UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.
Petitioner

v.

LYNK LABS, INC.
Patent Owner

Patent No. 10,492,251

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,492,251

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I. INTRODUCTION

Samsung Electronics Co., Ltd. ("Petitioner" or "Samsung") requests *inter partes* review of claims 1 and 6 ("challenged claims") of U.S. Patent No. 10,492,251 ("the '251 patent") (Ex. 1001) assigned to Lynk Labs, Inc. ("Patent Owner" or "PO"). As demonstrated below, the challenged claims should be found unpatentable and canceled.

II. MANDATORY NOTICES

Real Parties-in-Interest: Petitioner identifies the following as the real parties-in-interest: Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc.

Related Matters: The '251 patent is at issue in the following matter(s):

- *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, No. 1:21-cv-02665 (N.D. Ill.) (seeking declaratory judgment of non-infringement as to the '251 patent and also U.S Patent Nos. 10,492,252, 10,499,466, 10,506,674, 10,966,298, 10,687,400, 10,750,583, 10,517,149, 10,154,551, 10,652,979, and 11,019,697) ("Illinois-Litigation")
- *Lynk Labs, Inc. v. Samsung Electronics Co. Ltd. et al.*, 6:21-cv-00526 (W.D. Tex.), transferred to Illinois as Case No. 1:21-cv-05126 and consolidated with 1:21-cv-02665 (Illinois-Litigation)

- *Lynk Labs, Inc. v. The Home Depot USA, Inc. et al.*, No. 6:21-cv-00097 (W.D. Tex.) ("HD-Litigation")
- *Home Depot U.S.A., Inc. v. Lynk Labs, Inc.*, IPR2021-001369 ("HD-IPR").

The '251 patent claims the benefit of priority to a plurality of applications, including two provisional applications (U.S. Provisional Application No. 60/574,653, filed February 25, 2004 ("the '653 Provisional") (Ex. 1067), and 60/559,867, filed April 6, 2004 ("the '867 Provisional"). (Ex. 1001, 1-2 (Related U.S. Application Data).) The following patents claim the same benefit of priority to the '653 Provisional and '867 Provisional and have corresponding IPR proceedings:

- U.S. Patent No. 8,531,118 at issue in *Acuity Brands Lighting, Inc., v. Lynk Labs, Inc.*, IPR2016-01133 (terminated);
- U.S. Patent No. 10,506,674 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01299 (pending);
- U.S Patent No. 11,019,697 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01300 (pending);
- U.S Patent No. 10,492,252 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01345 (pending);
- U.S Patent No. 10,499,466 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01346 (pending);

- U.S Patent No. 10,966,298 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01347 (pending);
- U.S Patent No. 10,154,551 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01575 (pending);
- U.S Patent No. 10,652,979 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01576 (pending);
- U.S Patent No. 10,154,551 at issue in *Home Depot USA, Inc. v. Lynk Labs, Inc.*, IPR2021-01367 (pending).

Petitioner is concurrently filing another IPR petition challenging claims of the ’251 patent.[1]

Counsel and Service Information: Lead counsel: Naveen Modi (Reg. No. 46,224), and Backup counsel are (1) Joseph E. Palys (Reg. No. 46,508), (2) Arvind Jairam (Reg. No. 62,759), (3) Mark Consilvio (Reg. No. 72,065), (4) Howard Herr (*pro hac vice* admission to be requested). Service information is Paul Hastings LLP, 2050 M St., Washington, D.C., 20036, Tel.: 202.551.1700, Fax: 202.551.1705,

[1] Petitioner concurrently submits a separate paper (consistent with the Trial Practice Guide Update, July 2019), explaining why the filing of multiple petitions should not be a basis for discretionary denial under 35 U.S.C. § 314.

email: PH-Samsung-LynkLabs-IPR@paulhastings.com. Petitioner consents to electronic service.

III. PAYMENT OF FEES

The PTO is authorized to charge any fees due during this proceeding to Deposit Account No. 50-2613.

IV. GROUNDS FOR STANDING

Petitioner certifies that the ’251 patent is available for review and Petitioner is not barred/estopped from requesting review on the grounds herein.

V. PRECISE RELIEF REQUESTED AND GROUNDS

Claims 1 and 6 should be canceled as unpatentable based on the following grounds:

Ground 1: Claims 1 and 6 are unpatentable under § 103 as being obvious over *Birrell* (Ex. 1005) and *Schultz* (Ex. 1046);

Ground 2: Claims 1 and 6 are unpatentable under § 103 as being obvious over *Piepgras* (Ex. 1030); and

Ground 3: Claims 1 and 6 are unpatentable under § 103 as being obvious over *Harbers* (Ex. 1006) and *Schultz*.

The ’251 patent issued from an application filed October 1, 2018, which claims priority via a chain of applications to the ’653 Provisional filed February 25, 2004. Assuming *arguendo* that February 25, 2004 is the critical date, *Birrell*, published July 17, 2003, qualifies as prior art at least under pre-AIA 35 U.S.C. § 102(a); *Piepgras*, filed September 17, 2002 and issued July 24, 2003, qualifies as prior art at least under §§ 102(a) and/or (e); and *Schultz*, filed December 2, 2003 and published June 2, 2005, qualifies as prior art at least under §102(e).

Further, as discussed in §VII.B, the '251 patent is not entitled to a filing date earlier than May 12, 2010. Under that condition, *Harbers* qualifies as prior art at least under §102(e), and *Birrell*, *Piepgras*, and *Schultz* qualify as prior art under §102(b). *Harbers* issued from an application filed on April 19, 2011, but claims the benefit of, and is entitled to, priority under 35 U.S.C. § 119(e) based on provisional application No. 61/331,225 ("*Harbers-provisional*") filed May 4, 2010 (Ex. 1010). *Harbers-provisional* properly supports the claimed subject matter of *Harbers* in compliance with pre-AIA 35 U.S.C. §112, as at least one claim of *Harbers* is supported by the written description of *Harbers-provisional*. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1381 (Fed. Cir. 2015); MPEP § 2136(I) (9th ed. rev. 10.2019, June 2020); MPEP § 2136.03(III).

The drawings and specification of *Harbers-provisional* are nearly identical to those of *Harbers* and thus provide the same support for the claims of *Harbers* as *Harbers*' specification itself. (*Compare* Ex. 1006, *with* Ex. 1010). This Petition properly provides parallel citations to *Harbers* and *Harbers-provisional*. *See*, *e.g.*, *Unified Patents, Inc. v. Longhorn HD LLC*, IPR2020-00879, Paper 10 at 15-16

(PTAB Nov. 12, 2020). The chart below maps claim 1 of *Harbers* to corresponding support in *Harbers-provisional*. (Ex. 1002, ¶¶89-90.)

Harbers **(Ex. 1006)**	***Harbers-provisional*** **(Ex. 1010)**[2]
1. An LED based illumination device comprising:	*See*, *e.g.*, Ex. 1010, (claim 23 ("An LED based illumination module comprising:"), Title, FIGS. 1-14, ¶¶[0001], [0003] (luminaires of Figs. 1-2 including illumination module 100, reflector 140, and light fixture 130), [0004], [0005]-[0006] (FIGS. 3A-3B's components of "LED based illumination module" 100, including "packaged LEDs"), [0009] ("LEDs 102 can emit different or the same colors"), [0010]-[0012] (mounting board 104 and LED chip examples), [0014] and [0017]-[0021] (electrical interface module (EIM) 120), [0021]-[0025] (discussing EIM 120), [0026]-[0028] (describing LED selection module 40), [0029] (describing FIG. 12, and dimming controls), [0032]-[0033], [0034]-[0035], [0049]-[0050] (data receiving and transmitting), [0051]-[0053] (sensors and related communications by EIM), ([0055]

[2] Citations to Ex. 1010 are to specification paragraph numbers/figures/claims in Exhibit 1010 at pp. 5-53.

***Harbers* (Ex. 1006)**	***Harbers-provisional* (Ex. 1010)[2]**
	(modifications and combinations of disclosed features can be practiced).)
a processor;	(*See* citations above; Ex. 1010, claim 23 ("a processor"), FIG. 10 (processor 22), ¶¶[0021] (processor 22), [0024] (digital commands may be generated by operation of processor 22), [0025] ("processor 22 may command the current supplied by power converter 30"), [0028], [0031]-[0033] (various operations of processor 22), [0036].)
A non-volatile memory coupled to the processor and storing information associated with the LED based illumination device; and	(*See* citations above; Ex. 1010, claim 23 ("a non-volatile memory"), claim 24 ("the information includes an indication of a serial number of the illumination module stored in the non-volatile memory"), claim 25, FIG. 10, ¶¶[0021] (non-volatile memory 26), [0031] ("EIM 120 stores a serial number that individually identifies the illumination module 100 … The serial number is stored in non-volatile memory 26 of EIM 120."), *id.* (an illumination module 100 serial number "is programmed into EPROM 26"), [0033].)
a communications port controlled by the processor to transmit the information from	(*See* citations above; *see also* Ex. 1010, claim 23 ("a communications port operable to transmit information from the interface module"), claim

Harbers **(Ex. 1006)**	***Harbers-provisional*** **(Ex. 1010)**[2]
the LED based illumination device.	24 ("the information includes an indication of a serial number of the illumination module stored in the non-volatile memory"), claim 25, claims 34-39 (communicating lifetime data), FIG. 10, ¶¶[0025] ("EIM 120 may receive and transmit data over PDIC 34, RF transceiver 24, and IR transceiver 25" and "the information transmitted by EIM 120 by any of the above-mentioned means includes…serial number"), [0031] ("EIM 120 may communicate the serial number in response to receiving a request to transmit the serial number…In response, processor 22 … communicates the serial number to any of RF transceiver 24, IR transceiver 25, or PDIC 34 for communication of the serial number from EIM 120").)

Birrell, *Piepgras*, *Schultz*, and *Harbers* were not considered during prosecution. (Ex. 1004.)

VI. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art as of the claimed priority date of the '251 patent ("POSITA") would have had at least a bachelor's degree in electrical engineering, computer engineering, computer science, physics, or the equivalent, and two or more years of experience with LED devices and/or related circuit design, or a related field. (Ex. 1002, ¶¶20-24.)[3] More education can supplement practical experience and vice versa. (*Id.*)

VII. THE ’251 PATENT

A. SUMMARY OF THE ’251 PATENT

The ’251 patent purports its alleged invention relates to LEDs and drivers, e.g., AC-driven LEDs/circuits. (Ex. 1001, 1:40-44, 3:20-9:61.) Yet, the challenged claims are broadly directed to an LED lighting system/device/driver including conventional/well-known generic components arranged to operate according to their known functions. As such, the claimed systems/devices/drivers were demonstrably obvious.[4] (§IX; Ex. 1002, ¶¶51-53; *id.*, ¶¶25-50 (citing, *inter alia*, Exs. 1015, 1041-1045), 52-66, 67-201; Exs. 1054-1070.)

B. PRIORITY DATE OF THE ’251 PATENT

In the Illinois-Litigation, PO asserts the ’251 patent is entitled to a priority date of February 25, 2004 based on the ’653 Provisional (Ex. 1067). (Ex. 1038, 16.)

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[3] Petitioner submits the declaration of R. Jacob Baker, Ph.D., P.E., an expert in the field of the ’251 patent. (Ex. 1002, ¶¶1-19; Ex. 1003.)

[4] The ’251 patent issued from claims identified as allowable on first Office Action without any substantive prior art analysis. (Ex. 1004, 236, 256-262, 509-510.)

However, the ’251 Patent is entitled a priority date no earlier than May 12, 2010 for at least three reasons.

First, the ’251 patent is an indirect continuation of a national stage entry of a Patent Cooperation Treaty (“PCT”) application filed under 35 U.S.C. § 371. Under § 371(b), this national stage entry could not have claimed priority to any application filed more than 30 months before the filing of the national stage entry. Consistent with this rule, the national stage entry claimed priority to U.S. Provisional App. No. 61/333,963, filed exactly thirty months before the national stage entry. As such, the only priority document that falls within the required treaty parameters was filed on May 12, 2010.

Second, to the extent PO’s applications claimed an earlier priority date, both the PCT application and its national stage entry were filed-out-of-time (more than 12 months or 30 months, respectively) from earlier-claimed priority filings. Each of those filings are thus ineffective and break the priority chain.

Third, Lynk cannot bypass the PCT application and claim priority to the ’653 Provisional under § 120. By the time U.S. national stage prosecution began, the ’653 Provisional’s application chain already completed prosecution, thus breaking any continuity of prosecution.

Thus, PO cannot circumvent the timing and priority requirements of the PCT. PO filed international applications to gain the benefits associated with such filings, including streamlined entry into foreign jurisdictions. Having reaped these benefits, PO cannot now assert a priority date earlier than that permitted by the applicable treaties. Thus, as explained further below, the earliest available priority date for the ’251 patent claiming the benefit of these treaty filings is May 12, 2010.

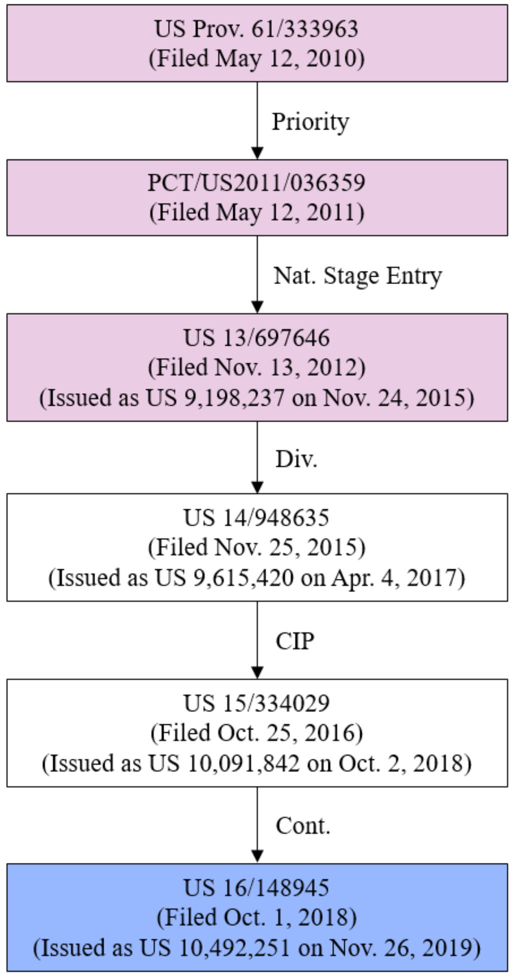
1. May 12, 2010 is the earliest possible priority date.

The ’251 patent is not entitled a priority date before May 12, 2010 because it claims priority through the national stage of a PCT application. (Ex. 1001, Cover.) Under § 371(b), PO’s national stage entry can only claim a priority date within 30 months from its filing. *Actelion Pharms., Ltd. v. Matal*, 881 F.3d 1339, 1342 (Fed. Cir. 2018) (“Article 22 of the PCT, which is referenced in § 371(b), specifies the national stage filing requirements under the Treaty, including the requirement to file the national stage application ‘not later than at the expiration of 30 months from the priority date.’”); *see also* 37 C.F.R. §§ 1.495(b) and (h).

The ’251 patent recites a complicated set of priority claims. (Ex. 1001, Cover.) These claims, however, run through U.S. Application No. 13/697,646 (the “’646 Application”). (*Id.*) The ’646 Application was filed on November 13, 2012 as the national stage entry of PCT/US2011/036359 (“the ’359 PCT Application”), as shown below.

> The present application is a continuation of U.S. patent application Ser. No. 15/334,029 filed Oct. 25, 2016, which is continuation-in-part of U.S. patent application Ser. No. 14/948,635 filed Nov. 23, 2015, which is a divisional application of U.S. patent application Ser. No. 13/697,646 filed Nov. 13, 2012 which is a 371 National Phase Application of International Application No. PCT/US2011/0363359 filed May 12, 2011 which claims priority to U.S. Provisional Application No. 61/333,963 filed May 12, 2010 and is a continuation-in-part of International Application No. PCT/US2010/062235 filed Dec. 28, 2010 which claims priority to U.S. Provisional Application No. 61/284,927 filed Dec. 28, 2009 and U.S. Provisional Application No. 61/335,069 filed Dec. 31, 2009 and is a continuation-in-part of U.S. patent application Ser. No. 12/287,267, filed Oct. 6, 2008, which claims priority to U.S. Provisional Application No. 60/997,771, filed Oct. 6, 2007; U.S. patent application Ser. No. 12/364,890 filed Feb. 3, 2009 which is a continuation of U.S. application Ser. No. 11/066,414 (now U.S. Pat. No. 7,489,086) filed Feb. 25, 2005 which claims priority to U.S. Provisional Application No. 60/547,653 filed Feb. 25, 2004 and U.S. Provisional Application No. 60/559,867 filed Apr. 6, 2004; International Application No. PCT/US2010/001597 filed May 28, 2010 which is a continuation-in-part of U.S. application Ser. No. 12/287,267, and claims priority to U.S. Provisional Application No. 61/217,215, filed May 28, 2009; International Application No. PCT/US2010/001269 filed Apr. 30, 2010 which is a continuation-in-part of U.S. application Ser. No. 12/287,267, and claims priority to U.S. Provisional Application No. 61/215,144, filed May 1, 2009; the contents of each of these applications are expressly incorporated herein by reference.

