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Paper 19
Date: June 7, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
Petitioner,

v.

LYNK LABS, INC.,
Patent Owner.

IPR2022-00051
Patent 10,492,251 B2

Before JON B. TORNQUIST, JENNIFER MEYER CHAGNON, and SCOTT RAEVSKY, *Administrative Patent Judges.*

TORNQUIST, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background and Summary

Samsung Electronics Co., Ltd. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1 and 6 of U.S. Patent No. 10,492,251 B2 (Ex. 1001, "the '251 patent"). Lynk Labs, Inc. ("Patent Owner") filed a Preliminary Response to the Petition. Paper 7 ("Prelim. Resp."). With authorization, Petitioner subsequently filed a Reply (Paper 11) and Patent Owner filed a Sur-Reply (Paper 14) addressing discretionary denial pursuant to 35 U.S.C. § 325(d).

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314; 37 C.F.R. § 42.4(a) (2021). The standard for institution is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted "unless the Director determines . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition."

For the reasons set forth below, Petitioner demonstrates a reasonable likelihood of prevailing with respect to claims 1 and 6 of the '251 patent. Accordingly, we institute an *inter partes* review with respect to claims 1 and 6 on all grounds asserted in the Petition. *See SAS Inst. Inc. v. Iancu*, 138 S.Ct. 1348, 1355 (2018).

B. Real Parties in Interest

Petitioner identifies itself and Samsung Electronics America, Inc. as the real parties in interest. Pet. 1.

Patent Owner identifies itself as the real party in interest. Paper 3, 1.

C. Related Matters

The parties identify the following district court proceedings as related matters: *Samsung Electronics Co. v. Lynk Labs, Inc.*, No. 1-21-cv-02665

(N.D. Ill.), *Lynk Labs, Inc. v. Samsung Electronics Co.*, No. 1-21-cv-05126 (N.D. Ill.), *Lynk Labs, Inc. v. Samsung Electronics Co.*, No. 6-21-cv-00526 (W.D. Tex.) (transferred from W.D. Tex. and consolidated with No. 1:21-cv-02665), and *Lynk Labs, Inc. v. Home Depot USA, Inc.*, No. 6:21-cv-00097 (W.D. Tex.) (transferred to N.D. Ga. as No. 1:21-cv-05021-MHC). Pet. 1–2; Paper 4, 1; Paper 6, 1 (Petitioner's updated mandatory notices); Paper 9, 1–2 (Patent Owner's updated mandatory notices). The parties also note that *inter partes* review of the '251 patent was instituted in *Home Depot USA, Inc. v. Lynk Labs, Inc.*, IPR2021-01369 ("the -01369 IPR"). Pet. 2; Prelim. Resp. 43.

D. The '251 Patent

The '251 patent "relates to alternating current ('AC') driven LEDs, LED circuits, and AC drive circuits and methods." Ex. 1001, 1:41–44. The '251 patent explains that LEDs "are intrinsically DC devices that only pass current in one polarity and historically have been driven by DC voltage sources using resistors, current regulators and voltage regulators to limit the voltage and current delivered to the LED." *Id.* at 1:63–67. With proper considerations, however, the '251 patent reports that "LEDs may be driven more efficiently with AC than with DC drive schemes." *Id.* at 2:3–4.

The '251 patent discloses various methods of driving LEDs, including the use of a single bridge rectifier to drive parallel LEDs, using a capacitor to smooth the AC waveform to reduce ripple and to protect the LEDs, and using various driver designs to provide a relatively constant or fixed voltage and frequency to LED circuits. *Id.* at 4:14–18, 4:22–24, 5:24–26.

E. Illustrative Claim

Petitioner challenges claims 1 and 6 of the '251 patent. Pet. 4. Claim 1, reproduced below, is illustrative of the challenged claims:

1. An LED lighting system comprising:

an LED driver having an input and an output, wherein the input is configured to receive an AC or DC voltage source, and wherein output provides an AC or DC voltage;

at least one LED circuit having a plurality of LEDs connected to the output of the LED driver, wherein the at least one LED circuit is mounted on a reflective substrate; and

a data receiver, wherein the data receiver can receive data from at least one of a transmission line or an antenna.

Ex. 1001, 25:17–27.

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1 and 6 would have been unpatentable on the following grounds (Pet. 4):

Claims Challenged	35 U.S.C. §[1]	Reference(s)/Basis
1, 6	103	Birrell[2], Schultz[3]
1, 6	103	Piepgras[4]
1, 6	103	Harbers[5], Schultz

In support of its grounds for unpatentability, Petitioner relies upon the declaration of R. Jacob Baker, Ph.D, P.E. Ex. 1002.

[1] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102 and 103, effective March 16, 2013. Petitioner contends the pre-AIA versions of §§ 102 and 103 apply in this proceeding, and Patent Owner does not dispute Petitioner's assertions. Pet. 4–5. Accordingly, on this record, we apply the pre-AIA versions of §§ 102 and 103. *See* 35 U.S.C. § 100(i)(1)(B).
[2] AU Patent No. AU 2003100206 A4, issued July 17, 2003. Ex. 1005 ("Birrell").
[3] US Publication No. 2005/0116235 A1, published June 2, 2005. Ex. 1046 ("Schultz").
[4] US Publication No. 2003/0137258 A1, published July 24, 2003. Ex. 1030 ("Piepgras").
[5] US Publication No. 2011/0193484 A1, published August 11, 2011. Ex. 1006 ("Harbers").

II. ANALYSIS

A. 35 U.S.C. § 325(d)

Patent Owner contends we should exercise our discretion under 35 U.S.C. § 325(d) to deny the Petition because the references and arguments set forth by Petitioner "are largely cumulative to prior art already being considered by the Board" in the -01369 IPR. Prelim. Resp. 1, 43–55.

Petitioner contends we should not exercise our discretion under § 325(d). Reply 1–5.

