

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SATCO PRODUCTS, INC.,
Petitioner,

v.

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA,
Patent Owner.

IPR2020-00695
Patent 9,240,529 B2

Before JENNIFER S. BISK, CHRISTOPHER L. CRUMBLY, and
STEVEN M. AMUNDSON, *Administrative Patent Judges*.

BISK, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Satco Products, Inc. (“Petitioner”), filed a Petition requesting an *inter partes* review of claims 1, 3, 4, 8–10, 12, 13, 15, 16, 20–22, and 24 (“the challenged claims”) of U.S. Patent No. 9,240,529 B2 (Ex. 1001, “the ’529 patent”). Paper 2 (“Pet”). The owner of the ’529 patent, The Regents of the University of California (“Patent Owner”), filed a Preliminary Response. Paper 7 (“Prelim. Resp.”).

We instituted review on September 16, 2020. Paper 8 (“Institution Dec.”). Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 16 (“PO Resp.”)), Petitioner filed a Reply (Paper 21 (“Reply”)), and Patent Owner filed a Sur-Reply (Paper 28 (“Sur-Reply”)). A transcript of the oral hearing held on June 14, 2021, has been entered into the record as Paper 36 (“Tr.”).

This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). For the reasons that follow, Petitioner has demonstrated by a preponderance of the evidence that the challenged claims are unpatentable.

II. BACKGROUND

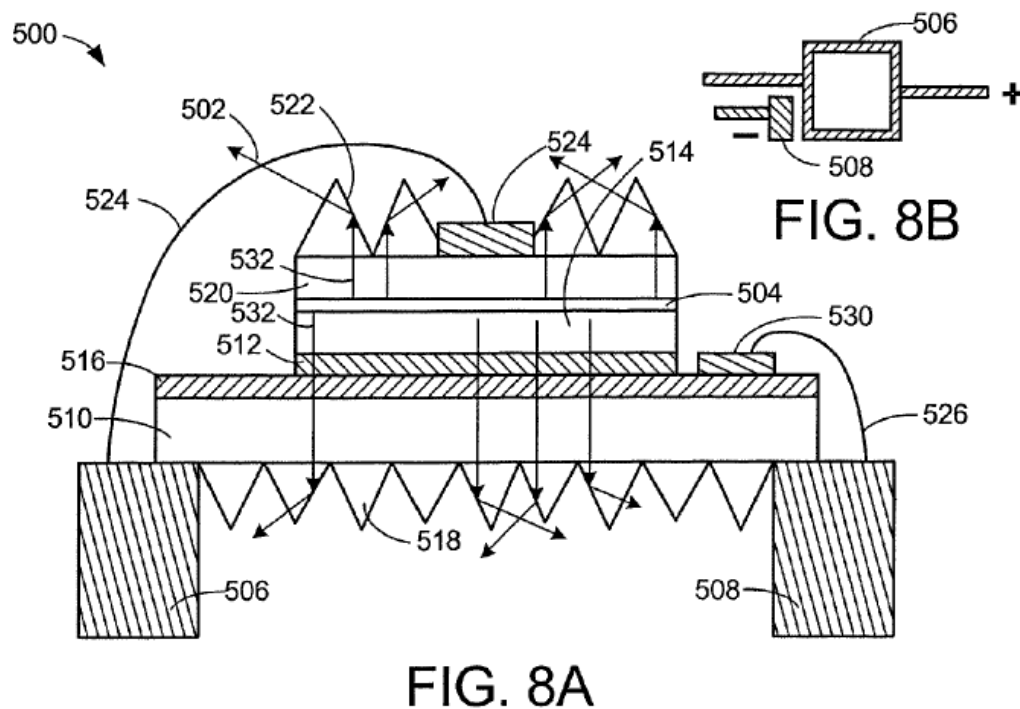
A. Related Matters

The parties identify several related district court cases, including *Satco Products, Inc. v. The Regents of the University of California*, 2:19-cv-06444, in the Eastern District of New York (“the Satco Litigation”). Pet. 1–2; Paper 4, 2–3. In the Satco Litigation, Petitioner filed a complaint seeking a declaratory judgment of non-infringement. Pet. 4. In addition, there are several other pending petitions for IPR challenging patents related to the ’529 patent, including IPR2020-00579, IPR2020-00780, IPR2020-00813, IPR2021-00661, IPR2021-00662, and IPR2021-00794.

