

U.S. Patent No. 8,842,253

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. 8,842,253

Case No. IPR2023-01203

PATENT OWNER'S RESPONSE

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TABLE OF EXHIBITS

Exhibit No.	Description of Document
2001	<i>Reserved.</i>
2002	Curriculum vitae of Bruce W. Smith, Ph.D.
2003	Willem den Boer, Active Matrix Liquid Crystal Displays: Fundamentals and Applications (2005)
2004	<i>Reserved.</i>
2005	<i>Reserved.</i>
2006	<i>Reserved.</i>
2007	<i>Reserved.</i>
2008	Declaration of Bruce W. Smith, Ph.D.
2009	Disclaimer in Patent Under 37 C.F.R. 1.321(a) for claims 1, 2, 4, 5, 7, 9, and 10 of U.S. Patent No. 8,842,253, filed November 8, 2023
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 Products Containing Same</i> , Investigation No. 337-TA-1349, dated April 16, 2024 (Public Redacted Version)

Exhibit No.	Description of Document
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 Patent Owner Response to Manufacturing Resources International, Inc.’s (“MRI”) Petition challenging claims 6, 8, 11–12, and 14–20 (the “challenged claims”) of U.S. Patent 8,842,253 (“the ’253 patent”).¹

MRI has failed to carry its burden of showing that the challenged claims are invalid. The Petition suffers two main flaws. First, MRI fails to explain how the cited prior art discloses all elements of the challenged claims. The ’253 patent claims a display panel with an innovative arrangement of elements designed to maximize the removal of heat from inside the digital display. For example, challenged claims 11, 12, and 14–20 all require a display device comprising a “housing,” a “sensor to measure a temperature of air in the housing,” and a “control device to control a fan to maintain a temperature of the housing.” Claims 8 and 19 recite that the fan operates such that the air in the channel 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.

¹ Claims 1, 2, 4, 5, 7, 9, and 10 were disclaimed and are not at issue in this proceeding. Institution Decision (“ID”) (Paper 11), 7.

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 Karppanen or Nagayama, 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. Overview of the ’253 Patent

The ’253 patent relates to display devices with components such as a cooling fan, a fan control device, and a temperature sensor that work together to cool a display assembly of the display device. In the case of challenged claims 11, 12, and 14–20, the control device “control[s] the fan to maintain a temperature of the housing.” Ex. 1001 (’253 patent), 11:19–23. As the ’253 patent recognizes, in the case of outdoor display assemblies, such as LCD displays, heat from the backlight and heat from sunlight can cause the liquid crystals to degrade. *Id.*, 1:29–51. In the prior art, elements that cool the liquid crystal panel were located on the back of the liquid crystal panel as they were focused on removing heat generated by the backlight, and not on the heat on the front side of the display caused by sunlight. *Id.* The ’253 patent addressed this issue by placing a sensor that measures the temperature of air in the housing, then using data collected by that sensor to control operation of a fan inside the system. Some challenged claims also require an

arrangement wherein there is a channel defined as the gap between a display panel of the display assembly and a front side of the housing and a fan which blows air through this channel in order to remove the heat on the front side of the display. *Id.*, 1:65–2:6.

III. 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 claim 12 of the ’253 patent is invalid as obvious over Nagayama (Ex. 1006) in view of U.S. Patent No. 7,075,261 (“Burstein”) and International Patent Publication No. 2007/116116 A1 (“Karppanen ’116”) in view of Burstein. *Id.*, 196. The ALJ held that MRI did not prove obviousness of claim 12 over Nagayama (Ex. 1006) by clear and convincing evidence, but found claim 12 obvious over Karppanen ’116 in view of Burstein. *Id.*, 214–22. In her findings as to Nagayama, the ALJ credited testimony from Samsung’s expert Dr. Bruce Smith, who also submitted a declaration in this proceeding (Ex. 2008).

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 '253 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 Portions of Grounds 1 and 3

As the Board recognized, MRI's Grounds 1 and 3 fail to articulate an argument that claim 14 is invalid because MRI failed entirely to address the limitation of claim 13, on which claim 14 relies. ID, 25.

To the extent MRI seeks to introduce new expert testimony or new arguments addressing the elements of claim 14 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 claim 14 is invalid as obvious in light of Karppanen in view of the knowledge of a POSITA or Nagayama in view of Gromatzky, Matsuoka, and the knowledge of a POSITA.

VI. GROUND 3: MRI Has Not Shown that Claim 6, 11, 12, 14–17, or 20 Is Obvious Over Karppanen and the Knowledge of a POSITA

MRI's Ground 3 asserts that challenged claims 6, 11, 12, 14–17, and 20 are obvious in light of a combination of Karppanen and the knowledge of a POSITA.

Karppanen, however, does not disclose certain limitations of the claims, and MRI has not adequately articulated a reason why a POSITA would have been motivated to modify Karppanen in view of the alleged knowledge of a POSITA to arrive at the claimed invention.

As set forth below, MRI has failed to show that the combination of the cited references discloses or teaches at least claim limitations 6, 11[c], 11[e], 11[f], 14, 16, and 20, and MRI fails to identify a motivation to modify Karppanen in view of alleged knowledge of a POSITA to arrive at the challenged claims.

A. Karppanen Does Not Disclose or Teach Claim 6

1. Karppanen Does Not Disclose or Teach “a temperature sensor to measure a temperature of the air having passed through the front channel”

MRI admits that Karppanen “does not expressly disclose that [its] transducers measure air discharged from the channel.” Petition at 55.

As opposed to measuring the temperature of air in the display, Karppanen discloses transducers that measure the temperature of its physical casings. Ex. 2008 (Smith Decl.) ¶ 79. In particular, 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 supplys [sic] of the control unit and the display's background light.

Ex. 1008 (Karppanen), 6:31–7:1.

Karppanen explains that its cooling system, including its transducers, operates as follows:

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. The control unit controls the operation of the circulating fans 72 based on the measured temperatures in accordance with a predetermined control logic.

Ex. 1008 (Karppanen), 9:9–18. 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.* at 9:18–21. 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; *see also id.*, 39:7–14 (“So [Karppanen’s] talking about stabilizing temperatures of two physical components, display casing and device casing.”). Finally, 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. Ex. 2008 (Smith Decl.) ¶ 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 In 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). 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 for a similar limitation recited in claim 1 of U.S. Patent No. 8,223,311 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.” Ex. 2012 (FID), 202.

MRI’s Petition, therefore, fails to establish that Karppanen teaches or discloses claim 6.

