

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Home Depot U.S.A., Inc.,
Petitioner

v.

Lynk Labs, Inc.,
Patent Owner

U.S. Patent No. 11,297,705

Filing Date: February 22, 2021

Issue Date: April 5, 2022

Title: Multi-Voltage and Multi-Brightness LED Lighting Devices and Methods of
Using Same

PGR2023-00016

**PETITION FOR POST-GRANT REVIEW OF
U.S. PATENT NO. 11,297,705**

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EXHIBITS

Exhibit No.	Description
1001	U.S. Patent No. 11,297,705 to Miskin, et al. (“ 705 patent ”)
1002	Declaration of Dr. Dean Neikirk
1003	File History of U.S. Pat. No. 11,297,705 to Miskin, et al.
1004	U.S. Patent Publication No. 2002/0070914 (“ Bruning ”)
1005	PGR2022-00009, Paper 5 (Patent Owner’s Preliminary Response) (February 28, 2022)
1006	U.S. Patent No. 10,932,341 to Miskin et al. (“ 341 patent ”)
1007	PGR2022-00009, Paper 10 (Decision Granting Institution of Post-Grant Review) (May 25, 2022)
1008	WO2005/084080
1009	U.S. Pat. App. Pub. No. 2017/0354005 (Ser. No. 15/685,429)
1010	U.S. Pat. App. Pub. No. 2014/0153232 (Ser. No. 14/172,644)
1011	U.S. Pat. App. Pub. No. 2018/0035510 (“ Doheny ”)
1012	U.S. Pat. App. Pub. No. 2018/0206305 (“ Van Winkle ”)
1013	U.S. Pat. App. Pub. No. 2002/0163529 (“ Evanicky ”)
1014	U.S. Provisional App. No. 61/217,215
1015	U.S. Provisional App. No. 60/997,771
1016	US 2012/0069560 (publication of 13/322,796)
1017	US 2009/0174337 (publication of 12/287,267)
1018	WO 2010/138211 (publication of PCT/US2010/001597)
1019	US 2019/0182919 (publication of 16/274,164)
1020	U.S. Patent No. 10,537,001 to Miskin et al. (“ 001 patent ”)
1021	Petitioner’s Opening Claim Construction Brief in <i>Lynk Labs, Inc. v. The Home Depot USA, Inc. et al.</i> , 1:21-cv-5021-VMC (N.D. Ga.) (Dkt. No. 36) (Oct. 6, 2021)

Exhibit No.	Description
1022	Patent Owner’s Responsive Claim Construction Brief in <i>Lynk Labs, Inc. v. The Home Depot USA, Inc. et al.</i> , 1:21-cv-5021-VMC (N.D. Ga.) (Dkt. No. 40) (Oct. 27, 2021)
1023	001 Patent Prosecution History Patent Owner’s Amendments and Arguments/Remarks on June 13, 2019
1024	479 Patent Prosecution History Examiner’s Non-Final Rejection on October 2, 2018
1025	U.S. Patent Publication No. 2012/0081009 (“ Shteynberg ”)
1026	783 Patent Prosecution History Patent Owner’s Amendments and Arguments/Remarks on August 22, 2019
1027	EP0515664B1 to Krakower (“ Krakower ”)
1028	Excerpt from “IEEE 100 The Authoritative Dictionary of IEEE Standards Terms,” Seventh Ed. (2000) with definition of “driver”
1029	783 Patent Prosecution History Patent Owner’s Amendments and Arguments/Remarks on June 16, 2020
1030	PGR2022-00009, Paper 20 (Patent Owner’s Response) (August 17, 2022)
1031	U.S. Pat. App. Pub. No. 2006/0022999 (“ Lee ”)

I. INTRODUCTION

Home Depot U.S.A., Inc (“Petitioner”) hereby petitions for post-grant review of claims 1-3, 5, 7-10, 12, 14-17, and 19 (“Challenged Claims”) of U.S. Patent No. 11,297,705 (EX1001, “the 705 patent”).

II. COMPLIANCE WITH FORMAL REQUIREMENTS

A. Mandatory Notices Under 37 C.F.R. §§ 42.8(b)(1)-(4)

1. Real Party-In-Interest

Petitioner identifies Home Depot Product Authority, LLC as a real party-in-interest (“RPI”).

In an abundance of caution, Petitioner also identifies as potential RPIs the following suppliers of certain products that have been accused in district court of infringing related patents: King of Fans, Inc., Air Cool Industries, New Bright Technology, Leedarson Lighting, ETI, and Globe Electric. These suppliers have not controlled or participated in the drafting of this Petition, and none has consented to being named an RPI. Moreover, it is highly unlikely that any individual supplier will ever be able to exert sufficient control over this proceeding that would support a finding that they are the RPI.

2. Related Matters

Petitioner identifies the following administrative proceedings that may affect, or be affected by, a decision in this proceeding:

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3. Lead and Backup Counsel

Lead counsel is Brian Erickson, Reg. No. 48,895, of DLA Piper LLP (US), 303 Colorado St., Suite 3000, Austin, TX 78701; brian.erickson@dlapiper.com, 512-457-7059 (phone), 512-457-7001 (fax).

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4. Service Information

Service information for lead and back-up counsel is provided in the designation of lead and back-up counsel above. Petitioner consents to electronic service to lead and back-up counsel and to:

HomeDepot-Lynk-IPR@us.dlapiper.com

B. Proof of Service on the Patent Owner

According to the assignment records at the USPTO, the 705 patent is currently owned by Lynk Labs, Inc. (“Patent Owner” or “PO”).

As identified in the attached Certificate of Service, a copy of this Petition and supporting evidence is being served electronically by agreement of the parties and pursuant to 37 C.F.R. §§ 42.6 & 42.105(b).

C. Power of Attorney

Powers of attorney are being filed, with designation of counsel, in accordance with 37 C.F.R. § 41.10(b).

D. Standing

In accordance with 37 C.F.R. §42.201, Petitioner certifies that the 705 patent is available for post-grant review and that Petitioner is not barred or estopped from requesting a post-grant review challenging the patent claims on the grounds identified in this Petition.

E. Timing

Under 37 C.F.R. §42.202, “[a] petition for a post-grant review of a patent must be filed no later than the date that is nine months after the date of the grant of a patent or of the issuance of a reissue patent.” Petitioner is filing this Petition within nine months of the 705 patent’s issue date (April 5, 2022), and this Petition is therefore timely.

F. Fees

The undersigned authorizes the Director to charge the fee specified by 37 C.F.R. § 42.15(b) and any additional fees that might be due in connection with this Petition to Deposit Account No. 50-3266.

III. STATEMENT OF PRECISE RELIEF REQUESTED

A. Prior Art

The following references are pertinent to the grounds of unpatentability:

- U.S. Pat. App. Pub. No. 2002/0070914 to Bruning et al. (“Bruning”), published June 13, 2002
- U.S. Pat. App. Pub. No. 2006/0022999 to Lee et al. (“Lee”), published February 2, 2006
- U.S. Pat. App. Pub. No. 2002/0163529 to Evanicky et al. (“Evanicky”), published November 7, 2002
- U.S. Pat. App. Pub. No. 2018/0035510 to Doheny et al. (“Doheny”), published February 1, 2018
- U.S. Pat. App. Pub. No. 2018/0206305 to Van Winkle (“Van Winkle”), published July 19, 2018

Each reference qualifies as prior art under 35 U.S.C. §102(a) (AIA).

B. Grounds

This Petition, supported by the declaration of Dr. Dean Neikirk (“Neikirk Declaration”) (EX1002), requests cancellation of the Challenged Claims of the 705 on the following grounds:

- **Ground 1:** Claims 3, 10 and 17 are invalid under Section 112.

- **Ground 2:** Claims 15, 17, and 19 are anticipated under Section 102 by Bruning.
- **Ground 3:** Claims 1-3, 5, 7-10, 12, 14-17, and 19 are obvious under Section 103 over Bruning in view of Evanicky.
- **Ground 4:** Claims 1-2, 5, 7-9, 12, 14-16, and 19 are anticipated under Section 102 by Doheny.
- **Ground 5:** Claims 1-2, 5, 7-9, 12, 14-16, and 19 are obvious under Section 103 over Van Winkle.
- **Ground 6:** Claims 1-3, 5, 7-10, 12, 14-17, and 19 are obvious under Section 103 over Bruning in view of Lee.

IV. THIS PETITION IS PROPER UNDER 35 U.S.C. §§ 324(A) AND 325(D)

A. The *Becton Dickinson* Factors Favor Institution Under § 325(d)

This PGR is appropriate under *Becton Dickinson* and Section 325(d).

None of the combination of Bruning and Evanicky (Ground 3), Doheny (Ground 4), Van Winkle (Ground 5), or the combination of Bruning and Lee (Ground 6) were considered during prosecution. None of these bases for invalidity are cumulative of the references discussed by the examiner, over which the Challenged Claims issued. EX1003, 135.

While Bruning and Petitioner's Petition in PGR2022-00009 challenging the 705 patent's parent patent, U.S. Patent No. 10,932,341 ("341 patent") (which

includes grounds similar to Grounds 1 and 2 herein), were made of record, the examiner did not discuss either. Nor did the examiner consider the Board's D.I. in PGR2022-00009, wherein the Board found Petitioner more likely than not to prevail on those grounds that are similar to Grounds 1 and 2 herein. EX1007, 47 (anticipated over Bruning), 43-44 (invalid under Section 112). The examiner erred by failing to substantively discuss these bases for invalidity, which are clearly meritorious. See Sections VI, VII.

Under these circumstances, the factors set out in *Becton, Dickinson and Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17-18 (PTAB December 15, 2017) (precedential) either favor institution or are neutral.

V. THE 705 PATENT

A. Summary of the 705 Patent

The 705 patent relates to a lighting system with a switch that connects multiple circuits. EX1001, Abstract. The 705 patent discloses four embodiments. EX1002, ¶21.

The first embodiment is an “unconnected” embodiment, wherein an LED package contains two “single-voltage” LED circuits, each having a predetermined, fixed forward voltage of, e.g., 6V. EX1001, Figs. 1-3, 11-12, 4:3-15, 4:32-36, 4:58-61, 7:13-15, 9:61-10:54, 11:56-12:13. Because the LED circuits are “unconnected,” a manufacturer or “packager” can “wire” them to connect or

configure them into one of either the second or third embodiments. *Id.*, 7:28-33. The 705 patent refers to these unconnected LED packages as a “multi-voltage and/or multi-brightness LED lighting device.” *Id.*, 9:61-62. This phrase in the 705 patent specification refers to the potential of the unconnected LED package to be manufactured into one of either the second or third embodiments. *Id.* The phrase does not disclose a hybrid implementation that provides both multi-voltage and multi-brightness functionality. EX1002, ¶22.

The second embodiment is a “serial or parallel” embodiment, in which an LED device is manufactured to have one of multiple forward voltages. EX1001, Figs. 4-5, 4:16-31, 4:37-57, 4:62-67, 10:55-11:3. In this embodiment, an unconnected LED package of the first embodiment is “wired” or “connected” into either a serial or parallel configuration during manufacture. If the two 6V LED circuits are wired in parallel, the LED device will have a 6V forward voltage. *Id.*, Fig. 4, 10:55-61. If the two 6V LED circuits are wired in series, the LED device will have a 12V forward voltage. *Id.*, Fig. 5, 10:62-11:3. The LED package can route the LED circuits to external contacts allowing an “LED package user to wire” the device into a “series or parallel” circuit. *Id.*, 6:25-67. The manufacturer then connects the configured LED device to a “standardized” driver of the appropriate “known specified voltage.” *Id.*, 8:7-15. Thus, in the disclosed embodiment that uses 120V LED circuits, if the LED device is configured for

120V operation, the manufacturer will connect the device to a 120V power supply. *Id.*, Fig. 4 (120VAC per LED circuit, connected in parallel, using 120VAC power source), Fig. 5 (120VAC per LED circuit, connected in series, using 240VAC power source). In the serial or parallel embodiment, the voltage supplied to each individual LED circuit is always the same (e.g., 6V) and, therefore, the brightness of the individual LED circuits and the LED device does not change. *Id.*, 4:29-31 (“the brightness would be approximately the same with either forward voltage drive selection of the multi-voltage LED device.”), 4:55-57 (same), 5:16-18 (same). No “switch” is disclosed for use with the serial or parallel embodiment. EX1002, ¶23.

The third embodiment is an “additional circuit” embodiment, wherein additional LED circuits can be connected in parallel such that the LED device emits multiple levels of brightness. EX1001, Figs. 6-9, 7:1-12, 7:34-49, 8:16-45, 11:4-49. In this embodiment, a manufacturer starts with an unconnected LED package of the first embodiment that includes at least two LED circuits, each having a single forward voltage of, e.g., 6V. A switch can connect one or more “additional” 6V LED circuits in parallel to the same 6V power source. Adding additional LED circuits in parallel will increase the brightness of the overall LED device, but will not change the voltage applied to any LED circuit. EX1002, ¶24.

The fourth embodiment includes a “dimmer switch,” and is disclosed in two sentences at the end of the summary of the invention. EX1001, 9:22-30. The summary of the invention ends with six paragraphs discussing a driver for an AC LED circuit. EX1001, 8:15-9:30 (discussing drivers with frequencies). These paragraphs were copied from U.S. Provisional App. No. 61/217,215 (“the 215 provisional”), which, as shown below in Sections V.C.1.a-b., relates solely to AC driven LED circuits. The 215 provisional copied these two sentences from a statutory prior art Miskin application to AC driven LED circuits. EX1008. The 705 patent discloses that the dimmer switch causes the driver to change the “voltage and/or frequency” of its output. EX1001, 9:22-30. Because the driver can change its “frequency,” a POSITA would have understood this disclosure to refer to an AC voltage, consistent with the preceding paragraphs. EX1002, ¶25.

The 705 patent does not disclose that any of the second, third, or fourth embodiments could be combined. For example, both the parallel or serial embodiment and the additional circuit embodiment use “single-voltage” LED circuits that are driven by a “predetermined forward voltage.” EX1001, 4:3-15. In contrast, the dimmer switch embodiment includes an LED driver that changes the voltage or frequency of the output to LED circuits. EX1001, 9:22-30; EX1002, ¶26.

Finally, the 705 patent also discloses a full-wave bridge rectifier can be used to convert AC to DC, but does not disclose any connection of that disclosure to any of the four embodiments discussed above. EX1001, Fig. 10, 7:16-27, 11:50-55; EX1002, ¶27.

B. Summary of the Prosecution History and Examiner’s Error

The examiner rejected claims 1-20 as being obvious over U.S. Pat. App. Pub. No. 2003/0179585 to Lefebvre in view of U.S. Pat. App. Pub. No. 2004/0201988 to Allen. EX1003, 126-34 (April 27, 2021 rejection). In response, the applicant argued that Lefebvre “fails to show a switch electrically connected between a DC voltage output (of an LED driver) and at least one of a first operating LED circuit or at least one additional LED circuit.” *Id.*, 182-83 (June 22, 2021 applicant argument). The applicant further argued that “[p]lacing a switch after an LED driver is more efficient,” safer, and allows for smaller switches. *Id.* The examiner then allowed the claims. *Id.*, 188 (July 15, 2021 Notice of Allowance). EX1002, ¶28

The examiner erred by failing to locate Evanicky, Doheny, Van Winkle, and Lee and not considering the Board’s D.I. in PGR2022-00009 where similar claims from the 705 patent’s parent were challenged over Bruning and Section 112. Bruning anticipates claims 15, 17, and 19, as shown below in Ground 2, and the combinations of Bruning with Evanicky or Lee render claims 1-3, 5, 7-10, 12, 14-

17, and 19 obvious as shown below in Grounds 3 and 6. Although Bruning is of record, neither the examiner nor the applicant discussed it individually or in combination with Evanicky or Lee.

The reason why the examiner overlooked Bruning is unknown. But the examiner may have overlooked the combination because of the large number of references submitted by the applicant, and because the applicant did not submit Bruning until October 2021, after the examiner had already indicated in July 2021 that the claims would be allowable. EX1003, 1595, 188.

C. Effective Filing Date and PGR Eligibility Under AIA § 3(n)(1).

The 705 patent is eligible for PGR if the 705 patent, or any of its priority applications, contains or contained at any time a claim with an effective filing date on or after March 16, 2013. *See* AIA § 3(n)(1).

The 705 patent issued from application no. 17/181,802, which was filed after March 16, 2013 with claims of priority to applications filed before March 16, 2013. EX1001, codes (22), (63), (60) (claiming priority to application nos. 61/217,215 (EX1014), 60/997,771 (EX1015), 13/322,796 (EX1016), 12/287,267 (EX1017), PCT/US2010/001597 (EX1018) (collectively, the “Pre-AIA Applications”)). EX1002, ¶30. Thus, the 705 patent issued from a “transitional application” and is eligible for post-grant review if that transitional application or

any application to which it claims priority contains or contained at any time a claim with an effective filing date after March 16, 2013. AIA § 3(n)(1).

“It is elementary patent law that a patent application is entitled to the benefit of the filing date of an earlier filed application only if the disclosure of the earlier application provides support for the claims of the later application, as required by 35 U.S.C. § 112.” *In re Chu*, 66 F.3d 292, 297 (Fed. Cir. 1995). To satisfy the written description requirement of 35 U.S.C. § 112, the disclosure of the earlier filed application must “convey with reasonable clarity to those skilled in the art that, as of the filing date sought, [the inventor] was in possession *of the invention*.” *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991) (emphasis in original). A prior application that merely renders the later-claimed invention obvious is not sufficient to meet the written description requirement—it must describe the claimed invention with all its limitations. *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1158 (Fed. Cir. 1998).

Even when “each element may be individually described in the specification, ... the lack of adequate description of their combination” renders those claimed combinations invalid under Section 112. *Hyatt v. Dudas*, 492 F.3d 1365, 1371 (Fed. Cir. 2007); *Flash-Control, LLC v. Intel Corp.*, No. 2020-2141, 2021 WL 2944592, at *4 (Fed. Cir. July 14, 2021) (“A patent owner cannot show written description support by picking and choosing claim elements from different

embodiments that are never linked together in the specification.”); *Novozymes A/S v. DuPont Nutrition Biosciences APS*, 723 F.3d 1336, 1349 (Fed. Cir. 2013) (“[T]he specification must present each claim as an ‘integrated whole.’”); *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1352 (Fed. Cir. 2010).

1. The Effective Filing Date of Claims 1-20 of the 705 Patent Is No Earlier than February 22, 2021.

a. Claims 1-20 of the 705 Patent

All independent claims of the 705 patent (and, therefore, all claims) recite “wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.” EX1001, 12:39-41, 13:17-19, 14:20-22. This limitation was new matter added in the 17/181,802 application as filed on February 22, 2021. EX1003, 17 (replacing previous abstract with a new abstract reciting the new matter), 19-21 (providing new claims reciting the new matter). The claims were allowed after the Applicant distinguished the prior art based on this new matter. EX1003, 182-84, 188; see Section V.B; EX1002, ¶33.

None of the applications to which the 705 patent claims priority discloses a switch that is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit, much less such a switch in combination with the other elements of the claims. EX1002, ¶34. Thus, the effective filing date of all claims is no earlier than February 22,

2021, such that the 705 patent is eligible for PGR and the art asserted in Grounds 4 and 5 qualify as prior art.

Pre-AIA Application nos. 60/997,771 (EX1015) and 12/287,267 (EX1017) do not disclose any “switch” at all and, therefore, do not support any of the claims. EX1002, ¶35.

Pre-AIA Application nos. 61/217,215 (EX1014), 13/322,796 (EX1016), and PCT/US2010/001597 (EX1018) disclose switches, but none of the disclosed switches is “electrically connected” between the “DC voltage output” of the driver and an LED circuit as claimed. Instead, these applications disclose switches electrically connected to AC voltages of the type the Applicant distinguished during prosecution. EX1014, [13] (“switch having at least two positions each of which is connected to at least one circuit within the multi-brightness single chip AC LED.”), [45] (same), Figs. 12 (“12 VAC”), 15 (“120 VAC”), 19 (AC); EX1016, [0036] (“means of switching on at least one additional single voltage AC LED circuit”), [0038], [0057]-[0060], Figs. 7 (“12 VAC”), 9 (AC); EX1018, Figs. 7 (“12 VAC”), 9 (AC). EX1002, ¶36.

The dimmer switch disclosed in EX1014[22] does not disclose the claimed switch because EX1014 relates solely to AC driven LEDs. *See* Section V.C.1.b.; EX1014[17] (defining “driven circuits” as “AC driven LED circuits”), [18] (explaining an “LED circuit driver” outputs AC voltage with a frequency), [22]

(“relatively fixed voltage and/or relatively fixed frequency output of the LED circuit driver”). Thus, the LED driver in EX1014 does not output DC. Regardless, the dimmer switch in EX1014[22] is not disclosed as being connected between the output of the LED driver and the LED circuits as claimed. Additionally, there is no disclosure of combining this dimmer switch in EX1014[22] with the other elements recited in the independent claims. EX1002, ¶37.