B. The '529 Patent

The '529 patent relates to “LED Light Extraction and white LED with high luminous efficacy for optoelectronic applications, and, more specifically, relates to a textured phosphor conversion layer LED.” Ex. 1001, 5:4–7. In particular, the '529 patent discloses that “[i]n conventional white LEDs, the phosphor conversion layer is typically placed directly on top of the blue GaN chip.” *Id.* at 5:14–15. Because photons are converted to lower energy photons in that phosphor layer, a large fraction of them are internally reflected and reabsorbed by the chip. *Id.* at 5:17–22. This is inefficient. *Id.* To increase efficiency of the LED, the '529 patent “minimizes the internal reflection of the phosphor layer by preferential patterning the emitting surface to direct more light away from the absorbing chip structure.” *Id.* at 5:42–45.

Figures 8A and 8B of the '529 patent are reproduced below.



Figures 8A and 8B of the '529 patent “illustrate the dual-sided roughened phosphor layer of the present invention.” *Id.* at 7:21–23. LED chip 500 contains glass plate 510, which is coated with Indium Tin Oxide (ITO) layer 516, which, in turn, is attached to deposited ITO layer 512 using epoxy as a glue. *Id.* at 10:14–18. “LED chip 500 is put on a lead frame 506” and wire bonding 524 and 526 connect bonding pads of LED chip 528 and 530 and lead frame 506 and electrode 508 “to allow an electric current to flow through the lead frame 506.” *Id.* at 10:25–30. Lead frame 506 “acts as a support around the edges of LED chip 500.” *Id.* at 10:32–36.

C. The Challenged Claims

Petitioner challenges claims 1, 3, 4, 8–10, 12, 13, 15, 16, 20–22, and 24 of the '529 patent. Claims 1 and 13 are independent. Claim 1 is reproduced below:

1. A light emitting device, comprising:
 - an LED chip emitting light at a first wavelength, wherein the emitted light is extracted from both front and back sides of the LED chip;
 - a lead frame to which the LED chip is attached, wherein the LED chip resides on or above a transparent plate in the lead frame that allows the emitted light to be extracted out of the LED chip through the transparent plate in the lead frame; and
 - a phosphor for converting the light emitted by the LED chip at the first wavelength to a second wavelength.

Ex. 1001, 21:62–22:5.

Claim 13 is substantively similar to claim 1, but recites a method. To the extent our analysis herein focuses on claim 1, it should be understood to apply equally to claim 13. Claims 3, 4, 8–10, and 12 depend from claim 1, and claims 15, 16, 20–22, and 24 depend from claim 13.

D. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §¹	Reference(s)/Basis
1, 3, 4, 8, 12, 13, 15, 16, 20, 24	103(a)	Okamoto, ² Shimizu ³
9, 10, 21, 22	103(a)	Okamoto, Shimizu, Lester-085 ^{4,5}
9, 10, 21, 22	103(a)	Okamoto, Shimizu, Tadatomo ⁶

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), included revisions to 35 U.S.C. § 102 and § 103 that became effective on March 16, 2013. Because the ’529 patent issued from an application that was a continuation of an application filed before March 16, 2013, we apply the pre-AIA version of the statutory basis for unpatentability.

²Japan Patent App. Pub. No. 2000/277808A, published Oct. 6, 2000 (Ex. 1008) (certified English translation). The original Japanese-language document is in the record as Exhibit 1009. Citations herein are to the English translation, the accuracy of which has not been challenged at this stage of the proceedings.

³ U.S. Patent No. 5,998,925 (issued Dec. 7, 1999). Ex. 1017.

⁴ U.S. Patent No. 6,091,085 (issued July 18, 2000). Ex. 1019.

⁵ Petitioner refers to this ground as Okamoto, Shimizu, Lester-085, “and/or Tadatomo.” Pet. 5, 56. However, the analysis provided by Petitioner only addresses the combinations of Okamoto, Shimizu, and Lester-085 or Okamoto, Shimizu, and Tadatomo and does not address a combination of Okamoto, Shimizu, Lester-085 and Tadatomo. Pet. 56–60.

⁶ Tadatomo, K. et al. “High Output Power Near-Ultraviolet and Violet Light-Emitting Diodes Fabricated on Patterned Sapphire Substrates Using Metalorganic Vapor Phase Epitaxy,” Proceedings of SPIE – the International Society for Optical Engineering, vol. 5187, Third International Conference on Solid State Lighting, (26 January 2004): 243-249. Bellingham, WA: SPIE, c2004. Ex. 1020.

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