2. MRI Has Failed to Establish Motivation to Modify Karppanen to Utilize a Temperature Sensor as Claimed by the ’253 Patent

MRI attempts to cure the failures of the prior art regarding this limitation by arguing that the placement of the temperature sensor is merely a “design choice” (*see* Petition at 56), but as the Board recognized in the Institution Decision (ID, 21), MRI’s argument is flawed. First, the placement of the temperature sensor in the ’253 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

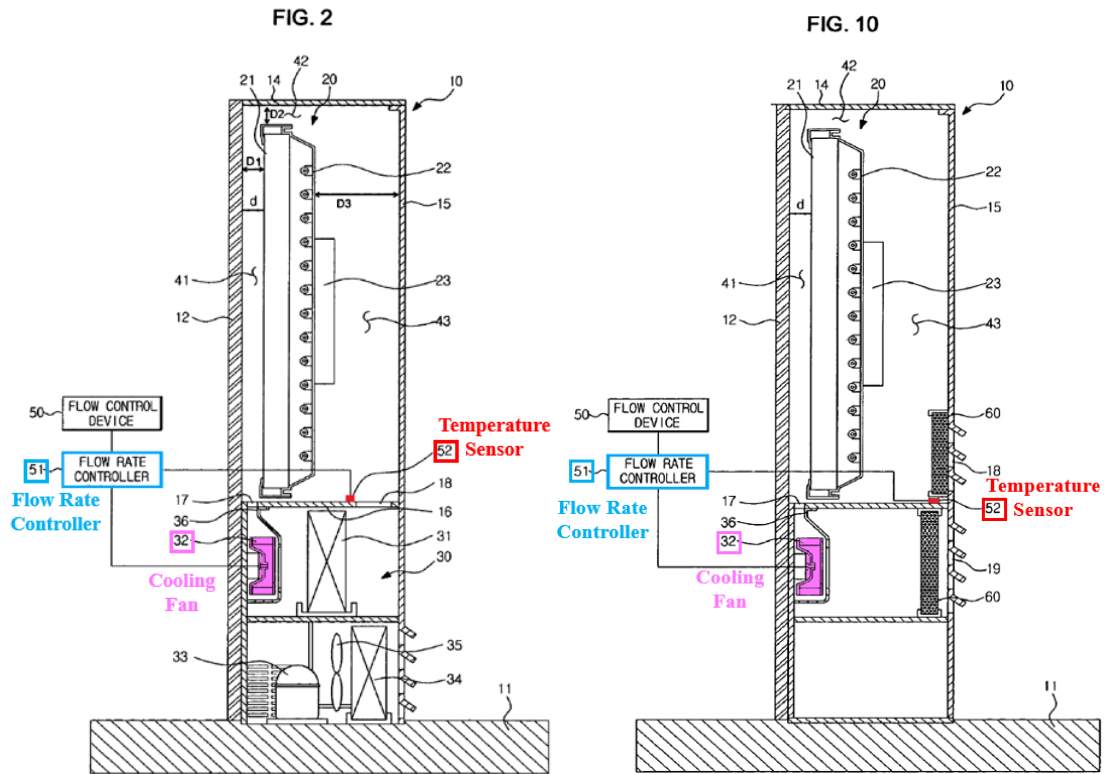
is a design choice does not make it obvious. The Board must offer a reason for why a [POSITA] would have made the specific design choice . . .”). As described further below, MRI has provided no support for its argument that a POSITA would have been motivated to make its proposed modification to Karppanen outside the hindsight of the teachings and invention of the ’253 patent.

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

As the Board recognized in its Institution Decision (at 21), the placement of the temperature sensor, which impacts the function of the system, is not simply a design choice in the ’253 patent, 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).

Here, the ’253 patent describes 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 (’253 patent), 1:52–56 (“the 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 '253 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,” and “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.*, 8:64–9:6, 9:46–52. 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 front of the display (which is exposed to sunlight). 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. The claimed temperature sensor is thus a critical feature of the '253 patent's invention. The temperature sensor is shown in Figures 2 and 10 as annotated below:



Id., Figs. 2, 10 (annotated).

MRI argues that “the decision of where and how many temperature sensors to utilize are simply a design choice based on the anticipated use case for the device, such as will it be utilized indoors or outdoors.” *See* Petition, 56. Although Dr. Meinhart parrots this language in his declaration (*see, e.g.*, Ex. 1003 (Meinhart Decl.) ¶ 169), he provides no further reasoning, analysis, or explanation of what is intended by “anticipated use case for the device” or how whether the display will be utilized indoors or outdoors would impact such a choice. MRI and Dr. Meinhart cite two background references, Burke and Hannemann, as alleged support for these

positions, but these references do not support a conclusion that the 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, 33–34 (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, 33 (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, 40–41) 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.” *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.

b. 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, 55) 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 (Meinhart Decl.) ¶ 169; *see* Petition, 56–57 (citing Ex. 1003, ¶¶ 169–70). Dr. Meinhart testified at his deposition that the only support for this 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 ’253 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, 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 (finding prior art in a similar record “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.) ¶ 170. 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.*, ¶ 170) 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, 55–56) 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. *See* 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. *See* Ex. 1013 (Hannemann), [0019]. Indeed, MRI and Dr. Meinhart do 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 examples of locations for the temperature sensor 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.” (quoting *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984)); *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 teachings and invention of the ’253 patent. Therefore, MRI has not established that a POSITA would have been motivated to combine Karppanen and the knowledge of a POSITA to arrive at claim 6.

B. Karppanen Does Not Teach or Disclose Claim 11

Claim limitation 11[c] requires “a sensor to measure a temperature of air in the housing.” As described above for claim 6, the transducers of Karppanen measure the temperature of the physical casings rather than the temperature of the air in the housing, 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 6. Petition, 60. For

the same reasons described above for claim 6, MRI has not established that Karppanen discloses or teaches claim 11.

Claim limitations 11[e] and 11[f] further require “a control device to control the fan to maintain a temperature of the housing” and “wherein the sensor transmits a resulting signal to the control device and the control device controls the fan based on the resulting signal.” The claimed control device operates based on the measured temperature of air in the housing. Karppanen does not disclose a control device that controls a fan based on a signal from a sensor that measures the temperature of air because its temperature sensor measures the temperature of the physical casings, as described above. Therefore, Karppanen also does not disclose 11[e] and 11[f].

MRI does not rely on any other prior art reference for these claim limitations. MRI’s Petition, therefore, fails to establish that the cited prior art teaches or discloses these claim limitations.

C. MRI Has Failed to Meet its Burden on Claim 14

As the Board recognized in its Institution Decision (at 25), MRI failed to meet its burden on Claim 14. Claim 14 depends from claim 13 and further recites “wherein the control device controls a flow rate of the air in the fan such that the air in the front channel has a controlled flow velocity.” Claim 13 depends from claim 12 and requires the additional limitation of “an air conditioner arranged in a lower space of the housing to blow air to the front channel.” Claim 13 is not challenged in

the Petition, and MRI has not addressed this limitation of the claim. Indeed, “air conditioner” is not mentioned in MRI’s analysis in the Petition.