Pre-AIA Application nos. 13/322,796 (EX1016) and PCT/US2010/001597 (EX1018) disclose bridge rectifiers, but the bridge rectifiers are directly connected in series to the LEDs without an intervening switch. EX1016, [0059], Fig. 8; EX1018, [58], Fig. 8; EX1002, ¶38.

The priority applications filed on or after March 16, 2013: 14/172,644 (EX1010), 15/685,429 (EX1009), 16/274,164 (EX1019), and 16/740,295 (EX1006) (collectively, the “AIA Applications”), fail to disclose the claimed switch, in isolation or in combination with the other aspects of the claim, for the same reasons as the Pre-AIA Applications. EX1001, codes (22), (63), (60); EX1002, ¶39.

Thus, the effective filing date for all Challenged Claims is the actual filing date of the 705 patent’s application, February 22, 2021. AIA § 100(i)(1)(A); EX1002, ¶40.

b. Claims 3, 10, and 17 of the 705 Patent

Claims 3, 10 and 17 of the 705 patent recite “wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.” EX1001, 12:44-47, 13:22-25, 14:25-28. None of the Pre-AIA Applications discloses providing two different DC forward voltages to either the first operating LED circuit or the one additional LED circuit as required by these claims, much less in combination with the LED system recited in the independent claims from which they depend. EX1002, ¶41.

No Pre-AIA Application discloses the claimed switch under the proper construction of “forward voltage.” See Section V.E.1 (“the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs”). Because each circuit has only one such minimum, there is only one “forward voltage” for each circuit, and no switch can provide “at least two different DC forward voltages” to either circuit. These claims to impossible subject matter are not disclosed in any Pre-AIA Application. See Section VI; EX1002, ¶42.

No Pre-AIA Application discloses the claimed switch under any other construction, including the alternative construction or PO’s proposed construction

of “forward voltage.” See Section V.E.1 (“a voltage in a diode’s forward direction” or “the operating voltage for the claimed LED circuit”); EX1002, ¶43.

Pre-AIA Application nos. 60/997,771 (EX1015) and 12/287,267 (EX1017) do not disclose any “switch” at all and, therefore, do not support any of the claims. EX1002, ¶44.

None of the switches disclosed in the 215 provisional (EX2014) supports these claims because none provides “two different DC forward voltages” to either LED circuit. The 215 provisional discloses only switches for “AC LED Circuits and Devices.” EX1014, Title, [2], [5]. The 215 provisional mentions DC voltage only in passing, where it disparages the use of DC voltage in the prior art. *Id.*, [7]-[8]. Thus, the 215 provisional does not support these claims under any construction of “forward voltage.” EX1002, ¶45.

None of the switches disclosed in U.S. App. No. 13/322,796 (“the 796 application”) (EX1016) or PCT/US2010/001597 (EX1018), supports these claims because none provides “two different DC forward voltages” to either LED circuit. EX1016, [0009] (“means [for] switching in additional circuits”), [0016] (“a switching means that connects and/or disconnects at least one additional LED circuit”), [0019] (“switching additional circuits on or off”), [0036] (“means of switching on at least one additional single voltage AC LED circuit”), [0038] (switch for LED bridge circuit), Figs. 6-9, [0057]-[0060] (switch for adding

additional LED circuits at same voltage). Each of these switches provides only a single voltage to each LED circuit. None of these switches provides two different DC forward voltages to any LED circuit as required by these dependent claims, much less in combination with the additional limitations recited in the independent claims. EX1002, ¶46.

None of these embodiments disclose or enable the full breadth of these claims. These claims recite that switching the switch provides different voltages to at least one of the first LED circuit “or” the additional LED circuit. Thus, these claims include embodiments wherein the two different voltages are applied to only one of the *individual* LED circuits. Assuming *arguendo* that any of these embodiments disclosed a switch wherein switching the switch provides different DC forward voltages, which they do not, those different voltages would be provided to all of the LED circuits. Thus, there is no disclosure of a switch providing two different voltages to one “or” the other LED circuit as claimed. EX1002, ¶47; *Abbott GmbH & Co., KG v. Centocor Ortho Biotech, Inc.*, 971 F. Supp. 2d 171, 175 (D. Mass. 2013), *aff’d sub nom. AbbVie Deutschland GmbH & Co., KG v. Janssen Biotech, Inc.*, 759 F.3d 1285 (Fed. Cir. 2014); *Carnegie Mellon Univ. v. Hoffmann-La Roche Inc.*, 541 F.3d 1115, 1124 (Fed. Cir. 2008).

2. Claims in the 341 Patent With An Effective Filing Date After March 16, 2013.

The 705 patent is a continuation of the application that issued as the 341 patent. EX1001, (63), 1:7-8. No Pre-AIA Application supports at least claims 3-4, 10-11, and 17-18 of the 341 patent. EX1002, ¶49.

a. Claims 3, 10 and 17 of the 341 Patent

Claims 3, 10 and 17 of the 341 patent recite the identical limitation to the 705 patent's corresponding claims: "wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit." EX1006, 12:30-33, 13:1-4, 14:13-16. None of the Pre-AIA Applications discloses providing two different DC forward voltages to either the first operating LED circuit or the one additional LED circuit as required by these claims, much less in combination with the LED device recited in the independent claims from which they depend, for the reasons provided above. Section V.C.1.b.; EX1002, ¶50.

In its D.I. in PGR2022-00009, the Board stated that it "need not first construe 'forward voltage' to reach a determination as to this argument." EX1007, 16-20 (preliminarily determining "the effective filing date is only as early as the filing date of the '295 application [January 10, 2020] from which the '341 patent matured").

b. Claims 4, 11 and 18 of the 341 Patent

Independent claims 1, 8 and 15 of the 341 patent recite “An LED lighting device comprising: . . . a switch . . . wherein the LED lighting device is configured to connect to an AC voltage power source.” EX1006, 12:9-27, 12:47-65, 13:18-14:10. Dependent claims 4, 11 and 18 depend on claims 1, 8 and 15, respectively, and further recite “wherein the switch is connected between the AC voltage power source and the LED lighting device.” *Id.*, 12:34-36, 13:5-7, 14:17-19. Thus, the independent claims define the “LED lighting device” to comprise the switch, but the dependent claims require that the switch be “between” that same “LED lighting device” and the power source. This claim to impossible subject matter is not disclosed in the Pre-AIA Applications. EX1002, ¶51.

In its D.I. in PGR2022-00009, the Board preliminarily agreed that claims 4, 11, and 18 lacked written description support and that it is “also persuaded by Petitioner’s second basis for PGR eligibility of the ’341 patent.” EX1007, 21-25.

3. Claims in the 001 Patent With An Effective Filing Date After March 16, 2013.

The 705 patent claims priority to the application that issued as the 001 patent. EX1001, (63), 1:9-10. No Pre-AIA Application supports at least claims 1-15 of the 001 patent. EX1002, ¶¶52-55.

a. Claims 1-15 of the 001 Patent

No Pre-AIA Application discloses the subject matter of independent claims 1 and 11, which recite a switch that is selectable to “independently switch on or off” at least a first LED circuit or an additional LED circuit. EX1020, 12:16-21, 13:20-23. Two of the Pre-AIA Applications do not disclose any switch at all. EX1015; EX1017. The Pre-AIA Applications that disclose a switch disclose a switch wherein a first “operating” LED circuit is turned on for a first brightness level, and then a second “additional” LED circuit may be turned on for a second, greater brightness level. EX1014, Figs. 12, 15, 19, [13]; EX1016, Figs. 7, 9, [0009], [0013], [0016], [0019], [0036]; EX1018, [8], [15], [18], [34]. No Pre-AIA Application discloses a switch turning the LED circuits on or off “independently” as required by these claims. *Id.* For example, no Pre-AIA Application discloses a switch that can turn the “additional” LED circuit on or off independent of the state of the first “operating” LED circuit or vice-versa. *Id.* In contrast, claim 16, which claims a switch that merely turns the “additional” LED circuit on or off (EX1020, 14:14-15), is the type of switch that is supported by at least EX1016. EX1002, ¶56.

b. Claim 15 of the 001 Patent

No Pre-AIA Application discloses the two-switch subject matter of claim 15, or the type of dimmer switch claimed in claim 15. Claim 15 recites that the LED

device of claim 11 is coupled to a “dimmer switch” that “adjusts a voltage of the mains power source to dim the first LED circuit or the at least one additional LED circuit regardless of a user’s selection via the switch.” EX1020, 14:4-7. The LED device of claim 11 already requires a “switch” that turns the LED circuits on or off, and a driver that connects to the mains power source and “has an output voltage lower than the” mains power source. *Id.*, 13:24-28. Thus, claim 15 requires a second “dimmer switch” that adjusts a voltage of the mains power source, which voltage is then received by the driver in the LED device. EX1002, ¶57.

No Pre-AIA Application discloses the claimed combination of switches, much less with the claimed relationship between the switches, i.e., wherein the dimmer switch functions “regardless of a user’s selection via the switch.” EX1014, EX1016, and EX1018 (each disclosing only single switch embodiments and not disclosing the claimed “regardless” relationship between two switches). Additionally, no Pre-AIA Application discloses a “dimmer switch” that “adjusts a voltage of the mains power source” as claimed. *Id.* Among the Pre-AIA Applications, only EX1014 discloses a dimmer switch, and that switch is coupled to the driver and adjusts the output of the driver. EX1014, [22]. There is no disclosure that this dimmer switch “adjusts a voltage of the mains power source” that is then input to the driver in claim 11 and there is no disclosure of this switch

being combined with a first switch as claimed in claim 11 and performing the claimed function “regardless” of that selection of the first switch. EX1002, ¶58.

c. Claim 9 of the 001 Patent

Claim 9 is not disclosed in any Pre-AIA Application. Specifically, independent claim 6 recites an LED lighting device “wherein the LED lighting device is configured to connect to a driver.” EX1020, 12:57-58. Claim 9 depends from claim 6, and recites that the LED lighting device itself “further compris[es] the driver.” *Id.*, 13:10-11. But the LED lighting device cannot both be configured to connect to a driver and comprise that driver. No Pre-AIA Application discloses this contradictory subject matter. EX1002 ¶59.

Thus, none of the Pre-AIA Applications support at least one claim of the applications that issued as the 705, 341, and 001 patent. EX1002 ¶60.

D. Level of Ordinary Skill in the Art

A person of ordinary skill in the art (“POSITA”) as of October 6, 2007 (earliest listed priority date) or February 22, 2021 (actual filing date), would have had a bachelor’s degree in electrical engineering, or similar technical field, with two years of relevant experience in the field of design and/or development of LEDs and circuits in the context of lighting control systems. An increase in experience could compensate for less education. EX1002 ¶61.

E. Claim Construction

Claims in this PGR should be construed in accordance with their “ordinary and customary meaning” as understood by one of ordinary skill in the art at the time of the invention. 37 C.F.R. § 42.200(b); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (*en banc*). Because the prior art asserted herein discloses the preferred embodiment within the indisputable scope of the claims, the Board need not construe the outer bounds of the claims as part of these proceedings. *See, e.g.*, 83 FR 51340 at 47-48, 55, 65-71.

1. “forward voltage”

“Forward voltage” should be construed as “the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs” based on the PO’s express definition and disclaimer in the intrinsic record.

During the prosecution of application no. 16/274,164, an application to which the 705 patent claims priority, claims to a “forward voltage of 6V or greater” were rejected over U.S. Patent No. 7,748,877 (Colby) which the Examiner found disclosed an operating voltage of 120V, which is greater than 6V. In order to distinguish Colby’s 120V, Applicant expressly defined “forward voltage” to mean “the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs.”

EX1023 (Amendment dated 6/13/2019 in 16/274,164), 9. Then Applicant argued that Colby did not disclose that minimum. *Id.*

This express definition is consistent with the specification of the 705 patent, which repeatedly states that each *individual* LED circuit has a “single” and “predetermined” “forward voltage.” EX1001, 4:9-7:12; *see also* EX1021, 28-30. The forward voltage of an overall device is determined by whether the *individual* LED circuits were wired together during manufacture in series or parallel, but the forward voltage of the *individual* LED circuits never changes. EX1002, ¶63.

In the alternative, “forward voltage” should be construed as “a voltage in a diode’s forward direction.” The concept of direction, such as “forward” and “reverse,” with respect to diodes is well known to a POSITA. If “forward voltage” is not construed according to its express definition, then it should encompass any voltage in a forward direction. EX1002, ¶64.

In PGR2022-00009, PO argues that “forward voltage” should be construed as “operating voltage for the claimed LED circuit.” PO’s proposed construction improperly attempts to read the claimed “operating” limitation into the “forward voltage” limitation and otherwise lacks intrinsic and extrinsic support. Regardless, none of the issues of patentability turn on the differences between Petitioner’s alternative construction and PO’s construction.

In its decision to institute post-grant review in PGR2022-00009, the Board preliminarily construed “forward voltage” according to its express definition in the intrinsic record. EX1007, 33-36 (“the intrinsic record—including the disclosures in the ’341 patent and the disclaimer made during prosecution of the application underlying the ’001 parent patent—persuades us that Petitioner’s first construction, “the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs” is supported by the record”).

2. “switch” / “selectable by a user switching the switch”

Switch is entitled to its ordinary meaning and needs no construction. The ordinary meaning of “switch” encompasses, for example, mechanical, electronic, electro-mechanical, and programmable switches. There is no disclaimer or lexicography that would justify departing from that ordinary meaning. EX1002, ¶65.

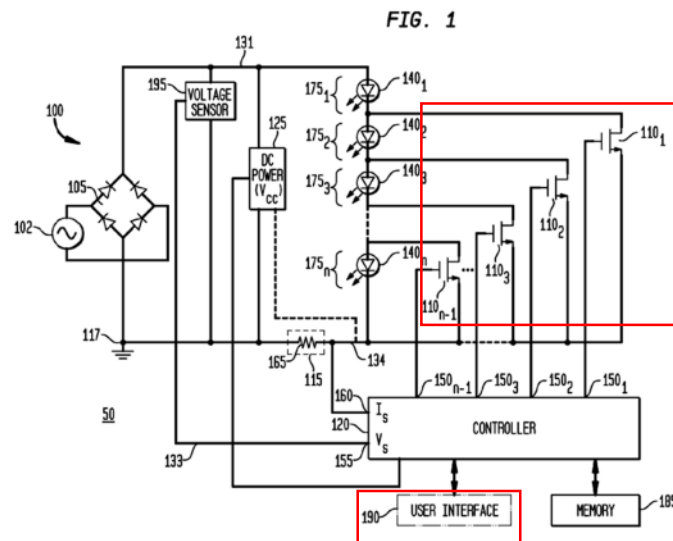
The use of “switch” in the specification is consistent with its ordinary meaning. For example, in disclosing AC voltage driven LEDs, the specification discloses that “the LED circuit driver may be coupled to a dimmer switch that regulates voltage or frequency or may have integrated circuitry that allows for adjustability of the otherwise relatively fixed voltage and/or relatively fixed frequency output of the LED circuit driver.” EX1001, 9:22-29. A POSITA would

recognize that such a switch would comprise electronics, such as transistors, capable of switching on and off many times a second to regulate the frequency of an AC signal. The specification states the AC signal could be mains, which is typically about 60 Hz, or even faster, which the specification describes as “high frequency.” EX1001, 9:18-19. Thus, “switch” should encompass switches comprising such electronics. EX1002, ¶66.

The intrinsic record includes ongoing challenges to related patents, which confirms that these limitations are entitled to their ordinary meanings. In PGR 2022-00009, which involves the immediate parent of the 705 patent, PO initially asserted that very similar claim language excluded switches that were “indirectly” selected by a user based on a “direct” control requirement. EX1005 (POPR in PGR2022-00009); *see also* EX1022, 29-34 (“selectable by a user” means “selectable by a user directly”). In its D.I., the Board preliminarily held that the claims encompassed the user “indirectly” controlling the switch. EX1007 (D.I. in PGR2022-00009), 55. PO then explicitly waived any construction that would require “direct” user control. EX1030 (POR in PGR2022-00009), 32-33. This record confirms that these limitations should be provided their ordinary meaning, which includes “indirect” selection of a switch by a user. EX1002, ¶67.

The prosecution histories of U.S. Patent Nos. 10,349,479 (“the 479 patent”) and 10,757,783 (“the 783 patent”), confirm that the plain and ordinary meaning of

these types of limitations includes a transistor (e.g., a switch) that is selected by a user through a controller. EX1024, p. 3 (finding “switch 110 is controlled by a user via interface 190 through controller 120”).



EX1025, Fig. 1 (annotated); EX1026 (temporarily narrowing claim to “a physical switch integrated in a package that includes the at least one LED circuit” before broadening the claim to remove those amendments); EX1029; EX1002, ¶68.

Finally, PO’s abandoned “directly” constructions are not applicable to claim 15 or its dependents, which do not recite the term “user.” EX1001, 14:1-38.

VI. GROUND 1: CLAIMS 3, 10 AND 17 ARE INVALID UNDER SECTION 112

Claims 3, 10 and 17 recite “wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.” EX1001, 12:44-47, 13:22-25,

14:25-28. The claims are invalid as indefinite and for lack of written description and enablement under the correct construction of “forward voltage.” EX1002, ¶¶69.

Under the correct construction of “forward voltage,” each of the “first operating LED circuit” and the “one additional LED circuit” has a single “forward voltage” because each has a single “minimum.” See Section V.E.1. Because each circuit has only a single “forward voltage,” no switch can provide “at least two different” forward voltages to either circuit. Thus, under the correct construction of “forward voltage,” these claims are to impossible subject matter that is not disclosed in the specification. EX1002, ¶¶70-71.

A claim to impossible subject matter is invalid as indefinite. *Koki Holdings Co. v. Kyocera Senco Indus. Tools, Inc.*, No. CV 18-313-CFC, 2021 WL 1092579, at *1 (D. Del. Mar. 22, 2021). Additionally, because the specification does not describe or enable this impossible subject matter, the claims are invalid for lack of written description and lack of enablement. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1359 (Fed. Cir. 1999); *Frazier v. Wireline Sols., LLC*, 725 F. Supp. 2d 588, 596 (S.D. Tex. 2010); *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 956 (Fed. Cir. 1983).

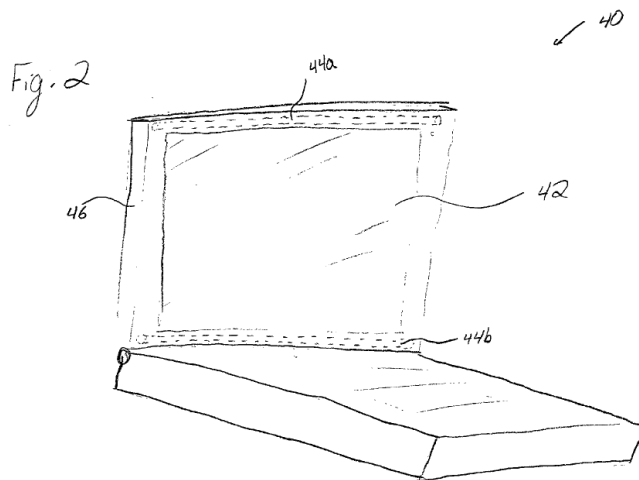
In its D.I. in PGR2022-00009, the Board found that it is more likely than not that substantially identical claims 3, 10, and 17 of the 705 patent’s immediate parent patent (the 341 patent) are invalid as not described, not enabled, and

indefinite. EX1007, 40-41 (written description), 42-44 (enablement), 44 (indefinite).

VII. GROUND 2: CLAIMS 15, 17, AND 19 ARE ANTICIPATED BY BRUNING

A. Bruning Overview

Bruning was filed December 12, 2000, published June 13, 2002, and is titled “Control and Drive Circuit Arrangement for Illumination Performance Enhancement with LED Light Sources.” EX1004, (22), (43), (54). The invention of Bruning is directed to an improvement to an LCD backlight, such as is used in its prior-art low-profile PC 40, as shown in Figure 2. *Id.*, [0006]. Bruning uses red, green, and blue LEDs. *Id.*, [0010].



Id., Fig. 2. Bruning discloses the backlight can display the individual LED colors, or mix the colors to produce other colors, including white light. *Id.*, [0004], [0010], [0026]-[0027], [0044]; EX1002, ¶72.

B. Analysis

1. Claim 15

a. 15.pre: An LED lighting system comprising:

Bruning discloses an LED lighting system (Figs. 2, 4) comprising an LED backlight for a mobile device, including the claimed elements as shown below.

EX1004, (54), (57), Figs. 1-5, [0004], [0007], [0009]-[0015], [0024]-[0029], [0031]-[0051]; § VII.A (Bruning overview); EX1002, ¶73.

b. 15.a: a first operating LED circuit and at least one additional LED circuit,

Bruning discloses a first operating LED circuit (e.g., LED sub-array circuit 210R) and at least one additional LED circuit (e.g., LED sub-array circuits 210G and 210B). EX1004, [0031], [0032] (“LED sub-array circuits 210R, 210G, 210B”), [0033]-[0044].

