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Paper 8
Date: February 18, 2022

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.

IPR2021-01369
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

Home Depot U.S.A., Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1, 11, and 13 ("Challenged Claims") 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 5 ("Prelim. Resp."). With authorization, Petitioner filed a Reply and Patent Owner filed a Sur-Reply. Paper 6 ("Reply"); Paper 7 ("Sur-Reply")

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."

After considering the parties' arguments and evidence, and for the reasons set forth below, Petitioner demonstrates a reasonable likelihood of prevailing with respect to at least one of the Challenged Claims of the '251 patent. Accordingly, we institute an *inter partes* review with respect to all Challenged Claims and 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 Home Depot Product Authority, LLC as the real parties-in-interest ("RPI"). Pet. 1. Petitioner also identifies The Home Depot, Inc. as a potential RPI "solely because it is also a named defendant" in litigation between the parties. *Id.* Finally, "[i]n an abundance of caution, Petitioner also identifies as potential RPIs": "Bel Air Lighting,

Inc.; New Bright Technology; Cordelia Lighting; Elec-Tech Solid State Lighting (HK) Ltd.; Globe Electric; King of Fans, Inc.; Leedarson Lighting/Green Intelligence Co.; and Year Young Industrial Co." *Id.*

Patent Owner identifies itself as the real party-in-interest. Paper 4, 1.

C. Related Matters

The parties identify the following district court proceeding as a related matter: *Lynk Labs, Inc. v. Home Depot USA, Inc.*, No. 6:21-cv-00097 (W.D. Tex.), which was recently transferred to the Northern District of Georgia ("the related litigation"). Pet. 2; Paper 4, 1; Ex. 1013. The '251 patent is also currently at issue in *Samsung Electronics Co. v. Lynk Labs, Inc.*, No. 1:21-cv-02665 (N.D. Ill.). Paper 4, 1; Pet. 2.

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 LEDs." *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 Claims

Petitioner challenges claims 1, 11, and 13 of the '251 patent, which are reproduced below. Pet. 5.

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.

11. An LED lighting system comprising:

an LED circuit array having a plurality of LED circuits, each LED circuit of the plurality of LED circuits comprising at least one LED;

an active current limiting device connected in series to at least one of the plurality of LED circuits; and

an LED driver connected to the LED circuit array, wherein the LED driver has an input of a first voltage and a first frequency and provides an output of a second voltage, wherein the first voltage is an AC voltage;

wherein an LED of at least one of the plurality of LED circuits in the LED circuit array is coated or doped with at least one of a phosphor, nano-crystals, or a light changing or enhancing substance, at least one of the coated or doped LEDs in the LED circuit array producing a different color of light than another coated or doped LED in the LED circuit array.

Id. at 25:60–26:9.

13. A lighting system comprising:

a driver having an input and an output, the input receiving an input voltage from a mains power source and the output

providing an output voltage, wherein the driver includes a bridge rectifier; and

at least one LED circuit mounted on a reflective substrate, wherein the at least one LED circuit is connected to the output of the driver and has one or more LEDs connected in series or parallel sufficient to approximately match the input voltage or the output voltage of the driver

Id. at 26:12–23.

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1, 11, and 13 would have been unpatentable on the following grounds (Pet. 5):

Claim Challenged	35 U.S.C. §[1]	Reference(s)/Basis
1	103	Deese[2], Kuo[3], Obeck[4]
13	103	Deese, Kuo
11	103	Okuno[5], Teshima[6]
11	103	Okuno, Teshima, Butterworth[7]

In support of its grounds for unpatentability, Petitioner relies upon the declaration of Dr. Michael Lebby. 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 presumes that the pre-AIA versions of §§ 102 and 103 apply in this proceeding, and Patent Owner does not appear to disagree. Pet. 4; Ex. 1003, 332. Thus, we apply the pre-AIA versions of §§ 102 and 103 in this Decision.
[2] US 5,457,450, issued October 10, 1995. Ex. 1004 ("Deese").
[3] US 6,019,493, issued February 1, 2000. Ex. 1013 ("Kuo").
[4] US 5,014,052, issued May 7, 1991. Ex. 1006 ("Obeck").
[5] US 4,298,869, issued November 3, 1981. Ex. 1007 ("Okuno").
[6] US 4,271,408, issued June 2, 1981. Ex. 1008 ("Teshima").
[7] US 5,847,507, issued December 8, 1988. Ex. 1009 ("Butterworth").

II. ANALYSIS

A. Discretion Under 35 U.S.C. § 314(a)

Patent Owner contends that we should exercise our discretion under 35 U.S.C. § 314(a) to deny institution of *inter partes* review in light of the related litigation. Prelim. Resp. 4–15 (citing, *e.g.*, *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) ("*Fintiv*")). Petitioner counters that the *Fintiv* factors actually weigh against discretionary denial, especially in view of the transfer of the related litigation from the district court in Texas to the district court in Georgia. Pet. 5–9; Reply 1.

After Patent Owner filed its Preliminary Response, we authorized further briefing from the parties to address how the transfer of the related litigation affects the analysis of the *Fintiv* factors. Reply 1; Sur-Reply 2–3; Ex. 1013.

In *Fintiv*, the Board articulated a list of factors that we consider in determining whether to exercise discretion to deny institution based on an advanced stage of a parallel proceeding:

> 1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
>
> 2. proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;
>
> 3. investment in the parallel proceeding by the court and the parties;
>
> 4. overlap between issues raised in the petition and in the parallel proceeding;
>
> 5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
>
> 6. other circumstances that impact the Board's exercise of discretion, including the merits.

Fintiv, Paper 11 at 5–6. In evaluating these factors, we take "a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review." *Id.* at 6.

1. *Factor 1—Likelihood of Stay*

Petitioner has moved for a stay in the Northern District of Georgia and asserts that it is likely to be granted. Reply 1. Patent Owner responds that no stay has been granted and it is improper to speculate as to whether the court might grant one. Sur-Reply 2.