Because MRI has not satisfied its burden on claim 13, from which claim 14 depends, MRI has failed to show claim 14 would have been obvious.

D. The Prior Art of Ground 1 Does Not Teach or Disclose the Additional Limitations of Claim 16

Claim 16 depends from claim 12, which in turn, depends from claim 11. As explained above, MRI has failed to show that claim 11 would have been obvious, and as such, has also failed to show that claim 16 would have been obvious. Even assuming MRI’s showing regarding claim 11 is sufficient, MRI cannot show that the prior art disclosed the additional limitation of claim 16, which recites that “the sensor measures the temperature of the air having passed through the front channel and sends the resulting signal to the control device.”

MRI sets forth no separate arguments for claim 16, instead solely referring back to its arguments regarding claim 6. Petition, 62. For the reasons described above for claim 6, Karppanen also fails to disclose this limitation.

E. Karppanen Does Not Teach or Disclose the Additional Limitations of Claim 15

Claim 15 depends from claim 12, which in turn depends from claim 11. As explained above, MRI has failed to show that claim 11 would have been obvious, and as such, has also failed to show that claim 15 would have been obvious. Even

assuming MRI's showing regarding claim 11 is sufficient, MRI cannot show that the prior art disclosed the additional limitation of claim 15, which recites that "the front channel comprises an air inlet to guide air into the front channel and an air outlet to discharge air from the front channel; and the fan is located near the air inlet."

In its argument for claim 15, MRI refers back to its argument for claim 7. Petition, 62. Karppanen discloses that:

When the circulating fans are in operation, the air flows from the fan casing through the third flow hole 64c to the cross-flow cell, from the cross-flow cell through the fourth flow hole 64d to the device casing 60, from the device casing through the first flow hole 64a to the upper part of the display casing 50 and through the second flow hole 64b in the lower part of the display casing back to the fan casing, after which a new circuit begins.

Ex. 1008, 8:9–14. Thus, Karppanen describes an "air inlet" into the display casing at 64a and an "air outlet" at 64b. MRI argues that "a POSITA would recognize that 64b" "could act as an inlet" such that the "inlet" would thus be near the "circulating fans 72." Petition, 58 (citing Ex. 1003, ¶¶ 173–74). The Petition, however, fails to provide any motivation for this modification of Karppanen. Petition, 58–59. And to the extent MRI relies on the testimony of Dr. Meinhardt without discussing it in the Petition, these citations amount to improper incorporation by reference because the arguments were never made in the Petition. *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)).

F. Karppanen Does Not Teach or Disclose the Additional Limitations of Claim 20

Claim 20 depends from claim 11 and further requires “the housing is partitioned into an upper space and a lower space in which the fan is disposed to blow the air to at least one of front side and back side of the display assembly.” MRI does not provide any analysis for claim 20, instead referring back its analysis for claim limitation 1[c] and claim 2. *See* Petition, 63.

In its analysis of claim 2, MRI fails to set forth with specificity the disclosure of Karppanen that it contends discloses this claim limitation. MRI argues that Karppanen discloses that its housing is partitioned into an upper space and a lower space and that there are two alternatives by which Karppanen discloses this claim limitation. Petition, 52–53. Under MRI’s first interpretation, device casing 60 is the “upper space” and the “lower space” is fan casing 70. *Id.*, 52. Under MRI’s second interpretation, the “upper part of the display casing 50” and “lower part of the display casing,” disclose this claim limitation. *Id.*, 53. MRI does not identify a “partition”

in either alternative, nor does MRI identify how a fan in either alleged “lower space” is disposed “to blow the air to at least one of the front side and back side of the display assembly.” MRI’s identification of alleged alternative “upper” and “lower spaces” in Karppanen without further explanation as to how this disclosure of Karppanen meets the claim limitation is insufficient to meet its burden. *Fellowes, Inc., v. Treefrog Devs., Inc.*, No. IPR2020-01623, Paper 11 (PTAB Apr. 6, 2021) (denying institution where petitioner argued that a claim limitation “can be satisfied by a variety of different disclosures in [the prior art]” because such arguments failed to “identify with sufficient specificity the structure of [the prior art] that allegedly meets the [limitation].”).

Thus, MRI has not established that Karppanen and the knowledge of a POSITA teach claim 20.

VII. GROUND 4: MRI Has Not Shown that Claim 8 or 19 Is Obvious Over Karppanen in View of Utsunomiya and the knowledge of a POSITA

MRI’s Ground 4 asserts that claims 8 and 19 are obvious over Karppanen, Utsunomiya, and the knowledge of a POSITA.

Claim 19 depends from claim 12, which in turn, depends from claim 11. As explained above, MRI has failed to show that claim 11, from which claim 19 indirectly depends, would have been obvious. As such, MRI has also failed to show claim 19 would be obvious. Even assuming that MRI’s showing regarding claim 11 is sufficient, MRI cannot show that the prior art discloses the additional limitation

of claim 19. Claim 19 requires “a flow velocity of the air in the front channel is maintained at 4 m/s or more.” MRI also cannot show that the prior art discloses the limitation of claim 8, which similarly requires that the “the flow velocity of air in the front channel is maintained at 4 m/s or more.” Karppanen does not disclose these claim limitations. Instead, MRI relies on Utsunomiya, but MRI has not adequately articulated why a POSITA would have been motivated to combine Karppanen and Utsunomiya to arrive at the claimed invention and would have had a reasonable expectation of success in doing so.

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

MRI’s brief analysis of claims 8 and 19 merely cherry picks elements of Utsunomiya without addressing how or why a POSITA would have applied that disclosure to Karppanen’s display system. Petition, 63–65. Rather than address these issues in the Petition, MRI improperly cites portions of an expert declaration from Dr. Meinhart to bolster its arguments. These citations, however, amount to improper incorporation by reference because the arguments were never made in the Petition. *See Fid. Nat’l Info. Servs.*, No. IPR2014-00490, Paper 9, 9–10. The Board should disregard the citations to Dr. Meinhart’s declaration for claims 8 and 19.

MRI’s discussion of alleged motivation to combine these prior art references in Section VII.D of the Petition likewise fails to establish motivation and reasonable

expectation of success for this Ground. *See* Petition, 20–22. In particular, the Petition does not address why, in view of the differences between these references, a POSITA would have understood the disclosure of Utsunomiya to apply to Karppanen’s system. The cited portions of Dr. Meinhart’s declaration likewise fail to address or explain this. Ex. 1003, ¶¶ 64–65. Dr. Meinhart’s conclusory and unsupported assertion that “[b]ased on the relationships from Utsunomiya, a POSITA would have understood flow rates that would be needed to cool LCD displays based on temperature sensor information,” (*id.* ¶ 65) without any further analysis or explanation, is the precise type of expert testimony that should not be credited by the Board. *Xerox*, IPR2022-00624, Paper 9, 15 (holding declaration is “entitled to little weight” when it contains an exact restatement of the petition’s unsupported, conclusory assertions without any additional supporting evidence or reasoning).

