the airflow velocities described in Utsunomiya’s Figure 4 with the cooling channel of Karppanen.” Petition, 54–55. As explained above, the Petition fails to set forth an explanation for why a POSITA would have combined the airflow velocities described in Utsunomiya with Karppanen as modified by Gromatzky. MRI’s sole support for its contention is a citation to paragraph 25 of the expert declaration of Dr. Meinhart, which does not address this issue. Similarly, in MRI’s discussion of motivation to combine Karppanen with Utsunomiya at Section VII.C of the Petition, MRI cites paragraphs 86, 87, and 88 of the Meinhart declaration, which likewise do not address this issue. MRI’s lack of clarity in its arguments improperly requires Samsung—and the Board—to wade through the record to determine what specific arguments MRI is making. *TCL Commc’n Tech. Holdings Ltd. v. DataQuill Ltd.*, No. IPR2020-00746, Paper 21 (PTAB. Sept. 18, 2020) (denying institution where petitioner’s argument merely quoted sections of the prior art “unaccompanied by requisite explanation of *how* the cited portions teach or disclose [the] limitations or of their significance to the analysis”). There is no evidence in support of MRI’s arguments discussed—or even cited—in the Petition.

Nonetheless, Dr. Meinhart opines that a POSITA “would be motivated to use the air flows disclosed by Utsunomiya as a basis for selecting suitable air flow speeds” and that “it would have been obvious to try air flows at or above 4.5 meters per second.” Ex. 1003 (Meinhart Decl.) ¶¶ 63–65. It is unclear what Dr. Meinhart means “as a *basis* for selecting suitable air flow speeds” because—while he suggests that the airflow velocities of Utsunomiya would not be equally applicable to Karppanen’s system—he does not provide any further explanation as to how a POSITA would have understood the disclosure of Utsunomiya to apply to Karppanen. Ex. 2008 (Smith Decl.) ¶ 120. Dr. Meinhart’s statements do not provide additional explanation that would assist the Board with its analysis and, accordingly, should not be credited. *Xerox*, IPR2022-00624, Paper 9, 15.

In relevant part, as relied on by MRI, Utsunomiya discloses a relationship between temperature and velocity with respect to its projector system in a laminar flow region, explaining that “a reduction in the operating temperature of the panel to some extent will result in a lower sensitivity of a change in panel temperature to a change in air velocity.” Ex. 1010 (Utsunomiya), 5:14–20. That relationship between temperature and velocity is shown below in Figure 4 of Utsunomiya, which is described by Utsunomiya as “a graph showing the relationship between a panel cooling air velocity and the panel operating temperature in 0.8"-SXGA (5000-lm class, 25°C environment).” *Id.*, 5:20–22.

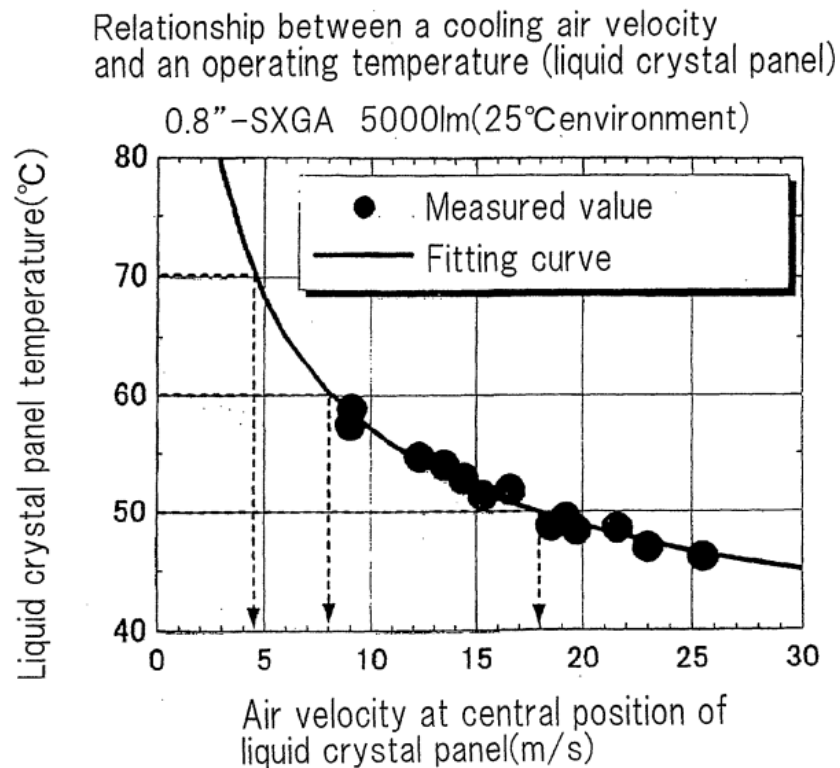


Fig. 4

Id., Fig. 4.