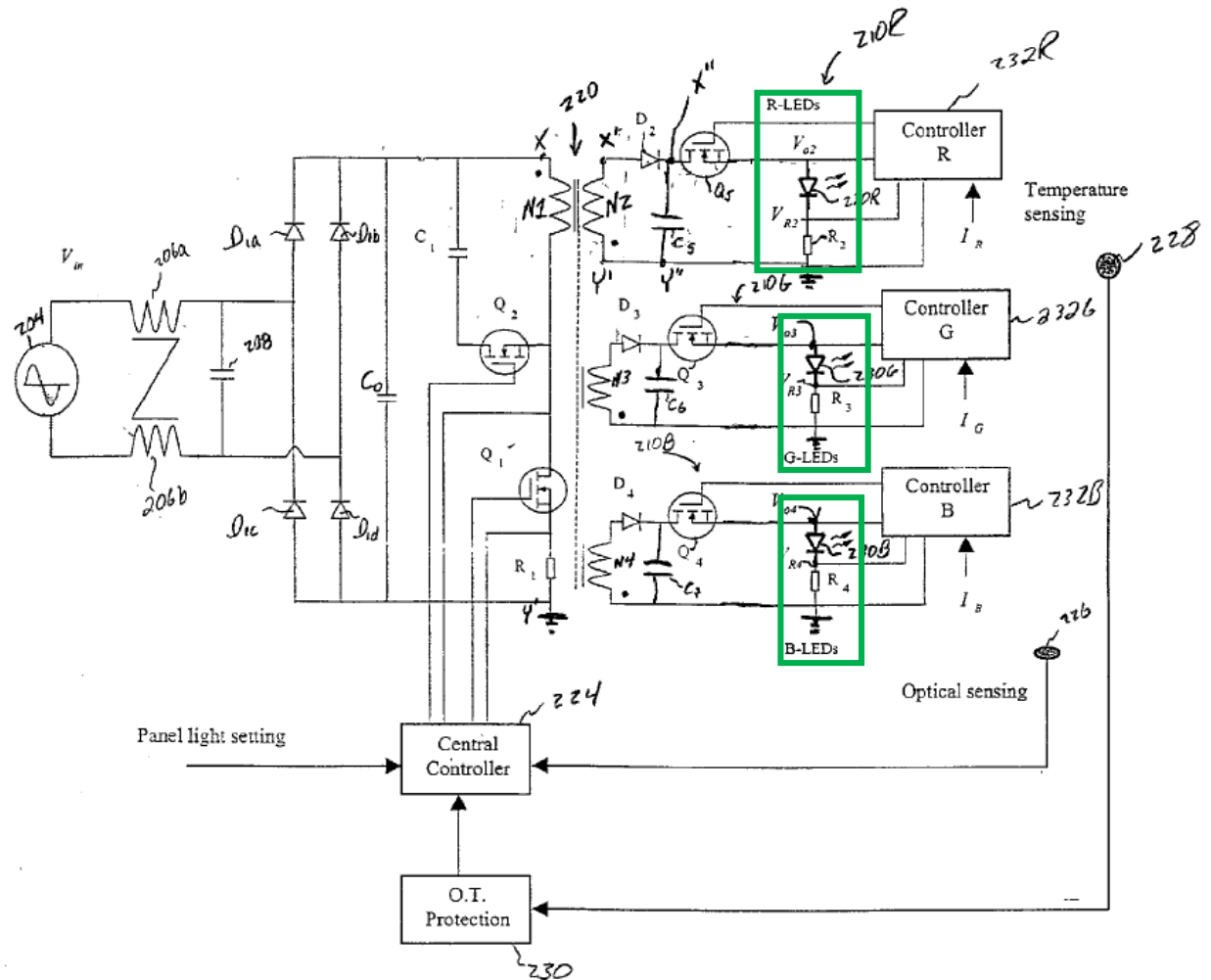


Fig. 4

Id., Fig. 4¹; EX1002, ¶74.

LED sub-arrays 210R, 210G and 210B include LEDs 230R, 230G, and 230B and one fixed resistor R_2 - R_4 , respectively. Circuits 210R, 210G and 210B, are the “LED circuit” as Bruning teaches they are the “circuit” to which the voltage

¹ Unless otherwise indicated, all outlining on figures have been added.

is applied and through which the current flows. EX1004, [0041], [0046]; EX1002, ¶75.

- c. **15.b: the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;**

Bruning discloses the at least one additional LED circuit (e.g., sub-array circuits 210G and 210B emitting green and blue light, respectively) being configured to emit a different color light compared to the first operating LED circuit (LED sub-array circuit 210R emitting red light). EX1004, [0004], [0007], [0009] (“an array or bank of red, green and blue (‘RGB’) LEDs”), [0011]-[0012] (“red, green and blue LEDs”), [0014] (“red, green and blue light”), [0015] (“red, green and blue”), [0024]-[0029], [0037], [0040] (“green and blue LED sub-arrays 210G, 210B”), [0044], [0048]-[0050]; EX1002, ¶76.

- d. **15.c: a switch capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off,**

Bruning discloses a switch (e.g., color-specific switches (Q₃, Q₄, Q₅) alone or combined with control circuitry) capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off. EX1004, [0041]-[0046], [0050], Figs. 4b-5. Color-specific switches, alone

or in combination with the controller, satisfy this limitation under the proper construction of “switch.” EX1002, ¶77.

Starting with the claimed alternative (b), Bruning discloses a switch (e.g., color-specific switches (Q_3 , Q_4) alone or combined with control circuitry) capable of (b) switching the at least one additional LED circuit (e.g., LED sub-array circuits 210G and 210B) on or off. EX1004, [0041]-[0046], [0050], Figs. 4b-5; EX1002, ¶78.

Bruning discloses the color-specific switches with respect to Q_5 for the red LED circuit 210R, but explicitly teaches the same disclosure applies to Q_3 and Q_4 for LED circuits 210G and 210B. EX1004, [0040]. In short, Bruning discloses that if Q_5 is switch on/closed, the voltage V_{R0} is applied to the LED circuit 210R, current flows through the LED circuit, and the LED circuit is switched on. Bruning discloses that if Q_5 is switched off/opened, no voltage is applied to the LED circuit, no current flows, and the LED circuit is switched off. EX1004, [0041]; EX1002, ¶79.

Bruning discloses the LED circuits can be turned on and off independently by their respective color-specific switches. EX1004, Figs. 4, 4b-4d, [0011] (“The light output of the red, green and blue LEDs may be independently controlled by separate controllers which supply, for example, an independent pulse modulation to the current supplied to the red, green and blue pixels of the LED array.”), [0012]

(“three independent controllers may be used”), [0025], [0026] (“multiple independent outputs”), [0042] (“Controller 232R independently controls the switching of switch Q₅.”), [0044], [0046].

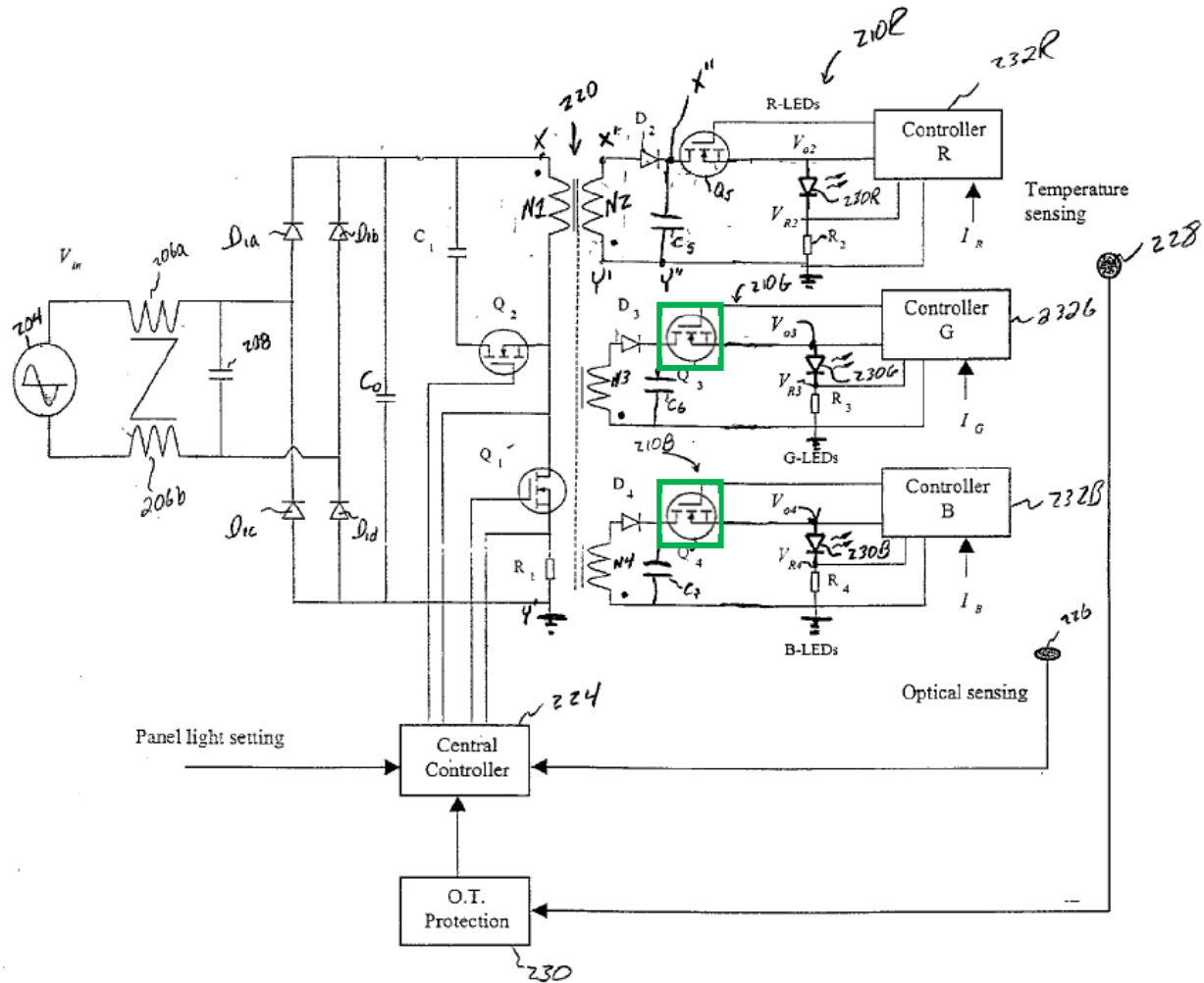


Fig. 4

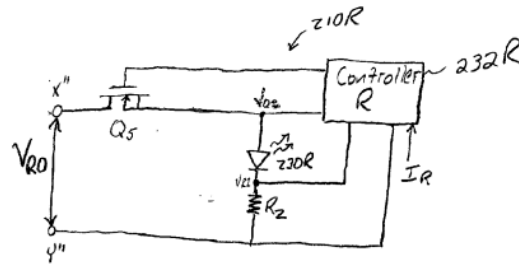


Fig. 4b

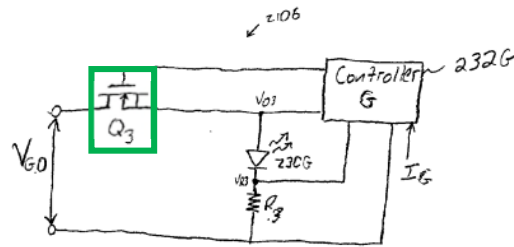


Fig. 4c

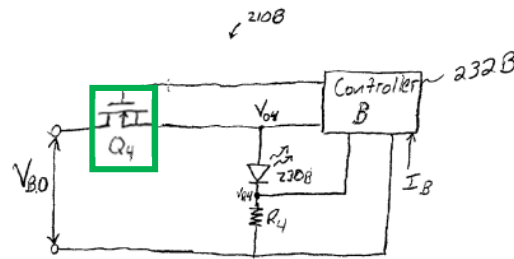


Fig. 4d

Id., Figs. 4-4d; EX1002, ¶80.

Color-specific switches Q_3 and Q_4 control the current that flows through circuits 210G and 210B and thus the light output of circuits 210G and 210B (including whether circuits 210G and 210B are on and off), respectively. EX1004, [0041] (“The current through red LED 230R and thus the light output of red LED 230R, may be varied by switching switch Q_5 on and off.”), [0042], [0040]. Thus, for example, when switch Q_3 “is switched off,” the current flowing through circuit 210G “immediately falls to zero,” meaning circuit 210G is switched off. *Id.*, [0041]; EX1002, ¶81.

Bruning discloses the additional LED circuits (e.g., LED sub-array circuits 210G and 210B) can be turned off while the red LED sub-array circuit 210R can be turned on—that is, Q_5 can be turned on while Q_3 and Q_4 are turned off. *Id.*, [0050] (“turn off green and blue sub-arrays while the red output is generated”), [0041] (explaining that “[w]hen Q_5 is switched off, the current supplied by applied voltage V_{R0} is interrupted and the current [flowing through the red LED circuit] immediately falls to zero”), [0043]-[0045] (explaining that switches Q_3 and Q_4 operate in the same manner as Q_5); EX1002, ¶82.

Moving now to the claimed alternative (a), Bruning discloses a switch (e.g., color-specific switches (Q_3 , Q_4 , Q_5) alone or combined with control circuitry) capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit (circuit 210R) or the at least one additional LED circuit (circuit 210G or 210B). Bruning discloses that the color-specific switches can be operated in their active regions to modulate the amplitude of the voltage pulse, i.e., to change the voltage level input to the LED circuit. EX1004, Fig. 5, [0043]. Thus, instead of the switch turning the LEDs on and off, the LEDs would stay on, but the amplitude of the voltage pulse, and thus the current running through the LEDs and the brightness of the LEDs, switches between high and low values depending on the state of the switch. *Id.*, Fig. 5 (illustrating the lumens output by the LED alternate between high and low values depending on the state of the

switch in its active region). Bruning teaches that the controller can monitor the voltage across the LEDs to adjust the switching. *Id.*, [0046]. In addition to the explicit disclosures in Bruning that the amplitude of the voltage is changed, a POSITA would have understood from the diode equation that the periods of high and low current through the LEDs (and their brightness) are caused by the high and low voltage levels input to the LED circuit. EX1002, ¶83.

e. 15.d: wherein (a) or (b) is selectable by switching the switch; and

Bruning discloses wherein (a) or (b) is selectable by switching the switch (e.g., color-specific switches (Q₃, Q₄, Q₅)). *See* 15.c; EX1002, ¶84.

Claim 15 does not require that the switch be selectable by a user. *Compare* claim 15 (“selectable by switching the switch”) *with* claim 1 (“selectable by a user switching the switch”) (emphasis added). Thus, Bruning’s disclosure that these switches may be switched by controllers (e.g., 232G, 232B) based on algorithms satisfies this claim. EX1004, [0010]-[0011] (video image signal streams); [0013], [0026], [0027]-[0029], [0038], [0042] (“Controller 232R independently controls the switching of switch Q₅. The duty cycle set by controller 232R controls the amount of time that Q₅ is turned on and off in a switching cycle.”), [0043]-[0047]; EX1002, ¶85.

f. 15.e: an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at

least one of the first operating LED circuit or the at least one additional LED circuit,

Bruning discloses an LED driver (“drive circuitry”) including an input configured to connect to an AC voltage power source (“ac input of ac source 204”), the LED driver configured to provide a DC voltage output (e.g., V_{R0} , V_{G0} , V_{B0}) to at least one of the first operating LED circuit (e.g., LED sub-array circuit 210R) or the at least one additional LED circuit (e.g., sub-array circuits 210G and 210B). EX1004, Abstract, [0011] (“backlight includes drive circuitry”), [0013], [0026], [0031] (“The drive circuitry of FIG. 4 will be readily recognized by one skilled in the art as comprising a multiple output, clamped mode flyback power converter.”), [0032]-[0044], Figs. 3-4.

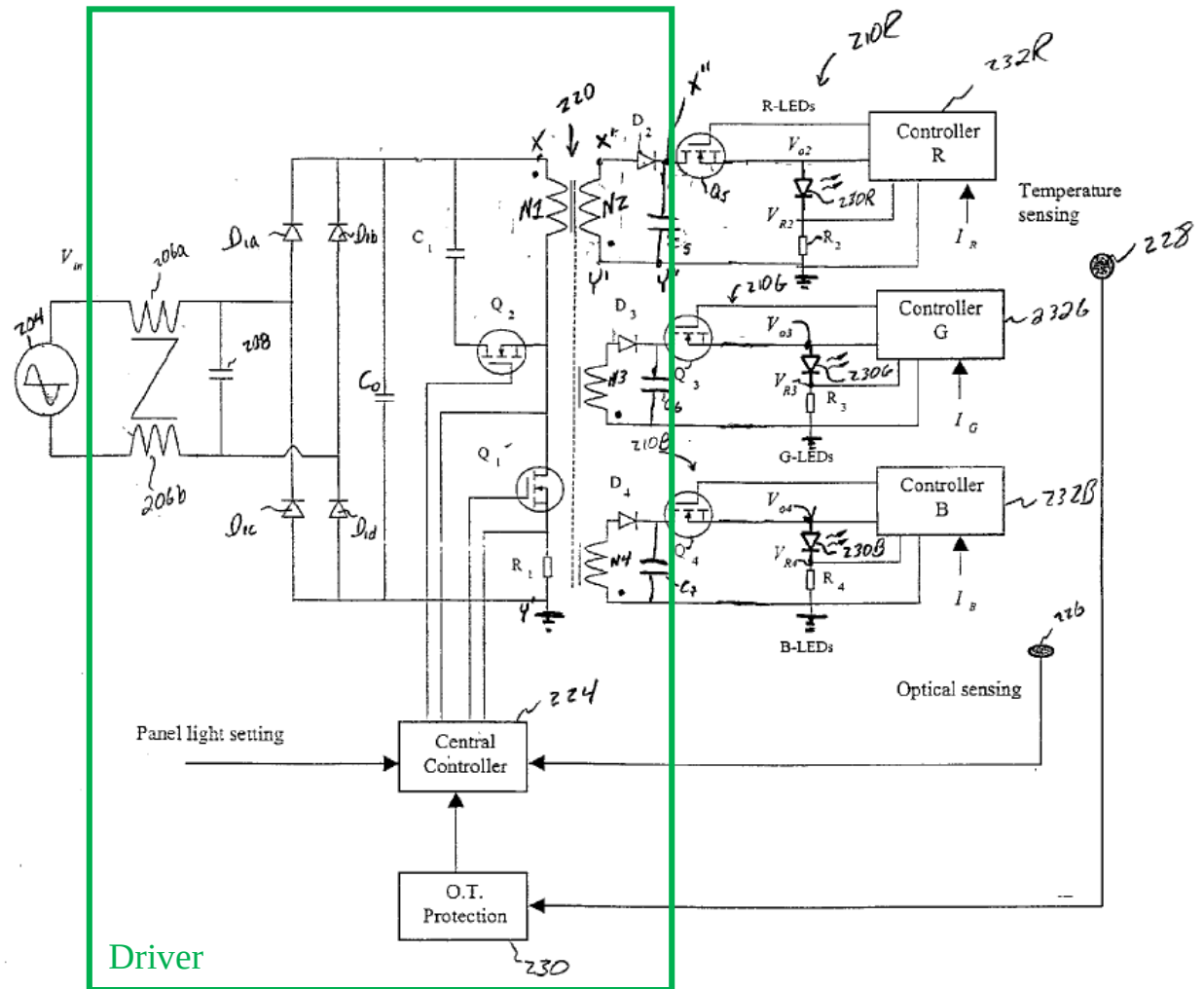
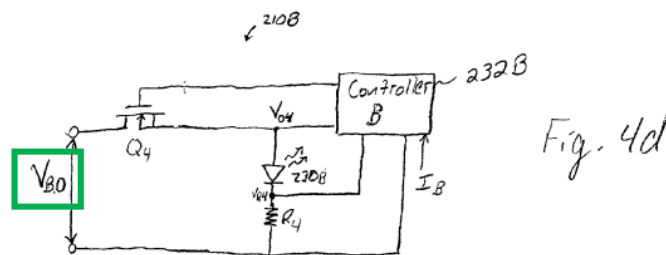
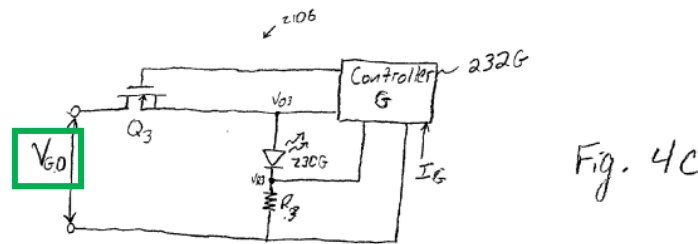
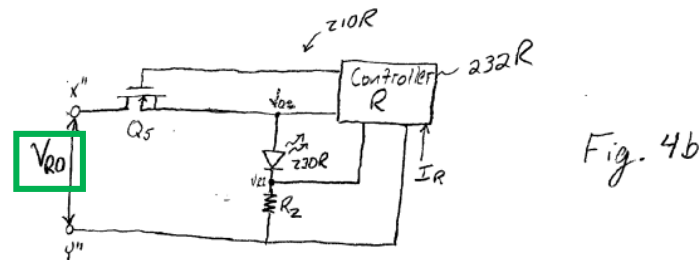


Fig. 4

Id., Fig. 4; EX1002, ¶86.