We decline to speculate as to whether Petitioner's stay request will be granted. *See Fintiv*, Paper 15 at 12 (PTAB May 13, 2020) (informative); *Sand Revolution II, LLC v. Cont'l Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 7 (PTAB June 16, 2020) (informative). Thus, this factor is neutral.

2. *Factor 2—Proximity of the Trial Date to the Final Written Decision Due Date*

The court has not set a trial date and Petitioner estimates that a final written decision is to be expected in this proceeding no later than March 2023, about six months before any trial in the related litigation would begin. Reply 1. Petitioner derives the expected date of trial in the district court based on the 30.8 month median time from filing of a complaint to trial in the Northern District of Georgia. *Id.* (citing Ex. 1014). Patent Owner argues that Petitioner's estimated trial date overlooks the fact that Patent Owner filed a motion for an expedited trial schedule, which is currently pending before the district court. Sur-Reply 2.

Although the parties speculate as to when trial may occur, no trial date has been set; thus, this factor weighs against exercising our discretion to deny institution. *See Oticon Med. AB v. Cochlear Ltd.*, IPR2019-00975,

Paper 15 at 23–24 (PTAB Oct. 16, 2019) (precedential as to §§ II.B, II.C) (lack of a trial date weighs against exercising discretion to deny institution, even when discovery is "well underway").

3. *Factor 3—Investment in Proceedings*

Petitioner contends the related litigation is "in its early stages" and "[n]o fact or expert discovery, dispositive motions, *Markman* hearing, or final contentions have occurred, or are expected to occur prior to the Board rendering its institution decision." Pet. 7; Reply 1.

Patent Owner does not expressly dispute that the related litigation is in its early stages, but contends Petitioner's assertions regarding the level of effort that will be expended prior to the institution decision are "simply speculative" given Patent Owner's pending motion to expedite the trial schedule. *See* Sur-Reply 3.

Given that the related litigation is in its early stages, we find that this factor weighs against exercising our discretion to deny institution.

4. *Factor 4—Overlap of Issues*

Petitioner stipulates that "if IPR is instituted, Petitioner will not pursue the same instituted grounds or grounds based on the same primary reference in the related district court litigation." Pet. 8.

Patent Owner argues that there is significant overlap of issues between the IPR and district court litigation, as evidence by the fact that all four grounds asserted in this proceeding rely on Deese or Okuno, which are also raised in Petitioner's preliminary invalidity contentions before the district court. Prelim. Resp. 11.

Petitioner's stipulation "mitigates to some degree the concerns of duplicative efforts between the district court and the Board, as well as concerns of potentially conflicting decisions." *Sand Revolution*, Paper 24 at

11–12. Thus, we find that this factor weighs, at least to some extent, against exercising our discretion to deny institution.

5. *Factor 5—Identity of Parties*

The same parties are involved in this proceeding and the district court litigation. Pet. 8; Prelim. Resp. 12. Thus, this factor weighs in favor of exercising our discretion to deny institution.

6. *Factor 6—Other Circumstances*

The sixth *Fintiv* factor takes into account any other relevant circumstances that would counsel for or against exercising discretion to deny institution, including the merits. *Fintiv*, Paper 11, 15–16. Petitioner argues that this factor weights against exercising discretion because "[t]he Challenged Claims are clearly invalid, Petitioner has not previously challenged any related patents based on the references relied upon in this petition, the 251 patent has never been challenged in a post-issuance proceeding, and the references were not cited during prosecution of the 251 patent." Pet. 8–9.

Patent Owner argues that the merits are not strong. Prelim. Resp. 12–13.

As we explain below, Petitioner has met its institution burden for at least one Challenged Claim. Under these circumstances, and under the specific facts of this case, we find that this factor is neutral.

7. *Conclusion*

Applying a holistic consideration of the relevant facts and the particular circumstances of this case, we conclude that the facts and factors counseling against exercising discretion collectively outweigh those in favor of exercising discretion. Accordingly, we do not exercise our discretion to deny institution under 35 U.S.C. § 314(a).

B. 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 both Okuno and Teshima were before the Examiner during prosecution. Prelim. Resp. 44–45.

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." The following 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).

Patent Owner contends we should exercise our discretion to deny the Petition because both Okuno and Teshima were previously considered during prosecution, and because Petitioner has "identified no error during prosecution, or explained why the examiner's decision to allow the claims should be undone." Prelim. Resp. 44–45.

The combination of Okuno and Teshima is directed to only claim 11, the combination is asserted in only two of four grounds, and in the fourth ground Petitioner also relies upon the additional disclosures of Butterworth. Pet. 4–5. Thus, Patent Owner's § 325(d) arguments do not sufficiently implicate the Petition as a whole, or demonstrate that the same art or

arguments that are set forth in the Petition were previously presented to the Office. As such, we decline to exercise discretion under § 325(d) to deny institution.

C. 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).

The Petition does not provide proposed constructions for any terms of the '251 patent. Pet. 11. And although Patent Owner disputes Petitioner's assertions regarding certain claim terms, it does not contend that any terms of the '251 require express construction for purposes of this Decision. *See, e.g.*, Prelim. Resp. 23–24, 35.

Upon review of the parties' arguments and supporting evidence, we find that no terms of the '251 patent require construction. *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.")).

D. Claim 13 over Deese and Kuo

Petitioner contends the subject matter of claim 13 would have been obvious over the combined disclosures of Deese and Kuo. Pet. 25–27.

1. Deese

Deese discloses an LED traffic light system that uses voltage compensation circuits to allow operation "over a wide range of input power voltages, while generating sufficient light intensity to control traffic at a highway intersection." Ex. 1004, Abst.