There is no teaching or suggestion in Utsunomiya that its air velocity ranges for a projector system with a 0.8" lens recorded at indoor temperatures of 25°C are applicable to large format LCD displays such that a POSITA would have been motivated to utilize them in Karppanen's display. Dr. Meinhart has also not identified any reason that a POSITA would have been motivated to look to Utsunomiya's disclosure and combine the specific flowrates with Karppanen as modified by Gromatzky. That a POSITA may have recognized that airflow speed "would be needed to design an effective cooling system for the device" (Ex. 1003 (Meinhart Decl.) ¶ 64) provides no support or explanation for why a POSITA would

have looked to Utsunomiya for that information, how or why a POSITA would have applied Utsunomiya's velocity and temperature teachings to Karppanen's display, or why a POSITA would have had a reasonable expectation of success in doing so. *See Apple*, 28 F.4th at 262 (finding substantial evidence for PTAB's rejection of expert testimony regarding motivation to combine because it was "conclusory and was, as a whole, improperly guided by hindsight").

Further compounding the deficiencies in MRI's Petition, the velocities recorded in Utsunomiya's Figure 4 are for a laminar flow region, not a turbulent airflow. Ex. 1010 (Utsunomiya), 5:14–20. The Petition and supporting declaration of Dr. Meinhart do not address how a POSITA would nonetheless have arrived at the invention recited in claim 4, which requires the use of turbulent airflow in the channel. Additionally, claim 10 further requires that the claimed channel have a width of 5 to 25 mm. MRI and Dr. Meinhart rely on Gromatzky for this limitation. Petition, 33, 38. Neither offer an explanation for why or how a POSITA would have combined Karppanen and Gromatzky to arrive at the claimed channel width and further combined with Utsunomiya's disclosure of airflow velocities.

As Dr. Smith explains, a POSITA would not have been motivated to apply the air velocity ranges disclosed in Figure 4 of Utsunomiya to the air circulation path of Karppanen because of the differences in the thermal management problems each reference seeks to solve. Ex. 2008 (Smith Decl.) ¶ 121. Due to the differences in

these references and the issues they seek to address, a POSITA would not have understood that the air flow velocities recorded in Utsunomiya would apply to the significantly different systems of Karppanen and Gromatzky. *Id.* ¶¶ 115–19, 121.

Further, neither MRI nor Dr. Meinhart set forth a basis for finding that a POSITA would have had a reasonable expectation of success in utilizing the airflow velocities generated under the specific conditions and with the specific type of device of Utsunomiya that, as described above, is much different than the one at issue in Karppanen. It is not enough for MRI to point to the airflow velocities in Utsunomiya and conclude that the claims are obvious. *Metalcraft of Mayville, Inc. v. The Toro Company*, 848 F.3d 1358, 1367 (Fed. Cir. 2017) (“it is not enough . . . to merely demonstrate that elements of the claimed invention were independently known in the prior art. Often, every element of a claimed invention can be found in the prior art . . . Without any explanation as to how or why the references would be combined to arrive at the claimed invention, we are left with only hindsight bias that *KSR* warns against.”); *see also* Ex. 2012 (FID), 210 (finding that “a POSITA would not have applied the airflow velocities of Utsunomiya, which is directed to liquid crystal display projectors, to liquid crystal displays.”).

Therefore, MRI has not established that Karppanen, Gromatzky, Utsunomiya, and the knowledge of a POSITA teach claims 4 and 10.

VIII. GROUND 1: MRI Has Not Shown that Claim 1–3, 5–7, 9, 11, or 13 Is Obvious Over the Combination of Nagayama, Gromatzky, and the Knowledge of a POSITA

As the Board acknowledged in its Institution Decision (at 36–38), MRI’s Ground 1 is insufficient on its face because MRI has failed to articulate a motivation to combine the references to arrive at the challenged claims. If, however, the Board considers the merits of Ground 1, MRI’s arguments still fail. MRI’s Ground 1 asserts that challenged claims 1–3, 5–7, 9, 11 and 13 are obvious over Nagayama, Gromatzky, and the knowledge of a POSITA (Petition, 22), but MRI has failed to show that the combination of Nagayama and Gromatzky discloses or teaches at least limitations 1[c], 1[d], 1[e], 6, 9[c], 13[f], and 13[g] of the ’311 patent. MRI has also failed to meet its burden of proving that a POSITA would have had a motivation to combine Nagayama with Gromatzky or to modify Nagayama in view of alleged knowledge of a POSITA to arrive at the claimed invention.

A. The Prior Art of Ground 1 Does Not Disclose All Limitations of Claim 1

1. MRI Has Not Established That a POSITA Would Have Been Motivated to Combine the Prior Art of Ground 1 to Arrive at Limitation 1[c]

Claim limitation 1[c] requires “a flow control device to impart turbulence to an air flow in the channel.” Ex. 1001 (’311 patent), claim 1. MRI does not rely on Nagayama for this claim limitation. *See* Petition, 25. Indeed, Nagayama does not

disclose or suggest the use of turbulent airflow in its display system. *See generally* Ex. 1006; Ex. 2008 (Smith Decl.) ¶ 64.