“LED sub-arrays 210R, 210G, 210B generate the light output of the LED backlight 200 using the applied voltages V_{R0} , V_{G0} , V_{B0} , respectively, as represented in FIGS. 4b-4d.” EX1004, [0040]. Bruning discloses that the circuitry identified above is involved in generating the “voltages V_{R0} , V_{G0} , V_{B0} applied to LED sub-arrays 210R, 210G and 210B, respectively.” *Id.*, [0031]-[0044]. Bruning’s driver

receives “ac input of ac source 204” and provides voltages V_{R0} , V_{G0} , V_{B0} to circuits 210R, 210G, and 210B, respectively. *Id.*, [0031]-[0033], [0036] (“[F]ocusing on LED sub-array 210R, the entire circuit to the left of points X”-Y” may be replaced with a voltage V_{R0} , as represented in FIG. 4b.”), [0040] (circuits 210G, 210B operate in similar fashion to 210R).



Id., Figs. 4b-4d. Additionally, Bruning discloses that voltages V_{R0} , V_{G0} , V_{B0} are DC. *Id.*, [0035] (diodes D_2 , D_3 , D_4 ensure that the currents flowing through the LED circuits are in a single direction), [0036] (capacitors C_5 , C_6 , C_7 maintain voltages V_{R0} , V_{G0} , V_{B0} “relatively constant” even during the half-cycle that Q_1 is “off”); EX1002, ¶87.

- g. 15.f: wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.**

Bruning discloses wherein the switch (e.g., color-specific switches (Q₃, Q₄, Q₅)) is electrically connected between the DC voltage output and at least one of the first operating LED circuit (e.g., circuit 210R) or the at least one additional LED circuit (e.g., circuits 210G and 210B). EX1004, Abstract, [0026], [0013], [0031]-[0044], Figs. 3-4a.

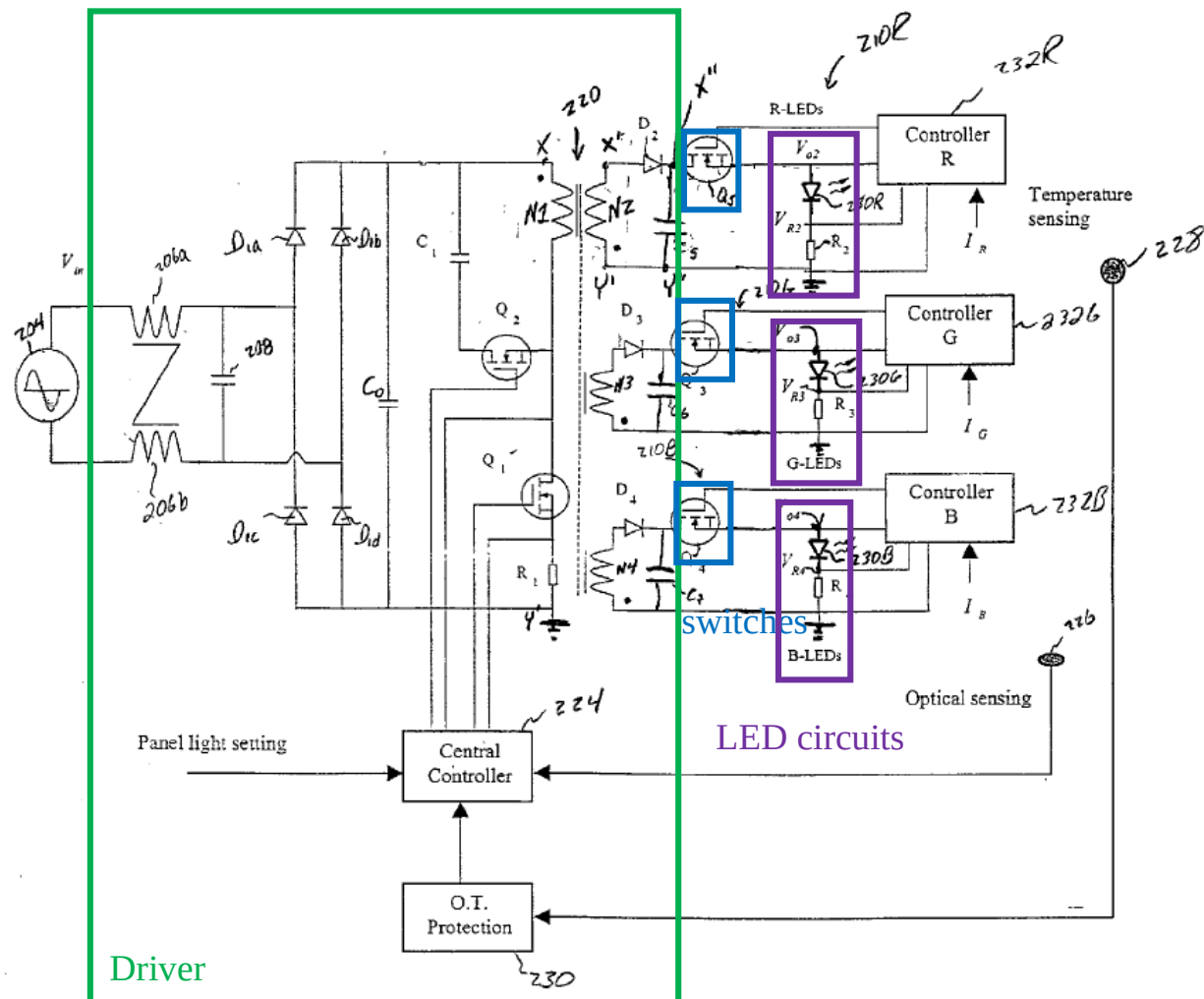


Fig. 4

Id., Fig. 4; EX1002, ¶88.

2. **Claim 17: The LED lighting system of claim 15, wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.**

As shown above in Ground 1, under the express definition of “forward voltage” in the intrinsic record, this claim is impossible. Alternatively, Bruning

discloses this claim under Petitioner’s alternative construction and PO’s likely construction. EX1002, ¶89.

Bruning discloses the LED lighting system of claim 15, wherein the switching of the switch (e.g., color-specific switches (Q₃, Q₄ Q₅) operated in their active regions) provides at least two different DC forward voltages (e.g., high and low amplitudes of voltage corresponding to high and low current and brightness) to at least one of the first operating LED circuit (circuit 210R) or the at least one additional LED circuit (circuits 210G and 210B). See claim 15.c(a) above. Each of these voltages is a forward operating voltage of the LED circuit as each causes a different level of light to be emitted by the LEDs. EX1004, Fig. 5, [0043]; EX1002, ¶90.

3. Claim 19: The LED lighting system of claim 15, wherein the switching of the switch changes light output of the LED lighting device.

Bruning discloses the LED lighting system of claim 15, wherein the switching of the switch (e.g., color-specific switches (Q₃, Q₄ Q₅)) changes light output of the LED lighting device (“light output” including “backlighting hue and composition and color output by the backlight”). See claim 15; EX1004, [0010]-[0012], [0041]-[0047]; EX1002, ¶91.

Bruning discloses that switching the color-specific switches Q₃, Q₄, Q₅ changes the light output of the respective colored circuits. EX1004, [0041] (“The

current through red LED 230R and thus the light output of red LED 230R, may be varied by switching switch Q₅ on and off.”), [0042], [0043] (“In the example of FIG. 5, switch Q₅ is operated in the active region so that the current through the LED is altered from a high to a low value, but not completely turned off. Thus, the light output varies between a high and low value.”); EX1002, ¶92.

Additionally, Bruning further discloses that the light output of the colored circuits in turn affects the “color point and/or color content of the backlight.” EX1004, [0011] (color point and/or color content), [0045] (same), [0044] (“color point and/or color content of white light generated ... [and] may generate a backlight have a color (i.e., non-white) hue.”), [0010] (“altering the color point of white light produced”), [0012], [0046] (“backlighting hue and composition and color output by the backlight 200 will depend on the mix of red, green and blue light levels”). EX1002, ¶93.

VIII. GROUND 3: CLAIMS 1-3, 5, 7-10, 12, 14-17, AND 19 ARE RENDERED OBVIOUS BY BRUNING IN VIEW OF EVANICKY

A. Bruning Overview

See Section VII.A.

B. Evanicky Overview

Evanicky was filed December 13, 2001, published November 7, 2002, and is titled “Multiple Light Source Color Balancing System Within a Liquid Crystal Flat Panel Display.” EX1013, (22), (43), (54).

Evanicky explains that “[t]he method of altering the relative color intensities of the color points across a display screen is called white balance adjustment (also referred to as color balance adjustment, color temperature adjustment, white adjustment, or color balancing).” EX1013, [0006]. Evanicky discloses a system for color balancing within an LCD. *Id.*, (57), [0002], [0012] (“mechanism and method that dynamically alters the color balance of a display and is particularly well suited for application with flat panel LCD units”), [0013], [0052], [0149]. Evanicky’s color balancing system can operate for both edge and backlighting systems. *Id.*, (57), [0013].

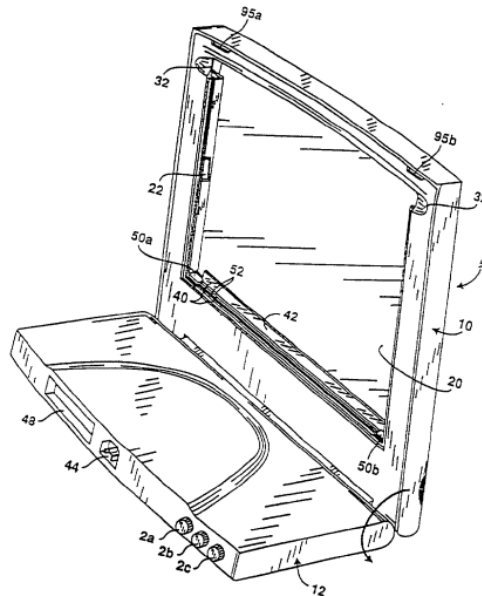


FIG. 1B

Id., Fig. 1B; EX1002, ¶96.

C. Combination Rationale

The 705 patent, Bruning, and Evanicky are all analogous art because they are all directed to the field of endeavor of lighting systems. Additionally, Bruning and Evanicky are reasonably pertinent to the particular problem faced by the inventor of providing adjustable lighting system and, more particularly, user control of a lighting system. EX1002, ¶97.

Bruning discloses that the “color temperature (color point) for the backlight” can be varied by adjusting the “light output of the [red, blue, and green] sub-arrays of the LED backlight.” EX1004, [0047]. A POSITA would have been motivated to modify Bruning’s backlight such that a user could adjust the color temperature or color point of the backlight, based on the express teachings of Evanicky. Specifically, a POSITA would have been motivated to modify Bruning to provide user selection of Bruning’s color-specific switches (Q₃, Q₄, and Q₅) that control the light output of their respective colored circuits. EX1002, ¶98.

Evanicky explains that “[t]he method of altering the relative color intensities of the color points across a display screen is called white balance adjustment (also referred to as color balance adjustment, color temperature adjustment, white adjustment, or color balancing).” EX1013, [0006]. Evanicky further discloses that “the white balance adjustment for a display is important because many users want the ability to alter the display’s color temperature for a variety of different

reasons.” *Id.*, [0008] (“For instance, the color temperature might be varied based on a viewer’s personal taste. In other situations, color temperature adjustment may be needed to perform color matching (e.g., from screen-to-screen or from screen-to-paper or screen-to-film). In some situations, color temperature adjustment can correct for the effects of aging in some displays. Therefore, it is important for a flat panel LCD unit to provide the user with a color balancing adjustment option.”). Accordingly, Evanicky discloses a knob or slider switch to enable the user to adjust the color temperature or color balance of the display. *Id.*, (57), [0012], [0057] (color temperature adjustment knob 2*b*), Fig. 1B, [0103] (“mechanisms in which the user can adjust the color balance of the display”), [0104], [0075]. “[T]he user can adjust a slider between two extreme mechanical positions in which the position of the slider (or knob 2*b*) represents a particular color temperature within the predetermined color temperature range.” *Id.*, [0103].

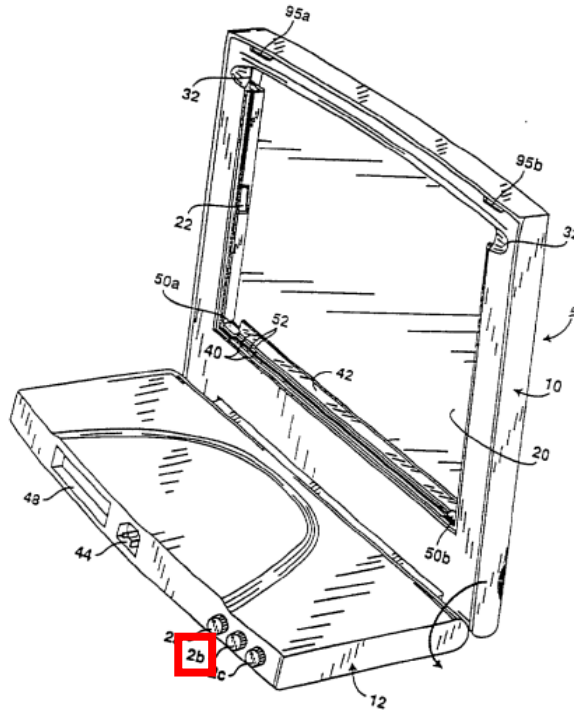


FIG. 1B

Id., Fig. 1B; EX1002, ¶99.

A POSITA would have recognized Evanicky’s teaching regarding the importance of giving a user the ability to adjust the display’s color temperature to be readily applicable to Bruning, especially in light of the disclosed systems’ similarities. EX1002, ¶100.

For example, both references disclose a backlight for an LCD display. EX1004, Abstract (“backlight for an LCD display”), [0001] (“backlighting in LCD panels.”), [0002]-[0006] (describing “basic backlighting arrangement of an LCD panel”), [0008], [0009] (“LED backlight for an LCD display.”), [0013]-[0014], [0024], [0028]-[0029], [0047]-[0050], Fig. 2; EX1013, (57), [0002], [0013],

[0016]-[0018] (“backlight to a liquid crystal display (LCD)”), [0019]-[0022], [0061], Figs. 1A-1D; EX1002, ¶101.

Both references disclose use of the backlit LCD in a laptop computer. EX1004, [0017] (“PC having a backlight”), Fig. 2; EX1013, [0004] (“LCD units are an excellent display choice for lap-top computers”), [0013] (“color balancing within a liquid crystal flat panel display unit”), [0020], [0057], Figs. 1A-1B; EX1002, ¶102.

Both references rely on the mixing of red, green, and blue light to form different shades and hues of light as perceived by the user. EX1004, [0004] (explaining that a pixel of an LCD backlight that is “a white light source” is “generally comprised of three separate pixels or ‘sub-pixels’ covered with a red, green and blue filter”), [0007] (“The relative amounts of light output of various colors, in particular, the relative amounts of red, green and blue light output” is “related to the color point of the output in the backlight.”), [0009], [0011]-[0012] (explaining that the color point of the backlight is determined by the relative amounts of time the red, green and blue LEDs are driven and the intensities at which they are driven), [0014]-[0015], [0024]-[0027], [0044], [0046] (“The backlighting hue and composition and color output by the backlight 200 will depend on the mix of red, green and blue light levels”), [0047]-[0050]; EX1013, [0005] (“To produce different colors at the pixel, the intensities (e.g., brightness) to

which the red, green and blue points are driven are altered in well known fashions”); EX1002, ¶103.

In fact, Bruning expressly contemplates selection of the backlight’s color temperature or color point, but falls short of *expressly* disclosing a switch that the user physically moves in order to adjust the color temperature or color point of the backlight. EX1004, [0047], [0015] (“Also, the modular LED chips may have independent control terminals so that the color point generated from each modular LED chip can be controlled.”). Thus, it would have been obvious to a POSITA to modify Bruning to allow a user to adjust the color balance or color temperature of the display, in light of Evanicky. EX1002, ¶104.

Finally, a POSITA would have found that Bruning and Evanicky’s teachings could have been predictably combined at least because of lighting art’s predictability and the various elements’ known interchangeability. Additionally, a POSITA would have had a reasonable expectation of success in combining Bruning and Evanicky at least because the references use known variations of existing technology (physical switches like knobs and slider switches as user interfaces) to solve routine and well understood problems (adjust settings of a laptop’s display, such as color balance) in predictable ways. Notably, Bruning already contemplates a user input (panel light setting) to a controller for controlling switch Q₁, showing that adding such a user input is within the skill of a POSITA.

EX1004, [0038], Fig. 4. The controllers of Bruning's color-specific switches would be reprogrammed to accept manual input from Evanicky's slider or knob, either in addition to or in alternative to the optional algorithms taught by Bruning. In either case, the combination would have been predictable matter of simply programming and well within the skill of a POSITA. EX1002, ¶105.

D. Analysis

1. Claim 1

a. 1.pre: An LED lighting system comprising:

See Ground 2, 15.pre.

b. 1.a: a first operating LED circuit and at least one additional LED circuit,

See Ground 2, 15.a.

c. 1.b: at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel, and

Bruning discloses at least one of the first operating LED circuit (LED sub-array circuit 210R) or the at least one additional LED circuit (e.g., LED sub-array circuits 210G and 210B) including at least two LEDs connected in either series or parallel ("One LED 230R is used in FIG. 4b to represent all of the LEDs in the sub-array 210R."). EX1004, [0024]-[0025], [0031]-[0044]; EX1002, ¶108.

Bruning discloses that each of the sub-arrays includes at least two LEDs connected in either series or parallel, and preferably includes redundant

connections to minimize the impact of a failure or short of an LED. EX1004, [0024]-[0025], [0040]; EX1002, ¶109.

- d. **1.c: the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;**

See Ground 2, 15.b.

- e. **1.d: a switch capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off,**

See Ground 2, 15.c.

In the combination, the color-specific switches of Bruning are the switch. Alternatively, the combination of the color-specific switches of Bruning, the controllers, and the slider/knob of Evanicky together are the switch. EX1002, ¶112.

- f. **1.e: wherein (a) or (b) is selectable by a user switching the switch; and**

See Ground 2, 15.d (Bruning).

Evanicky discloses the backlight's color point or color temperature is selectable by a user switching a switch. EX1013, [0008], [0057], [0103]-[0104], Fig. 1B. For example, Evanicky discloses that a user can adjust the color temperature or color point of the backlight of a laptop's LCD display using a knob or slider. *Id.*, [0006], [0008], [0012], [0057], [0103], Fig. 1B. It would have been

obvious to modify Bruning's controllers to allow user selection (e.g., via a slider or knob) as taught by Evanicky. See Section VIII.C (Combination Rationale); EX1002, ¶114.

In the combination, the color-specific switches of Bruning are the switch, and they are indirectly selectable by the user via the knob/slider of Evanicky and the controllers. Alternatively, the combination of the color-specific switches of Bruning, the controllers, and the slider/knob of Evanicky together are the switch, which is directly selected by the user. EX1002, ¶115.

- g. 1.f: an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,**

See Ground 2, 15.e.

- h. 1.g: wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See Ground 2, 15.f.

- 2. Claim 2: The LED lighting system of claim 1, wherein the switch has at least two positions.**

In the combination, the switch includes the slider or knob of Evanicky. A slider or knob explicitly discloses at least two positions, as the user will slide the slider or turn the knob between multiple positions. See claim 1; EX1002, ¶118.

3. **Claim 3: The LED lighting system of claim 1, wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.**

See Ground 2, claim 17.

4. **Claim 5: The LED lighting system of claim 1, wherein the switching of the switch changes light output of the LED lighting device.**

See Ground 2, claim 19.

5. **Claim 7: The LED lighting system of claim 1, further comprising a driver electrically coupled to the switch and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See 1.f, 1.g (showing three instances of a driver electrically coupled to a color-specific switch via a top line and to at least one LED circuit via a bottom line); EX1002, ¶121.

6. **Claim 8**

- a. **8.pre: An LED lighting system comprising:**

See 1.pre.

- b. **8.a: a first operating LED circuit and at least one additional LED circuit,**

See 1.a.

- c. **8.b: at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel, and**

See 1.b.

- d. **8.c: the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;**

See 1.c.

- e. **8.d: a switch capable of at least one of: (a) switching a brightness level of at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off,**

See 1.d. (obvious to combine Bruning from Ground 2, 15.c and Evanicky).

As for 8.d(b), see Ground 2, 15.c(b).

