

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SATCO PRODUCTS, INC.,
Petitioner,

v.

LIGHTING SCIENCE GROUP CORP.,
Patent Owner.

Case IPR2017-01639
Patent 8,967,844 B2

Before KEVIN F. TURNER, PATRICK M. BOUCHER, and
JOHN A. HUDALLA, *Administrative Patent Judges*.

HUDALLA, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
Inter Partes Review
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

Petitioner, Satco Products, Inc. (“Petitioner”), filed a Petition (Paper 11¹, “Pet.”) requesting an *inter partes* review of claims 1–3, 5, 7, 9–12, 14–17, and 19–24 of U.S. Patent No. 8,967,844 B2 (Ex. 1001, “the

¹ Petitioner filed the Petition multiple times in response to certain defects identified in the Notice of Filing Date Accorded to the Petition. See Paper 5. We refer to the version of the Petition at Paper 11.

'844 patent") pursuant to 35 U.S.C. §§ 311–319. Patent Owner, Lighting Science Group Corp. ("Patent Owner"), filed a Preliminary Response (Paper 12, "Prelim. Resp.") to the Petition. Taking into account the arguments presented in the Patent Owner's Preliminary Response, we determined that the information presented in the Petition established that there was a reasonable likelihood that Petitioner would prevail in challenging claims 1–3, 5, 7, 9–12, 14–17, and 19–24 of the '844 patent on certain grounds of unpatentability presented. Pursuant to 35 U.S.C. § 314, we instituted this proceeding on January 12, 2018, as to claims 1–3, 5, 7, 9–12, 14–17, and 19–24 of the '844 patent. Paper 13 ("Institution Decision" or "Dec. on Inst.").

During the course of trial, Patent Owner filed a Patent Owner Response (Paper 17, "PO Resp."). Then, in light of the U.S. Supreme Court's decision in *SAS Institute, Inc. v. Iancu*, 138 S. Ct. 1348 (2018), we modified the Institution Decision to institute on all of the grounds presented in the Petition. Paper 18 ("SAS Order"). The parties did not seek any modifications to the schedule or additional briefing in response to the SAS Order. Petitioner subsequently filed a Reply to the Patent Owner Response (Paper 19, "Pet. Reply").

Petitioner filed Declarations of Victor Roberts, Ph.D., with its Petition (Ex. 1002) and its Reply (Ex. 1018). Patent Owner filed a Declaration of Eric Bretschneider, Ph.D. (Ex. 2001) with its Response.

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 1–3, 5, 7, 9–12, 14–17, and 19–24 of the '844 patent. For the reasons discussed below, Petitioner has demonstrated by a preponderance of the

evidence that claims 1–3, 5, 7, 9, 10, 12, 14, 16, 17, and 20–24 of the '844 patent are unpatentable.

I. BACKGROUND

A. *Related Proceedings*

The parties identify the following proceedings related to the '844 patent (Pet. 1; Paper 3, 1–3; Paper 23, 1–3):

Lighting Sci. Grp. Corp. v. Cree, Inc., Case No. 6:13-cv-00587 (M.D. Fla. filed Apr. 10, 2013);

Lighting Sci. Grp. Corp. v. Cooper Lighting, LLC, Case No. 6:14-cv-00195 (M.D. Fla. filed Feb. 6, 2014);

Lighting Sci. Grp. Corp. v. Sea Gull Lighting Prods. LLC, Case No. 6:16-cv-00338 (M.D. Fla. filed Feb. 25, 2016);

Lighting Sci. Grp. Corp. v. U.S.A. Light & Elec., Inc., Case No. 6:16-cv-00344 (M.D. Fla. filed Feb. 26, 2016);

Lighting Sci. Grp. Corp. v. Hyperikon, Inc., Case No. 6:16-cv-00343 (M.D. Fla. filed Feb. 26, 2016);

Lighting Sci. Grp. Corp. v. Nicor Inc., Case No. 6:16-cv-00413 (M.D. Fla. filed Mar. 10, 2016);

Lighting Sci. Grp. Corp. v. Sunco Lighting, Inc., Case No. 6:16-cv-00677 (M.D. Fla. filed Apr. 21, 2016);

Lighting Sci. Grp. Corp. v. Panor Corp., Case No. 6:16-cv-00678 (M.D. Fla. filed Apr. 21, 2016);

Lighting Sci. Grp. Corp. v. S E L S, Inc., Case No. 6:16-cv-00679 (M.D. Fla. filed Apr. 21, 2016);

Lighting Sci. Grp. Corp. v. EEL Co., Ltd., Case No. 6:16-cv-00680
(M.D. Fla. filed Apr. 21, 2016);

Lighting Sci. Grp. Corp. v. Globalux Lighting LLC, Case No. 6:16-cv-00681 (M.D. Fla. filed Apr. 21, 2016);

Lighting Sci. Grp. Corp. v. Hubbell Inc., Case No. 6:16-cv-01084
(M.D. Fla. filed June 22, 2016);

Lighting Sci. Grp. Corp. v. American De Rosa Lamparts, LLC, Case No. 6:16-cv-01087 (M.D. Fla. filed June 21, 2016);

Lighting Sci. Grp. Corp. v. Titch Indus., Inc., Case No. 6:16-cv-1228
(M.D. Fla. filed July 7, 2016);

Lighting Sci. Grp. Corp. v. Tech. Consumer Prods., Inc., Case No. 6:16-cv-01255 (M.D. Fla. filed July 13, 2016);

Lighting Sci. Grp. Corp. v. Satco Prods., Inc., Case No. 6:16-01256
(M.D. Fla. filed July 13, 2016);

Lighting Sci. Grp. Corp. v. Wangs Alliance Corp., Case No. 6:16-cv-01320 (M.D. Fla. filed July 22, 2016);

Lighting Sci. Grp. Corp. v. Amax Lighting, Case No. 6:16-cv-01321
(M.D. Fla. filed July 22, 2016);

Lighting Sci. Grp. Corp. v. Halco Lighting Techs., LLC, Case No. 6:16-cv-02188 (M.D. Fla. filed Dec. 21, 2016);

Lighting Sci. Grp. Corp. v. Leedarson Lighting Co., Case No. 6:17-cv-00826 (M.D. Fla. filed May 9, 2017); and

Lighting Sci. Grp. Corp. v. Shenzhen Jiawei Photovoltaic Lighting, Case No. 5:16-cv-03886 (N.D. Cal. filed July 11, 2016).

Petitioner also filed another petition for *inter partes* review of U.S. Patent No. 8,201,968 B2 (“the ’968 patent”), which also is owned by Patent

Owner, in co-pending IPR2017-01638. *See* Paper 3, 1. Petitioner additionally filed a petition for *inter partes* review of U.S. Patent No. 8,672,518 B2 (“the ’518 patent”), which also is owned by Patent Owner, in co-pending IPR2017-01643. *See id.* The provisional and non-provisional applications from which the ’968 patent and ’518 patent issued are in the priority chain of the ’844 patent. *See* Ex. 1001, [60], [63], Cert. of Correction.

Technical Consumer Products, Inc., Nicor Inc., and Amax Lighting (collectively, “TCP”) previously filed another petition for *inter partes* review of the ’844 patent in Case IPR2017-01280.² *See* Paper 3, 1. In that case, we issued a Final Written Decision holding claims 1–3, 5, 7–9, 11, 12, 14, 16, 17, 19, and 21–24 of the ’844 patent to be unpatentable. *See* IPR2017-01280, Paper 32. TCP also filed petitions for *inter partes* review of the ’968 patent and the ’518 patent in IPR2017-01287 and IPR2017-01285, respectively (*see* Paper 3, 1), and we have issued Final Written Decisions in those cases, as well. *See* IPR2017-01285, Paper 34; IPR2017-01287, Paper 31.

Generation Brands LLC previously filed petitions for *inter partes* review of the ’844 patent and the ’968 patent in IPR2016-01546 and IPR2016-01458, respectively. *See id.* After our decisions to institute *inter partes* review in these cases, both cases were settled and terminated. *See id.*

² IPR2018-00261 and IPR2018-00271 were ultimately joined with IPR2017-01280, and Jiawei Technology (HK) Ltd., Jiawei Technology (USA) Ltd., Shenzhen Jiawei Photovoltaic Lighting Co., Ltd., Leedarson Lighting Co., Ltd., and Leedarson America, Inc. were joined as Petitioner entities in a limited capacity. *See* IPR2018-00261, Paper 7; IPR2018-00271, Paper 7.

B. The '844 Patent

The '844 patent relates to “low profile downlighting for retrofit applications.” Ex. 1001, 1:17–19. Figures 5 and 12 of the '844 patent are reproduced below.

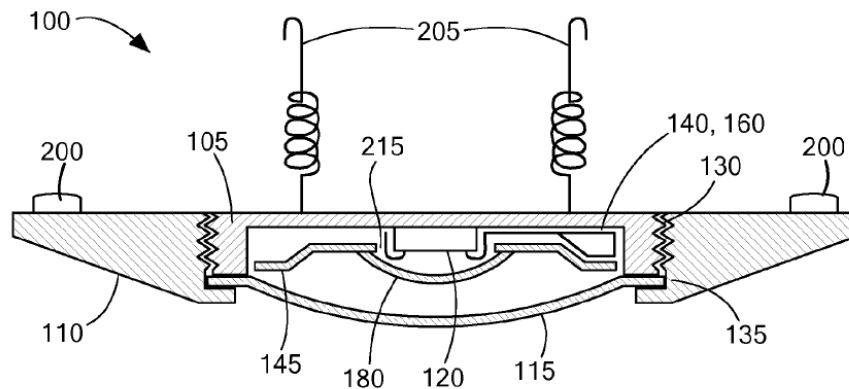
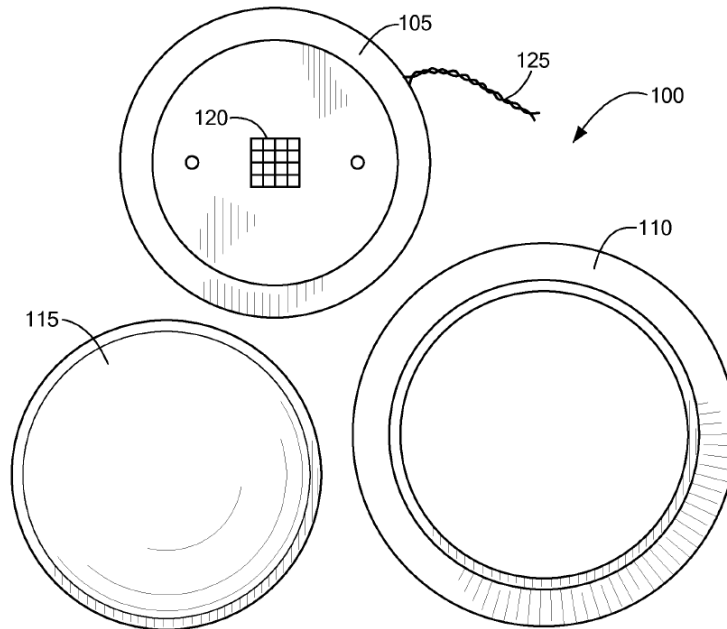


Figure 5 depicts the separated components of luminaire 100, whereas Figure 12 depicts a section view of assembled luminaire 100. *Id.* at 3:63–65, 4:14–15. Luminaire 100 includes heat spreader 105, heat sink 110, and

outer optic 115, light source 120, and electrical supply line 125. *Id.* at 5:37–44. Light source 120, which may be a plurality of light emitting diodes (LEDs), is disposed in thermal communication with heat spreader 105. *Id.* at 5:37–44, 6:11–14. Heat sink 110 is thermally coupled to, and disposed diametrically outboard of, heat spreader 105. *Id.* at 5:37–44. In addition, outer optic 115 is securely retained relative to at least one of heat spreader 105 and heat sink 110. *Id.* The combination of heat spreader 105, heat sink 110, and outer optic 115 has an overall height H and an overall outside dimension/diameter D such that the ratio of H/D is less than or equal to 0.25 (e.g., when H=1.5 inches and D=7 inches). *Id.* at 5:44–50.