(*Id.*, 1:6-37.) (*See also* Ex. 1056, Cover; Ex. 1039, 286-308.)



Under § 371(b), which adopts and incorporates PCT Articles 22 and 39, the national stage prosecution of a PCT application must begin within 30 months after its priority date. *Actelion*, 881 F.3d at 1342; 37 C.F.R. §§ 1.495(b) and (h). "[T]he claim for priority must be made during the pendency of the [PCT] application and within the time limit set forth in the PCT and the Regulations under the PCT." 37 C.F.R. § 1.55(a)(1)(ii) (January 16, 2007); *see also* 37 C.F.R. § 1.55 (d)-(e) (current) (any priority claim not "made within the time limit set forth in the PCT and the Regulations under the PCT" is "considered to have been waived"). Thirty months before November 13, 2012 was May 12, 2010—the filing date of U.S. Provisional App. No. 61/333,963.[5] Thus, the '646 Application's earliest possible priority date is May 12, 2010. Because the '251 patent descends from the '646 Application, it is limited to the same priority date. *See Natural Alternatives Int'l, Inc. v. Iancu*, 904 F.3d 1375, 1382-83 (Fed. Cir. 2018) (child application's priority limited by priority claim of parent).

2. Any earlier priority claim is ineffective under the PCT.

The '359 PCT Application lists on its face a number of previously filed U.S. patent applications. (Ex. 1049, 2.) But it does not (and cannot) claim priority to them because they were filed more than twelve months earlier. Had the '359 PCT Application claimed priority to an earlier application, it would have been untimely under PCT Rules, and thus ineffective when it was filed. *See* PCT Rule 2.4 (defining "priority period" as "the period of 12 months from the filing date of the earlier application whose priority is so claimed"); PCT Article 8 ("The international application may … claim[] the priority of one or more earlier applications filed in or for any country party to the Paris Convention" and such a claim is "provided in Article 4 of the Stockholm Act of the Paris Convention"); Article 4(C) of the Paris

[5] November 12, 2012 was Veteran's Day, a Federal holiday. Thus, November 13, 2020 is considered within 30 months of May 12, 2010 under 37 C.F.R § 1.7.

Convention (setting a twelve month "period[] of priority" for patents); MPEP § 1842, II ("An international application under the Patent Cooperation Treaty is generally filed within 12 months after the filing of the first application directed to the same subject matter.").

Indeed, the PCT's examining and searching authorities correctly determined "12 May 2010" as the '359 PCT Application's priority date in its Preliminary Report on Patentability and Written Opinion:

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference LYN101061PCT	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/US2011/036359	International filing date *(day/month/year)* 12 May 2011 (12.05.2011)	Priority date *(day/month/year)* 12 May 2010 (12.05.2010)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant LYNK LABS, INC.		

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: MICHAEL D. LAKE
FACTOR & LAKE, LTD.
1327 W. WASHINGTON BLVD., SUITE 5G/H
CHICAGO, IL 60607

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	17 AUG 2011
Applicant's or agent's file reference LYN101061PCT	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US 11/36359	12 May 2011 (12.05.2011)	12 May 2010 (12.05.2010)

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - G05F 1/00 (2011.01)
USPC - 315/294

Applicant LYNK LABS, INC.

(Ex. 1039, 426-427; *see also* Ex. 1050, 2, 45-46, 48.)

Similarly, the ’646 Application, the national stage entry filed under § 371, lists several earlier-filed applications on its face, but does not (and cannot) claim priority to them. (Ex. 1056, Cover; Ex. 1039, 126, 145, 283, 286, 426-427.) Because these prior applications were filed more than 30 months before the ’646 Application’s filing, PO’s national stage entry would have been untimely had it claimed priority to them. *See* 35 U.S.C. § 371(b); *Actelion,* 881 F.3d at 1342. Indeed, the PTO’s Notice of Acceptance and Filing Receipt for the ’646 Application correctly recognized “05/12/2010” as the claimed priority date:

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U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
13/697,646	Michael Miskin	LYN-101061

22876
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INTERNATIONAL APPLICATION NO.	
PCT/US11/36359	
I.A. FILING DATE	PRIORITY DATE
05/12/2011	05/12/2010

CONFIRMATION NO. 9036
371 ACCEPTANCE LETTER

OC000000057679922

Date Mailed: 11/21/2012

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office in its capacity as a Designated / Elected Office (37 CFR 1.495), has determined that the above identified international application has met the requirements of 35 U.S.C. 371, and is ACCEPTED for national patentability examination in the United States Patent and Trademark Office.

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

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Assignment For Published Patent Application
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Power of Attorney: The patent practitioners associated with Customer Number 22876

Domestic Priority data as claimed by applicant
This application is a 371 of PCT/US11/36359 05/12/2011
which claims benefit of 61/333,963 05/12/2010

(Ex. 1039, 283, 286.) When the '646 Application was allowed to issue, its Bibliographic Data Sheet accompanying the Notice of Allowance again identified "05/12/2010" as its priority claim:

BIB DATA SHEET

CONFIRMATION NO. 9036

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
13/697,646	11/13/2012 RULE	315	2844	LYN-101061

APPLICANTS

INVENTORS
Michael Miskin, Sleepy Hollow, IL;

** **CONTINUING DATA** *************************
This application is a 371 of PCT/US11/36359 05/12/2011
which claims benefit of 61/333,963 05/12/2010

** **FOREIGN APPLICATIONS** *************************

** **IF REQUIRED, FOREIGN FILING LICENSE GRANTED** ** ** SMALL ENTITY **
11/17/2012

Foreign Priority claimed ☑ Yes ☐ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /MONICA C KING/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		IL	14	33	2

(*Id.*, 145.)

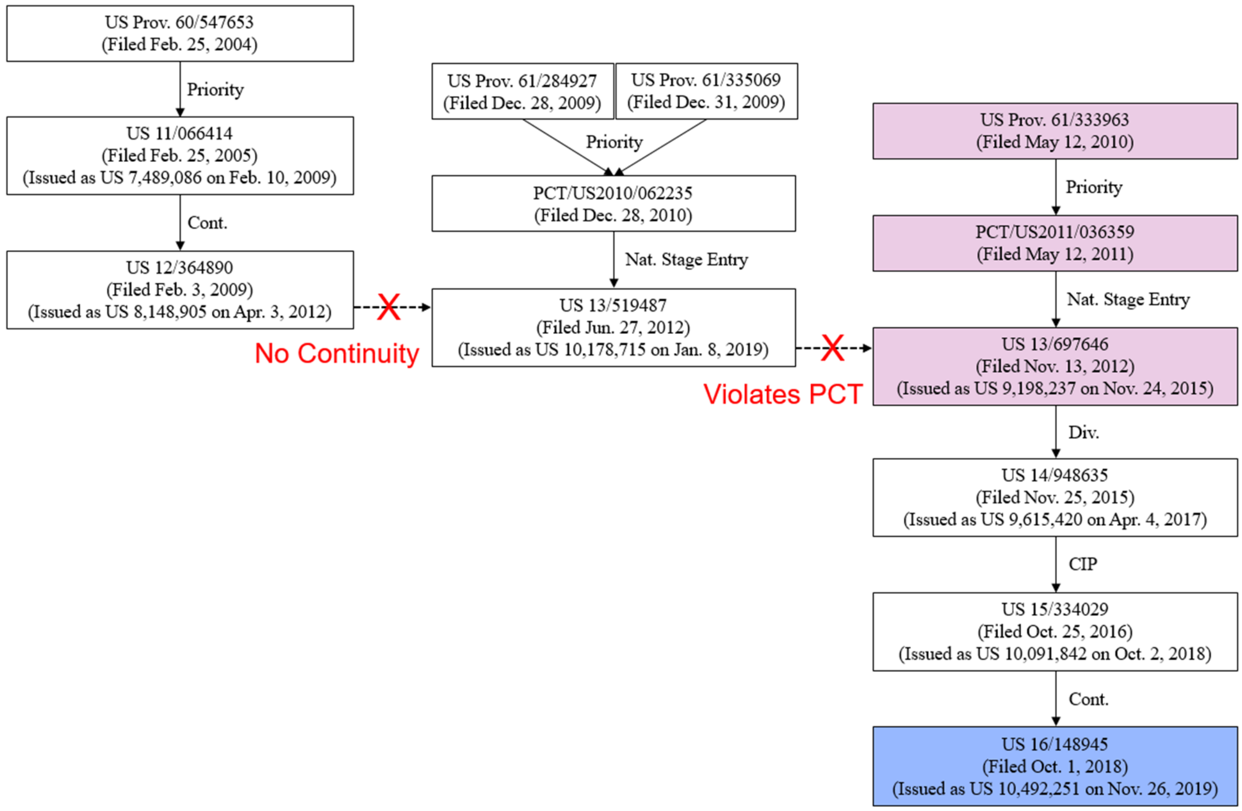
The ’251 patent’s claim priority to the February 25, 2004 filing date of the ’653 Provisional flows through the ’646 Application, and is therefore improper. The ’646 Application, as a PCT national stage entry, complied with the 30-month rule only if it claimed priority to U.S. Provisional Application No. 61/333,963 filed on May 12, 2010. Had PO tried to claim priority to a 2004 application, as PO now asserts in litigation, its national stage entry would have been untimely by over ***74 months***.

3. Any earlier priority claim under § 120 also fails.

By the time that the ’646 Application was filed, the domestic priority chain to which the ’251 patent claims already completed prosecution. Thus, PO cannot bypass the PCT Application to claim priority to the '653 Provisional through another U.S. application due to the lack of continuity of prosecution.[6]

As shown below, the '251 patent's priority claim to the '653 Provisional goes through U.S. Application No. 13/519,487 ("the '487 Application"), which was the national stage entry of PCT/US2010/062235, and U.S. Application No. 12/364,890 ("the '890 Application"), which issued as U.S. Patent No. 8,148,905 ("the '905 Patent"):

[6] The '646 Application was a national stage entry and not a "bypass" application, which would have required a different application and a different filing fee. (*See* Ex. 1039, 286, 290-291, 295; MPEP § 1895.01 (procedure for "bypass" application).)



(Ex. 1001, Cover; Ex. 1051, Cover; Ex. 1056, Cover.) The ’487 Application was filed on June 27, 2012; the ’646 Application was filed on November 13, 2012. (Ex. 1051, Cover; Ex. 1056, Cover.) By the beginning of their U.S. prosecution in June and November 2012, the ’890 Application already issued as the ’905 Patent in April 2012. (Ex. 1059, Cover.) Thus, there is no continuity of prosecution between the ’890 Application and the ’487/’646 Applications.

The ’235/’359 PCT applications cannot provide the continuity of prosecution required by § 120 either. As explained above, neither PCT application could have claimed priority to the ’890 Application because they were filed more than twelve months after the ’890 Application, in contravention of the treaty rules. *See* PCT

Rule 2.4; PCT Article 8; Article 4(C) of the Paris Convention; MPEP 1842; *see also* (Ex. 1050, 2, 45-46, 48) (identifying the ’646 PCT Application’s priority date as “12 May 2010”); Ex. 1052, 19, 26-27, 29) (identifying PCT/US2010/062235’s priority date as “28 December 2009”). Because any assertion of earlier priority would render these PCT filings ineffective under applicable treaties and rules, continuity of prosecution is broken and any such priority claim must fail.

The ’251 Patent’s priority date cannot be earlier than the ’646 Application’s priority date. *See Natural Alternatives*, 904 F.3d at 1382-83. Thus, applying § 371, under which the ’646 Application was filed, PO cannot establish a priority date earlier than May 12, 2010 for the ’251 Patent.

VIII. CLAIM CONSTRUCTION

The Board only construes the claims when necessary to resolve the underlying controversy. *Toyota Motor Corp. v. Cellport Systems, Inc.*, IPR2015-00633, Paper 11 at 16 (Aug. 14, 2015) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). For purposes of this proceeding, no special constructions are necessary to assess whether the challenged claims are unpatentable over the asserted prior art as the asserted grounds demonstrate unpatentability under any reasonable interpretation of the claimed terms.[7] (Ex. 1002, ¶54.)

[7] Petitioner reserves all rights to raise claim construction and other arguments, including challenges under 35 U.S.C. §§ 101 or 112, in district court as relevant to those proceedings. *See*, *e.g.*, *Target Corp. v. Proxicom Wireless, LLC*, IPR2020-00904, Paper 11 at 11-13 (Nov. 10, 2020). A comparison of the claims to any accused products in litigation may raise controversies that are not presented here given the similarities between the references and the patent.

IX. DETAILED EXPLANATION OF GROUNDS[8]

A. Ground 1: Claims 1 and 6 Are Obvious over *Birrell* and *Schultz*

1. Claim 1

a) An LED lighting system comprising:

To the extent limiting, *Birrell* discloses this limitation. (Ex. 1002, ¶¶91-95.) For example, *Birrell* discloses systems for "connecting electrical devices to power sources," e.g., "lighting **systems** to illuminate wide areas" and "other lighting arrangements." (Ex. 1005, 2:3-13, Title, Abstract, FIGS. 1-3, 8-10; Ex. 1002, ¶¶92-93.)[9] The system includes a lighting tile 50 and **light-emitting diode (LED)** light source(s), which are LEDs. (Ex. 1005, FIGS. 1, 8 (LEDs 59), 11:26-12:11, 13:31-33, 14:26-15:33, 15:15-16:10 (tile 50 including various components, e.g., sensors, circuitry, and microcontroller for controlling tile functions); Ex. 1002, ¶93.)

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[8] Section IX references exhibits other than the asserted prior art for each ground, which for each respective ground, reflect the state of the art known to a POSITA consistent with the testimony of Dr. Baker.

[9] PO contends things like a smartphone, smart TV, smart refrigerator, and smart washer/dryer, constitute an "LED lighting system." (Ex. 1083, 2-5; Ex. 1084, 2, 7, 11, 15, 19, 24, 28, 33, 37, 41.)

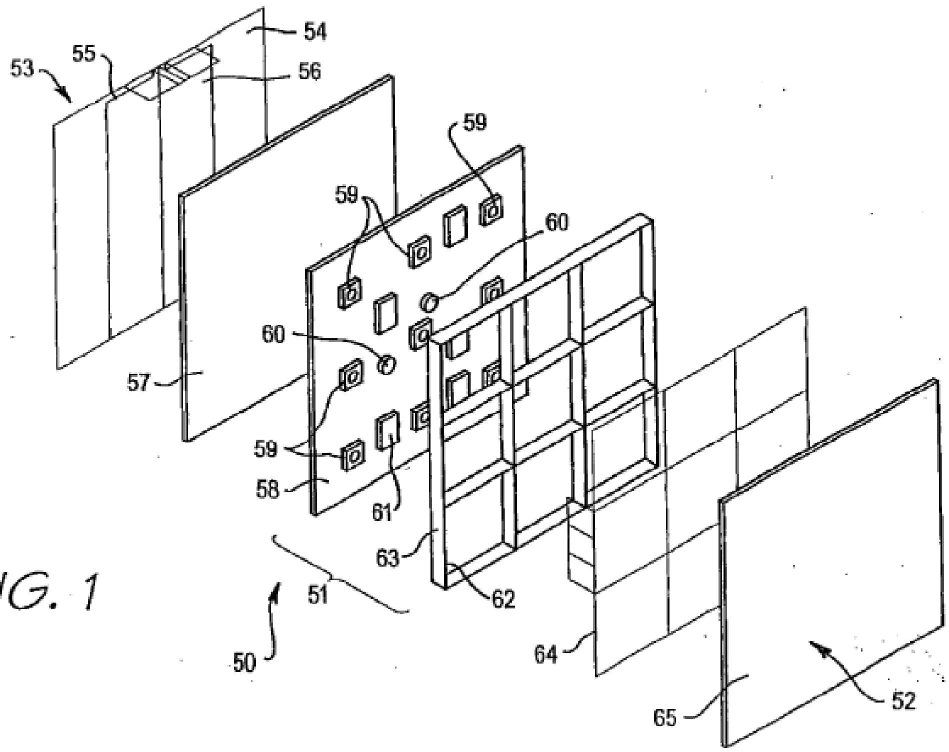

FIG. 1

(Ex. 1005, FIG. 1, 14:26-18:12, Ex. 1002, ¶93.)

Birrell describes various details and configurations of the LED lighting system in connection with other figures. (Ex. 1002, ¶¶94-95; Ex. 1005, 13:30-14:18-25, FIGS. 1-14.) Figure 3 describes such a system with four lighting tiles 50 of Figure 1 connected to an AC power source 11 (Ex. 1005, 13:34-14:2, 17:25-28, 19:12-24, FIG. 3), and Figure 4 shows a simplified circuit diagram of tile 50 in lighting system 10 (*id.*, 18:37-19:11, FIG. 4). (Ex. 1002, ¶¶94-95.) Figures 8-10 show additional details relating to the lighting system. For instance, Figure 8 shows a circuit diagram of the lighting system including LEDs 59 coupled to a 48 AC voltage source via a rectifier (diodes 67) and a capacitive coupling (formed by capacitors C_A and C_B). (Ex. 1005, FIG. 8, 19:1-7, 20:26-31, 20:32-23:29; §IX.A.1(b).) One example of the claimed "LED lighting system" is shown below.