As for 8.d(a), as shown in Ground 2, 15.c(a) Bruning discloses the switch can be operated in the active region to change the amplitude (voltage level) input to the LED circuit, thereby changing the amount of current that flows through the LED circuit and the brightness level of the LED circuit.

Additionally, as shown in Ground 2, 15.c(b) Bruning discloses the switch can be operated to change the pulse width or frequency, which will change the percentage of time the LED is on and hence its brightness to the human eye.

EX1004, [0042]; EX1002, ¶¶126-29.

- f. **8.e: wherein (a) or (b) is selectable by a user switching the switch; and**

See 1.e.

- g. **8.f: an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at**

least one of the first operating LED circuit or the at least one additional LED circuit,

See 1.f.

- h. 8.g: wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See 1.g.

- 7. Claim 9: The LED lighting system of claim 8, wherein the switch has at least two positions.**

See claims 2 and 8.

- 8. Claim 10: The LED lighting system of claim 8, wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.**

See claims 3 and 8.

- 9. Claim 12: The LED lighting system of claim 8, wherein the switching of the switch changes light output of the LED lighting device.**

See claims 5 and 8.

- 10. Claim 14: The LED lighting system of claim 8, further comprising a driver electrically coupled to the switch and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See claims 7 and 8.

- 11. Claim 15**

- a. 15.pre: An LED lighting system comprising:**

See 1.pre.

- b. 15.a: a first operating LED circuit and at least one additional LED circuit,**

See 1.a.

- c. 15.b: the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;**

See 1.c.

- d. 15.c: a switch capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off,**

See 1.d.

- e. 15.d: wherein (a) or (b) is selectable by switching the switch; and**

See 1.e.; Ground 2, 15.d.

- f. 15.e: an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,**

See 1.f.

- g. 15.f: wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See 1.g.

- 12. Claim 16: The LED lighting system of claim 15, wherein the switch has at least two positions.**

See claims 2 and 15.

- 13. Claim 17: The LED lighting system of claim 15, wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.**

See claims 3 and 15.

- 14. Claim 19: The LED lighting system of claim 15, wherein the switching of the switch changes light output of the LED lighting device.**

See claims 5 and 15.

IX. GROUND 4: CLAIMS 1-2, 5, 7-9, 12, 14-16, AND 19 ARE ANTICIPATED BY DOHENY

A. Doheny Overview

Doheny was filed October 9, 2017, published February 1, 2018, and is titled “Configurable Lighting System.” EX1011, (22), (43), (54). Doheny relates to “lighting systems that can be readily configured to produce illumination of different color temperatures.” *Id.*, [0002]. Doheny discloses a “light emitting diode system” or configurable “luminaire” that “provide[s] illumination of a selected color temperature, a selected lumen output, or a selected photometric distribution based on an input.” *Id.*, [0006]-[0007].

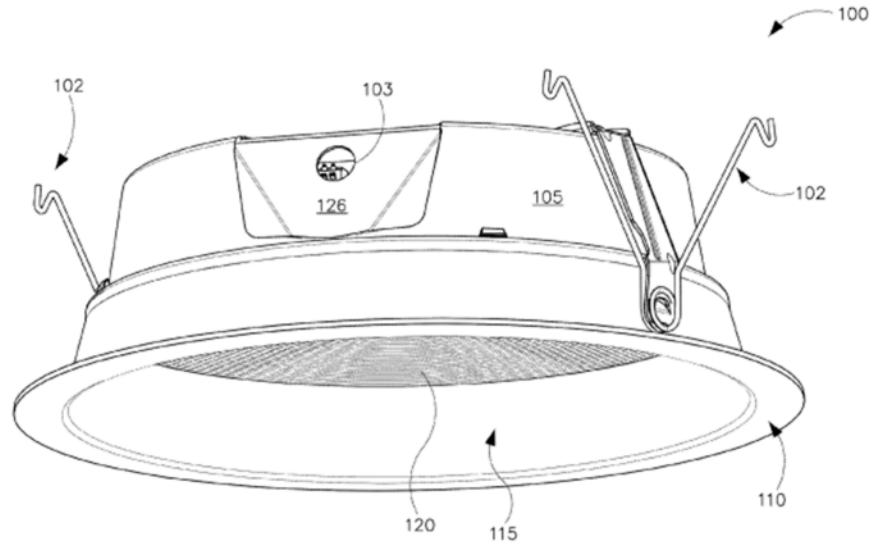


FIG. 1A

Id., Fig. 1A; EX1002, ¶147.

B. Analysis

1. Claim 1

a. 1.pre: An LED lighting system comprising:

Doheny discloses an LED lighting system (luminaire 100, Fig. 1) comprising the claimed elements as shown below. EX1011, (54), (57), Figs. 1-7, [0002]-[0057], [0060], [0063]-[0064], [0089]-[0091], [0099]-[0100], [0108]-[0110], [0121]-[0125]; § IX.A (Doheny overview); EX1002, ¶148.

Doheny discloses luminaire 100 with LEDs. EX1011, [0039], [0031] (Fig. 1 discloses luminaire 100), [0041] (Figs. 2-4 discloses circuit 200 “in further detail with example reference to the luminaire 100”), [0053] (relating Figs. 3 and 4), [0054] (relating Figs. 1 and 4), [0054]-[0055] (relating “FIGS. 1A-5”), [0056] (relating Figure 7). EX1002, ¶149.

b. 1.a: a first operating LED circuit and at least one additional LED circuit,

Doheny discloses a first operating LED circuit (LED group 150) and at least one additional LED circuit (LED group 155). EX1011, [0013]-[0016], [0022]-[0023], [0039] (“two groups of light emitting diodes 150, 155”), [0040]-[0041], [0046], [0054], Figs. 1-4, EX1002, ¶150.

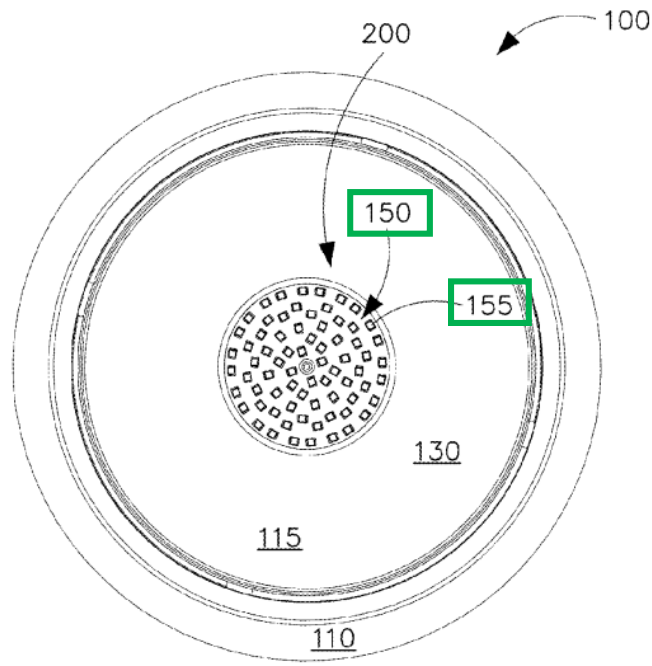


FIG. 1D

FIG. 2

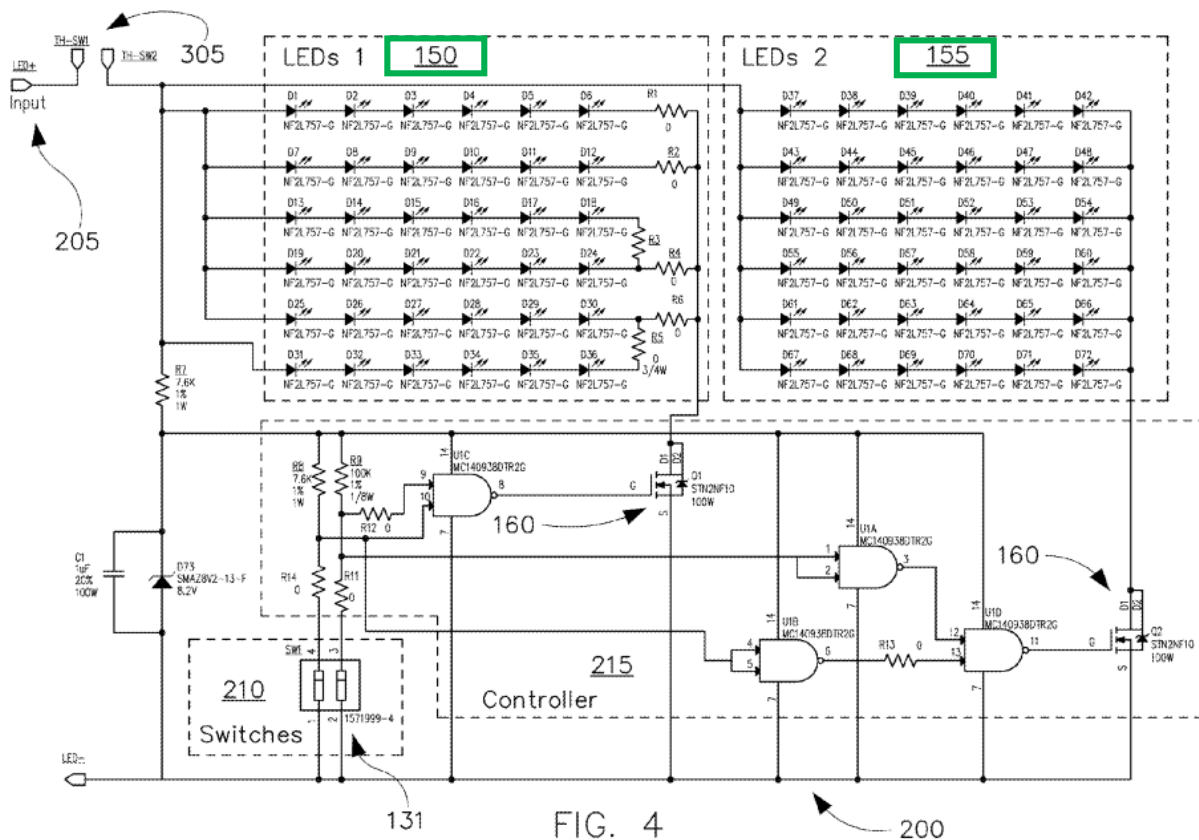
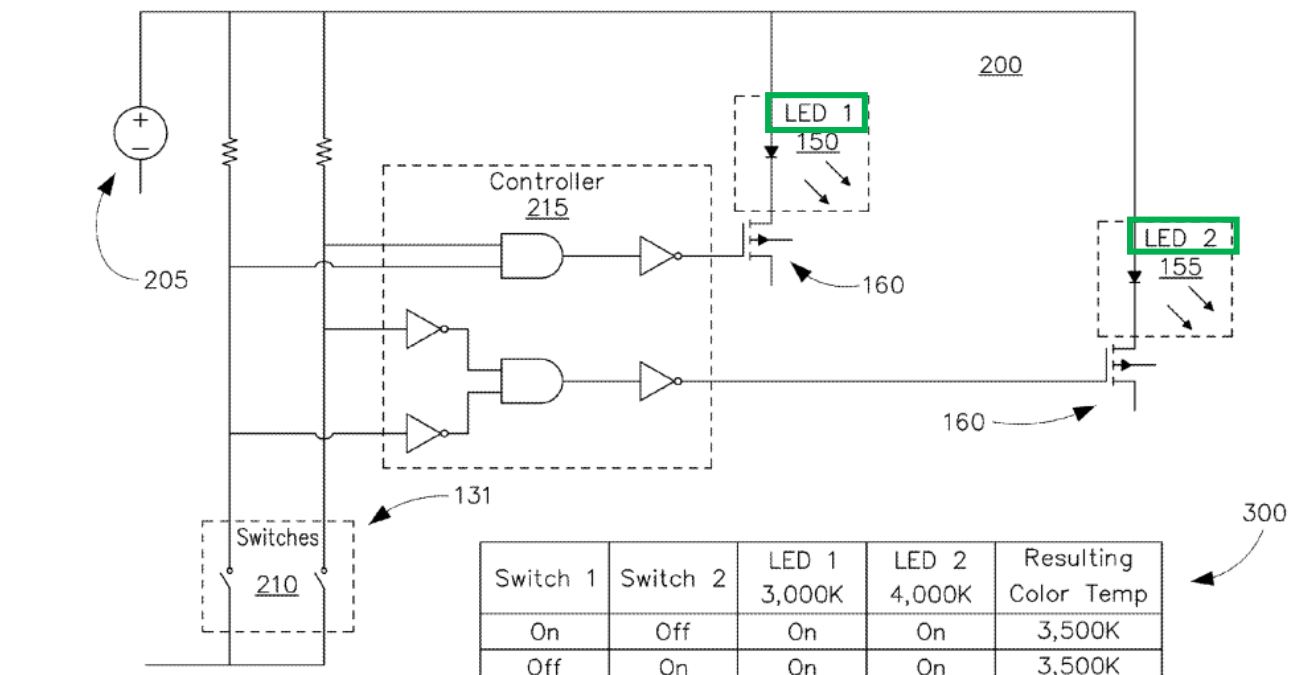


FIG. 4

Id., Figs. 1D, 2, 4; EX1002, ¶150.

- Doheny discloses at least one of the first operating LED circuit (LED group 150) or the at least one additional LED circuit (LED group 155) including at least two LEDs connected in either series or parallel. EX1011, [0013]-[0016], [0022]-[0023], [0039]-[0041], [0046], [0054], [0121] (“plurality of light emitting diodes”), Figs. 1-4.



- d. 1.c: the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;**

Doheny discloses the at least one additional LED circuit (LED group 155 producing light having color temperature 4000K) being configured to emit a different color light compared to the first operating LED circuit (LED group 150 producing light having color temperature 3000K). EX1011, [0008]-[0009], [0015], [0022] (“groups of light emitting diodes of different color temperatures”), [0023]-[0026], [0034], [0039] (“two groups of light emitting diodes 150, 155, with each group having a different color temperature”), [0040]-[0041], [0046]-[0054], [0108], [0121] (“a first plurality of light emitting diodes” with “a first color temperature,” “a second plurality of light emitting diodes” with “a second color temperature”), [0123], Fig. 3; EX1002, ¶152.

- e. 1.d: a switch capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off,**

Doheny discloses a switch (switch 131, controller 215 and transistors 160) capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off (“switching scheme that can turn each group of light emitting diodes on and off to change the color

temperature of the luminaire”). EX1011, [0006]-[0009], [0013]-[0016], [0022]-[0023], [0027], [0031], [0034], [0043]-[0053], [0089]-[0091], [0121]-[0123]; Figs. 1-4; EX1002, ¶153.

Doheny explains that the luminaire can comprise at least two light sources having different color temperatures. EX1001, [0008]. “In a first configuration, the luminaire can produce illumination of a first color temperature using a first one of the light sources. In a second configuration, the luminaire can produce illumination of a second color temperature using a second one of the light sources. In a third configuration, the luminaire can produce illumination of a third color temperature using both of the first and second the light sources.” *Id.*; *see also id.*, [0023], [0121]; EX1002, ¶154.

Doheny discloses dual inline pin (DIP) switch 131 comprises individual switches 210 that provide an input for configuring luminaire 100 to operate at a selected color temperature. EX1011, [0043]. When both switches 210 are in the off state, LED group 155 is on while LED group 150 is off. *Id.*, [0049]. When only one of the switches 210 is in the off state, both LED groups 150 and 155 are on. *Id.*, [0050]. When both switches 210 are in the on state, only LED group 150 is on. *Id.*, [0048]. Fig. 3 illustrates a representative table 300 describing the operation of LEDs depending on the state of switch 131. *Id.*, [0048]-[0052].

FIG. 2

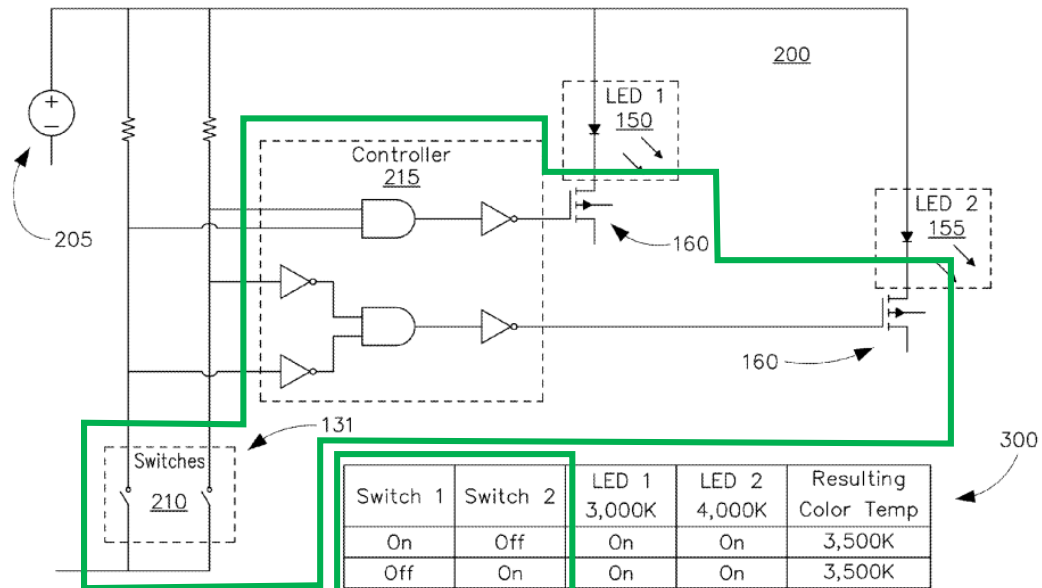


FIG. 3

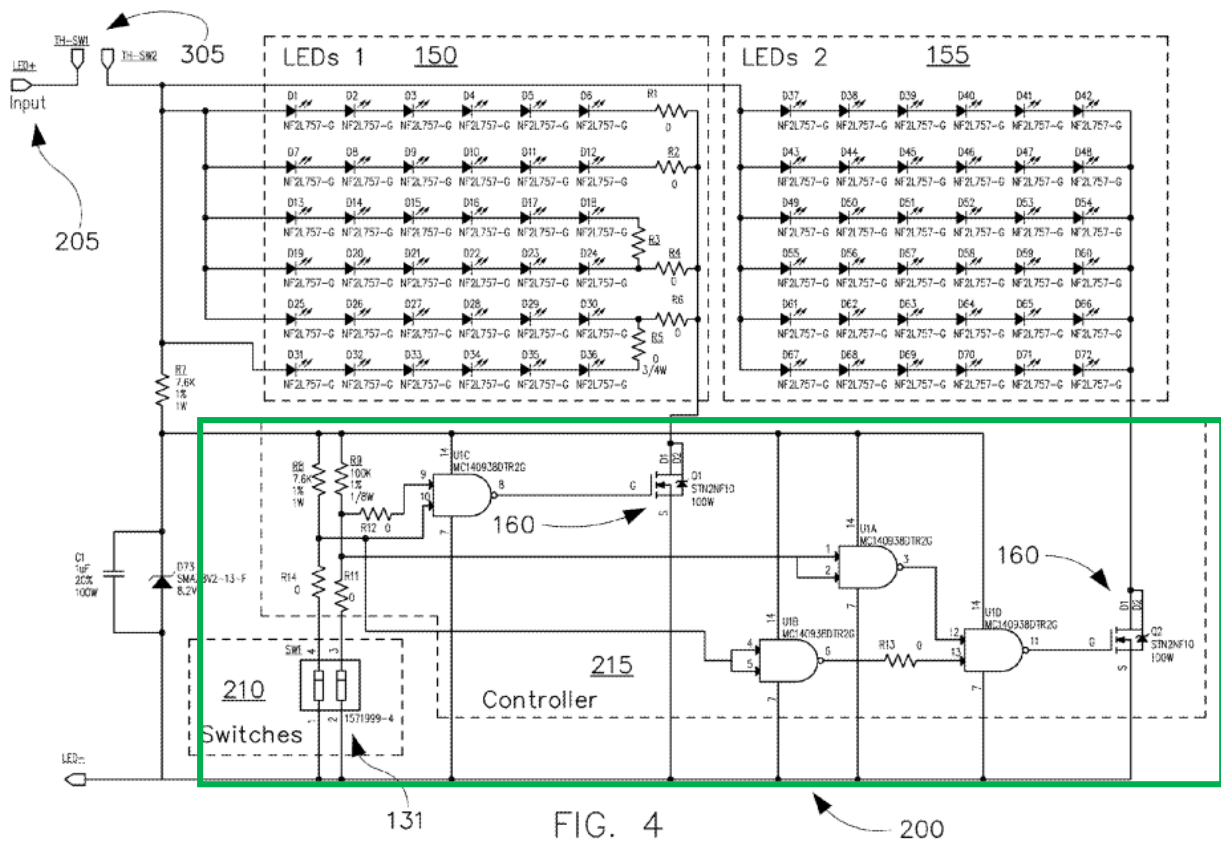


FIG. 4

Id., Figs. 2-4. Thus, switch 131 configures luminaire 100 to operate with “either or both” of LED groups 150, 155. *Id.*, [0046]; EX1002, ¶155.