MRI cites Gromatzky in an attempt to resolve this deficiency. Petition, 25. However, the Petition fails to set forth why a POSITA would have selected a turbulent airflow based on Gromatzky's teachings, how or why a POSITA would have been motivated to modify the invention of Nagayama to implement fans that impart turbulence to an air flow in the channel, or why a POSITA would have had a reasonable expectation of success in doing so. *See* Ex. 2008 (Smith Decl.) ¶ 65; *see also* Petition, 14–15, 25. As described below, a POSITA reviewing Gromatzky would not have been motivated to use turbulent airflow in a display system.

a. The Petition Fails to Establish Motivation and Reasonable Expectation of Success in Utilizing Turbulent Airflow in Nagayama's System

As the Board recognized, MRI's Petition is devoid of any analysis that would support a finding of motivation to combine and reasonable expectation of success as to this limitation 1[c]. *See* ID, 36–37. Although the Petition includes a section entitled "Motivation to Combine Nagayama and Gromatzky," it does not discuss or even reference the use of turbulent airflow. *See* Petition, 14–15. The brief discussion of limitation 1[c] also does not discuss how or why a POSITA would utilize turbulent airflow in Nagayama's display. *See id.* Rather than address these issues in the Petition, MRI improperly cites portions of Dr. Meinhardt's expert

declaration in an attempt to bolster its arguments. *See id.* These citations, however, amount to improper incorporation by reference because the arguments were never made in the Petition. *Fid. Nat'l Info. Servs.*, No. IPR2014-00490, Paper 9, 9–10. Therefore, the Board should disregard the citations to Dr. Meinhart's declaration for limitation 1[c].

Even if the Board were to consider the arguments in these citations, Dr. Meinhart fails to provide sufficient evidence to support a finding of motivation to combine and reasonable expectation of success. Dr. Meinhart briefly asserts that “[b]ecause the POSITA only has a limited number of options regarding air flow—laminar and turbulent—it would have been obvious to try a fan that generates turbulent air.” Ex. 1003 (Meinhart Decl.) ¶ 225. This statement, however, does not provide additional explanation that would assist the Board with its analysis. Instead it provides only the precise type of conclusory testimony that the Board has cautioned against. *Xerox*, IPR2022-00624, Paper 9, 15. Dr. Meinhart's assertions, which lack reasoned analysis, should not be credited. *TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1361 (Fed. Cir. 2019) (the Court “rejects[] obviousness determinations based on conclusory and unsupported expert testimony” due to “concerns that crediting such testimony risks allowing the challenger to use the challenged patent as a roadmap to reconstruct the claimed invention using disparate

elements from the prior art—i.e., the impermissible *ex post* reasoning and hindsight bias that *KSR* warned against.” (alteration in original)).

b. Gromatzky Does Not Motivate the Use of Turbulent Airflow in a Display System

As described above for Ground 3 (*see supra* § VI.A.2), although Gromatzky discloses the option of a fan that generates turbulent airflow, it discloses a preferred use of a fan generating laminar airflow in a thin-depth enclosure. Ex. 1007 (Gromatzky), 5:4–14. As such, if anything, a POSITA would have been motivated by Gromatzky to use laminar airflow over the front surface of a liquid crystal panel over turbulent airflow. Ex. 2008 (Smith Decl.) ¶¶ 65–68; *supra* § VI.A.2.b.

MRI’s Petition, therefore, fails to establish that the cited prior art teaches or discloses limitation 1[c].

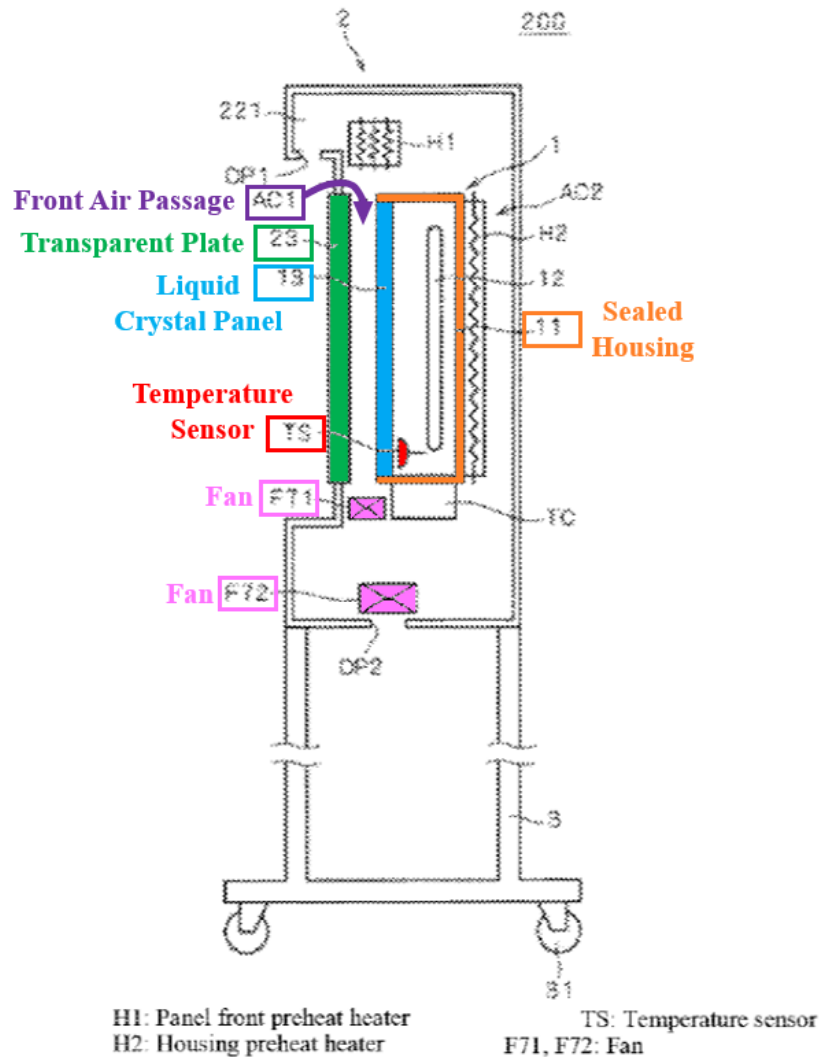
2. The Prior Art Does Not Teach or Disclose Limitations 1[d] and 1[e]