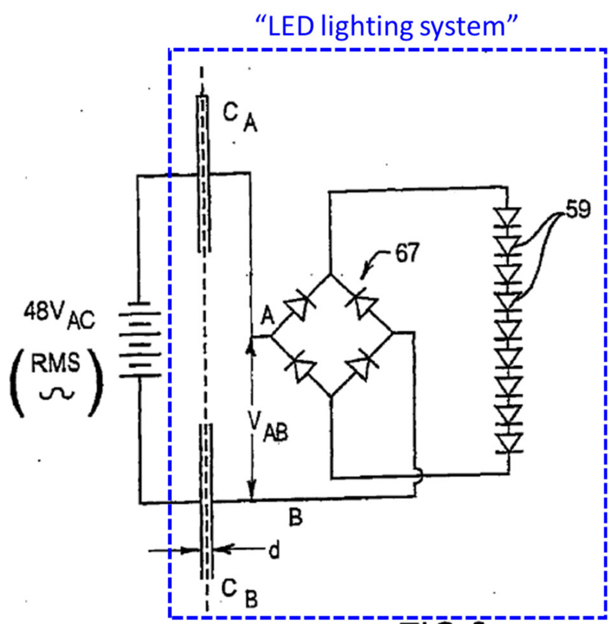

FIG 8

(Ex. 1005, FIG. 8 (annotated); Ex. 1002, ¶95.) The "lighting system" is also disclosed by the circuits and conductors to the right of capacitors C_A and C_B. (Ex. 1002, ¶95.) Further, *Birrell*'s arrangements regarding FIGS. 1-4 associated with the circuit of FIG. 8 also disclose a lighting system, which receives power from a power source (*e.g.*, source 11). (Ex. 1005, 14:26-18:12; *id.*, FIGS. 9-10, 13:31-14:25, 18:37-19:11, 23:15-24:25; Ex. 1002, ¶95; §§IX.A.1(b)-(d).)

b) 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;

Birrell discloses this limitation. (Ex. 1002, ¶¶96-98.) FIG. 8 discloses a 48V AC power supply capacitively coupled to LEDs (59) via rectifier 67. (Ex. 1005, 20:26-31, 22:29-30, FIG. 8; Ex. 1002, ¶¶96-97.) Bridge rectifier (67), capacitors C_A-C_B, and interconnecting conductors (and other existing components not shown (Ex. 1005, FIG. 9)) disclose an "LED driver" because these components collectively provide power to drive LEDs 59. (Ex. 1005, FIG. 8, 19:1-7 (rectifier 67 ensures "light is emitted from the LEDs during both the positive and negative cycles of the AC power supply coupled via capacitors…").) The capacitors (C_A-C_B) couple the 48V AC source to the rectifier (diodes 67), which in turn provides rectified power ("AC or DC voltage") to drive LEDs 59. (*Id.*, FIG. 4, 19:1-11 (simplified diagram of tile 50 (part of the "LED driver") including components for controlling "any or all of the LEDs" and other functions are "not shown").)

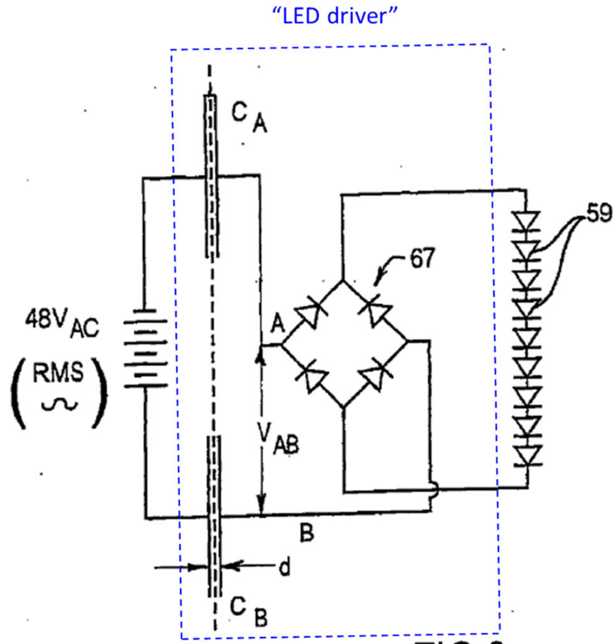

FIG 8

(Ex. 1005, FIG. 8 (annotated); Ex. 1002, ¶97.) The "LED driver" is also disclosed as above but without including capacitors (C_A-C_B), which couple the 48V AC to such a "driver." (Ex. 1002, ¶98.)

Birrell's "LED driver" has an input receiving power from an AC power source (e.g., 48V AC source) and an output providing rectified power ("AC or DC voltage"). (Ex. 1005, FIG. 8, 20:26-31 ("LEDs…capacitively coupled to an AC power supply"), 22:29-30 ("Thus, a 48 Volt AC power supply…will satisfactorily illuminate the LED's of Figure 8."); Ex. 1002, ¶98; Ex. 1013, 163-167.) Accordingly, *Birrell* discloses an LED driver with an "input [that] is configured to receive an AC [] voltage source" (*e.g.*, 48V AC) and an "output [that] provides an

AC or DC voltage" (*e.g.*, rectified power (including voltage) provided by the output of rectifier 67). (Ex. 1002, ¶98.)

c) 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

Birrell in view of *Schultz* discloses and/or suggests this limitation. (Ex. 1002, ¶¶99-107.) The output of the above "LED driver" is connected to multiple series-connected LEDs 59, which in combination with, e.g., the conductive wires connecting the LEDs and connecting to receive power (and thus current), discloses "at least one LED *circuit* having a plurality of LEDs connected to the output of the LED driver," as claimed. (Ex. 1002, ¶99; Ex. 1005, FIG. 8, 19:1-7; §§IX.A.1(a)-(b).) LEDs 59 receive current (and voltage, and power), and thus a circuit is needed given without a circuit, current could not flow. (Ex. 1002, ¶99.)

Further, *Birrell* describes a circuit board subassembly 58 providing mechanical support for circuitry and the electrical components, including to mount LEDs 59 (and thus the "LED circuit"). (Ex. 1005, 15:15-21, FIG. 1; *id.*, 14:26-17:3.) Although *Birrell* does not expressly state that the LED circuit is mounted on a "reflective substrate,"[10] *Birrell* describes the desire for a device "optimized for uniform optical reflection to provide a uniform diffused light source." (Ex. 1005, 12:29-33.) Moreover, the use of a reflective substrate to provide mechanical support for an array of LEDs was well known in the art. (Ex. 1002, ¶101; Ex. 1018, 6:6-18, 6:48-7:34 (LED array substrate with integral reflector component), FIGS. 18, 19, 27); Ex. 1022, Abstract (LED chips mounted on the circuit board coated with "a layer of high reflection material on the board to collect light"), FIG. 2.1, ¶¶[0018], [0034], [0081]; Ex. 1046, ¶¶[0047]-[0049] (LED array substrate is made of a reflective material or laminated with a reflective layer).) Thus, it would have been obvious in view of *Schultz* and state of the art knowledge to configure the substrate on which to mount *Birrell*'s LED circuit. (Ex. 1002, ¶¶101-107.)

For example, *Schultz* "generally relates to a lighting or illumination assembly" and, in particular, illumination systems including LEDs. (Ex. 1046, ¶¶[0002]-[0010].) *Schultz*, being from the same general field as the '251 patent, therefore would have been considered by a POSITA. (Ex. 1002, ¶¶102-103; Ex. 1001, 1:55-58 (describing the field as relating to LEDs).) *Schultz* also teaches that with non-

[10] In Illinois-Litigation, PO contends that a non-reflective, white circuit board constitutes "a reflective substrate." (Ex. 1084, 43.)

reflective circuit boards, "[a]ny light from the LED die that strikes the circuit board is unutilized due to absorption or scattering of the light." (Ex. 1046, ¶[0048].) *Schultz* discloses that by mounting the LED dies on a reflective circuit board, "the utilization of the light is improved." (*Id.*) Thus, *Schultz* also addresses a similar problem as the '251 patent. (Ex. 1002, ¶103; Ex. 1001, 24:62-25:8.) Accordingly, a POSITA would have similarly been motivated by *Schultz*'s teachings/suggestions to address the problem of unutilized light due to absorption or scattering by the circuit board/substrate in the context of *Birrell*'s lighting system. (Ex. 1002, ¶103.)

A POSITA would also have been motivated to implement such a configuration given *Birrell*'s expressed desire for a uniform optical reflection to provide a uniform light source and the knowledge of a POSITA regarding the use of reflective substrates to increase the optical efficiency of lighting systems. (Ex. 1002, ¶104; Ex. 1018, 6:6-18 (reflective substrate that redirects LED light so "light is not lost and can be effectively used"); Ex. 1022, ¶[0081] (coating the circuit board with a high reflection material for "uniform illumination"); Ex. 1023, 16:24-45.) Such a modification would have been no more than the predictable use of known lighting design techniques and components according to their established functions (*e.g.*, adding a reflective layer to a non-reflective substrate, forming the substrate from a reflective material, or using such a substrate to efficiently direct light). (Ex. 1002, ¶104.) *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007).

A POSITA would have been motivated to use various known design concepts, components, and techniques in implementing the above-discussed *Birrell* lighting system, and would have recognized the predictable benefit of mounting the LED circuit on a reflective substrate, such as providing efficient light output as discussed by *Birrell* (*see supra*) and known in the state of the art. (Ex. 1002, ¶¶105-106; Ex. 1008, ¶[0017]; Ex. 1022, Abstract, FIG. 2.1, ¶¶[0018], [0034], [0081]; Ex. 1018, 2:6-10, 7:49-8:46, 6:6-7:34, FIGS. 1, 27.) Thus, a POSITA would have been motivated to modify *Birrell*'s lighting system to use a reflective substrate to mount the LED circuit because the use of reflective substrates in lighting systems was known to increase the optical efficiency. (*Id.*; Ex. 1023, 16:24-45.)

Given the disclosures of *Birrell* and *Schultz* and the knowledge of a POSITA of such mounting and optical techniques, a POSITA would have had a reasonable expectation of success in implementing such a modification. Such a design would have involved the use of known components and mounting techniques to produce the predictable result of an LED circuit that benefited from known properties of reflective base structures, as suggested by *Schultz* and the knowledge of a POSITA. (Ex. 1002, ¶107.)

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

Birrell discloses this limitation. (Ex. 1002, ¶¶108-110.) For example, *Birrell* discloses that "[d]ata communication between devices or elements including controls or sensors and devices or elements without controls or sensors may be achieved by means of wireless techniques such as radio frequency, infra-red or direct connection such as modulation of the external power source used by the device." (Ex. 1005, 8:14-20.) *Birrell* explains that "power and control functionality is coordinated through the electrical coupling [*i.e.*, a transmission line] to thereby enable them to be networked with the other devices which are similarly connected." (Ex. 1005, 8:29-9:10; Ex. 1002, ¶¶108-109.) Control data may be transmitted, *e.g.*, by modulating the load current with a serial data packet. (Ex. 1005, 9:11-29, 26:6-23; Ex. 1002, ¶109.) The packets are then demodulated for local processing or repetition to other devices. (*Id.*) For example, with respect to FIG. 9, *Birrell* explains that each tile 50 can transmit data via a "data modulator 80" which is "extracted on another tile or device via a data demodulator 81." (Ex. 1005, 23:22-26; *id.*, FIG. 10, 23:30-34.) Moreover, tile 50's circuitry is "structured so that all data is transferred by the same electrical path that is used for the electrical power transfer" (Ex. 1005, 23:15-21), where data are transmitted using a data modulator 80 and **received using a data demodulator 81** ("data receiver") (*id.*, 16:4-8, 23:22-29; FIG. 9). (Ex. 1002, ¶109.)

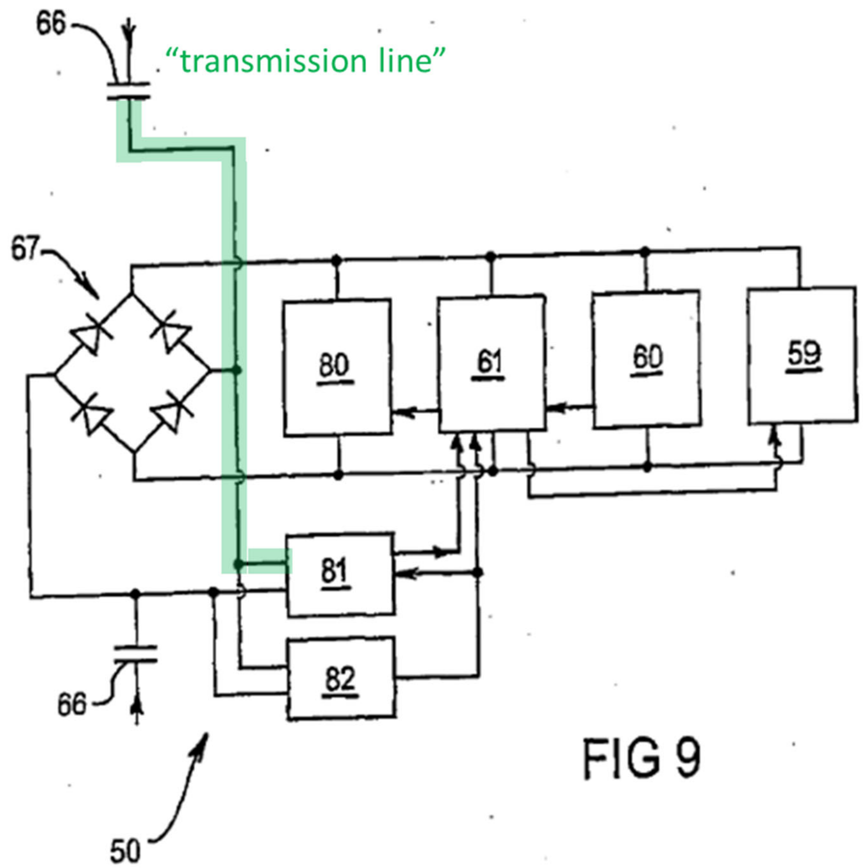

FIG 9

(Ex. 1005, FIG. 9 (annotated); Ex. 1002, ¶109.) The coupling (as exemplified above) is a transmission line because it transmits the data (and power) received by tile 50, and received by demodulator 81 so that the data can be demodulated in accordance with *Birrell*'s disclosed operations. (Ex. 1002, ¶110.) Further, data demodulator 81 is a "data receiver" because it receives data as described by *Birrell*. (*Id.*) Thus, given that the data in *Birrell* is transmitted by the electrical path used for power transmission (*i.e.*, a "transmission line") and received by data demodulator 81, *Birrell* discloses that "the data receiver can receive data from at least one of a transmission line or an antenna," as claimed. (Ex. 1002, ¶¶109-110; *see also* Ex.

1001, 22:6-45, FIG. 52 (example of "transmission line" 2072 as a conductor that transmits data and power similar to that described by *Birrell*).)

2. Claim 6

a) The LED lighting system of claim 1, wherein the LED lighting system is dimmable in response to the data received.

Birrell discloses/suggests this limitation. (Ex. 1002, ¶¶111-117.) *Birrell*'s lighting system includes "controls such as...**light level controls** [and] **automatic light level controls**." (Ex. 1005, 8:4-30.) Wireless data communication and/or direct connection (e.g., modulation of the external power source used by the device) may be used to control devices and elements without controls or sensors, "thus eliminating the need for other wired control or sensing elements." (*Id.*) Also, the system's microcontroller may "monitor[] power transfer to the load, and a variable impedance device, wherein the impedance is able to be varied...." (*Id.*, 4:2-7.) Microcontroller 61 "**controls the total amount of energy available to all the LEDs** and is able to **control individual LED brightness**" and accepts and converts sensor signals to remote reports or commands and construct and transmit data messages. (*Id.*, 15:36-16:10.) "By controlling the amount of light emitted from each of these LEDs, most colours of light can be generated." (*Id.*, 11:32-34.) Thus, using light level controls, the LED lighting system is dimmable in response to the data received. (Ex. 1002, ¶95.)

Moreover, beyond this disclosure, it would have been obvious to configure the lighting system to perform dimming functions in response to the received data, such as from a remote control or other source for adjusting light levels of the system (including dimming). (*Id.*, ¶¶113-114; Ex. 1005, 8:4-30, 15:34-16:6.) *Birrell*'s guidance regarding the use of remote control sensors, and the microcontroller's ability to control the "individual LED," as well as disclosures relating to controlling LEDs based on received data signals, would have motivated a POSITA to consider and modify the system to providing dimming functionalities based on data received from, e.g., a remote control source. (Ex. 1005, 8:4-7, 15:28, 23:12-14 (sensors and microcontroller to "receive signals and to provide control over the LEDs"), 24:3-12 (central controller controlling groups of tiles with single message), 27:5-9.) Such an implementation would have predictably used known sources for providing control signals (data) for directing the brightness (including dimming) controls provided by *Birrell*'s system, and such data for controlling the dimming would have been provided to, e.g., microcontroller 61 via the "transmission line" discussed for limitation 1(d). (§IX.A.1(d); Ex. 1002, ¶115.)

Such an implementation would have involved usage of known technologies and design techniques, to provide light controls for adjusting the brightness of the LEDs, which a POSITA would have designed to include lowering (dimming) and raising light levels to accommodate desired applications and uses during operation.

