

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG DISPLAY CO., LTD.,
Petitioner,

v.

SOLAS OLED LTD.,
Patent Owner.

IPR2020-00140
Patent 6,072,450

Before SALLY C. MEDLEY, JESSICA C. KAISER, and
JULIA HEANEY, *Administrative Patent Judges*.

HEANEY, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
37 C.F.R. § 318(a)

I. INTRODUCTION

Samsung Display Co., Ltd. (“Petitioner”)¹ filed a Petition to institute an *inter partes* review of claims 1–9, 11–13, and 15–18 of U.S. Patent

¹ This proceeding has been terminated with respect to one of the original petitioners, Dell Inc., and a petitioner by joinder, Apple Inc. See Paper 46.

No. 6,072,450 (Ex. 1001, “the ’450 patent”). Paper 1 (“Petition” or “Pet.”). Solas OLED Ltd. (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). Taking into account the arguments presented in Patent Owner’s Preliminary Response, we determined the information presented in the Petition established that there was a reasonable likelihood that Petitioner would prevail in challenging at least one of claims 1–9, 11–13, and 15–18 of the ’450 patent, and we instituted this *inter partes* review as to all challenged claims. Paper 9 (“Dec. on Inst.”).

During the course of trial, Patent Owner filed a Patent Owner Response (Paper 20, “PO Resp.”); Petitioner filed a Reply to the Patent Owner Response (Paper 26, “Pet. Reply”); Patent Owner filed a Sur-reply (Paper 28, “PO Sur-reply”). An oral hearing was held on February 9, 2021, and a transcript of the hearing is included in the record. Paper 43 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of claims 1–9, 11–13, and 15–18 of the ’450 patent. For the reasons discussed below, we hold that Petitioner has demonstrated by a preponderance of the evidence that claims 1–9, 11–13, and 15–18 are unpatentable under § 103.

II. BACKGROUND

A. *The ’450 Patent (Ex. 1001)*

The ’450 patent, titled “Display Apparatus,” describes a passive matrix type electroluminescent (“EL”) display apparatus including parallel cathode lines, parallel anode lines perpendicular to the cathode lines, and an organic electroluminescent layer between the cathode lines and anode lines. Ex. 1001, [54], 1:6–7, 1:14–20. Applying a positive voltage to the cathode lines drives the organic electroluminescent layer, and the display apparatus

displays an image corresponding to the applied voltage. *Id.* at 1:20–24. The '450 patent explains that the organic electroluminescent layer “can emit light at a high instantaneous luminance by applying a high voltage to the organic EL layer” but, due to this, “the organic EL layer can easily deteriorate.” *Id.* at 1:38–41. The '450 patent further explains that the larger the number of anode lines and cathode lines, the greater the possibility of crosstalk in a passive matrix type electroluminescent display apparatus, which makes it difficult to display a highly precise image. *Id.* at 1:42–46.

The '450 patent describes a conventional active matrix type display apparatus to address the above problems. *Id.* at 1:47–49. The display apparatus is depicted in Figure 22 of the '450 patent, reproduced below.

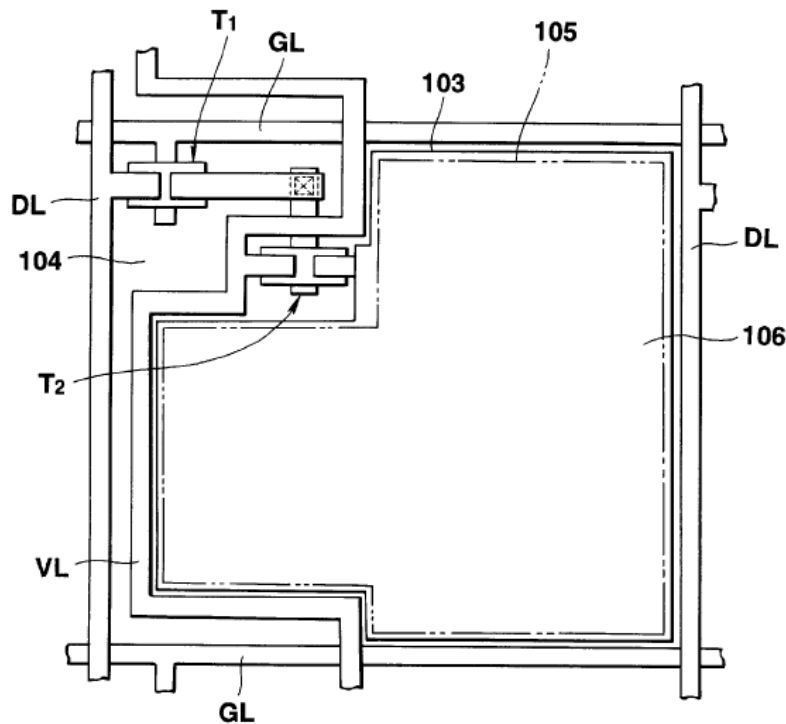


FIG.22

Figure 22 “is a plan view of a display apparatus according to the related art.” *Id.* at 5:12–13. The display apparatus includes pairs of thin film transistors

that include selection transistor T1 and drive transistor T2 and confer a voltage storing capability on pixels. *Id.* at 1:49–51. The '450 patent states that transistors T1, T2 can be thin film transistors. *Id.* at 1:58–59.

The display apparatus further includes an organic EL layer 106 that is arranged to not overlap transistors T1 and T2 so that light emitted by the EL layer 106 is prevented from entering thin film transistors T1, T2. *Id.* at 2:23–27. The '450 patent explains that “[i]f the emitted light entered the thin film transistors T1 and T2, unnecessary photoelectromotive force would be generated in the channel regions of the thin film transistors T1 and T2, which entails the possibility of the thin film transistors T1 and T2 malfunctioning.” *Id.* at 2:27–32.

An object of the '450 patent is “to provide a display apparatus which has a light emitting area enlarged so as to emit light at a satisfactorily high luminescence even though a voltage applied to an EL layer is low, and which has a long luminance life.” *Id.* at 2:66–3:3. Another object of the '450 patent is “to provide a display apparatus which prevents light from entering active elements such as transistors, to thereby avoid the malfunction of the active elements.” *Id.* at 3:4–7. An embodiment of such a display apparatus is shown in Figure 1, which is reproduced below.

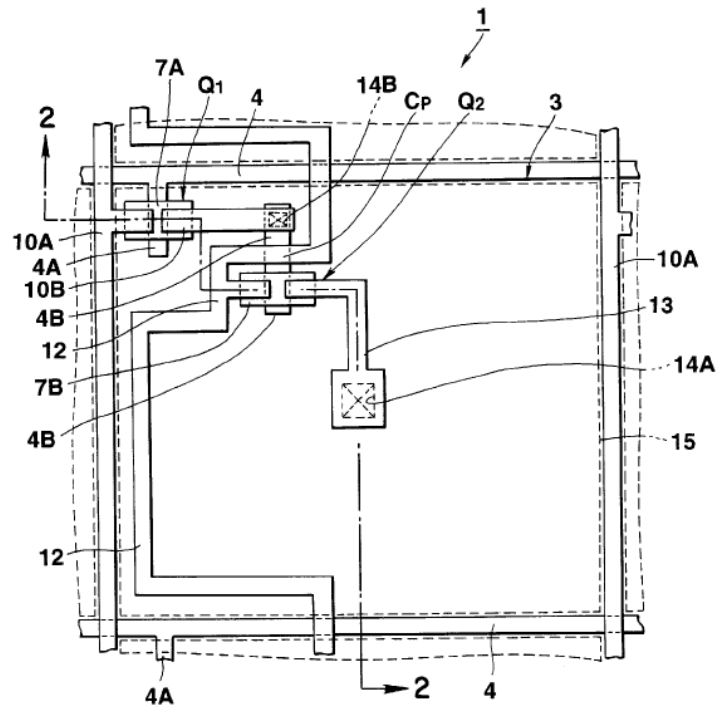


FIG.1

Figure 1 “is a plan view of an [sic] display apparatus according to one embodiment of the present invention.” *Id.* at 4:28–29.