Figure 3 of Deese is reproduced below:

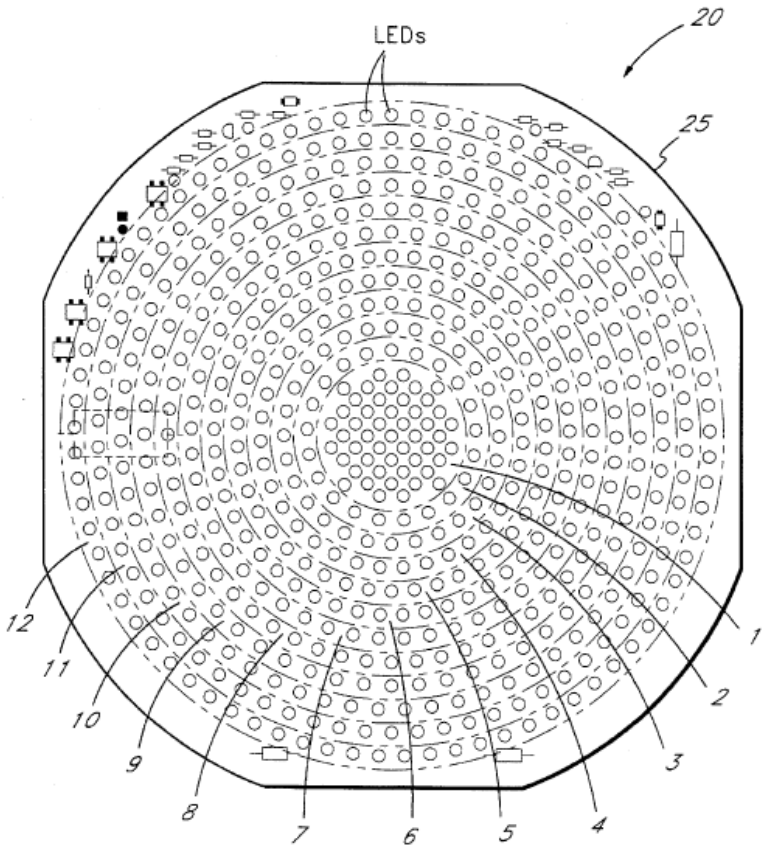


FIG. 3

Figure 3 "is a front view of a circuit board containing the LEDs and associated electronic circuitry of a first embodiment" of Deese, and depicts "LED configuration and control circuits 20." *Id.* at 4:3–5, 4:55–56; *see also id.* at 5:27–28 (explaining that circuit board 25 supports the "associated electronic driver and control circuitry"). As shown in Figure 3, LED

arrays 1–12 are arranged on circular printed circuit board 25 in a generally concentric pattern. *Id.* at 5:24–28, 5:36–37.

Figure 4 of Deese is reproduced below:

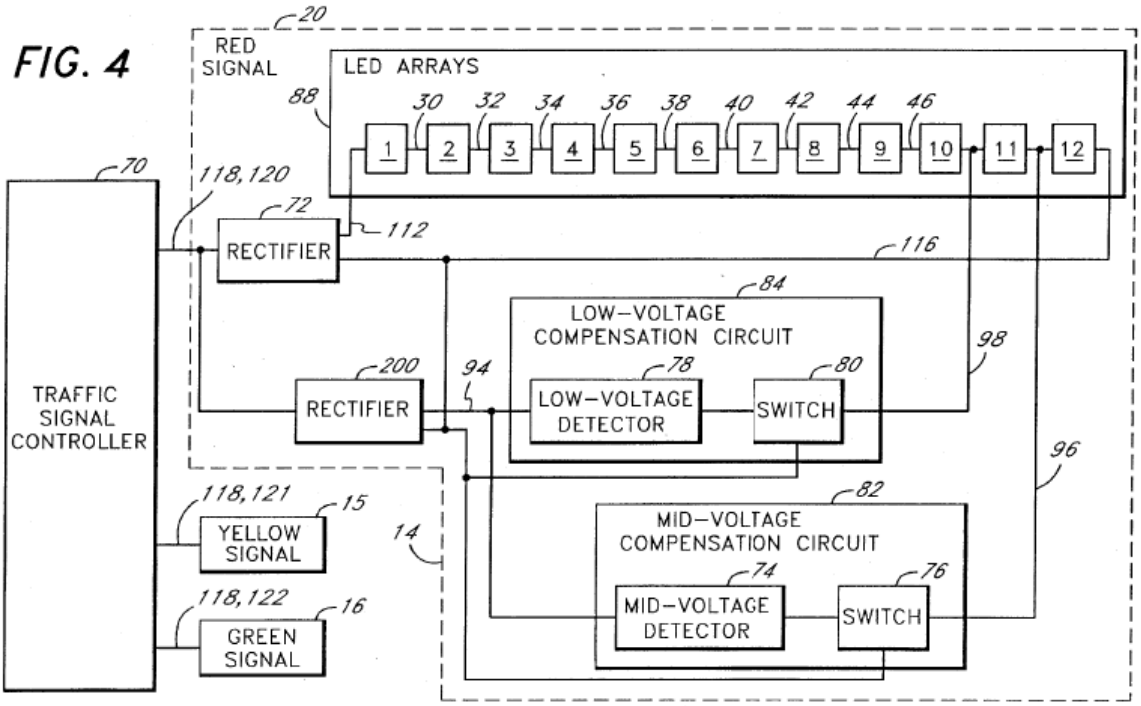


Figure 4 is a functional block diagram of a first embodiment of Deese. *Id.* at 4:6–7. In Figure 4, conventional traffic signal controller 70 selectively energizes red, yellow, and green traffic lights 14, 15, and 16. *Id.* at 5:48–50. As shown in Figure 4, LED circuit 20 of the red LED traffic light is energized by line power delivered via AC power line 118 and return signal line 120. *Id.* at 5:50–52.

AC power lines 118 and 120 are connected to rectifier 72, which converts the AC power delivered by traffic signal controller 70 to DC power. *Id.* at 5:64–66. DC power is then provided to LED arrays 1–12, which each comprise seven strings of series-connected LEDs that are connected in parallel. *Id.* at 5:66–7:3, 7:30–59.

As shown in Figure 4, line voltage power line 118 and line voltage return line 120 are also connected to rectifier 200, which provides reference voltage 94 to mid-voltage detector 74 and low-voltage detector 78. *Id.* at 7:34–41. When reference voltage 94 is greater than the intermediate voltage threshold (approximately 107 volts), mid-voltage detector 74 of mid-voltage compensation circuit 82 operates to open switch 76 connected between line 96 and DC return line 116. *Id.* at 7:45–51. If reference voltage 94 is less than the intermediate voltage threshold, switch 76 is closed, effectively shorting line 96 to DC return line 116 and removing LED array 12 from the circuit. *Id.* at 7:53–60.

