

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HOME DEPOT U.S.A., INC.,
Petitioner,

v.

LYNK LABS, INC.,
Patent Owner.

IPR2021-01541
Patent 10,537,001 B2

Before JON B. TORNQUIST, ARTHUR M. PESLAK, and
SCOTT RAEVSKY, *Administrative Patent Judges*.

RAEVSKY, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Home Depot U.S.A., Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1–4, 6–8, 11–13, 15–17, and 19 of U.S. Patent No. 10,537,001 B2 (Ex. 1001, “the ’001 patent”). Lynk Labs, Inc. (“Patent Owner”) filed a Preliminary Response (Paper 5, “Prelim. Resp.”). Based on these submissions, we instituted an *inter partes* review of claims 1–4, 6–8, 11–13, 15–17, and 19 (Paper 10, “Institution Decision” or “Dec.”). Subsequent filings include a Patent Owner Response (Paper 19, “PO Resp.”), a Petitioner Reply (Paper 28, “Reply”), and a Patent Owner Sur-reply (Paper 30, “Sur-reply”). We held an oral hearing on February 14, 2023, a transcript of which has been entered into the record. Paper 38 (“Tr.”).

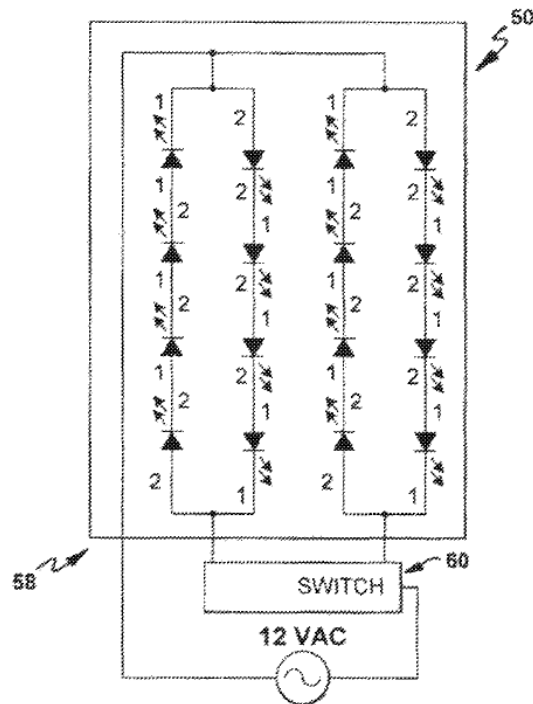
We have jurisdiction over this proceeding under 35 U.S.C. § 6(b). After considering the evidence and arguments of the parties, we determine that Petitioner has proven by a preponderance of the evidence that claims 1–4, 6–8, 11–13, 15–17, and 19 are unpatentable.

II. BACKGROUND

A. The ’001 patent

The ’001 patent relates to a multi-brightness light-emitting diode (LED) device having at least two LED circuits. Ex. 1001, code (57) (Abstract). Figure 7, reproduced below, depicts an example LED device:

FIG. 7



Id. at 11:18. Figure 7 depicts multi-brightness LED device 50 integrated within lamp 58 and connected to switch 60 to control the brightness level of device 50. *Id.* at 11:18–22. Each LED circuit of the LED lighting device can include multiple LEDs connected in series. *Id.* at code (57), 10:66–11:2. The two LED circuits are in parallel with one another. *Id.*

B. Challenged Claims

Petitioner challenges claims 1–4, 6–8, 11–13, 15–17, and 19 of the '001 patent. Claim 1 is illustrative:¹

1. An LED lighting device comprising:
[a] a first operating LED circuit and at least one additional LED circuit, wherein at least one of the first operating LED circuit or

¹ For convenience, we use Petitioner's element labeling. *See* Pet. 27–36.

the at least one additional LED circuit includes at least two LEDs connected in either series or parallel;

[b] a switch that is selectable by a user and configured to at least one of independently switch on or off at least one of the first LED circuit or the at least one additional LED circuit, or switch at least one of the first LED circuit or the at least one additional LED circuit to a different level of brightness;

[c] a driver connected to the first operating LED circuit and the at least one LED circuit;

[d] wherein the LED lighting device is configured to connect to an AC mains power source;

[e] wherein the driver has an output voltage lower than the AC mains power source and increases a frequency to be higher than the AC mains power source frequency; and

[f] wherein the first operating LED circuit and the at least one additional LED circuit both have a forward voltage of 6V or greater.

Ex. 1001, 12:10–31.

C. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 4–5):

Claims Challenged	35 U.S.C. § ²	Reference(s)/Basis
1, 3, 4, 11, 15	103	Dowling, ³ Mueller, ⁴ Okuno ⁵
2, 6–8, 11–13, 16, 17, 19	103	Dowling, Mueller, Okuno, Nortrup ⁶
6–8, 12, 16, 17, 19	103	Dowling, Mueller, Okuno, Yan ⁷
16, 17, 19	103	Dowling, Mueller, Okuno, Martin ⁸

Petitioner relies on the declarations of Dr. Dean Neikirk (Exs. 1002, 1033). Patent Owner relies on the declaration of Dr. Eric Bretschneider (Ex. 2008).

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. §§ 102, 103 effective March 16, 2013. The challenged patent claims priority to an application filed before March 16, 2013. Ex. 1001, code (63). However, Petitioner asserts that the AIA first-to-file provisions apply because the claims are not entitled to an effective filing date before March 16, 2013. Pet. 5, 15–18; Reply 1. As Patent Owner does not dispute Petitioner’s assertion, we apply the AIA first-to-file provisions.

³ U.S. Publication No. 2002/0048169 A1 to Dowling (“Dowling”), published April 25, 2002 (Ex. 1004).

⁴ U.S. Patent No. 6,016,038 to Mueller (“Mueller”), issued Jan. 18, 2000 (Ex. 1005).

⁵ U.S. Patent No. 4,298,869 to Okuno (“Okuno”), issued Nov. 3, 1981 (Ex. 1006).

⁶ U.S. Publication No. 2005/0276053 A1 to Nortrup (“Nortrup”), published Dec. 15, 2005 (Ex. 1007).

⁷ U.S. Publication No. 2006/0091415 A1 to Yan (“Yan”), published May 4, 2006 (Ex. 1008).

⁸ U.S. Publication No. 2005/0111234 A1 to Martin (“Martin”), published May 26, 2005 (Ex. 1009).

III. ANALYSIS

A. Principles of Law

Petitioner bears the burden to demonstrate unpatentability. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A claim is unpatentable as obvious if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103(a)). We resolve the question of obviousness based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the prior art and the claims; (3) the level of skill in the art; and (4) when in evidence, objective indicia of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When conducting an obviousness analysis, we consider a prior art reference “not only for what it expressly teaches, but also for what it fairly suggests.” *Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1049 (Fed. Cir. 2019) (citation omitted).

We apply these principles to the Petition’s challenges.

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Graham*, 383 U.S. at 13, 17. Petitioner asserts that

[a] person of ordinary skill in the art (“POSITA”) . . . would have had a bachelor’s degree in electrical engineering, or similar technical field, with two years of relevant experience in

the field of design and/or development of LEDs and circuits in the context of lighting control systems. An increase in experience could compensate for less education.

Pet. 10–11 (citing Ex. 1002 ¶ 22).

Patent Owner does not dispute Petitioner’s definition of the level of ordinary skill. PO Resp. 14. We are persuaded that Petitioner’s proposal is consistent with the problems and solutions in the ’001 patent and prior art of record. We therefore adopt Petitioner’s definition of the level of skill.