The '450 patent states that display apparatus 1 includes “a substrate 2, an n-channel transistor Q1, an n-channel transistor Q2, [and] an organic EL element 3.” *Id.* at 5:25–33. According to the '450 patent, “[i]n the entire display area, an organic EL layer 16 is formed on the cathode electrodes 15 and the interlayer insulation film 14, and a transparent anode electrode 17.” *Id.* at 6:39–41. The '450 patent further explains that “each EL element 3 emits light over the entirety of one pixel area” and “cathode electrodes 15 are formed of MgIn which reflects light.” *Id.* at 7:66–8:47, 8:49–50. Thus, “light emitted by the organic EL layer 16 when a voltage is applied between the anode electrode 17 and the cathode electrodes 15 comes out through the anode electrode 17 without leaking downward” and “the light does not enter

the selection transistors Q1 and the drive transistors Q2, and hence the malfunction of the transistors Q1 and Q2 due to the photoelectromotive force is avoided.” *Id.* at 8:50–57.

In addition, the ’450 patent describes wavelength conversion layers having the photoluminescence effect of absorbing light of one wavelength from an organic electroluminescence layer and emitting light of a different wavelength. *Id.* at 11:47–65. As a result, “display apparatus 1 can easily display a full-color image.” *Id.* at 12:8–9. The ’450 patent also describes color filter layers that allow light of only a certain wavelength range to pass through. *Id.* at 12:28–48. In one embodiment, a color filter absorbs a wavelength range of light that excites a corresponding wavelength conversion layer so the wavelength conversion layer is not excited by light coming from outside of the display apparatus. *Id.* at 12:49–13:10. The ’450 patent explains that with such an arrangement of wavelength range conversion layers and color filter layers, “the color purity of light going outside the display apparatus 1 is high.” *Id.* at 13:17–18.

B. The Challenged Claims

Petitioner challenges claims 1–9, 11–13, and 15–18 of the ’450 patent. Pet. 1. Claims 2–9, 11–13, 17, and 18 depend from claim 1, and claim 16 depends from claim 15. Claim 1, reproduced below, is illustrative of the subject matter of the challenged claims:

1. A display apparatus comprising:
 - a substrate;
 - active elements formed over said substrate and driven by an externally supplied signal;
 - an insulation film formed over said substrate so as to cover said active elements, said insulation having at least one contact hole;

at least one first electrode formed on said insulation film so as to cover said active elements, and connected to said active elements through said at least one contact hole, said at least one first electrode being made of a material which shields visible light;

an organic electroluminescent layer having an organic electroluminescent material formed on said at least one first electrode so as to cover said active elements and including at least one layer which emits light in accordance with a voltage applied to said at least one layer; and

at least one second electrode formed on said organic electroluminescent layer which covers said active elements.

Ex. 1001, 17:49–18:3.

C. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Challenged Claim(s)	35 U.S.C. ²	Reference(s)/Basis
1, 2, 4–8, 15, and 16	§ 102(e)	Utsugi ³
1, 2, 4–8, 15, and 16	§ 103(a)	Utsugi
3	§ 103(a)	Utsugi and Manabe ⁴
9, 11–13, 17, and 18	§ 103(a)	Utsugi and Eida ⁵

² The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. §§ 102 and 103 that became effective on March 16, 2013. Because the ’450 patent issued from an application filed before March 16, 2013, we apply the pre-AIA versions of the statutory bases for unpatentability.

³ US Patent No. 5,670,792 to Utsugi et al., issued Sept. 23, 1997 (Ex. 1003).

⁴ JP H05-3079 to Manabe et al. Citations to Manabe reference Petitioner’s certified translation of Manabe (Ex. 1004), unless stated otherwise. A Japanese language copy of Manabe was provided as Exhibit 1009.

⁵ WO 96/25020 to Eida et al. Citations to the Eida reference are to Petitioner’s certified translation of Eida (Ex. 1005), unless stated otherwise. A Japanese language copy of Eida was provided as Exhibit 1010.

Pet. 5. Petitioner relies on testimony of Adam Fontecchio, Ph.D. (Ex. 1007) (“Fontecchio Declaration”). Patent Owner relies on testimony of Richard Flasck (Ex. 2001) (“Flasck Declaration”).

D. Related Proceedings

The parties identify the following litigation involving the ’450 patent: *Solas OLED Ltd. v. Samsung Display Co., Ltd., et al.*, No. 2:19-cv-00152-JRG (E.D. Tex.); *Solas OLED Ltd. v. Dell Technologies Inc.*, No. 6:19-cv-00514-ADA (W.D. Tex.); *Solas OLED Ltd. v. Google Inc.*, No. 6:19-cv-00515-ADA (W.D. Tex.); and *Solas OLED Ltd. v. Apple Inc.*, No. 6:19-cv-00537-ADA (W.D. Tex.). Pet. 4; Paper 5, 1. The parties have informed us that there has been a jury verdict in the Eastern District of Texas proceeding. Ex. 1019, 7:3–11, 7:21–8:3, 9:11–13. In that verdict, the jury determined claims 4 and 5 were invalid, and did not address the other claims challenged in this proceeding. *Id.*

III. ANALYSIS

A. Claim Construction

In an *inter partes* review, we construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2019). Under that standard, we construe claims “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.* Furthermore, we expressly construe the claims only to the extent necessary to resolve the parties’ dispute. See *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the

controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

In our Decision on Institution, we determined that we did not need to explicitly construe any claim terms at that stage of the proceeding. Dec. on Inst. 8. After the Petition was filed, the parties agreed on constructions for the claim terms “active elements” and “wherein said at least one first electrode has a rough surface which is in contact with the said organic electroluminescent layer” in Case No. 2:19-cv-00152-JRG (E.D. Tex.), and the district court in that case adopted the parties’ construction of “cover” and resolved the parties’ dispute as to whether the term “said active elements” necessarily mapped onto all active elements in a device. PO Resp. 8–9 (citing Ex. 1012, Ex. 2006); Pet. Reply 2 (citing Ex. 1012, Ex. 2006). Moreover, during the instant trial, the parties agreed that we do not need to resolve any claim construction issues in order to resolve the challenges raised in the Petition. *See* PO Resp. 9; Pet. Reply 2–3.

We determine that we need not explicitly construe any claim terms to resolve the unpatentability issues before us. *See Nidec*, 868 F.3d at 1017 (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs.*, 200 F.3d at 803)).

B. Level of Ordinary Skill in the Art

Factors pertinent to a determination of the level of ordinary skill in the art include “(1) educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of workers active in the field.” *Envtl. Designs, Ltd. v.*

Union Oil Co., 713 F.2d 693, 696–97 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *Id.*

In our Institution Decision, we adopted Petitioner’s formulation of the level of ordinary skill in the art and determined that a person of ordinary skill in the art at the time of the invention “would have had a relevant technical degree in Electrical Engineering, Computer Engineering, Materials Science, Physics, or the like, and experience in active matrix display design and electroluminescence.” Dec. on Inst. 9 (quoting Pet. 13) (adopting Petitioner’s formulation, which is supported by Dr. Fontecchio’s testimony, because it is consistent with the ’450 patent and the asserted prior art). In its Patent Owner Response, Patent Owner argues that a person of ordinary skill would need approximately two years of experience working in design and development related to active matrix organic light emitting diodes (“OLED”) displays, in addition to a Bachelor’s degree in Electrical Engineering, Physics, and/or Materials Science and Engineering or equivalent training. PO Resp. 7–8 (citing Ex. 2001 ¶¶ 30–31). Patent Owner also states, however, that its arguments in opposition to the Petition apply under Petitioner’s definition of the level of ordinary skill as well. *Id.* at 8. Accordingly, having considered the parties’ arguments and evidence, we maintain our determination from the Institution Decision adopting Petitioner’s proposed level of ordinary skill in the art, as it is consistent with the problems and solutions in the ’450 patent and prior art of record. We also determine our decision would be the same under either side’s formulation of the level of ordinary skill.

C. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103 if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when available, evidence such as commercial success, long felt but unsolved needs, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *see KSR*, 550 U.S. at 407 (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”).

The Supreme Court made clear that we apply “an expansive and flexible approach” to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming the combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. Reaching this conclusion, however, requires more than merely showing that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness additionally requires that a person of ordinary skill at the time of the invention “would have selected and combined those prior art elements in the

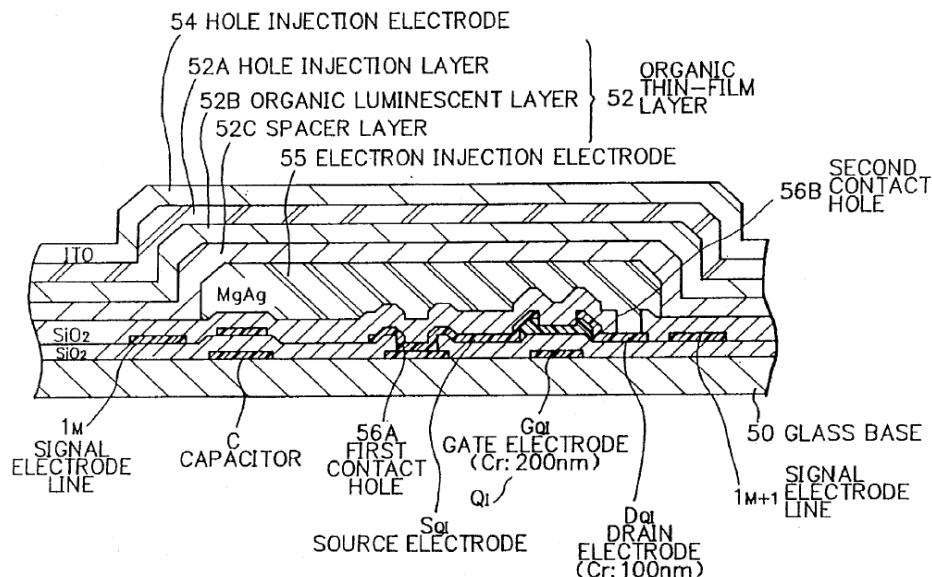
normal course of research and development to yield the claimed invention.”
Id.

D. Overview of the Asserted References

1. Utsugi (Ex. 1003)

Utsugi is titled “Current-Controlled Luminous Element Array and Method for Producing the Same” and relates “to a current-controlled luminous element array of an active matrix type such as for a display purpose, having multiple current-controlled luminous elements arranged in a matrix form.” Ex. 1003 at [54], 1:8–11. Utsugi’s Figure 5 is reproduced below.

F I G. 5



Utsugi’s Figure 5 is a sectional view of an internal structure of a picture element, according to an embodiment of Utsugi. *Id.* at 5:39–41. The picture element includes a luminescent element EL that “includes an organic thin-film layer 52 of a three-layered structure having a spacer layer 52C, an organic luminescent layer 528 and a hole injection layer 52A laminated in

this order over a glass base 50.” *Id.* at 6:37–41. Utsugi’s device further includes electron injection electrode 55. *Id.* at 6:47–54.

Utsugi describes “[t]he luminescent element EL as a layered organic thin-film EL element extends over the capacitor C and the transistors Q_I and Q_S , covering substantially the entirety of the picture element region.” *Id.* at 6:23–27.

2. Manabe (*Ex. 1004*)

Manabe is titled “Organic EL Element.” *Ex. 1004* at [54]. Manabe’s Figure 1 is reproduced below.

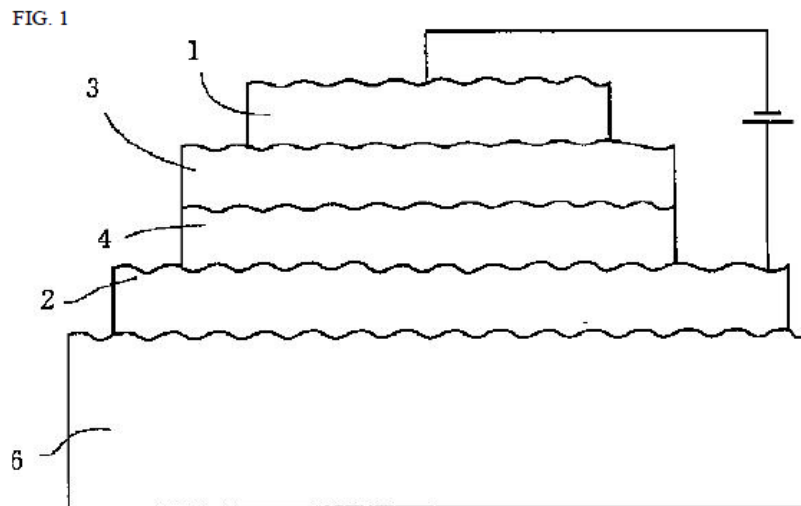


Figure 1 “is a drawing showing an embodiment applying the present invention to an organic EL element with a two-layer structure.” *Id.* ¶ 34. Manabe describes an organic electroluminescent element that includes transparent electrode 2 and hole transport layer 4 that make up an organic electroluminescent layer, light emitting layer 3, and metal electrode 1 “formed in order on the rough surface of a glass substrate 6.” *Id.* ¶ 26.

Manabe’s Figure 5 is reproduced below.

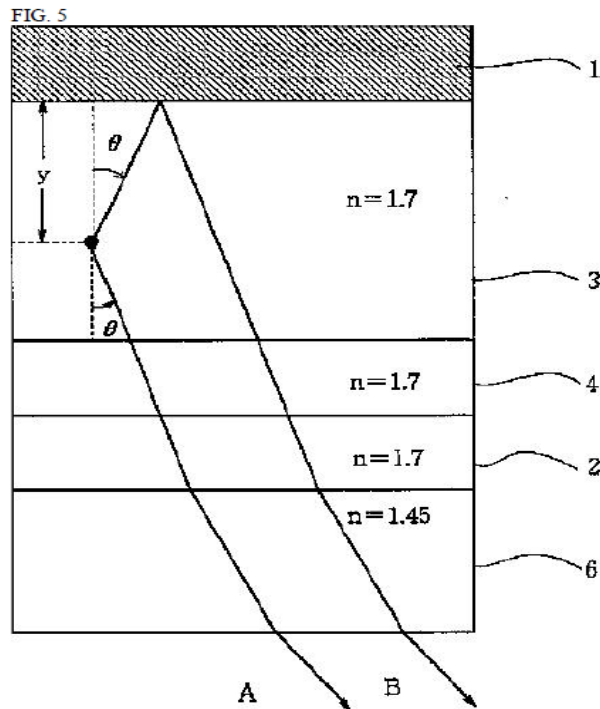


Figure 5 “is a partial enlarged cross-section drawing describing light interference of an organic EL element with a two-layer structure.” *Id.* ¶ 34.

Manabe explains:

Light emitted from one point of emission source P within the EL layer includes light from two sources, path A of light directly impinging on the substrate 6 in the drawings and path B of light reflecting off the metal electrode 1 and impinging on the substrate 6. The light from these two paths have light path difference L given by equation 1 and furthermore phase difference ηy given by equation 2 and mutually interfere.

Id. ¶ 7. In view of this, Manabe describes:

roughening of the surface of the organic EL layer in contact with the metal electrode or the surface of the metal electrode in contact with the organic EL layer causes slight differences in the light path from light sources within the light emission layer causing averaging of the interference effect and reducing angle dependence and film thickness dependence.

Id. ¶ 24.

In addition, Manabe states:

In this manner, the interface of each layer is roughened to a degree as described above. As a result, there are different optical path variations from each of the light emitting points in the light emitting layer when seen from certain visual angles and is not constant. Therefore, interference effect is averaged, and changes in visual angle dependence in luminance and the light emitting spectrum and variation in membrane thickness are suppressed.