Based on the state of switch 131, the logic in controller 215 opens or closes transistors 160 to switch the LED circuits on or off. EX1011, Figs. 3-4, [0045]-[0054]; EX1002, ¶156.

Additionally, Doheny explains that while Fig. 2 illustrates switch 131 as comprising two manual switches 210, it is possible to have only one manual switch 210. EX1011, [0043] (“other embodiments may have fewer or more switches 210”), [0056] (“single switch or multiple switches”); EX1002, ¶157.

f. 1.e: wherein (a) or (b) is selectable by a user switching the switch; and

Doheny discloses wherein (b) is selectable by a user switching the switch (switch 131). EX1011, [0008]-[0009], [0013]-[0016], [0022]-[0023], [0031], [0034], [0043]-[0053], [0060], [0089]-[0091], [0121]-[0123], Figs. 1-4, claims 7 (“physical switch that is manipulated by a user to select the position”), 9; EX1002, ¶158.

Doheny discloses a user can select switch 131 which is located adjacent to access aperture 129 to facilitate “convenient and efficient access.” EX1011, [0034], [0043]-[0044], claim 9 (“housing has an access mechanism that allows the user to access the at least one first switch without disassembling the luminaire”).

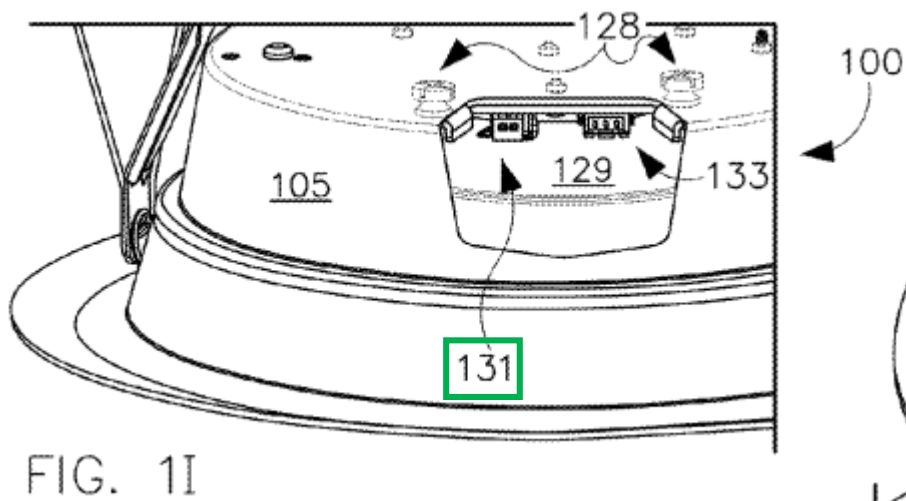


FIG. 1I

Id., Fig. 1I, EX1002, ¶159.

- g. **1.f: an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,**

Doheny discloses an LED driver (“light emitting diode driver,” power supply 540/740) including an input configured to connect to an AC voltage power source (“AC mains power”), the LED driver configured to provide a DC voltage output (“DC”) to at least one of the first operating LED circuit or the at least one additional LED circuit. EX1011; [0022], [0040]-[0042], [0054]-[0055], [0063]-[0064], [0099]-[00100], [0108]-[0110], (57); EX1002, ¶160.

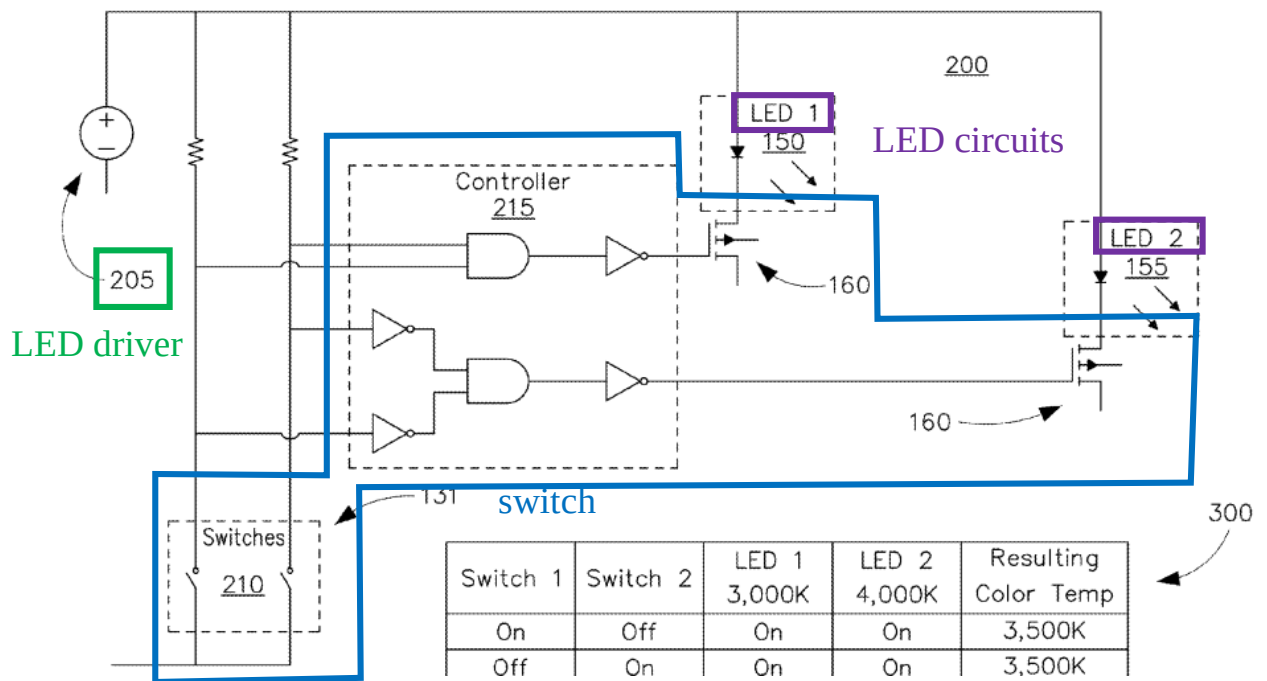
Doheny discloses the circuit 200 in the luminaire 100 can comprise “a light emitting diode driver.” EX1011, [0040]-[0042]. Doheny discloses that driver is power supply 540/740, which receives “AC mains” and generates DC output voltage for input to the LEDs. *Id.*, [0054]-[0055] (relating “FIGS. 1A-5” and

explaining “power supply 540 and the light sources 542 of FIG. 5 are described in more detail below with respect to the power supply 740 and the light sources 742 of FIG. 7A”), [0063]-[0064] (power supply 740 “directly” receives “AC mains”), [0108]-[0109] (“power supply 740 can be called by any of a number of other names, including ... a driver [or] a LED driver”), [0110] (“power supply 740 can include one or more components (e.g., a transformer, a diode bridge, an inverter, a converter)” that “generates power of a type (e.g., alternating current, direct current) and level (e.g., 12V, 24V, 120V)”); *see also id.*, (57) (“luminaire can include a power supply that receives AC mains power from a power source and delivers intermediate power”), [0022] (“constant current power supply for powering the light emitting diodes”), [0099]-[0100]; EX1002, ¶161.

h. 1.g: wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.

Doheny discloses wherein the switch (switch 131, controller 215 and transistors 160) is electrically connected between the DC voltage output (“DC”) and at least one of the first operating LED circuit (LED group 150) or the at least one additional LED circuit (LED group 150). EX1011, [0041]-[0046], [0053]-[0057], [0064], (57) (power supply “coupled to” lumen control module, which is “coupled to” light source; lumen control module includes switch) Figs. 2, 4-5; EX1002, ¶162.

FIG. 2



EX1011, Fig. 2; *see also id.*, [0055] (relating Figs. 1A-5), Fig. 5 (showing switch 570 electrically connected between power supply 540 and light sources 542).

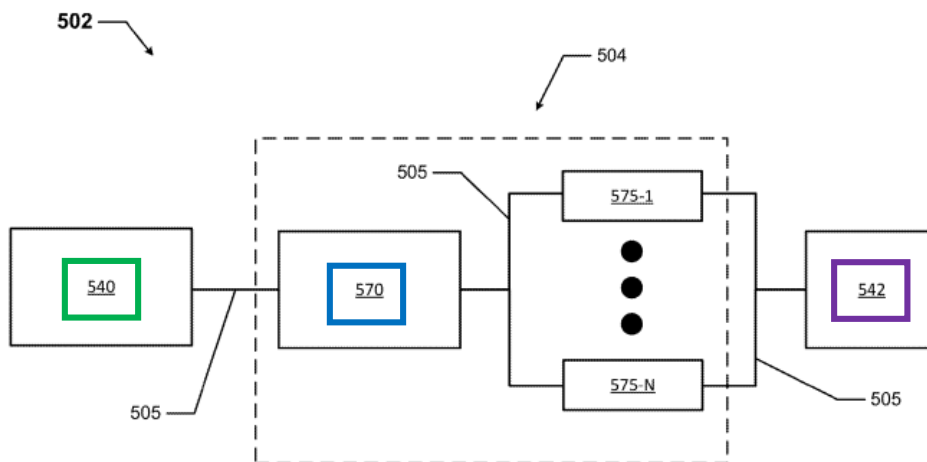


FIG. 5

EX1002, ¶162.

2. Claim 2: The LED lighting system of claim 1, wherein the switch has at least two positions.

Doheny discloses the LED lighting system of claim 1, wherein the switch (switch 131, controller 215 and transistors 160) has at least two positions (“multiple positions”). EX1011, (57), [0043]-[0044] (disclosing that switch 131 can take the form of switches with at least two positions like DIP switches, “rotary dials,” “slide switches,” and “toggle switches”), claim 1 (“at least one first switch that has multiple positions”), Figs. 1-3; EX1002, ¶163.

3. Claim 5: The LED lighting system of claim 1, wherein the switching of the switch changes light output of the LED lighting device.

Doheny discloses the LED lighting system of claim 1, wherein the switching of the switch (switch 131, controller 215 and transistors 160) changes light output of the LED lighting device (brightness and color temperature). See claim 1; EX1011, [0007]-[0008], [0023], [0034], [0047]-[0052], [0055], [0121] (providing first, second and third color temperatures), Fig. 3, (57); EX1002, ¶164.

Switch 131 enables the user to change the color temperature of luminaire’s light output, e.g., between 3000K and 4000K, by selecting which of LED circuits 150 and/or 155 are on. EX1011, [0047]-[0052], Fig. 3.

Switch 1	Switch 2	LED 1 3,000K	LED 2 4,000K	Resulting Color Temp
On	Off	On	On	3,500K
Off	On	On	On	3,500K
On	On	On	Off	3,000K
Off	Off	Off	On	4,000K

300

FIG. 3

Switch 131 also enables the user to change the luminaire's brightness. *Id.* For example, the luminaire's brightness is greatest when both LED circuits 150 and 155 are on, as opposed to when only one of LED circuits 150 and 155 is on. *Id.*, [0055]; EX1002, ¶165.

4. **Claim 7: The LED lighting system of claim 1, further comprising a driver electrically coupled to the switch and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See claim 1 (driver connected by top line to LED circuit, and by bottom line to switch); EX1002, ¶166.

5. **Claim 8**

- a. **8.pre: An LED lighting system comprising:**

See 1.pre.

- b. **8.a: a first operating LED circuit and at least one additional LED circuit,**

See 1.a.

- c. **8.b: at least one of the first operating LED circuit or the at least one additional LED circuit including at**

**least two LEDs connected in either series or parallel,
and**

See 1.b.

- d. 8.c: the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;**

See 1.c.

- e. 8.d: a switch capable of at least one of: (a) switching a brightness level of at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off,**

Doheny discloses a switch (switch 131, controller 215 and transistors 160) capable of at least one of: (a) switching a brightness level of at least one of the first operating LED circuit (LED group 150) or the at least one additional LED circuit (LED group 155) or (b) switching the at least one additional LED circuit on or off.

Doheny's switch satisfies (b). *See 1.d (switches on and off); EX1002, ¶171.*

- f. 8.e: wherein (a) or (b) is selectable by a user switching the switch; and**

See 1.d-1.e.; EX1002, ¶172.

- g. 8.f: an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,**

See 1.f.

- d. **15.c: a switch capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off,**

See 1.d.

- e. **15.d: wherein (a) or (b) is selectable by switching the switch; and**

See 1.e.

- f. **15.e: an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,**

See 1.f.

- g. **15.f: wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See 1.g.

- 10. Claim 16: The LED lighting system of claim 15, wherein the switch has at least two positions.**

See claims 2 and 15.

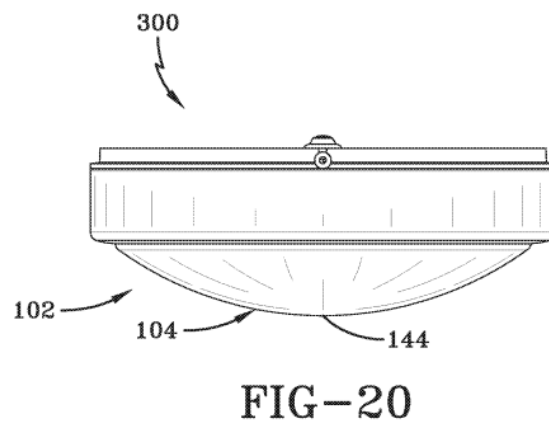
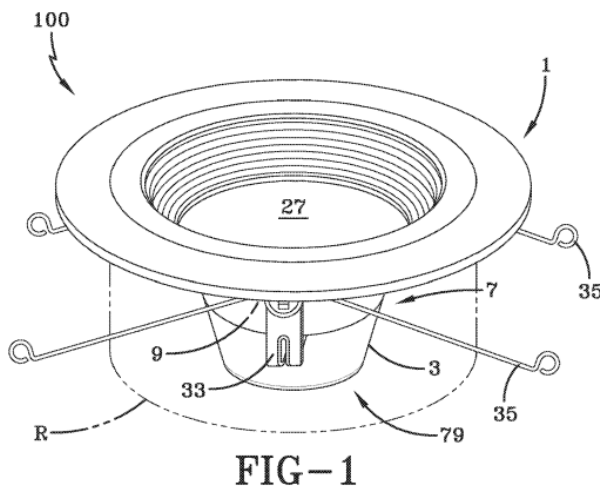
- 11. Claim 19: The LED lighting system of claim 15, wherein the switching of the switch changes light output of the LED lighting device.**

See claims 5 and 15.

X. GROUND 5: CLAIMS 1-2, 5, 7-9, 12, 14-16, AND 19 ARE RENDERED OBVIOUS BY VAN WINKLE

A. Van Winkle Overview

Van Winkle was filed January 15, 2018, published July 19, 2018, and is titled “Manually Controllable LED Correlated Color Temperature Light Fixture.” EX1012, (22), (43), (54). Van Winkle relates to “LED light fixtures having manually controllable correlated color temperature (CCT) to obtain different correlated color temperatures.” *Id.*, [0002]. Van Winkle discloses “[a]n LED light fixture having at least two LED light sources, each having a different correlated color temperature, with a manually controllable correlated color temperature switching assembly to control an electric circuit to select a particular LED light source or combination of LEDs.” *Id.*, (57). Two embodiments of Van Winkle’s invention, LED downlight 100 and ceiling fan LED light 102, are shown below:



Id., Figs. 1, 20. EX1002, ¶187.

B. Analysis

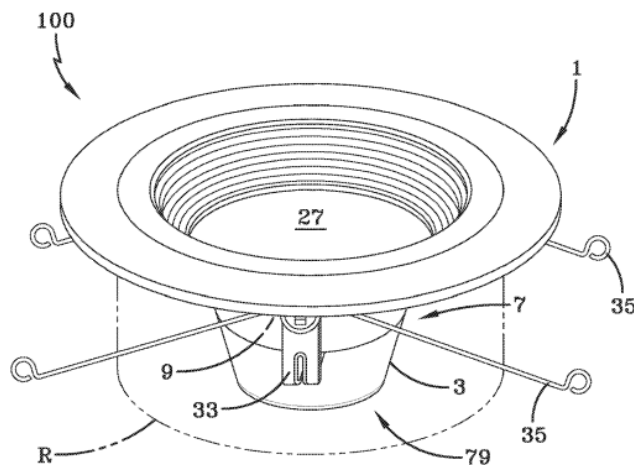
1. Claim 1

a. 1.pre: An LED lighting system comprising:

Van Winkle discloses an LED lighting system (LED downlight 100 and ceiling fan LED light 102) comprising the claimed elements as shown below.

EX1012, (54), (57), [0002]-[0048], [0063]-[0077], [0102], Figs. 1-24; § X.A (Van Winkle overview); EX1002, ¶188.

Van Winkle discloses an “LED downlight 100 with manually variable CCTs.” EX1012, [0064], Figs. 1, 3-5, 8-19; *see id.*, [0030]-[0032] (relating Figs. 1, 3-5 as pertaining to LED downlight 100), [0066] (Figs. 8-12 detail LED downlight 100’s slide switch 51), [0037] (Fig. 13 is circuitry for LED downlight 100), [0067]-[0071] (Figs. 14A-19B disclose switch alternatives to LED downlight 100’s slide switch 51).



Id., Fig. 1; EX1002, ¶189.

Van Winkle discloses the downlight can be implemented as a ceiling fan LED light 102 “incorporating a manually controllable CCT switch.” EX1012, [0074], Figs. 20-24, 8-12, 14-19; *see also id.*, [0044]-[0048] (relating Figs. 20-24 as pertaining to ceiling fan LED light 102), [0074] (describing ceiling fan LED light 102’s switch 103 with reference to switch assembly 13), [0066]-[0071] (describing switch assembly 13 with reference to Figs. 8-12, 14-19), [0076] (relating ceiling fan LED light 102 with Figs. 8-12).

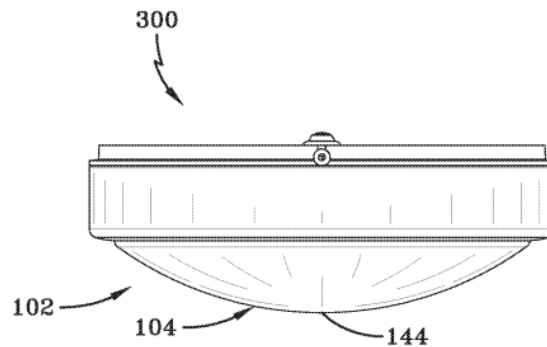


FIG-20

Id., Fig. 20; EX1002, ¶190.

b. 1.a: a first operating LED circuit and at least one additional LED circuit,

Van Winkle discloses a first operating LED circuit and at least one additional LED circuit. EX1012, [0037], [0047], Figs. 1, 13, 20, 23; EX1002, ¶191.

100 (Fig. 1) and ceiling fan LED light 102 (Fig. 20), respectively. EX1012, [0037], [0047]. Both circuit diagrams depict two LED circuits.