As described further below, a POSITA would not have been motivated to combine Karppanen with Utsunomiya, and MRI has not shown that a POSITA would have been motivated and had a reasonable expectation of success in applying the airflow velocity disclosures of Utsunomiya’s Figure 4 to the display system of Karppanen.

B. A POSITA Would Not Have Been Motivated to Combine Karppanen and Utsunomiya

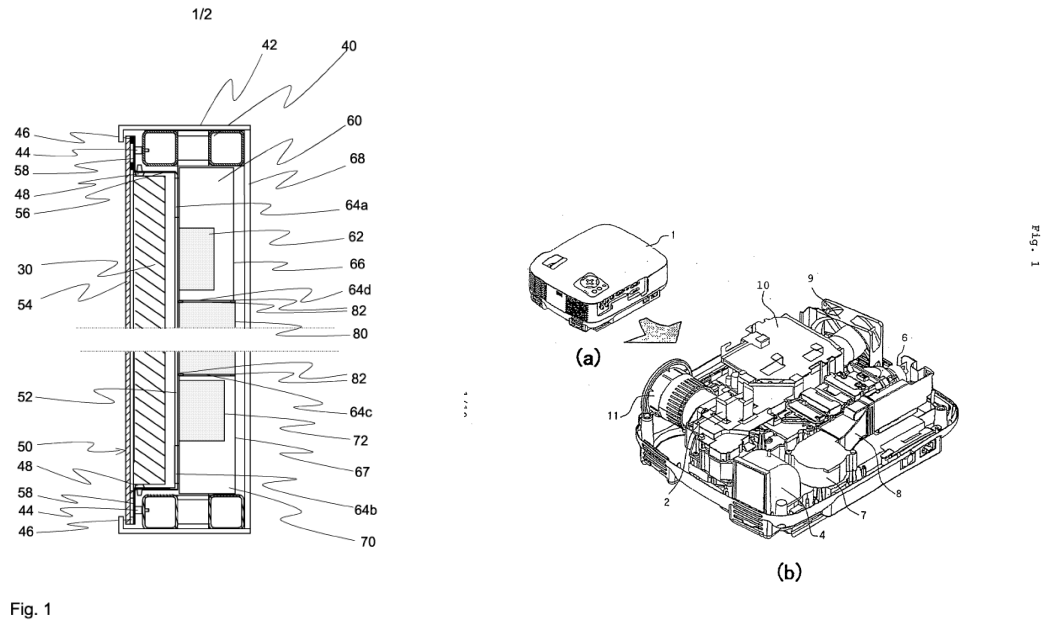
1. A POSITA Would Have Understood that Utsunomiya Solves Different Issues than Karppanen

A POSITA would not have been motivated to combine Utsunomiya, Karppanen 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.) ¶¶ 115–21.

First, a POSITA would have recognized that the projector device of Utsunomiya is not the same as the viewable display of Karppanen. *Id.*, ¶ 115. 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), 1:1–3. Karppanen relates 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 shown 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) at 12:13–16, 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 significantly 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, 2:30–33, 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.

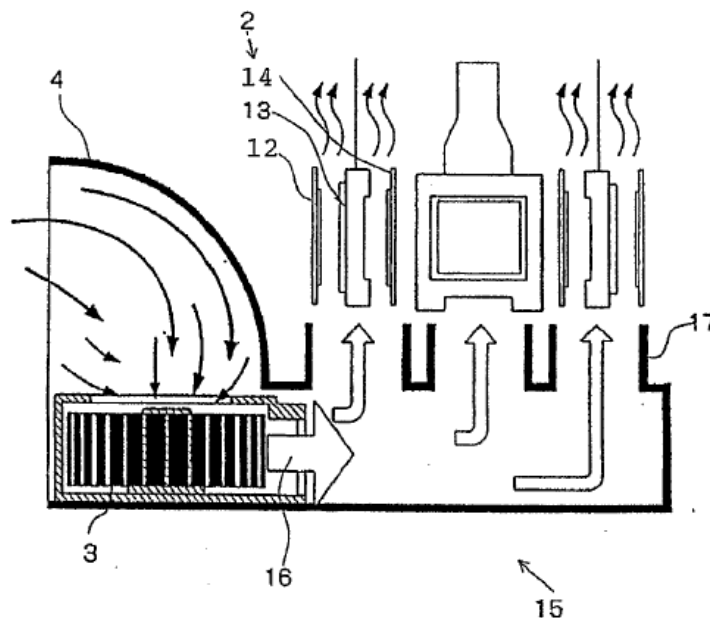
Id., 2:21–26. Karppanen describes that the “transparent window” in front of the display causes “a significant rise of temperature in the upper parts of the display especially on the visible side of the display.” *Id.*, 2:19–21. Therefore, according to Karppanen, “the temperatures of the upper parts set 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. 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 . . .” *Id.*, 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 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. 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 with Utsunomiya for its Airflow Velocity Rates

MRI asserts that it “would have been obvious to combine the specific cooling air velocity described in Utsunomiya with the cooling channel of Karppanen.” Petition, 64; *see also id.*, 20–22. As discussed above (*supra* § VII.A), MRI provides no substantive discussion of motivation and reasonable expectation of success in the Petition, and the Board should disregard MRI’s improper attempt to incorporate by reference arguments in the declaration.

Nonetheless, turning to the declaration of Dr. Meinhart, he 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 ¶ 178; *see also id.* ¶¶ 63–65. It is unclear what Dr. Meinhart means “as a *basis* for selecting suitable air flow speeds” because—while this suggests that the airflow velocities would not apply the same in the system of Karppanen versus Utsunomiya—he does not provide any further explanation as to how a POSITA would have understood the disclosure of Utsunomiya to apply to Karppanen. As noted above, Dr. Meinhart’s statements do not provide additional explanation that would assist the Board with its analysis on

this claim limitation and, accordingly, this testimony should not be credited by the Board. *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.

