

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LG DISPLAY CO., LTD and LG ELECTRONICS, INC.,
Petitioner,

v.

INNOVATIVE DISPLAY TECHNOLOGIES LLC,
Patent Owner.

Case IPR2014-01362¹
Patent 7,384,177 B2

Before THOMAS L. GIANNETTI, MIRIAM L. QUINN, and
BEVERLY M. BUNTING, *Administrative Patent Judges*.

GIANNETTI, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 328(a) and 37 C.F.R. § 42.73

¹ Case IPR2015-00489 has been joined with this proceeding.

LG Display Co., Ltd. filed a Petition seeking to institute an *inter partes* review of claims 1–3, 5–7, 9, 10, 13–15, 19, 21, and 23–27 of U.S. Patent No. 7,384,177 (“the ’177 patent”). Paper 2 (“Pet.”). Innovative Display Technologies LLC (“Patent Owner”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). Applying the standard set forth in 35 U.S.C. § 314(a), the Board instituted an *inter partes* review of all challenged claims. Paper 12 (“Institution Decision”). Following institution, the proceeding was joined with IPR2015-00489, filed by LG Electronics, Inc., challenging the same claims of the ’177 patent on the same grounds as in this proceeding. For the purpose of this Decision, we will refer to LG Display Co., Ltd. and LG Electronics, Inc., jointly, as “Petitioner.”

During the trial, Patent Owner filed a Patent Owner Response (Paper 20, “PO Resp.”), and Petitioner filed a Reply to the Patent Owner Response (Paper 24, “Pet. Reply”). An oral hearing was held on November, 20, 2015, and a copy of the transcript has been made part of the record. Paper 31 (“Hearing Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c). This Decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the claims on which we instituted trial. Based on the record before us, Petitioner has shown, by a preponderance of the evidence, that claims 1–3, 5–7, 9, 10, 13–15, 19, 21, 23–25, and 27 of the ’177 patent are unpatentable under 35 U.S.C. § 103(a) and claims 1, 2, 6, 7, 9, 10, 13–15, 19, 21, 23, 24, and 26 are unpatentable under 35 U.S.C. § 102(e).

I. BACKGROUND

A. The '177 Patent (Ex. 1001)

The '177 patent is titled "Light Emitting Panel Assemblies." The Abstract describes the subject matter as follows:

Light emitting assemblies include a tray that forms a cavity or recess containing one or more light sources. A sheet, film or substrate is positioned over the cavity or recess for controlling the light emitted from the assembly. The tray acts as a back, side or edge reflector, and has one or more secondary reflective or refractive surfaces.

Ex. 1001, Abstract.

B. Challenged Claims

The '177 patent has two independent claims. They are reproduced here, with emphasis added to certain elements that will be discussed *infra*.

1. A light emitting assembly comprising *a tray having a back wall and continuous side walls that form a hollow cavity or recess completely surrounded by the side walls*, at least one light source located, mounted or positioned in the cavity or recess, and at least one sheet, film or substrate overlying the assembly *for controlling the light emitted from the assembly to fit a particular application*, wherein the tray acts as at least one of a back, side edge, and end edge reflector and has one or more secondary flat, angled, faceted or curved reflective or refractive surfaces to redirect at least a portion of the light emitted by the light source in a predetermined manner within the cavity or recess.

15. A light emitting assembly comprising *a tray having a back wall and continuous side walls that form a hollow cavity or recess completely surrounded by the side walls*, at least two light sources located, mounted or positioned in the cavity or recess, and at least one sheet, film or substrate overlying the assembly *for controlling the light emitted from the assembly to fit a particular application*, wherein the tray acts as at least one of a back, side edge and end edge reflector and has at least one

secondary flat, angled, faceted or curved reflective or refractive surface to facilitate better mixing of light rays within the cavity or recess to produce a desired light output color or uniformity.

C. Related Proceedings

Patent Owner states that it has asserted infringement of the '177 patent by Petitioner in the following proceeding: *Delaware Display Group LLC v. LG Electronics, Inc.*, No. 1:13-cv-02109 (D. Del., filed Dec. 31, 2013). Paper 5. Patent Owner identifies numerous other civil actions in which it has asserted infringement of the '177 patent by other defendants. See Paper 5 for a listing.