Id. ¶ 31.

3. Eida (Ex. 1005)

Eida is titled “Multi-Color Light Emission Apparatus and Method for Production Thereof” and “relates to a multi-color light emission apparatus suitable for use in multi-color or full-color thin-type displays and a method for producing the multi-color light emission apparatus.” Ex. 1005 at [54], 1:6–8.

Eida’s Figure 5 is reproduced below.

FIG. 5

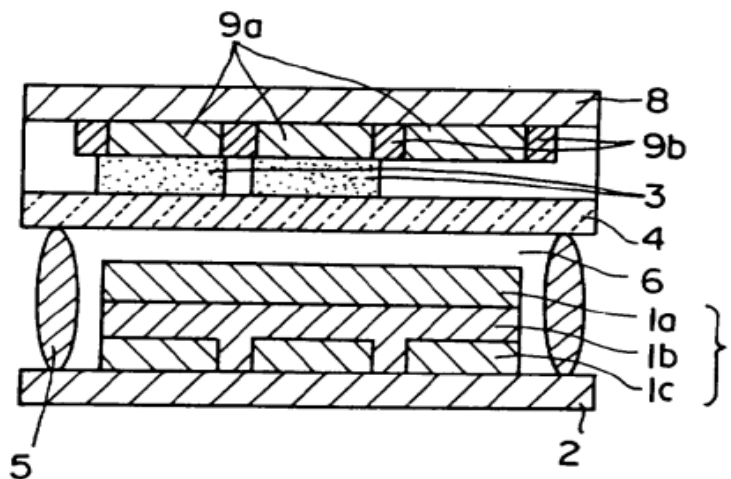


Figure 5 “is a schematic cross section that schematically shows the multi-color light emission apparatus (first invention) of the present invention with

an example using a color filter and a black matrix.” *Id.* at 8:1–3. Eida describes a multi-color light emissions apparatus that includes support substrate 2, organic electroluminescent element 1, transparent inorganic oxide substrate 4, fluorescent layers 3, and transparent substrate 8. *Id.* at 9:22–24, 9:28–10:5.

According to Eida, “a fluorescent layer should convert the light emitted from an organic EL element into light of a wave length longer than that of the light emitted from the organic EL element,” and fluorescent layers 3 “emit rays of fluorescent light of different colors . . . separately arranged on the same plane to obtain emitted light of the three primary colors (RGB).” *Id.* at 9:24–26, 10:12–13. Eida states that “[t]he installation of the fluorescent layer has the advantage that multi-color light emission which is higher in efficiency than in the case of installing a color filter can be anticipated.” *Id.* at 3:8–9. Eida further describes that “a color filter 9a may be arranged on each of the fluorescent layers 3 to control the fluorescent colors and thereby to promote the color purity.” *Id.* at 10:15–16.

Eida depicts another embodiment in Figure 13, reproduced below.

FIG. 13

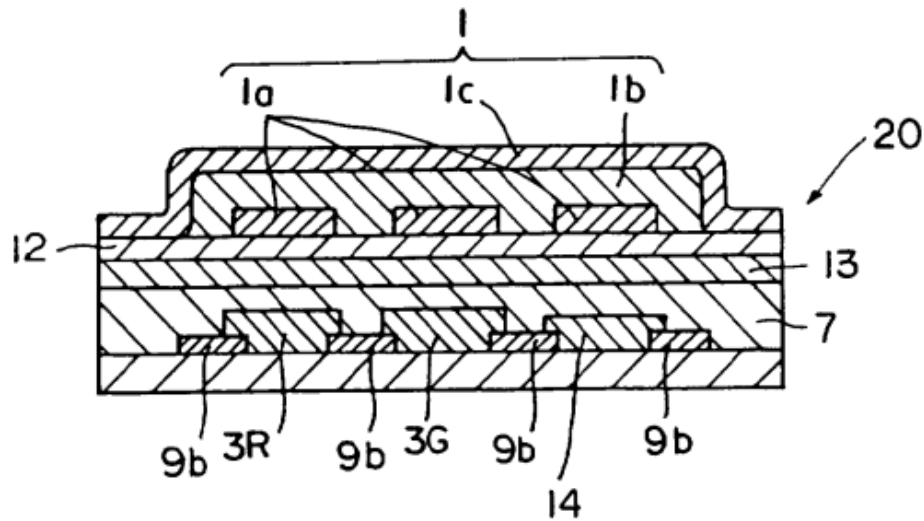


Figure 13 “is a schematic cross section that schematically shows the multi-color light emission apparatus (second invention) of the present invention showing another embodiment that uses a transparent adhesive, transparent fluorescent layer protective layer, color filter, and a black matrix.” *Id.* at 8:31–9:2. The multi-color light emission apparatus includes a transparent support substrate (not labeled in Figure 13), red color conversion fluorescent layer 3R, green color conversion fluorescent layer 3G, blue color filter 14, transparent and electrically insulating inorganic oxide layer 12, and organic electroluminescent element 1. *Id.* at 37:11–38:2, 38:10–12.

Eida explains that blue color filter 14 adjusts “the colors of light emitted from the organic EL element to improve the purity of these colors.” *Id.* at 38:10–12. Eida further explains that, in addition to the above structures, “a red color filter and a green color filter may be arranged between the red color conversion fluorescent layer 3R and the transparent substrate, and between the green color conversion fluorescent layer 3G and the transparent substrate respectively, thereby adjusting colors of light of a

red color and of a green color to improve purity of these colors.” *Id.* at 38:4–8.

E. Alleged Obviousness Based on Utsugi

Petitioner argues that claims 1, 2, 4–8, 15, and 16 would have been obvious over Utsugi. Pet. 53–62. We have reviewed the evidence and arguments provided by the parties and are persuaded, based on the record before us, that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 2, 4–8, 15, and 16 would have been obvious over Utsugi.

Claim 1

“a substrate”

“active elements formed over said substrate and driven by an externally supplied signal”

Petitioner contends that Utsugi discloses these limitations because “glass base 50” is a substrate upon which the EL element is built (Pet. 22 (citing Ex. 1003, 6:37–40; Ex. 1007 ¶ 75)), and current-controlling transistor Q_I and switching transistor Q_S are active elements formed on top of glass base 50. Pet. 22–23 (citing Ex. 1003, 6:19–23, 7:20–45, Fig. 5; Ex. 1007 ¶¶ 77–78). Petitioner also contends that switching transistor Q_S is driven by the external signal from scan electrode line 3_{N+1} , while current-controlling transistor Q_I is driven by the external signal from the signal electrode line 1_M . *Id.* at 23 (citing Ex. 1003, 7:9–12, 8:11–16, Fig. 3; Ex. 1007 ¶ 79). Patent Owner does not present any argument with respect to these limitations. Based on the evidence presented, we are persuaded that Utsugi teaches these limitations.

Petitioner contends that it would have been obvious to form the SiO₂ layer to cover Q_S because Utsugi's disclosures show that the SiO₂ layer is deposited over the array after Q_I and Q_S have been formed, the purpose of the SiO₂ layer is to form an insulation layer, and a person of ordinary skill in the art would have been motivated to leave the insulating SiO₂ layer in place above Q_S, just as it is above Q_I. Pet. Reply 9 (citing Ex. 1007 ¶¶ 168–170). Petitioner further contends that a person of ordinary skill in the art would have understood “that it would have been obvious, if not necessary, to include an insulation layer” over both transistors Q_S and Q_I, in order to prevent the metal layers of the transistors from coming into contact with electron injection electrode 55, which would cause them to short circuit. Pet. 53–54 (citing Ex. 1003, Fig. 4; Ex. 1007 ¶¶ 168–170). According to Petitioner:

Using Utsugi's SiO₂ insulation layer to provide the insulation above transistor Q_S would be the most natural and straightforward implementation of Utsugi's disclosures: it would entail simply *not undertaking an undisclosed and unnecessary additional step* of patterning or masking the SiO₂ insulation to remove it from the area above transistor Q_S.