(Ex. 1002, ¶116.) Indeed, it was known to provide dimming functionalities in LED lighting systems. (*Id.*; Ex. 1018, 7:59-8:6; Ex. 1034, 6:56-7:21; Ex. 1035, FIGS. 1-2, 1:17-57, 2:34-3:4; Ex. 1036, FIGS. 3-4, ¶¶[0004]-[0008], [0014]-[0027]; Ex. 1037, FIGS. 1-8, Abstract, 1:6-12, 1:41-55, 3:65-5:29).)

Thus, a POSITA would have recognized the predictable benefit of adding a data-controlled dimmer to provide the versatility of controlled light levels, consistent with that contemplated by *Birrell* and known in the art. (Ex. 1002, ¶117.) Given *Birrell*'s disclosures and a POSITA's knowledge, a POSITA would have had the capability and reasons to implement the above modification with a reasonable expectation of success. (*Id.*) Indeed, such a modification would have involved the use of known technologies and techniques to produce predictable results. (*Id.*; Ex. 1005, 8:4-9, 15:27-31.) *KSR*, 550 U.S. at 416.

B. Ground 2: Claims 1 and 6 Are Obvious over *Piepgras*

1. Claim 1

a) An LED lighting system comprising:

To the extent limiting, *Piepgras* discloses this limitation. (Ex. 1002, ¶¶118-123.) Regarding FIG. 1, *Piepgras* discloses "a lighting system or device 500" including LEDs 4, controllers 3, and processor 2. (Ex. 1030, ¶[0088].)

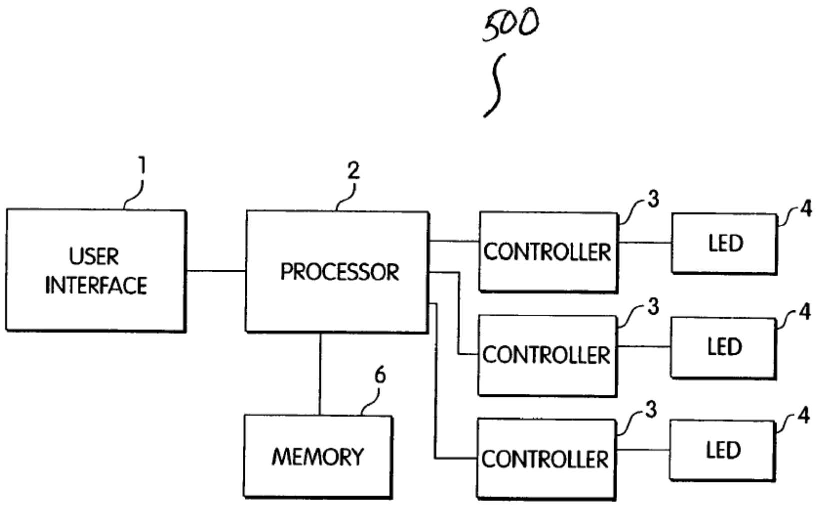

Fig. 1

(*Id.*, FIG. 1; *id.*, ¶¶[0033], [0088]-[0098], FIGS. 2A-2B, [0099]-[0105]; Ex. 1002, ¶¶119-121.)

Piepgras discloses several examples of lighting systems implemented using system 500. (Ex. 1030, Title, Abstract, ¶¶[0083]), [0106]-[0241], FIGS. 3-54; Ex. 1002, ¶122.) System 500 (Figure 1) is a general arrangement implemented with the various lighting system examples described throughout *Piepgras*.[11] (Ex. 1002,

[11] To the extent it is argued that *Piepgras*' embodiments are distinct, the challenged claims remain obvious over the asserted prior art as explained herein because a POSITA would have found it obvious to configure any of *Piepgras*' identified embodiments with features from *Piepgras*' other related embodiments given the express relationships called out by *Piepgras*. (Ex. 1002, ¶139.) Indeed, a POSITA

¶122; *e.g.,* Ex. 1030, ¶[0106] (FIG. 3 example "include[s] the components described above with reference to FIG. 1, and may operate according to the techniques described above and with reference to FIGS. 2A-2B"), ¶¶[0107]-[0110] (*e.g.*, key chain and spotlight examples described with reference to Figure 4-6), ¶¶[0121], [0149] (applications of system 500 described by FIGS. 1, 2A-2B), FIGS. 7-8, 11, 16-17, 22-23, 34, 39, 41A-41C, 50, ¶¶[0111]-[0113], [0119], [0131], [0133], [0143]-[0147], [0168]-[0169], [0180], [0183], [0216].) Thus, the disclosures relating to system 500 are applicable to the various exemplary lighting system implementations, and such implementation(s) (further discussed below) discloses an "LED lighting system." (§§IX.B.1(b)-(d); Ex. 1002, ¶123.)

b) 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;

Piepgras discloses this limitation. (Ex. 1002, ¶¶124-131.) System 500 (applicable to various LED light systems (§IX.B.1(a)) includes controllers 3

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would have had reasons to consider the collective teachings in *Piepgras* to configure a lighting system as explained below, and would have done so with a reasonable expectation of success given *Piepgras*' descriptions of a working system and processes. (*Id.*; *e.g.*, §§IX.B.1(b)-(d), IX.B.2.)

connected to LEDs 4, processor 2, other components and associated circuitry coupling the components. (Ex. 1030, FIG. 1 (below).)

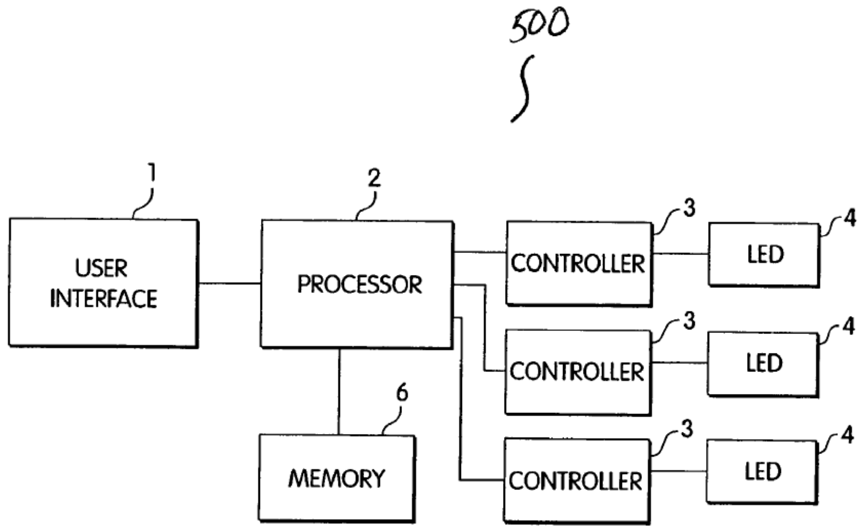


Fig. 1

Controllers 3 work to drive LEDs 4. (Ex. 1030, ¶¶[0088], [0090] ("The controller 3 generally **regulates the current, voltage and/or power through the LED**, in response to signals received from the processor 2."); *id.*, ¶¶[0085]-[0086] ("LED" may refer to single LED package, multiple "LEDs" etc.), [0090], [0094]-[0105], FIGS. 2A-2B; Ex. 1002, ¶124.) "[P]rocessor 2 and controller 3 may be incorporated into one device," which "**drive[s] several LEDs 4** in series where it has sufficient **power output**, or the device may **drive single LEDs 4** with a corresponding number of outputs." (Ex. 1030, ¶[0090]; Ex. 1002, ¶124.)

Piepgras' drive circuitry (e.g., controller(s) 3 in conjunction with processor 2) has an input and output. Signals from processor 2 "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" (Ex. 1030, ¶[0088]) and thus driver circuitry provides an input to receive power and an output to drive the LEDs. (Ex. 1002, ¶125.)

Piepgras discloses applications of such a system 500 where power (including voltage) is received (via an input) and power is provided (via an output voltage). (Ex. 1030, ¶¶[0121], [0149]; Ex. 1002, ¶126.) For example, *Piepgras* discloses a spotlight lighting system (FIGS. 5-6**)**, which includes "a system such as that depicted in FIG. 1 for controlling a plurality of LEDs," includes a "converter to convert received power to power that is useful for the spotlight" and uses a housing suitable for use with "conventional lighting fixtures, as those used with AC spotlights." (Ex. 1030, FIG. 5, ¶[0108].) *Piepgras* explains that "the converter may include an **AC to DC converter** to convert one-hundred twenty Volts at sixty Hertz into a direct current at a voltage of, for example, five Volts or twelve Volts" and could be powered with a battery (DC input and DC output for LEDs). (*Id.*; ¶¶[0108]-[0109]; Ex. 1002, ¶126.)

Other examples of receiving power (e.g., AC power from an outlet) are also provided. (*E.g.*, Ex. 1030, FIGS. 7-8, 11, 16-17, 22-23, 32A-32B, 34, 39, 41A-41C, 50, ¶¶[0111]-[0113], [0119], [0131], [0133], [0143]-[0147], [0164]-[0165], [0168]-[0169], [0180], [0183], [0216]; Ex. 1002, ¶126.) Thus, the various lighting systems that receive AC power include system 500 (FIG. 1), and such a lighting system would likewise necessarily (or explicitly (e.g., FIG. 5 system)) include converter circuitry to convert the AC power (and thus AC voltage) to DC power (and thus DC voltage) to facilitate operation of the components in system 500 that drive LEDs 4 in such lighting system. (Ex. 1002, ¶127.) Accordingly, in such arrangements, *Piepgras* discloses an "LED driver" (e.g., controllers 3, processor 2, and AC-DC converter circuitry) because as explained, controllers 3 work with processor 2 for controlling "stimulation of the LEDs 4" "into a form suitable for **driving** the LEDs 4" (Ex. 1030, ¶[0088]) and because *Piepgras* describes usage of circuitry (e.g., FIG. 5, ¶¶[0108]-[0109]) for converting AC voltage to DC voltage for proper operation of such LEDs. In this way, the LED lighting system (limitation 1(a)) includes an "**LED driver**" (e.g., AC-DC converter circuitry, controllers 3, processor 2, and associated circuits connecting such components) **having an input configured to receive an AC or DC voltage source**, e.g., the input to receive the AC voltage from an AC power source (e.g., commercial or standard AC power, such as from a residential outlet or the like) **and an output providing an AC or DC voltage** (e.g., the DC voltage provided to the LEDs 4 by controllers 3), as claimed. (Ex. 1002, ¶128.)

To the extent *Piepgras* does not explicitly disclose an LED driver that has an "input" configured to receive "an AC … voltage source", it would have been obvious to configure the LED driver components of the above-described *Piepgras*' lighting system to include, or operate with, such converter circuitry, to provide an "LED driver" that provides appropriate power to the LEDs in the various AC voltage sourced systems contemplated by *Piepgras*, (e.g., 110V/120V power). (Ex. 1002, ¶¶129-131.)

As explained, *Piepgras* discloses examples of LED lighting systems that operate with system 500 that convert AC to DC power or receive power to provide illumination from such LEDs. Thus, a POSITA would have been motivated to ensure such lighting system that received AC power e.g., from a mains supply, included appropriate converter circuitry to enable circuit components (including LEDs) requiring DC power to be properly powered, as known in the art. (*Id.*, ¶130; Ex. 1005, FIG. 8 (rectifier 67 converting AC voltage to drive LEDs); Ex. 1012, 37-39; Ex. 1021, FIG. 2, 7:9-13; Ex. 1022, FIG. 2.1, ¶¶[0083]-[0084]; Ex. 1024, 1:9-28, 1:35-48, FIG. 1; Ex. 1025, 1:10-13 ("Since alternating current (AC) power is readily available, power supply circuits which convert AC power to DC power are desirable.").)

Configuring the lighting system to include such an "LED driver" having an "input" to receive AC voltage (*e.g.*, via a mains power supply) would have provided a reliable source of power that, when converted to an appropriate voltage for driving the LEDs (e.g., DC voltage), ensured expected operation of the system, consistent with systems contemplated by *Piepgras.* (Ex. 1002, ¶131; Ex. 1005, FIGS. 1-2, 4, 8, 19:1-11, 20:26-31; Ex. 1008, FIG. 7, ¶¶[0032]-[0034], [0062], [0092]-[0095]; Ex. 1021, FIGS. 1, 2, 4, 6:15-32, 6:60-7:5.) Thus, a POSITA would have had the motivation, capability and knowledge to implement such a configuration with a reasonable expectation of success, especially given the POSITA's knowledge in context of *Piepgras*. (Ex. 1002, ¶131.)

c) 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

Piepgras discloses/suggests this limitation. (Ex. 1002, ¶¶132-143.) Section IX.B.1(b) above explains how *Piepgras* discloses/suggests an "LED driver" with an output connected to LEDs 4 in the lighting system for limitations 1(a)-1(b). (§§IX.B.1(a)-(b); Ex. 1005, FIG. 1 (below), ¶¶[0085]-[0086] (describing "LED"), [0090].)

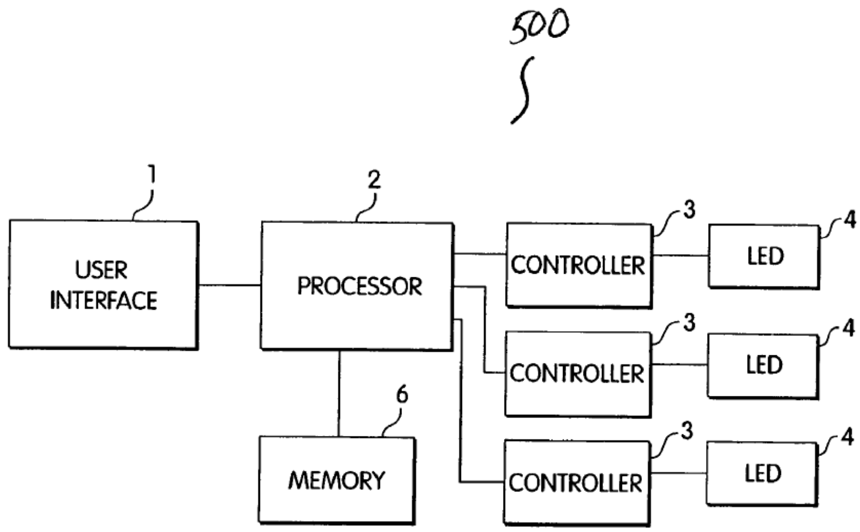


Fig. 1

Piepgras' LEDs receive current (and voltage, and power), and thus a circuit is needed to achieve such electrical attributes. (Ex. 1002, ¶¶133-134; Ex. 1030, ¶¶[0088], [0090] ("controller 3 generally regulates the current, voltage and/or power through the LED").) A POSITA would have known that circuitry was commonly employed to electrically connect LEDs to a power source as without it, current cannot flow. (Ex. 1030, ¶[0148] ("wires for driving [LEDs]"); Ex. 1002, ¶134.) Thus, for reasons regarding limitations 1(a)-(b), *Piepgras* discloses "at least one LED circuit having a plurality of LEDs connected to the output of the LED driver." (§§IX.B.1(a)-(b); Ex. 1002, ¶134.)

Regarding a "reflective substrate," *Piepgras* discloses applications where system 500 is used in a lighting system with an "optic" (e.g., FIG. 42 (4202)) associated with reflective material (e.g., 4204) "designed to reflect at least a portion of the light transmitted through the optic." (Ex. 1030, ¶¶[0188]-[0189] ("4204 may be a reflective material" and "may be…co-extruded in the optic 4202, embedded in the optic 4202…or otherwise arranged such that light may be reflected by the material 4204"), [0190] (lighting device 4200 including "devices 500"), [0191]-[0196], FIGS. 42-48; Ex. 1002, ¶135.) Devices 500 "may be epoxied or otherwise attached to the various types of optics to minimize the loss of light" and "ends of the optic may be coated with anti-reflective coating" to minimize the loss of light, and thus the optics (integrated with the reflective material) mounting the devices 500 would be a reflective substrate supporting, among other things, the "LED circuit" of the system. (Ex. 1030, ¶[0197]; Ex. 1002, ¶136.) Moreover, *Piepgras* discloses "a platform where the LED-based illumination devices are mounted may be made of or coated with a **reflective material**," and "the platform may be constructed of materials designed to **increase the reflection** off of the platform[']s surface." (Ex. 1030, ¶[0197].) *Piepgras* describes "devices 500" (FIG. 1) in such exemplary arrangements, and thus *Piepgras*' disclosures regarding mounting LED-based devices 500 (including "LED circuit") on a reflective platform or "substrate" are applicable to the lighting systems discussed for limitations 1(a)-1(b). (Ex. 1002, ¶13; §§IX.B.1(a)-(b).)

To the extent *Piepgras* does not disclose the "at least one LED circuit" is mounted on a reflective substrate for the lighting system as discussed for limitations

1(a)-1(b), it would have been obvious to implement such features. (Ex. 1002, ¶¶138-143.) As explained, *Piepgras* contemplates applications where a reflective substrate is used to mount LEDs, which is consistent with known uses of reflective substrates in lighting applications. (*Id.*; Ex. 1018, 6:6-18, 6:48-7:34, FIGS. 18, 19, 27; Ex. 1022, Abstract, FIG. 2.1, ¶¶[0018], [0034], [0081]; Ex. 1046, ¶¶[0047]-[0049].)

