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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/083,070	11/18/2013	Yuequan Hu	1535-2102	1214
158862	7590	12/20/2019	EXAMINER	
MYERS BIGEL, P.A. P.O. BOX 37428 RALEIGH, NC 27627			YESILDAG, LAURA G	
			ART UNIT	PAPER NUMBER
			2844	
			MAIL DATE	DELIVERY MODE
			12/20/2019	PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YUEQUAN HU and LIQIN NI

Appeal 2019-002822
Application 14/083,070
Technology Center 2800

Before MONTÉ T. SQUIRE, AVELYN M. ROSS, and BRIAN D. RANGE,
Administrative Patent Judges.

SQUIRE, *Administrative Patent Judge.*

DECISION ON APPEAL¹

Appellant² appeals under 35 U.S.C. § 134(a) from the Examiner’s decision to finally reject claims 1–12 and 21–28, which are all of the claims pending in this application. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ In this Decision, we refer to the Specification filed Nov. 18, 2013 (“Spec.”); Final Office Action dated May 31, 2018 (“Final Act.”); Advisory Action dated Aug. 31, 2018 (“Advisory Act.”); Appeal Brief filed Oct. 30, 2018 (“Appeal Br.”); Examiner’s Answer dated Jan. 2, 2019 (“Ans.”); and Reply Brief filed Feb. 27, 2019 (“Reply Br.”).

² We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies Cree, Inc. as the real party in interest. Appeal Br. 1.

CLAIMED SUBJECT MATTER

Appellant's disclosure relates to light emitting diode (LED) driver systems and more particularly to a current sharing driver for light emitting diodes. Spec. ¶ 1; Abstract. According to the Specification, embodiments of the present disclosure include circuits for balancing the current between two or more strings of LEDs in parallel and may include a plurality of LED strings placed in parallel to form a light output, e.g., as a replacement for a traditional incandescent or florescent light source. Spec. ¶ 4.

Claim 1 illustrates the claimed subject matter on appeal and is reproduced below from the Claims Appendix to the Appeal Brief:

1. A system comprising:
 - a first string of LEDs;
 - a second string of LEDs connected in parallel with the first string of LEDs;
 - a first current control device connected in series with the first string of LEDs;
 - a second current control device connected in series with the second string of LEDs;
 - a ***first voltage measurement device*** coupled to the first string of LEDs and the second string of LEDs, the first voltage measurement device coupled to the first current control device and configured to control the first current control device in response to measurements of the second string of LEDs; and
 - a ***second voltage measurement device*** coupled to the first string of LEDs and the second string of LEDs, the second voltage measurement device coupled to the second current control device and configured to control the second current control device in response to measurements of the first string of LEDs.

Appeal Br. 19 (Appendix A) (key disputed claim language italicized and bolded).

REFERENCES

The Examiner relies on the following prior art references as evidence in rejecting the claims on appeal:

Name	Reference	Date
Kotikalapoodi et al. ("Kotikalapoodi")	US 2008/0054815 A1	Mar. 6, 2008
Lee et al. ("Lee")	US 2012/0268021 A1	Oct. 25, 2012

REJECTION

On appeal, the Examiner maintains (Ans. 3) the following rejection: claims 1–12 and 21–28 rejected under 35 U.S.C. § 103 as being unpatentable over Lee in view of Kotikalapoodi. Final Act. 2–24.

OPINION

The Examiner determines that the combination of Lee and Kotikalapoodi suggests a system satisfying all of the limitations of claim 1 and concludes the combination would have rendered the claim obvious. Final Act. 2–8. Regarding the "first voltage measurement device" and "second voltage measurement device" recitations of claim 1, the Examiner principally relies on Lee for teaching or suggesting those elements of the claim. *Id.* at 3–5. In particular, the Examiner finds that Lee's protective unit 80, which the Examiner contends connects and controls linear regulators 40, corresponds to and falls within the scope of the "voltage measurement device" elements of the claim. *Id.* at 3.

More specifically, the Examiner finds

[t]he protective unit as a whole or any one or more elements (such as the op-amps U1 or U2) in the protective

unit 80 can be used as the voltage measurement device since the protective unit [80] is connected and controlling the linear regulator [40] in Lee.

Id. at 3 (citing Lee, Fig. 3, ¶ 29).

Alternatively, the Examiner finds that Lee’s “detecting resistors **Rs** of the linear resistors **40**” also correspond to and fall within the scope of a “voltage measurement device,” as recited in the claim. *Id.* at 3–4 (citing Lee ¶ 25).

Appellant argues the Examiner’s rejection of claim 1 should be reversed because Lee does not teach or suggest a “first voltage measurement device” and a “second voltage measurement device,” as recited in the claim. Appeal Br. 9–12; Reply Br. 1–8. In particular, Appellant argues the Examiner has failed to establish Lee’s protective unit 80 falls within the scope of a “voltage measure device,” as claimed. *Id.* at 9.