C. Claim Construction

In *inter partes* review, we construe a claim using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b) (2021).

The Petition includes constructions for five terms: “switch,” “selectable by a user,” “device,” “package,” and “forward voltage.” Pet. 11–15. Our Institution Decision preliminarily addressed the meanings of both “switch” and “selectable by a user,” concluding that neither term required construction at that stage. Dec. 8–11. We also did not find it necessary to construe Petitioner’s other proposed constructions. *Id.* at 8.

Post-institution, the parties disagree on the meanings of the following terms: “independently switch,” “selectable by a user,” “device,” and “reflective substrate.”⁹ PO Resp. 17, 21–22, 27–28, 34; Reply 1–7, 13, 14; Sur-reply 1–6, 10. We address each in turn.

⁹ Petitioner asserts that there is also a disagreement over the term “heat sink” in claim 16, but we need not address any disagreement over this term.

1. “*independently switch*”

Claim 1 recites “a switch . . . configured to at least one of *independently switch* on or off at least one of the first LED circuit or the at least one additional LED circuit.” Ex. 1001, 12:16–19 (emphasis added). Similar limitations occur in claims 6 and 11. *Id.* at 12:53–56, 13:20–23.¹⁰

The Petition does not construe this term, and the Patent Owner Response also does not explicitly construe it. Pet. 11–15; PO Resp. 15 (“Patent Owner . . . does not submit that any claim requires express construction.”). However, Patent Owner argues that the prior art’s switch does not “independently (of other switches) switch on or off an LED circuit of at least two LED circuits as claimed.” PO Resp. 17 (citing Ex. 2008 ¶¶ 75–77). In light of this argument, Petitioner asserts, and we agree, that Patent Owner implicitly construes “independently switch” to mean “independently of other switches.” Reply 1.

The Reply addresses this construction on the merits, and we discuss those arguments below. *Id.* at 1–2. But the Reply also argues that Patent Owner “has waived any attempt to fashion a proper claim construction argument.” *Id.* at 3. “[Patent Owner] and its expert state no claim construction is necessary,” Petitioner argues, “while simultaneously stating

Reply 7. Patent Owner’s claim 16 arguments over Dowling, Mueller, Okuno, and Nortrup are unavailing because Petitioner also relies on additional grounds (Dowling, Mueller, Okuno, and Yan, as well as Dowling, Mueller, Okuno, and Martin) for claim 16. Pet. 5; PO Resp. 35 (no substantive challenge to Dowling, Mueller, Okuno, and Yan); Tr. 48:4–10 (effectively conceding that “the argument[] against Nortrup for the heat sink isn’t applicable to Yan”).

¹⁰ Claim 16 is also similar but broader, as it does not require “independently” switching. Ex. 1001, 14:14–15.

the claim requires an addition ‘of other switches’ limitation that does not exist in the claim.” *Id.* Petitioner asserts that the argument is waived because neither Patent Owner nor its expert “conduct any type of claim construction analysis to support the addition of that limitation to the claim.” *Id.*

We agree. Despite professing that no term “requires express construction,” Patent Owner does indeed make a construction. PO Resp. 15, 17. It adds three words to the claim: “of other switches.” *Id.* at 17. The Patent Owner Response offers no supporting argument and merely cites three paragraphs of its expert declaration, which do not address construction. *Id.* (citing Ex. 2008 ¶¶ 75–77). The first time Patent Owner substantively addresses its construction is in the Sur-reply. Sur-reply 1–4. But the Sur-reply’s two and a half pages of argument is a significant expansion over the Patent Owner Response’s terse parenthetical. *Compare id.*, with PO Resp. 17 (“independently (of other switches)”). This argument exceeds the proper scope of a sur-reply because it “belatedly presents evidence” not relied upon in the Patent Owner Response. *See Consolidated Trial Practice Guide*,¹¹ 74 (2019); 37 C.F.R. § 42.23(b); *Trane U.S. Inc. v. SEMCO, LLC*, IPR2018-00514, Paper 34 at 7 (PTAB Apr. 17, 2019) (citing *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 775 (Fed. Cir. 2018) (“The reason for limiting the scope of a sur-reply is simple—to promote procedural fairness and prevent sandbagging.”)).

We do not adopt the Patent Owner Response’s construction because it is conclusory and unsupported by any evidence, and the Sur-reply’s

¹¹ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

arguments exceed the proper scope of a sur-reply for the reasons just explained. But to preserve a fuller record for any appeal, we also address Patent Owner's late Sur-reply arguments on their merits and, in light of the Reply's more persuasive arguments discussed below, also find these late arguments unavailing.

Turning to the merits, the Reply contends that the claims do not include the prepositional phrase, "of other switches." Reply 1–2. Petitioner also asserts that there is no disclaimer or lexicography requiring this addition. *Id.* at 2 (citing Ex. 1033 ¶¶ 14–17). To the contrary, Petitioner asserts that this construction is inconsistent with the intrinsic record because it requires a second switch from which the first switch can be independent, but "none of the disclosed embodiments include multiple switches at all, much less multiple switches that are independent of each other." *Id.* (citing Ex. 1001, Figs. 7, 9).

In the Sur-reply, Patent Owner asserts that Petitioner effectively reads the word "independently" out of the claims. Sur-reply 2. Patent Owner asserts that "[t]he word 'independently' must be given effect, that is, the claimed switch must switch LED circuits on or off without depending on other switches." *Id.* The specification and claims support this interpretation, Patent Owner argues, because they "disclose embodiments that provide independent control of LED circuits." *Id.* For example, Patent Owner asserts, "claim 11 recites an LED lighting device comprising an analogous user selectable switch, while its dependent claim 15 recites that the LED lighting device further comprises a different, dimmer switch." *Id.* at 2–3. As for the specification, Patent Owner quotes a few lengthy passages that mention "a switch" (as in claim 1) and "a dimmer switch" (as in claim 15)

and then concludes, “[f]or these reasons, the correct reading of claim 1 must give effect to the word ‘independently,’ which must be understood as the recited switch switching on or off LED circuits without depending on other switches.” *Id.* at 3–4 (citing Ex. 1001, 7:30–45, 9:16–24). Neither party addresses the prosecution history.

We begin our analysis with the claim language. Claim 1 requires a switch to “independently switch on or off at least one of the first LED circuit or the at least one additional LED circuit.” There is no express requirement in the claim that any switching occur independently “of other switches.” In effect, Patent Owner appears to imply that “independently” modifies only the word “switch.” Yet the plain reading of this phrase is that the word “independently” modifies the entire phrase that follows—“switch on or off at least one of the first LED circuit or the at least one additional LED circuit.” As such, the plain language of the claim encompasses switching one of the LED circuits on or off independently of another LED circuit. In other words, the switch can turn on or off either LED circuit by itself, without affecting the other LED circuit. Patent Owner even appears to have had the same understanding pre-institution, arguing that one of Dowling’s modes “is simultaneously controlling all the LEDs, not independently switching one LED circuit on or off.” Prelim. Resp. 19.

The specification does not inform the meaning of this limitation because it does not include the word “independently”—this term only appears in the claims. And Patent Owner points us to no discussion of independent switching in the specification by another name. At most, Patent Owner refers to two separate claims and a few specification references that possibly mention two separate switches. Sur-reply 3–4. But Patent Owner’s

references to claims 11 and 15 are unavailing, as even if claims 11 and 15 mention different switches, Patent Owner does not sufficiently explain how this compels the meaning it ascribes to “independently switch.” This is true even though claim 11 itself recites a similar “independently switch” limitation. Further, the specification’s mere mention of different switches is also insufficient to draw any conclusion about whether those switches are independently switched from one another. We therefore find no disavowal, lexicography, or any context that would counsel departing from the plain and ordinary meaning of this limitation.