Thus, a POSITA would have been motivated to configure the "LED circuit" on a reflective substrate to enhance the illumination properties of the above discussed lighting system for limitations 1(b)-(c). *Piepgras* contemplates the use of a reflective platform for mounting LEDs to "increase the reflection off of the platform[']s surface ..." (Ex. 1030, ¶[0197) and the benefits of a reflective substrate were known. (Ex. 1002, ¶¶139-140; Ex. 1018, 6:6-18 (reflective substrate "so that such light is not lost and can be effectively used"); Ex. 1022, ¶[0018] (high reflection material for "very uniform illumination"); Ex. 1023, 16:24-45.) Thus, mounting the above-discussed "LED circuit" on a reflective substrate would have been a predictable implementation of known lighting design techniques/technologies according to their established functions. (Ex. 1002, ¶140.)

A POSITA would have used known design concepts, components, and techniques to implement the above-discussed *Piepgras* lighting system, and thus would have been motivated to implement the above modification to increase/improve LED illumination efficiency, with a reasonable expectation of success. (*Id.*, ¶¶141-143; Ex. 1023, 16:24-45.)

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

Piepgras discloses and/or suggests this limitation. (Ex. 1002, ¶¶144-147.) *Piepgras* discloses use of a remote control interface for remotely controlling LED lighting via wired/wireless mechanisms. (Ex. 1030, Abstract ("**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."), ¶¶[0032] ("the systems" can include network interface for controlling LED illumination) [0083], [0123] ("**Each lighting device** may instead be addressed individually **through a wired or wireless network** to control operation thereof" and use "**transceivers** for **communicating with a remote control device, or for communicating over a wired or wireless network**."), [0177] (user interface "may generate and **communicate signals to various lighting devices** through **wired or wireless transmission)**, [0232] (illumination is controlled via interface on a "wall mount or handheld device or computer screen); Ex. 1002, ¶144.) Figure 6 (below) describes "a remote user interface 102" that may "transmit control information" to spotlight 100 using an RF communication link and "corresponding **transceivers in the spotlight 100** and the remote user interface 102." (Ex. 1030, ¶[0110].)

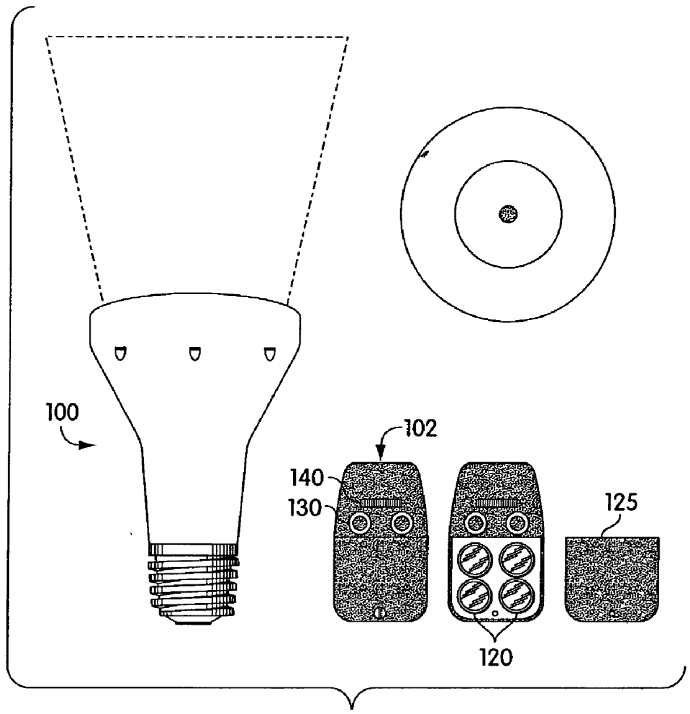


Fig. 6

(*Id.*, FIG. 6; ¶[0232]; Ex. 1002, ¶147.)

Thus, *Piepgras* discloses implementing components in a lighting system that receives data (wirelessly or wired) to control lighting. (Ex. 1002, ¶146.) To facilitate such features in the above-discussed LED lighting system (limitations 1(a)-1(c)), the system must necessarily include a "data receiver" to receive the control signals (data) provided by the remote control data sources contemplated by *Piepgras*. (Ex. 1002, ¶146.) Indeed, a transceiver (as discussed above) includes a transmitter and receiver. (*Id.*) And by disclosing the transmission of "control information" for remotely controlling the system and providing wired/wireless lighting control (*e.g.*, Ex. 1030, ¶¶[0110], [0123]), *Piepgras* discloses a *data* receiver that can receive data from either a transmission line (*e.g.*, wired) or an antenna (RF ("radio frequency")). (Ex. 1002, ¶146.) A transceiver supporting RF communication for remotely controlling lighting necessarily involves the use of an antenna to receive the electromagnetic signals necessarily provided by RF communications. (*Id.*; Ex. 1047, 49; Ex. 1048, 110; Ex. 1028, FIG. 15.) Thus, the "LED lighting system" discussed above (limitations 1(a)-(c)) includes a data receiver that "can receive data from at least one of a transmission line or an antenna" as claimed. (Ex. 1002, ¶146.)

To the extent *Piepgras* does not disclose the "LED lighting system" of limitations 1(a)-(c) includes such a "data receiver," it would have been obvious to implement such features. (*Id.*, ¶147.) Given *Piepgras* contemplates applications with components to receive data via wired/wireless mediums, a POSITA would have been motivated to implement a "data receiver" that receives data signals to facilitate remote control of the lighting system via a transmission line (e.g., wired) or an antenna (RF) to provide such convenient features. A POSITA would have been motivated to use various known design concepts, components, and techniques in implementing such a modification, and would have had the knowledge/skills to configure it with a reasonable expectation of success. (*Id.*)

2. Claim 6

a) The LED lighting system of claim 1, wherein the LED lighting system is dimmable in response to the data received.

Piepgras (as modified above) discloses and/or suggests this limitation. (Ex. 1002, ¶¶148-152.) As discussed in Section IX.A.2, dimming/brightness control was well known in the art. (§IX.A.2 (state of art knowledge and supporting exhibits demonstrating same (Exs. 1018, 1034-1037)); Ex. 1002, ¶148.) *Piepgras* discloses applications where dimming of LED light is provided in an "intelligent," controlled manner. (Ex. 1030, ¶[0114]; Ex. 1002, ¶149.) *Piepgras* recognizes that dimming controls based on "conventional lighting control systems" can be realized "through changes to applied voltages" and power converter circuitry to convert received power "for the control circuitry" and controlling LED brightness. (Ex. 1030, ¶¶[0113]-[0114].) "[L]ighting instructions could be used to **dim** the illumination from the lighting system" and control illumination effects. (*Id.*; *id.*, ¶¶[0116], [0122]; Ex. 1002, ¶149.)

While *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. (Ex. 1002, ¶¶150-152.) A POSITA would have been motivated to providing dimming controls via data control signals provided through the wired/wireless data signal communication aspects described by *Piepgras* (§IX.B.1(d); Ex. 1030, Abstract, ¶¶[0032], [0083] (local/remote interfaces to control generated light based on "user input"), [0110], [0123], [0177]; Ex. 1002, ¶150.)

Given *Piepgras*' disclosures and guidance, a POSITA would have had reason to consider/implement dimming functionalities in the above-LED lighting device configured with the above-discussed remote control features described by *Piepgras.* Such a modification would have improved the LED lighting system by providing known brightness control of LED lighting, consistent with "conventional" and known dimming control mechanisms, as contemplated by *Piepgras* and known in the art. (Ex. 1002, ¶151; Ex. 1030, ¶[0113]-[0114]; Ex. 1018, 7:66-8:6.)

Thus, a POSITA would have had the motivation and capability to implement dimming controlled by the data received by the data receiver with a reasonable expectation of success, especially given the state of art knowledge in context of *Piepgras*' disclosures noted above. (Ex. 1002, ¶152.) Such a configuration would have involved applying known technologies/techniques (conventional dimming features and remote lighting control (*Piepgras*)) that would have predictably led to the lighting system including a "data receiver" that receives data signals for controlling the brightness of LED light (e.g., dimming), thus enhancing the features provided by the lighting system. (*Id.*)

C. Ground 3: Claims 1 and 6 Are Obvious over *Harbers* and *Schultz*

1. Claim 1

a) An LED lighting system comprising:

To the extent limiting, *Harbers* discloses this limitation. (Ex. 1002, ¶¶153-163.) *Harbers* discloses a luminaire 150 comprising LED illumination device 100, reflector 140, and light fixture 130. (Ex. 1006, ¶[0021], FIGS. 1-2; *id.*, Abstract, ¶[0004]; Ex. 1010, ¶[0003].)

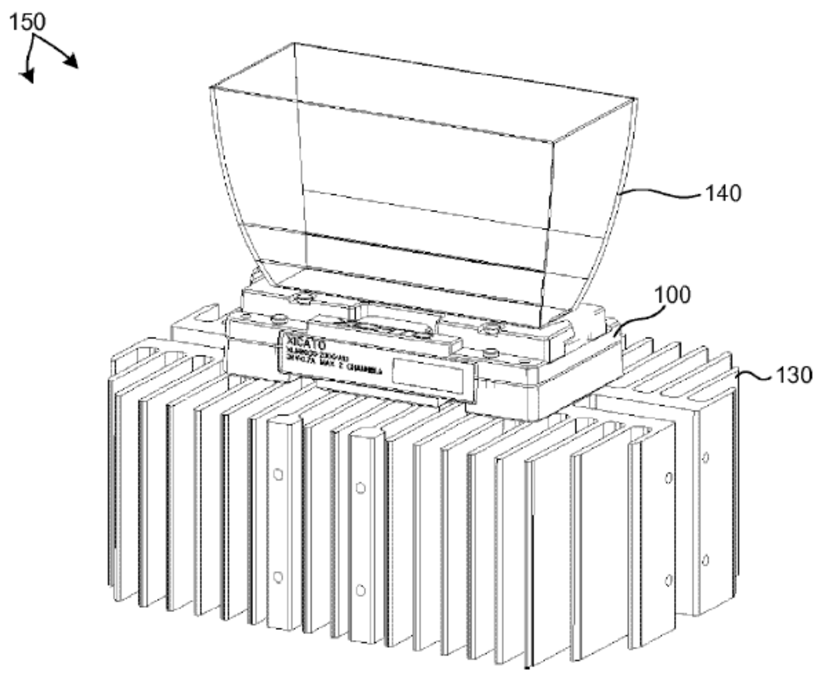


FIG. 1

(Ex. 1006, FIG. 1; Ex. 1010, FIG. 1.) Light fixture 130 acts as a structure and heat sink for illumination device 100. (Ex. 1006, ¶[0021]; Ex. 1010, ¶[0003].) Reflector 140 can be "coated with a highly reflecting material" to "collimate or deflect light emitted from illumination device 100." (*Id.*; Ex. 1002, ¶155.)

FIGS. 3A-3B shows components of illumination device 100 of FIG. 1. (Ex. 1006, ¶[0023]; Ex. 1010, ¶[0005].)

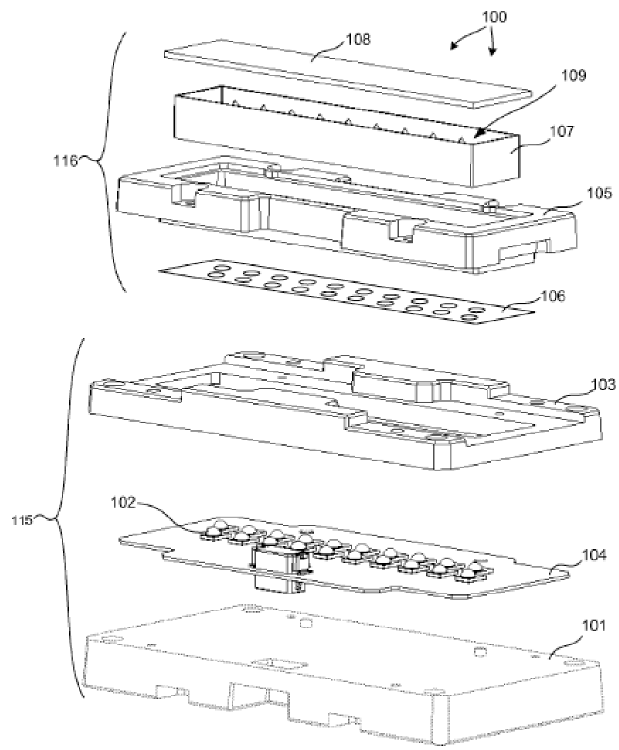


FIG. 3A

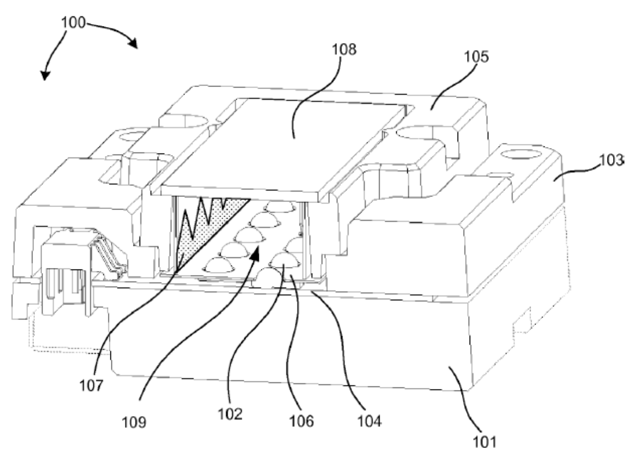
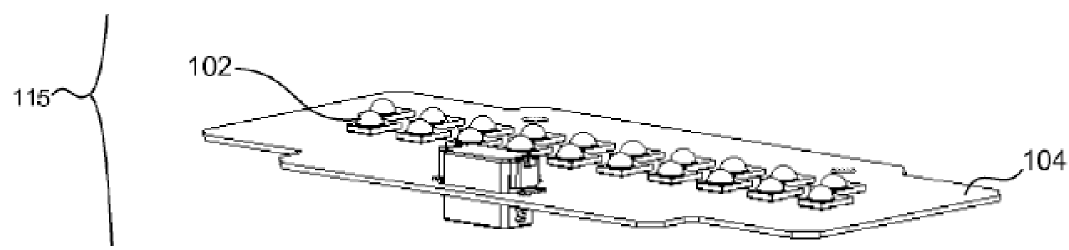


FIG. 3B

(Ex. 1006, FIGS. 3A-3B; Ex. 1010, FIGS. 3A-3B.)

LED illumination device 100 "is an LED light source or fixture or component part of an LED light source or fixture." (Ex. 1006, ¶[0023]; Ex. 1010, ¶[0005].) It includes "one or more LED die or packaged LEDs and a mounting board to which LED die or packaged LEDs are attached," and "one or more…light emitting diodes (LEDs) 102, mounted on mounting board 104." (Ex. 1006, ¶[0023]; Ex. 1010, ¶[0005].) Mounting board 104 "populated by LEDs 102" and ring 103 form a sub-assembly 115 (shown below). (Ex. 1006, ¶[0023]; Ex. 1010, ¶[0005]; Ex. 1002, ¶¶156-158.)



(Ex. 1006, FIG. 3A (excerpted); Ex. 1010, FIG. 3A.) Sub-assembly 115 is operable to convert electrical energy into light using LEDs 102. (Ex. 1006, ¶[0023]; Ex. 1010, ¶[0005]; Ex. 1002, ¶157.) Light emitted from sub-assembly 115 is directed to sub-assembly 116 "for color mixing and color conversion," which includes a "reflector insert 106 that may "**optionally** be placed over mounting board 104." (Ex. 1006, ¶[0023]; Ex. 1010, ¶[0005]; Ex. 1006, FIG. 3B; Ex. 1010, FIG. 3B.)

The "LEDs can emit different or the same colors" whether by direct emission or phosphor conversion, "e.g., where phosphor layers are applied to the LEDs as part of the LED package." (Ex. 1006, ¶[0027]; Ex. 1010, ¶[0009]; *see also* Ex. 1006,

¶[0028]; Ex. 1010, ¶[0010]; Ex. 1002, ¶¶158-159.) (*See also* Ex. 1006, ¶¶[0024] (describing mixing cavity 109 formed by inserts 106-107 and window 108 for reflecting and mixing light); *see also* Ex. 1010, ¶[0006]; Ex. 1002, ¶158.)

The illumination device also includes an electrical interface module (EIM) 120, shown in FIG. 10. (Ex. 1006, ¶¶[0032], [0039]-[0043]; Ex. 1010, ¶¶[0014], [0021]-[0025]; Ex. 1002, ¶160.) EIM includes components, such as a powered device interface controller (PDIC) 34, processor 22, memory 23, 26, transceivers 24, 25, sensor interface 28, a power converter 30 and LED selection module 40. (Ex. 1006, ¶[0039]; Ex. 1010, ¶[0021].) EIM 120 operates to convert electrical signals to power the LEDs of LED circuitry 33, receive/transmit data, and process/generate signals to selectively control LED lighting. (Ex. 1006, FIGS. 10-11, ¶¶[0039]-[0048]; Ex. 1010, ¶¶[0021]-[0030]; Ex. 1002, ¶161.)