Luminaire 100 may also include a power conditioner. *Id.* at 6:36–38. The power conditioner may be a circuit board having electronic components for receiving alternating current (AC) voltage from supply line 125 and delivering direct current (DC) voltage to the LEDs. *Id.* at 6:38–46. In one embodiment, the electronics of the power conditioner are contained within a housing to form block-type power conditioner 165, which can be disposed on the back surface the heat spreader 105. *Id.* at 6:53–56, Fig. 11. In this configuration, block-type power conditioner 165 can be configured and sized to fit within the interior space of an industry-standard nominally sized can-type light fixture or an industry-standard nominally sized wall/ceiling junction box. *Id.* at 6:56–59.

The '844 patent issued from an application that was filed on December 19, 2013, and claims priority back through a continuation application and a continuation-in-part application to a provisional application filed on October 5, 2009. *Id.* at [22], [60], [63]. Neither party put forth arguments regarding the priority status of the challenged claims

under 35 U.S.C. §§ 119(e) and 120. As discussed below, Petitioner attempts to establish that, at a minimum, its asserted references qualify as prior art relative to the October 5, 2009, filing date of the provisional application that ultimately led to the '844 patent.³

C. Illustrative Claim

Claims 1 and 24 of the '844 patent are independent. Claims 2, 3, 5, 7, 9–12, 14–17, and 20–23 depend directly or indirectly from claim 1. Claim 1 is illustrative of the challenged claims and recites:

1. A luminaire, comprising:

a heat spreader and a heat sink, the heat sink being substantially ring-shaped and being disposed around and in thermal communication with an outer periphery of the heat spreader;

a light source disposed in thermal communication with the heat spreader, the light source comprising a plurality of light emitting diodes (LEDs) that are disposed in thermal communication with the heat spreader such that the heat spreader facilitates transfer of heat from the LEDs to the heat sink;

an outer optic disposed in optical communication with the plurality of LEDs; and

a power conditioner disposed and configured to receive AC voltage from an electrical supply and to provide DC voltage for the plurality of LEDs;

³ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102 and 103. Because it is undisputed that the '844 patent claims have an effective filing date before the effective date of the applicable AIA amendments, we apply the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

wherein the power conditioner is disposed, configured and sized to fit at least partially within an interior space of: a nominally sized can light fixture; and, a nominally sized electrical junction box.

Id. at 14:32–51.

D. Prior Art

Petitioner relies on the following prior art:

U.S. Patent No. 7,670,021 B2 to Chou, filed May 20, 2008, issued Mar. 2, 2010 (Ex. 1011, “Chou”);

U.S. Patent No. 7,980,736 B2 to Soderman et al., filed Nov. 13, 2007, issued July 19, 2011 (Ex. 1012, “Soderman”);

U.S. Patent No. 7,722,227 B2 to Zhang et al., filed Oct. 10, 2008, issued May 25, 2010 (Ex. 1013, “Zhang”);

U.S. Patent No. 7,993,034 B2 to Wegner, filed Sept. 22, 2008, issued Aug. 9, 2011 (Ex. 1014, “Wegner”);

U.S. Patent Application Publication No. 2009/0086476 A1 to Tickner et al., published Apr. 2, 2009 (Ex. 1015, “Tickner”);

U.S. Patent No. 8,777,449 B2 to Van De Ven et al., filed Sept. 25, 2009, issued July 15, 2014 (Ex. 1016, “Van De Ven”);

“OptoElectronix Plug-&-Play LED Light Engine Products,” OptoElectronix, Inc., 2008 (Ex. 1017, “ULE5000”).

E. Instituted Grounds

We instituted *inter partes* review of claims 1–3, 5, 7, 9–12, 14–17, and 19–24 of the ’844 patent on the following grounds (Dec. on Inst. 30–31; Paper 18):

Reference(s)	Basis	Claim(s) Challenged
Chou and Wegner	35 U.S.C. § 103(a)	1–3, 5, 7, 9, 12, 14, 16, and 21–24
Chou, Wegner, and Zhang	35 U.S.C. § 103(a)	10
Zhang	35 U.S.C. § 103(a)	1, 2, 9, 10, 16, 21, and 22
Zhang and Wegner	35 U.S.C. § 103(a)	17
Zhang and Soderman ⁴	35 U.S.C. § 103(a)	20
Tickner and Van De Ven	35 U.S.C. § 103(a)	1, 2, 7–9, 11, 12, 14–17, 19, 21, 22, and 24
Tickner, Van De Ven, and ULE5000	35 U.S.C. § 103(a)	3–5 ⁵ and 23

F. Claim Interpretation

Because this *inter partes* review is based on a petition filed before November 13, 2018, we construe the claims by applying the broadest reasonable interpretation in light of the specification. 37 C.F.R. § 42.100(b) (2016); *see Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under the broadest reasonable interpretation standard, and absent any special definitions, claim terms are given their ordinary and customary

⁴ Our Institution Decision mistakenly referred to this ground as relating to the combination of “Zhang, Wegman, and Soderman.” *See* Dec. on Inst. 31. The parties’ subsequent papers referred to the correct combination, which is Zhang and Soderman. *See* PO Resp. 35; Pet. Reply 23.

⁵ Petitioner does not list claim 4 in its summary of the grounds at page 12 of the Petition, but Petitioner does provide unpatentability contentions for claim 4 at page 42 of the Petition.

meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. See *In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms or phrases must be set forth “with reasonable clarity, deliberateness, and precision.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

Petitioner proposes interpretations for several claim terms in the ’844 patent: “heat spreader,” “heat sink,” “integrally formed,” and “ring-shaped.” Pet. 11–12. Patent Owner does not dispute Petitioner’s constructions and states that it “addresses the claims under Petitioner’s proposed constructions.” PO Resp. 4. Based on the entire trial record, we determine that none of these terms requires explicit construction. See *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”).

II. ANALYSIS

A. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a) 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. See *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 skill in the art; and (4) where in evidence, so-called secondary

considerations.⁶ *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We also recognize that prior art references must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d at 1480 (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)). We analyze Petitioner’s obviousness grounds with the principles identified above in mind.

B. Level of Skill in the Art

Petitioner’s declarant, Dr. Roberts, testifies that an ordinarily skilled artisan

would have [had] at least at least a bachelor’s degree in either mechanical or electrical engineering and at least 3-4 years of experience designing light fixtures based on light emitting diodes (LEDs), or basic knowledge of the operational characteristics of LEDs and 3-4 years of experience designing equipment that uses power semiconductors and heat sinks.

Ex. 1002 ¶ 22. Citing testimony from Dr. Bretschneider, Patent Owner contends an ordinarily skilled artisan “would have [had] at least a B.S. degree or equivalent in electrical engineering, mechanical engineering, chemical engineering, physics, or a related field and at least 2-3 years of experience in designing LED lighting products or fixtures.” PO Resp. 4 (citing Ex. 2001 ¶¶ 22–23).

In its Reply, Petitioner suggests that Dr. Bretschneider’s inclusion of a degree in chemical engineering is “motivated by self-interest” because Dr. Bretschneider has that degree. Pet. Reply 4 n.2. As such, Petitioner

⁶ Patent Owner has not put forth any evidence or argument related to secondary considerations of nonobviousness.

disputes that a chemical engineer with 2–3 years of experience in the LED industry would qualify as an ordinarily skilled artisan. *Id.* at 4 (citing Ex. 1018 ¶ 8).

The parties’ definitions of the level of skill differ in the number of years of experience and in whether a background degree is required. We are not persuaded by Dr. Roberts’s testimony insofar as it does not explain why a similar length of relevant experience (3–4 years) is required regardless of whether the person has a degree. Nor does Dr. Roberts explain why the type of experience—“experience designing light fixtures based on light emitting diodes (LEDs)” versus “experience designing equipment that uses power semiconductors and heat sinks”—would impact the need for a background degree. In that respect, we find Dr. Bretschneider’s testimony about educational background more internally consistent and persuasive. We also have considered Petitioner’s argument and Dr. Roberts’s testimony disputing the inclusion of a chemical engineering degree. *See* Pet. Reply 4; Ex. 1018 ¶ 8. Petitioner presents no evidence other than the unsubstantiated implication of Dr. Bretschneider’s bias and self-interest to support its position.⁷ *See* Pet. Reply 3–4; *see also* Ex. 1018 ¶ 8 (Dr. Roberts testifying,

⁷ Petitioner contends we should accord “almost no weight” to Dr. Bretschneider’s testimony based on his “long-standing and ongoing relationships with the Patent Owner[] and the inventors.” Pet. Reply 3–4. Although Petitioner is correct that Dr. Bretschneider was once employed by Patent Owner (*see* Ex. 2001, 43), Petitioner puts forth no evidence of his “ongoing” ties to Patent Owner or other evidence of conflicts that would taint his testimony. We also note that Petitioner could have, but did not, pursue its bias theory by cross-examining Dr. Bretschneider. Under these circumstances, we decline to discount Dr. Bretschneider’s testimony based on Petitioner’s mere implication of bias. We do address Dr. Bretschneider’s testimony on its merits, however, as discussed below.

without explanation, that he found the inclusion of a degree in chemical engineering “highly unlikely”). In the absence of any persuasive evidence to support Petitioner’s position, we do not credit Petitioner’s argument.

Regarding the difference in years of experience, both declarants agree that three years of experience is appropriate. We apply Dr. Bretschneider’s description of the type of relevant experience because Dr. Roberts does not explain why he included two different types of experience in his definition. Thus, we define the person of ordinary skill in the art as having a bachelor’s degree in electrical engineering, mechanical engineering, chemical engineering, physics, or a related field, and three years of experience in designing LED lighting products or fixtures. We are satisfied that this definition comports with the qualifications a person would have needed to understand and implement the teachings of the ’844 patent and the prior art of record.

C. Obviousness Ground Based on Chou and Wegner

Petitioner contends claims 1–3, 5, 7, 9, 12, 14, 16, and 21–24 would have been obvious over Chou and Wegner. Pet. 13–22. Patent Owner disputes Petitioner’s contentions. PO Resp. 4–25.

1. Chou

Chou is a U.S. patent directed to “a recessed light fixture having a thermally effective trim.” Ex. 1011, 1:16–18. Figures 2a and 2b of Chou are reproduced below.