Pet. Reply 9–10.

Petitioner also argues that including an insulation layer over both transistors would have been predictable and nothing more than applying a known technique to a known device, as evidenced by the '450 patent's teaching that related art at the time of the invention made use of a passivation film that covered both transistors. Pet. 55 (citing Ex. 1007 ¶ 169). Petitioner relies on the '450 patent's description of the related art in Figures 22 and 23, which states that the thickness of passivation film 104 is

set at such a value to “prevent the occurrence of a parasitic capacitance in the thin film transistors.” *Id.* (citing Ex. 1001, 2:53–56).

Patent Owner contends that Utsugi’s SiO₂ layer does not necessarily cover transistor Q_S, because different materials or techniques could be used in forming Utsugi’s structure, in order to insulate the electrodes of Q_S and Q_I. PO Resp. 12–13 (citing Ex. 2001 ¶¶ 54–55). In response to Petitioner’s rationale as to why it would have been obvious to use Utsugi’s SiO₂ insulation layer to provide the insulation above transistor Q_S, Patent Owner contends that the “undisclosed” and “unnecessary” masking or patterning steps that Petitioner asserts would be avoided by modifying Utsugi are “*already present* in the process disclosed in Utsugi, meaning that no ‘undisclosed’ or ‘unnecessary’ steps are required.” PO Sur-reply 5 (citing Ex. 2001 ¶ 54).

Patent Owner further contends that Petitioner’s reliance on Figure 23 of the ’450 patent is improper hindsight because there is no evidence that Figure 23 was actually known in the prior art. PO Resp. 13 (citing Ex. 1001, 1:47–49; Ex. 2001 ¶ 56); PO Sur-reply 6. According to Patent Owner, insulation film 104 of Figure 23 “does not have a ‘contact hole’ as this limitation requires,” and the Petition does not explain how a contact hole would be formed in the insulation film or “how that contact hole could connect the ‘first electrode’ to the ‘active elements,’ as required by the ’450 patent claims.” *Id.* at 13–14 (citing Ex. 2001 ¶¶ 56–57).

Based on the evidence presented, notwithstanding Patent Owner’s arguments to the contrary as discussed above, we find Petitioner has demonstrated by a preponderance of the evidence that a person of ordinary skill in the art would have modified Utsugi so that the SiO₂ layer covers both

transistors Q_S and Q_I , and satisfies this limitation. We find persuasive Petitioner's rationale that a person of ordinary skill would have understood that insulation above transistor Q_S would have been necessary to prevent a short circuit across Q_S ; indeed, both parties' experts agree on this point. *See* Ex. 1007 ¶ 168; Ex. 1017, 155:8–16. We also find it persuasive, as Petitioner argues, that using the SiO_2 layer to provide insulation above transistor Q_S would have been straightforward and efficient, because it would have avoided additional patterning and the SiO_2 layer was already used to provide insulation above other structures. *See* Ex. 1007 ¶ 169.

Patent Owner's argument that a different insulating material could be deposited does not undermine Petitioner's showing because Mr. Flasck did not articulate any reason why a person of ordinary skill would undertake such an additional step. *See* Ex. 1017, 156:6–21. And Patent Owner fails to adequately explain how Petitioner's proposed modification does not avoid the asserted additional patterning steps; Mr. Flasck's testimony does not specifically address this. *See* Ex. 2001 ¶ 54; *see generally* Ex. 1017. We have also considered Patent Owner's argument that modifying Utsugi by oxidizing transistor Q_S 's electrode in order to insulate it would have been an alternative modification that would not involve additional patterning steps. *See* Tr. 48 (quoting Ex. 2005, 98:25–99:20). Although Dr. Fontecchio's testimony concerning oxidation of an aluminum surface during vacuum chamber deposition supports Patent Owner's argument that there would have been alternative techniques to leaving the SiO_2 layer in place in order to insulate the electrodes of Q_S , it neither persuades us that a person of ordinary skill would not have been motivated to use the already-present SiO_2 layer to insulate Q_S , nor outweighs Petitioner's evidence on that issue. In other

words, one obvious modification to a reference does not exclude the possibility of other obvious modifications.

We find Petitioner has demonstrated by a preponderance of the evidence that a person of ordinary skill in the art would have modified Utsugi such that this claim limitation is satisfied.

“at least one first electrode formed on said insulation film so as to cover said active elements, and connected to said active elements through said at least one contact hole, said at least one first electrode being made of a material which shields visible light”

Petitioner contends that Utsugi discloses this limitation because electron injection electrode 55 is formed as a MgAg layer on the SiO₂ layer, as shown in Figure 5. Pet. 26 (citing Ex. 1003, 7:47–57; Ex. 1007 ¶ 86). Petitioner further contends that electron injection electrode is connected to transistors Q_S and Q_I through contact hole 56B, as shown in Figure 5 and described in Utsugi’s manufacturing steps. *Id.* at 27 (citing Ex. 1003, 7:46–51; Ex. 1007 ¶ 88). Petitioner also contends that MgAg, a metallic material, would be reflective and shield visible light from the transistors. *Id.* at 28 (citing Ex. 1003, 6:47–50; Ex. 1007 ¶ 89). As support, Petitioner further points out that the ’450 patent identifies magnesium-based metals such as MgAg and MgIn as suitable materials for forming the first electrode, which is described as shielding visible light. *Id.* (citing Ex. 1001, 8:49–54, 17:26–28).

Patent Owner does not expressly dispute Petitioner’s arguments with respect to this limitation. Based on the evidence presented, we are persuaded that Utsugi teaches this limitation.

“an organic electroluminescent layer having an organic electroluminescent material formed on said at least one first electrode so as to cover said active elements and including at least one layer which emits light in accordance with a voltage applied to said at least one layer”

Petitioner contends that Utsugi discloses this limitation because organic thin-film layer 52 includes at least one layer (52B), which emits light in accordance with a voltage applied to the layer. Pet. 28 (citing Ex. 1003, 6:59–63, 8:20–28, Fig. 5; Ex. 1007 ¶ 92). Petitioner further contends that Utsugi discloses that the EL structure, including organic thin-film layer 52, extends over the capacitor C and transistors Q_S and Q_I , covering the entire picture element region. *Id.* at 29 (citing Ex. 1003, 6:23–29, 6:53–59; Ex. 1007 ¶ 93).

Patent Owner does not expressly dispute Petitioner’s arguments with respect to this limitation. Based on the evidence presented, we are persuaded that Utsugi teaches this limitation.

“at least one second electrode formed on said organic electroluminescent layer which covers said active elements.”

Petitioner contends that Utsugi discloses this limitation because hole injection electrode 54 is formed on organic thin-film layer 52, so as to cover the entire picture element region, including transistors Q_S and Q_I . Pet. 30–31 (citing Ex. 1003, 6:23–29, 6:53–59, Fig. 5; Ex. 1007 ¶¶ 95–96).

Patent Owner does not expressly dispute Petitioner’s arguments with respect to this limitation. Based on the evidence presented, we are persuaded that Utsugi teaches this limitation.

Conclusion as to Claim 1

For the reasons explained above, we conclude, on this record, that Petitioner has shown by a preponderance of the evidence that claim 1 is unpatentable as obvious over Utsugi.

Claim 4

Claim 4 depends from claim 1, and additionally requires that the active elements are a selection transistor and a drive transistor that form a pair. Ex. 1001, 18:10–18. Petitioner contends Utsugi discloses that switching transistor Q_S is turned on when scan electrode line 3_{N+1} is selected, and that a person of ordinary skill would understand that the scan electrode line is an address line because it addresses a row of pixels. Pet. 31–32 (citing Ex. 1003, Fig. 3, 7:9–12, 8:11–16; Ex. 1007 ¶ 101). Petitioner further contends Utsugi discloses that image data from electrode line 1_M is supplied from the electrode line through switching transistor Q_S on the gate of current-controlling transistor Q_I , which controls the current, and therefore the voltage, across the organic electroluminescent layer. *Id.* at 32–33 (citing Ex. 1003, 6:59–63, 8:11–16, 8:20–28; Ex. 1007 ¶ 104–105). Petitioner further contends Utsugi discloses that transistors Q_S and Q_I form a pair. *Id.* at 33 (citing Ex. 1003, 5:50–56; Ex. 1007 ¶ 106).