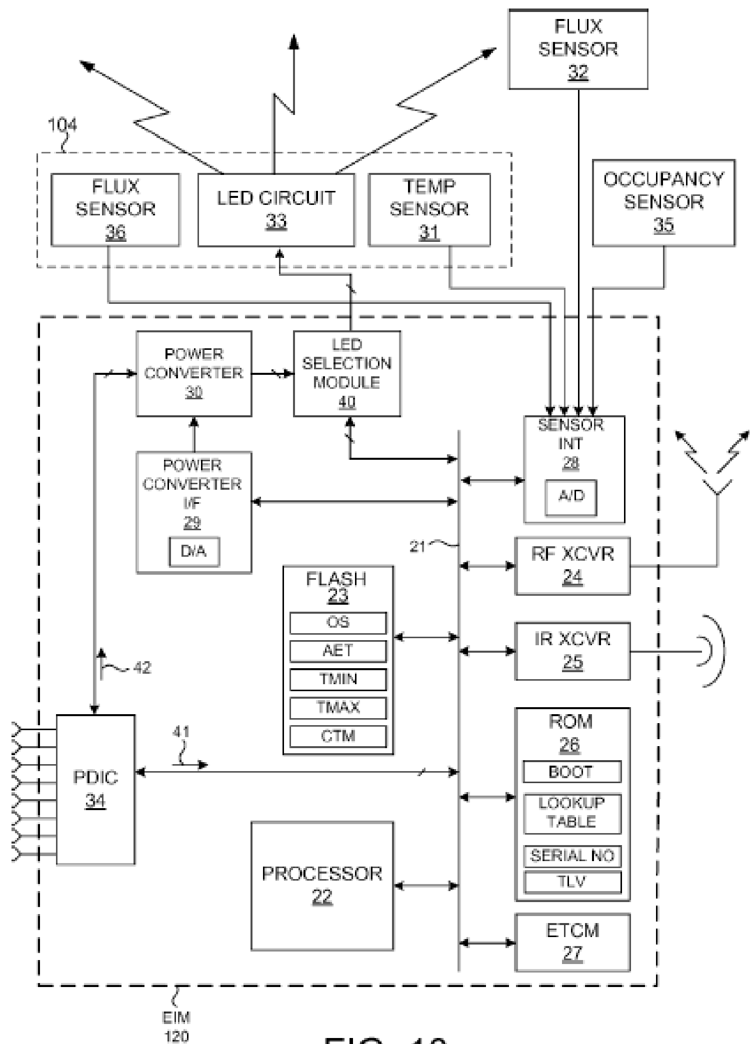


FIG. 10

(Ex. 1006, FIG. 10; Ex. 1010, FIG. 10.)

Harbers explains the disclosed teachings "have general applicability and are not limited to the specific disclosed embodiments and that "various modifications, adaptations, and combinations of various features of the described embodiments can be practiced." (Ex. 1006, ¶[0055]; Ex. 1010, ¶[0036]; Ex. 1002, ¶162.)

Accordingly, *Harbers* discloses an "LED lighting system." (Ex. 1002, ¶163.) For example, the luminaire (e.g., luminaire 150) including at least LED illumination device 100 (e.g., FIGS. 1-3B, 10-11), is an "LED lighting system." (*Id.*) Moreover, the illumination device 100 is also an example of the claimed "LED lighting system." (*Id.*) (§§IX.C.1(b)-(d); Ex. 1002, ¶163.)

b) 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;

Harbers discloses this limitation. (Ex. 1002, ¶¶164-168.) The "LED lighting system" discussed for limitation 1(a) includes LED illumination device 100. (§IX.C.1(a); Ex. 1006, FIGS. 1-2, 3A, 10; Ex. 1010, FIGS. 1-2, 3A, 10.) LED illumination device 100 includes EIM 120, which as shown in FIG. 10 (below) includes a power converter 30 that powers LEDs 102 in LED circuitry 33, and can operate in conjunction with LED selection module 40 to selectively drive LEDs 102 in LED circuitry 33. (Ex. 1006, ¶¶[0039]-[0048]; Ex. 1010, ¶¶[0021]-[0030]; Ex. 1002, ¶164.)

Harbers explains that PDIC 34 of EIM 120 communicates power signals 42 to power converter 30. (Ex. 1006, FIG. 10, ¶[0040]; Ex. 1010, FIG. 10, ¶[0022]; Ex. 1002, ¶165.) Power converter 30 "operates to perform power conversion to generate electrical signal **to drive one or more LED circuits of circuitry 33**." (Ex. 1006, ¶[0040]; Ex. 1010, ¶[0022].) Power converter 30 operates "in a current control mode to supply a controlled amount of current to LED circuits within a predefined voltage range" and can be a DC-DC power converter, an **AC-DC power converter**, or an AC-AC power converter. (Ex. 1006, ¶[0040]; Ex. 1010, ¶[0022].) Moreover, power converter 30 "may be single channel or multichannel" where each channel "**supplies electrical power to one LED circuit of series connected LEDs**." (Ex. 1006, ¶[0041]; Ex. 1010, ¶[0023].) Power converter 30 thus operates in a constant current mode (useful for series connected LEDs) or as a constant voltage source (useful for parallel connected LEDs). (Ex. 1006, ¶[0041]; Ex. 1010, ¶[0023]; Ex. 1002, ¶165.) Power converter 30 also receives signals from power converter interface 29, which converts signals provided by processor 22 for "adjust[ing] the current communicated to coupled LED circuits." (Ex. 1006, ¶[0042]; Ex. 1010, ¶[0024].) (Ex. 1002, ¶165.)

LED selection module 40 of EIM 120 "selectively powers LEDs of an LED circuit 33 coupled to a channel of power converter 30." (Ex. 1006, ¶[0045]; *id.* (switching elements act to "switch off" certain LEDs to "selectively power LEDs 55-59"), ¶[0044] (module 40 includes switching elements 44-48, each coupled to corresponding lead of LED of LED circuit 33), *id.* ("output channel of power converter 30 is coupled between voltage nodes 49-54 forming a current loop conducting current 60"), FIG. 11 (below); Ex. 1010, ¶¶[0026]-[0027], FIG. 11.)

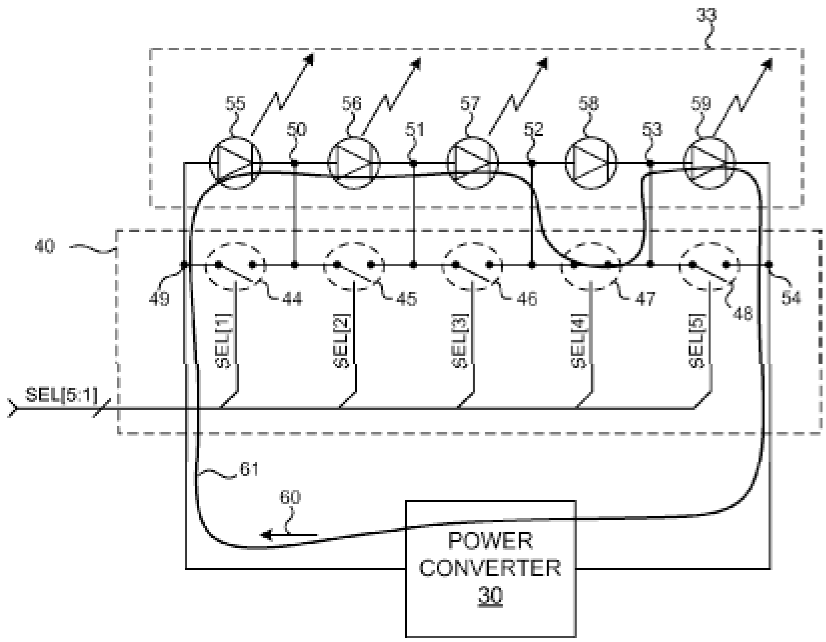
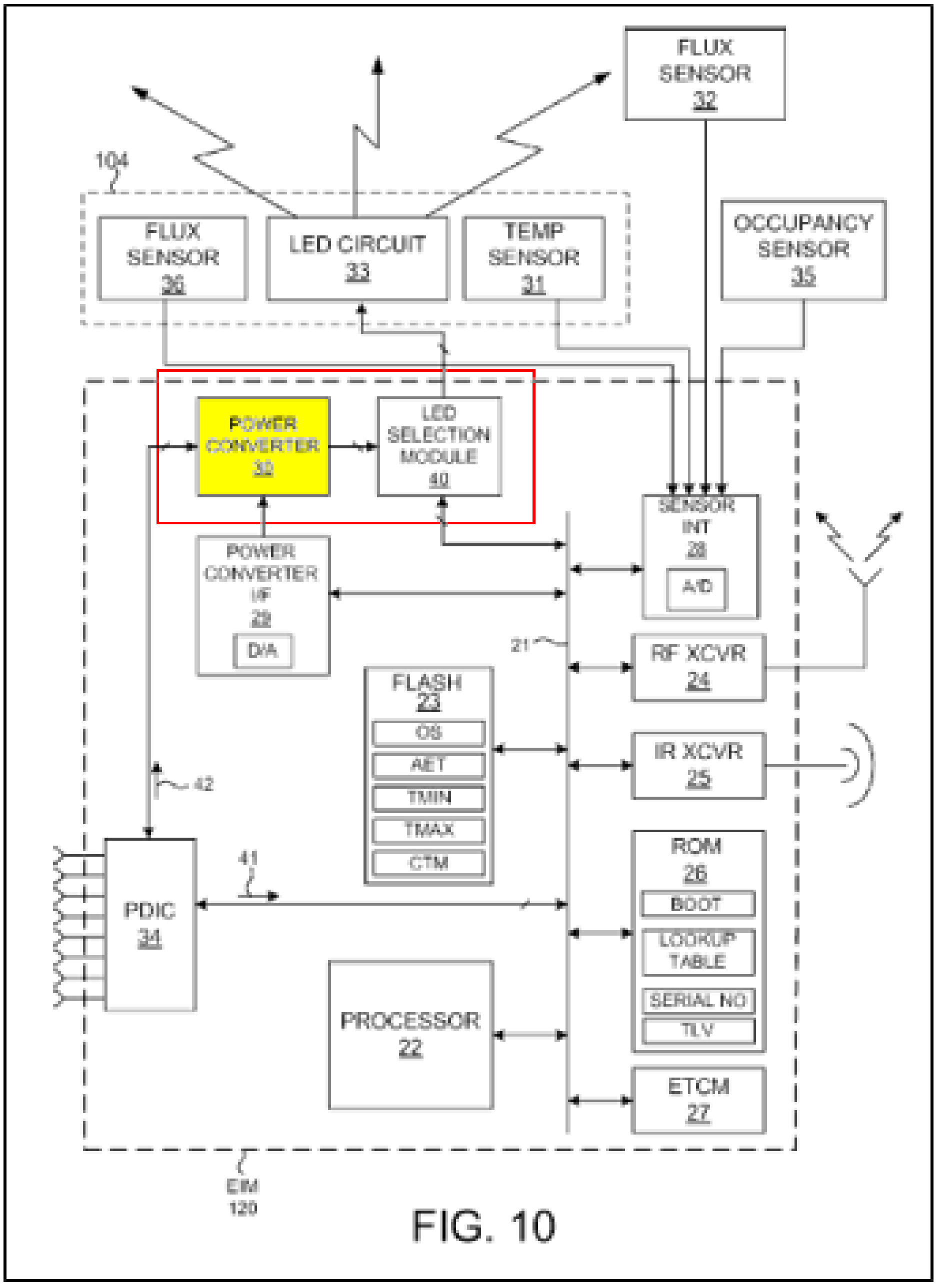


FIG. 11

(Ex. 1006, FIG. 11; Ex. 1010, FIG. 11; Ex. 1002, ¶166.)

Accordingly, as exemplified in FIG. 10 below, *Harbers* discloses an "LED driver" (e.g., power converter 30 (yellow) or, collectively, power converter 30 and LED selection module 40 (red box)).



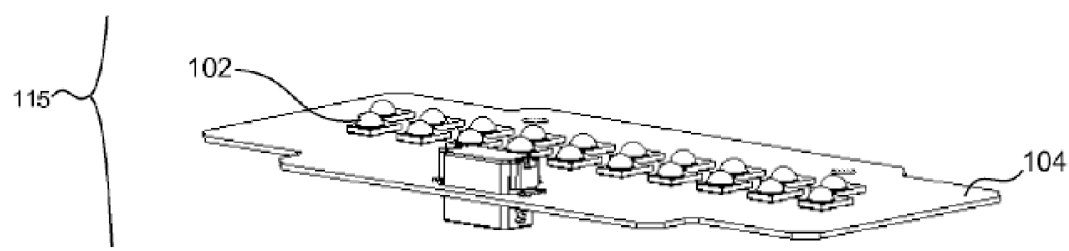
(Ex. 1006, FIG. 10 (annotated); Ex. 1010, FIG. 1010; Ex. 1002, ¶166.)

Harbers' above-identified "LED driver" has an "**input**" that is "**configured to receive an AC or DC voltage source**" as claimed (e.g., the input in power converter 30 receiving power signal 42 from PDIC 34). (Ex. 1006, ¶[0040]; *see also id.*, FIG. 10; Ex. 1010, ¶[0022], FIG. 10; Ex. 1002, ¶167.) The power signal 42 received at the "input" of power converter 30 can be an AC or DC voltage, given power converter 30 can be a DC-DC or an AC-DC converter. (Ex. 1006, ¶[0040]; Ex. 1010, ¶[0022]; Ex. 1002, ¶167.) The above-identified "LED driver" also includes an "**output**" that "**provides an AC or DC voltage**" as claimed because power converter 30 supplies power to drive LEDs 102 of LED circuitry 33 after conversion (e.g., from DC voltage to DC voltage or AC voltage to DC voltage). (Ex. 1006, ¶[0040] ("Power converter 30 operates to perform power conversion to generate electrical signal **to drive one or more LED circuits of circuitry 33.**"); Ex. 1010, ¶[0022]; Ex. 1002, ¶168.) Further, LED selection module 40 also "selectively powers LEDs of an LED circuit coupled to a channel of power converter 30," and thus provides similar output (e.g., DC) voltage. (Ex. 1006, ¶[0045]; Ex. 1010, ¶[0027]; Ex. 1002, ¶168.)

c) 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

Harbers discloses and/or suggests this limitation. (Ex. 1002, ¶¶169-182.)

As explained, LED illumination device 100 includes "one or more LED die or packaged LEDs and a mounting board to which LED die or packaged LEDs are attached," and "one or more solid state light emitting elements, such as light emitting diodes (LEDS) 102, mounted on mounting board 104." (Ex. 1006, ¶[0023]; Ex. 1010, ¶[0005]; Ex. 1006, FIGS. 1-2, 3A-3B, 4; Ex. 1010, FIGS. 1-2, 3A-3B, 4.) "Together, mounting board 104 populated by LEDs 12 and mounting board retaining ring 103 comprise light source sub-assembly 115" (shown below). (Ex. 1006, ¶[0023]; Ex. 1010, ¶[0005]; Ex. 1002, ¶169.)



(Ex. 1006, FIG. 3A (excerpted, showing LEDs 102 and mounting board 104).) Sub-assembly 115 is operable to convert electrical energy into light using LEDs 102. (Ex. 1006, ¶[0023]; Ex. 1010, ¶[0005].)

Harbers explains that the LEDs in illumination device 100 "can emit different or the same colors" whether by direct emission or phosphor conversion, "e.g., where phosphor layers are applied to the LEDs as part of the LED package." (Ex. 1006, ¶[0027]; Ex. 1010, ¶[0009]; *see also* Ex. 1006, ¶[0028] (describing known commercially available packaged LEDs usable in the device 100); Ex. 1010, ¶[0010]; Ex. 1002, ¶170.) "[A] packaged LED is an assembly of one or more LED die that contains electrical connections…and possibly includes an optical element and thermal, mechanical, and electrical interfaces." (Ex. 1006, ¶[0028]; Ex. 1010, ¶[0010].) Further, "[e]ach LED includes at least one LED chip or die, which may be mounted on a submount" and may include "multiple chips" that can emit the same or different colors. (Ex. 1006, ¶[0028]; Ex. 1010, ¶[0010].) The LED submount "typically includes electrical contact pads…coupled to contacts on the mounting board 104." (Ex. 1006, ¶[0028]; Ex. 1010, ¶[0010].)

As discussed for limitation 1(b), the **LED circuit** 33 is "**connected to the output of the LED driver**," like that recited in limitation 1(c). (§IX.C.1(b); Ex. 1002, ¶171; Ex. 1006, ¶¶[0040] ("power converter 30…drive[s] one or more **LED circuits** of circuitry 33," supplies "a controlled amount of current to **LED circuits**"), [0041] ("power converter 30 supplies electrical power to one **LED circuit of series connected LEDs**"), [0042] ("[p]ower converter 30 adjusts the current communicated to coupled **LED circuits**" or may pulse or modulate current to "coupled **LED circuits**"), [0043] ("LED circuitry 33"), [0044] (LED circuitry 33 includes LEDs 55-59 and describing a "current loop 61 conducting current 60" in

LED circuitry 33), FIG. 11 (below showing LED selection module 40 of EIM 120 and LED circuitry 33); Ex. 1010, ¶¶[0022]-[0025], FIG. 11.)