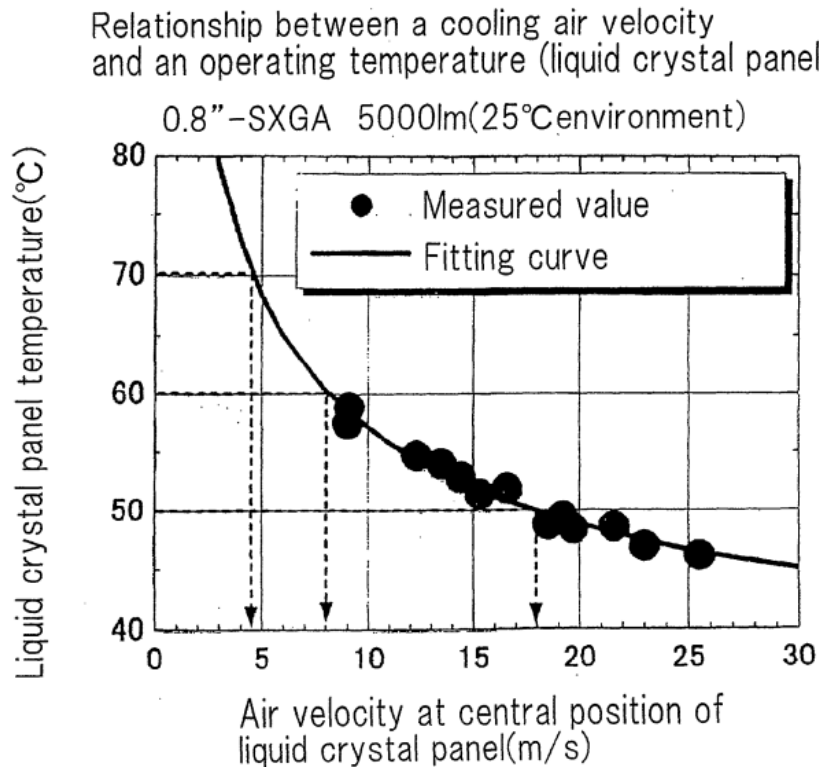


Fig. 4

Ex. 1010 (Utsunomiya), Fig. 4.

There is no teaching or suggestion in Utsunomiya that its recorded air velocity ranges for a 0.8" projector LCD system are applicable to large format LCD displays such that a POSITA would have been motivated to utilize these 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. 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 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").

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, as discussed above. 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 system of Karppanen. *Id.*

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 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.”).

Therefore, MRI has not established that Karppanen, Utsunomiya, and the knowledge of a POSITA teach claims 8 and 19.

VIII. GROUND 5: MRI Has Not Shown that Claim 18 Is Obvious Over Karppanen, Gromatzky, and the Knowledge of a POSITA

Claim 18 depends from claim 12, which in turn, depends from claim 11. As explained above with respect to Ground 3 (*supra* § VI.B), MRI has failed to show that claim 11 would have been obvious, and as such, has also failed to show claims 12 and 18 would have been obvious.

IX. GROUND 1: MRI Has Not Shown that Claim 6, 11, 12, 14–18, or 20 Is Obvious Over the Combination of Nagayama, Gromatzky, Matsuoka, and the Knowledge of a POSITA

MRI’s Ground 1 asserts that challenged claims 6, 11, 12, 14–18, and 20 are obvious in light of a combination of Nagayama, Gromatzky, Matsuoka, and the knowledge of a POSITA. Petition, 24. Nagayama, Gromatzky, and Matsuoka, however, do not disclose certain elements of the challenged claims, and MRI has not adequately articulated a reason why a POSITA would have been motivated to

combine Nagayama with Gromatzky or Matsuoka, or to modify Nagayama in view of the alleged knowledge of a POSITA to arrive at the claimed invention.

As set forth below, MRI has failed to show that the combination of the cited references discloses or teaches at least claims 6, 11[c], 11[e], 11[f], 14, 16, and 20 of the '253 patent. Further, MRI has failed to identify a motivation to either combine Nagayama with Gromatzky and Matsuoka or to modify Nagayama in view of alleged knowledge of a POSITA to arrive at the claimed invention.

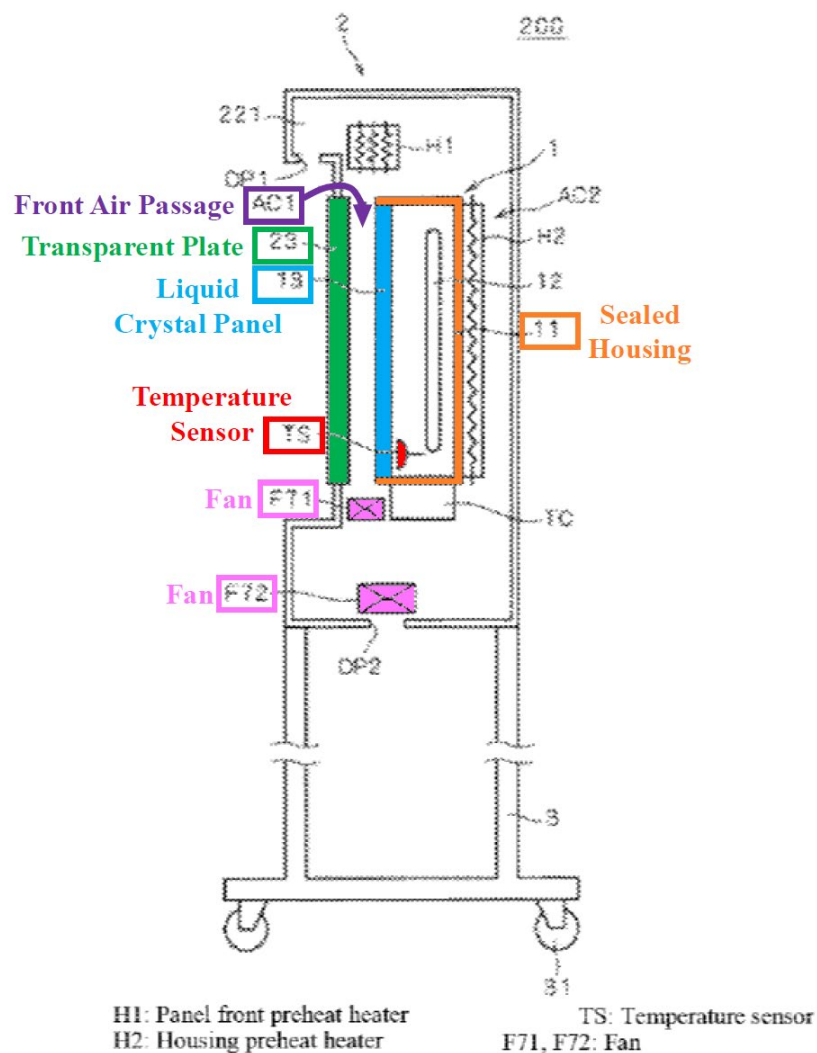
A. The Prior Art of Ground 1 Does Not Disclose or Teach Claim 6

1. The Cited Prior Does Not Teach “a temperature sensor to measure a temperature of the air having passed through the front channel”

MRI admits that Nagayama fails to disclose “a temperature sensor to measure the temperature of air having passed through the front channel.” Petition, 40. 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), [0074]. Behind liquid crystal panel 13 is a backlight 12. *Id.*, [0037]. 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.* A sealed housing is preferred to prevent the ambient air from “reduc[ing] the illuminance of the backlight 12.” *Id.* Thus, 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. Ex. 1006 (Nagayama), [0071], Fig. 9; Ex. 2008 (Smith Decl.) ¶ 76; *see also* Ex. 2012 (FID), 216 (“according to Nagayama’s teaching with respect to components that would be desirable, the housing 11 is sealed from the device box 2 so there is ‘no gap,’ and so the temperature sensor would not be exposed to the air within the device box 2 as required by the claim language.”).