Patent Owner contends that Petitioner fails to show unpatentability of claim 4 for the same reasons Patent Owner raises for claim 1, and specifically argues that claim 4 makes explicit that the active elements Q_S and Q_I must be covered in order to satisfy claim 1. PO Sur-reply 7. We address Patent Owner's arguments as to claim 1 above. We have reviewed the parties' contentions and the full record and conclude that Petitioner has

proven by a preponderance of the evidence that claim 4 would have been obvious over Utsugi.

Claims 8 and 16

Claims 8 and 16 depend from claims 1 and 15, respectively, and additionally require that “a constant voltage is applied to said second electrode.” Ex. 1001, 18:52. Petitioner contends Utsugi teaches a constant voltage is applied to hole injection electrode 54, which is connected to power source electrode line 5, labeled as V_{DD} in Figure 3. Pet. 40 (citing Ex. 1003, Fig 3, 6:43–47). Petitioner contends that a person of ordinary skill in the art would have understood that V_{DD} refers to a direct current (“DC”) supply, which has a constant voltage. *Id.* (citing Ex. 1006, App. D, 387). Petitioner further contends that Utsugi’s disclosure of an example where power source line 5 applies a 7V voltage across the EL structure (*id.* (citing Ex. 1003, 8:32–40)) conveys that power source line 5 applies a constant voltage. *Id.* (citing Ex. 1007 ¶ 129). Petitioner further contends that even if a person of ordinary skill in the art would not have understood that Utsugi teaches constant voltage, it would have been obvious to use a constant voltage for line V_{DD} in Utsugi because it would have been nothing more than selection from a limited set of known options, i.e. constant voltage or alternating voltage. Pet. 56–58 (citing Ex. 1007 ¶¶ 171–172). Petitioner contends that because the voltage applied to the second electrode creates current flow through luminescent element EL, a person of ordinary skill in the art would have understood that “constant voltage would be necessary to keep the image displayed for the entirety of a full frame, without a flicker, and to prevent a perceivable change in brightness.” *Id.* at 57 (citing Ex. 1003, 6:59–63, 8:20–28; Ex. 1007 ¶¶ 171–174).

Patent Owner disputes that Utsugi teaches that V_{DD} is constant. PO Resp. 16 (citing Ex. 2001 ¶ 66). Mr. Flasck testifies that “direct current” does not mean that current is “constant.” Ex. 2001 ¶ 61. As to Utsugi’s reference to a 7V voltage across the EL structure, Patent Owner asserts that a constant 7V drive voltage would require that V_{DD} change over time. PO Resp. 17 (citing Ex. 1007 ¶ 129; Ex. 2001 ¶ 62). Patent Owner does not address Petitioner’s argument that a person of ordinary skill in the art would have understood that constant voltage would be necessary to display a full frame image without flicker or perceivable change in brightness.

Petitioner responds that Utsugi does not contain any discussion of V_{DD} changing, and further that Utsugi’s second embodiment is inconsistent with V_{DD} changing because it adds diode D_1 between the EL element and power source line 5, but no such diode would be necessary if V_{DD} could be changed over time. Pet. Reply 15–16 (citing Ex. 1003, Fig. 6, 9:39–64).

In its Sur-reply, Patent Owner further contends that Utsugi’s description of the 7V drive voltage does not imply that it is constant, even under Petitioner’s interpretation of Utsugi, and therefore Utsugi’s V_{DD} is not constant either. PO Sur-reply 16 (citing Ex. 1003, 8:32–36). Patent Owner also contends that a person of ordinary skill in the art would have understood that Utsugi does not include only two options for the voltage applied to the second electrode, i.e., constant voltage or alternating voltage conditions, as there is “at least one further possibility . . . : a ‘direct current’ that is not constant” because the 7V voltage changes as the scan electrode line voltage changes. *Id.*

We have considered the parties’ argument and evidence on this issue as detailed above, and we find Petitioner’s contentions persuasive. As an

initial matter, we agree with Petitioner that Utsugi's disclosure of applying a specific drive voltage of 7V teaches a constant voltage. Ex. 1007 ¶ 129. Further, Petitioner has provided a persuasive explanation as to why a person of ordinary skill in the art would have understood that Utsugi teaches applying a constant voltage, i.e., because constant voltage would be necessary to prevent a change in brightness in luminescent element EL. Ex. 1007 ¶¶ 171–174. Petitioner provides a rationale for a person of ordinary skill to modify Utsugi if necessary to select constant voltage, because a person of ordinary skill in the art would understand that constant voltage would be most appropriate for driving Utsugi's display without flicker or a perceptible change in brightness. *See* Ex. 1007 ¶ 171. Patent Owner does not address this evidence. Accordingly, we conclude that Petitioner has proven by a preponderance of the evidence that claims 8 and 16 would have been obvious over Utsugi.

Claim 15

Petitioner contends independent claim 15 is unpatentable as obvious over Utsugi. Pet. 41–53, 58–62; Pet. Reply 19–21, 23–24. Petitioner's argument and evidence in support of unpatentability of claim 15 is similar to that for claim 1, as discussed above, except that Petitioner contends Utsugi's switching transistor Q_S corresponds to claim 15's "selection transistors formed over said substrate arranged in a matrix pattern" and Utsugi's current-controlling transistor Q_I corresponds to claim 15's "drive transistors formed over said substrate . . . , each of said drive transistors being connected to one of said selection transistors." Pet. 42 (citing Ex. 1003, 4:5–21, 6:19–23, 7:20–45; Ex. 1007 ¶¶ 135, 137). As to claim 15's limitations reciting "address lines connected to said selection transistors" and "data

lines connected to said selection transistors,” Petitioner contends Utsugi’s scan electrode lines correspond to the claimed address lines, and Utsugi’s signal electrode lines correspond to the claimed data lines. *Id.* at 43–45 (citing Ex. 1003, Fig. 3, 3:66–4:4, 7:9–12, 8:11–16; Ex. 1007 ¶¶ 139, 141–142). Petitioner provides an annotated version of Utsugi’s Figure 3, reproduced below.

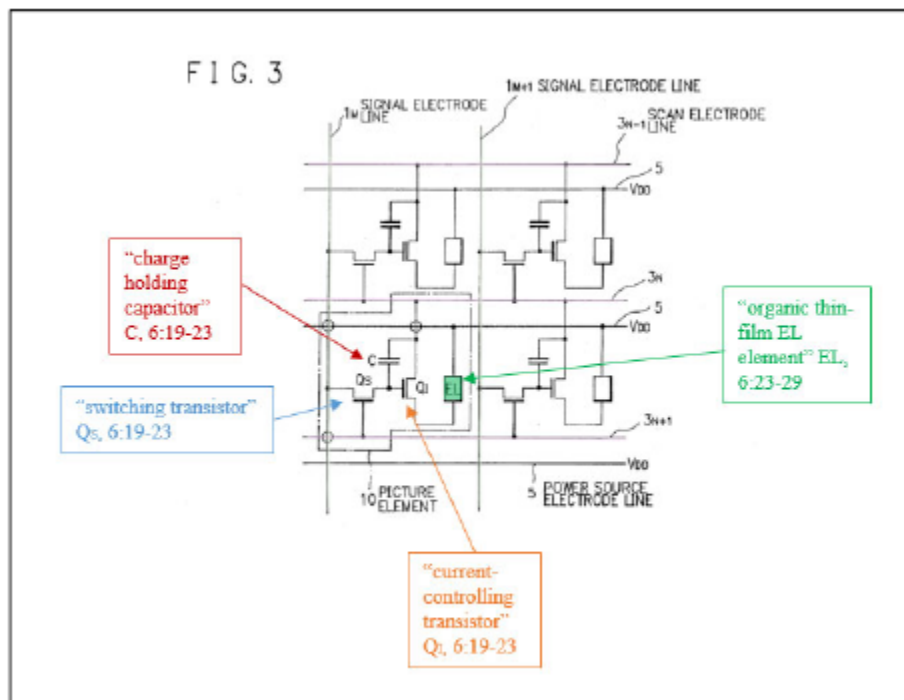


Figure 3 is a partial circuit diagram of an array according to Utsugi’s first embodiment; the annotated version of Figure 3 adds highlighting and text identifying switching transistor, current-controlling transistor, charge holding capacitor, and organic thin-film EL elements described in Utsugi. Pet. 44–45.