Pursuant to 35 U.S.C. § 325(d), in determining whether to institute review "the Director may take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office." A two-part framework is used to determine whether to exercise discretion under § 325(d) to deny institution:

> (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of the first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of the challenged claims.

Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential).

The following non-exclusive *Becton, Dickinson* factors "provide useful insight into how to apply the [two-part] framework under 35 U.S.C. § 325(d)": (a) the similarities and material differences between the asserted art and the prior art involved during examination; (b) the cumulative nature of the asserted art and the prior art evaluated during examination; (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection; (d) the extent of the overlap

between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art; (e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and (f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments. *Advanced Bionics*, Paper 6, at 9 (citing *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (Dec. 15, 2017) (precedential as to § III.C.5, first paragraph) ("*Becton, Dickinson*").

Although the *Becton, Dickinson* factors are focused on the question of whether the same or substantially the same art or arguments were previously presented during initial examination of the challenged patent, *Advanced Bionics* explains that these factors "more broadly provide guidance as to whether the art presented in the petition is the 'same or substantially the same' as the prior art previously presented to the Office during *any* proceeding, including prior AIA proceedings." *Advanced Bionics*, Paper 6, at 9–10.

"At bottom," the two-part framework utilized for 35 U.S.C. § 325(d) "reflects a commitment to defer to previous Office evaluations of the evidence of record unless material error is shown." *Id.* at 9. The art in the -01369 IPR has not yet been fully considered. There has been no definitive determination in that proceeding as to the scope of the prior art nor any definitive determination as to whether the submitted evidence is sufficient to show that any claims of the '251 patent would have been obvious. As such, there is no reference point to determine whether the Office erred; there has simply been no definitive determination to analyze or reconsider. Accordingly, the framework described in *Advanced Bionics* is

not yet applicable and does not support discretionary denial.[6] Thus, we decline to exercise our discretion to deny institution under 35 U.S.C. § 325(d) on these facts.

B. Claim Construction

In this proceeding, the claims of the '251 patent are construed "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)." 37 C.F.R. § 42.100(b). Under that standard, the words of a claim are generally given their "ordinary and customary meaning," which is the meaning the term would have had to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

Neither party asserts that any claim terms of the '251 patent require construction. Pet. 21–22; Prelim. Resp. 13. And, upon review of the

[6] When different petitioners challenge the same patent, discretionary denial may be appropriate under 35 U.S.C. § 314(a), upon evaluation of the non-exhaustive factors set forth in *General Plastic Industrial Co. v. Canon Kabushiki Kaisha,* IPR2016-01357, Paper 19, at 15–16 (Sept. 6, 2017) (precedential). *See Valve Corp. v. Elecs. Scripting Prods., Inc.*, IPR2019-00062, Paper 11, at 2, 9 (April 2, 2019) (applying the *General Plastic* factors to a second petition filed by a different party). Application of the *General Plastic* factors, however, requires analysis of, among other things, any relationship between the different petitioners and the timing of the second petition with respect to Patent Owner's preliminary response and the Board's institution decision in the first proceeding. *Id.* at 9, 12. Patent Owner presents no persuasive evidence demonstrating that these factors counsel in favor of discretionary denial in this case, and Petitioner presents evidence that they do not. Pet. 81–84 (Petitioner asserting that it has no "significant relationship" with the petitioner in the -01369 IPR and that no preliminary response had been filed in the -01369 IPR when the Petition was filed). Accordingly, we do not consider discretionary denial under § 314(a).

parties' arguments and supporting evidence, we find that no terms require construction for purposes of this Decision. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *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.")).

C. Claims 1 and 6 over Birrell and Schultz

Petitioner contends that the subject matter of claims 1 and 6 would have been obvious over the combined disclosures of Birrell and Schultz. Pet. 23–36.

1. Birrell

Birrell discloses "systems and methods for connecting electrical devices to power sources." Ex. 1005, 2:3–5. Figure 1 of Birrell is reproduced below:

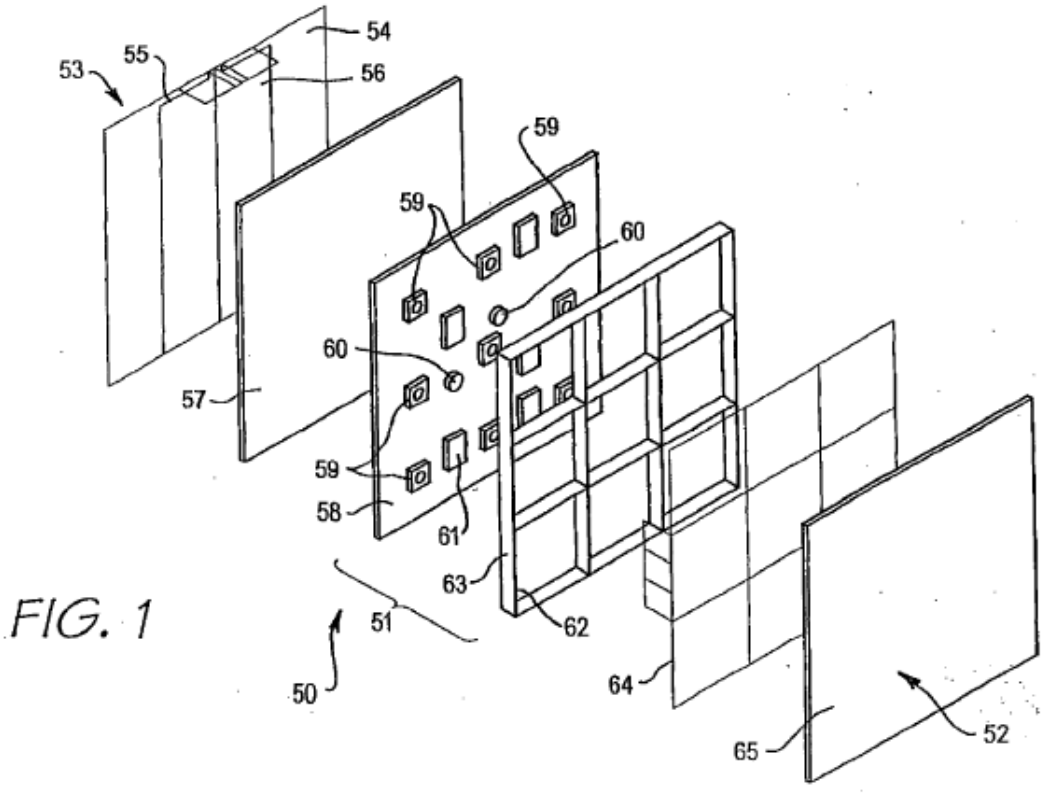

FIG. 1

Figure 1 is an exploded view of a lighting tile for use in the lighting system of Birrell. *Id.* at 13:31–33. As shown in Figure 1, lighting tile 50 has "a thin body 51 having opposite first and second major surfaces" 52 and 53. *Id.* at 14:27–29. Back face 53 of body 51 includes metallized strips 55 and 56, which act as electrical coupling elements for tile 50 to "enable it to be capacitively coupled to a power source." *Id.* at 14:31–37. Flexible magnetic sheet 57 provides an active magnetic force to secure the lighting tile to a magnetic receptive element. *Id.* at 15:5–8. Printed circuit board subassembly 58 supports LEDs 59 (which are set out in a 3 x 3 grid format), sensors 60, and microcontroller 61. *Id.* at 15:15–36. Circuit board 58 also supports power supply circuitry, such as bridge rectifiers, energy storage components, and data circuits that are used to modulate and demodulate signals. *Id.* at 16:6–10. Support frame 62 provides physical protection for the lighting components, and metallized polymer film 64 acts as a touch sensor to enable lighting tile 50 to be controlled, as least to some extent, by human touch on first major surface 52 of the tile body. *Id.* at 16:11–21.

Figure 8 of Birrell is reproduced below:

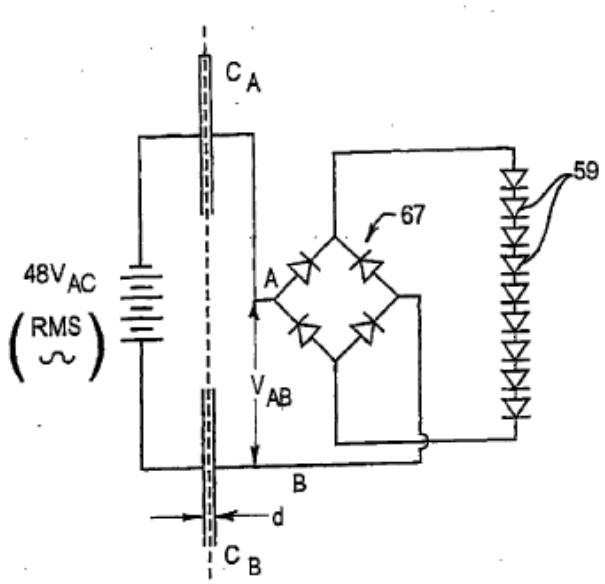

FIG 8

Figure 8 is a simplified circuit diagram of the lighting element of Birrell. *Id.* at 20:26–28. In the circuit depicted in Figure 8, a 48 Volt AC power supply is coupled to capacitors C_A and C_B and used to power LEDs 59. *Id.* at 21:15–34. Diodes 67 are configured to form a bridge rectifier, ensuring "that light is emitted from the LEDs during both the positive and negative cycles of the AC power supply." *Id.* at 19:1–7.

2. Schultz

Schultz discloses an illumination assembly. Ex. 1046, code (57). Figure 1 of Schultz is reproduced below:

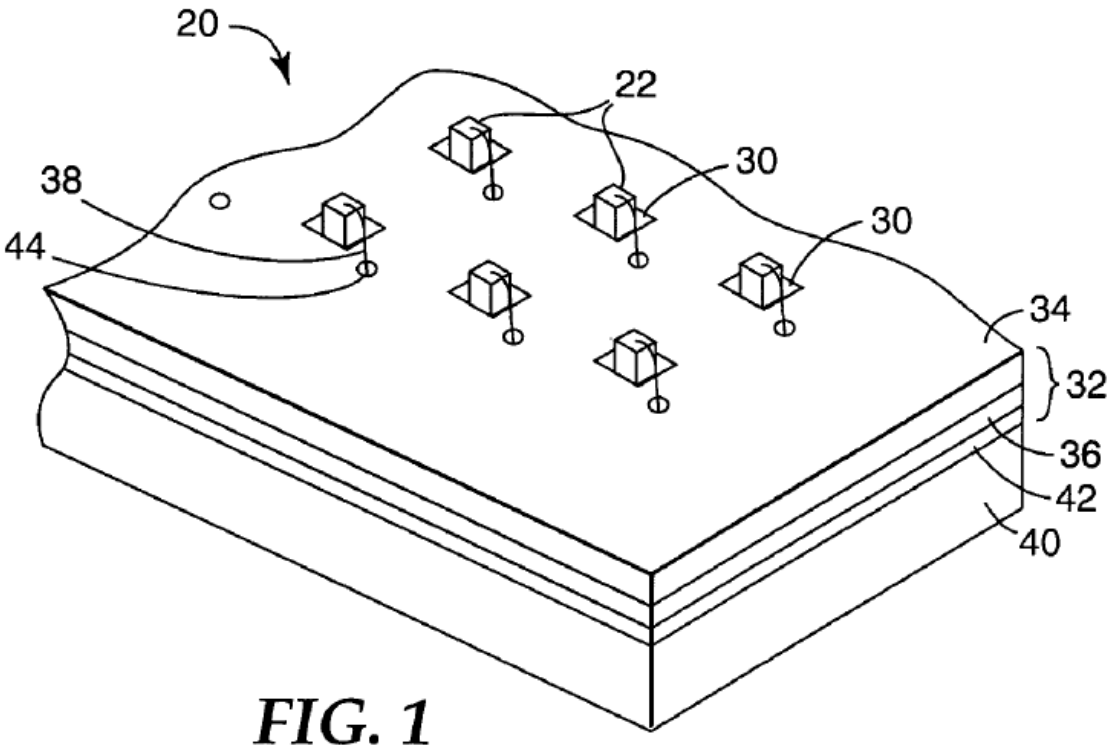

FIG. 1

Figure 1 of Schultz is a schematic perspective view of one embodiment of an illumination assembly. *Id.* ¶ 13. As shown in Figure 1, illumination assembly 20 includes LED dies 22 disposed in an array and within vias 30 on substrate 32. *Id.* ¶¶ 28–29. Substrate 32 is comprised of electrically insulative dielectric layer 34 and patterned conductive layer 36. *Id.* ¶ 29.