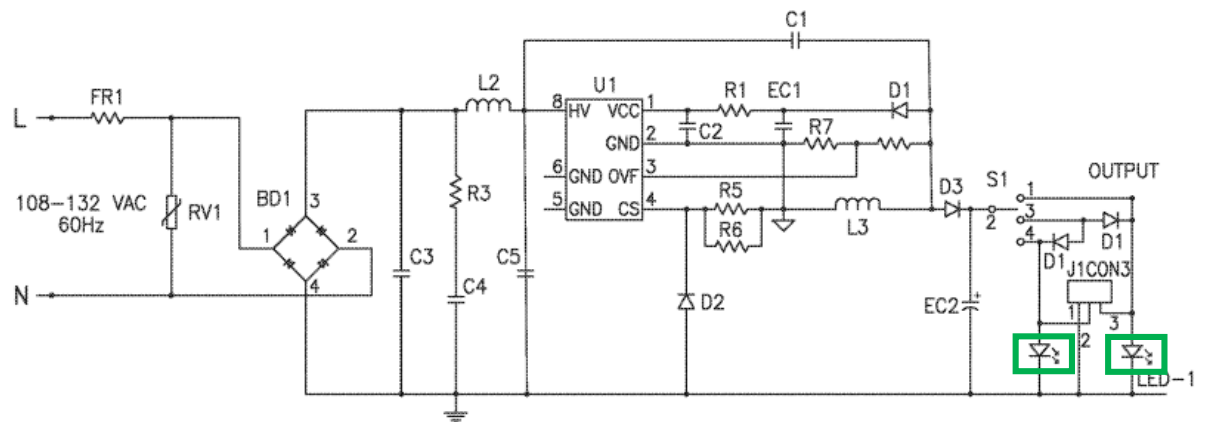


FIG-13

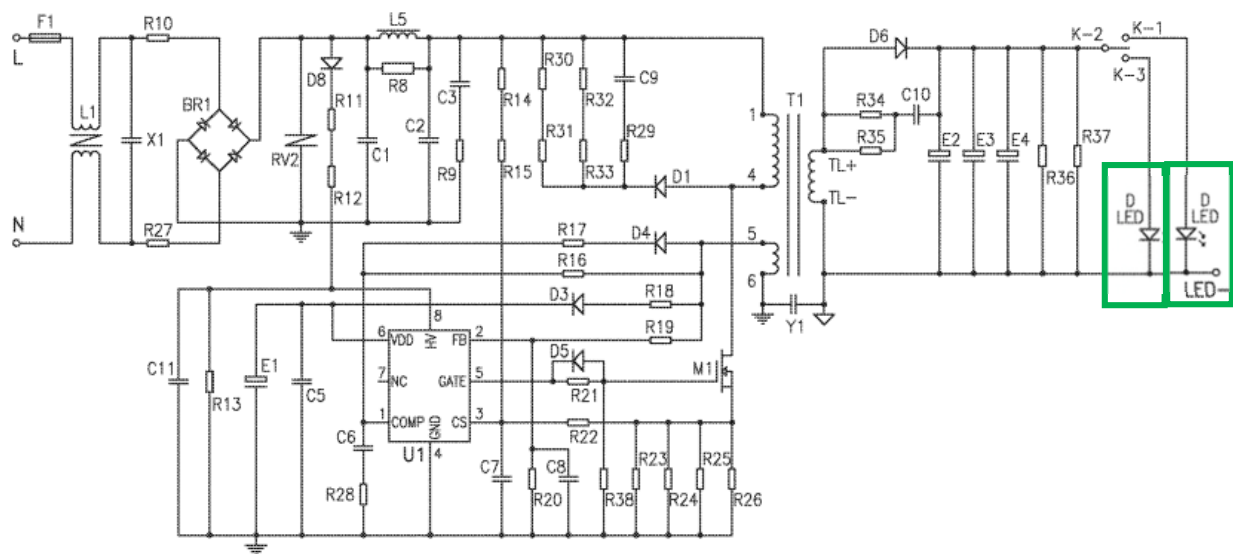


FIG-23

Id., Figs. 13, 23; EX1002, ¶192.

- c. 1.b: at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel, and**

Van Winkle discloses at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel. EX1012, [0013] (“sets of LEDs”), [0046], [0055], [0079] (“series of LEDs”), [0084], [0093] (“array of LEDs”), Figs. 13, 22-23, 29, 31, 35, 37, 47, 38D, claims 10, 19 (“groups of LEDs”), 24, 26, 34-35; EX1002, ¶193.

Although the circuit diagrams for LED downlight 100 (Fig. 1) and ceiling fan LED light 102 (Fig. 23) depict each LED circuit having a single LED, a POSITA would understand the single LED to be “shorthand” for a circuit comprising at least two LEDs connected in either series or parallel. Indeed, Van Winkle uses this shorthand elsewhere. For example, Van Winkle uses a single LED to represent an LED circuit comprising at least two LEDs in Figs. 38A-38C. Figs. 38A-38C relate to Figs. 29, 31, 35, and 37, which all show a plurality of LEDs. EX1012, [0079], [0054], [0084], [0086]. EX1002, ¶194.

Additionally, similar embodiments disclose LED circuits with at least two LEDs connected in either series or parallel.

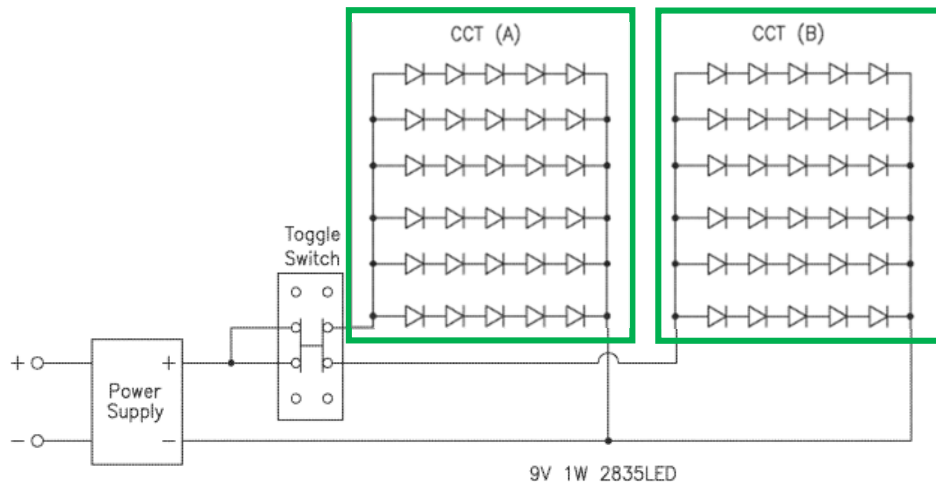


FIG-38D

EX1012, Fig. 38D, *see also id.*, Figs. 29, 31, 35, 37, 47, [0055], [0079] (“series of LEDs”), [0093] (“array of LEDs”), [0013] (“sets of LEDs”), [0084] (same), claims 10, 24, 26, 34-35 (same); EX1002, ¶195. Thus, if it were determined that Van Winkle does not explicitly disclose LED circuits with least two LEDs connected in either series or parallel, it would have been obvious to implement at least one of the first operating LED circuit or the at least one additional LED circuit to include at least two LEDs connected in either series or parallel. EX1002, ¶196.

d. 1.c: the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;

Van Winkle discloses the at least one additional LED circuit being configured to emit a different color light (“bluish white”) compared to the first operating LED circuit (“yellowish white through red”). EX1012, (57) (“at least two LED light sources, each having a different correlated color temperature”),

[0004]-[0010], [0013], [0018]-[0020] (“color tunable”), [0063] (“different light temperature”), [0066], [0077], Figs. 8, 24; *see also id.*, [0085]-[0086] (“color changing”), [0093]; claims 1 (“different, predetermined correlated color temperatures”), 10, 12, 19, 22, 24, EX1002, ¶197.

Van Winkle discloses that color temperature is “the color of light within the white light.” EX1012, [0004]. For example, “color temperatures over 4000K are generally called cool colors (bluish white), while lower temperatures (2700K-3000K) are referred to as warm colors (yellowish white through red).” *Id.*; EX1002, ¶198.

LED downlight 100 and ceiling fan LED light 102 are “LED light fixture[s] having at least two LED light sources, each having a different correlated color temperature” with a switch for “select[ing] a particular LED light source or combination of LEDs.” EX1012, (57). Van Winkle discloses three color temperature settings—3000K, 4000K, and 5000K—in connection with both embodiments, meaning the LED circuits have color temperatures of 3000K and 5000K, respectively. *Id.*, [0066], [0077], Figs. 8, 24. Thus, the at least one additional LED circuit emits a cooler, more bluish white color than the first operating LED circuit. *Id.*, [0004]; EX1002, ¶¶199-200.

- e. **1.d: a switch capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit,**

or (b) switching the at least one additional LED circuit on or off,

Van Winkle discloses a switch (“manually controllable correlated color temperature switching assembly”) capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off (“select a particular LED light source or combination of LEDs,” “connect said selected one of said group to the electric power source to effect the illumination of said selected one of said group of one of said at least two LED sources and a combination of said at least two LED light sources”). EX1012, (57), [0011] (“manually operable CCT switches”), [0015]-[0016], [0018]-[0019], [0026] (“It is a general object of the present invention to provide an LED light fixture including a manually controllable, easily accessible CCT select switch”), [0028], [0035] (“switch for selecting a CCT for an LED light fixture”), [0036]-[0048], [0063], [0064], [0066]-[0071], [0074], [0076]-[0077], Figs. 1, 6, 8-19, 22-24, claims 1, 8, 10, 24; *see also id.*, [0086]-[0087], Figs. 38A-38C; EX1002, ¶201.

LED downlight 100 and ceiling fan LED light 102 both have “a manually controllable correlated color temperature switching assembly to control an electric circuit to select a particular LED light source or combination of LEDs.” EX1012, (57). For example, LED downlight 100 has a “[m]anually operable CCT switch assembly 13 [that] includes a slide switch 51 shown in FIGS. 8-12.” *Id.*, [0064],

[0066]. Slide switch 51 comprises slide 52 that is “slideable to result in the actuating of a switch member S1 shown in the circuit diagram of FIG. 13 to change the CCT depending to [sic] which contact 1, 3 or 4 of CCT switch assembly 13 operatively is connected.” *Id.*, [0066].

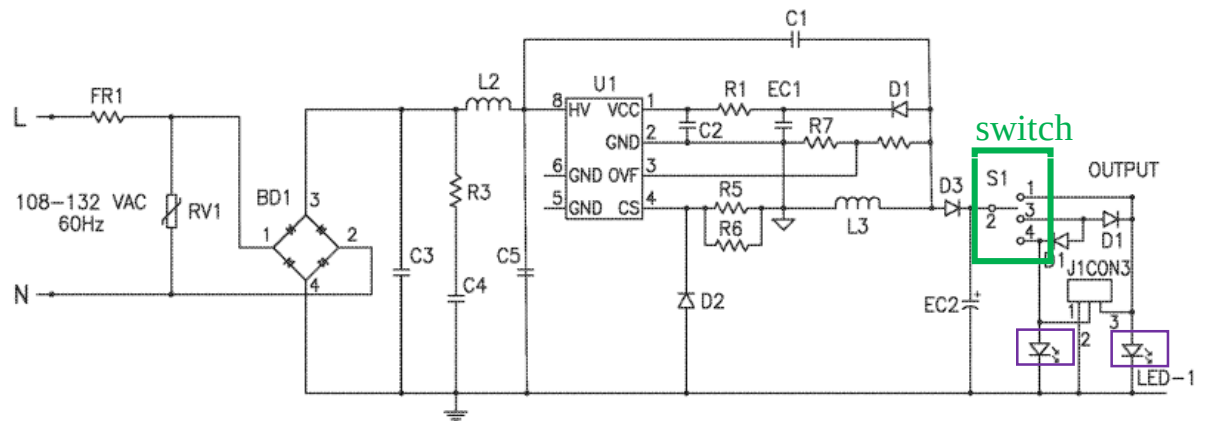


FIG-13

Id., Fig. 13. A POSITA would understand that the at least one additional LED circuit (circuit on the right) is “on” and “off” depending on which contact of switch assembly 13 is connected (e.g., “on” if contact 1 is connected and “off” if contact 4 is connected). EX1002, ¶202.

Additionally, Van Winkle discloses that switching assembly 13 can comprise “other types of CCT switching devices” besides a slide switch. EX1012, [0067]-[0071], Figs. 14A-19B. For example, a toggle switch can be used to “connect an electric power source to the lighting circuit” (switching circuit on) or

“disconnect the power source from the lighting circuit” (switching circuit off). *Id.*, [0067], Figs. 14A-16B; EX1002, ¶203.

Ceiling fan LED light 102 has a similar switch to LED downlight 100. EX1012, [0074] (ceiling fan light 102 incorporates “a manually controllable CCT switch 103,” which is “corresponding in structure and with its electrical circuitry to that described above with respect to manually operable CCT switch assembly 13”), [0076] (relating ceiling fan LED light 102 with Figs. 8-12). The at least one additional LED circuit is on when the switch assembly’s contact 1 is connected to power and off when contact 3 is connected to power instead. EX1002, ¶204.

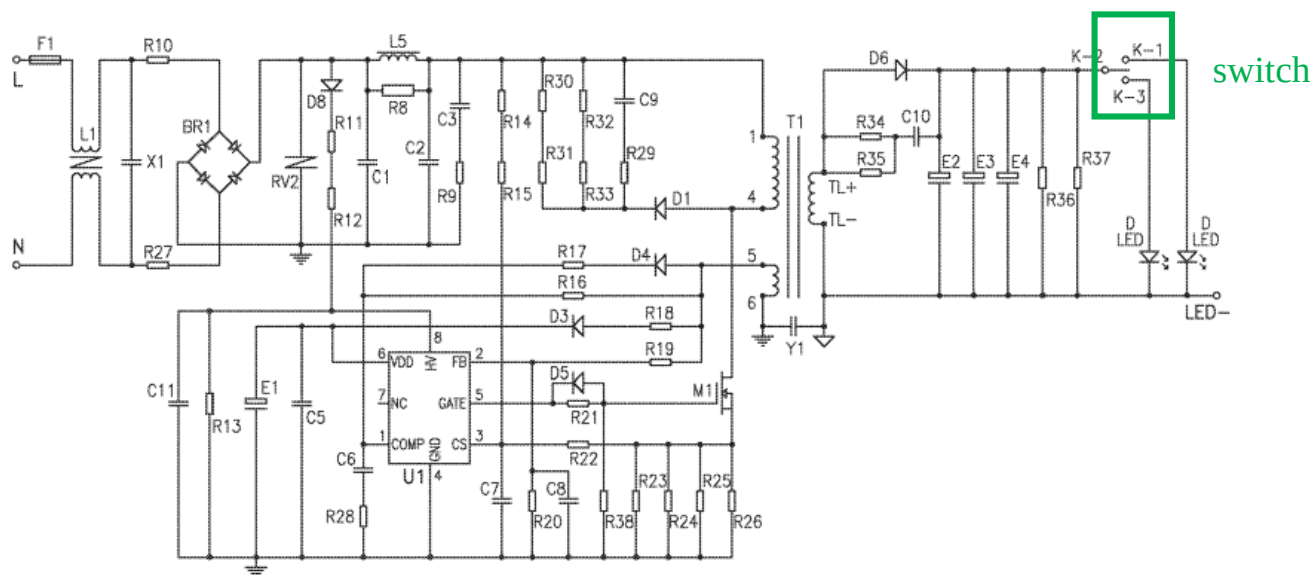


FIG-23

EX1012, Fig. 23; EX1002, ¶204.

Finally, Van Winkle discloses in connection with similar “manually controllable LED CCT light fixture” embodiments a switch that controls current

flow through the LED circuits (i.e., whether the LED circuits are on or off); the switch's position determines whether current flows through the first of the two LED circuits, the second of the two LED circuits, or both circuits. EX1012, Figs. 38A-38C, [0086]-[0087]; EX1002, ¶205.

f. 1.e: wherein (a) or (b) is selectable by a user switching the switch; and

Van Winkle discloses wherein (b) is selectable by a user switching the switch (“manually controllable”). EX1012, (54), (57) (“manually controllable correlated color temperature switching assembly”), [0002], [0010]-[0025], [0026] (“manually controllable, easily accessible CCT select switch”), [0028], [0030], [0035]-[0044], [0046]-[0048], [0063] (“The term ‘manually controllable’ includes controlled by a person’s fingers, i.e. digitally.”), [0064], [0066]-[0071], [0074]-[0077], claims 13, 18, 19, 21, Figs. 3, 8-19B, 22-24; EX1002, ¶206.

Van Winkle’s “invention involves a manually operable switch” or a switch “controlled by a person’s fingers.” EX1012, [0063]. For example, LED downlight 100 has a “[m]anually operable CCT switch assembly 13” that “includes a slide switch 51,” which is shown in Fig. 8. *Id.*, [0066]. “[T]he user’s fingers can move slide 52 along opening 57 to select a specific correlated color temperature.” *Id.*

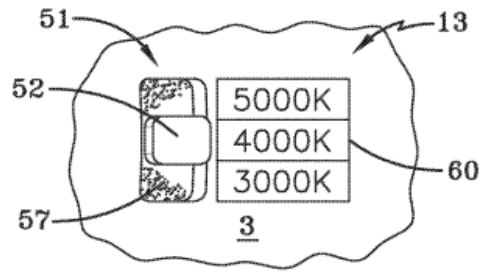


FIG-8

Id., Fig. 8; EX1002, ¶207.

Similarly, ceiling fan LED light 102 “could use a slide switch corresponding to that shown and described in FIGS. 8-12.” EX1012, [0076]. For example, ceiling fan LED light 102 can include “a slide switch assembly 146” that includes “a slide 148 which is used to manually change the CCT.” *Id.*, [0077]. A user can move slide 148 “between various CCTs for which CCT switch assembly is adjustable.” *Id.* (slide 148 is “slidable between three CCTs, namely 3000K, 4000K and 5000K”).

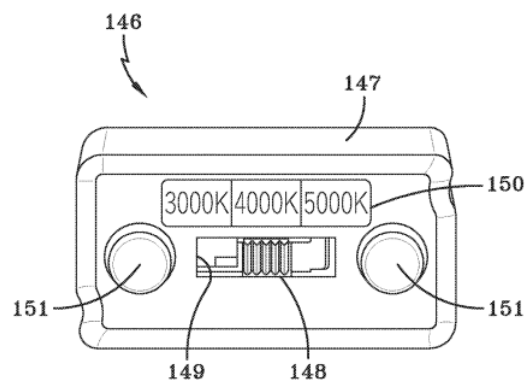


FIG-24

Id., Fig. 24; EX1002, ¶208.

- g. 1.f: an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,

Van Winkle discloses an LED driver (“driver”) including an input configured to connect to an AC voltage power source (e.g., “108-132 VAC”), the LED driver configured to provide a DC voltage output (via bridge rectifier BD1 and capacitors) to at least one of the first operating LED circuit or the at least one additional LED circuit. EX1012, [0037], [0047], [0064] (LED downlight 100 has “driver 5”), Figs. 1, 3, 13 (LED downlight 100’s circuitry), 23 (ceiling fan LED light 102’s circuitry); EX1002, ¶209.

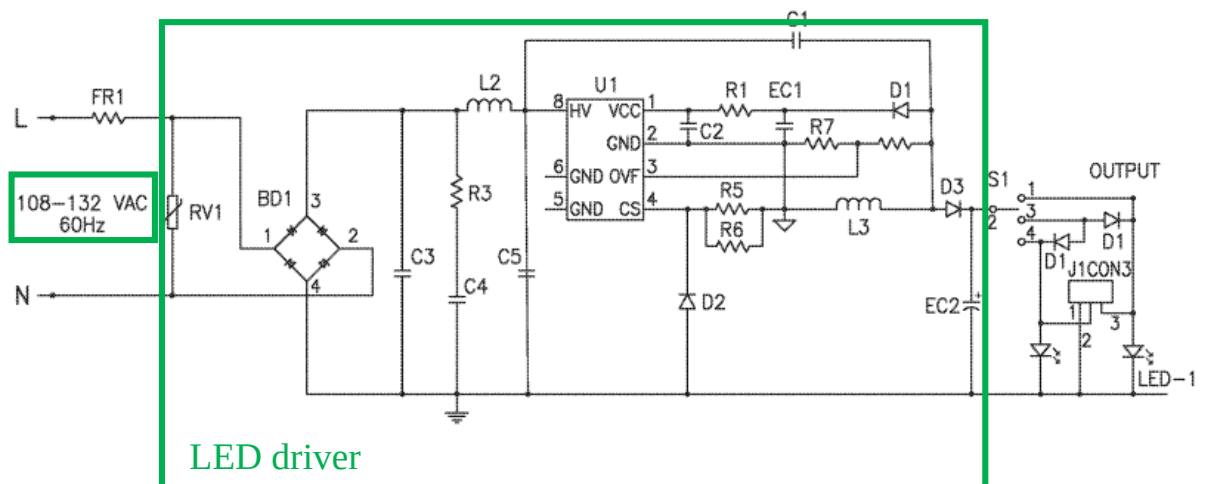


FIG-13

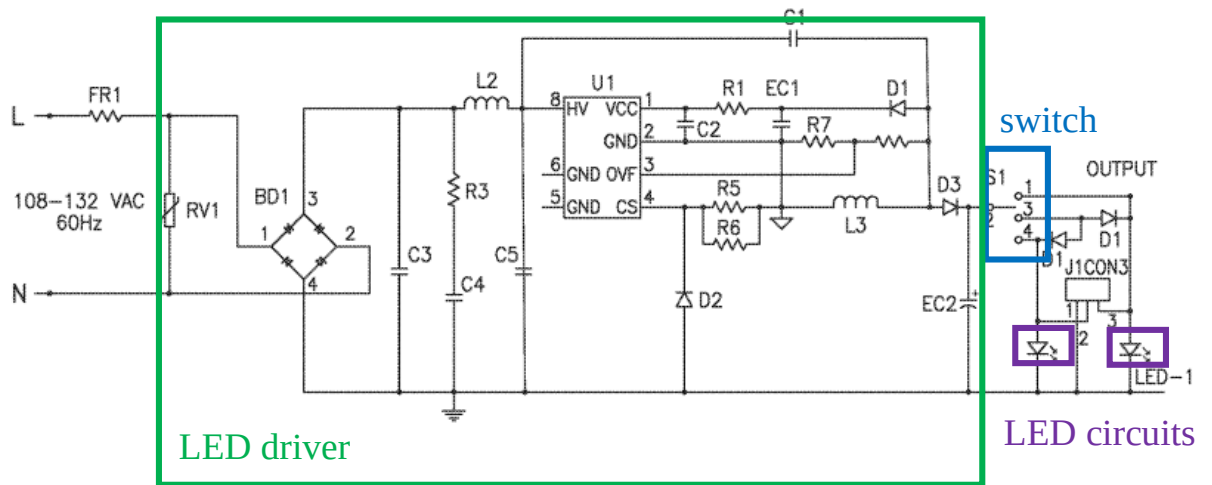


FIG-13

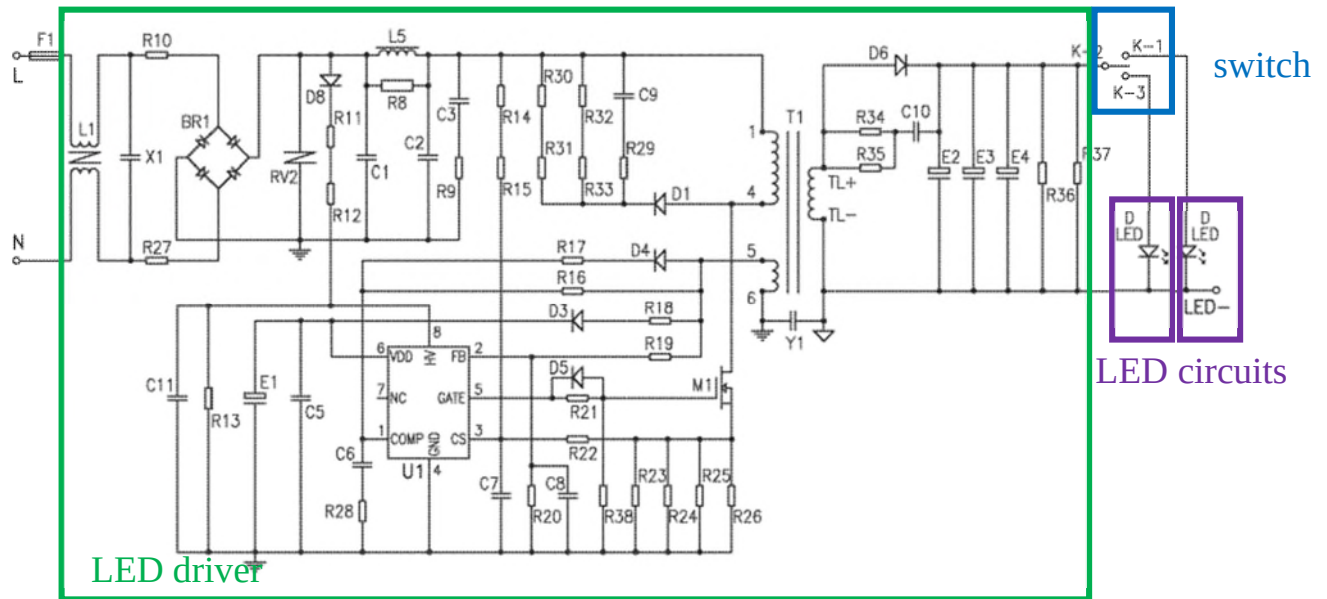


FIG-23

EX1012, Figs. 13, 23; EX1002, ¶210.