Low voltage compensation circuit 84 operates in a similar manner to mid-voltage compensation circuit 82, but utilizes a lower voltage threshold of approximately 96 volts. *Id.* at 7:63–67. If reference voltage 94 is less than the low voltage threshold, switch 80 shorts line 98 to DC return line 116, effectively removing LED arrays 11 and 12 from the circuit. *Id.* at 8:4–13.

Figure 5 of Deese is reproduced below:

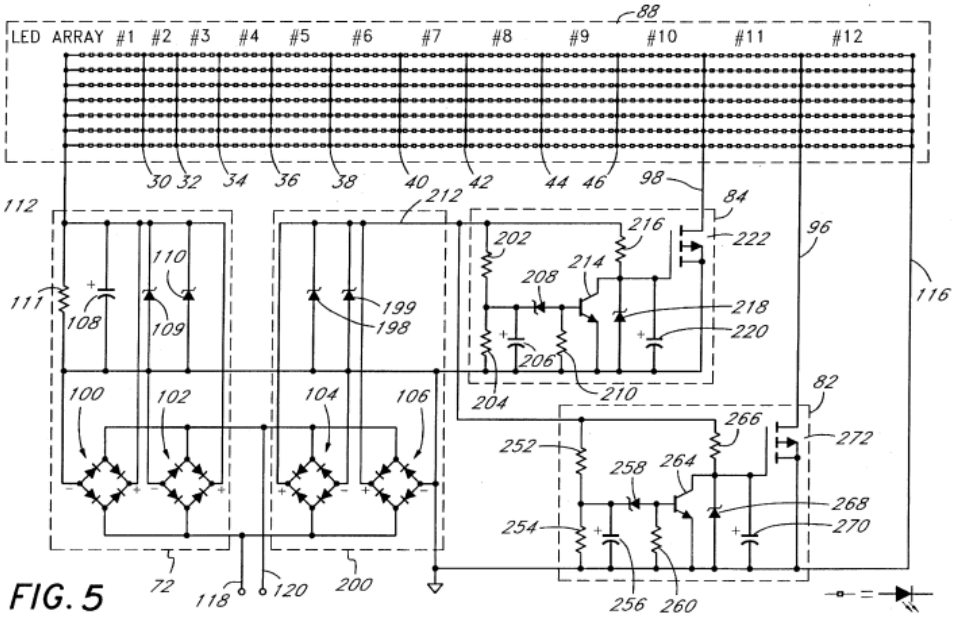


FIG. 5

Figure 5 is a schematic diagram of the first embodiment of Deese. *Id.* at 4:11–12. In Figure 5, AC power lines 118 and 120 are connected to rectifier 72, which comprises a pair of "dual in-line package (DIP) bridge rectifiers 100 and 102, a resistor 111, a capacitor 108, and a pair of zener diodes 109 and 110." *Id.* at 9:52–55. Regulated DC voltage on line 112 is connected to the positive terminal of LED array 1, and DC return line 116 is connected to the negative terminal of LED array 12. *Id.* at 10:4–9. Deese explains that bridge rectifiers 100 and 102 convert AC to DC voltage, capacitor 108 and resistor 111 provide voltage filtering for the voltage across regulated DC power line 112 and DC return line 116, and zener diodes 109 and 110 protect LED circuit 20 from damage caused by a lightning strike. *Id.* at 10:10–27.

Second rectifier 200 comprises a pair of DIP bridge rectifiers 104 and 106 and a pair of zener diodes 198 and 199. *Id.* at 10:30–33. Second rectifier 200 is "substantially independent" of first rectifier 72, such that noise produced by the LEDs does not affect the regulated DC reference voltage on line 212 that is provided to voltage compensation circuits 82 and 84. *Id.* at 10:50–54. As discussed above, mid-voltage and low voltage compensation circuits 82 and 84, respectively, are designed to remove LEDs 11 and/or 12 from the circuit, depending on the regulated DC voltage on line 112. *Id.* at 10:61–12:11.

2. Kuo

Kuo discloses a traffic light that utilizes LEDs and different lenses to amplify the intensity of light from the LEDs. Ex. 1005, 1:6–9. Figure 2 of Kuo is reproduced below:

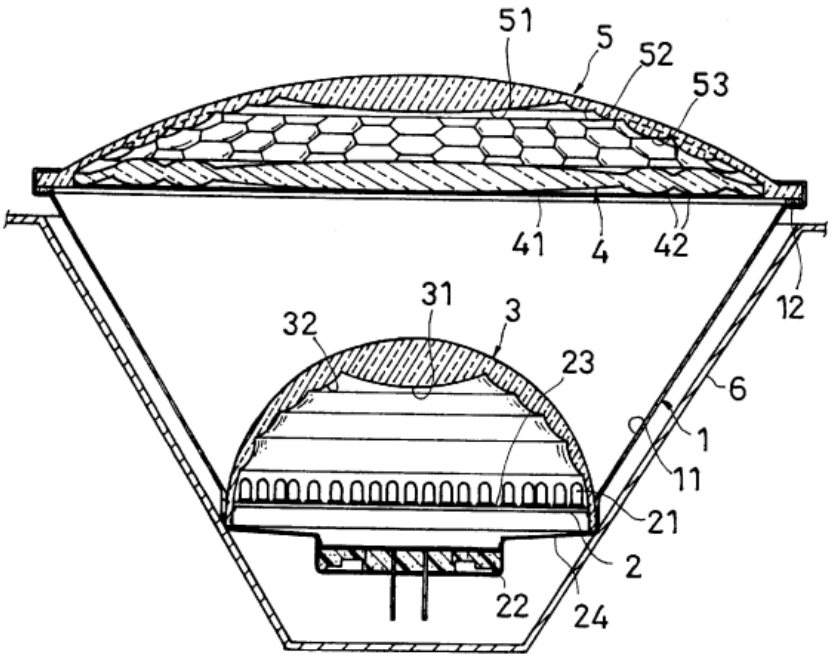


FIG.2

Figure 2 is a sectional assembly view of the high efficiency light of Kuo. *Id.* at 2:15–16. As shown in Figure 2, lamp shade 1, having a light reflecting surface 11, is mounted in signal light bracket 6. *Id.* at 2:30–35. Circuit board 2 has LEDs 21 on its top surface and power save control circuit 22 mounted on its bottom surface. *Id.* at 2:30–39. The top side 23 of circuit board 2 is coated with a light reflecting substance. *Id.* at 3:1–3.