Thermally conductive material 42 separates substrate 32 from heat dissipation assembly 40. *Id.*

Schultz explains that electrically insulative dielectric layer 34 may be comprised of any suitable material, including polyimide, polyester, polyethyleneterephthalate (PET), and a multilayer optical film. *Id.* ¶ 30. Electrically and thermally conductive layer 36 may be comprised of various materials, including copper, nickel, gold, aluminum, tin, lead, and combinations thereof. *Id.* ¶ 31.

Schultz notes that there exist "a wide variety of LED die arrays available on rigid," "non-reflective circuit boards." *Id.* ¶ 48. Schultz further notes that "[a]ny light from the LED die that strikes the circuit board is unutilized due to absorption or scattering of the light." *Id.* By mounting the LED dies on a reflective, flexible circuit, however, "the utilization of the light is improved." *Id.* And, "[b]y using [flexible,] reflective surfaced materials, such as a multilayered optical film, for the insulative layer 34," "the light reflected from the attached LED dies has a higher probability of being reflected toward" a focusing element. *Id.* ¶ 49.

3. Analysis – Claim 1

Petitioner contends that Birrell discloses the majority of the limitations of claim 1, including an LED lighting system, an LED driver having an input from an AC voltage source and an output of a rectified DC voltage, an LED circuit having a plurality of LEDs connected to the output of the LED driver, and a data receiver that can receive data from a transmission line. Pet. 23–34. With respect to the requirement that the LED circuit be mounted on a reflective substrate, Petitioner concedes that Birrell does not expressly describe this configuration, but contends "the use of a reflective substrate to provide mechanical support for an array of LEDs was

well known in the art," and is expressly disclosed in Schultz. *Id.* at 28–29. Petitioner further contends that one of ordinary skill in the art would have sought to use a reflective substrate in Birrell in order to increase the optical efficiency of the lighting system. *Id.* at 30–31.

Patent Owner contends Petitioner's proposed combination does not support institution because (1) Birrell and Schultz do not teach an LED circuit that is mounted on a reflective substrate, (2) Petitioner fails to articulate a rational basis for why a person of ordinary skill in the art would have made the proposed combination, and (3) Petitioner fails to articulate what the resulting combination of Birrell and Schultz would be. Prelim. Resp. 56–66. We address these arguments below.

a) "at least one LED circuit having a plurality of LEDs . . . wherein the at least one LED circuit is mounted on a reflective substrate"

Claim 1 requires that at least one LED circuit is mounted on a reflective substrate. As noted above, Petitioner contends that Schultz expressly discloses the use of a reflective substrate and that one of ordinary skill in the art would have used a reflective coating on the substrate of Birrell in order to increase the optical efficiency of the lighting system. Pet. 29–30.

Patent Owner contends the "Petition's proposal for adding reflective surface material to Birrell does not teach or suggest a reflective substrate" because, as depicted in Figures 3A–C and 7, the LEDs of Schultz are mounted on conductive layers that Petitioner has not shown to be reflective. Prelim. Resp. 61–62.

As noted by Patent Owner, Figure 3A–C and 7 of Schultz depict the LEDs directly connected to conductive layer 36 or solder layer 52, which

Schultz does not describe as being reflective. Ex. 1046 ¶¶ 29, 41, 45–47, Figs. 3A, 3B, 7. Petitioner does not rely on Figures 3A–C or 7, however, to support its argument that Schultz teaches or suggests mounting LEDs to a reflective substrate. Rather, Petitioner points to Schultz's additional discussion of the benefits of mounting LED dies on a reflective circuit in order to improve light utilization. Pet. 29–30 (citing Ex. 1046 ¶ 48 ("By mounting the LED dies on a reflective, flexible circuit, the utilization of the light is improved.")). Given this express disclosure, Petitioner explains sufficiently for purposes of institution where Schultz teaches or suggests mounting LEDs on a reflective substrate. *See* Ex. 1046 ¶ 49 (disclosing attaching LED dies to a reflective, multilayer optical film).

Moreover, even if Patent Owner is correct that in all embodiments the LEDs of Schultz are physically connected to the lower portion of substrate 32, i.e., conductive layer 36, Patent Owner does not explain why the LEDs of Schultz would not still be considered by one of ordinary skill in the art to be mounted on substrate 32, which may be reflective. Ex. 1046 ¶¶ 29, 45, 47, 49. The parties are encouraged to address this issue at trial.

Patent Owner also argues that the substrate of Schultz is composed of both insulative dielectric layer 34 and conductive layer 36, and adding a reflective surface material to dielectric layer 34 "does not render substrate 32 reflective because only the surface is reflective, not the substrate 32 including layers 34 and 36." Prelim. Resp. 61.

On this record, we are not persuaded that claim 1 requires that the entire thickness of the substrate be reflective. Patent Owner directs our attention to no disclosure or requirement in claim 1 or in the written description of the '251 patent that the entire thickness of the substrate needs to be reflective. And, the '251 patent notes that LEDs may be mounted on a

printed circuit board having a mirror like reflective material *or coating* "designed into or on" the circuit board in order to have the "printed circuit board reflect light rather than absorb it." Ex. 1001, 24:62–25:3. As such, on this record, a coating that makes only the surface of the substrate reflective is sufficient to create a "reflective substrate," as recited in claim 1.