[FIG. 9]



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

MRI did not rely on any teaching of Gromatzky or Matsuoka for these claim limitations. MRI's Petition, therefore, failed to establish that the cited prior art teaches or discloses claim 6.

2. MRI Has Failed to Establish Motivation to Modify Nagayama to Utilize a Temperature Sensor as Taught by the '253 Patent

MRI attempts to cure the failures of the prior art regarding this limitation by arguing that the claimed temperature sensor is merely a “design choice.” *See* Petition, 34. As recognized by the Board in its Institution Decision (at 21) and as described above for Ground 3, MRI's argument is flawed. MRI does not include any additional analysis or explanation of its contention for Ground 1 (compare Petition, 32–34 *with* Petition, 55–57), and thus the analysis set forth for Ground 3 applies similarly here.

Further, MRI has provided no motivation for this proposed modification to Nagayama outside the hindsight of the teachings and invention of the '253 patent.

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

As described above for Ground 3, the claimed temperature sensor is not merely a “design choice” for the '253 patent. *See supra* § VI.A.2.a. MRI does not include any additional analysis or explanation of its contention for Ground 1 (*compare* Petition, 55–57 *with* Petition, 32–33), and thus the analysis set forth for Ground 1 applies similarly here.

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

MRI has not established any reason why a POSITA would have modified Nagayama's temperature sensor "to monitor the air temperature of air flowing by the panel" as it contends. Petition, 34. MRI does not appear to argue that Hannemann and Burke would have motivated a POSITA to modify Nagayama's display. *See id.*, 32–35. Nonetheless, Hannemann's disclosure that the location of a temperature sensor within a display unit can vary does not support MRI's argument that a POSITA would have modified Nagayama's display to specifically choose to place the temperature sensor to measure air in the display system, including air having passed through the channel. Ex. 2008 (Smith Decl.) ¶ 90. Likewise, Burke's disclosure that multiple temperature sensors could be used in a display unit does not support MRI's argument that a POSITA would have been motivated to specifically choose to place a singular temperature sensor to measure the temperature of air in Nagayama's display, as required by the challenged claims. *Id.*

MRI has not established any reason why a POSITA would have moved the location of Nagayama's temperature sensor. 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

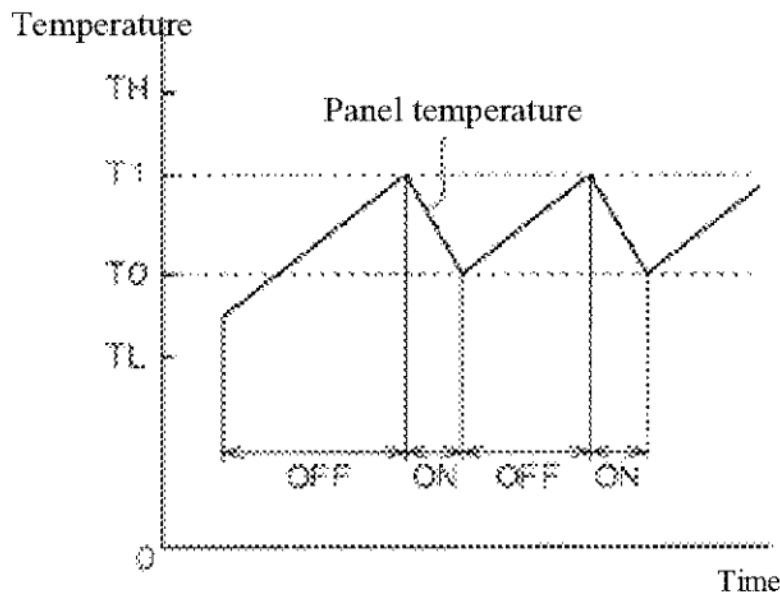
designer.” Petition, 34. This does not provide any basis for why a POSITA *would* have placed the sensor to specifically measure the temperature of air as claimed, and thus does not make a requisite showing of motivation. MRI’s assertions as to how a POSITA would have allegedly modified Nagayama’s temperature 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* Petition, 32 (“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 does not amount to the required showing of motivation. *Pers. Web. Techs.*, 848 F.3d at 994. Ultimately, MRI provides no support for its contention that it would have been obvious to modify Nagayama’s temperature sensor outside the hindsight of the teachings and invention of the ’253 patent.

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

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

The undisputed goal and teaching of Nagayama is to measure the temperature of the physical liquid crystal panel and then to operate the cooling and warming

components of its system based on that temperature. Ex. 1006 (Nagayama), [0074]; *see also id.*, [0009] (“The present invention . . . is intended to provide a display device capable of efficiently dissipating heat generated from a flat panel display device.”); Petition, 26. 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.” Ex. 1006 (Nagayama), [0070]. Nagayama describes 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:



Id., Fig. 11. There is no dispute that to accomplish its goals, Nagayama places its temperature sensor behind the liquid crystal panel and inside the housing (which houses the backlight and drive circuit). Ex. 2013 (Meinhart Tr.), 74:17–20.

Modifying Nagayama to place the temperature sensor in a location to measure a temperature of the air having passed through the front channel would require a fundamental change to Nagayama’s system and render it inefficient for the purposes of determining if the LCD panel is at the proper temperature, because the sensor would only indirectly measure the temperature of the panel. Ex. 2008 (Smith Decl.) ¶ 96. 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. This means that a temperature sensor measuring air having passed through the front channel would not yield predictable temperature measurement results and would therefore fail to serve the purpose of the sensor in Nagayama’s display. *Id.*, ¶¶ 97–98; *see also* Ex. 2012 (FID), 216–17 (“Figure 11 of Nagayama depicts the relationship structurally and functionally between panel temperature and the on/off state of the fan, further reinforcing that the panel temperature is being controlled rather than any other temperature.”). For this reason, the temperature sensor location modification suggested by MRI would have required additional changes to the operation of Fans F71 and F72 as well as the temperature control board TC to maintain adequate control in both warming and cooling

operations. A POSITA would not have been motivated to implement multiple modifications to Nagayama's system where there is no benefit to making those modifications. Ex. 2008 (Smith Decl.) ¶ 98. Moreover, MRI has not addressed these additional changes in its Petition. In view of these considerations, MRI has failed to establish that a POSITA would have modified the temperature sensor in Nagayama.