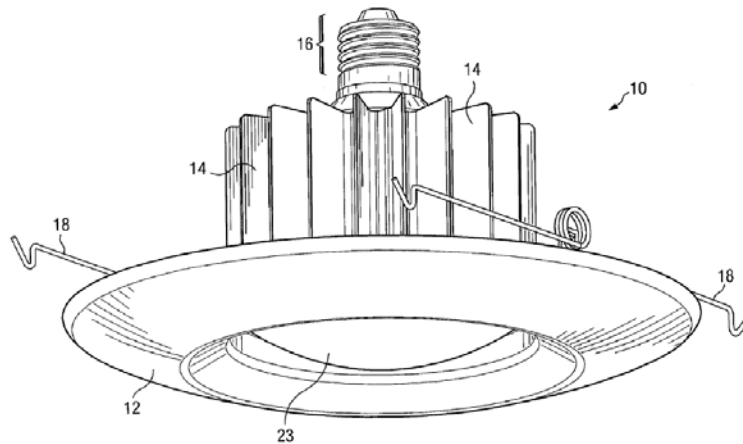


FIG. 2a

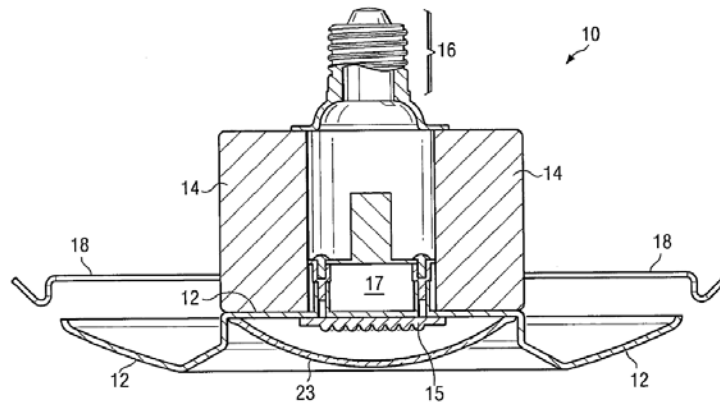


FIG. 2b

Figures 2a and 2b depict perspective and cross-sectional views, respectively, of “a recessed can light fixture including a thermally conductive trim and heat sink for redistributing heat.” *Id.* at 3:1–6. Fixture 10 includes light source 15, which can be “a light engine that includes a plurality of LEDs.” *Id.* at 4:15–17, 8:53–54. Light source 15 is mounted on a front surface of trim 12, into which heat from light source 15 is transferred. *Id.* 4:15–16, 7:45–47. Heat is subsequently transferred to both flange portion 22 of trim 12 and to heatsink 14. *Id.* at 7:45–47, 7:63. “Although some heat is vented into the recessed housing via heatsink 14, a majority of heat is dissipated from trim 12 outside the housing.” *Id.* at 5:8–10, 7:14–19.

Fixture 10 also includes optical lens 23 and electrical socket 16 for connecting the light source to an electricity source. *Id.* at 4:17–18, 8:17–23. In addition, an AC-to-DC converter circuit may be connected between socket 16 and the light source, and the conversion circuit can include circuit board 17. *Id.* at 4:22–27.

Petitioner notes that Chou issued from an application filed on May 20, 2008, but Petitioner does not take a position about how Chou qualifies as prior art. Pet. 6. Patent Owner does not dispute the prior art status of Chou. We determine that Chou qualifies as prior art under 35 U.S.C. § 102(e) because Chou’s application date was before the October 5, 2009, filing date of the provisional application that led to the ’844 patent. Ex. 1001, [60]; Ex. 1011, [22].

2. *Wegner*

Wegner is a U.S. patent directed to “a light emitting diode downlight can fixture for a recessed luminaire.” Ex. 1014, 1:31–33. Wegner describes Edison base adapter 1520 as allowing for retrofitting an LED module in an existing, non-LED fixture. *Id.* at 10:4–6, Fig. 16. For certain applications where a direct wired connection is desired, Wegner describes removing the Edison base adapter and connecting the remaining wires to the wiring of an existing fixture. *Id.* at 11:3–32, Fig. 14.

Petitioner notes that Wegner issued from an application filed on September 22, 2008, but Petitioner does not take a position about how Wegner qualifies as prior art. Pet. 8. Patent Owner does not dispute the prior art status of Wegner. We determine that Wegner qualifies as prior art under 35 U.S.C. § 102(e) because Wegner’s application date was before the

October 5, 2009, filing date of the provisional application that led to the '844 patent. Ex. 1001, [60]; Ex. 1014, [22].

3. *Claim 1*

In its obviousness analysis for claim 1, Petitioner maps the recited “heat spreader” of claim 1 to “the interior portion of [Chou’s] trim 12.” Pet. 19 (citing Ex. 1011, 7:44–46; 7:63–8:1, Figs. 2b, 4a, 4b). Petitioner also maps the recited “heat sink” to Chou’s flange portion 22 of trim 12. *Id.* (citing Ex. 1011, 5:1–5, 7:63–8:3, Fig. 4a). Petitioner cites Chou for teaching an LED light source that is in thermal communication with trim 12. *Id.* at 14 (citing Ex. 1011, 4:14–17, 5:1–5, 7:37–40, 7:44–46, 7:63–8:1, 8:44–48, Figs. 2b, 4b). Petitioner also quotes Chou for the proposition that heat from the LED light source “is transferred into trim 12 at the attachment point. From there, the heat is transferred into . . . the flange of trim 12.” *Id.* at 13 (quoting Ex. 1011, 7:44–46). Regarding the requirement that the heat sink is “substantially ring-shaped” and “in thermal communication with an outer periphery of the heat spreader,” Petitioner contends Chou teaches that trim 12 is thermally conductive and that it “includes a flange around a perimeter of the trim.” *Id.* at 14 (quoting Ex. 1011, 2:54–55 and citing Ex. 1011, 7:50–51, Figs. 2b, 4a, 4b). Petitioner explains that the inner portion of Chou’s trim 12 and flange portion 22 are in thermal communication because they are the same piece of metal. *Id.* (citing Ex. 1011, 7:24–25, 7:49–50). Furthermore, for the recited “outer optic,” Petitioner cites Chou’s lens 23. *Id.* at 15 (citing Ex. 1011, 8:16–23, Fig. 2b).

Regarding the recited “power conditioner,” Petitioner cites Chou’s teaching that “an AC to DC converter circuit may be connected between

socket 16 and the light source to convert the AC power source into a DC source.” *Id.* (quoting Ex. 1011, 4:22–26). Petitioner contends Chou’s power conditioner would “fit at least partially within an interior space of[] a nominally sized can light fixture” based on Chou’s teachings that fixture 10 is configured to fit within 5-inch and 6-inch can light fixtures. *Id.* (citing Ex. 1011, 3:65–66). Petitioner explains that “power conversion circuit board 17 is positioned within secondary heatsink 14 and therefore must fit within a 5-inch can.” *Id.* (citing Ex. 1011, 4:28, 4:46–54, Fig. 2b).

In addition, Petitioner contends it would have been obvious to modify Chou’s heatsink 14 and driver such that the power conditioner would “fit at least partially within an interior space of . . . a nominally sized electrical junction box” in accordance with clam 1. *See id.* at 15–16. Specifically, Petitioner proposes “selecting an alternative driver and heat sink scaled/sized to fit in the shallower dimension of an electrical junction box.” *Id.* at 15 (citing Ex. 1002 ¶ 61). In support of the modification, Petitioner cites Chou’s teaching that “fixture 10 may be configured to be installed into a recessed can housing having other geometries.” *Id.* (quoting Ex. 1011, 3:67–4:1). Petitioner also contends that power conditioners come sized to fit in a junction box, though Petitioner acknowledges that smaller power conditioners might have “a lower total power output and lesser heat sinking requirements than a physically larger driver.” *Id.* at 15–16 (citing Ex. 1002 ¶¶ 57–58). Petitioner further acknowledges that an ordinarily skilled artisan would have reduced “the number of LEDs . . . (thus consuming less power) in order to match/accommodate the heat dissipating characteristics of the smaller driver, heat sink, and volume.” *Id.* at 16 (citing Ex. 1002 ¶ 61). Petitioner additionally cites Wegner for teaching the removal of Chou’s

male Edison base “to expose and connect wires in an LED light fixture.” *Id.* (citing Ex. 1002 ¶ 60; Ex. 1014, 11:3–32).

Petitioner contends an ordinarily skilled artisan would have been motivated to modify Chou’s power conditioner to fit in a nominally sized junction box to serve “not just [the] retrofit but also [the] new construction market[s]” because “4-inch, 5-inch, and 6-inch junction boxes were widely used and well known in new construction applications at the time.” *Id.* (citing Ex. 1002 ¶ 61). Petitioner also contends substituting an “available smaller driver[] and correspondingly smaller secondary heat sink would have yielded the predictable result of the driver and accompanying heat sink fitting inside a nominally sized junction box.” *Id.* (citing Ex. 1002 ¶ 58).

Patent Owner disputes Petitioner’s obviousness showing as to the junction box limitation. Patent Owner contends Chou’s “other geometries” teaching “only applies to 5-inch and 6-inch recessed can housings having non-standard cross-sections.” PO Resp. 6–7 (citing Ex. 1011, 3:65–66, 4:5–7; Ex. 2001 ¶ 98). Patent Owner argues that Chou does not discuss junction boxes even though Petitioner acknowledges that junction boxes were widely used and well known. *Id.* at 6 (citing Pet. 16). Patent Owner also cites Figures 3 and 8 of Chou for their alleged depiction of a junction box attached to the outside of the can structure, which Patent Owner contends reflects the state of the art at the time of the ’844 patent. *Id.* at 7 (citing Ex. 1011, Figs. 3, 8; Ex. 2001 ¶ 24). As such, Patent Owner contends Chou “provides no basis to conclude that its fixture could, or should, be installed in both” junction boxes and can housings. *Id.* at 7–8 (citing Ex. 2001 ¶¶ 96–98).

We agree with Petitioner (Pet. Reply 5–7), however, that an ordinarily skilled artisan would not have read Chou as narrowly as Patent Owner contends. Not only does Chou state that its fixture “may be configured to be installed into a recessed can housing having other geometries,” but it also refers to “*recessed housings . . . developed with different geometries.*” Ex. 1011, 3:65–4:7 (emphasis added). In light of this express teaching in Chou, we do not agree that Chou’s teachings are confined to 5- and 6-inch can lights, or even can lights in general. Junction boxes represent another geometry that can serve as a recessed housing for an LED light fixture. In addition, the fact that certain figures of Chou might depict a junction box external to a can light does not mean that junction boxes are excluded from the universe of “recessed housings” contemplated in the quotation above. We also note that Dr. Bretschneider’s testimony against extending Chou’s teaching to “other geometries” merely rehashes the specific embodiments of Chou; Dr. Bretschneider does not provide a reason why ordinarily skilled artisans would have confined themselves strictly to the embodiments of Chou, and no more. *See* Ex. 2001 ¶ 98.

Patent Owner also contends Petitioner has provided no reason or motivation to combine Wegner with Chou. PO Resp. 9–11. Patent Owner contends an ordinarily skilled artisan would not have combined Wegner with Chou because Wegner pertains to a light with a tall reflector, which must be installed in a can light fixture (and not a junction box). *Id.* at 11–12 (citing Ex. 2001 ¶¶ 66–67, 99–103). Yet Petitioner cites Wegner only for its teaching of removing an Edison base from an LED light fixture to facilitate direct wiring, and not for anything to do with reflectors. Pet. 16 (citing Ex. 1002 ¶ 60; Ex. 1014, 11:3–32). As such, Patent Owner’s arguments

regarding Wegner's light reflectors amounts to a bodily incorporation argument, which is not the test for obviousness. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981) ("The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference."). We are persuaded that, based on Wegner, an ordinarily skilled artisan would have known to remove the Edison base of Chou's fixture regardless of the type of reflector and housing used in Wegner's fixture. *See* Ex. 1002 ¶ 60. Regarding motivation, Petitioner posits a market-based rationale, namely, that an ordinarily skilled artisan would have been motivated to make a version of Chou's luminaire to fit nominally sized junction boxes to serve the new construction market. Pet. 16 (citing Ex. 1002 ¶ 61). Dr. Roberts testifies that the Edison base would have been removed to make Chou's luminaire work in a junction box. Ex. 1002 ¶ 60. We are persuaded that an ordinarily skilled artisan wanting to modify Chou for use in junction boxes would have known to make this modification.