Patent Owner further argues that Schultz actually teaches away from mounting LEDs on rigid circuit boards. Prelim. Resp. 61. Patent Owner points to Schultz's disclosure that there are a wide variety of LED die arrays that are mounted on "rigid," "non-reflective circuit boards," which leads to unutilized light due to absorption or scattering. *Id.* (citing Ex. 1046 ¶ 48). According to Patent Owner, Schultz teaches that by using flexible, "reflective surfaced materials, such as a multilayer optical film, ... the light reflected from the attached LED dies has a higher probability of being reflected towards the focusing element." *Id.* (citing Ex. 1046 ¶ 49).

On this record, Patent Owner has not sufficiently demonstrated that Schultz teaches away from mounting LEDs on rigid circuit boards, such as the allegedly rigid circuit board of Birrell. First, Patent Owner does not demonstrate that the substrate of Birrell is necessarily rigid. Indeed, Birrell expressly contemplates that the body of the lighting element—in which light source is embedded—may be "rigid or flexible." Ex. 1005, 11:4–25. Second, although Schultz discloses that a flexible, reflective substrate is beneficial in its disclosed embodiments, Patent Owner does not explain why this disclosure would teach away from using reflective coatings on rigid circuit boards. Ex. 1046 ¶ 48; *see In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) (explaining that a "teaching away" exists when a person of ordinary skill in the art would be discouraged from following the path set out

in the reference, and that the mere disclosure of alternate designs does not teach away).

In view of the foregoing, we determine that Petitioner sufficiently explains where Birrell and Schultz teach or suggest "at least one LED circuit having a plurality of LEDs . . . wherein the at least one LED circuit is mounted on a reflective substrate," as recited in claim 1.

b) Basis for Combining Birrell and Shultz

Patent Owner contends that "[n]othing in Birrell or Schultz suggests any reflective substrate that is suitable for mounting at least one LED circuit thereon," and "[t]he mere fact that reflective substrates may have been known is irrelevant, [as] the question is 'whether the relevant skilled artisan had a motivation to combine pieces of prior art **in the way eventually claimed** in the patent at issue.'" Prelim. Resp. 64 (citing *Intercont'l Great Brands LLC v. Kellogg N. Am. Co.*, 869 F.3d 1336, 1343 (Fed. Cir. 2017)). Thus, Patent Owner contends that "[t]he Petition fails to provide the requisite rational[e] and underpinnings to support its purported 'combination' and therefore should be denied." *Id.*

Petitioner contends that a person of ordinary skill in the art would have been able to apply a reflective coating, such as that disclosed in Shultz, to Birrell's circuit board, and would have sought to do so because such coatings were well known in the art and it was understood that a reflective coating would improve the illumination provided by an LED lighting system. Pet. 29–30; Ex. 1002 ¶ 105. Petitioner's arguments and rationale for the proposed combination are clear and supported by evidence of record. Pet. 29–30 (citing Ex. 1046 ¶¶ 47–49; Ex. 1002 ¶ 101; Ex. 1018, 6:6–18, 6:48–7:34; Ex. 1022, Abstract, ¶¶ 18, 34, 81). Accordingly, Petitioner sufficiently explains for purposes of institution why one of ordinary skill in

the art would have sought to combine the disclosures of Birrell and Schultz to arrive at the subject matter of claim 1.

c) Resulting Combination of Birrell and Schultz

Patent Owner contends the Petition does not support institution because it "fails to provide the requisite explanation as to how Birrell and Schultz are to be combined or what is the operation of the resulting combination." Prelim. Resp. 65–66.

Contrary to Patent Owner's argument, Petitioner's proposed combination appears straightforward: mount the LED circuit of Birrell on a reflective substrate, as was known in the art and disclosed in Schultz. Pet. 28–30; Ex. 1046 ¶ 48 (discussing mounting LED dies on a reflective substrate). To achieve a reflective substrate, Petitioner contends a reflective layer could be added to the substrate of Birrell or the substrate could be formed of a reflective material. Pet. 30. As such, on this record, Petitioner provides sufficient argument and evidence to explain how Birrell and Schultz are to be combined.

d) Conclusion with Respect to Claim 1

Petitioner sufficiently identifies for purposes of institution where Birrell and Shultz teach or suggest every limitation of claim 1. Petitioner also sufficiently explains why one of ordinary skill in the art would have combined the identified disclosures of Birrell and Shultz to arrive at the subject matter of claim 1 with a reasonable expectation of success. Accordingly, Petitioner demonstrates a reasonable likelihood that claim 1 would have been obvious over Birrell and Shultz.

4. Analysis – Claim 6

Claim 6 depends from claim 1 and further requires "wherein the LED lighting system is dimmable in response to the data received." Ex. 1001, 25:38–39.

Petitioner contends that Birrell discloses using controls to automatically adjust light levels and that wireless data communications or a direct connection may be used to control the devices and elements of the lighting system. Pet. 34–36 (citing Ex. 1005, 8:4–30).

Patent Owner does not address Petitioner's arguments with respect to dependent claim 6.

Upon review of Petitioner's arguments and supporting evidence, we determine that Petitioner demonstrates a reasonable likelihood that claim 6 would have been obvious over Birrell and Schultz.

D. Claims 1 and 6 over Piepgras

Petitioner contends the subject matter of claims 1 and 6 would have been obvious over the disclosures of Piepgras. Pet. 36–51.