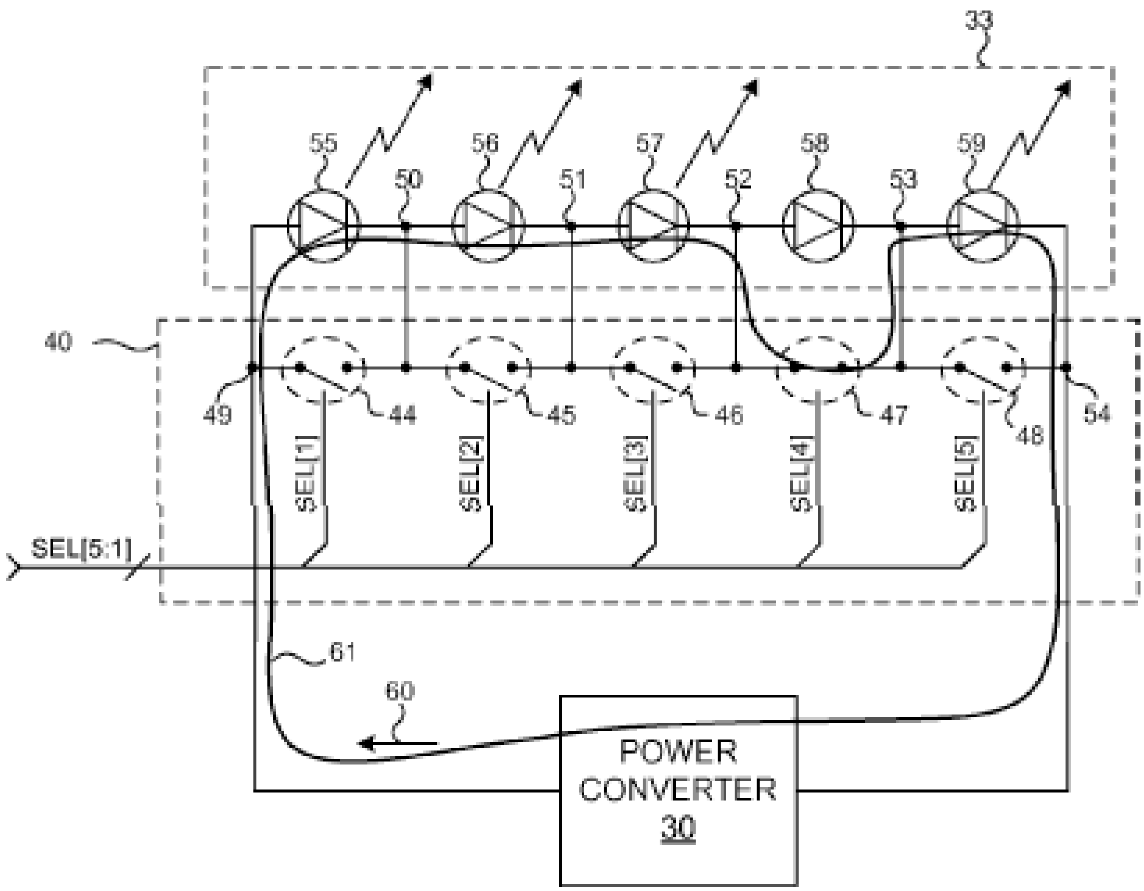
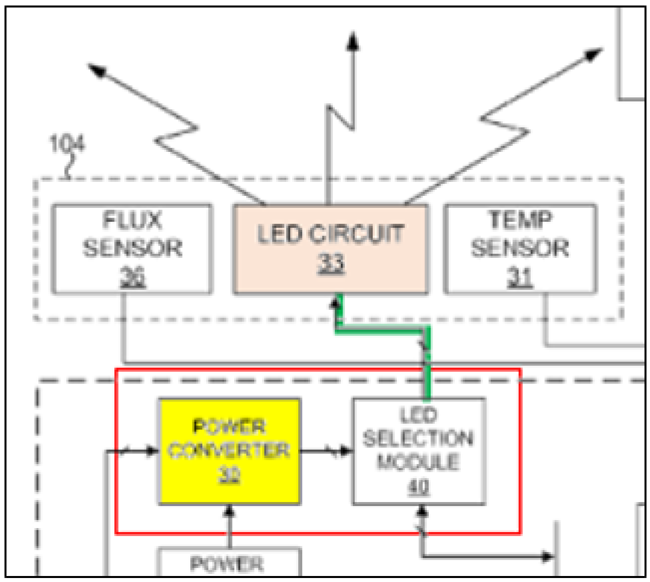


FIG. 11

(Ex. 1006, FIG. 11; *id.*, ¶¶[0045]; Ex. 1010, FIG. 11, ¶[0027]; Ex. 1002, ¶171.)

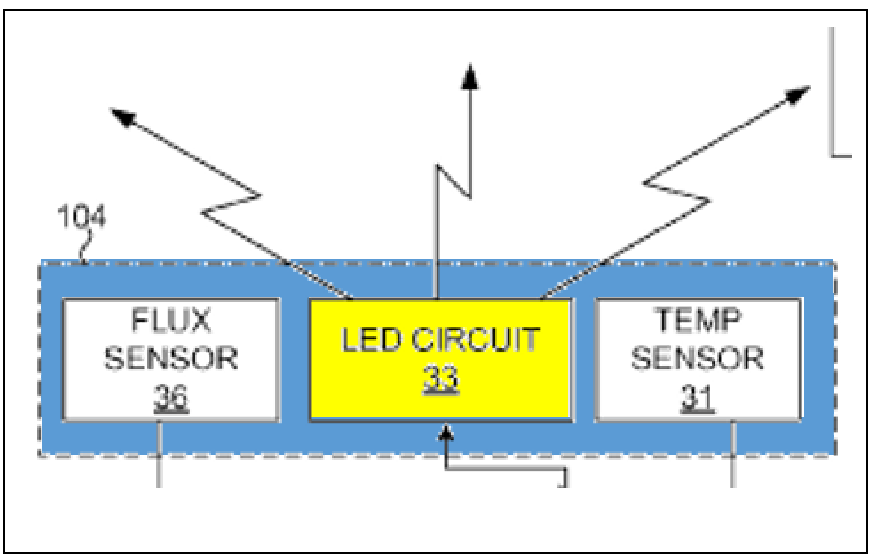
Thus, as exemplified below, *Harbers* discloses that the "**LED circuit**" (pink (LED circuit 33)) is "**connected to**" (green) "**the output of the LED driver**" (e.g., yellow or red box). (Ex. 1002, ¶172.)



(Ex. 1006, FIG. 10 (excerpted and annotated); Ex. 1010, FIG. 10; Ex. 1002, ¶172.)

Harbers also discloses that the "**LED circuit is mounted on a [] substrate**" like that claimed. (Ex. 1002, ¶173.) For example, *Harbers* explains that illumination device 100 includes a mounting board 104 that mounts the LEDs of the LED circuit(s). (Ex. 1006, ¶¶[0023], [0029]; Ex. 1010, ¶¶[0005], [0011].) Mounting board may be a PCB, ceramic submount, or "other types of boards" (Ex. 1006, ¶[0029]; Ex. 1010, ¶[0011]) and includes "electrical pads to which the electrical pads on the LEDs 102 are connected" (Ex. 1006, ¶[0030]; Ex. 1010, ¶[0012]; *see also* Ex.

1006, ¶[0032] ("[m]ounting board 104 includes conductors to appropriately couple LEDs 102 to the contact pads of mounting board 104" to allow "electrical signals" to be "communicated from mounting board 104 to appropriate LEDs 102 to generate light"); Ex. 1010, ¶[0014] (same).). EIM 120 is also connected to mounting board 104. (Ex. 1006, ¶¶[0032], [0035]-[0036], FIGS. 4, 5A-5B; Ex. 1010, ¶¶[0014], [0017]-[0018], FIGS. 4, 5A-5B.) Further, *Harbers*' discussion in connection with FIG. 10 discloses that mounting board 104 mounts LED circuitry 33 including the multiple LEDs 102. (Ex. 1006, ¶¶[0039]-[0045], FIGS. 10-11; Ex. 1010, ¶¶[0021]-[0027], FIGS. 10-11; Ex. 1002, ¶173.) Indeed, *Harbers* explains that LED mounting board 104 is coupled to EIM 120 and includes "**LED circuitry 33** including LEDs 102." (Ex. 1006, ¶[0039]; Ex. 1010, ¶[0021].)



(Ex. 1006, FIG. 10 (excerpted and annotated showing "LED circuit" (yellow) mounted on a "substrate" (blue)); Ex. 1010, FIG. 10; Ex. 1002, ¶173.)

Although *Harbers* does not expressly disclose mounting the LED circuit on a "**reflective**" substrate, it would have been obvious to a POSITA to configure *Harbers*' lighting system to use a reflective substrate to mount the LEDs and LED circuit of illumination device 100. (Ex. 1002, ¶174.)

Harbers describes features relating to controlling the direction of light emitted by the LEDs. (Ex. 1002, ¶175.) For example, *Harbers* explains that "[o]ptical elements, such as a diffuser or reflector 140 may be removably coupled to illumination device 100" that may be a concentrator "constructed of or coated with a highly reflective material" and is mounted to "deflect light emitted from illumination device." (Ex. 1006, FIGS. 1-2, 4, ¶¶[0021], [0031]; Ex. 1010, FIGS. 1-2, 4, ¶¶[0003], [0013].) *Harbers* also discloses how illumination device 100 can include a light mixing cavity 109 formed of insert 107, window 108, reflector insert 106, "in which a portion of light from the LEDs 102 is reflected until exist through output window 108," which "has the effect of mixing the light and providing a more uniform distribution of the light that is emitted from the LED illumination device 100." (Ex. 1006, ¶[0024]; Ex. 1010, ¶[0006].) *Harbers* further discusses that reflector insert 106 may be coated with wavelength converting material, which in conjunction with cavity 109 allows specific color properties to be created by device 100. (Ex. 1006, ¶[0024]; Ex. 1010, ¶[0006]; Ex. 1002, ¶175.)

Thus, a POSITA considering the design and implementation of *Harbers*' lighting system would have considered ways to mitigate the loss of light to promote efficient and uniform illumination by the LEDS 102 of the LED circuit. (Ex. 1002, ¶176.) A POSITA would have been skilled and knowledgeable in the design and configuration of LED lighting devices, like those described by *Harbers*, including the use of materials and components for mounting device components and the known ways to improve the efficiency of the light produced by an LED lighting system. (*Id.*).

Indeed, the use of reflective substrate to provide mechanical support for LED-based lighting arrangements was well known in the art. (Ex. 1002, ¶176; Ex. 1018, 6:6-18, 6:48-7:34 (LED array substrate with integral reflector component), FIGS. 18, 19, 27); Ex. 1022, Abstract (LED chips mounted on the circuit board coated with "a layer of high reflection material on the board to collect light"), FIG. 2.1, ¶¶[0018], [0034] ("coat a reflection layer on the board to collect the back forward light"), [0081] ("coat a layer of high **reflection material** on the top of the board"); Ex. 1046, ¶¶[0047]-[0049] (LED array substrate is made of a reflective material or laminated with a reflective layer); Ex. 1002, ¶176.) Thus, a POSITA would have found it obvious in view of *Schultz* and state of the art knowledge to configure the mounting board 104 ("substrate") that mounts the LED circuit in *Harbers*' LED lighting system to be reflective to minimize the loss of light emitted from LEDs 102 and enhance the reflectivity of such light in the system. (Ex. 1002, ¶176.)

For example, *Schultz* "generally relates to a lighting or illumination assembly" and, in particular, illumination systems including LEDs. (Ex. 1046, ¶¶[0002]-[0010].) *Schultz*, being from the same general field as the '251 patent and *Harbers*, therefore would have been considered by a POSITA when considering the design and implementation of illumination device 100 of *Harbers*. (Ex. 1002, ¶177; Ex. 1001, 1:55-58 (describing the field as relating to LEDs).) *Schultz* discloses that with non-reflective circuit boards "[a]ny light from the LED die that strikes the circuit board is unutilized due to absorption or scattering of the light." (Ex. 1046, ¶[0048].) *Schultz* discloses that by mounting the LED dies on a reflective circuit board, "the utilization of the light is improved." (*Id.*) Thus, *Schultz* also addresses a similar problem as the '251 patent. (Ex. 1002, ¶177; Ex. 1001, 24:62-25:8.) Accordingly, a POSITA would have similarly been motivated by *Schultz*'s teachings/suggestions to mitigate the effects of light loss due to absorption or scattering by the circuit board/substrate in the context of *Harbers*' lighting system. (Ex. 1002, ¶177.)

A POSITA would also have been motivated to implement such a modification given *Harbers*' considerations and concerns for a uniform illumination and use of reflective materials to direct light in accordance with particular implementations of its disclosed lighting system to increase the optical efficiency. (Ex. 1006, ¶¶[0021],

[0023]-[0024], [0053]; Ex. 1010, ¶¶[0003], [0005]-[0006], [0034]; Ex. 1018, 6:6:-12 (reflective substrate that redirects LED light so "light is not lost and can be effectively used"); Ex. 1022, ¶[0018] (coating the circuit board with a high reflection material for "uniform illumination"); Ex. 1023, 16:24-45; Ex. 1002, ¶178.) Such a modification would have been no more than the predictable use of known lighting design techniques and components according to their established functions (*e.g.*, adding a reflective layer to a non-reflective substrate, forming the substrate from a reflective material, or using such a substrate to efficiently direct light). (Ex. 1002, ¶178.) *KSR*, 550 U.S. at 417 (2007).

Further, a POSITA would have appreciated that configuring *Harbers*' system with a reflective substrate to mount the LED circuit would beneficially complement the heat dissipation concerns that *Harbers* expressly considers in its design. (Ex. 1006, ¶¶[0021] (explaining how reflector 140 can be made from thermally conductive material (e.g., aluminum or copper) to promote thermal convection), [0022] (use of a heat sink 130 made from e.g., aluminum or copper) that likewise promotes thermal convection); Ex. 1010, ¶¶[0003]-[0004]; Ex. 1002, ¶179.) Notably, *Harbers* explains that "LEDs 102 may include thermal contact areas on the bottom surface of the submount through which heat generated by the LED chips can be extracted" and that "thermal contact areas are coupled to **heat spreading layers on the mounting board 104**," which "**may be disposed on any of the top, bottom,**

or intermediate layers of mounting board 104." (Ex. 1006, ¶[0028]; Ex. 1010, ¶[0010]; Ex. 1002, ¶179.) Accordingly, a POSITA would have recognized the additional advantages of providing reflective material on the mounting board 104 ("substrate") to promote heat dissipation aspects contemplated by *Harbers*. (Ex. 1002, ¶179.)

A POSITA would have been motivated to use various known design concepts, components, and techniques in implementing the above-discussed *Harbers*' lighting system, and thus would have considered various ways to configure the mounting board as a reflective substrate to achieve the above-discussed predictable benefits disclosed/suggested by *Harbers* and known in the art by such a skilled person at the time. (Ex. 1002, ¶180; Ex. 1008, ¶[0017]; Ex. 1022, Abstract, FIG. 2.1, ¶¶[0018], [0034], [0081]; Ex. 1018, 2:6-10, 7:49-8:46, 6:6-7:34, FIGS. 1, 27; Ex. 1023, 16:24-45.) Indeed, a POSITA would have appreciated that *Harbers* contemplates modifications to its configurations. (Ex. 1006, ¶[0055] ("the teachings…are not limited to the specific embodiments described above" (e.g., mounting base 101 and certain components of EIM 120 may be excluded) and "various modifications, adaptions, and combinations of various features of the described embodiments can be practiced"); Ex. 1010, ¶[0036]; Ex. 1002, ¶181.) This includes the optional use of bottom reflector insert 106 that is placed over mounting board 104 in certain configurations. (Ex. 1006, ¶[0023] (subassembly 116 "optionally includes either or both bottom reflector insert 106 and sidewall insert 106"); Ex. 1010, ¶[0005].)[12] Moreover, a POSITA would have found benefits of such a reflective substrate even where a reflector 140 is implemented, as such a substrate would complement the reflective properties provided by reflector 140, and thus further improve the system by additionally mitigating against loss of LED light and enhancing heat dissipation features as discussed above. (Ex. 1002, ¶181.)

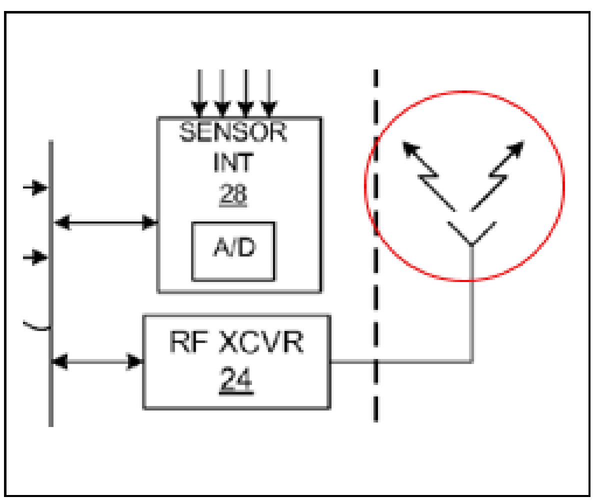
Given the disclosures of *Harbers* and *Schultz* and the knowledge of a POSITA of such mounting and optical techniques, a POSITA would have had a reasonable expectation of success in implementing such a modification. Such a design would have involved the use of known components and mounting techniques to produce the predictable result of an LED circuit that benefited from known properties of

[12] Thus, a POSITA would have been motivated to implement a reflective substrate as explained, and appreciated the benefits of such a configuration, especially where insert 106 and sidewall 107 were not implemented in the design, as contemplated by *Harbers*. (Ex. 1002, ¶181.) Accordingly, *Harbers* expressly dispels any attempt by PO to suggest the above modification would not be feasible because insert 106 would cover mounting board 104 modified as a reflective substrate, given use of such component is an optional feature.

reflective base structures, as suggested by *Schultz* and the knowledge of a POSITA (demonstrated above). (*Id.*, ¶182.)