D. Claim Construction

The Board interprets claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see also* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). The only claim term the Board construed in its Institution Decision is the term “deformities,” appearing in all challenged claims. We construed the term as “any change in the shape or geometry of the panel surface and/or coating or surface treatment that causes a portion of light to be emitted.” Paper 12, 4 (citing '177 patent, Ex. 1001, col. 4, ll. 44–48). Neither party has proposed any other constructions. In light of the foregoing, we see no reason to modify our previous construction of “deformities” or to construe any other terms.

E. References

Petitioner relies on the following two references from the Petition:²

Melby	US 5,054,885	Oct. 8, 1991	Ex. 1006
Nakamura et al.,	US 5,453,855	Dec. 9, 1993	Ex. 1007

Petitioner relies also on a Declaration of Michael J. Escuti, Ph.D. (“Escuti Decl.”). Ex. 1004. Likewise, Patent Owner’s Response (Paper 24) is accompanied by a Declaration of Mr. Kenneth Werner (Werner Decl.”). Ex. 2016. Deposition transcripts for those witnesses have been entered in the record as Exhibits 1026 (“Werner Dep.”) and 2015 (“Escuti Dep.”).

F. Grounds Asserted

We instituted trial on the following grounds:

References	Basis	Claims Challenged
Melby	§ 103(a)	1–3, 5–7, 9, 10, 13–15, 19, 21, 23–25, and 27
Nakamura	§ 102(e)	1, 2, 6, 7, 9, 10, 13–15, 19, 21, 23, 24, and 26

II. ANALYSIS

A. Overview — Obviousness

Under 35 U.S.C. § 103(a), an invention is not patentable if the differences between the claimed subject matter 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

² The references are ordered by exhibit number with effective dates asserted by Petitioner.

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 skill in the art; and, (4) where in evidence, so-called secondary considerations, including commercial success, long-felt but unsolved needs, failure of others, and unexpected results. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Asserted Obviousness Based On Melby
(Claims 1–3, 5–7, 9, 10, 13–15, 19, 21, 23–25, and 27)

1. Background

Petitioner contends that these claims would have been obvious over the teachings of Melby. Pet. 13–22. In support of this contention, Petitioner provides detailed claim charts and expert testimony through the Escuti Declaration. Pet. 12–22; Escuti Decl. ¶¶ 69–152. Through the claim charts and expert testimony, Petitioner asserts that Melby’s embodiments (particularly, Figures 1 and 3) disclose “all the limitations” of the challenged claims. Pet. 13. Moreover, Petitioner contends that a person of ordinary skill would have been motivated to combine those embodiments. *Id.*

In response, Patent Owner challenges the sufficiency of Petitioner’s proofs in several respects that we discuss *infra*. We note, however, that most of the claim elements are undisputed. Patent Owner challenges Petitioner’s assertions only as to certain claim elements, and does not challenge Petitioner’s presentation of the rationale to combine various embodiments of Melby in addressing the obviousness challenge to any of these challenged claims. Pet. 13; Escuti Decl. ¶¶ 67–68. As Petitioner points out, Melby’s embodiments are taught within the same patent. Pet. 13. Moreover, they are described as alternatives. Ex. 1006, col. 2, ll. 63. Melby

explains that the structured surface of the Figure 3 embodiment, discussed *infra*, may be replaced by the planar surface of Figure 1. Ex. 1006, col. 3, ll. 1–6. Further supporting reasons for combining the embodiments are presented in the Escuti Declaration, at paragraphs 67–68, which we credit and adopt, and which are not challenged by Patent Owner. We determine that, for these reasons, a person of ordinary skill would have combined these embodiments.

Patent Owner has not presented any evidence of secondary considerations. We, therefore, have not been given evidence of commercial success, long-felt but unsolved needs, failure of others, or unexpected results to consider.

The relatively high level of skill in the art is another consideration we have taken into account. In this determination, we were aided by expert testimony. According to Dr. Escuti, “a person of ordinary skill in the art relevant to the ’177 patent would have at least an undergraduate degree in physics, optics, electrical engineering, or applied mathematics AND 3 years of work experience (or a graduate degree) in a field related to optical technology.” Escuti Decl. ¶ 23. Mr. Werner does not take issue with this testimony, and in fact proposes a similar standard:

In this declaration, I rely on the following definition of a person of ordinary skill in the art: “a person of ordinary skill in the art of the patents would hold an undergraduate degree in physics, material science, electrical engineering, or mathematics and have one or both of the following: (1) three or more years of work experience in a field related to optical technology; or (2) a graduate degree in a field related to optical technology.”