1. Piepgras

Piepgras discloses "high-brightness, processor-controlled LEDs in combination with diffuse materials to produce color-changing effects." Ex. 1030 ¶ 32. Figure 1 of Piepgras is reproduced below:

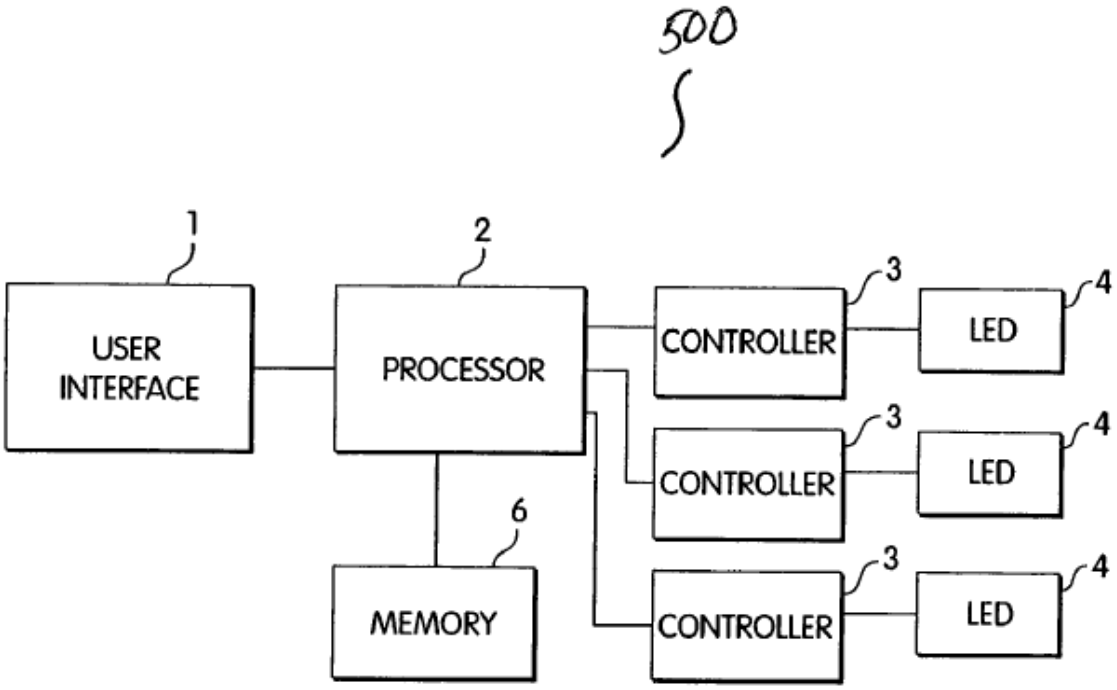

Fig. 1

Figure 1 is a block diagram of one embodiment of Piepgras. *Id.* ¶ 33. As depicted in Figure 1, lighting system or device 500 includes user interface 1, processor 2, one or more controllers 3, one or more LEDs 4, and memory 6. *Id.* ¶ 88. "In general, the processor 2 may execute a program stored in the memory 6 to generate signals that control stimulation of the LEDs 4. The signals may be converted by the controllers 3 into a form suitable for driving the LEDs 4, which may include controlling the current, amplitude, duration, or waveform of the signals impressed on the LEDs 4." *Id.*

Figure 6 of Piepgras is reproduced below:

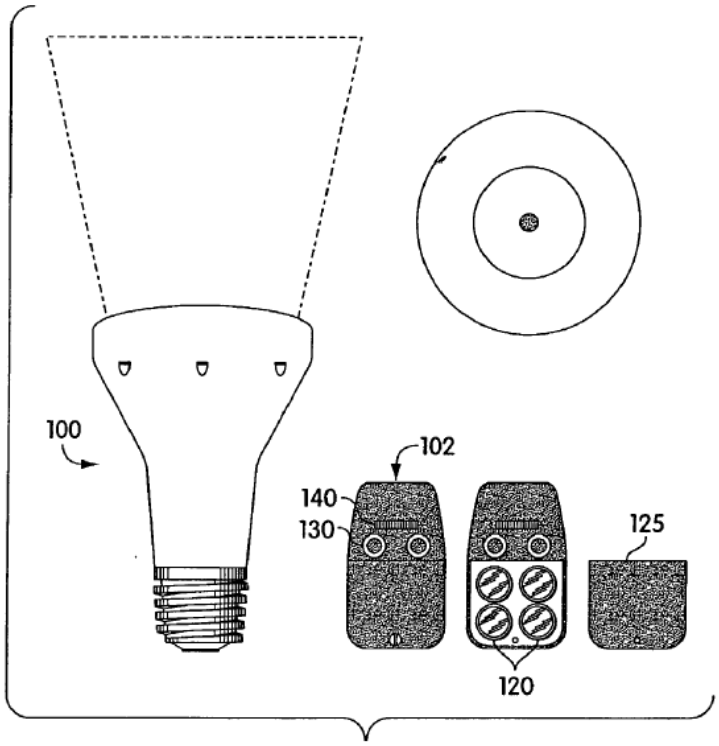

Fig. 6

Figure 6 shows a spotlight embodiment of the invention. *Id.* ¶¶ 38, 110. In the embodiment shown in Figure 6, spotlight 100 may be controlled using remote user interface 102, having one or more buttons 130 and dial 140 "for selecting modes and parameters." *Id.* ¶ 110. Remote user interface 102 may transmit control information to spotlight 100 using, for example, "an infrared or radio frequency communication link, with corresponding transceivers in the spotlight 100 and the remote user interface 102." *Id.* Transmitted information "could also be carried, for its complete path or a portion thereof, through a wire, cable, fiber optic, network or other transmission medium." *Id.*

Figure 42 of Piepgras is reproduced below:

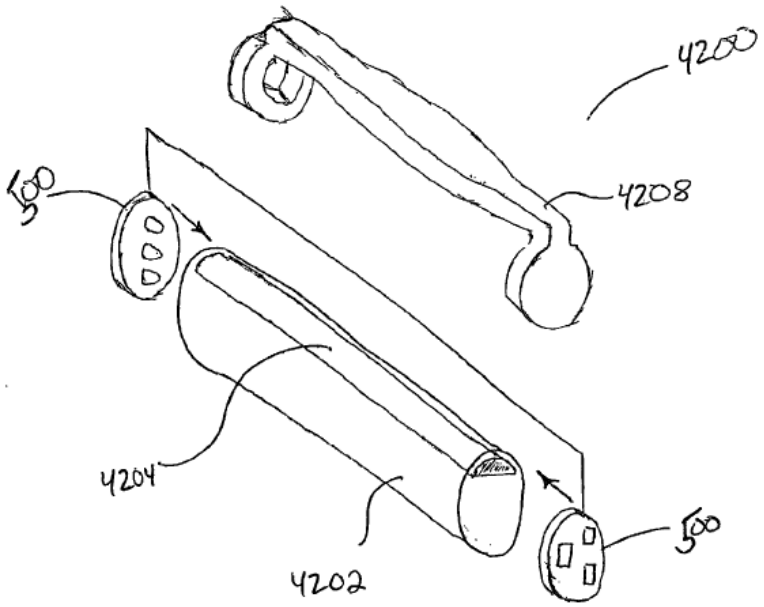

Figure 42

Figure 42 illustrates a lighting device having an elongated optic element. *Id.* ¶ 70. In Figure 42, lighting device 4200 may include an optic 4202, which may be "an elongated optic, tubular optic, light guide, tubular light guide, elongated light guide, or other style of optic." *Id.* ¶ 188. Optic 4202 "may be associated with another material 4204 designed to reflect at least a portion of the light transmitted through the optic 4202." *Id.* ¶ 189. Illumination device 500 may be arranged to project light through one end of optic 4202, or two individual illumination devices 500, each with their own processor, may be used to project light through opposite ends of optic 4202. *Id.* ¶ 190. Piepgras explains that in one embodiment, "a platform where the LED-based illumination devices are mounted may be made of or coated with a reflective material." *Id.* ¶ 197.

2. Analysis—Claim 1

Pointing to Figure 1, Petitioner contends that Piepgras discloses an LED lighting system having a driver (controller 3 in conjunction with processor 2) that has an input configured to receive an AC or DC voltage source and an output configured to provide an AC or DC voltage. Pet. 38–40 (citing Ex. 1030 ¶¶ 108–109 ("the converter may include an AC to DC converter to convert one-hundred twenty Volts at sixty Hertz into a direct current . . . ")). Petitioner further contends that the system depicted in Figure 1 of Piepgras has an LED circuit with a plurality of LEDs connected to the output of the LED driver, and that the specific lighting system depicted in Figure 6 has a data receiver that can receive data from at least one of a transmission line or an antenna. *Id.* at 43–44, 47–49.

With respect to the requirement that the LED circuit be mounted on a reflective substrate, Petitioner points to the embodiment depicted in Figure 42, wherein LED devices 500 are used in a lighting system with an "optic" that is associated with reflective material 4204. *Id.* at 44–45. Petitioner argues that the illumination devices 500 that are epoxied to the optics would be considered to be mounted to a reflective substrate and, in at least one embodiment, a platform where the LED-based illumination devices are mounted may be made of or coated with a reflective material. *Id.* at 45 (citing Ex. 1030 ¶ 197). And, to the extent that Piepgras is determined to not explicitly disclose mounting the LEDs on a reflective substrate, Petitioner contends one of ordinary skill in the art would have found it obvious to do so in light of the knowledge of skill in the art and the disclosures of Piepgras regarding the use of reflective materials. *Id.* at 45–46.

Patent Owner contends the ground based on Piepgras does not support institution because Piepgras does not teach or suggest mounting an LED

circuit on a reflective substrate. Prelim. Resp. 66–72. Patent Owner reasons that in the embodiment depicted in Figure 42 of Piepgras, LED illumination devices 500 are at the endcaps of the light, "not on the reflective material 4204 which extends between the endcaps." *Id.* at 69. And, in the embodiment in which the LED-based illumination devices are mounted on a platform with a coating of reflective material, Patent Owner contends this only discloses that the platform on which lighting device 500 is mounted is reflective, not that LEDs 4 (Figure 1) are mounted on a reflective material or substrate. *Id.* at 69–71.

Device 500 of Piepgras (schematically depicted in Figure 1 of Piepgras) has multiple LEDs and, in at least one embodiment, device 500 is mounted to a reflective platform. Ex. 1030 ¶ 197 ("In an embodiment, a platform where the LED-based illumination devices are mounted may be made of or coated with a reflective material."). In addition, Figure 42 appears to depict three LEDs mounted on the platform. *Id.* at Fig. 42. Accordingly, Petitioner explains sufficiently for purposes of institution where Piepgras teaches or suggests mounting an LED circuit on a reflective substrate.[7]

Patent Owner further contends that one of ordinary skill in the art would not have sought to mount LEDs of Piepgras onto reflective material

[7] Dr. Baker testifies that one of ordinary skill in the art would have understood that device 500, including the LEDs, is mounted to a reflective substrate (platform). Ex. 1002 ¶¶ 136–137. Patent Owner argues that there is no evidence that the LEDs are mounted on a reflective material and asserts that the platform of Piepgras is "not a substrate." Prelim. Resp. 70–71. Patent Owner does not explain, however, why Dr. Baker is incorrect in his understanding of Piepgras' disclosures. Accordingly, Patent Owner's arguments are unavailing. The parties are encouraged, however, to further address this issue at trial.

4204 "because the LEDs would interfere with reflection and thus defeat the teachings of Piepgras to use the reflective material 4204 to reflect light." *Id.* at 72. This argument, however, assumes that Piepgras does not expressly teach or suggest mounting an LED circuit on a reflective substrate or platform. As such, on this record, Patent Owner's argument is unavailing.

Patent Owner also argues that the Petition mixes disclosures from various embodiments of Piepgras, including spotlights and tubular lights, but fails to articulate what the result of the modification to Piepgras would be or why these various embodiments would be selected and combined. Prelim. Resp. 73–74. In particular, Patent Owner contends Petitioner has not explained sufficiently why disparate embodiments of Piepgras would be combined to satisfy the claim limitation of "at least one LED circuit having a plurality of LEDs . . . wherein the at least one LED circuit is mounted on a reflective substrate." *Id.* at 74 (citing Pet. 43–47).