a. The Cited Prior Art Does Not Teach the Claimed “temperature sensor to measure the temperature of air discharged from the channel” or controlling air flow according to the “measured temperature”

Claim limitation 1[d] requires “a temperature sensor to measure the temperature of air discharged from the channel.” Ex. 1001 (’311 patent), claim 1. MRI admits that Nagayama does not this limitation. *See* Petition, 26. Instead, as shown below in annotated Figure 9, Nagayama discloses a temperature sensor TS that is “attached to the back surface of the liquid crystal panel 13” and measures “the

temperature of the liquid crystal panel 13.” Ex. 1006 (Nagayama), [0071], [0074]. Behind liquid crystal panel 13 is a backlight 12. *Id.*, [0037], Fig. 9. The backlight 12, liquid crystal panel 13, and drive circuitry for the liquid crystal panel 13 are preferably located in a “seal[ed]” housing 11. *Id.*, [0037]. A sealed housing is preferred to prevent the ambient air from “reduc[ing] the illuminance of the backlight.” *Id.* Thus, as shown below, temperature sensor TS is separated from the air that flows in front air passage AC1 between the front of the liquid crystal panel 13 and transparent plate 23. *Id.*, [0071], Fig. 9; Ex. 2008 (Smith Decl.) ¶ 76.

[FIG. 9]



Ex. 1006 (Nagayama), Fig. 9 (annotated).

Claim limitation 1[e] further requires “a flow rate controller to control air flow through the channel according to the measured temperature.” Ex. 1001 (’311 patent), claim 1. Because the “measured temperature” refers to the measured temperature of air inside the display device, including the temperature of air discharged from the channel, Nagayama also does not disclose this limitation.

MRI does not rely on any teaching of Gromatzky for limitations 1[d] and 1[e]. *See* Petition, 25–30. MRI’s Petition, therefore, fails to establish that the cited prior art teaches or discloses these claim limitations.

b. MRI Has Failed to Establish Motivation to Modify Nagayama to Utilize a Temperature Sensor as Taught by the ’311 Patent

MRI attempts to cure the failures of the prior art regarding limitations 1[d] and 1[e] by arguing that the claimed temperature sensor is merely a “design choice.” As the Board recognized and as discussed above in relation to Ground 3, MRI’s argument is flawed and the claimed temperature sensor is not merely a “design choice.” *Supra* § VI.A.1.b.i. MRI does not include any additional analysis or explanation of its contention for Ground 1 (compare Petition, 42–44 *with* Petition, 25–28), and thus the analysis set forth for Ground 3 applies similarly here.

Further, MRI has provided no motivation for this proposed modification of Nagayama. MRI does not argue that Hannemann and Burke would have motivated a POSITA to modify Nagayama’s temperature sensor. *See* Petition, 25–28. Nonetheless, as described above, Hannemann or Burke would not have motivated a POSITA to make this specific modification. Ex. 2008 (Smith Decl.) ¶¶ 87–90.