Werner Decl. ¶ 36. We find that Mr. Werner’s definition is too limited, in that it does not include a person with an undergraduate degree in optics.

We, therefore, do not accept his standard and adopt instead Dr. Escuti's more complete definition.

2. Melby Overview

Melby describes a thin light fixture for a backlit flat panel display. Ex. 1001, col. 1, ll. 14–16. In one embodiment, the fixture includes a housing with walls that define an optical cavity having an optical window. This is illustrated in Figure 3 of Melby, reproduced here:

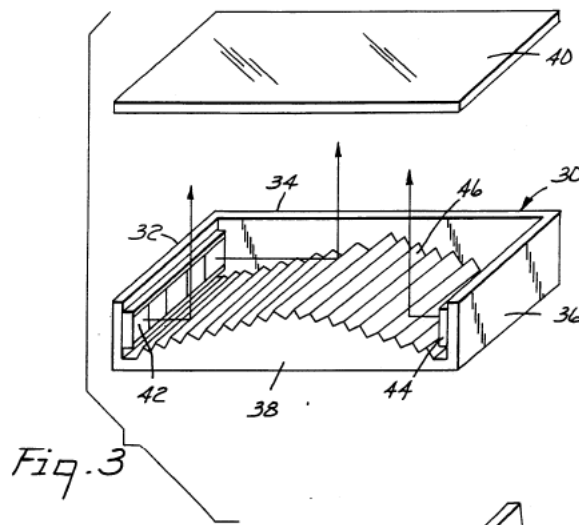


Figure 3 of Melby shows an embodiment of a lighting fixture wherein a housing 30, including sidewalls 32, 34, 36, and 38, define an “optical cavity.” Ex. 1004, col. 2, ll. 63–65. Light from two partially collimated light sources 42 and 44 is directed to the prisms of a structured surface 46. *Id.* at col. 2, l. 67–col. 3, l. 1.

In another embodiment, a housing, including its walls, defines an optical cavity. *Id.* at Fig. 1; col. 2, ll. 6–8. The optical cavity has an optical window with a light transmitting member. *Id.* at col. 2, ll. 9–11. The light transmitting member may be transparent or translucent or it may include structures. *Id.* at col. 2, ll. 11–14.

We turn now to the individual claims being challenged. We note that Patent Owner's Response presents separate arguments for independent claims 1 and 15, and dependent claims 9, 14, and 23 only. Accordingly, we address only those claims in this Decision. Because they are not separately argued, the other claims will stand or fall with the claims from which they depend.

3. Claims 1 and 15

Petitioner's analysis of claim 1 in relation to Melby appears at pages 13–17 of the Petition and in paragraphs 69–81 of the Escuti Declaration. Petitioner shows where each element of the clam is found in Melby. Patent Owner contends that Petitioner's analysis is deficient in several respects. PO Resp. 9–13. First, Patent Owner contends that Petitioner fails to demonstrate that the sheet or film substrate disclosed in Melby meets the requirement of claim 1, i.e., that it control “the light emitted from the assembly to fit a particular application.” *Id.* at 9. Petitioner responds that this limitation is satisfied by the disclosure in Melby regarding “a particular application,” namely, flat panel displays. Pet. Reply. 5. This conclusion is supported by the Melby specification. Ex. 1006, col. 1, ll. 14–16. We therefore agree with Petitioner.

Petitioner further points out that Melby meets this limitation because sheet 40 overlying the assembly in Melby has pillow optics and Fresnel prisms that reflect light and provide for light mixing. Pet. Reply 5–6. We agree also with this conclusion. *See* Ex. 1006, col. 2, ll. 11–14, 30–33; Escuti Decl. ¶¶ 84, 88, 92–94, 114–16. As Dr. Escuti specifically testifies: “Melby is directed to a light fixture with a light source of partially collimated light in a housing with a cavity having a structured surface with a

plurality of prisms for reflecting light from [sic] the light source out of the cavity.” Escuti Decl. ¶65 (citing Ex. 1006, Abstract). Finally, Petitioner demonstrates that this information was presented in the Petition. Pet. Reply 5–7. We agree with and adopt Petitioner’s analysis and conclusion regarding this element. As shown above, they are supported by Melby’s disclosure and Dr. Escuti’s testimony, and for at least those reasons we determine that Melby meets this limitation.