Patent Owner argues that Petitioner's proposed modifications—namely, "(1) reducing the size of LED driver 17, (2) reducing the size of heatsink 14, and (3) reducing the number of LEDs"—would result in an entirely new luminaire. PO Resp. 12–14 (citing Pet. 15–16; Ex. 2001 ¶ 104). Patent Owner contends an ordinarily skilled artisan

would not [have] beg[un] with a LED light fixture (1) including an oversized LED Driver, (2) requiring a bulky heat sink that itself is too big for even a 4-inch can light fixture for heat dissipation, (3) equipped with an oversized LED package, and (4) taught to be installed in can light fixtures that already include an integral junction box.

Id. at 13 (citing Ex. 2001 ¶ 104). As such, Patent Owner argues Petitioner’s proposed modifications are “steeped in hindsight bias.” *Id.*

Despite Patent Owner’s argument that an ordinarily skilled artisan would not have designed an LED fixture starting with Chou’s teachings, we nonetheless must consider Chou “for everything it *teaches* by way of technology” and not just for the “*invention* [Chou] is describing and attempting to protect.” *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1076 (Fed. Cir. 2015) (quoting *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907 (Fed. Cir. 1985) (emphases in original)). Petitioner utilizes Chou for its teaching of a number of the limitations in claim 1. Beyond these teachings, Petitioner provides reasons why and how an ordinarily skilled artisan would have modified Chou’s specific application in can light housings so that the same teachings would be applied to junction boxes. *See* Pet. 15–16. In particular, Petitioner presents testimony from Dr. Roberts establishing that an ordinarily skilled artisan would have known to modify the number and type of LEDs, the size of the driver, and the size of the secondary heat sink as design choices attendant to producing an LED light fixture. *See* Ex. 1002 ¶¶ 58–60. Dr. Bretschneider’s testimony supports this notion. *See* Ex. 2001 ¶ 91 (“In designing any new LED, a[n ordinarily skilled artisan] would have to pick an LED for the application, a power source for that LED and a heat sinking system for dissipating the heat generated by those components.”).

Patent Owner also argues that Petitioner’s proposed modifications to Chou would result in a luminaire that does not perform its required function. PO Resp. 14 (citing Ex. 2001 ¶ 104). Patent Owner notes the modified luminaire would have reduced light. *Id.* (citing Ex. 2001 ¶ 34). Patent

Owner also notes such a luminaire would have less ability to dissipate heat, which could shorten the lifespans of the LEDs and LED drivers by subjecting them to excess heat. *Id.* (citing Ex. 2001 ¶ 32). Yet these arguments relate to the very same type of design considerations discussed above. In addition, we agree with Petitioner that the claims do not require any “particular level of lumens, power and heat dissipation or efficiency of the light fixture.” Pet. Reply 7.

Patent Owner disputes Dr. Roberts’s testimony on LED power conditioners being available in “a variety of shapes and sizes” insofar as it “does not point to any LED power conditioner that could fit into a junction box, let alone one that would sufficiently operate Chou’s can light fixture.” PO Resp. 15 (citing Ex. 1002 ¶¶ 57–58). Yet Patent Owner does not dispute that smaller power conditioners were known; rather, Patent Owner faults Petitioner’s analysis for not providing examples of such smaller power conditioners.⁸ *Id.* In fact, Dr. Bretschneider characterizes the choice of power conditioners as a design choice. Ex. 2001 ¶ 91 (“In designing any new LED, a[n ordinarily skilled artisan] would have to pick an LED for the application, *a power source for that LED* and a heat sinking system for dissipating the heat generated by those components” (emphasis added)). Petitioner’s proposed modification—the use of a smaller power conditioner (Pet. 15–16 (citing Ex. 1002 ¶¶ 57–58, 61))—corresponds to such a design choice. And Petitioner’s proposed modification is rooted in Chou’s express teaching of a power conditioner that is disposed within a nominally sized 5-

⁸ We agree with Patent Owner (PO Resp. 16–17) that the “DiLouie” reference mentioned in the Petition is not of record of this case. We therefore do not consider Petitioner’s arguments directed to DiLouie.

inch or 6-inch can light fixture and Chou’s suggestion that its teachings can be applied to “recessed housings . . . with different geometries.” *See* Pet. 15; Ex. 1011, 3:65–4:7. Under these circumstances, we are persuaded that an ordinarily skilled artisan would have known to extend this teaching from Chou to junction boxes, including the use of a smaller power conditioner as needed. *Id.* at 15–16 (citing Ex. 1002 ¶¶ 57–58).

Having considered the arguments and evidence of record, we determine that Petitioner has established that the combination of Chou and Wegner teaches all the limitations in claim 1 except for disposing the power conditioner within the interior space of a junction box. In particular, Petitioner has established that Chou’s flange 22 of trim 12 is a “heat sink” commensurate with claim 1. *See* Pet. 13–14; Pet. Reply 13–14; Ex. 1002 ¶ 78; Ex. 1011, 7:1–3 (Chou stating that “trim 12 dissipates approximately 65% of the heat energy generated by the LED light source”). Petitioner has also provided a persuasive rationale for modifying Chou in light of Wegner to teach the junction box limitation. We also are persuaded that an ordinarily skilled artisan would have known to scale Chou’s secondary heat sink and power conditioner/driver to fit within a can housing or junction box. Thus, we determine, by a preponderance of the evidence, that the subject matter of claim 1 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

4. *Claim 2*

Claim 2 depends from claim 1 and recites that “the heat spreader, the heat sink and the outer optic, in combination, have an overall outside dimension D so dimensioned as to: cover an opening defined by a nominally

sized four-inch can light fixture; and, cover an opening defined by a nominally sized four-inch electrical junction box.” Building on its obviousness analysis for claim 1, Petitioner cites Chou’s teaching that “[t]he outer flange of trim 12 may contact a structural surface that surrounds the recessed housing such as a ceiling or wall surface” and that clips “pull the flange portion of trim 12 against the surface surrounding the recessed can application.” Pet. 17 (quoting Ex. 1011, 4:46–54). Petitioner notes Chou’s teachings on 5- and 6-inch can housings and contends that “[i]f Chou covers a 5-inch can, it will also cover the opening defined by a four-inch can and four-inch electrical junction box.” *Id.* (citing Ex. 1002 ¶¶ 63; Ex. 1011, 3:65–66).

We are persuaded that the combination of Chou and Wegner teaches the additional limitations in claim 2. Petitioner’s rationale for modifying Chou in light of Wegner and the knowledge of an ordinarily skilled artisan is the same as that of claim 1. Patent Owner relies on the same arguments that we discussed above with respect to claim 1. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 2 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

5. *Claim 3*

Claim 3 depends from claim 2 and recites “the heat spreader, the heat sink and the outer optic, in combination, further have an overall height H such that the ratio of H/D is equal to or less than 0.25.” Petitioner cites Chou’s teaching that trim 12 has an outer diameter of 200 mm and a depth of 42 mm. Pet. 17 (citing Ex. 1011, 5:24–27, Figs. 2a, 2b, 4a). As such,

Petitioner calculates the ratio of H/D as $42/200 = 0.21$, which is less than 0.25. *Id.*

Patent Owner disputes Petitioner's calculation of the recited ratio. PO Resp. 17–24. Specifically, Patent Owner contends “‘the heat sink’ in Chou as understood by [an ordinarily skilled artisan] at the time of the ’844 Patent would encompass both the ‘trim 12’ and the element actually labeled ‘heatsink 14.’” *Id.* at 17 (citing Ex. 2001 ¶ 112). Patent Owner notes that heatsink 14 dissipates approximately 35% of the heat generated by the LED light source in Chou. *Id.* at 18 (citing Ex. 1011, 7:11–13).

In its analysis for claim 1, from which claim 3 ultimately depends, Petitioner maps the recited “heat sink” to Chou’s flange portion 22 of trim 12. Pet. 13. In light of its claim 1 analysis, Petitioner’s analysis for claim 3 is premised on including only the height of Chou’s trim 12 for the recited “overall height H” and does not address any height ascribable to Chou’s heatsink 14. *See id.* at 17 (relying on trim 12’s depth of 42 mm for the overall height H). We are persuaded by Petitioner’s analysis because Petitioner relies on Chou’s flange portion 22 for teaching the recited “heat sink,” not Chou’s heatsink 14. Regardless of whether Chou’s disclosed fixture might have an additional heat sink, Petitioner has persuaded us that Chou’s flange 22 of trim 12 teaches a discrete “heat sink” commensurate with claim 1. *See supra* § II.A.5. In that sense, we are considering Chou for everything it teaches by way of technology. *See Belden*, 805 F.3d at 1076. Although it disputes Petitioner’s mapping of claim 3 to Chou, Patent Owner does not dispute the heat sinking capability of Chou’s trim 12. *See* PO Resp. 17–20.

We also agree with Petitioner’s argument (Pet. Reply 14) that the challenged claims include the transitional word “comprising,” which “creates a presumption that the recited elements are only a part of the device, that the claim does not exclude additional, unrecited elements.” *Crystal Semiconductor Corp. v. TriTech Microelectronics Int’l, Inc.*, 246 F.3d 1336, 1348 (Fed. Cir. 2001). Chou’s heatsink 14 is such an additional element. With these considerations in mind, we find Petitioner’s analysis for claim 3’s overall height dimension H to be consistent with Petitioner’s claim 1 mapping.

Furthermore, we disagree with Patent Owner’s arguments based on the percentage of heat dissipated by heatsink 14 in Chou’s embodiments. Petitioner addresses an ordinarily skilled artisan’s design considerations for heat dissipation, including a modified secondary heat sink and a reduced number of LEDs, as we discussed above with respect to claim 1. *See supra* § II.A.5. Petitioner provides persuasive reasons why an artisan would have modified Chou’s LED luminaire in this way. *See id.*

We additionally discount certain arguments made by Patent Owner with respect to claim 3 because they relate to anticipation, rather than obviousness. *See, e.g.*, PO Resp. 18 (“Prior art only anticipates that which it enables”), 19 (arguing that Chou’s heatsink 14 is required as part of “Chou’s enabled disclosure”), 21–24 (citing case law on anticipation). We agree with Petitioner (Pet. Reply 4–5) that these arguments in Patent Owner’s brief are not apt in the context of Petitioner’s obviousness ground, and Petitioner need not establish that its references are enabling in order to establish obviousness. *See ABT Sys., LLC v. Emerson Elec. Co.*, 797 F.3d 1350, 1360 n.2 (Fed. Cir. 2015) (quoting earlier cases for the proposition that even a

non-enabling reference may qualify as prior art for the purpose of determining obviousness and even an inoperative device is prior art for all that it teaches).

We are persuaded that the combination of Chou and Wegner teaches the additional limitations in claim 3. Petitioner's rationale for modifying Chou in light of Wegner and the knowledge of an ordinarily skilled artisan is the same as that of claim 1. In addition to the arguments specifically directed to claim 3, outlined above, Patent Owner relies on the same arguments that we discussed above with respect to claim 1. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 3 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

6. *Claim 5*

Claim 5 depends from claim 3 and recites "the overall outside dimension D is equal to or greater than 7 inches." Petitioner cites the same teaching as in claim 3 for the proposition that, in Chou, "the outer periphery of trim 12 is 200 mm (i.e., 7.87 inches)." Pet. 17 (citing Ex. 1011, 5:24–27).