MRI has not provided sufficient evidence that a POSITA would have modified Nagayama’s temperature sensor “to monitor the air temperature of air flowing by the panel” as it contends. Petition, 27–28. MRI asserts that a POSITA would have measured the temperature of air instead of the temperature of the LCD

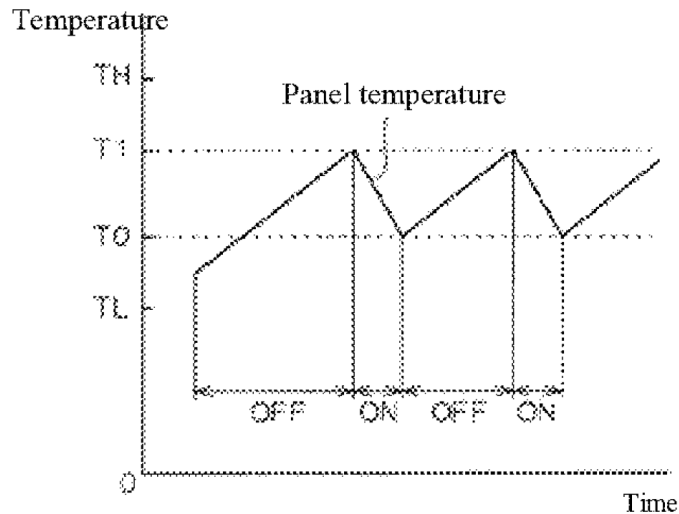
because it would represent an “indirect” measurement of the panel temperature, and “would have simplified the Nagayama sensor since a sensor for measuring the air could be placed almost anywhere in the air flow, thus providing flexibility to the panel designer.” *Id.* This does not, however, provide sufficient basis for why a POSITA *would* have placed the sensor to specifically measure the temperature of air as claimed. *See supra* § VI.A.1.b.ii. MRI’s assertions as to how a POSITA would have allegedly modified Nagayama’s temperature sensor to “indirectly” measure the temperature of the air are vague and insufficient to support its conclusion that a POSITA would have landed on the claimed invention. *See id.*, 26 (“It would have been obvious to one of skill in the art to mount the temperature sensor TS in the air passage AC1 *or elsewhere . . .*” (emphasis added)). That a POSITA *could* have placed a temperature sensor to measure the temperature of air discharged from the channel does not rise to the level of showing that a POSITA would have had a motivation to do so. *Pers. Web. Techs.*, 848 F.3d at 994 (“obviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.” (citation omitted)). Ultimately, just as for Ground 3, MRI provides no support for its contention that it would have been obvious to modify Nagayama’s temperature sensor outside the hindsight of the invention of the ’311 patent.

c. MRI's Proposed Modification Would Render Nagayama Inoperable for its Intended Purpose

MRI (and Dr. Meinhart) further fail to contend with the teachings and goals of Nagayama that are contrary to MRI's contention that a POSITA would have been motivated to—or even could—modify the location of Nagayama's temperature sensor in the manner suggested.

Nagayama's goal is to measure the temperature of the panel and then to operate the cooling and warming components of its system based on that temperature. *See* Ex. 1006 (Nagayama), [0009], [0071], [0079]. Nagayama explains that its invention is “described from the perspective of cooling the liquid crystal panel in order to suppress temperature rise, but if the operating temperature of the liquid crystal panel is maintained appropriately and power consumption is reduced, not only cooling but heating may be necessary.” *Id.*, [0070]. Nagayama explains that “[w]hen the liquid crystal display device 1 is activated, the panel temperature begins to rise due to heat input from the backlight 12, etc. At this stage, the fan F71 is off.” *Id.*, [0078]. This is visually depicted in Nagayama's Figure 11 below:

[FIG. 11]



Id., Fig. 11. To accomplish its goals, Nagayama attaches its temperature sensor to the back of the panel inside the sealed housing (which houses the backlight and drive circuit). *See, e.g., id.*, [0071], [0037], Fig. 9.

Modifying Nagayama to place the temperature sensor in a location to measure the air discharged from the channel would require changes to the operation and purpose of Nagayama's system. Ex. 2008 (Smith Decl.) ¶¶ 94–98. If Nagayama's sensor were to only indirectly measure the panel temperature, it would be inefficient for the purposes of determining if the panel is at the proper temperature. *Id.* ¶ 96. Specifically, because the Fan F71 is only “on” when the panel temperature is above a threshold temperature, there is no air circulation created from Fan F71 when the temperature is below that threshold. *Id.* ¶ 97. Because of the lack of air circulation under those circumstances, the temperature of the air at the exit of the channel may

not accurately reflect the temperature of the panel, and thus a temperature sensor in that location would not yield predictable measurements of the display temperature.

Id. For this reason, the temperature sensor location modification suggested by MRI would have required additional changes to the operation of Nagayama's Fans F71 and F72 as well as the temperature control board TC to maintain adequate control in both warming and cooling operations. *Id.* ¶ 98. A POSITA would not have been motivated to implement this many modifications when there is no apparent benefit. *Id.* In view of these considerations, MRI has failed to establish that a POSITA would have made this modification to Nagayama.

Therefore, MRI has not established that Nagayama, Gromatzky, and the knowledge of a POSITA teach limitations 1[d] and 1[e].

B. The Prior Art Does Not Teach or Disclose Claim 6

As explained above, MRI has failed to show that claim 1 would have been obvious (*supra* § VIII.A), and as such, has also failed to show claim 6 would have been obvious. Even assuming MRI's showing regarding claim 1 is sufficient, however, MRI has not proven that the prior art discloses the additional element of claim 6, which requires "the width of the channel is in a range of 5 to 25 mm."