3. Analysis

Petitioner contends Deese and Kuo teach or suggest every limitation of independent claim 13. In particular, Petitioner contends that Deese discloses a lighting system comprising (1) a driver (elements 72, 82, 84, and 200) having an input and an output, wherein the input voltage is received from a mains power source and the driver includes a bridge rectifier (Pet. 25 (citing Ex. 1004, 9:52–10:30, Fig. 5; Ex. 1002 ¶¶ 72–73)), (2) an LED

circuit mounted on a reflective substrate (*id.* at 26 (citing Ex. 1002 ¶ 74)), and (3) connecting the LED circuit to the output of the driver, wherein the LED circuit has one or more LEDs connected in series or in parallel sufficient to approximately match the input voltage or the output voltage of the driver (*id.* at 26–27 (citing Ex. 1004, 6:4–7:33, 8:18–35, 8:55–9:20, Figs. 4, 5; Ex. 1002 ¶¶ 75–77)). Petitioner further contends that Kuo discloses providing a reflective coating on the circuit board supporting the LEDs and that one of ordinary skill in the art would have sought to add the reflective coating of Kuo to the circular circuit board of Deese in order to improve the brightness and safety of the traffic lights. *Id.* at 14, 22, 26.

Patent Owner contends the Petition's arguments with respect to claim 13 are deficient because (1) Deese and Kuo are not analogous art to the '251 patent, (2) Petitioner applies an unreasonably broad construction of the term "reflective substrate," (3) Petitioner does not demonstrate that Deese or Kuo disclose "at least one LED circuit mounted on a reflective substrate," and (4) Petitioner's rationale for combining Deese and Kuo is defective. Prelim. Resp. 34–44. We address these arguments in turn.

a) Analogous Art

To resolve whether art is analogous we must determine "(1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved." *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004).

Petitioner contends Deese and Kuo are analogous art to the '251 patent because they are all directed to "lighting systems." Pet. 16 (citing Ex. 1004, Abstr.; Ex. 1006, code (54); Ex. 1002 ¶ 49).

Patent Owner contends the function of the traffic signals of Deese and Kuo is to convey a signal or provide information, whereas the function of the LED lighting systems of the '251 patent is to illuminate an area. Prelim. Resp. 18–19. Patent Owner further contends that traffic signal lights turn on and off every few seconds, whereas the lighting systems of the '251 patent are designed to stay active for long periods of time and provide steady illumination. *Id.* at 20. In view of these differences in function and purpose, Patent Owner contends the traffic light systems of Deese and Kuo are "not something a [person of ordinary skill in the art] would ordinarily rely upon when designing the LED lighting systems of the '251 Patent." *Id.* at 18, 20.

The '251 patent is directed to "alternating current ('AC') driven LEDs, LED circuits and AC drive circuits and methods." Ex. 1001, 1:41–44. Thus, on this record, we find that the field of endeavor is LED lighting systems.

On the present record, Deese discloses AC driven LEDs, LED circuits, and AC drive circuits, and Kuo discloses a "high efficiency" LED lighting systems, as well as methods of maximizing emitted light from LEDs. Ex. 1004, 5:55–58; Ex. 1005, 1:45–60, 3:1–3, code (54). As such, both references appear to be within the '251 patent's field of LED lighting systems. Ex. 1001, 2:4:7 (noting that LED based lighting may be used for, among other things, "general lighting" and "signs"). Moreover, to the extent that either Deese or Kuo is not considered to be within the field of LED lighting systems, on this preliminary record both references appear reasonably pertinent to the efficiency problem for which the inventor was involved. *Id.* at 2:3–4 (noting that "[w]ith proper design considerations LEDs may be driven more efficiently"). Accordingly, Petitioner

demonstrates sufficiently for purposes of institution that Deese and Kuo are analogous art to the '251 patent

b) Reflective Substrate

Patent Owner argues the Petition should be denied because Petitioner applies a construction of "reflective substrate," i.e., "a substrate that reflects some light," that is unreasonably broad. Prelim. Resp. 35–36 (citing Pet. 22; Ex. 2003).

As noted by Patent Owner, Petitioner does assert that Deese's circuit board would reflect some light. Pet. 22. Petitioner further asserts, however, that Kuo has a reflective coating on its substrate and that one of ordinary skill in the art would have applied this coating to the circuit board of Deese. *Id.* at 13, 22. Patent Owner present no argument or evidence to suggest that the reflective coating of Kuo would not result in a "reflective substrate," as asserted by Petitioner.

On this record, Petitioner sufficiently explains where Deese and Kuo teach or suggest a reflective substrate. *Id.* at 13, 22.

c) "at least one LED circuit mounted on a reflective substrate"

Petitioner contends that the combination of Deese and Kuo would result in an LED circuit mounted on a reflective substrate. Pet. 13–14, 22. Patent Owner argues that this argument fails because Deese does not disclose a reflective substrate, and because the top side of Kuo's reflective circuit board does not support the full LED circuit. Prelim Resp. 37. According to Patent Owner, although the circuit board of Kuo has the LEDs on its reflective side, power save control circuit 22 is mounted on the non-reflective bottom of the circuit board. *Id.* at 37–38.