As to claim 15’s limitations that Petitioner refers to as 15[g]–[i], Petitioner provides contentions based on Utsugi’s Figures 4 and 5 that are substantially the same as Petitioner’s contentions for the limitations of claim

1 relating to a first electrode, second electrode, and organic electroluminescent layer, as discussed *supra*. Pet. 47–52.

We have reviewed Petitioner’s evidence and argument as to the limitations of claim 15 discussed above, and find that Petitioner has shown that Utsugi teaches each of these limitations. Patent Owner does not separately address Petitioner’s showing as to these limitations of claim 15. *See generally* PO Resp.; PO Sur-reply. We discuss below the limitations of claim 15 that the parties separately address.

“an insulation film formed over said substrate so as to cover said drive transistors, said address lines and said data lines, said insulation film having contact holes formed in correspondence with said drive transistors”

Petitioner contends Utsugi discloses that after current-controlling transistor Q_I , scan electrode lines 3_N , and signal electrode lines 1_M are formed on the substrate, SiO_2 layer is grown and covers them, and then contact holes are formed to allow contact between electron injection electrode 55 and drain electrode D_{QI} of current-controlling transistor Q_I . Pet. 46–47 (citing Ex. 1003, 7:16–52; Ex. 1007 ¶¶ 146–148). Similar to its argument for claim 1, Petitioner contends a person of ordinary skill in the art would have understood the SiO_2 layer is continuous apart from the contact holes (*id.* at 47 (citing Ex. 1003, Fig. 5; Ex. 1007 ¶ 147)), and that even if Utsugi does not disclose that the SiO_2 layer covers the scan electrode line, it would have been obvious to leave the SiO_2 layer in place above the scan electrode line in the same way as it is left in place above the capacitor and gate electrodes, in order to avoid an unnecessary and additional step of patterning or masking the SiO_2 layer. *Id.* at 58–59 (citing Ex. 1003, 7:20–25, 46–51; Ex. 1007 ¶ 176). Petitioner further contends a person of ordinary

skill in the art would have recognized that “it would be most efficient to form the SiO₂ layer across the entire area, so as to cover the scan electrode lines.” Pet. Reply 20 (citing Ex. 1017, 155:20–22).

Petitioner further contends a person of ordinary skill in the art would have understood that insulation provided by the SiO₂ layer would be beneficial to mitigate parasitic capacitance, and that the ’450 patent recognizes parasitic capacitance as a “detrimental or unwanted phenomenon.” Pet. Reply 21 (quoting Ex. 1001, 2:54–57; citing Ex. 1017, 174:22–175:4, 181:21–182:3).

Patent Owner responds, similar to its response for claim 1, that even if the SiO₂ layer were deposited over the scan electrode lines, it may be removed by etching, for example as part of the same etching step used to form second contact hole 56B. PO Resp. 19 (citing Ex. 1007 ¶¶ 84, 147; Ex. 2001 ¶ 66). Patent Owner also contends that there would have been no concern of shorting, unlike for claim 1, because the scan electrode lines and electron injection electrode 55 do not overlap. *Id.* at 19–20 (citing Ex. 1003, Fig. 4; Ex. 2001 ¶ 67). Patent Owner further asserts that Petitioner’s argument about mitigating parasitic capacitance is untimely as to claim 15, because the Petition does not mention parasitic capacitance with respect to scan electrode lines. PO Sur-reply 12.

We have considered the parties’ argument and evidence as detailed above, and we find Petitioner’s contentions persuasive. As with claim 1, we find persuasive Petitioner’s rationale that a person of ordinary skill in the art would have been motivated to modify Utsugi to leave the SiO₂ layer in place above the scan electrode lines, because Utsugi’s Figure 5 shows the SiO₂ layer covering everything except for the location of the contact holes, and it

would have added unnecessary complexity to remove the insulation above the scan lines. Ex. 1007 ¶¶ 175–176. Further, Patent Owner has not identified any benefit to undertaking an additional step to remove the SiO₂ layer. Although the parties do not appear to dispute that a person of ordinary skill in the art would not have been concerned with preventing a short with respect to Utsugi’s scan electrode lines, we find that Petitioner’s rationale for leaving the SiO₂ layer in place (avoiding unnecessary additional manufacturing steps) is sufficient to support a determination of obviousness as to this claim limitation. *Id.* We do not rely on Petitioner’s argument about mitigating parasitic capacitance and therefore need not address Patent Owner’s contention that it is an improper Reply argument.

*“a first driver circuit for selectively supplying said address signal to said address lines in sequence; and
a second driver circuit for supplying said image data to said data lines”*

Petitioner contends Utsugi discloses that row selection in its active matrix type luminous element array “is performed by sequentially selecting corresponding one of row-addressed scan electrode lines,” which satisfies claim 15’s limitation of selectively supplying an address signal to address lines in sequence. Pet. 53 (citing Ex. 1003, 8:59–62; Ex. 1007 ¶¶ 161–162). Petitioner further contends Utsugi discloses that signal electrode lines 1_M supply image data to current-controlling transistors Q_I. *Id.* (citing Ex. 1003, Fig. 3; Ex. 1007 ¶¶ 164–165). Patent Owner does not dispute that Utsugi discloses these functions.

Petitioner acknowledges that Utsugi does not discuss the circuitry used to perform the functions recited in claim 15’s first and second driver circuit limitations set forth above. Pet. 53. Petitioner contends, however,

that a person of ordinary skill in the art would have understood that these functions are performed by driver circuitry, and that implementing such circuitry would have been well within the skill of a person of ordinary skill. *Id.* at 53, 60–62 (citing Ex. 1007 ¶¶ 162, 165, 177–179; *KSR*, 550 U.S. at 417 (“application of a known technique to a piece of prior art ready for the improvement”)). In addition to this supporting testimony from Dr. Fontecchio, Petitioner relies on Mr. Flasck’s testimony as an admission that “in the vast majority of cases for image displays, based on this type of OLED technology – there would be drivers, driver circuits.” *See* Pet. Reply 24 (citing Ex. 1017, 170:22–171:3).

Patent Owner contends that Utsugi does not disclose any structure for performing the functions of selectively supplying an address signal and supplying image data to data lines. PO Resp. 21; PO Sur-reply 13. Patent Owner further contends that there “are multiple different ways to select scan electrode lines that do not involve a driver circuit” (PO Resp. 21 (citing Ex. 2001 ¶ 69)) and that Petitioner’s argument that any circuitry performing the claimed functions is necessarily a driver circuit is unsupported by evidence (PO Sur-reply 14).

We have considered the parties’ argument and evidence on this issue as detailed above, and we find Petitioner’s contentions persuasive. Petitioner’s rationale that driver circuits were known technology for supplying image data is supported by the evidence, including Mr. Flasck’s testimony. *See* Ex. 1007 ¶ 177; Ex. 1017, 170:22–171:3. We find less persuasive Patent Owner’s contention that “it would not be unusual to manually apply signals to particular lines in no particular order, such as in a test device or an experimental device” (Ex. 2001 ¶ 69), because Patent

Owner does not explain why a person of ordinary skill in the art would choose that implementation over a driver circuit that its expert admits would be used “in the vast majority of cases for image displays.” Ex. 1017, 170:22–171:3. Again, Patent Owner’s identification of a different obvious modification does not undermine Petitioner’s showing that its proposed modification would have been obvious.