We are persuaded that the combination of Chou and Wegner teaches the additional limitation in claim 5. Petitioner's rationale for modifying Chou in light of Wegner and the knowledge of an ordinarily skilled artisan is the same as that of claim 1. Patent Owner relies on the same arguments that we discussed above with respect to claims 1 and 3. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 5 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

7. *Claim 7*

Claim 7 depends from claim 1 and recites “the heat spreader and the heat sink are integrally formed such that a heat flow path through the heat spreader to the heat sink is continuous an[d] uninterrupted.” Petitioner references its mapping from claim 1 where the inner portion of Chou’s trim 12 is the “heat spreader” and Chou’s flange 22 of trim 12 is the “heat sink.” Pet. 18. With respect to the “integrally formed” limitation, Petitioner notes that Chou’s trim 12 “is manufactured as a single piece of stamped aluminum.” *Id.* (quoting Ex. 1011, 7:49–50 and citing *id.* at 7:24–25, Figs. 2b, 30).

We are persuaded that the combination of Chou and Wegner teaches the additional limitation in claim 7. Petitioner’s rationale for modifying Chou in light of Wegner and the knowledge of an ordinarily skilled artisan is the same as that of claim 1. Patent Owner relies on the same arguments that we discussed above with respect to claim 1. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 7 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

8. *Claim 9*

Claim 9 depends from claim 1 and recites “the power conditioner is configured and sized to fit completely within an interior space of a nominally sized can light fixture; and, a nominally sized electrical junction box.” This claim differs from claim 1 only insofar as the power conditioner fits completely within, rather than partially within, the interior space. Petitioner refers to its analysis from claim 1 regarding, *inter alia*, the

scalability of various components and known examples of LED drivers that fit within junction boxes. Pet. 18 (citing Ex. 1002 ¶ 71).

For the same reasons discussed above with respect to claim 1, we are persuaded that the combination of Chou and Wegner teaches this additional limitation in claim 9. We also are persuaded by Petitioner’s rationale for modifying Chou in light of Wegner and the knowledge of an ordinarily skilled artisan. Patent Owner relies on the same arguments that we discussed above with respect to claim 1. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 9 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

9. *Claim 12*

Claim 12 depends from claim 1 and recites “the heat sink forms a trim plate that is disposed completely external of the can light fixture or the electrical junction box.” Petitioner points to Chou’s flange 22 of trim 12, which Petitioner likens to the “heat sink” of claim 1, and contends it is “completely below the ceiling plane and thus external of the can light fixture or electrical junction box.” Pet. 18–19 (citing Ex. 1011, 4:46–54, 7:63, Figs. 2b, 3, 4a).

We are persuaded that the combination of Chou and Wegner teaches the additional limitation in claim 12. Petitioner’s rationale for modifying Chou in light of Wegner and the knowledge of an ordinarily skilled artisan is the same as that of claim 1. Patent Owner relies on the same arguments that we discussed above with respect to claims 1 and 3. See PO Resp. 24. On the entire trial record, we determine, by a preponderance of the evidence,

that the subject matter of claim 12 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

10. Claim 14

Claim 14 depends from claim 1 and recites “the heat sink is disposed in direct thermal communication with the heat spreader.” Petitioner contends the inner portion of Chou’s trim 12 (“heat spreader”) and flange portion 22 (“heat sink”) are in direct thermal communication because they are formed from the same piece of metal. Pet. 19 (citing Ex. 1011, Fig. 2b).

We are persuaded that the combination of Chou and Wegner teaches the additional limitation in claim 14. Petitioner’s rationale for modifying Chou in light of Wegner and the knowledge of an ordinarily skilled artisan is the same as that of claim 1. Patent Owner relies on the same arguments that we discussed above with respect to claim 1. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 14 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

11. Claim 16

Claim 16 depends from claim 1 and recites “the outer optic is securely retained relative to at least one of the heat spreader and the heat sink.” Petitioner cites Chou’s lens 23 attached to trim 12. Pet. 19 (citing Ex. 1011, 8:16–23, Fig. 2b). We are persuaded that the combination of Chou and Wegner teaches the additional limitation in claim 16. Petitioner’s rationale for modifying Chou in light of Wegner and the knowledge of an ordinarily skilled artisan is the same as that of claim 1. Patent Owner relies on the

same arguments that we discussed above with respect to claim 1. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 16 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

12. Claim 21

Claim 21 depends from claim 1 and recites “the nominally sized can light fixture is a nominally sized four-inch can light fixture, and the nominally sized electrical junction box is a nominally sized four-inch electrical junction box.” This claim further limits the can light fixtures and junction boxes of claim 1 to a size of four inches. Petitioner relies on its analysis for claim 1. Pet. 19–20 (citing Ex. 1002 ¶ 80). Patent Owner relies on the same arguments that we discussed above with respect to claim 1. In addition, Patent Owner argues Petitioner does not address the “four-inch can light fixture” limitation of claim 21. PO Resp. 24–25. Notwithstanding, the record includes evidence that an ordinarily skilled artisan would have applied the same analysis from claim 1 as to four-inch can light fixtures and four-inch junction boxes. Pet. 19–20; Pet. Reply 15; Ex. 1002 ¶ 80.

We are persuaded that the combination of Chou and Wegner teaches the additional limitations in claim 21. Petitioner’s rationale for modifying Chou in light of Wegner and the knowledge of an ordinarily skilled artisan is the same as that of claim 1. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 21 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

13. *Claim 22*

Claim 22 depends from claim 1 and recites “the heat sink is disposed diametrically outboard of the heat spreader.” Petitioner contends Chou’s flange portion 22 (“heat sink”) is completely exterior and disposed outboard of inner portion of Chou’s trim 12 (“heat spreader”). Pet. 20 (citing Ex. 1011, Fig. 4a).

We are persuaded that the combination of Chou and Wegner teaches the additional limitation in claim 22. Petitioner’s rationale for modifying Chou in light of Wegner and the knowledge of an ordinarily skilled artisan is the same as that of claim 1. Patent Owner relies on the same arguments that we discussed above with respect to claim 1. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 22 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

14. *Claim 23*

Claim 23 depends from claim 1 and recites “the heat sink also serves as a trim plate; the combination of the trim plate and the outer optic have an overall height H; the trim plate has an overall diameter D; and the ratio of H/D is equal to or less than 0.25.” This claim incorporates limitations from claims 3 and 12. Petitioner relies on its analysis from these claims, which we have discussed above. See Pet. 20 (citing Ex. 1011, 5:1–5, 5:24–28, 7:63–8:3, Figs. 2a, 2b, 4a, 4b).

We are persuaded that the combination of Chou and Wegner teaches the additional limitation in claim 23. Petitioner’s rationale for modifying Chou in light of Wegner and the knowledge of an ordinarily skilled artisan is

the same as that of claim 1. Patent Owner relies on the same arguments that we discussed above with respect to claims 1, 3, and 12. *See* PO Resp. 25. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 23 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

15. *Claim 24*

Independent claim 24 incorporates limitations from claims 1, 2, and 12. Petitioner relies on its analysis from claims 1, 2, and 12. Pet. 22–24. Patent Owner relies on the same arguments that we discussed above with respect to claims 1, 2, and 12. *See* PO Resp. 25. For the same reasons discussed above in our analysis of claims 1, 2, and 12, we are persuaded that the combination of Chou and Wegner teaches limitations in claim 24, and we are persuaded by Petitioner’s rationale for the combination. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 24 would have been obvious over the combination of Chou and Wegner under 35 U.S.C. § 103(a).

D. *Obviousness Ground Based on Chou, Wegner, and Zhang*

Petitioner contends that claim 10 would have been obvious over Chou, Wegner, and Zhang. Pet. 22–23. Patent Owner disputes Petitioner’s contentions. PO Resp. 25–28.

1. Zhang

Zhang is a U.S. patent directed to “a recessed lighting fixture that provides improved heat dissipation and grounding.” Ex. 1013, 1:15–17. Figures 2 and 3 of Zhang are reproduced below.

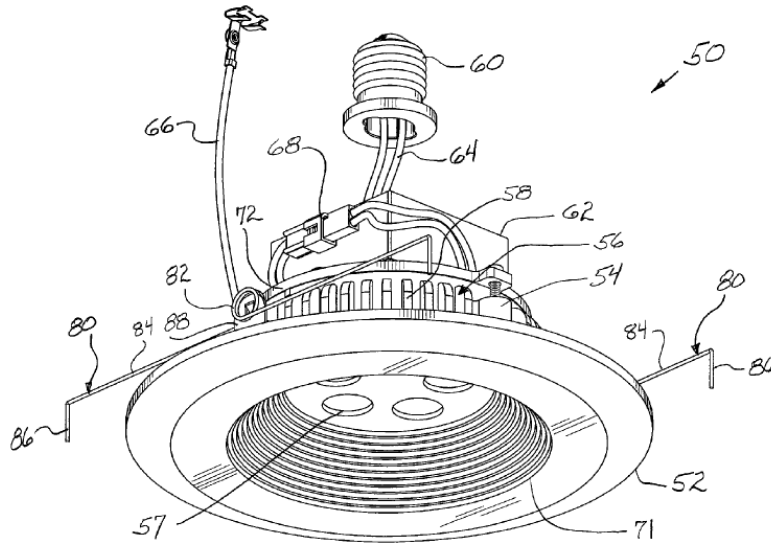


FIG. 2

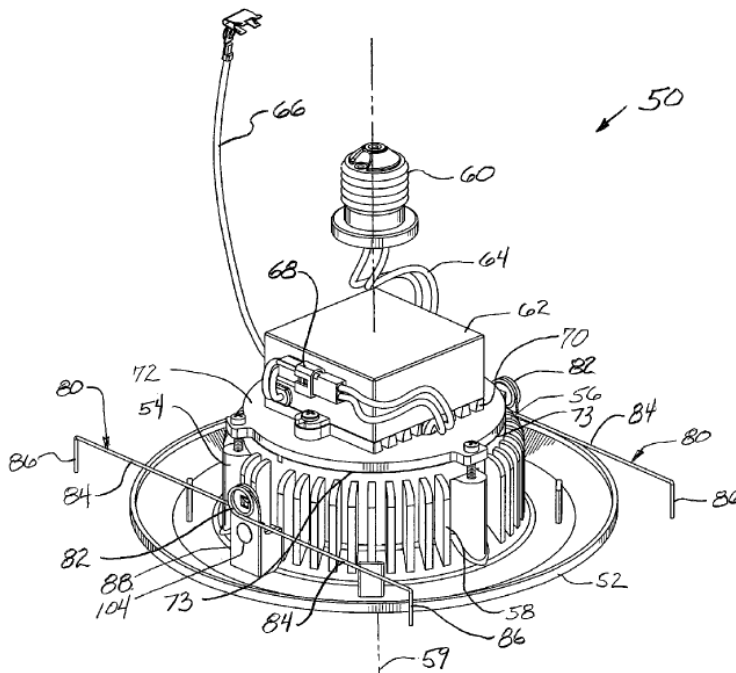


FIG. 3

Figures 2 and 3 depict trim unit 50 for a recessed light fixture having trim ring 52, baffle 54, and heat sink 56. *Id.* at 7:55–8:1. Trim unit 50 also includes trim cup 72. *Id.* at 8:31–34. A plurality of LEDs 57 are mounted to trim cup 72 within baffle 54. *Id.* at 7:65–8:1, 8:10–14, 9:44–48. Heat is transferred from the LEDs to the trim cup. *Id.* at 12:42–48. In turn, heat is transferred to the baffle and heat sink of the trim unit, from which it can be dissipated into the surrounding room via the trim ring portion of the trim unit. *Id.* at 7:9–13, 7:65–8:1.

Zhang also describes the LEDs being “located within LED lenses” and a tempered glass plate disposed below the LEDs. *Id.* at 9:41–44.