Patent Owner's argument misconstrues Petitioner's proposed combination. Petitioner does not contend that one of ordinary skill in the art would have applied Kuo's particular circuit board and circuit orientation in Deese. Rather, Petitioner argues that one of ordinary skill in the art would have applied Kuo's reflective coating to the circuit board of Deese. Pet. 13–14, 22. On this record, it appears this proposed combination would result in "at least one LED circuit mounted on a reflective substrate," as recited in claim 13.

d) Reason to Combine Deese and Kuo

Patent Owner contends Petitioner's rationale for combining Deese and Kuo is defective because it fails to explain why one of ordinary skill in the art would have made the proposed combination. Prelim. Resp. 40. According to Patent Owner, Petitioner merely "parrot[s] back" the teachings of Kuo, as opposed to providing a *KSR* rationale for making the proposed combination. *Id.* at 40–41 (referencing *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007)).

Petitioner asserts that one of ordinary skill in the art would have used Kuo's reflective coating on the circuit board of Deese in order to "improv[e] the brightness and safety of the traffic lights." Pet. 13–14. On this record, we see nothing conclusory or facially insufficient in this argument. Petitioner identifies specific disclosures of Deese and Kuo and, consistent with the reasoning of *KSR*, provides a rationale supported by factual underpinnings to explain why one of ordinary skill in the art would have combined the identified disclosures to arrive at the claimed subject matter.

e) Conclusion with Respect to Claim 13

Petitioner identifies where Deese and Kuo teach or suggest every limitation of claim 13. Petitioner also provides a reasoned argument as to

why one of ordinary skill in the art would have applied Kuo's reflective coating on the circuit board of Deese with a reasonable expectation of success. Accordingly, Petitioner demonstrates a reasonable likelihood that claim 13 would have been obvious over Deese and Kuo.

E. Claim 11 over Okuno and Teshima

Petitioner contends the subject matter of claim 11 would have been obvious over the combined disclosures of Okuno and Teshima. Pet. 27–38.

1. Okuno

Okuno discloses a "light-emitting diode display capable of emitting a large amount of colored light." Ex. 1007, 1:6–8. One object of Okuno's invention is to provide "a light-emitting diode display which, even at the occurrence of failure of some of the component diodes, can work continuously with no marked drop in function." *Id.* at 2:16–19.

The LED display of Okuno may have "a plurality of light-emitting diode units connected in parallel, each unit including a plurality of light-emitting diodes connected in series." *Id.* at 2:30–34. The power source may be any "power source of appropriate voltage such as a commercial ac power source." *Id.* at 2:34–37. A current limiting means may be provided in each unit in series with the light-emitting diodes, and a "full-wave rectifying circuit may be connected between the input terminal and the parallel connection of the diode units." *Id.* at 2:42–48. A capacitor may also be used to smooth the rectified waveform. *Id.* at 7:49–52.

Okuno reports that the wavelength of light emitted by the diodes may be determined by the type of semiconductor material employed, as well as the impurities added to this semiconductor material. *Id.* at 4:27–30. In particular, red, yellow, and green LEDs may be produced by varying the

amount and type of elements that make up the semiconductor material and the added impurities or dopants. *Id.* at 4:14–30.

2. Teshima

Teshima discloses a display device that uses colored light-emitting diodes as the light source. Ex. 1008, 1:6–9. Figures 10 and 11 of Teshima are reproduced below:

FIG. 10

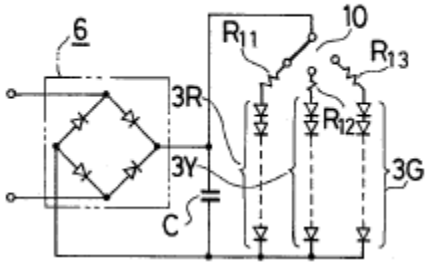


FIG. 11

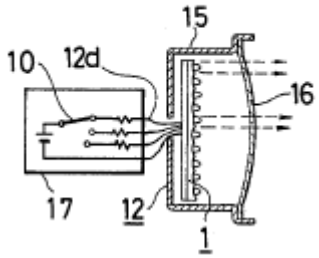


Figure 10 is a circuit diagram of a selective colored light display lamp device and Figure 11 is a diagrammatic cross-sectional view of a lamp unit. *Id.* at 4:6–9.

The circuit shown in Figure 10 is used "for actuating three groups of different color light emitting diodes." *Id.* at 8:39–40. This circuit includes full-wave rectifying circuit 6 and smoothing capacitor C. *Id.* at 8:40–42. Selection switch 10 may be connected to one of three different groups of colored light emitting diodes 3R, 3Y, and 3G, which are composed of "series connections of red, yellow, and green light emitting diodes, respectively." *Id.* at 8:42–50.

The lamp assembly of Figure 11 includes reflector unit 1 "carrying thereon three groups of light emitting diodes of red, yellow, and green colors and a substrate 12." *Id.* at 9:6–9. Reflector unit 1 is loaded in housing 15, which has transparent cover lens 16. *Id.* at 9:7–11. Lead wires 12d may be

connected to driver circuit 17 for selectively actuating any one of the red, yellow, and green lights via switch 10. *Id.* at 9:11–18.

3. Analysis

Petitioner contends that Okuno and Teshima both disclose an LED light system having an LED circuit array with a plurality of LED circuits (red, yellow, and green LED circuits) that each contain at least one LED, as recited in claim 11. Pet. 31–33. Petitioner further contends that Okuno discloses an active current limiting device connected in series to at least one of the LED circuits, as well as an LED driver (rectifier with smoothing capacitor) that is connected to the LED circuit array and has an input of a first AC voltage and frequency and outputs a second voltage. *Id.* at 34–35. Finally, Petitioner contends that Okuno discloses LEDs within the LED circuits that are doped with a light changing or enhancing substance and therefore produce a different color than another coated or doped LED in the LED circuit array. *Id.* at 36–37.

Petitioner contends one of ordinary skill in the art would have sought to implement Okuno's composite traffic light using the LED circuit array implementation details set forth in Teshima. *Id.* at 28. In particular, Petitioner contends one of ordinary skill in the art would have used Teshima's LED circuit array that is driven by a single LED driver "because doing so would eliminate redundant and wasteful additional LED drivers" in Okuno. *Id.* at 29 (asserting that a traffic light "only needs to drive one of the red, yellow, or green LED circuits at a time").