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

B. The Prior Art of Ground 1 Does Not Teach Claim 11

Claim limitation 11[c] requires “a sensor to measure a temperature of air in the housing.” As described above for claim 6 (*supra* § IX.A.1), the temperature sensor TS of Nagayama measures the temperature of “the liquid crystal panel 13” and does not disclose “a temperature sensor to measure the temperature of air in the housing,” which MRI admits. Petition, 40. MRI has failed to establish a motivation to modify Nagayama to achieve the claimed invention. For the same reasons described above for claim 6, MRI has not established that the cited prior art discloses or teaches claim 11. Indeed, for the reasons described above for claim 6, a POSITA would not have made these modifications where there would be no benefit in doing so and it would impact the operation of Nagayama's system. *See* Ex. 2012 (FID), 217 (finding MRI failed to carry its burden of showing this claim was obvious “because the mere fact that a reference ‘could’ be modified to arrive at the claimed

invention does not render the claimed invention obvious ‘unless the prior art suggested the desirability of the modification.’” (quoting *Orexo AB v. Actavis Elizabeth LLC*, 903 F.3d 1265, 1272 (Fed. Cir. 2018)).

Claim limitations 11[e] and 11[f] further require “a control device to control the fan to maintain a temperature of the housing” and “wherein the sensor transmits a resulting signal to the control device and the control device controls the fan based on the resulting signal.” The claimed control device operates based on the measured temperature of air in the housing. Nagayama does not disclose a control device that controls a fan based on a signal from a sensor that measures the temperature of air because Nagayama’s temperature sensor measures the temperature of LCD panel 13, as described above. Therefore, Nagayama also does not disclose 11[e] and 11[f]. *See* Ex. 2012 (FID), 220–21 (finding Nagayama neither discloses nor renders obvious claim elements 11[e] or 11[f] because “the temperature sensor TS of Nagayama is not an air temperature sensor as required for claim element 11[c] and the control device does not maintain a temperature of the device box 2 as required for claim element 11[e].”).

MRI does not rely on any other prior art reference for these claim limitations. MRI’s Petition, therefore, fails to establish that the cited prior art teaches or discloses these claim limitations.

C. MRI Has Failed to Meet its Burden on Claim 14

Claim 14 depends from claim 13 and further recites “wherein the control device controls a flow rate of the air in the fan such that the air in the front channel has a controlled flow velocity.” Claim 13 depends from claim 12 and requires the additional limitation of “an air conditioner arranged in a lower space of the housing to blow air to the front channel.” However, claim 13 is not challenged in the Petition, and MRI has not addressed the limitations of the claim in its Petition. Indeed, the Petition does not mention an “air conditioner” at all.

Because MRI has not satisfied its burden on claim 13, from which claim 14 depends, MRI has failed to show claim 14 would have been obvious.

D. The Prior Art of Ground 1 Does Not Teach or Disclose the Additional Limitations of Claim 16

Claim 16 depends from claim 12, which in turn, depends from claim 11. As explained above, MRI has failed to show that claim 11 would have been obvious, and as such, has also failed to show that claim 16 would have been obvious. Even assuming MRI’s showing regarding claim 11 is sufficient, however, MRI cannot show that the prior art disclosed the additional limitation of claim 16, which requires that “the sensor measures the temperature of the air having passed through the front channel and sends the resulting signal to the control device.”

MRI sets forth no separate arguments for claim 16, instead solely referring back to its arguments regarding claim 6. Petition, 43. For the reasons described above for claim 6, the cited prior art also fails to disclose this limitation.

E. The Prior Art of Ground 1 Does Not Teach or Disclose the Additional Limitations of Claim 20

Claim 20 depends from claim 11 and further requires “the housing is partitioned into an upper space and a lower space in which the fan is disposed to blow the air to at least one of front side and back side of the display assembly.” MRI does not provide any analysis for claim 20, instead referring back its analysis for claim limitation 1[c] and claim 2. Petition, 44. As described below, MRI has failed to show that the combination of Nagayama, Gromatzky, and Matsuoka teaches claim 20 or that a POSITA would have been motivated to combine these references in the manner MRI claims.

1. Nagayama in Combination with Matsuoka Does Not Disclose the Limitation of Claim 20

Nagayama does not disclose this limitation. Indeed, Nagayama does not discuss partitioning its housing in the manner recited in claim 20. MRI does not rely on Nagayama for this claim limitation. In its analysis for claim 2, which MRI relies on for claim 20, MRI merely asserts that “Matsuoka discloses upper and lower spaces and using a fan to move air to cool a display assembly.” Petition, 29. In a

different section of the Petition titled “Motivation to Combine Nagayama and Gromatzky with Matsuoka,” MRI states that:

It would have been obvious for one of skill in the art wishing to cool the various components of the display in Nagayama to combine or apply the various enclosures disclosed in Matsuoka to the housing of Nagayama to provide more discreet control over the provision of cooling air, including the direction of the air flow and the sequence of components over which the air flows.

Petition, 17–18. The Petition, however, does not point to any features of Matsuoka that teach the claim limitation requiring an upper and a lower space where a fan is disposed. MRI vaguely contends that a POSITA would have modified Nagayama in view of Matsuoka, but its vague assertions are insufficient to establish why and how a POSITA would have modified Nagayama to reach the claimed invention. Dr. Meinhart’s declaration does not resolve this deficiency. *See* Ex. 1003 (Meinhart Decl.) ¶¶ 92–93.

Thus, MRI has failed to demonstrate that this claim limitation is disclosed by the cited prior art.

2. A POSITA Would Not Have Been Motivated to Combine Nagayama, Gromatzky, and Matsuoka

Even assuming that MRI had demonstrated that the limitations of claim 20 are disclosed in the prior art, which it has not, MRI has failed to provide sufficient

evidence that a POSITA would have been motivated to combine Nagayama, Gromatzky, and Matsuoka to arrive at claim 20.

Dr. Meinhart's opinion that "it would have been obvious to modify the Nagayama display device to use upper and lower spaces as one of many available design choices" is not sufficient, on its own, to demonstrate that a POSITA would have modified Nagayama. Ex. 1003 (Meinhart Decl.) ¶ 92. The structure of the housing is not a mere "design choice," as it impacts the function of the system. *See In re Gal*, 980 F.2d at 719; Ex. 2008 (Smith Decl.) ¶ 125. Dr. Meinhart does not explain *why* a POSITA would have modified the Nagayama display to "create upper and lower spaces rather than the front and rear spaces shown in Nagayama Figure 7," or how the arrangement of Nagayama's fan and other components of its system would be impacted by doing so. Ex. 1003 (Meinhart Decl.) ¶ 93.