MRI acknowledges that Nagayama does not disclose a channel with a width in a range of 5 to 25 mm. *See* Petition, 33. Instead, MRI cites to Gromatzky. *Id.* As described above for Ground 3, however, Gromatzky suggests to a POSITA that

an embodiment of Gromatzky's invention utilizing a fan to generate turbulent airflow would be less efficient and larger in size, and thus would not motivate a POSITA to utilize turbulent airflow with the claimed channel width. *See* Ex. 2008 (Smith Decl.) ¶ 68; Ex. 1007 (Gromatzky), 5:4–14. As for Ground 3, neither MRI nor its expert engage with these disclosures of Gromatzky, and MRI's cherry picking of elements from Gromatzky is insufficient to establish obviousness. *Ex Parte Li Xiong*, 2023 WL 6387858, at *5. Further, as discussed above (*supra* § VIII.A.1), MRI fails to provide specific motivations to combine Nagayama and Gromatzky.

Therefore, MRI has not established that Nagayama and Gromatzky teach claim 6.

C. MRI Has Failed to Meet its Burden on Claim 9

MRI has failed to set forth with specificity, as required, how the prior art renders claim 9 obvious. Instead, the Petition merely references its analysis of four different claim elements without elaboration on how that prior analysis is to be applied to claim 9[c]. Petition, 34 (referencing claims 1[c], 1[d], 1[e], and 3). In particular, the Petition fails to address how Nagayama, alone or with Gromatzky, teaches “a flow control device to detect temperature variation *caused by heat incident on a front side of the liquid crystal panel*,” which is a requirement of claim 9 not recited in the earlier claims. Ex. 1001 ('311 patent), claim 9 (emphasis added). The Board has repeatedly stated that a party must adequately explain its positions

and cannot rely on the Board to wade through the record to uncover arguments it failed to articulate. *TCL*, No. IPR2020-00746, Paper 21.

Therefore, MRI has failed to show claim 9 would have been obvious.

D. The Prior Art of Ground 1 Does Not Teach or Disclose the Temperature Sensor of Claims 11 and 13

1. The Prior Art Does Not Teach or Disclose Claim 11

Claim 11 depends from claim 10 and requires that “the flow control device further includes a temperature sensor to detect a temperature variation of the air having passed through the channel, and the flow rate controller is operated according to a signal transmitted from the temperature sensor.” Ex. 1001 (’311 patent), claim 11. As explained above, and as the Board recognized (ID, 39), MRI has not put forth any evidence regarding whether the prior art cited in Ground 1 discloses or teaches the elements of claim 10, and therefore any arguments that claim 11 is unpatentable fail.

Even setting aside MRI’s failure of proof, as described above for claim element 1[d], the temperature sensor TS of Nagayama measures the temperature of “the liquid crystal panel 13” rather than the temperature of the “air having passed through the channel.” *Supra* § VIII.A.2. MRI sets forth no separate arguments for claim 11, instead solely referring back to its arguments regarding claim elements 1[d] and 1[e]. Petition, 34. For the same reasons described above for claim 1 (*supra*

§ VIII.A), MRI has not established that Nagayama, Gromatzky, and the knowledge of a POSITA teach claim 11.

2. The Prior Art Does Not Teach or Disclose 13[f] and 13[g]

Claim 13 requires, in part, a display device comprising “a temperature sensor to measure the temperature of air discharged from the channel” and “a flow rate controller [to] control the fan according to the measured temperature to regulate the flow rate of the air in the channel.” Ex. 1001 (’311 patent), claim 13. As described above for claim 1, Nagayama’s temperature sensor TS measures the temperature of “the liquid crystal panel 13” and does not disclose “a temperature sensor to measure the temperature of air discharged from the channel” (*supra* § VIII.A.2) which MRI admits (Petition, 26). MRI sets forth no separate arguments for claim elements 13[f] and 13[g], instead solely referring back to claim elements 1[d] and 1[e]. *Id.*, 53. For the same reasons described for claim 1 (*supra* § VIII.A), MRI has not established that Nagayama, Gromatzky, and the knowledge of a POSITA disclose claim 13.

IX. GROUND 2: MRI Has Not Shown that Claim 4 or 10 Is Obvious Over the Combination of Nagayama, Gromatzky, Utsunomiya, and the Knowledge of a POSITA

MRI’s Ground 2 asserts that claims 4 and 10 are obvious over Nagayama, Gromatzky, Utsunomiya, and the knowledge of a POSITA. *See* Petition, 36. As explained above, MRI has failed to show that claim 1, from which claim 4 indirectly depends, and claim 9, from which claim 10 directly depends, would have been

obvious. *Supra* § VIII.A. As such, MRI has also failed to show claims 4 and 10 would have been obvious.