Patent Owner contends we should deny institution on this ground because (1) the Petition fails to demonstrate that Okuno and Teshima disclose "at least one of the coated or doped LEDs in the LED circuit array producing a different color of light than another coated or doped LED in the

LED circuit array," (2) the Petition seeks an improper advisory opinion regarding written description support in the '251 patent, and (3) the rationale for combining Okuno and Teshima is defective. Prelim. Resp. 44–54. We address these arguments in turn.

a) "at least one of the coated or doped LEDs in the LED circuit array producing a different color of light than another coated or doped LED in the LED circuit array"

Petitioner contends that the red, yellow, and green LED circuits of Okuno, in combination, constitute an LED circuit array. Pet. 31–32. Petitioner also contends that Teshima discloses a LED circuit array that is composed of LED circuits 3R, 3Y, and 3G, each of which is coupled to the output of the LED driver. *Id.* at 32. And Okuno explains that the different colors of the LEDs are generated by altering the type and amount of a dopant or impurity in the diode. Ex. 1007, 4:14–30; Pet. 36.

Patent Owner contends the Petition fails to demonstrate that Okuno teaches or suggests using coated or doped LEDs in an LED circuit array that produce different colors because "[e]ach color of LEDs in Okuno is its own distinct LED circuit array." Prelim. Resp. 46–47.

On this record, Petitioner adequately explains why the red, yellow, and green diodes of Okuno are doped LEDs with different compositions, why the red, yellow, and green LED circuits of Okuno produce different colored light, and why the red, yellow, and green LED circuits in combination constitute an LED circuit array. Pet. 31–32. Patent Owner's counter-arguments are not compelling at this stage because it does not explain why the red, yellow, and green LED circuits of Okuno each constitute a separate LED circuit array, as opposed to being individual LED circuits that are then combined into an LED circuit array having red, yellow,

and green LEDs. *See* Ex. 1001, 9:20–23 (noting that an LED circuit array has "a plurality of different LED circuits"), 25:61 (claiming "an LED circuit array having a plurality of LED circuits").

b) Advisory Opinion

The Petition asserts that, because the '251 patent relies entirely on the knowledge of one of ordinary skill in the art to support the "doped LED" claims, no narrower construction of doped LEDs would be supported by the written description of the '251 patent. Pet. 37–38. Patent Owner contends resolution of this question improperly requires an advisory opinion regarding the written description support provided in the '251 patent. Prelim. Resp. 48–49.

Patent Owner has not construed "doped LED" or suggested that Petitioner's interpretation of this claim term is incorrect. Accordingly, we need not address Petitioner's argument regarding the scope of the '251 patent's disclosure of this claim element.

c) Reason to Combine

Patent Owner argues that the fact that Okuno lacks implementation details is not, by itself, sufficient to explain why one of ordinary skill in the art would have sought to implement or combine specific structures of Teshima. Prelim. Resp. 50.

Contrary to Patent Owner's argument, the Petition does not rely merely on implementation details as the reason one of ordinary skill in the art would have combined the disclosures of Okuno and Teshima. Pet. 28–29. Rather, Petitioner argues that one of ordinary skill in the art looking to implement Okuno's disclosures would have looked to the method of Teshima because it was understood in the art that Teshima's use of a single driver was beneficial and "would eliminate redundant and wasteful

additional LED drivers." *Id.* at 29. Accordingly, on this record, Patent Owner's arguments do not dissuade us from instituting trial.

d) Conclusion with Respect to Claim 11

Petitioner sufficiently identifies where every limitation of claim 11 is taught or suggested in Okuno and Teshima. Petitioner also provides a sufficient rationale supported by factual underpinnings to explain why one of ordinary skill in the art would have combined the relevant disclosures of Okuno and Teshima to arrive at the subject matter of claim 11 with a reasonable expectation of success. Pet. 28–31. Accordingly, Petitioner demonstrates a reasonable likelihood that claim 11 would have been obvious over Okuno and Teshima.

F. Claim 11 over Okuno, Teshima, and Butterworth

Petitioner contends the subject matter of claim 11 would have been obvious over the combined disclosures of Okuno, Teshima, and Butterworth. Pet. 38–44. Petitioner relies upon Butterworth in this ground for its disclosure of coated LEDs that can be used in place of doped LEDs. *Id.* at 39–40. Having determined that Petitioner demonstrates a reasonable likelihood that claim 11 would have been obvious over Okuno and Teshima, we need not address, for purposes of this Decision, Petitioner's further arguments regarding Okuno, Teshima, and Butterworth.[8]

G. Claim 1 over Deese, Kuo, and Obeck

Petitioner contends the subject matter of claim 1 would have been obvious over the combined disclosures of Deese, Kuo, and Obeck. Pet. 11–24.

[8] We note, however, that we will address this ground if necessary in any Final Written Decision.

1. Obeck

Obeck discloses a traffic light control system "which includes two-way communications between a moving emergency vehicle approaching a busy intersection with one or more traffic lights." Ex. 1006, code (57).