Appellant contends that, contrary to the Examiner’s findings, protective unit 80 does not control the linear regulators 40 in Lee. Appeal Br. 9–10. Rather, the linear regulators 40 are actually controlled by PWM signal 90, and not by protective unit 80, as the Examiner alleges. *Id.* at 9 (citing Lee ¶ 23). Appellant further contends that, in contrast to the claimed first voltage measurement device, for example, which is “configured to control the first current control device in response to measurements of the second string of LEDs,” Lee’s protective unit 80 merely provides short circuit protection, and there is no teaching or suggestion that it controls or can even be configured to control a control device and operate in the manner claimed. *Id.* at 10.

Appellant also argues the Examiner’s rejection should be reversed because the Examiner’s alternative theory that Lee’s linear resistors 40

themselves fall within the scope of the claimed voltage measurement device is erroneous and unsupported by sufficient evidence in the record. *Id.* at 10–11.

The weight of the evidence supports Appellant’s arguments. On the record before us, we are not persuaded the Examiner has established by a preponderance of the evidence that the cited art teaches or suggests a “first voltage measurement device” and a “second voltage measurement device,” as recited in the claim. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992) (holding the examiner bears the initial burden of establishing a prima facie case of obviousness).

In particular, we are not persuaded the portions of Lee the Examiner cites and relies upon in the rejection teach or suggest the “voltage measurement device” elements of the claim. The Examiner’s findings regarding Lee’s protective unit 80 are not persuasive because, as Appellant correctly points out, protective unit 80 does not control the linear regulators 40 and does not function as the claimed voltage measurement device, as the Examiner alleges. Rather, Lee teaches that the linear regulators 40 are actually controlled by PWM signal 90 (Lee ¶ 23 (disclosing “the linear regulators **40** receive a PWM dimming signal 90 for turning on or turning off the MOSFETs **42** of the linear regulators **40** so as to dim control the LED strings **30**”)), and that protective unit 80 provides Lee’s device short circuit protection (*id.* ¶ 31).

Specifically, regarding the operation of protective unit 80, paragraph 31 of Lee discloses

[t]he first switch units Sw1 will conduct while the voltage drop between drain and source of corresponding MOSFET 42 is larger than the threshold limit voltage, and the second

operation amplifier U2 outputs a protective signal so as to cut off the DC power to achieve LED short circuit protection.

Although Figures 1 and 3 of Lee depict that protective unit 80 may be electrically connected to linear regulators 40, there is no teaching or suggestion that protective unit 80 is or corresponds to a “voltage measurement device” configured in the manner claimed.

The Examiner’s alternative theory that Lee’s linear regulators 40 themselves correspond to and fall within the scope of voltage measurement device elements of the claim is equally unpersuasive because the Examiner does not identify sufficient evidence in the record or provide an adequate technical explanation to support it. The fact that paragraph 25 of Lee discusses that the detecting resistors R_s of the linear regulators 40 may be operated in feedback controlling mode, without more, does not necessarily teach or suggest that the described linear regulators 40 are considered and can be operated as voltage measurement devices configured in the manner claimed, and the Examiner does not provide technical reasoning sufficient to support such a finding. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (requiring “reasoning with some rational underpinning to support the legal conclusion of obviousness”) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

Moreover, in the Answer, the Examiner does not provide any persuasive findings or discussion regarding the technical feasibility of modifying Lee’s protective unit 80 or the linear regulators 40 to operate as voltage measurement devices configured in the manner claimed; the impact that would have on the operation of the Lee’s circuit; or why one of ordinary skill in the art would have had a reasonable expectation of success in making

such modification. For example, the Examiner provides no discussion regarding what impact such a modification would have on the operation and capability of Lee’s circuit to achieve the objective of current-sharing control of the multi-channel LED driving circuit, which is a feature that Lee teaches is desired (Lee ¶¶ 5–7). *See also Belden Inc. v. Berk–Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”).

Thus, for principally the same reasons provided by Appellant at pages 9–12 of the Appeal Brief and pages 1–8 of the Reply Brief, we are not persuaded the Examiner has established by a preponderance of the evidence that either the protective unit 80 or the linear regulators 40 disclosed by Lee falls within the scope of a “first voltage measurement device” and a “second voltage measurement device,” as recited in the claim.

We, therefore, do not sustain the Examiner’s rejection of claim 1 and determination that it would have been obvious to combine the teachings of Lee and Kotikalapoodi to arrive at the claimed subject matter.

Because claims 1–12 depend from claim 1, we also do not sustain the Examiner’s rejection of these claims. Because claims 21 and 22 recite the same “voltage measurement device” limitation as claim 1 and claims 23–28 recite a similar limitation, we also do not sustain the Examiner’s rejection of those claims.

Accordingly, we reverse the Examiner’s rejection of claims 1–12 and 21–28 under 35 U.S.C. § 103 as obvious over the combination of Lee and Kotikalapoodi.

CONCLUSION

In summary:

Claim(s) Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1-12, 21-28	103	Lee, Kotikalapoodi		1-12, 21-28

REVERSED