Moreover, MRI cannot show that the prior art discloses the additional elements of claims 4 and 10. Claim 4 requires that the airflow in the channel have “a velocity in a range of 4 to 14 m/s” (Ex. 1001 (’311 patent), claim 4), and claim 10 requires “a flow velocity of not less than 4 m/s when the channel . . . has a spacing distance in a range of 5 to 25 mm” (*id.*, claim 10). Nagayama and Gromatzky do not disclose these additional elements. *See* Petition, 37–38. MRI again relies on Utsunomiya, for this disclosure (*id.*), but as with Ground 4, MRI has not adequately articulated why a POSITA would have been motivated to combine Nagayama, Gromatzky, and Utsunomiya or that a POSITA would have had a reasonable expectation of success in doing so.

A. The Petition Fails to Set Forth Any Analysis of Motivation to Combine These References

As the Board recognized (ID, 40), the Petition is completely devoid of any analysis regarding why a POSITA would have been motivated to combine the cited prior art to arrive at the challenged claims or that there would be a reasonable expectation of success in doing so. Petition, 15–16, 37–38. Although MRI’s Petition includes a section titled “Motivation to Combine Nagayama and Gromatzky with Utsunomiya,” Utsunomiya is not addressed. *Id.*, 15–16. Instead, the Petition

discusses Matsuoka, a reference not relied on in any of the Grounds and not filed with the Petition. *Id.*

MRI's brief analysis of claims 4 and 10 merely cherry picks elements of Utsunomiya without addressing how or why a POSITA would have applied that disclosure to Nagayama. *See id.* As above, to the extent the Petition cites paragraphs of Dr. Meinhart's declaration with respect to these claims without discussing the significance of any such information (*see id.*), the Board should disregard those citations. *Fid. Nat'l Info. Servs.*, No. IPR2014-00490, Paper 9, 9–10; *supra* § V.A.1.a.

B. A POSITA Would Not Have Been Motivated To Combine Nagayama, Gromatzky, and Utsunomiya

Even considering Dr. Meinhart's opinions as set forth in his declaration but not discussed in the Petition, MRI's positions fail. As set out below, a POSITA would not have been motivated to combine Nagayama with Utsunomiya.

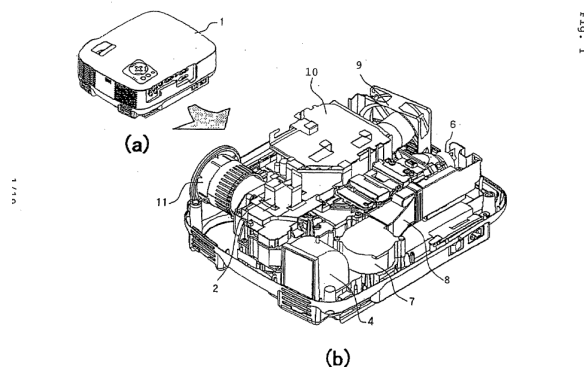
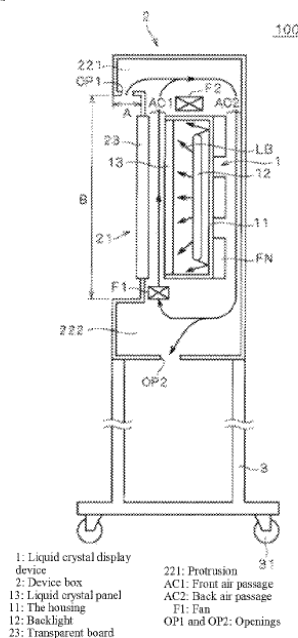
1. A POSITA Would Have Understood that Utsunomiya Solves Different Issues than Nagayama and Gromatzky

A POSITA would not have been motivated to combine Nagayama and Gromatzky due to fundamental differences in the devices disclosed by these references and the problems intended to be addressed by each. Ex. 2008 (Smith Decl.) ¶¶ 106–11. First, Nagayama relates to large backlit outdoor LCD display devices, whereas, as described above for Ground 4, Utsunomiya relates to high-

intensity lamp projectors used to project images onto screens placed at a distance away from the projector. *Id.* ¶ 106; *supra* § VII.B.1.

Utsunomiya's projector has a 0.8" lens and is intended to be used indoors. Ex. 2008 (Smith Decl.) ¶ 106. Exemplary figures depicting the devices of Nagayama and Utsunomiya are shown below. Figure 1 of Nagayama, shown on the left, is “the configuration of an outdoor display 100 using a liquid crystal device.” Ex. 1006 (Nagayama), [0013], Fig. 1. Fig. 1 of Utsunomiya, shown on the right, includes “schematic diagrams of the configuration of a liquid crystal projector apparatus of a background related art, where Fig. 1(a) illustrates the appearance . . . and Fig. 1(b) illustrates the internal structure” Ex. 1010 (Utsunomiya), 12:13–16, Fig. 1.

[FIG. 1]



The issues and challenges that confront large format LCD displays versus small LCD projectors differ, and a POSITA looking to modify Nagayama to improve its temperature control would not look to Utsunomiya for this reason alone. Ex. 2008 (Smith Decl.) ¶¶ 109–11.