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

Harbers discloses this limitation. (Ex. 1002, ¶¶183-186.) For example, *Harbers* discloses that EIM 120 (part of illumination device 100) "includes several mechanisms for **receiving data** from and transmitting data to devices communicatively linked to illumination device 100." (Ex. 1006, ¶[0043]; Ex. 1010, ¶[0025].) Namely, "EIM 120 may **receive** and transmit **data** over PDIC 34, **RF transceiver 24**, and IR transceiver 25." (Ex. 1006, ¶[0043]; Ex. 1010, ¶[0025].) A POSITA would have recognized that *Harbers*' FIG. 10 shows an "antenna" as part of RF transceiver as shown below (red). (Ex. 1002, ¶183.)



(Ex. 1006, FIG. 10 (excerpted and annotated); Ex. 1010, FIG. 10; Ex. 1002, ¶183.)

Further, PDIC 34 "is coupled to connector 121 and receives electrical signals 135 over conductors 134" and is a device "complying with the IEEE 802.3 protocol" that "separates incoming signals 135 into data signals 41…and power signals 42" in accordance with the protocol. (Ex. 1006, ¶[0040]; Ex. 1010, ¶[0022].)

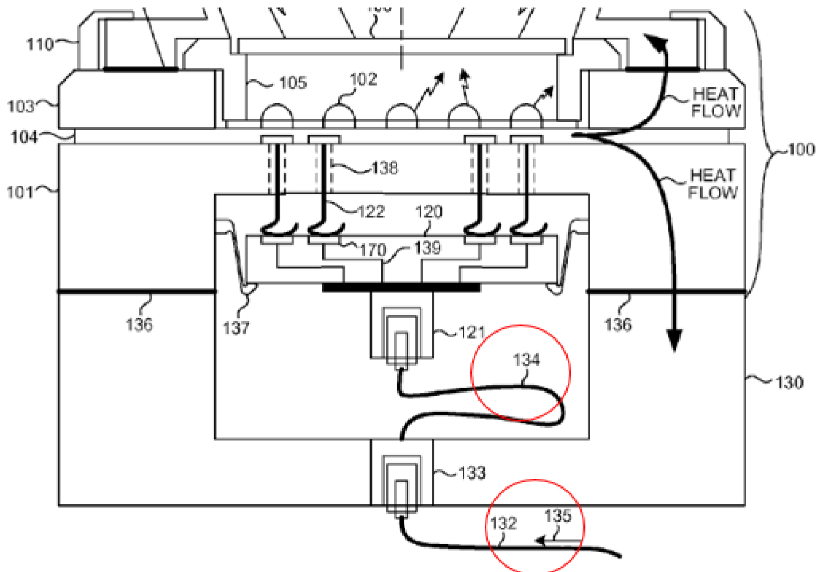


FIG. 4

(Ex. 1006, FIG. 4 (excerpted and annotated); Ex. 1010, FIG. 4; Ex. 1002, ¶184.)

Harbers describes "a process of externally communicating LED illumination device information." (Ex. 1006, ¶[0049]; Ex. 1010, ¶[0031].) As discussed, EIM 120 stores a serial number that identified illumination device 100, which may be communicated "in response to **receiving a request** to transmit the serial number." (*Id.*, ¶[0050]; *id.* (in response **to a request for a serial number**, "processor 22 reads the serial number…and communicates the serial number to any of RF transceiver 24, IR transceiver 25, or PDIC 34 for communication of the serial number from EIM

120"); Ex. 1010, ¶[0031]; Ex. 1002, ¶185.)

Thus, *Harbers* discloses a "data receiver [that] can receive data from at least one of a transmission line or antenna," as claimed. For example, PDIC 34 is a "data receiver" that receives data over a transmission line (e.g., conductor 134). Moreover, RF transceiver 24 is a "data receiver" that receives data over an antenna (e.g., FIG. 10 antenna). (Ex. 1002, ¶186.)

2. Claim 6

a) The LED lighting system of claim 1, wherein the LED lighting system is dimmable in response to the data received.

Harbers discloses this limitation. (Ex. 1002, ¶¶187-189.) As explained, EIM 120 includes LED selection module 40 that works in conjunction with power convert 30 to selectively control the emission of light by the LEDs 102 in LED circuit 33. (§IX.C.1(b); Ex. 1006, ¶¶[0045]-[0048]; Ex. 1010, ¶¶[0027]-[0030].) In particular, LED selection module 40 can selectively switch on and off specific LEDs in LED circuit 33 based on, for example, control signals from processor 22 "in response to a command signal received onto EIM 120 (e.g., communication received by RF transceiver 24, IR transceiver 25, or PDIC 34)." (Ex. 1006, ¶¶[0045]-[0046]; Ex. 1010, ¶¶[0027]-[0028].)

Harbers discusses in connection with FIG. 12 "how LEDs may be switched on or off to change the amount of flux emitted by powered LEDs of LED circuit 33." (Ex. 1006, ¶[0047]; Ex. 1010, [0029].)

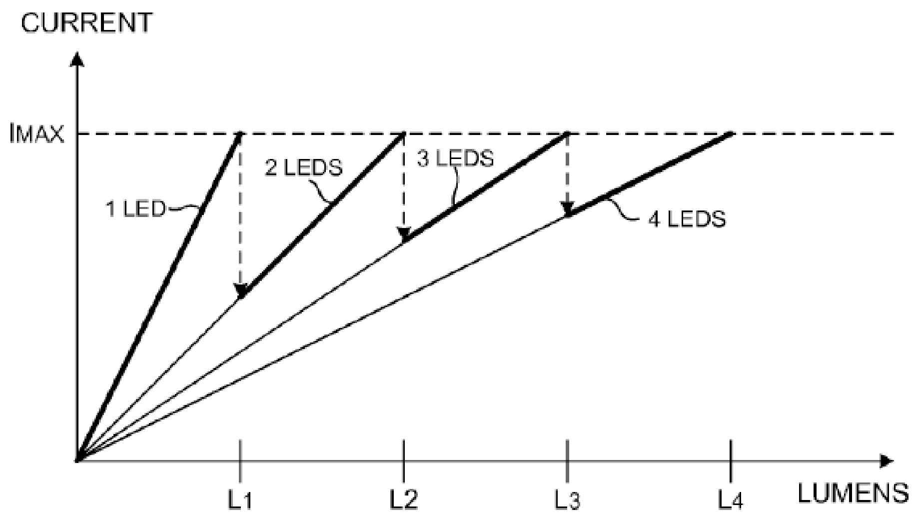


FIG. 12

(Ex. 1006, FIG. 12; Ex. 1010, FIG. 12; Ex. 1002, ¶188.) As shown, "current 60 is plotted against the luminous flux emitted by powered LEDs of LED circuit 33" with a "linear relationship between luminous flux and drive current." (Ex. 1006, ¶[0047]; Ex. 1010, ¶[0029].) *Harbers* explains FIG. 12 shows how **luminous flux** is emitted as a function of drive current for four cases (i.e., one, two, three, or four LEDs are "switched on"), resulting in different "luminous output[s]." (Ex. 1006, ¶[0047]; Ex. 1010, ¶[0029].) Specifically, *Harbers* discloses that "[w]hen reduced amounts of light are required for a period of time (e.g., **dimming** of restaurant lighting), light selection module 40 may be used to selectively 'switch off' LEDs, rather than simply scaling back current." (Ex. 1006, ¶[0047]; Ex. 1010, ¶[0029].) In either case, *Harbers* discloses that the "LED lighting system" (discussed for claim 1) "is dimmable in response to the data received" as claimed (e.g., command signal received onto EIM 120 (e.g., communication received by RF transceiver 24, IR transceiver 25, or PDIC 34). (Ex. 1002, ¶189.)

X. THE CIRCUMSTANCES WEIGH AGAINST DISCRETIONARY DENIAL

A. The *Fintiv* factors favor institution

An evaluation of the factors under *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (Mar. 20, 2020) (precedential), weighs against discretion to deny institution. Rather, the strong invalidity showing on the merits favors institution, notwithstanding Illinois-Litigation and HD-Litigation. (*See* §II).

First factor. Petitioner intends to seek a stay in Illinois-Litigation upon institution. The Board has explained it will not speculate as to the outcome of such unresolved issues before a district court, *Google LLC et al. v. Parus Holdings, Inc.*, IPR2020-00847, Paper 9 at 12-13, and this factor is neutral where no such stay motion has yet been filed, *Hulu LLC v. SITO Mobile R&D IP, LLC*, IPR2021-00298, Paper 11 at 10-11 (May 19, 2021). Accordingly, this factor does not weigh in favor of discretionary denial.

Second factor. Regarding Illinois-Litigation, the court has not set a trial date.[13] (Exs. 1076, 1080, 1086-1087.) There has not been significant resource investment by the court and the parties, particularly compared to the resource expenditures leading up to a trial. Moreover, any trial (if it occurs) would likely only occur at least 102 weeks after the service of the complaint (and indeed the complaint

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[13] PO motion to transfer the Illinois-Litigation to Texas was denied. (Ex. 1085.)

has been amended twice)—and thus after a final written decision in this IPR. (*Id.*; Ex. 1079, 1-2 (document available at Northern District of Illinois website, estimating "Case Ready for Trial" 102 weeks after complaint served); Ex. 1076, 8 (Dkt. #16 showing summons returned May 19, 2021).)

The HD-Litigation is not relevant to this analysis, but nonetheless has a "tentative" trial date for December 7, 2022. (IPR2021-01367, Paper 1 at 8-9; Ex. 1077, 8 (regarding Dkt. #31).) And as Home Depot noted, more than a dozen other trials are scheduled before the same judge—calling into question whether trial could practically take place as scheduled. (*Id.*)

Third factor. The minimal investment by the court and parties in Illinois-Litigation weighs against discretional denial. Discovery is at an early stage. Expert discovery is not open, no depositions have occurred, and no substantive efforts toward claim construction have begun. In short, little has happened and the most resource intensive period in the district court case will occur after the institution decision in this proceeding. (*See* Exs. 1076, 1086.) This alone weighs against denial. *See*, *e.g.*, *Hulu*, IPR2021-00298, Paper 11 at 13.

Fourth factor. While PO has asserted only claims 1 and 6 of the '251 patent, challenged here (§IX; Ex. 1083, 2-5; Ex. 1084, 2-45), to mitigate any potential concerns, Petitioner stipulates that it will not pursue invalidity of the '251 patent in district court based on any instituted IPR grounds in this proceeding.

Fifth factor. That Petitioner is a party to Illinois-Litigation does not outweigh the other factors that strongly weigh against discretionary denial.

Sixth factor. Petitioner diligently filed this Petition with strong grounds (*supra* §IX) **within three months** of PO's assertion of the '251 patent (Ex. 1082, ¶¶72-82, p.67), **within two months** of PO's amended preliminary infringement contentions in Illinois-Litigation (Ex. 1083), and **more than nine months before** the statutory deadline for filing an IPR (Ex. 1082, 67). Such diligence weighs against exercising discretion. *See*, *e.g.*, *Hulu*, IPR2021-00298, Paper 11 at 13; *Facebook, Inc. v. USC IP P'ship, L.P.*, IPR2021-00033, Paper 13 at 13.

Further, the '251 patent issued on first office action without any substantive prior art analysis of the ultimately issued claims. (Ex. 1004, 229-237, 256-262, 509-510).) Institution is thus consistent with the significant public interest against "leaving bad patents enforceable." *Thryv, Inc. v. Click-To-Call Techs., LP*, 140 S. Ct. 1367, 1374 (2020). This Petition also raises unique issues, such as the *Harbers*-ground based on a priority challenge to the '251 patent and the challenge to claim 6 (not challenged in HD-IPR).

Accordingly, based on a "holistic view of whether efficiency and integrity of the system are best served," the facts here weigh against exercising discretion denial. *Samsung Elecs. Co. Ltd. v. Dynamics Inc.*, IPR2020-00505, Paper 11 at 15 (Aug. 12, 2020). At a minimum, factors 2, 3, 4, and 6 (or combinations thereof) outweigh factors 1 (neutral) and 5, and thus favor institution.

B. The *General Plastic* analysis favors institution

The Board should not exercise its discretion to deny institution based on the '251 patent being at issue in HD-IPR (§II). Indeed, the facts and issues relevant to the seven factors concerning discretionary denial under 35 U.S.C. § 314(a) favor institution. *General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper No. 19 at 3, 8, 15-19 (Sept. 6, 2017).

First factor. Petitioner is not (and was not) a party in HD-Litigation or HD-IPR. And Home Depot is not a party to Illinois-Litigation. In short, Petitioner has no "significant relationship" with Home Depot. *See Valve Corp. v. Electronic Scripting Product, Inc.*, IPR2019-00062, Paper No. 11 at 8-10 (Apr. 2, 2019) (precedential). Home Depot and Petitioner are not co-defendants and there was/is no direction or control between the parties relating to this petition or HD-IPR. The accused products in HD-Litigation and Illinois-Litigation are not the same. Indeed, there is **no complete overlap in the asserted claims** of HD-Litigation and Illinois-Litigation. (Ex. 1083, 2-5; Ex. 1089, 16-28.) Also, there is only one overlapping claim (claim 1) in the challenged claims here and in HD-IPR (*e.g.*, HD-IPR does not challenge claim 6). Petitioner and Home Depot thus remain distinct parties, with ultimately distinct interests and litigation strategies.[14] *Id.*; *Paypal, Inc. v. IOENGINE,* LLC, IPR2019-00884, Paper 22 at 3-11 (Oct. 3, 2019).

Second to fifth factors. Since Petitioner has not previously filed a petition against the same patent, factors 2–5 bear little relevance. *Id*. Nevertheless, Petitioner has diligently invested significant effort to prepare the detailed grounds presented in this Petition, and has not delayed the preparation or filing of this Petition. And while at the time of filing HD-IPR (August 18, 2021), Petitioner was working on its strategies and challenges against the '251 patent, Petitioner had no notice as to which claims of the '251 patent PO would assert against Petitioner. Petitioner continued its efforts to prepare and file its petition soon thereafter. This is significant because of the number of claims issued in the '251 patent, and the various different compilations of conventional arrangements claimed in those claims. Thus any delay between its filing and HD-IPR was reasonable and

[14] A general common interest by defendants seeking to invalidate asserted unpatentable claims should not create a significant relationship to warrant discretionary denial, especially where here, Petitioner asserts different prior art and challenges other claims without any coordination or direction/control, and has no significant relationship with Home Depot regarding the challenged patent asserted against different products.

warranted, regardless of whether Petitioner knew at the time of HD-IPR about the prior art it ultimately asserted in this petition. If anything, any delay between the filing of the petitions is a product of PO's litigation strategy. Indeed, PO staggered its assertion of the '251 patent against Home Depot and Petitioner by more than 6 months. (Ex. 1088, 87; Ex. 1082, 50-53, 57 (counterclaim asserting infringement of the '251 patent).)

Moreover, Petitioner filed its petition merely a few months after HD-IPR. Also, Petitioner has gained no advantage in filing its own petition. At time of this filing, no preliminary response has been filed in HD-IPR. Moreover, as noted, Petitioner asserts different prior art (including intervening art), based on a different expert's opinions, against one different claim (claim 6). Thus, **factors two through five** do not support discretionary denial. Indeed, Petitioner would be prejudiced by the denial of institution given its reasonable and significant efforts and invested resources to diligently file its petition following PO's recent infringement contentions.

Sixth and Seventh factors. Instituting this Petition would be no more a burden on the Board's finite resources than instituting any other petition. Indeed, this Petition challenges a finite set of claims based on a limited set of primary references. (§IX.) Nor are there any readily identifiable roadblocks for the Board to issue a final determination within the statutory one-year limit like those found in other cases where discretionary denial was exercised. *See*, *e.g.*, *Valve Corp.*, at 15.

XI. CONCLUSION

Accordingly, Petitioner requests institution of IPR for the challenged claims based on the specified grounds.

Respectfully submitted,

Dated: October 27, 2021 By: /Joseph E. Palys/
Joseph E. Palys (Reg. No. 46,508)
Counsel for Petitioner

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,492,251 contains, as measured by the word-processing system used to prepare this paper, 13,986 words. This word count does not include the items excluded by 37 C.F.R. § 42.24 as not counting towards the word limit.

Respectfully submitted,

Dated: October 27, 2021

By: /Joseph E. Palys/
Joseph E. Palys (Reg. No. 46,508)
Counsel for Petitioner

CERTIFICATE OF SERVICE

I hereby certify that on October 27, 2021, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,492,251 and supporting exhibits to be served via express mail on the Patent Owner at the following correspondence address of record as listed on PAIR:

K&L Gates LLP-Chicago
P.O. Box 1135
Chicago IL 60690

By: /Joseph E. Palys/
Joseph E. Palys (Reg. No. 46,508)