In this ground, Petitioner relies on the disclosures of Piepgras relating to the embodiments shown in Figures 6 (data receiver) and 42 (LED lighting system with reflective substrate). Pet. 44–45, 47–48. With respect to the use of a data receiver, Petitioner persuasively explains that the spotlight embodiment shown in Figure 6 uses a data receiver and that Piepgras expressly suggests that all of its disclosed devices may have local or remote interfaces to control the light generated from the LED lighting device. *Id.* at 47 (citing Ex. 1030 ¶ 32, Abstract); *see also id.* at 50 (Petitioner discussing the limitations of dependent claim 6).

With respect to mounting the LEDs on a reflective substrate, the proposed combination of different embodiments of Piepgras is relied upon by Petitioner only to the extent that it is determined that Piepgras' description of the embodiment shown in Figure 42 does not expressly teach

or suggest mounting an LED circuit on a reflective substrate. Pet. 45–46 ("To the extent *Piepgras* does not disclose the 'at least one LED circuit' is mounted on a reflective substrate . . . it would have been obvious to implement such features."). As Petitioner presents sufficient evidence that Figure 42 of Piepgras teaches or suggests mounting an LED circuit on a reflective substrate, Patent Owner's argument about different embodiments of Piepgras is, on this record, unavailing.

In view of the foregoing, we determine that Petitioner demonstrates that Piepgras teaches or suggests every limitation of claim 1. Petitioner also sufficiently explains for purposes of institution why one of ordinary skill in the art would have combined the various disclosures of Piepgras to arrive at the subject matter of claim 1 with a reasonable expectation of success. Thus, Petitioner demonstrates a reasonable likelihood that claim 1 of the '251 patent would have been obvious over the disclosures of Piepgras.

3. Analysis—Claim 6

Claim 6 depends from claim 1 and further requires "wherein the LED lighting system is dimmable in response to the data received." Ex. 1001, 25:38–39. Petitioner contends that Piepgras expressly contemplates dimming LED lights and, although Piepgras "does not expressly disclose that such dimming is controlled in response to the data received by the 'data receiver' (limitation 1(d)), it would have been obvious to implement such features." Pet. 50. Petitioner reasons that Piepgras expressly contemplates using wired/wireless data signals to provide dimming controls in several lighting embodiments, and one of ordinary skill in the art would have understood that such a modification "would have improved the LED lighting system by providing known brightness control of LED lighting . . . as

contemplated by *Piepgras* and known in the art." *Id.* at 51 (citing Ex. 1002 ¶¶ 151–152; Ex. 1030 ¶¶ 113–114; Ex. 1018, 7:66–8:6).

Patent Owner does not address Petitioner's arguments with respect to claim 6, but asserts that "[b]ecause the Petition does not establish that Claim 1 is obvious over Piepgras, the Petition likewise fails to establish that Claim 6 is obvious over Piepgras." Prelim. Resp. 74.

Piepgras expressly contemplates using wired or wireless data signals to control LED lighting systems. Ex. 1030 ¶¶ 32 ("illumination of the LEDs may be controlled via the network"), 83 ("Any of the foregoing devices may be equipped with various types of user interfaces (both 'local' and 'remote') to control light generated from the device"), 110 (transmitting control information to an LED lighting system having a transceiver), 123, 177. Petitioner also provides an explanation, supported by record evidence, as to why one of ordinary skill in the art would have sought to use remotely transmitted data to dim LED lighting systems. Accordingly, Petitioner demonstrates a reasonable likelihood that the subject matter of claim 6 would have been obvious over the disclosures of Piepgras

E. Claims 1 and 6 over Harbers and Schultz

Petitioner contends the subject matter of claims 1 and 6 would have been obvious over the combined disclosures of Harbers and Schultz. Pet. 52–77.

Petitioner contends Harbers is prior art to the '251 patent because it is entitled to the benefit of the filing date of a provisional application filed on May 4, 2010, and because the '251 patent is not entitled to a filing date that is earlier than May 12, 2010. Pet. 5.

Patent Owner contends the '251 patent is entitled to the benefit of at least the February 25, 2005, filing date of US Provisional Application No. 60/559,867. Prelim. Resp. 22–43.

In support of their respective positions regarding the disclosures of the prior art and the effective filing dates of Harbers and the '251 patent, Petitioner and Patent Owner provide extensive claim charts and analysis.

Having determined that Petitioner demonstrates a reasonable likelihood that claims 1 and 6 would have been obvious over the disclosures of Birrell and Schultz, as well as over the disclosures of Piepgras, we do not address at this stage the full extent of the parties' arguments with respect to Harbers and Schultz, or the parties' priority disputes with respect to the '251 patent and Harbers.[8] We note, however, that Harbers' lighting system utilizes a reflector insert 106 that is placed over a mounting board containing the LEDs, with only the light emitting portion of each LED extending through the reflector insert. Ex. 1006 ¶ 23, Fig. 3A. Given the orientation of the mounting board and reflector insert 106, with the reflector insert covering the mounting board except for the light emitting portion of the LEDs, it is not evident why one of ordinary skill in the art would have sought to make the mounting board of Harbers reflective. Pet. 69–73; Prelim. Resp. 77–78. In addition, given the successful use of reflector insert 106, it is not evident why one of ordinary skill in the art would have abandoned the use of reflector insert 106 in place of a reflective mounting board, as asserted by Petitioner. The parties are encouraged to address this issue, or any other issue related to this ground, at trial.

[8] We will address this ground and any priority date disputes in a Final Written Decision, if necessary.

III. CONCLUSION

For the reasons discussed above, Petitioner demonstrates a reasonable likelihood that it would prevail in showing that claims 1 and 6 of the '251 patent are unpatentable.

IV. ORDER

Accordingly, it is:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1 and 6 of the '251 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '251 patent shall commence on the date of this Decision, and notice is hereby given of the institution of trial.

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