Petitioner notes that Zhang issued from an application filed on October 10, 2008, but Petitioner does not take a position about how Zhang qualifies as prior art. Pet. 7. Patent Owner does not contest that Zhang is prior art. We determine that Zhang qualifies as prior art under 35 U.S.C. § 102(e) because Zhang’s application date was before the October 5, 2009, filing date of the provisional application that led to the ’844 patent. Ex. 1001, [60]; Ex. 1013, [22].

2. *Claim 10*

Claim 10 depends from claim 1 and recites “an inner optic disposed over the plurality of LEDs between the plurality of LEDs and the outer optic.” Building on its analysis for claim 1 from the Chou–Wegner ground, Petitioner cites Zhang’s description of LED lenses 108 for the recited inner optic. Pet. 22 (citing Ex. 1013, 9:42–44). Petitioner contends an ordinarily skilled artisan would have “recognized that an additional optic, as taught in Zhang, could be added to Chou in order to advance the goal suggested by

Chou: further modifying the raw light from the LED (*e.g.* directing, diffusing, coloring, collimating) or to further the well-understood goal of protecting the LEDs.” *Id.* at 23 (citing Ex. 1002 ¶ 98; Ex. 1011, 8:21–26); Pet. Reply 18 (citing same).

Patent Owner argues that the Petition is not clear about which of Zhang’s optics—tempered glass plate 106 or lens 108—an ordinarily skilled artisan would have added to Chou’s can light fixture. PO Resp. 26. Patent Owner also disputes that an ordinarily skilled artisan would have added an additional optic to Chou’s fixture, because “two optics would increase complexity and costs as well as reduce yields.” *Id.* at 27 (citing Ex. 2001 ¶ 115). Patent Owner further disputes that Chou’s LEDs would need further protection by way of an additional inner optic. *Id.* at 27–28 (citing Ex. 2001 ¶¶ 115–116).

Although we have no trouble discerning that Petitioner’s obviousness challenge for claim 10 relies on Zhang’s inner optic 108, we nonetheless agree with Patent Owner that Petitioner does not put forth a sufficient reason for adding Zhang’s inner optic 108 to Chou’s fixture, which already has lens 23 for optically altering light and protecting the LEDs. *See* Pet. 15 (citing Ex. 1011, 8:16–23, Fig. 2b). Petitioner does not indicate any deficiency in Chou’s optical effects or LED protection that would have impelled an ordinarily skilled artisan to make Petitioner’s proposed modification. And, absent other evidence, the fact that the artisan *could* have modified Chou’s optics to more closely resemble the optics of Zhang is not a sufficient rational underpinning to support the legal conclusion of obviousness. *KSR*, 550 U.S. at 418. Against Petitioner’s deficient showing, Patent Owner puts forth Dr. Bretschneider’s testimony that an ordinarily skilled artisan

would not modified Chou's fixture as proposed by Petitioner because it would have increased complexity and cost in contravention of standard design techniques in the field. *See* PO Resp. 27 (citing Ex. 2001 ¶¶ 115–116). We credit this testimony because it is intuitive that an artisan would have avoided increased cost and complexity where, as here, Chou's fixture already optically alters light and protects its LEDs via lens 23.

On the entire trial record, we determine that Petitioner has not established by a preponderance of the evidence that the subject matter of claim 10 would have been obvious over the combination of Chou, Wegner, and Zhang under 35 U.S.C. § 103(a).

E. Obviousness Ground Based on Zhang

Petitioner contends that claims 1, 2, 9, 10, 16, 21, and 22 would have been obvious over Zhang. Pet. 23–29. Patent Owner disputes Petitioner's contentions. PO Resp. 28–33.

1. Claim 1

In its obviousness analysis for claim 1, Petitioner cites Zhang's recessed lighting fixture, which utilizes a plurality of LEDs 57 that are mounted on a printed circuit board. Pet. 25 (citing Ex. 1013, 8:10–12, 9:44–48). Zhang's fixture includes tempered glass plate 106 below the LEDs, which Petitioner maps to the recited "outer optic" of claim 1. *Id.* (citing Ex. 1002 ¶ 108⁹; Ex. 1013, 9:41–44, Figs. 5, 8).

⁹ Petitioner mistakenly cites to paragraph 107, but the context makes clear Petitioner intended to cite to paragraph 108.

Petitioner cites Zhang's trim cup for the recited "heat spreader." *Id.* at 23 (citing Ex. 1013, 12:43–48). Petitioner notes that the LEDs are mounted to the trim cup, which is made of a thermally conductive material such that the LEDs are in thermal communication with the trim cup. *Id.* at 23, 25 (citing Ex. 1013, 8:37–38, 9:44–48, 12:43–48, Fig. 5). Petitioner maps Zhang's trim unit, which comprises trim ring 52, baffle 54, and heat sink 56 and which is also made of thermally conductive material, to the recited "heat sink" of claim 1. *Id.* at 23–24 (citing Ex. 1013, 3:6–18, 4:23–29, 7:3, 8:34–36, 8:58–61, Figs. 1, 1A, 3, 5). Petitioner also notes the trim unit is circular, so Petitioner contends the trim unit is "substantially ring-shaped" in accordance with claim 1. *Id.* at 24 (citing Ex. 1002 ¶ 104¹⁰; Ex. 1013, Figs. 2, 3). Petitioner further contends "[t]he interior perimeter of the baffle cavity (*i.e.* the upper portion of the integrated trim unit) surrounds the exterior perimeter of the bottom of the trim cup on which the LEDs are mounted." *Id.* at 25 (citing Ex. 1013, Fig. 5). Petitioner notes the heat sink and baffle draw heat from the trim cup, and then the trim ring dissipates heat into the room. *Id.* at 24–25 (citing Ex. 1002 ¶ 105¹¹; Ex. 1013, 7:8–13, 7:65–8:1, 12:43–48, Fig. 3). Accordingly, Petitioner contends Zhang's trim unit is "in thermal communication with an outer periphery" of Zhang's trim cup. *Id.* at 25 (citing Ex. 1002 ¶ 105¹²).

¹⁰ Petitioner mistakenly cites to paragraph 103, but the context makes clear Petitioner intended to cite to paragraph 104.

¹¹ Petitioner mistakenly cites to paragraph 104, but the context makes clear Petitioner intended to cite to paragraph 105.

¹² Petitioner mistakenly cites to paragraph 104, but the context makes clear Petitioner intended to cite to paragraph 105.

For the recited “power conditioner,” Petitioner cites Zhang’s teachings on a driver (e.g., driver 42) that “provides the necessary electrical energy to cause the LEDs to emit light.” *Id.* at 25–26 (quoting Ex. 1013, 7:26–29 and citing Ex. 1013, 5:37–39, 8:24–26). Citing testimony from Dr. Roberts, Petitioner contends an ordinarily skilled artisan would have understood Zhang’s references to the driver and to the processing of electrical energy as “disclosing an AC-to-DC power converter.” *Id.* at 26 (citing Ex. 1002 ¶ 109¹³). Regarding claim 1’s limitation on disposing the power conditioner within a nominally sized can, Petitioner contends “Zhang already discloses driver 42 on top of the trim cup and completely within the internal space 49 of recessed can 36.” *Id.* (citing Ex. 1013, 6:66–67, 7:26–30, Fig. 1A). For disposition within a junction box, Petitioner contends that it would have been obvious for an ordinarily skilled artisan “to select a[n] AC/DC power conditioner from the many available at the time that would have fit inside an electrical junction box.” *Id.* at 26 (citing Ex. 1002 ¶ 110). Similar to the analysis for the Chou–Wegner ground, Petitioner contends an ordinarily skilled artisan would have been motivated to make a driver that fit inside a junction box “in order to serve more of the market for lighting fixtures.” *Id.* at 26–27 (citing Ex. 1002 ¶ 110). Petitioner also contends an ordinarily skilled artisan would have known to reduce the size of Zhang’s trim cup and to reduce the number of LEDs to accommodate this modification. *Id.* at 27 & n.17 (citing Ex. 1002 ¶ 110).

Patent Owner does not dispute any portion of Petitioner’s analysis except for Petitioner’s arguments regarding the recited junction box. Patent

¹³ Petitioner mistakenly cites to paragraph 108, but the context makes clear Petitioner intended to cite to paragraph 109.

Owner argues that Zhang’s teachings are limited to can housings, and that Zhang does not mention junction boxes. PO Resp. 29. In particular, Patent Owner cites Zhang’s statement that “very little of the lighting fixture is visible from below the ceiling” and contends this statement would preclude a fixture in a junction box because “such an installation would result in a fixture fully below the ceiling.” *Id.* (quoting Ex. 1013, 1:15–21 (emphasis omitted) and citing Ex. 2001 ¶ 118).

We do not agree with Patent Owner that a person of ordinary skill in the art would have read Zhang as narrowly as Patent Owner contends. For example, Patent Owner supports its position with testimony from Dr. Bretschneider, who testifies that an ordinarily skilled artisan would not have understood Zhang “to be in the field of ceiling mounted light fixtures for installation within a junction box.” Ex. 2001 ¶ 118. Dr. Bretschneider also testifies that ceiling mounted light fixtures, i.e., those mounted to a junction box, “are the antithesis of can light fixtures.” *See id.* ¶¶ 26–27. Nevertheless, LED fixtures for mounting in junction boxes are in the same or analogous field as LED fixtures mounted in a can housing, regardless of whether they are mounted above or below a ceiling. Patent Owner can scarcely maintain that Zhang, which is directed to recessed LED lighting fixtures (*see* Ex. 1013, Abstract), would not have been at least “reasonably pertinent to the particular problem” addressed by the ’844 patent. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004).

Moreover, claim 1 does not recite any limitations regarding whether the LED fixture is disposed above or below the level of the ceiling. Thus, the disposition of Petitioner’s modified version of Zhang’s fixture relative to the ceiling has no bearing on patentability. Having considered both sides’

arguments regarding Petitioner's proposed modification of Zhang, we are persuaded that an ordinarily skilled artisan would have extended Zhang's teachings about recessed can fixtures to junction boxes based on market forces, as Petitioner contends. *See* Pet. 15–16 (citing Ex. 1002 ¶¶ 57–58, 61), 26–27 (citing Ex. 1002 ¶ 110).

Similarly to its arguments addressed above regarding the Chou–Wegner ground, Patent Owner also argues that Petitioner's proposed modifications would result in an entirely new luminaire. PO Resp. 30–32. We do not agree with Patent Owner's arguments, however, for reasons similar to those discussed above. *See supra* § II.A.5. In particular, Petitioner provides an analysis of how Zhang teaches all of the limitations of the claim, or else that an ordinarily skilled artisan would have modified Zhang such that the limitations are rendered obvious. *See* Pet. 23–27. Petitioner also accounts for the design considerations attendant to the proposed modifications. *See id.* at 26–27 & n.17. And, as mentioned above, Dr. Bretschneider testifies about design choices in a way that supports Petitioner's position. *See* Ex. 2001 ¶ 91.

Patent Owner also argues that Petitioner's modifications to Zhang would render it inadequate for its application. PO Resp. 32–33. We do not agree with Patent Owner's argument for the same reasons discussed above in the Chou–Wegner ground, namely, that “there is no requirement in the claims or specification of the '844 patent for a particular level of lumens, power and heat dissipation or efficiency of the light fixture.” Pet. Reply 21. We likewise reject Patent Owner's argument regarding the availability of power conditioners sized to fit in a junction box. *See* PO Resp. 33 (citing Ex. 2001 ¶¶ 119–121). For the same reasons discussed above, we are

persuaded by Petitioner’s evidence that an ordinarily skilled artisan would have sized a power conditioner for use in a junction box with Zhang’s luminaire. *See supra* § II.A.5; Pet. 15–16 (citing Ex. 1002 ¶¶ 57–58, 61), 26–27 (citing Ex. 1002 ¶ 110).