We have also considered Patent Owner’s argument that Petitioner improperly relies on prior art not included in the Petition, for disclosure of a driver circuit. *See* Tr. 37. We determine, however, that Petitioner has shown the knowledge of a person of ordinary skill in the art sufficiently supplies a “driver circuit” to support that it would have been obvious to modify Utsugi. *See Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330 (Fed Cir. 2020) (“[I]t does not follow that we ignore the skilled artisan’s knowledge when determining whether it would have been obvious to modify the prior art.”) (citing *Dow Jones & Co. v. Abblaise Ltd.*, 606 F.3d 1338, 1349, 1353 (Fed. Cir. 2010) (“[T]he obviousness ‘analysis *requires* an assessment of the ‘ . . . background knowledge possessed by a person having ordinary skill in the art.’”))).

For the reasons discussed above, we conclude that Petitioner has proven by a preponderance of the evidence that claim 15 would have been obvious over Utsugi.

Other Challenged Claims

Petitioner provides additional contentions regarding Utsugi’s disclosures relevant to the additional limitations of dependent claims 2 and 5–7. Pet. 31, 34–39, 56. Patent Owner does not separately address those contentions; Patent Owner argues that Petitioner fails to show

unpatentability for the same reasons Patent Owner raises for claim 1. PO Resp. 9. We have reviewed the parties' contentions and the full record and conclude that Petitioner has proven by a preponderance of the evidence that claims 2 and 5–7 would have been obvious over Utsugi, for the reasons provided by Petitioner. *See* Pet. 31, 34–39, 56.

F. Alleged Obviousness Based on Utsugi and Manabe

Petitioner argues claim 3 would have been obvious over the combined teachings of Utsugi and Manabe. Pet. 62–67. Claim 3 depends from claim 1 and additionally recites “wherein said at least one first electrode has a rough surface which is in contact with said organic electroluminescent layer.” Ex. 1001, 18:7–9.

According to Petitioner, Manabe discloses an EL structure comprising a metal electrode, and teaches benefits of the metal electrode having a rough surface in contact with the organic electroluminescent layer, including “averaging of the interference effect and reducing angle dependence and film thickness dependence” in order to improve display quality. Pet. 63–64 (citing Ex. 1004, Fig. 1, ¶¶ 24, 26; Ex. 1007 ¶¶ 181–183). Petitioner contends a person of ordinary skill in the art would have recognized that Utsugi's structure incorporating a reflective first electrode would have a problem with the viewing angle of the display, and would have been motivated to optimize the viewing angle of Utsugi's display by using Manabe's roughened electrode. *Id.* at 64–65 (citing Ex. 1004 ¶ 34; Ex. 1007 ¶¶ 180–183, 185).

Patent Owner does not separately address Petitioner's contentions as to claim 3; Patent Owner argues that Petitioner fails to show unpatentability for the same reasons Patent Owner raises for claim 1. PO Resp. 25. We

have reviewed the parties' contentions and the full record and conclude that Petitioner has proven by a preponderance of the evidence that claim 3 would have been obvious over the combination of Utsugi and Manabe, for the reasons provided by Petitioner. *See* Pet. 62–67.

G. Alleged Obviousness Based on Utsugi and Eida

Petitioner argues claims 9, 11–13, 17, and 18 would have been obvious over the combined teachings of Utsugi and Eida. Pet. 67–82. Claims 9, 11–13, 17, and 18 depend directly or indirectly from claim 1 and recite additional limitations of “wavelength conversion layers” for absorbing light emitted from the organic electroluminescent layer and “filters” for selectively permitting light rays in a wavelength range to pass. Ex. 1001, 18:53–58, 18:62–67, 19:1–13, 20:23–35. Petitioner addresses those limitations with Eida.

According to Petitioner, Eida discloses both wavelength conversion layers and color filters in an organic EL device, with the layers and filters formed over an EL structure including a first electrode, an organic EL layer, and a transparent second electrode, as in Utsugi. Pet. 67 (citing Ex. 1005, Fig. 5, 1:5–8, 10:11–16; Ex. 1007 ¶ 191). Petitioner contends a person of ordinary skill in the art would have been motivated to use Eida's wavelength conversion layers and color filters with Utsugi's display structure, because Utsugi explains that organic thin-film EL structures had possibility as a full-colored wide display but does not provide details on the color aspect. *Id.* at 68 (citing Ex. 1003, 1:17–23). Petitioner contends that Eida's express teaching of using wavelength conversion layers and color filters in order to optimize a multi-color light emission apparatus for use in multicolor or full-color displays constitutes application of a known technique to a piece of

prior art ready for the improvement. *Id.* at 70 (citing Ex. 1007 ¶ 192; *KSR*, 550 U.S. at 417 (“application of a known technique to a piece of prior art ready for the improvement”)).

Patent Owner does not separately address Petitioner’s contentions as to claims 9, 11–13, 17, and 18; Patent Owner argues that Petitioner fails to show unpatentability for the same reasons Patent Owner raises for claim 1. PO Resp. 25. We have reviewed the parties’ contentions and the full record and conclude that Petitioner has proven by a preponderance of the evidence that claims 9, 11–13, 17, and 18 would have been obvious over the combination of Utsugi and Eida, for the reasons provided by Petitioner. *See* Pet. 67–82.

H. Alleged Anticipation Based on Utsugi

For the reasons discussed above, Petitioner has shown, by a preponderance of the evidence, that claims 1–9, 11–13, and 15–18 of the ’450 patent are unpatentable as obvious over Utsugi alone, Utsugi and Manbe, or Utsugi and Eida. In addressing these grounds, we have addressed all of the challenged claims. *See* 35 U.S.C. § 318(a) (requiring the Board to “issue a final written decision with respect to the patentability of any patent claim challenged by the petitioner and any new claim added under section 316(d)"); *see also SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding that a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”). Accordingly, we need not and do not decide whether Petitioner has shown by a preponderance of the evidence that claims 1, 2, 4–8, 15, and 16 are anticipated by Utsugi. *Cf. In re Gleave*, 560 F.3d 1331, 1338 (Fed. Cir. 2009) (not reaching other grounds of unpatentability after affirming the anticipation ground); *see also Beloit*

Corp. v. Valmet Oy, 742 F.2d 1421, 1423 (Fed. Cir. 1984) (holding that once a dispositive issue is decided, there is no need to decide other issues).

IV. CONCLUSION

Petitioner has shown, by a preponderance of the evidence, that claims 1, 2, 4–8, 15, and 16 are unpatentable under § 103(a) over Utsugi; claim 3 is unpatentable under § 103(a) over the combination of Utsugi and Manabe; and claims 9, 11–13, 17, and 18 are unpatentable under § 103(a) over the combination of Utsugi and Eida,⁶ as summarized below:

Claims	35 U.S.C. §	Reference(s) /Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 2, 4–8, 15, 16	102(e) ⁷	Utsugi		
1, 2, 4–8, 15, 16	103(a)	Utsugi	1, 2, 4–8, 15, 16	
3	103(a)	Utsugi, Manabe	3	
9, 11–13, 17, 18	103(a)	Utsugi, Eida	9, 11–13, 17, 18	
Overall Outcome			1–9, 11–13, 15–18	

⁶ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this Decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

⁷ As explained in the previous section, we need not and do not decide whether Petitioner has shown by a preponderance of the evidence that Utsugi anticipates the challenged claims.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–9, 11–13, and 15–18 of the '450 patent are held to be unpatentable; and

FURTHER ORDERED that because this is a Final Written Decision, parties to this proceeding seeking judicial review of our decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2020-00140
Patent 6,072,450

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