Next, Patent Owner argues that Melby does not show “a tray having a back wall and continuous side walls that form a hollow cavity or recess completely surrounded by the side walls,” required by claim 1. PO Resp. 12–13. Patent Owner contends that Figure 3 of Melby, reproduced above, does not meet this requirement because the fourth wall that completely surrounds the cavity is missing. *Id.* at 11–13. Petitioner responds that Patent Owner’s argument assumes, incorrectly, that Figure 3 of Melby is not a cross-sectional view. Pet. Reply 7. As Petitioner explains: “Nowhere does Patent Owner explain how the light fixture of Melby could actually function as a light fixture according to the invention with an opening on one side.” *Id.*

We agree with the reasoning set forth by Petitioner and Petitioner’s expert, Dr. Escuti, and for those reasons we conclude that a person of ordinary skill would have recognized that Figure 3 of Melby is a cross-sectional view, and that the walls of Melby’s fixture meet this claim requirement. Pet. Reply 9; Escuti Decl. ¶ 71. We are persuaded by, among other things, Melby’s description of Figure 3 as showing a “housing” whose walls 32, 34, 36, and 38 define an “optical cavity.” Ex. 1006, col. 2, ll. 64–66. We have considered Patent Owner’s other arguments on this issue and

for reasons to those set forth above and in the Petition and Reply, find them unpersuasive. PO Resp. 12–13. We conclude, therefore, that this element is described by Melby.

Patent Owner relies on the same unpersuasive arguments for claim 15 proffered with respect to claim 1. PO Resp. 15–16. For the foregoing reasons, we conclude that claims 1 and 15 are obvious over Melby.

4. Claim 9

Petitioner’s analysis of claim 9 in relation to Melby appears at pages 19 of the Petition and in paragraphs 105–09 of the Escuti Declaration. For this claim, Patent Owner contends that the requirement, that the “light emitted from the light sources mixes in the cavity or recess,” is not met by Melby. PO Resp. 14–15. Patent Owner asserts that in Figures 1 and 3 of Melby, the light rays are not shown mixing. *Id.*

Petitioner responds that the light from Melby’s partially collimated light sources collimates in the cavity and mixes. Pet. Reply (citing Escuti Decl. ¶ 107). Petitioner further asserts that light from the light sources is also reflected in the cavity and the reflected light is also mixed. *Id.*

Petitioner relies also on admissions from Patent Owner’s expert, Mr. Werner. *Id.* at 10–11. We note that Mr. Werner testified the light rays in Figure 3 are “representative.” Werner Dep. 60:3–8. He also agreed that the light rays emitted from the light sources shown in Figure 3 of Melby could cross: “That might be - - that might be possible, but it - - that does not change the conclusions I come to.” *Id.* at 76:12–16. We find that testimony compelling evidence that Melby’s figures are not intended to show all light rays. This was confirmed by Patent Owner’s counsel at oral argument:

[THE BOARD]: Well, isn't what is happening in the cavity a lot more complicated than what is shown in Melby, and a physicist would know that?

[PATENT OWNER'S COUNSEL:] Yeah, look, I think that that's right. I think that that's right. But I still -- but it is not -- it is not described as, and our expert doesn't understand it to say that that figure is showing you mixing of light.

Hearing Tr. 28:3–9.

Based on the foregoing, we conclude that Figures 1 and 3 of Melby are simplified diagrams that do not show all light rays from partially collimated light sources 42. Furthermore, we determine that a person of ordinary skill would recognize that the light rays from the partially collimated light sources in Melby mix, as called for in the claim. On this point, in addition to the above evidence, we credit Dr. Escuti's testimony that partially collimated light from the light sources, as well as light reflected from the prisms, mixes in the cavity. Escuti Decl. ¶¶ 105–09. We determine that this limitation is met and claim 9 is obvious over Melby.

5. Claims 14 and 23

Petitioner's analysis of claim 14 in relation to Melby appears at page 20 of the Petition and in paragraphs 118–21 of the Escuti Declaration. Patent Owner contends that the Petition fails to demonstrate that Melby discloses that the “sheet, film or substrate has deformities for controlling the light output ray angle distribution to fit a particular application.” PO Resp. 15 (citing Werner Decl. 49).