As such, we construe “a switch . . . configured to at least one of independently switch on or off at least one of the first LED circuit or the at least one additional LED circuit” in claims 1, 6, and 11 to encompass a switch that switches an LED circuit on or off independently of another LED circuit.

2. “*selectable by a user*”

The Petition argues that the term “selectable by a user” needs no construction. Pet. 12. But the Petition preemptively disputes Patent Owner’s construction from related litigation requiring this term to mean “selectable by a user directly.” *Id.* (citing Ex. 1019; Ex. 1002 ¶ 26). Petitioner contends that the plain language of the claim does not require a user to “directly” control the switch. *Id.* Regardless, Petitioner contends that “[t]his claim construction dispute is irrelevant to Dowling’s physical mode and brightness switches, which are selectable by a user ‘directly.’” *Id.* at 13. In our Institution Decision, we preliminarily agreed with Petitioner that Dowling discloses direct user selection of a switch and therefore determined that we need not construe this term. Dec. 11.

Post-institution, Patent Owner asserts (without analysis) that “[a] POSITA would understand that a switch that is selectable by a user requires the user to *directly* interact with the switch to turn the switch on or off.” PO Resp. 21 (emphasis added) (citing Ex. 2008 ¶ 72). In the Reply, Petitioner asserts that the ordinary meaning of this claim term encompasses both direct and indirect switching. Reply 3 (citing Ex. 1033 ¶¶ 21–23, 32–34). In the Sur-reply, Patent Owner expressly disavows the Response’s “directly” argument, asserting that

To be clear, Patent Owner’s argument is not that the switches identified by the Petition in Dowling do not directly switch LED circuits on or off—Patent Owner’s argument is that **the identified switches in Dowling do not independently switch LED circuits on or off**. . . . [W]hether the claims require “direct switching”—[is] an argument Patent Owner is not making.

Sur-reply 4–5.

Given that Patent Owner disavows the Response’s directly switch argument, and that we agree with Petitioner for reasons stated below that Dowling discloses direct user selection of a switch, we again determine that we need not construe this term.

3. “*device*”

The Petition argues that “‘device’ is entitled to its ordinary meaning of ‘includes any hardware, software, or firmware that performs the functions enumerated in the claims using any number of modules with any names.’”

Pet. 14. Patent Owner refers to “device” as follows:

Claim 19 recites an “LED lighting device . . . further comprising . . . a dimmer switch.” Based on this language, a POSITA would understand that claim 19 requires that the

dimmer switch be an element of the LED lighting device. . . .
[A]nd a dimmer on a wall is not part of a lighting device.

PO Resp. 34 (citing Ex. 2008, ¶¶ 103–105).

In the Reply, Petitioner asserts that Patent Owner implicitly interprets “device” in claims 16 and 19 to require an “integrated unit” in an attempt to distinguish a wall mounted dimmer switch disclosed in Dowling. Reply 6 (citing PO Resp. 34). Petitioner contrasts the “device” in claims 16 and 19 with claim 8’s reference to an LED circuit “integrated . . . in an LED package.” *Id.* Because the patentee knew how to claim integrated units such as a package when intended, Petitioner argues, the “device” in claims 16 and 19 does not require an “integrated unit.” *Id.* at 6–7. Finally, Petitioner asserts that Patent Owner’s “similar patents were amended to require integration to overcome wall mounted switches, and no such limitations exist in the challenged claims.” *Id.* at 7 (citing Ex. 1026, 8).

We agree with Petitioner that “device” in claims 16 and 19 is entitled to its ordinary meaning of “any hardware, software, or firmware that performs the functions enumerated in the claims using any number of modules with any names.” Pet. 14. We also agree with Petitioner that the claimed “device” does not require an “integrated unit.” Reply 6. Claim 11 recites an “LED lighting device” as well as “wherein the first LED circuit, the at least one additional LED circuit, and the switch are integrated within an LED package.” Ex. 1001, 13:15, 32–34. Claim 16 also recites an “LED lighting device” but does not require the claimed LED circuits and switch to be “integrated within a package.” *Id.* at 14:8–28. That Patent Owner chose to recite “integrated within a package” in claim 11 and chose not to in claim 16 implies that the “device” of claim 16 is not so limited.

In the Sur-reply, Patent Owner agrees, stating, “Patent Owner acknowledges that a device may have multiple elements and may not be integrated into a single unit.” Sur-reply 5. Instead, Patent Owner asserts, the dispute is “whether an ‘LED lighting device’ may encompass elements of the electrical infrastructure,” as Petitioner’s interpretation “would consider every component up to the power plant supplying electricity to the LED lighting device as part of the same LED lighting device.” *Id.* We disagree, as Patent Owner’s contention is no more than hyperbole. Petitioner’s assertion that a “device” includes a dimmer switch on a wall does not remotely imply that a “device” must include a power plant. In any event, Patent Owner does not explain why a device that is not integrated into a single unit cannot encompass a switch separate from other components of the device, such as a dimmer switch on a wall. And Patent Owner does not identify any disclaimer or disavowal in the specification that would require us to exclude a separate switch on a wall from the claimed device.

As for the prosecution history, Patent Owner disagrees that it amended claims to overcome prior art with wall mounted switches. *Id.* at 5–6. Rather, Patent Owner asserts, it “distinguished external switches which could be seen as a separate component.” *Id.* at 6. In our view, the prosecution history is, at best, unclear. Neither party explains in sufficient detail how the prosecution history supports its position. *See id.* at 5–6; Reply 7.

We therefore adopt the plain and ordinary meaning of “device” as including any hardware, software, or firmware that performs the functions enumerated in the claims using any number of modules with any names, and

we also interpret “device” as not excluding a switch separate from other components of the device.

4. “*reflective substrate*”

The Petition does not construe “reflective substrate” in claims 2 and 13. *See* Pet. 11–15. Patent Owner asserts that a “POSITA would understand that a reflective substrate is a substrate comprising material that provides enhanced light reflection for the substrate.” PO Resp. 27–28 (citing Ex. 2008 ¶ 90). Like its previous constructions, Patent Owner provides no reasoning to support this construction. Its expert declaration contains a conclusory verbatim quote of the conclusory statement in the Patent Owner Response and is likewise unpersuasive. Ex. 2008 ¶ 90; *see Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15 (PTAB Aug. 24, 2022) (citing 37 C.F.R. § 42.65(a)) (precedential) (determining that an expert’s verbatim, conclusory assertion adds little to the conclusory assertion for which it is offered to support and is entitled to little weight).

Petitioner asserts in the Reply that “enhanced light reflection” is not required by the claims; rather, “the claims merely require that the substrate be reflective.” Reply 13. Moreover, Petitioner asserts, claims 3, 8, and 17 recite “light enhancing” limitations, which suggests that the “reflective” term in claims 2 and 13 is broader. *Id.* at 13–14. The specification’s only mention of “enhancement,” Petitioner argues, is in regard to “phosphor, nano-crystals, or other . . . *substances*,” not reflective material or substrates. *Id.* at 14 (citing Ex. 1001, 7:66–8:2). Thus, Petitioner concludes, “a POSITA would have understood ‘reflective substrate’ to be broad and not limited to a minimum amount of reflection or a substrate provid[ing] enhanced light reflection.” *Id.* (citing Ex. 1033 ¶¶ 36–38).