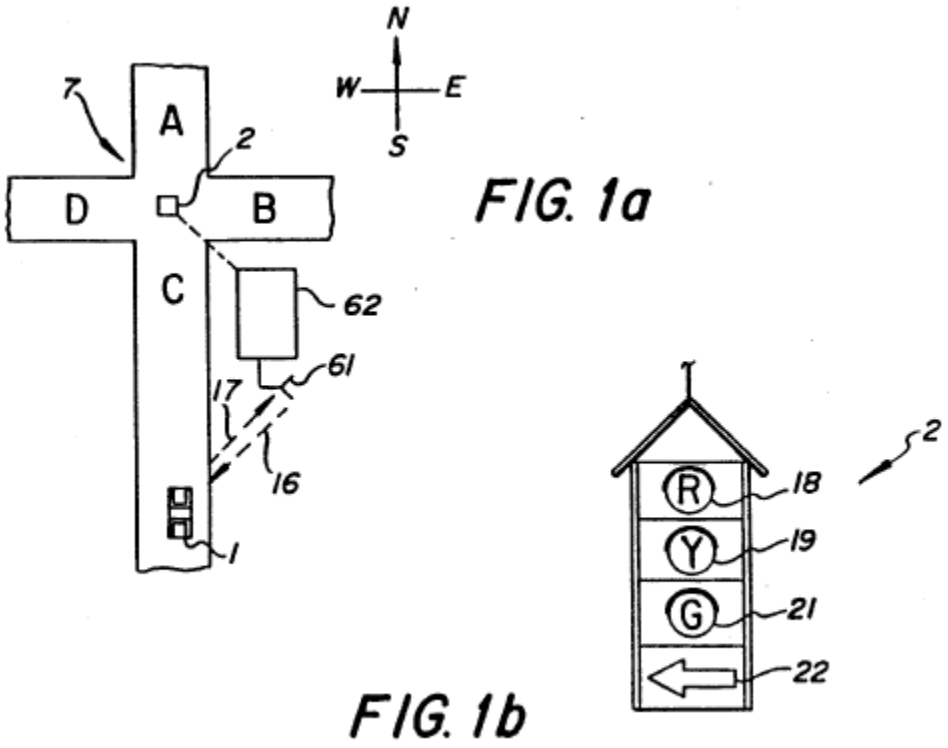


Figure 1a is a diagrammatic "birds-eye" view of an intersection and Figure 1b is a traffic light. Ex. 1006, 3:9–12, 3:44–46.

In Figure 1a, as emergency vehicle 1 approaches an intersection, it communicates with signal control 62, which contains an antenna and is located near the intersection. *Id.* at 3:51–57, 4:12–16, 5:39–43. Obeck explains that signal control 62 includes "electrical relays with contacts to control the lights, power connections to the main ac-power source, and sequencing apparatus that controls the successive phases of traffic lights." *Id.* at 3:51–57, 5:39–51. Signal 2, also shown in Figure 1b, is located above

the intersection and is controlled by signal control 62. *Id.* at 3:49–57, 6:36–48.

2. Analysis

Petitioner contends that Deese, Kuo, and Obeck teach or suggest every limitation of claim 1. Pet. 18–24. With respect to the reason to combine the various disclosures of Deese, Kuo, and Obeck, Petitioner contends that one of ordinary skill in the art would have sought to use the reflective coating of Kuo in Deese in order to more efficiently utilize all of the light generated by Deese's LEDs. *Id.* at 13. Petitioner further contends that one of ordinary skill in the art would have sought to implement Obeck's antenna and receiver in the traffic light system of Deese in order to provide for signal preemption for emergency vehicles, as is expressly disclosed in Obeck. *Id.* at 16, 23–24.

Patent Owner contends Petitioner's arguments are insufficient to support institution because (1) Deese, Kuo, and Obeck are not analogous art to the '251 patent, (2) Petitioner provides inconsistent arguments regarding the driver of Deese in a parallel proceeding, (3) Obeck's ground-based antenna is distinct from the "packaged" LED devices described in the '251 patent, and (4) Petitioner's proffered rationale for combining Deese, Kuo, and Obeck is defective. Prelim. Resp. 13, 17–34. We address Patent Owner's first argument below.

As noted above, to resolve whether art is analogous we must determine "(1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the problem with which the inventor is involved." *Bigio*, 381 F.3d at 1325.

Petitioner contends Deese, Kuo, and Obeck are analogous art to the '251 patent because they are all directed to "lighting systems." Pet. 16 (citing Ex. 1002 ¶ 49).

As discussed above, on the present record, we determine the '251 patent's field of endeavor is "LED lighting systems." Ex. 1001, 1:41–44. For the reasons set forth above with respect to the combination of Deese and Kuo, on this preliminary record it appears that Deese and Kuo are within the '251 patent's field of endeavor (LED lighting systems), and are also reasonably pertinent to the problem faced by the inventor of the '251 patent. Ex. 1004, 5:55–58; Ex. 1005, 1:45–60, 3:1–3, code (54). Obeck, on the other hand, does not disclose an LED lighting system or any circuits or drivers intended to operate LED lights. As such, it is unclear why Obeck is in the same field of endeavor as the '251 patent.[9]

As noted by Petitioner, Deese, Kuo, and Obeck are all directed to traffic light systems. Pet. 16. The relevant question, however, is whether Obeck's general traffic signal system is within the *'251 patent's* field of LED lighting systems, not whether Deese, Kuo, and Obeck could be said to all be in the same field of endeavor. As such, Petitioner's arguments regarding the related teachings of Deese, Kuo, and Obeck are insufficient to show that Obeck is in the same field of endeavor as the '251 patent.

Even if Obeck is not in the same field of endeavor as the '251 patent, it may still be analogous art if it is "reasonably pertinent to the problem with

[9] Petitioner identifies the field of endeavor for the '251 patent as "LED lighting systems" when discussing the combination of Okuno and Teshima. Pet. 28 ("Okuno, Teshima and the '251 patent are analogous art because they all relate to the field of endeavor of LED lighting systems."). Petitioner does not explain why the field of endeavor *of the '251 patent* would shift depending on the prior art asserted.

which the inventor is involved." *Bigio*, 381 F.3d at 1325. On this record, however, Petitioner does not appear to explain why Obeck's non-LED traffic light system and signal preemption method are reasonably pertinent to the LED circuit and driver issues faced by the inventor of the '251 patent. Pet. 16. Accordingly, we question whether Obeck is analogous art to the '251 patent—a question that the parties may further address at trial.

III. CONCLUSION

For the reasons discussed above, Petitioner demonstrates a reasonable likelihood that it would prevail in showing that at least one claim of the '251 patent is unpatentable. As such, we institute review with respect to all claims and grounds asserted in the Petition. *See PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (interpreting 35 U.S.C. § 314 to require "a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition").

IV. ORDER

Accordingly, it is:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1, 11, and 13 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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