Patent Owner makes the same argument with respect to Petitioner's analysis of claim 23. *Id.* at 17. Petitioner answers by referring to its response for claim 1, as the same argument is presented by Patent Owner for that claim. *See supra.*

For the reasons stated above, we determine that claims 14 and 23 are obvious over Melby.

C. Asserted Anticipation Based on Nakamura
(Claims 1, 2, 6, 7, 9, 10, 13–15, 19, 21, 23, 24, and 26)

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987).

Petitioner contends that claims 1, 2, 6, 7, 9, 10, 13–15, 19, 21, 23, 24, and 26 are anticipated by Nakamura. Pet. 22–32. In support of this contention, Petitioner provides detailed claim charts and expert testimony through the Escuti Declaration. Pet. 25–32; Escuti Decl. ¶¶ 155–224. Through the claim charts and expert testimony, Petitioner asserts that Nakamura meets each element of the challenged claims. Pet. 24

In response, Patent Owner again challenges the sufficiency of Petitioner’s proof in several respects that we discuss *infra*. PO Resp. 17–19. We note, however, that, as was the case for the challenge based on Melby, *supra*, most of the claim elements are undisputed. Thus, Patent Owner challenges Petitioner’s assertions only as to certain claim elements. The unchallenged elements will not be discussed, nor will claims that have not been separately argued by Patent Owner. See Paper 13, 2–3. Based on the arguments and evidence presented in the Petition, we conclude that Petitioner has met its burden of proving anticipation of these claims by Nakamura.

1. Nakamura Overview

Nakamura describes a liquid crystal display device that is back-illuminated by means of LEDs. Ex. 1007, col. 1, ll. 9–10. Nakamura describes a shallow box-form holder and a liquid crystal panel installed in the front surface opening of the holder. *Id.* col. 2, ll. 51–54; col. 4, ll. 49–55. Nakamura also describes a light source mounted in the cavity of the holder. *Id.* col. 2, ll. 59–60; col. 4, ll. 51–53. The inside surface of the holder is reflection-treated and a light diffusing plate is installed in the opening of the holder. *Id.* col. 2, ll. 60–64, col. 4, ll. 54–65.

This is illustrated by Figure 2 of Nakamura, reproduced here:

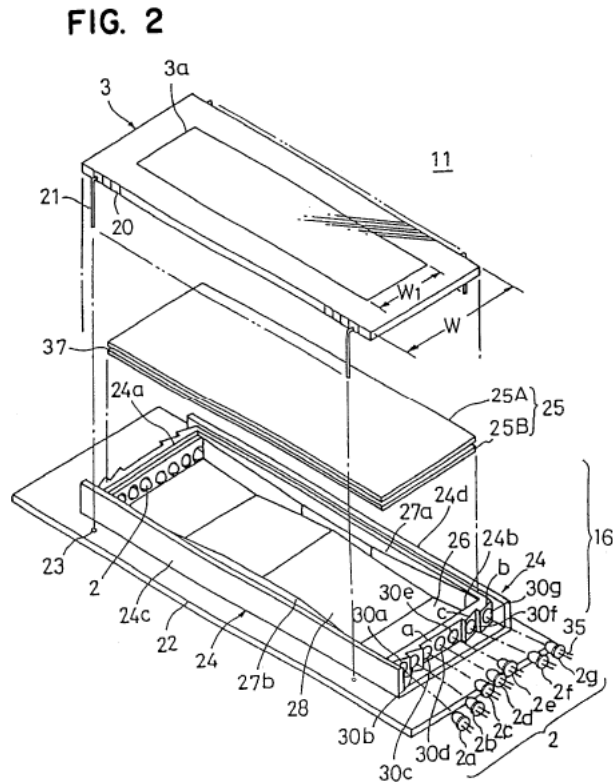


Figure 2 of Nakamura shows a liquid crystal display device having LEDs 2, liquid crystal display panel 3, and shallow box-form holder 24. Ex. 1007, col. 2, ll. 10–55.

We turn now to the individual claims being challenged. We note that Patent Owner’s Response presents separate arguments for independent claim 1 and 15, and dependent claims 14 and 23 only. Accordingly, we address only those claims in this Decision.

2. Claims 1 and 15

Petitioner’s analysis of these claims in relation to Nakamura appears at pages 23–28 and 30–31 of the Petition and in paragraphs 155–67 and 198–203 of the Escuti Declaration.