In the Sur-reply, Patent Owner contends that Petitioner's interpretation effectively reads the term "reflective substrate" out of the claim. Sur-reply 10. The correct interpretation of this term, Patent Owner argues, "does not encompass all materials except a hypothetical perfect black body." *Id.*

Petitioner is correct; Patent Owner does not sufficiently explain how "enhanced light reflection" is required by the term "reflective substrate." Patent Owner also does not engage with the Reply's arguments in any meaningful way, other than to say they are wrong. *See id.* In contrast, we find persuasive Petitioner's identification of the term "light enhancing" in claims 3, 8, and 17, which shows that the patentee knew how to claim "light enhancing" when intended and therefore did not so intend when claiming the "reflective substrate" in claims 2 and 13. *See Reply 13–14.* We also find persuasive Petitioner's point that the specification refers to "enhancement" only in the context of "phosphor, nano-crystals, or other light . . . enhancing substances" and does not use "light enhancing" to refer to reflective materials or substrates. *Id.* at 14 (citing Ex. 1001, 7:66–8:2). Moreover, it is unclear what "enhanced light reflection" means, as the term "enhanced" is ambiguous and not explained by the specification.

Accordingly, we apply the plain and ordinary meaning of "reflective substrate" and determine that this term is not limited to "enhanced light reflection for the substrate."

5. *Remaining terms*

No other terms need to be construed. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent

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

D. Asserted Obviousness over Dowling, Mueller, and Okuno (Ground 1)

Petitioner contends that claims 1, 3, 4, 11, and 15 would have been obvious over Dowling, Mueller, and Okuno. Pet. 18–43.

1. Overview of Dowling

Dowling describes a system for using high-brightness, processor-controlled LEDs in combination with diffuse materials to produce color-changing effects. Ex. 1004, code (57). Figure 1, below, depicts an example device having LEDs:

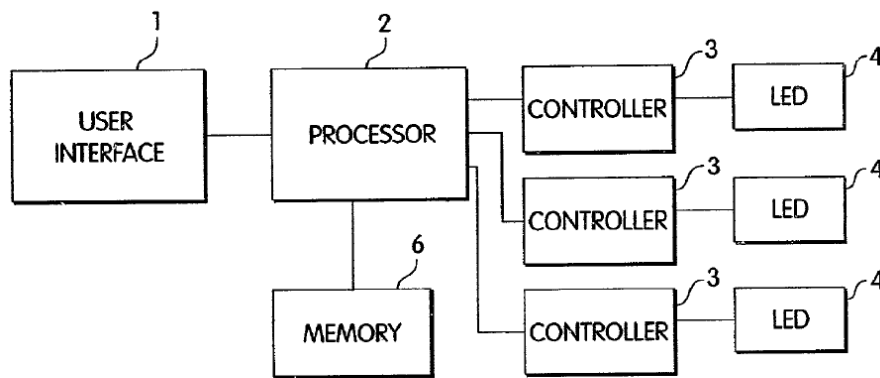


Fig. 1

Id. ¶ 38. The device includes user interface 1 and processor 2 for executing a program stored in memory 6 to generate control signals. *Id.* The control signals may be converted by controllers 3 into a form suitable for driving LEDs 4. *Id.*

Figure 8, below, depicts an example light bulb described in Dowling:

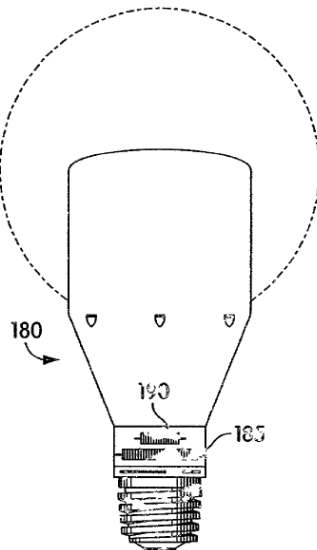


Fig. 8

Id. ¶ 62. The lightbulb in Figure 8 above includes thumbwheel 185 and two-way switch 190. *Id.* Switch 190 permits selection of available modes, and thumbwheel 185 may control brightness. *Id.*

2. Overview of Mueller

Mueller describes LED systems capable of generating light, such as for illumination or display purposes. Ex. 1005, code (57). The LEDs may be controlled by a processor to alter the brightness or color of the generated light by using pulse-width modulated signals. *Id.* The resulting illumination may be controlled by a computer program to provide complex, predesigned patterns of light. *Id.* The LED lighting system can include circuits containing multiple red LEDs, blue LEDs, and green LEDs. *Id.* at 3:15–3:65.

3. Overview of Okuno

Okuno describes LEDs connected in series to elevate a working voltage, which can be used in a traffic signal or road sign. Ex. 1006, code

(57), 3:35–37. A number of series-connected LEDs are also connected in parallel to maintain a display even upon a disconnection accident. *Id.* at code (57). Thus, the LEDs provide a failure-safe colored light display at a low power consumption. *Id.*

4. Independent Claim 1

a. An LED lighting device comprising

Petitioner argues that Dowling discloses the preamble because Dowling discloses an LED bulb that can connect to an AC or DC power source. Pet. 26 (citing, e.g., Ex. 1004 ¶¶ 58–59, 63; Ex. 1002 ¶ 59). Patent Owner does not dispute that Dowling discloses this. We agree that Dowling discloses the preamble, whether or not it is limiting.

b. [a] a first operating LED circuit and at least one additional LED circuit, wherein at least one of the first operating LED circuit or the at least one additional LED circuit includes at least two LEDs connected in either series or parallel

Petitioner argues that Dowling discloses this limitation. Pet. 27–28. For example, Petitioner contends that Dowling’s Figure 1, reproduced below and annotated by Petitioner, depicts this limitation:

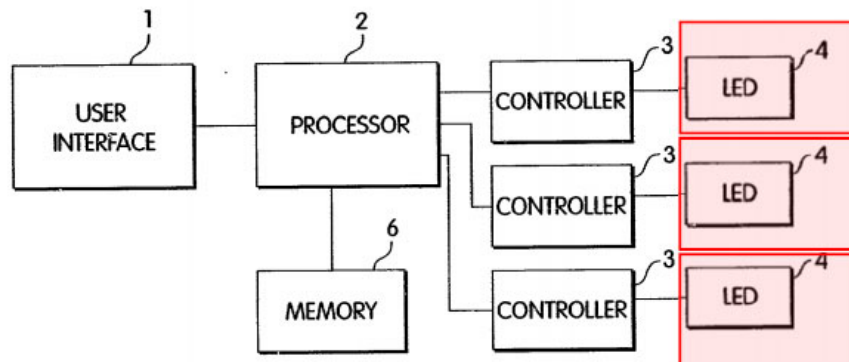


Fig. 1

Id. at 28 (citing, e.g., Ex. 1004, Figs. 1, 8, ¶¶ 38–43; Ex. 1002 ¶ 63). Figure 1, above, depicts a light emitting device including multiple LEDs 4 (in red), among other components. Ex. 1004 ¶ 38.

Petitioner further contends that Mueller and Okuno “each disclose that each LED circuit comprises a plurality of LEDs connected in series and parallel.” Pet. 29 (citing, e.g., Ex. 1005, 2:63–3:65 (red, blue, and green LED circuits in serial/parallel); Ex. 1006, 3:35–63, 4:60–6:68, 17:49–55 (“3-color light-emitting diodes of red, yellow, and green”)). Petitioner sets forth a rationale for combining Dowling, Mueller, and Okuno, which is supported by evidence and a rationale underpinning, which Patent Owner does not dispute. *Id.* at 20–23.