A POSITA would not have been motivated to combine Nagayama with Matsuoka because the inventions of these references relate to different types of systems and have different objectives. Matsuoka relates to a thin display unit to be used in portable computers such as notebook-type personal computers, whereas Nagayama relates to cooling and mitigating temperature increases from a liquid crystal display panel used outdoors. In view of the differences in Nagayama and Matsuoka's function and design, a POSITA would not have been motivated to

partition the device box of Nagayama based on the disclosures of Matsuoka. Ex. 2008 (Smith Decl.) ¶¶ 126–27.

X. GROUND 2: MRI Has Not Shown that Claim 8 or 19 is Obvious Over the Combination of Nagayama, Gromatzky, Matsuoka, Utsunomiya, and the Knowledge of a POSITA

MRI's Ground 2 asserts that claims 8 and 19 are obvious in light of a combination of Nagayama, Gromatzky, Utsunomiya, and the knowledge of a POSITA.

First, as explained above, MRI has failed to show that claim 12, from which claim 19 depends, would have been obvious. Claim 12 depends from claim 11 and as explained above, MRI has failed to show that claim 11 would have been obvious. As such, MRI has also failed to show claim 19 would have been obvious.

Even assuming that MRI's showing regarding claims 11 and 12 is sufficient, however, MRI cannot show that the prior art discloses the additional limitation of claim 19. Claim 19 requires "a flow velocity of the air in the front channel is maintained at 4 m/s or more." MRI also cannot show that the prior art discloses the limitation of claim 8, which similarly requires that the "the flow velocity of air in the front channel is maintained at 4 m/s or more." Nagayama, Gromatzky, and Matsuoka do not disclose these additional limitations. MRI again relies on Utsunomiya for this disclosure, but MRI has not adequately articulated why a POSITA would have been motivated to combine Nagayama, Gromatzky, and

Matsuoka with Utsunomiya to arrive at the claimed invention and would have had a reasonable expectation of success in doing so.

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

MRI's brief analysis of claims 8 and 19 merely cherry picks elements of Utsunomiya without addressing how or why a POSITA would have applied that disclosure to Nagayama as modified by Gromatzky and Matsuoka. Petition, 44–46.

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* §§ VI.E, VII.A.

MRI's discussion of alleged motivation to combine these prior art references in Section VII.C of the Petition likewise fails to establish motivation and reasonable expectation of success for this Ground. *See* Petition, 18–20. In particular, MRI admits that “the specific relationship disclosed in Utsunomiya would likely be somewhat different in the Nagayama cooling channel . . .” Petition, 19. The Petition does not explain, however, in view of these differences, how a POSITA would have understood the disclosure of Utsunomiya to apply to Nagayama's different system, including as modified by Gromatzky, Matsuoka, and the knowledge of a POSITA.

The cited portions of Dr. Meinhart’s declaration likewise fail to address or explain this. Ex. 1003 (Meinhart Decl.), ¶¶ 58–59.

As described further below, a POSITA would not have been motivated to combine Nagayama with Utsunomiya, and MRI has not shown that a POSITA would have been motivated and had a reasonable expectation of success in applying the airflow velocity disclosures of Utsunomiya’s Figure 4 to the display system of Nagayama.

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

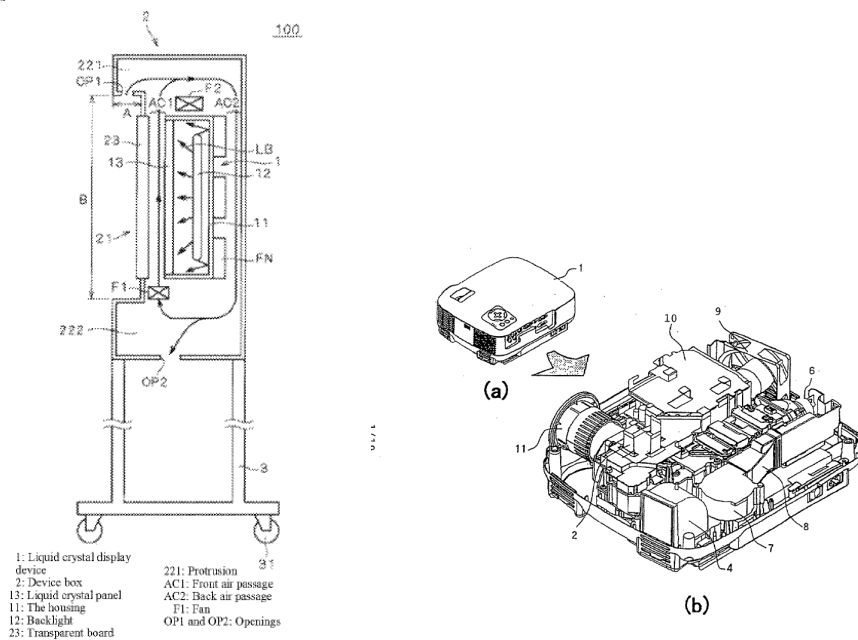
1. A POSITA Would Have Understood that Utsunomiya Solves Different Issues than Nagayama

A POSITA would not have been motivated to combine Nagayama 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.) ¶¶ 106–14. 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. *Supra* § VII.B.1.

Utsunomiya’s projector has a 0.8" lens and is intended to be used indoors. *Id.*, 5:20–22. 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 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) generally illustrates the appearance” and Fig. 1(b) “illustrates the internal structure.” Ex. 1010 (Utsunomiya) at 12:13–16.

[FIG. 1]



Ex. 1006 (Nagayama), Fig. 1; Ex. 1010 (Utsunomiya), 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.

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. 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 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 . . . 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 2.” 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 8 and 19, 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, 46. As described above with respect to Ground 4, there is no teaching or suggestion in Utsunomiya that its recorded air velocity ranges for a 0.8" projector LCD system are applicable to large format LCD displays such that a POSITA would have been motivated to utilize these in Nagayama’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 Nagayama as modified by Gromatzky and Matsuoka. 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 disclosure to Nagayama, and why a POSITA would have had a reasonable expectation of success in doing so. *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").

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. Ex. 2008 (Smith Decl.) ¶¶ 111–14. Due to these differences, a POSITA looking at Nagayama's display 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. *Id.* ¶ 114.

Thus, MRI has not established that Nagayama, Gromatzky, Utsunomiya, and the knowledge of a POSITA teach claims 8 and 19.

XI. 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.

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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 12,185 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).

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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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