Patent Owner contends that the Petition does not identify the claimed “continuous side walls” and “back wall” in Nakamura. PO Resp. 17–18 (citing Werner Decl. ¶ 55). Petitioner responds by pointing out that Nakamura’s shallow box-form holder 24 depicted in Figure 2, *supra*, has “continuous” side walls 24a and 24b and only has an opening on the front surface. Pet. Reply 14–16. Petitioner also identifies the bottom surface of the holder as the back wall. *Id.* at 15–16. These assertions are supported by the Escuti Declaration (¶ 157).

Petitioner further points out that Patent Owner’s expert should not be credited on this issue. PO Reply 15. Specifically, Mr. Werner admitted that his testimony was intended to rebut the Petition, and, therefore, it was not necessary for him to determine whether Nakamura shows four continuous walls. Werner Dep. 141:1–16. Instead of discussing what is disclosed in Nakamura, Mr. Werner’s declaration focuses on alleged deficiencies in the Petition. Werner Decl. ¶¶ 54–55. Under our rules, expert testimony that

does not have a proper basis is entitled to little or no weight. 37 C.F.R. § 42.65(a).

Under the circumstances, we credit Dr. Escuti's opinion on this issue over Mr. Werner's. We determine that for the reasons presented by Petitioner, a person of ordinary skill would understand Nakamura's holder shown in Figure 2 to have a back wall and continuous side walls. We conclude, therefore, that claims 1 and 15 are anticipated by Nakamura.

2. Claims 14 and 23

Petitioner's analysis of these claims in relation to Nakamura appears at pages 29–30 and 31–32 of the Petition and in paragraphs 193–197 and 212–216 of the Escuti Declaration.

Patent Owner contends that the Petition fails to demonstrate that Nakamura discloses a “sheet, film or substrate has deformities for controlling the light output ray angle distribution to fit a particular application.” PO Resp. 18. According to Patent Owner, there is no “particular application” mentioned in the Petition. *Id.*

Petitioner responds that Nakamura discloses a particular application, namely, a liquid crystal display device that is backlit with LEDs. Pet. Reply 16. We agree. This conclusion is supported by the record including Dr. Escuti's testimony (Escuti Decl. ¶ 196–97) as well as the Nakamura specification. Ex. 1007, col. 1, ll. 9–10 (“The present invention relates to a liquid crystal display device which is back-illuminated by means of LEDs”). Petitioner further explains that Nakamura discloses a film with a diffusing effect for controlling the emitted light. Pet. Reply at 17. We agree with this conclusion, which is supported by Dr. Escuti's testimony (Escuti Decl. ¶ 195) as well as the Nakamura specification. Ex. 1007, col. 6, ll. 43–61.

We determine that for at least for these reasons and those set forth by Petitioner, this element is met by Nakamura. We conclude, therefore, that Nakamura anticipates these claims.

D. Real Party-in-Interest and Statutory Bar

Patent Owner contends that the Petition is insufficient for failure to name two real parties-in-interest: LG Electronics Inc. and LG Electronics U.S.A. Inc. PO Resp. 20–21. Patent Owner also contends that the Petition is barred under 35 U.S.C. § 315(b). *Id.* at 21–27. The same arguments were raised in Patent Owner’s Preliminary Response. Prelim. Resp. 26–34. We determined in our Institution Decision that Patent Owner failed to provide convincing evidence that LG Electronics Inc. and LG Electronics U.S.A. Inc. are real parties-in-interest. Paper 12, 5–6. We also determined that Patent Owner failed to provide sufficient evidence of a bar under § 315(b). *Id.* at 6–7.

Patent Owner’s Response relies on the same evidence and arguments that we considered in our Institution Decision. For the reasons stated in our Institution Decision, we determine that Patent Owner fails to prove that the Petition does not name the real parties-in-interest or that it is barred under § 315(b). Paper 12, 5–7.

IV. ORDER

In consideration of the foregoing, it is

ORDERED that this is a final written decision of the Board under 35 U.S.C. § 318(a). Parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2;

FURTHER ORDERED that claims 1–3, 5–7, 9, 10, 13–15, 19, 21, 23–25, and 27 of U.S. Patent 7,384,177 are unpatentable under 35 U.S.C. § 103(a); and

FURTHER ORDERED that claims 1, 2, 6, 7, 9, 10, 13–15, 19, 21, 23, 24, and 26 of U.S. Patent 7,384,177 are unpatentable under 35 U.S.C. § 102(e).

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