Patent Owner also does not dispute that Dowling or the combination of Dowling, Mueller, and Okuno discloses this limitation. We agree that Dowling and the combination of Dowling, Mueller, and Okuno discloses this limitation.

- c. [b] a switch that is selectable by a user and configured to at least one of independently switch on or off at least one of the first LED circuit or the at least one additional LED circuit, or switch at least one of the first LED circuit or the at least one additional LED circuit to a different level of brightness*

Petitioner argues that Dowling discloses this limitation, and in the alternative, that the combination of Dowling, Mueller, and Okuno discloses it. Pet. 29–32. This limitation includes three parts: (1) “a switch that is selectable by a user,” which is either configured to (2) “at least one of independently switch on or off at least one of the first LED circuit or the at least one additional LED circuit,” or (3) “switch at least one of the first LED

circuit or the at least one additional LED circuit to a different level of brightness.” For the first two parts of this limitation, Petitioner relies on Dowling’s disclosure of a two-way mode switch 190. *Id.* at 29–31. For the third part, Petitioner relies on Dowling’s thumbwheel 185. *Id.* at 31–32. In the alternative, Petitioner also relies on the teachings of Mueller. *Id.* at 32–33.

We reproduce Petitioner’s annotated Figure 8 of Dowling, which depicts these two switches 190, 185, below:

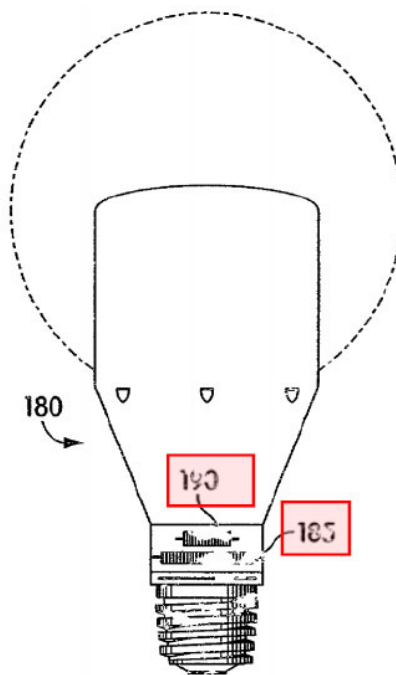


Fig. 8

Id. at 30. Figure 8 above depicts lightbulb 180 including two-way switch 190 and thumbwheel 185 (each highlighted in red). *Id.*; Ex. 1004 ¶ 62. According to Petitioner, two-way switch 190 can be pushed to the left to select one of four modes, each of which involves independently switching on and off at least one LED circuit. Pet. 30–31 (citing Ex. 1004, Fig. 2A, ¶¶ 44–47). Petitioner also asserts that “thumbwheel 185 may control a

brightness of the light bulb 180.” *Id.* at 31 (quoting Ex. 1004 ¶ 62).

Petitioner contends that each of these switches “is selectable ‘directly’ by the user when the user physically moves them.” *Id.* at 32 (citing Ex. 1002 ¶ 72).

Patent Owner contends that none of Dowling’s switches teaches or suggests this limitation because these switches are (1) not user-selectable and (2) do not independently switch on or off an LED circuit of at least two LED circuits. PO Resp. 16–17 (citing Ex. 2008 ¶¶ 72–81). Patent Owner does not elaborate on its first argument, and in fact, later contradicts itself by stating that “[t]he *user selects* one of [Dowling’s] four modes by use of the two-way switch.” *Id.* 18 (emphasis added). On its face then, we find this first argument unavailing and agree with Petitioner that each of Dowling’s switches “is selectable ‘directly’ by the user when the user physically moves them.” *See* Pet. 32 (citing Ex. 1002 ¶ 72).

Patent Owner focuses more on its second argument, contending that Dowling’s two-way switch does not “independently (of other switches) switch on or off an LED circuit.” PO Resp. 17 (citing Ex. 2008 ¶¶ 75–77). This is because Dowling’s switch causes a processor to direct controllers to switch LEDs on or off based on the user’s mode selection, Patent Owner argues. *Id.* at 21. That is, Patent Owner asserts, “[t]he user’s interaction with the two-way switch in Dowling does not turn the LED circuit on or off—instead, the LED circuit is turned on or off by transistors controlled by controller 3 based on the user’s mode selection.” *Id.* (citing Ex. 2008 ¶ 75). Thus, Patent Owner asserts, “the two way switch does not [turn the LED circuit on or off] independently for one (user-selected) LED circuit, as claimed.” *Id.* at 22. Patent Owner also disputes that Dowling’s thumbwheel 185 is “independent of other switches” because thumbwheel 185 “depends

on switch 190 and is not independent of other switches as claimed.” PO Resp. 22–23.

Patent Owner raises similar arguments that Mueller’s transistors are neither user-selectable nor independent of other switches. PO Resp. 23–24. We find it unnecessary to address Patent Owner’s Mueller arguments because Petitioner relies on Mueller in the alternative, and we find it unnecessary to rely on Mueller. *See* Pet. 32–33.

Patent Owner also contends that Dowling’s two-way switch does not adjust brightness of any LED, so it cannot be relied on to disclose the second alternative operation of the claimed switch. PO Resp. 20 (citing Ex. 2008 ¶ 75). We also find it unnecessary to reach this argument because claim 1’s “switch . . . to a different level of brightness” limitation is recited in the alternative to the “independently switch on or off” limitation, so we need not address the brightness limitation. Ex. 1001, 12:16–21.¹²

In the Reply, Petitioner contends that Patent Owner’s arguments are premised on an incorrect construction of “switch,” but that even under that incorrect construction, this limitation is disclosed. Reply 8. Namely, Petitioner contends, Dowling’s two-way switch 190 and thumbwheel 185 are independent of each other. *Id.* at 9. Patent Owner’s argument to the

¹² As we noted above in our claim construction section, Patent Owner also argues that the claim requires a user to “directly interact with the switch to turn the switch on or off.” PO Resp. 21. On that basis, Patent Owner also argues that Dowling’s two-way switch is not user-selectable to switch an LED circuit on or off because the LED circuit is actually turned on or off by transistors based on a user’s mode selection. *Id.* But, as we also noted above, Patent Owner disavows this argument in the Sur-reply. Sur-reply 4–5. We therefore do not consider Patent Owner’s “directly” switch argument further.

contrary “is not responsive to the Petition,” argues Petitioner, “which relies on the embodiment wherein the two-way switch 190 is pushed to the left to set the mode and to the right to set the parameter.” *Id.* (citing Pet. 30–31; Ex. 1004 ¶ 62 (last sentence)). “In that embodiment,” according to Petitioner, “the thumbwheel is used to independently adjust the brightness.” *Id.* Therefore, Petitioner argues, “[a] POSITA would have understood that embodiment satisfies PO’s incorrect ‘independent of other switches’ interpretation because a user can power on/off an LED circuit using only switch 190, and can control the brightness using only thumbwheel 185.” *Id.* at 9–10 (citing Ex. 1033 ¶¶ 24, 30).