Petitioner has established that Zhang, as modified by Petitioner’s obviousness rationale, teaches the limitations in claim 1. We also are persuaded by Petitioner’s reasons for the modification. Thus, we determine, by a preponderance of the evidence, that the subject matter of claim 1 would have been obvious over Zhang in light of the knowledge of an ordinarily skilled artisan under 35 U.S.C. § 103(a).

2. *Claim 2*

For claim 2, Petitioner cites Zhang’s teaching on covering the ceiling opening with a trim unit held by torsion springs. *Id.* at 27 (citing Ex. 1013, 6:64–67, 7:46–50, Fig. 1A). Petitioner contends an ordinarily skilled artisan would have found it obvious “to implement Zhang so as to cover a four-inch can or four-inch junction box” because “4-inch cans and 4-inch junction boxes were widely used.” *Id.* at 27–28 (citing Ex. 1002 ¶ 114¹⁴). Petitioner reasons the artisan would have understood that “Zhang could be scaled (if necessary) to fit into and thus cover a range of sizes, including 4-inch junction box or 4-inch can.” *Id.* at 27.

We are persuaded that Zhang, as modified by Petitioner’s obviousness rationale, teaches the additional limitations in claim 2. We also are persuaded by Petitioner’s reasons for the modification. Patent Owner relies

¹⁴ Petitioner mistakenly cites to paragraph 113, but the context makes clear Petitioner intended to cite to paragraph 114.

on the same arguments discussed above with respect to claim 1. PO Resp. 28. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 2 would have been obvious over Zhang under 35 U.S.C. § 103(a).

3. *Claim 9*

Petitioner's analysis for claim 9 is similar to that of claim 1. Petitioner cites Zhang's teaching of a power conditioner that fits completely within a nominally sized can. Pet. 28 (citing Ex. 1013, 7:26–30, 8:24–26, Fig. 1A). Petitioner contends that “[f]itting the driver completely within the electrical junction box would also preserve Zhang's shape, design, function, heat dissipation system, and aesthetic” and “would open up a greater market.” *Id.* (citing Ex. 1002 ¶ 118¹⁵).

We are persuaded that Zhang, as modified by Petitioner's obviousness rationale, teaches the additional limitation in claim 9. We also are persuaded by Petitioner's reasons for the modification. Patent Owner relies on the same arguments discussed above with respect to claim 1. PO Resp. 28. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 9 would have been obvious over Zhang under 35 U.S.C. § 103(a).

4. *Claim 10*

For claim 10, Petitioner cites Zhang's lenses 108 over the LEDs as the recited “inner optic” and contends that lenses 108 are interior to glass

¹⁵ Petitioner mistakenly cites to paragraph 116, but the context makes clear Petitioner intended to cite to paragraph 118.

plate 106, which Petitioner likens to the recited “outer optic.” Pet. 28 (citing Ex. 1013, 9:41–44, 12:4–7, Fig. 5).

We are persuaded that Zhang teaches the additional limitation in claim 10. Petitioner’s rationale for modifying Zhang is the same as that of claim 1. Patent Owner relies on the same arguments discussed above with respect to claim 1. PO Resp. 28. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 10 would have been obvious over Zhang under 35 U.S.C. § 103(a).

5. *Claim 16*

For claim 16, Petitioner maps the “outer optic” to Zhang’s glass plate 106 and contends it “rests on the divider within the baffle cavity” and “is secured in a fixed position relative to the trim cup, *i.e.* heat spreader.” Pet. 28 (citing Ex. 1002 ¶ 121¹⁶; Ex. 1013, 9:41–44, Fig. 5).

We are persuaded that Zhang teaches the additional limitation in claim 16. Petitioner’s rationale for modifying Zhang is the same as that of claim 1. Patent Owner relies on the same arguments discussed above with respect to claim 1. PO Resp. 28. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 16 would have been obvious over Zhang under 35 U.S.C. § 103(a).

6. *Claim 21*

For claim 21, Petitioner relies on the same analysis as for claim 1. Petitioner contends “4-inch cans and [junction] boxes are a subset of the

¹⁶ Petitioner mistakenly cites to paragraph 119, but the context makes clear Petitioner intended to cite to paragraph 121.

implementations taught by Zhang in light of knowledge in the art.” Pet. 29 (citing Ex. 1002 ¶ 123¹⁷).

We are persuaded that Zhang, as modified by Petitioner’s obviousness rationale, teaches the additional limitations in claim 21. We also are persuaded by Petitioner’s reasons for the modification. Patent Owner relies on the same arguments discussed above with respect to claim 1. PO Resp. 28. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 21 would have been obvious over Zhang under 35 U.S.C. § 103(a).

7. *Claim 22*

For claim 22, Petitioner contends Zhang’s trim cup 112 sits within the cavity of baffle 98. Pet. 29 (citing Ex. 1013, Fig. 5). Petitioner contends “[t]he interior perimeter of the baffle cavity surrounds and is exterior to the outer perimeter of the trim cup on which the LED [printed circuit board] is mounted, *i.e.* the lower plane of the trim cup” and “is completely exterior to the external perimeter of the surface on which the LED [printed circuit board] is mounted.” *Id.* (citing Ex. 1002 ¶¶ 125–126¹⁸).

We are persuaded that Zhang teaches the additional limitation in claim 22. Petitioner’s rationale for modifying Zhang is the same as that of claim 1. Patent Owner relies on the same arguments discussed above with respect to claim 1. PO Resp. 28. On the entire trial record, we determine,

¹⁷ Petitioner mistakenly cites to paragraph 121, but the context makes clear Petitioner intended to cite to paragraph 123.

¹⁸ Petitioner mistakenly cites to paragraph 121, but the context makes clear Petitioner intended to cite to paragraphs 125–126.

by a preponderance of the evidence, that the subject matter of claim 22 would have been obvious over Zhang under 35 U.S.C. § 103(a).

F. Obviousness Ground Based on Zhang and Wegner

Petitioner contends that claim 17 would have been obvious over Zhang, and Wegner. Pet. 30–31. Patent Owner disputes Petitioner’s contentions. PO Resp. 34–35

Claim 17 depends from claim 1 and recites:

an electrical supply line having a first end electrically connected to the power conditioner, and a second end electrically connected to a plug-in connector; and

an accessory kit, comprising:

at least one of: a first pre-wired jumper comprising a pair of insulated electrical wires having a first plug-in connector electrically connected at one end and an Edison base electrically connected at the other opposing end; and, a second pre-wired jumper comprising a pair of insulated electrical wires having a second plug-in connector electrically connected at one end and cut wire ends at the other opposing end;

wherein the plug-in connector of the first pre-wired jumper and the second pre-wired jumper are each configured to electrically engage with the plug-in connector of the electrical supply line.

Petitioner cites, *inter alia*, Zhang’s teachings related to adapter 60 for the recited accessory kit and its Edison base. *Id.* at 30 (citing Ex. 1013, 8:22–26, 9:11–12, Fig. 3). Petitioner contends it would have been obvious to modify Zhang to include the accessory kit because Zhang includes almost

all elements of the kit. *Id.* (citing Ex. 1002 ¶ 128¹⁹). According to Petitioner, the only missing element of the kit, a connector, is taught by Wegner and would have made Zhang's adapter 60 detachable and easier to install, a desirable improvement. *Id.* at 31 (citing Ex. 1002 ¶¶ 129–130; Ex. 1014, 10:46–60, Figs. 6, 15, 16).

Patent Owner argues that an ordinarily skilled artisan would have had no reason or motivation to combine Wegner with Zhang. PO Resp. 34. Patent Owner also makes arguments related to the combinability of Wegner's tall reflectors with Zhang's fixture. *Id.* at 34–35.

We agree with Petitioner (Pet. Reply 22), however, that Patent Owner's arguments related to Wegner's reflector are irrelevant to the instant combination. Petitioner only relies on Wegner's connector in the instant combination. *See* Pet. 31. Regarding the addition of Wegner's connector, we are persuaded that an ordinarily skilled artisan would have found the addition of a detachable Edison base to Zhang's fixture to be a desirable improvement for ease of installation. *See id.*; *see also* Ex. 1018 ¶ 97 (Dr. Roberts testifying that pluggable inline connectors like those in Wegner have been used to connect power line circuits in electrical and electronic devices since at least the 1960s). Accordingly, we are persuaded that the combination of Zhang and Wegner teaches the additional limitations in claim 17, and that Petitioner has provided a persuasive rationale for the combination. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 17 would have been obvious over the combination of Zhang and Wegner under 35 U.S.C. § 103(a).

¹⁹ Petitioner mistakenly cites to paragraph 126, but the context makes clear Petitioner intended to cite to paragraph 128.

G. Obviousness Ground Based on Zhang and Soderman

Petitioner contends that claim 20 would have been obvious over Zhang and Soderman. Pet. 31.

1. Soderman

Soderman is a U.S. patent directed to “a light fixture assembly comprising an illumination assembly incorporating a light emitting diode (LED) array electrically connected to a source of electrical energy by a conductor assembly segregated from conductive transfer to a heat sink portion of the light fixture.” Ex. 1012, 1:8–12. Soderman describes mounting the fixture to a housing or junction box using, *inter alia*, connectors passing through “appropriately disposed and dimensioned apertures” in a mounting assembly. *Id.* at 8:1–13, 9:15–34.

Petitioner notes that Soderman issued from an application filed on November 13, 2007, but Petitioner does not take a position about how Soderman qualifies as prior art. Pet. 6. Patent Owner does not contest that Soderman is prior art. We find that Soderman qualifies as prior art under 35 U.S.C. § 102(e) because Soderman’s application date was before the October 5, 2009, filing date of the provisional application that led to the ’844 patent. Ex. 1001, [60]; Ex. 1012, [22].

2. Claim 20

Claim 20 depends from claim 1 and recites “the heat spreader comprises mounting holes suitably spaced apart to receive mounting fasteners to secure the heat spreader to an electrical junction box.” Ex. 1001, 16:7–10. Petitioner cites Soderman for the mounting holes and

contends that “[a]dding such holes to Zhang would predictably allow the fixture to be installed into a junction box.” Pet. 31 (citing Ex. 1002 ¶ 133²⁰; Ex. 1012, Fig. 6).

Patent Owner argues that Petitioner provides no motivation to combine Zhang and Soderman. PO Resp. 36. Patent Owner also argues that an ordinarily skilled artisan would not have been motivated to combine these references because “Zhang is a fixture designed only for can light housings,” whereas “Soderman discloses low profile fixtures suitable for installation into junction boxes.” *Id.* at 37 (citing Ex. 2001 ¶ 126). Patent Owner further contends that, before the time of the ’844 patent, “lights were designed for installation within either a can light fixture or a junction box, not both.” *Id.* (citing Ex. 2001 ¶¶ 24–27). Patent Owner also argues that “[a] shorter version of Zhang required by the design of Soderman would result in a significant reduction in Zhang’s heat-sinking capabilities.” *Id.* at 38 (citing Ex. 2001 ¶ 127).