Second, the problems that Nagayama and Utsunomiya seek to address, as well as the resulting cooling systems for its devices, are likewise significantly different from one another. *Id.* ¶ 106. Utsunomiya explains that it seeks to solve a problem in the art resulting from “an increase in lamp power and a reduction in lamp size” for liquid crystal projector apparatuses (Ex. 1010 (Utsunomiya), 4:12–18), whereas Nagayama seeks to address issues associated with installing liquid crystal advertising media outside (Ex. 1006 (Nagayama), [0006]-[0007]). A POSITA would not have expected that methods of controlling the heat generated by the high power lamp of Utsunomiya would be applicable to Nagayama’s LCD display. Ex. 2008 (Smith Decl.) ¶ 111. Whereas the heat Nagayama seeks to manage is both internal heat from LCD components and external heat from sunlight (*id.* ¶ 110), Utsunomiya only seeks to manage increasing internal heat sources from “an increase in lamp power and a reduction in size of display device . . . resulting in an increase in flux density of light incident on the liquid crystal unit, and a continuous increase in heat load on each component which forms part of liquid crystal unit” (*id.*; Ex. 1010 (Utsunomiya), 4:12–18). As described above for Ground 4, a POSITA would

have understood that the thermal management for heat sources from different locations puts different components at risk of damage, and accordingly require cooling different locations. Ex. 2008 (Smith Decl.) ¶ 110; *supra* § VII.B.1.

2. A POSITA Would Not Have Been Motivated to Combine Nagayama and Gromatzky with Utsunomiya for its Airflow Velocity Rates

With respect to claims 4 and 10, MRI argues that “it would have been obvious to combine the specific cooling air velocity described in Utsunomiya with the cooling channel of Nagayama.” Petition, 37–38. As described above, MRI’s Petition is deficient in that it does not make any such showing of motivation or reasonable expectation of success.

As discussed above with respect to Ground 4, there is no teaching or suggestion in Utsunomiya that its air velocity ranges for a projector system with a 0.8” lens recorded at indoor temperatures of 25°C are applicable to large format LCD displays such that a POSITA would have been motivated to utilize them in Nagayama’s display. *See supra* § VII.B.2. Dr. Meinhart has also not identified any reason that a POSITA would have been motivated to look to Utsunomiya’s disclosure and combine the specific flowrates with Nagayama as modified by Gromatzky. That a POSITA may have recognized that airflow speed “would be needed to design an effective cooling system for the device” (Ex. 1003 (Meinhart Decl.) ¶ 58) provides no support or explanation for why a POSITA would have

looked to Utsunomiya for that information, how or why a POSITA would have applied Utsunomiya's velocity and temperature teachings to Nagayama's display, or why a POSITA would have had a reasonable expectation of success in doing so. *See Apple*, 28 F.4th at 262.

As noted above (*supra* § VII.B.2), the velocities recorded in Utsunomiya's Figure 4 are for a laminar flow region, not a turbulent airflow. Ex. 1010 (Utsunomiya), 5:14–20. Same as for Ground 4, the Petition and supporting declaration of Dr. Meinhart do not address how a POSITA would nonetheless have arrived at the invention recited in claim 4, which requires the use of turbulent airflow in the channel. Additionally, claim 10 further requires that the claimed channel have a width of 5 to 25 mm. MRI and Dr. Meinhart rely on Gromatzky for this limitation. Petition, 33, 38. Neither offer an explanation for why or how a POSITA would have combined Nagayama and Gromatzky to arrive at the claimed channel width and further combined with Utsunomiya's disclosure of airflow velocities.

As Dr. Smith explains, a POSITA would not have been motivated to apply the air velocity ranges disclosed in Figure 4 of Utsunomiya to the air passage in Nagayama because of the differences in the physical systems and thermal management problems each reference seeks to solve, as described above. Ex. 2008 (Smith Decl.) ¶ 114. Due to these differences, a POSITA looking at Nagayama's display system would not have understood that the data recorded by Utsunomiya in

Figure 4 would have applied to Nagayama's display and thus would not have looked to Utsunomiya for this purpose. *See id.*

Therefore, MRI has not established that Nagayama, Gromatzky, Utsunomiya, and the knowledge of a POSITA teach this claim limitation.

X. Conclusion

For the foregoing reasons, Patent Owner respectfully asserts that the Petition fails to establish by a preponderance of evidence that any of the Challenged Claims are obvious.

Date: May 15, 2024

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing PATENT OWNER'S RESPONSE complies with the type-volume limits of 37 C.F.R. § 42.24(b)(1) because it contains 13,966 words according to the word-processing system used to prepare this Response, excluding the words in the Table of Contents, Table of Authorities, List of Exhibits, Certification Under §42.24(d), and Certificate of Service, as set forth in 37 C.F.R. § 42.24(a)(1).

Date: May 15, 2024

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e)(4), the undersigned certifies that a true and correct copy of PATENT OWNER'S RESPONSE together with all exhibits identified in the above Table of Exhibits, were provided via email, to the Petitioner by serving the correspondence email addresses of records as follows:

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