Petitioner further argues that Dowling discloses that by “controlling the LEDs 4 *independently*, color mixing can be applied for the creation of lighting effects.” *Id.* at 10 (citing Ex. 1004 ¶¶ 40, 84 (same regarding light patterns)). Along those lines, Petitioner asserts that “a POSITA would have understood that the LEDs would have to be switched on or off, or dimmed, independently in order to achieve the color mixing taught by Dowling.” *Id.* at 10–11 (citing Ex. 1033 ¶ 25; Ex. 1004 ¶ 103 (“If two LEDs were used . . . with circuitry to turn each color on or off, four colors could be produced.”)). Petitioner also asserts that Dowling discloses several examples of the two-way switch 190 switching at least one of the LED circuits on or off independently of another LED circuit. *Id.* at 11–12 (citing Ex. 1004 ¶¶ 44, 103 (color wash, where “LEDs cycle . . . through the full color spectrum,” turning different colored LEDs on or off), 46 (switching on one static color, implying other LED circuits are turned off), 47 (strobing different colors on and off)).

In the Sur-reply, Patent Owner disagrees that Dowling’s two-way switch 190 and thumbwheel 180 are independent of each other because even in the embodiment Petitioner identifies, “**switch 190 alone does not turn any LED circuits on or off**” but instead relies on transistors. Sur-reply 8–9. “Because the two-way mode switch 190 and the transistors of the PWM circuit operate together,” Patent Owner asserts, “neither of them individually operate independently of the other.” *Id.* at 9.

Turning to our analysis, we find Petitioner’s arguments more convincing. Patent Owner’s arguments rely on a claim construction we have not adopted. As we explain above, we construe “a switch . . . configured to at least one of independently switch on or off at least one of the first LED circuit or the at least one additional LED circuit” to encompass a switch that switches an LED circuit on or off independently of another LED circuit. Patent Owner’s arguments rely on its incorrect claim construction that rewrites “independently switch” to mean switch “independently (of other switches).” PO Resp. 17.

Under the correct claim construction, Dowling discloses this limitation because Dowling discloses several examples of two-way switch 190 turning on or off LED circuits, independent of other LED circuits. For example, Dr. Neikirk persuasively testifies that Dowling’s color wash mode (selected by switch 190) discloses this limitation by referring to LEDs that “cycle . . . through the full color spectrum,” turning different colored LEDs on or off. Ex. 1033 ¶ 26 (citing Ex. 1004 ¶¶ 44, 103 (“If two LEDs were used . . . *with circuitry to turn each color on or off*, four colors could be produced.”) (emphasis added)). As another example, Dr. Neikirk persuasively testifies that switch 190 can be used to select a “static color

mode to produce, for example, the color red, then only the red LED will be turned on and the remaining LEDs will be turned off.” *Id.* ¶ 28 (citing Ex. 1004 ¶ 103). Finally, Dr. Neikirk persuasively testifies that switch 190 can select a strobing mode to cause LEDs to “alternate[] green and red,” which a POSITA would have understood to cause “at least one color LED circuit to be turned on or off independent of other LED circuits.” *Id.* ¶ 29 (citing Ex. 1004 ¶ 47).

Patent Owner does not rebut these assertions of Dr. Neikirk. *See* Sur-reply 7–10. Accordingly, we determine that Petitioner has established that Dowling discloses this limitation.

d. [c] a driver connected to the first operating LED circuit and the at least one LED circuit

Petitioner argues that “Dowling teaches a driver is connected to the LED circuits and incorporates Mueller for additional details.” Pet. 34 (citing Ex. 1004, Fig. 1, ¶¶ 38–43, 58–64). Petitioner further argues that “Mueller teaches the LED circuits are driven by a supply voltage from a transformer and rectifier and incorporates Okuno for further details.” *Id.* (citing Ex. 1005, Fig. 2, 3:15–4:6, 9:23–26). And, Petitioner contends, “Okuno teaches a transformer drops an AC mains commercial voltage and a bridge rectifier converts the dropped voltage to a supply voltage.” *Id.* (citing, e.g., Ex. 1006, *passim*; Ex. 1002 ¶ 74). Petitioner concludes, “[i]t would have been obvious to implement Dowling using the PWM techniques, bridge rectifier and transformer, as Mueller and Okuno teach, such that the driver was internal or external to the LED bulb,” and as we noted above, Petitioner supplies a rationale for combining these references that is supported by evidence and

rational underpinning. *Id.* (citing Ex. 1002 ¶ 75; Pet. § VI.D.2 (combination rationale)).

Patent Owner does not dispute that Dowling or the combination of Dowling, Mueller, and Okuno discloses this limitation. We agree that the combination of Dowling, Mueller, and Okuno discloses it.

e. [d] wherein the LED lighting device is configured to connect to an AC mains power source

For this limitation, Petitioner relies on Dowling’s description of “110 VAC at 60 Hz” in connection with various LED circuits. Pet. 34–35 (citing, e.g., Ex. 1004 ¶ 63; Ex. 1002 ¶ 76). Patent Owner does not dispute that Dowling discloses this limitation. We agree that Dowling discloses it.

f. [e] wherein the driver has an output voltage lower than the AC mains power source and increases a frequency to be higher than the AC mains power source frequency

Petitioner contends that “Dowling discloses the driver has an output voltage of, e.g., 12V, which is lower than the AC mains power source (110 or 220 VAC) and that the AC mains power source has a 50 or 60 Hz frequency.” Pet. 35 (citing Ex. 1004 ¶¶ 40, 58; Ex. 1002 ¶ 78). Petitioner also contends that “[i]t would have been obvious to implement Dowling using the PWM techniques, bridge rectifier and transformer taught by Mueller and Okuno to lower the voltage and increase the frequency.” *Id.* (citing, e.g., Ex. 1002 ¶¶ 79–80; Pet. § VI.D.2 (combination rationale)).

Patent Owner does not dispute that the combination of Dowling, Mueller, and Okuno discloses this limitation. We agree that the combination of Dowling, Mueller, and Okuno discloses this limitation.

g. [f] wherein the first operating LED circuit and the at least one additional LED circuit both have a forward voltage of 6V or greater

Petitioner argues, for example, that because a blue or green LED's voltage drop is about 4.0V, "an LED circuit comprised of at least two blue or two green LEDs in series would have had a forward voltage of 6V or greater." Pet. 36–37 (citing Ex. 1005, 3:34–37; Ex. 1002 ¶ 82). Patent Owner does not dispute that Dowling discloses this limitation. We agree that Dowling discloses it.

h. Summary as to Claim 1

We agree with Petitioner that the combination of Dowling, Mueller, and Okuno discloses all the limitations of claim 1 and that one of ordinary skill in the art would have combined Dowling, Mueller, and Okuno for the reasons stated in the Petition, which Patent Owner does not dispute. Pet. 20–23. We therefore determine that Petitioner has proven by a preponderance of the evidence that the combination of Dowling, Mueller, and Okuno would have rendered claim 1 obvious.

5. Independent Claim 11

The parties raise similar arguments for independent claim 11 as with claim 1. Pet. 38–41; PO Resp. 16. Petitioner's showing is similar for this claim and addresses any pertinent differences, which we find persuasive. We find Patent Owner's arguments unavailing for similar reasons set forth above. Accordingly, we determine that Petitioner has proven by a preponderance of the evidence that the combination of Dowling, Mueller, and Okuno would have rendered claim 11 obvious.

6. Dependent Claims 3, 4, and 15

Petitioner contends that dependent claims 3, 4, and 15 are unpatentable as obvious over Dowling, Mueller, and Okuno. Pet. 37–38, 41–43. Petitioner provides a detailed analysis explaining where the combination of Dowling, Mueller, and Okuno discloses the limitations in these dependent claims, which Patent Owner does not contest. *Id.* We determine that Petitioner has proven by a preponderance of the evidence that the combination of Dowling, Mueller, and Okuno would have rendered obvious claims 3, 4, and 15.