We do not agree with Patent Owner’s arguments. Petitioner’s obviousness case builds on its analysis for claim 1 in the Zhang obviousness ground. *See supra* § II.C.1. The same reasons supplied in that ground for modifying Zhang apply here: that an ordinarily skilled artisan would have been motivated to fit a power conditioner inside a junction box “in order to serve more of the market for lighting fixtures.” Pet. 26–27 (citing Ex. 1002 ¶ 110). The instant ground extends that rationale based on Soderman to provide junction box mounting holes, which would facilitate mounting in a junction box. *See* Ex. 1002 ¶ 133. We are persuaded that an ordinarily

²⁰ Petitioner mistakenly cites to paragraphs 13 and 195, but the context makes clear Petitioner intended to cite paragraph 133.

skilled artisan would have known to make this additional, minor, and well-known modification. *See* Ex. 1018 ¶¶ 103–105 (Dr. Roberts testifying that lighting fixtures have been secured to junction boxes using screws inserted through mounting holes for at least 89 years).

The combination of Zhang and Soderman teaches the additional limitation in claim 20, and Petitioner has provided a persuasive rationale for the combination. On the entire trial record, we determine, by a preponderance of the evidence, that the subject matter of claim 20 would have been obvious over the combination of Zhang and Soderman under 35 U.S.C. § 103(a).

H. Obviousness Ground Based on Tickner and Van De Ven

Petitioner contends that claims 1, 2, 7–9, 11, 12, 14, 16, 17, 19, 21, 22, and 24 would have been obvious over Tickner and Van De Ven. Pet. 32–41. Patent Owner disputed Petitioner’s contentions in its Preliminary Response. Prelim. Resp. 4–14. We originally denied institution of this ground, but we later instituted this ground in our SAS Order. Thereafter, neither party sought modification to the schedule or additional briefing to address this ground. Thus, the record regarding this ground is the same as it was at the time of our original Institution Decision.

1. Tickner

Tickner is a U.S. Patent Application publication directed to “a light emitting diode downlight can fixture for a recessed luminaire.” Ex. 1015 ¶ 2. Figure 8 of Tickner is reproduced below.

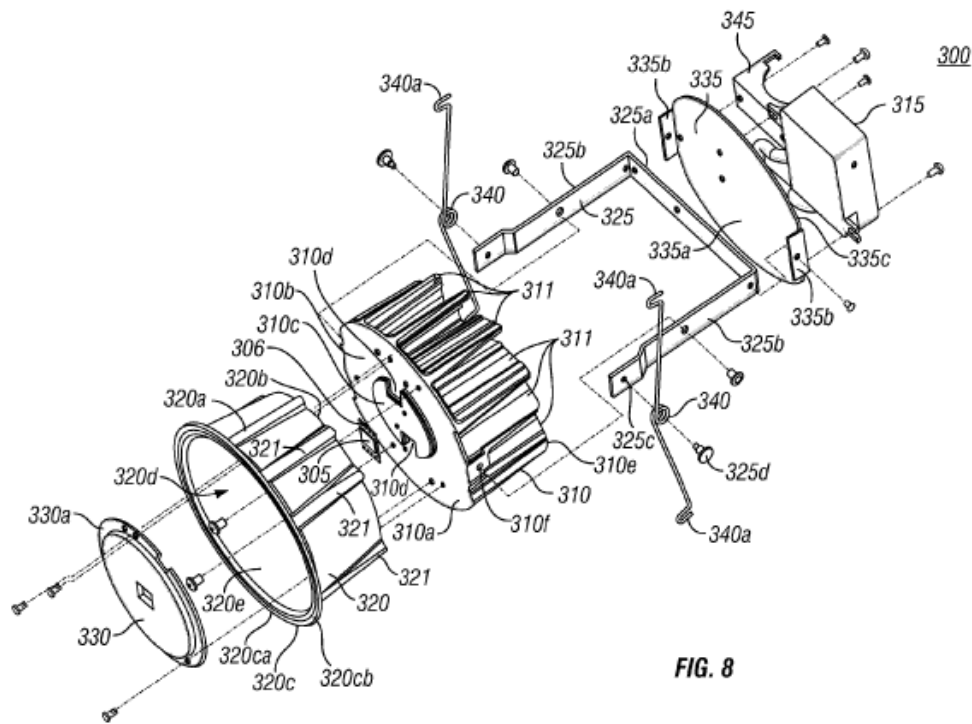


FIG. 8

Figure 8 depicts LED module 300 that can be configured for installation within a can of a recessed lighting fixture. *Id.* ¶ 39. LED module 300 includes LED package 305 mounted to heat sink 310. “LED package 305 may be mounted directly to the heat sink 310 or with one or more other components mounted in-between the LED package 305 and the heat sink 310.” *Id.* Reflector housing 320 is coupled to the bottom surface 310a of heat sink 310. *Id.* ¶ 51. Reflector housing 320 is configured to receive reflector 1205 (not shown) composed of a material for reflecting, refracting, transmitting, or diffusing light emitted by LED package 305. *Id.* ¶ 53. Top end 1205b of the reflector 1205 (not shown) abuts edge surface 330a of optic coupler 330, which is mounted to bottom surface 310a of heat sink 310. *Id.* Optic coupler 330 allows a geometric tolerance between LED package 305 and reflector 1205 to guide light emitted by the LED package 305. *Id.*

2. *Van De Ven*

Van De Ven is a U.S. Patent directed to lighting devices with one or more LEDs. Ex. 1016, 1:6–9. Van De Ven describes a mixing chamber for mixing different colors of light emitted from various LEDs having, *inter alia*, a lens. *Id.* at 2:24–28, 27:46–49.

3. *Claims 1, 2, 7–9, 11, 12, 14–17, 19, 21, 22, and 24*

In its obviousness analysis for claim 1, Petitioner maps the recited “heat spreader”²¹ to Tickner’s optic coupler 330 and the recited “heat sink” to Tickner’s reflector housing 320. Pet. 32 (citing Ex. 1002 ¶ 135²²; Ex. 1015, Fig. 8). Petitioner contends that Tickner’s LEDs are in thermal communication with the heat spreader based on Tickner’s statements that “the reflector housing is formed integrally with the heat sink” and “the reflector housing 320 is configured to act as a secondary heat sink for conducting heat away from the LEDs.” *Id.* at 33 (quoting Ex. 1015 ¶ 52). Petitioner further contends Tickner’s “LED package 300 [sic²³] [is] aligned

²¹ Confusingly and perhaps mistakenly, Petitioner also appears to map the recited “heat spreader” to Tickner’s heat sink 310 in its “Overview of Tickner.” See Pet. 10; Prelim. Resp. 6. We follow Petitioner’s mapping of the recited “heat spreader” to Tickner’s optic coupler 330 as set forth in the Petition’s Section XI obviousness analysis. See Pet. 32. To the extent Petitioner intended otherwise, it has not “identifie[d], in writing and with particularity, . . . the grounds on which the challenge to each claim is based.” 35 U.S.C. § 312(a)(3).

²² Petitioner mistakenly cites to paragraph 133, but the context makes clear Petitioner intended to cite to paragraph 135.

²³ Tickner identifies the LED package with reference numeral 305. See, e.g., Ex. 1015 ¶ 39.

with and mounted on the heat sink 330 [sic²⁴] allowing heat to flow from the LED package 300 [sic] through the heat sink 330 [sic].” *Id.* (citing Ex. 1015 ¶ 69).

In its Preliminary Response, Patent Owner contended Petitioner had not established that Tickner teaches (1) that the LEDs that are disposed in thermal communication with the heat spreader; and (2) that the heat spreader facilitates transfer of heat from the LEDs to the heat sink. Prelim. Resp. 7–8.

In our Institution Decision, we analyzed Petitioner’s mapping of claim 1 to Tickner and determined that Petitioner did not establish that Tickner’s LEDs are “in thermal communication with” optic coupler 330 (i.e., the recited “heat spreader”). Dec. on Inst. 26–27. We also determined that Petitioner did not establish that Tickner’s optic coupler 330 “facilitates transfer of heat” from LED package 305 to reflector housing 320 (i.e., the recited “heat sink”). *Id.* at 27–28. Because the record for this ground has not changed since the time of the Institution Decision, we discern no reason to depart from our initial reasoning. Thus, for the reasons set forth in our Institution Decision (*id.* at 25–29), we determine that Petitioner has not established by a preponderance of the evidence that the subject matter of

²⁴ Petitioner identifies Tickner’s optic coupler 330 as the recited “heat spreader,” not the recited “heat sink.” See Pet. 32. Thus, we read this reference as “heat spreader 330.” To the extent Petitioner intended a different mapping, it has not “identifie[d], in writing and with particularity, . . . the grounds on which the challenge to each claim is based.” 35 U.S.C. § 312(a)(3).

claim 1 would have been obvious over the combination of Tickner and Van De Ven under 35 U.S.C. § 103(a).

Claims 2, 7–9, 11, 12, 14, 16, 17, 19, 21, and 22 depend, directly or indirectly, from claim 1, and claim 24 relies on the same analysis from claim 1. *See* Pet. 35–41. Thus, for the same reasons, we determine that Petitioner has not established by a preponderance of the evidence that the subject matter of claims 2, 7–9, 11, 12, 14, 16, 17, 19, 21, 22, and 24 would have been obvious over the combination of Tickner and Van De Ven under 35 U.S.C. § 103(a).

I. Obviousness Ground Based on Tickner, Van De Ven, and ULE5000

Petitioner contends that claims 3–5 and 23 would have been obvious over Tickner, Van De Ven, and ULE5000. Pet. 32–41. Patent Owner disputed Petitioner’s contentions in its Preliminary Response. Prelim. Resp. 14–24. We originally denied institution of this ground, but we later instituted this ground in our SAS Order. Thereafter, neither party sought modifications to the schedule or additional briefing to address this ground. Thus, the record regarding this ground is the same as it was at the time of our original Institution Decision.

1. ULE5000

ULE5000 is a data sheet or advertisement related to “OptoElectronix Plug-&-Play LED Light Engine Products.” Ex. 1017, 1. ULE5000 refers to diameter and height dimensions for certain “LightDisc High-Output Round LED Light Engines.” *Id.*

2. *Claims 3–5 and 23*

Claims 3–5 and 23 depend directly or indirectly from claim 1. Petitioner’s analysis for this ground builds on its analysis for claim 1 from the Tickner–Van De Ven ground, and Petitioner’s citations to ULE5000 do not cure the deficiencies noted above. *See* Pet. 32–41. Thus, for the same reasons discussed above in the Tickner–Van De Ven ground, we determine that Petitioner has not established by a preponderance of the evidence that the subject matter of claims 3–5 and 23 would have been obvious over Tickner, Van De Ven, and ULE5000 under 35 U.S.C. § 103(a).

III. CONCLUSION

Petitioner has demonstrated, by a preponderance of the evidence, that:

- A. Claims 1–3, 5, 7, 9, 12, 14, 16, and 21–24 of the ’844 patent are unpatentable under § 103(a) over Chou and Wegner;
- B. Claims 1, 2, 9, 10, 16, 21, and 22 of the ’844 patent are unpatentable under § 103(a) over Zhang;
- C. Claim 17 of the ’844 patent is unpatentable under § 103(a) over Zhang and Wegner; and
- D. Claim 20 of the ’844 patent is unpatentable under § 103(a) over Zhang and Soderman.

Petitioner has not demonstrated, by a preponderance of the evidence, that:

- E. Claim 10 of the ’844 patent is unpatentable under § 103(a) over Chou, Wegner, and Zhang;

- F. Claims 1, 2, 7–9, 11, 12, 14–17, 19, 21, 22, and 24 of the '844 patent are unpatentable under § 103(a) over Tickner and Van De Ven; and
- G. Claims 3–5 and 23 of the '844 patent are unpatentable under § 103(a) over Tickner, Van De Ven, and ULE5000.

IV. ORDER

Accordingly, it is:

ORDERED that claims 1–3, 5, 7, 9, 10, 12, 14, 16, 17, and 20–24 of the '844 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.

IPR2017-01639
Patent 8,967,844 B2

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