2. **Claim 2: The LED lighting system of claim 1, wherein the switch has at least two positions.**

Van Winkle discloses the LED lighting system of claim 1, wherein the switch has at least two positions (“three possible settings”). EX1012, [0011],

[0035]-[0041], [0047]-[0048], [0076], Figs. 8-17, 23, 24, claims 13, 18, 21; EX1002, ¶211.

LED downlight 100 and ceiling fan LED light 102 both have a switch with at least two positions. EX1012, [0035] (three settings), [0048] (three settings), [0067]-[0070], [0076].

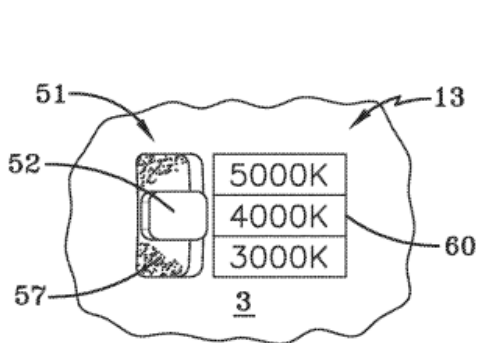


FIG-8

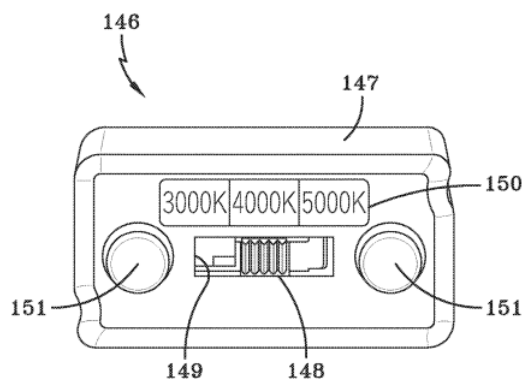


FIG-24

Id., Figs. 8, 24; EX1002, ¶212. Additionally, Van Winkle discloses that other types of switches having at least two positions are possible alternatives to slider switches (e.g., toggle, rotary, and DIP switches). *Id.*, [0011], [0067]-[0070], Figs 8-17; EX1002, ¶213.

3. Claim 5: The LED lighting system of claim 1, wherein the switching of the switch changes light output of the LED lighting device.

Van Winkle discloses the LED lighting system of claim 1, wherein the switching of the switch (“manually controllable correlated color temperature switching assembly”) changes light output of the LED lighting device (brightness and color temperature). See claim 1; EX1012, (54), (57), [0011] (“manually

operable CCT switches”), [0015]-[0016], [0018]-[0019], [0026] , [0028], [0035] (“switch for selecting a CCT for an LED light fixture”), [0036]-[0048], [0063], [0064], [0066]-[0071], [0074], [0076]-[0077], Figs. 1, 6, 8-19, 22-24, claims 1, 8, 10, 24; *see also id.*, [0086]-[0087], Figs. 38A-38C; EX1002, ¶214.

The “manually controllable correlated color temperature switching assembly” enables the user to change the light fixture’s color temperature. *See, e.g.*, EX1012, [0066] (“select a specific correlated color temperature”), [0077] (“various CCTs for which CCT switch assembly is adjustable ... slidable between three CCTs, namely 3000K, 4000K and 5000K”), Figs. 8-12, 24. Moreover, it also changes the light fixture’s brightness because the brightness is greatest when both LED circuits are on, as opposed to when a single LED circuit is on. *Id.* (57) (“select a particular LED light source or combination of LEDs”), EX1002, ¶215.

4. **Claim 7: The LED lighting system of claim 1, further comprising a driver electrically coupled to the switch and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See claim 1 (driver connected by top line to switch and bottom line to LED circuits); EX1002, ¶216.

5. **Claim 8**

- a. **8.pre: An LED lighting system comprising:**

See 1.pre.

- b. 8.a: a first operating LED circuit and at least one additional LED circuit,**

See 1.a.

- c. 8.b: at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel, and**

See 1.b.

- d. 8.c: the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;**

See 1.c.

- e. 8.d: a switch capable of at least one of: (a) switching a brightness level of at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off,**

Van Winkle discloses a switch (“manually controllable correlated color temperature switching assembly”) capable of at least one of: (a) switching a brightness level of at least one of the first operating LED circuit or the at least one additional LED circuit or (b) switching the at least one additional LED circuit on or off. The “manually controllable correlated color temperature switching assembly” satisfies (b). *See 1.d (switches on and off); EX1002, ¶221.*

- f. 8.e: wherein (a) or (b) is selectable by a user switching the switch; and**

See 1.d-1.e.; EX1002, ¶222.

- c. **15.b:** the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;

See 1.c.

- d. **15.c:** a switch capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off,

See 1.d.

- e. **15.d:** wherein (a) or (b) is selectable by switching the switch; and

See 1.e.

- f. **15.e:** an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,

See 1.f.

- g. **15.f:** wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.

See 1.g.

- 10. Claim 16:** The LED lighting system of claim 15, wherein the switch has at least two positions.

See claims 2 and 15.

11. Claim 19: The LED lighting system of claim 15, wherein the switching of the switch changes light output of the LED lighting device.

See claims 5 and 15.

XI. GROUND 6: CLAIMS 1-3, 5, 7-10, 12, 14-17, AND 19 ARE RENDERED OBVIOUS BY BRUNING IN VIEW OF LEE

A. Bruning Overview

See Section VII.A.

B. Lee Overview

Lee was filed July 28, 2004, published February 2, 2006, and is titled “Methods and Apparatus for Setting the Color Point of an LED Light Source.” EX1031, (22), (43), (54).

Lee discloses methods and apparatus for a user to select the color point of an LED light source such as an LCD backlight. EX1031, [0001] (“a user may wish to set the color point of an LED light source—especially in applications such as liquid crystal display (LCD) backlighting”), [0002]-[0004] (“user-selected color point”), [0007]-[0009] (“setting the color point of an LED light source”), [0010]-[0022] (methods for setting the color point), [0023]-[0028] (apparatus for setting the color point), Figs. 1-5. Lee discloses that a user can use a button or slider to select the color point of a display backlight that “comprises red, green and blue LEDs.” EX1031, [0023] (“LED light source 502 comprises red, green and blue

LEDs 504-520 ... the LED light source could take various forms, such as that of a display backlight”), [0024]-0028], Fig. 5; EX1002, ¶239.

C. Combination Rationale

The 705 patent, Bruning, and Lee are all analogous art because they are all directed to the field of endeavor of lighting systems. Additionally, Bruning and Lee are reasonably pertinent to the particular problem faced by the inventor of providing adjustable lighting systems and, more particularly, user control of a lighting system. EX1002, ¶240.

A POSITA would have been motivated to modify Bruning’s backlight such that a user could adjust the color temperature or color point of the backlight, based on the express teachings of Lee. Specifically, a POSITA would have been motivated to modify Bruning to provide user selection of Bruning’s color-specific switches (Q₃, Q₄, and Q₅) that control the light output of their respective colored circuits. EX1002, ¶241.

Lee explains that “[l]ight from a plurality of light emitting diodes (LEDs) of different colors (e.g., red, green and blue)” can be used to “create a light source of predetermined spectral balance (e.g., a ‘white’ light source)” and that “[a]t times, a user may wish to set the color point of an LED light source—especially in applications such as liquid crystal display (LCD) backlighting.” EX1031, [0001].

Lee discloses that the user selects the color point of the display via an interface, including “buttons or sliders.” *Id.*, [0024].

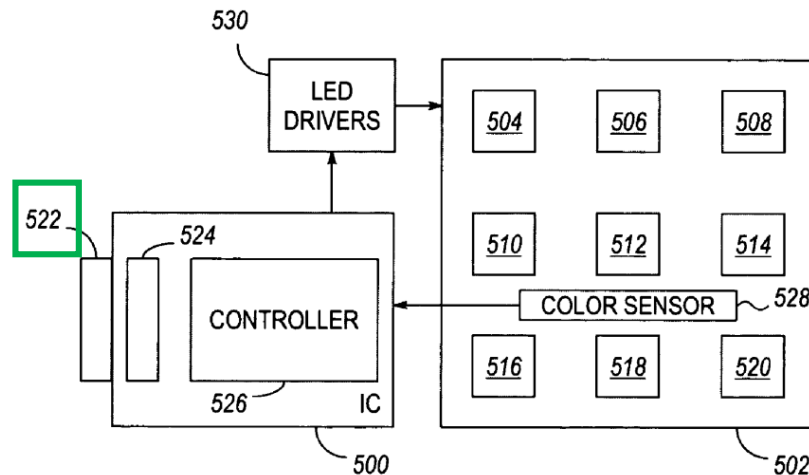


FIG. 5

Id., Fig. 5. EX1002, ¶242.

A POSITA would have recognized Lee’s teaching regarding a user’s desire to “set the color point of an LED light source—especially in applications such as liquid crystal display (LCD) backlighting” to be readily applicable to Bruning, especially in light of the disclosed systems’ similarities. EX1031, [0001]; EX1002, ¶243.

For example, both references disclose a backlight for an LCD. See Section VIII.C (Bruning discloses backlight for an LCD); EX1031, [0001] (“liquid crystal display (LCD) backlighting”), [0023] (“LED light source could take various forms, such as that of a display backlight”); EX1002, ¶244.

Both references rely on the mixing of red, green, and blue light to form different shades and hues of light as perceived by the user. See Section VIII.C (Bruning discloses mixing different colors); EX1031, [0001] (“Light from a plurality of light emitting diodes (LEDs) of different colors (e.g., red, green and blue) has been used to create a light source of predetermined spectral balance (e.g., a ‘white’ light source).”), [0002], [0017]-[0018], [0023], [0028]; EX1002, ¶245.

Both references also disclose pulse-width modulation of the different colored LEDs in order to generate specific color points. EX1004, [0011], [0023] (“pulse modulated light output”), [0025]-[0026], [0030], [0043] (“pulse amplitude modulation of light output of red LED 230”), claims 21-22 (“pulse width modulation of the current input to the LEDs in the sub-arrays”), Fig. 5; EX1031, (57) (“pulse width modulated signals”), [0002]-[0004], [0015], [0018]-[0020], [0022], [0026], [0028]; EX1002, ¶246.

Moreover, as previously discussed, Bruning expressly contemplates selection of the backlight’s color temperature or color point, but does not *expressly* disclose a switch that the user physically moves in order to adjust the color temperature or color point of the backlight. See Section VIII.C. Thus, it would have been obvious to a POSITA to modify Bruning to allow a user to adjust the color balance or color temperature of the display, in light of Lee. EX1002, ¶247.

Finally, a POSITA would have found that Bruning and Lee's teachings could have been predictably combined at least because of lighting art's predictability and the various elements' known interchangeability. Additionally, a POSITA would have had a reasonable expectation of success in combining Bruning and Lee at least because the references use known variations of existing technology (physical switches like buttons and slider switches as user interfaces) to solve routine and well understood problems (adjust settings of a laptop's display, such as color balance) in predictable ways. Notably, Bruning already contemplates a user input (panel light setting) to a controller for controlling switch Q₁, showing that adding such a user input is within the skill of a POSITA. EX1004, [0038], Fig. 4. The controllers of Bruning's color-specific switches would be reprogrammed to accept manual input from Lee's button or slider, either in addition to or in alternative to the optional algorithms taught by Bruning. In either case, the combination would have been predictable matter of simply programming and well within the skill of a POSITA. EX1002, ¶248.

D. Analysis

1. Claim 1

a. 1.pre: An LED lighting system comprising:

See Ground 2, 15.pre.

- b. 1.a: a first operating LED circuit and at least one additional LED circuit,**

See Ground 2, 15.a.

- c. 1.b: at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel, and**

See Ground 3, 1.b.

- d. 1.c: the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;**

See Ground 2, 15.b.

- e. 1.d: a switch capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off,**

See Ground 2, 15.c.

In the combination, the color-specific switches of Bruning are the switch.

Alternatively, the combination of the color-specific switches of Bruning, the controllers, and the slider of Lee together are the switch. EX1002, ¶¶253-54.

- f. 1.e: wherein (a) or (b) is selectable by a user switching the switch; and**

See Ground 2, 15.d (Bruning).

Lee discloses the backlight's color point or color temperature is selectable by a user. EX1031, [0001] ("a user may wish to set the color point of an LED light

source—especially in applications such as liquid crystal display (LCD) backlighting”), [0002]-[0004] (“user-selected color point”), [0007]-[0009] (“setting the color point of an LED light source”), [0010]-[0022] (methods for setting the color point), [0023]-[0028] (apparatus for setting the color point), Figs. 1-5. For example, Lee discloses that a user can adjust the color temperature or color point of the backlight of a laptop’s LCD display using a slider. EX1031, [0024].

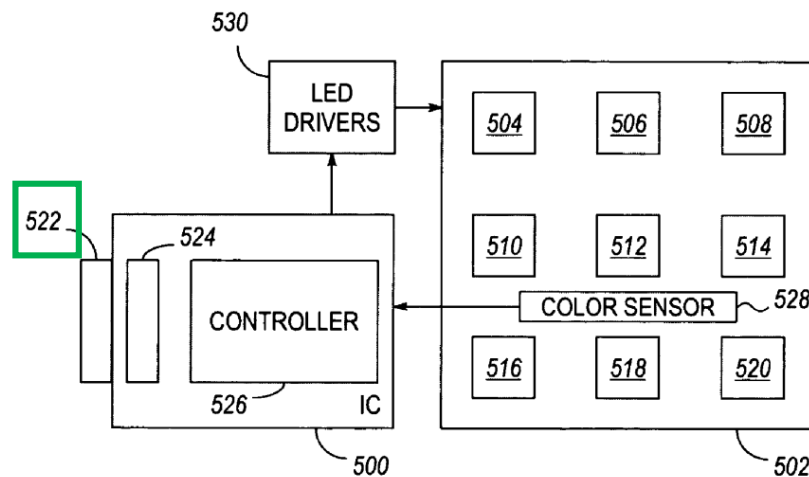


FIG. 5

Id., Fig. 5. EX1002, ¶¶255-56. It would have been obvious to modify Bruning’s controllers to allow user selection (e.g., via a slider) as taught by Lee. See Section XI.C (Combination Rationale); EX1002, ¶257.

In the combination, the color-specific switches of Bruning are the switch, and they are indirectly selectable by the user via the slider of Lee and the controllers. Alternatively, the combination of the color-specific switches of

Bruning, the controllers, and the slider of Lee together are the switch, which is directly selected by the user. EX1002, ¶258.

- g. 1.f: an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,**

See Ground 2, 15.e.

- h. 1.g: wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See Ground 2, 15.f.

- 2. Claim 2: The LED lighting system of claim 1, wherein the switch has at least two positions.**

In the combination, the switch includes the slider of Lee. A slider explicitly discloses at least two positions, as the user will slide the slider between multiple positions. *See* claim 1; EX1002, ¶261.

- 3. Claim 3: The LED lighting system of claim 1, wherein the switching of the switch provides at least two different DC forward voltages to at least one of the first operating LED circuit or the at least one additional LED circuit.**

See Ground 2, claim 17.

- 4. Claim 5: The LED lighting system of claim 1, wherein the switching of the switch changes light output of the LED lighting device.**

See Ground 2, claim 19.

5. **Claim 7: The LED lighting system of claim 1, further comprising a driver electrically coupled to the switch and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See 1.f, 1.g (showing three instances of a driver electrically coupled to a color-specific switch via a top line and to at least one LED circuit via a bottom line); EX1002, ¶264.

6. **Claim 8**

- a. **8.pre: An LED lighting system comprising:**

See 1.pre.

- b. **8.a: a first operating LED circuit and at least one additional LED circuit,**

See 1.a.

- c. **8.b: at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel, and**

See 1.b.

- d. **8.c: the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;**

See 1.c.

- e. **8.d: a switch capable of at least one of: (a) switching a brightness level of at least one of the first operating LED circuit or the at least one additional LED circuit,**

or (b) switching the at least one additional LED circuit on or off,

See 1.d. (showing it would have been obvious to combine Bruning from Ground 2, 15.c and Lee); Ground 3, 8.d (brightness); Ground 2, 15.c(b) (switching on and off).

- f. 8.e: wherein (a) or (b) is selectable by a user switching the switch; and**

See 1.e.

- g. 8.f: an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,**

See 1.f.

- h. 8.g: wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See 1.g.

7. Claim 9.

See claims 2 and 8.

8. Claim 10.

See claims 3 and 8.

9. Claim 12.

See claims 5 and 8.

10. Claim 14.

See claims 7 and 8.

11. Claim 15

- a. 15.pre: An LED lighting system comprising:**

See 1.pre.

- b. 15.a: a first operating LED circuit and at least one additional LED circuit,**

See 1.a.

- c. 15.b: the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit;**

See 1.c.

- d. 15.c: a switch capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off,**

See 1.d.

- e. 15.d: wherein (a) or (b) is selectable by switching the switch; and**

See 1.e.; Ground 2, 15.d.

- f. 15.e: an LED driver including an input configured to connect to an AC voltage power source, the LED driver configured to provide a DC voltage output to at least one of the first operating LED circuit or the at least one additional LED circuit,**

See 1.f.

- g. **15.f: wherein the switch is electrically connected between the DC voltage output and at least one of the first operating LED circuit or the at least one additional LED circuit.**

See 1.g.

12. Claim 16.

See claims 2 and 15.

13. Claim 17.

See claims 3 and 15.

14. Claim 19.

See claims 5 and 15.

XII. CONCLUSION

For the foregoing reasons, Petitioner requests that the Board institute trial and cancel the Challenged Claims.

Dated: January 5, 2023

Respectfully Submitted,

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CERTIFICATION UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Post-Grant* Review totals 18,583, as calculated by Microsoft Word, which is less than the 18,700 allowed under 37 CFR § 42.24(a)(ii).

Dated: January 5, 2023

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(b), the undersigned hereby certifies that a copy of the foregoing Petition for *Post-Grant* Review and all Exhibits was provided to Patent Owner by emailing a copy of same (by agreement) to the following attorneys of record for the Patent Owner:

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