E. Asserted obviousness over Dowling, Mueller, Okuno, and Nortrup (Ground 2)

Petitioner contends that claims 2, 6–8, 11–13, 16, 17, and 19 would have been obvious over Dowling, Mueller, Okuno, and Nortrup. Pet. 43–62.

1. Independent Claims 6 and 11

The parties raise similar arguments for independent claims 6 and 11 as with claim 1 under Ground 1. Pet. 43–62; PO Resp. 25–26. Petitioner’s showing is similar for these claims and addresses any pertinent differences, which we find persuasive. We find Patent Owner’s arguments unavailing for similar reasons set forth above. We address one comment by Patent Owner, however. Patent Owner notes that unlike claim 1, claim 11 only recites the switch “independently switch on or off at least one of the first LED circuit or the at least one additional LED circuit.” PO Resp. 25. “This difference is important,” Patent Owner contends, “because, to the extent that the Petition argues that claim 1 can be met by either switching an LED circuit on or off, or adjusting the brightness of the LED circuit, adjusting the brightness of the LED circuit alone (*i.e.*, Dowling’s thumbwheel 185) would

not meet claims 6, 11, or 19.” *Id.* at 25–26. As we explain above, we do not rely on Petitioner’s arguments for the “switch . . . to a different level of brightness” alternative limitation in claim 1. Thus, Patent Owner’s comment is moot.

Petitioner also sets forth a rationale for combining Dowling, Mueller, Okuno, and Nortrup, which is supported by evidence and a rationale underpinning, which Patent Owner does not dispute. Pet. 44–45. Accordingly, we determine that Petitioner has proven by a preponderance of the evidence that the combination of Dowling, Mueller, Okuno, and Nortrup would have rendered claims 6 and 11 obvious.

2. Dependent Claims 7, 8, 12, and 17

Petitioner contends that dependent claims 7, 8, 12, and 17 are unpatentable as obvious over Dowling, Mueller, Okuno, and Nortrup. Pet. 52, 53, 56–58, 62. Petitioner provides a detailed analysis explaining where the combination of Dowling, Mueller, Okuno, and Nortrup discloses the limitations in these dependent claims, which Patent Owner does not contest. *Id.* We therefore determine that Petitioner has proven by a preponderance of the evidence that the combination of Dowling, Mueller, and Okuno would have rendered obvious claims 7, 8, 12, and 17.

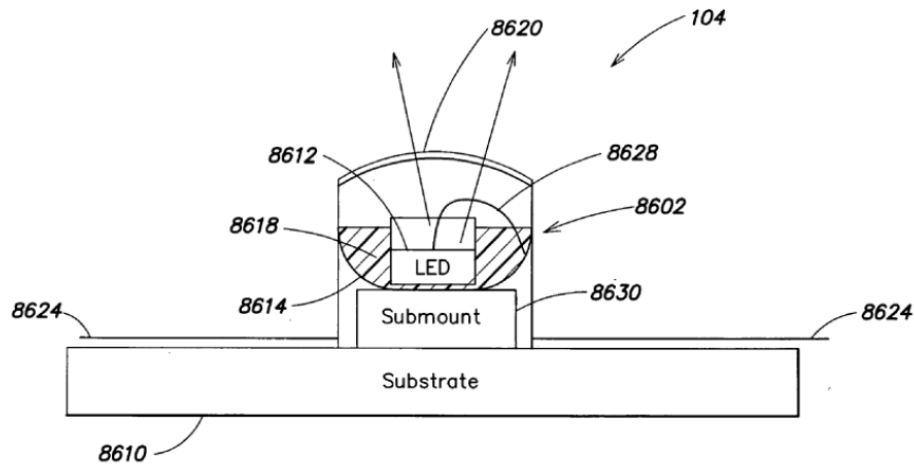
3. Dependent Claims 2 and 13

Claim 2 recites “wherein the first operating LED circuit and the at least one additional LED circuit are mounted on a reflective substrate.” Ex. 1001, 12:32–34. Claim 13 is similar. *Id.* at 13:37–39. Petitioner contends, “Nortrup teaches that LED circuits can be mounted on a circuit board (7114) aluminum or copper (8500), reflector (8614), and sapphire (8610), each of which reflects at least some light and, therefore, is a reflective substrate.”

Pet. 50 (citing Ex. 1007 ¶¶ 398–403, 418–426, Figs. 71–75, 85–86; Ex. 1002 ¶ 119).

Patent Owner contends that Petitioner’s argument fails “because materials such as aluminum or sapphire cannot be considered a reflective substrate merely because they reflect a non-zero amount of light, and because Nortrup’s reflector is not a substrate.” PO Resp. 27 (citing Ex. 2008 ¶¶ 87–96). Patent Owner contends that a reflective substrate must provide enhanced light reflection for the substrate and asserts that Nortrup’s materials do not do so. *Id.* at 27–28. This argument relies on a claim construction we have not adopted. As we note above, we apply the plain and ordinary meaning of “reflective substrate” and determine that this term is not limited to “enhanced light reflection for the substrate.” Under the correct claim construction, as Dr. Neikirk persuasively testifies, “a POSITA would have understood that Nortrup’s circuit board, aluminum or copper conductive plate, reflector and/or sapphire—on which LED circuits are mounted—are literally reflective substrates.” Ex. 1033 ¶ 39, *cited in* Reply 14. Aluminum, for example, indisputably reflects light. *Id.* (“aluminum . . . literally reflect[s] a substantial amount of light”). Dr. Neikirk’s testimony stands un rebutted.

Patent Owner next argues that Nortrup’s reflector is not a substrate. PO Resp. 27–30. Patent Owner points to Figure 86 of Nortrup as showing a substrate 8610 separate from a cup-shaped reflector 8614:



Id. at 29. Nortrup describes Figure 86 above as depicting an LED module that includes a submount. Ex. 1007 ¶ 191. Patent Owner asserts that reflector 8614 is different from substrate 8610, as they are different components in Figure 86. PO Resp. 28.

In response, Petitioner’s Reply asserts that “[t]here is nothing in the intrinsic record that would require a substrate that is composed of a single component or layer.” Reply 15. Petitioner also relies on Nortrup’s aluminum or copper conductive plate, among other components, as the reflective substrate. *Id.* at 14 (citing Ex. 1033 ¶ 39). On this issue, the Sur-reply claims that “the Reply falls back to its alternative position that Nortrup’s reflector 8614 corresponds to the claimed reflective substrate.” Sur-reply 11.

We do not rely on Nortrup’s reflector 8614 but instead find that Nortrup’s aluminum conductive plate is a reflective substrate. Nortrup describes the conductive plate in the context of an LED lighting system as follows: “an LED lighting system includ[es] LEDs 7112, a circuit board 7114 and a thermally conductive back plate 7110 (e.g. a metal plate mounted on a circuit board or a metal core circuit board).” Ex. 1007 ¶ 398, *cited in*

Pet. 50. “In a preferred embodiment a conductive plate is aluminum or copper,” Nortrup further explains. *Id.* ¶ 420, *cited in* Pet. 50. As we noted above, aluminum is reflective, and Patent Owner does not dispute that the conductive plate is a substrate or that a substrate can have multiple layers, including the aluminum conductive plate. *See* Ex. 1033 ¶ 39. Thus, Patent Owner’s arguments that Nortrup’s reflector 8614 is not a substrate are unavailing.

Patent Owner’s final argument against this limitation is that Nortrup discloses only a single LED on reflector 8614, not at least two LED circuits as claimed. PO Resp. 29 (citing Ex. 2008 ¶¶ 91, 95). Relatedly, Patent Owner contends that “a POSITA would not consider a single LED as a ‘LED circuit’ as claimed.” *Id.* at 29–30 (citing Ex. 2008 ¶ 95). Even if the single LED were a circuit, Patent Owner adds, it does not disclose “at least two LEDs connected in series or parallel.” *Id.* at 30. In so arguing, Patent Owner appears to be referring to underlying limitations of claim 1.

This argument is unpersuasive, as the Petition argues that it would have been obvious to modify the combination of Dowling, Mueller, and Okuno to mount the LED circuits on a reflective substrate as Nortrup teaches.¹³ Pet. 50 (citing Ex. 1002 ¶ 120); *see also id.* at 44–45 (“Rationale for Further Combining with Nortrup”). Patent Owner does not dispute Petitioner’s rationale for combining these references or that Dowling, Mueller, and Okuno disclose the underlying limitations of claim 1 that Patent Owner asserts Nortrup does not disclose. We further find that

¹³ The Reply argues that Nortrup also discloses multiple LED dies connected in series and/or parallel. Reply 16. In light of the undisputed combination in the Petition, we need not reach these arguments. *See* Pet. 50, 44–45.

Petitioner has articulated an appropriate rationale to combine with reasonable success, with sufficient evidentiary underpinning, which as we noted above, Patent Owner does not dispute. *See* Pet. 44–45, 50; Ex. 1002 ¶¶ 101–104, 120. In essence, Patent Owner argues the references individually, rather than disputing the teachings of the combination. A finding of obviousness, however, cannot be overcome “by attacking references individually where the [ground] is based upon the teachings of a combination of references.” *See Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1050 (Fed. Cir. 2019) (quoting *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986)).

We therefore determine that Petitioner has proven by a preponderance of the evidence that claims 2 and 13 would have been obvious over the combination of Dowling, Mueller, Okuno, and Nortrup.

4. *Independent Claim 16*

Petitioner contends that most of the limitations of independent claim 16 are met by the combination of Dowling, Mueller, and Okuno for similar reasons as with Ground 1. Pet. 58–59. For limitation 16(f), “wherein the first operating LED circuit and the at least one additional LED circuit are mounted on a substrate including a heat sink,” Petitioner relies on Nortrup. *Id.* at 59–61.

Patent Owner argues that Nortrup does not teach or suggest the claimed heat sink. PO Resp. 30–33. However, Patent Owner does not challenge Petitioner’s arguments for Ground 3, which applies the combination of Dowling, Mueller, Okuno, and Yan to claim 16, or Ground 4, which applies the combination of Dowling, Mueller, Okuno, and Martin to claim 16. *See id.* at 35; Pet. 67 (“Yan discloses an LED mounted on a

substrate including a heat sink.”), 69 (“Martin discloses an LED lighting device with LEDs ‘mounted on a heat sink.’”). We agree with Petitioner that in their respective Grounds, Yan and Martin disclose this limitation, so Patent Owner’s arguments for claim 16 over Dowling, Mueller, Okuno, and Nortrup are moot. *See also* Tr. 48:4–10 (effectively conceding that “the argument[] against Nortrup for the heat sink isn’t applicable to Yan”).

5. *Dependent Claim 19*

Claim 19 recites, “The LED lighting device of claim 16, further comprising: a *dimmer switch* configured to adjust a voltage of the AC voltage power source to dim the first operating LED circuit or the at least one additional LED circuit regardless of a user’s selection via the switch.” Ex. 1001, 14:35–40 (emphasis added). For this claim, the Petition relies on its Ground 1 argument for similar claim 15. Pet. 62. According to Petitioner,

Dowling discloses wherein the LED lighting device is configured to be coupled to a dimmer switch (conventional dimmer switch). EX1004, Fig. 8 [0062]-[0064], [0066] (“*dimmer on a wall*”), [0072], [0080]-[0081]. Dowling discloses light bulb 180 can be controlled through “conventional lighting control systems” such as dimmers commonly used with incandescent lighting.

Pet. 41 (emphasis added) (citing Ex. 1002 ¶ 95).

Patent Owner contends that Dowling does not disclose this limitation because a dimmer on a wall is part of the electrical wiring of the wall and is not part of a lighting device. PO Resp. 34 (citing Ex. 2008 ¶¶ 104–105). These arguments rely on Patent Owner’s interpretation of “device,” discussed above. *Id.*

The Reply contends that “[a] wall mounted dimmer switch would be considered part of an LED lighting device under the ordinary meaning of that phrase, which does not require integration into a single housing.” Reply 22 (citing Ex. 1033 ¶¶ 48–49). The Reply also propounds a new theory, that Dowling’s thumbwheel 185 discloses this limitation, but we do not rely on this theory. *Id.* The Sur-reply essentially reiterates the positions of the Patent Owner Response. Sur-reply 14–17. For example, Patent Owner asserts that “[a] ‘LED lighting device’ is not merely any generic device but rather a discrete device for LED lighting,” which would not include a dimmer switch on a wall. *Id.* at 15.

We agree with Petitioner that Dowling’s dimmer switch discloses this limitation. Patent Owner’s arguments rely on a claim construction we have not adopted. As we note above, we adopt the plain and ordinary meaning of “device” as including any hardware, software, or firmware that performs the functions enumerated in the claims using any number of modules with any names, and we also interpret “device” as not excluding a switch separate from other components of the device. Under this construction, Dowling’s dimmer switch on the wall discloses this limitation. Ex. 1002 ¶ 95.

F. Remaining Grounds

Petitioner argues that claims 6–8, 12, 16, 17, and 19 would have been obvious over Dowling, Mueller, Okuno, and Yan. Pet. 62–67. Petitioner also argues that claims 16, 17, and 19 would have been obvious over Dowling, Mueller, Okuno, and Martin. *Id.* at 67–70. Patent Owner does not dispute these grounds. Based on our review of the evidence of record, Petitioner has proven by a preponderance of the evidence that claims 6–8, 12, 16, 17, and 19 would have been obvious over Dowling, Mueller, Okuno,

and Yan and that claims 16, 17, and 19 would have been obvious over Dowling, Mueller, Okuno, and Martin.

IV. CONCLUSION¹⁴

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 3, 4, 11, 15	103	Dowling, Mueller, Okuno	1, 3, 4, 11, 15	
2, 6–8, 11–13, 16, 17, 19	103	Dowling, Mueller, Okuno, Nortrup ¹⁵	2, 6–8, 11–13	
6–8, 12, 16, 17, 19	103	Dowling, Mueller, Okuno, Yan	6–8, 12, 16–17, 19	
16, 17, 19	103	Dowling, Mueller, Okuno, Martin	16, 17, 19	
Overall Outcome			1–4, 6–8, 11–13, 15–17, 19	

¹⁴ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

¹⁵ We do not decide the patentability of claims 16, 17, and 19 under this ground because we find that these claims are unpatentable under the Dowling, Mueller, Okuno, and Yan ground.

V. ORDER

It is, therefore,

ORDERED that Petitioner has shown by a preponderance of the evidence that claims 1–4, 6–8, 11–13, 15–17, and 19 of the '001 patent are unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, 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.

IPR2021-01541
Patent 10,537,001 B2

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