

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SATCO PRODUCTS, INC.,  
Petitioner,

v.

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA,  
Patent Owner.

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IPR2020-00780  
Patent 10,217,916 B2

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

CRUMBLEY, *Administrative Patent Judge*.

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

## I. INTRODUCTION

Satco Products, Inc., filed a Petition requesting an *inter partes* review of claims 1, 5, 6, 7, 9, 13, 14, 18, 19, 20, 22, and 26 (“the challenged claims”) of U.S. Patent No. 10,217,916 B2 (Ex. 1001, “the ’916 patent”). Paper 3 (“Pet”). The owner of the ’916 patent, The Regents of the University of California, filed a Preliminary Response. Paper 9 (“Prelim. Resp.”).

We instituted review on October 13, 2020. Paper 10 (“Institution Dec.”). Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 19 (“PO Resp.”)), Petitioner filed a Reply (Paper 27 (“Reply”)), and Patent Owner filed a Sur-Reply (Paper 29 (“Sur-Reply”)). A transcript of the oral hearing held on September 8, 2021, has been entered into the record as Paper 41 (“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*

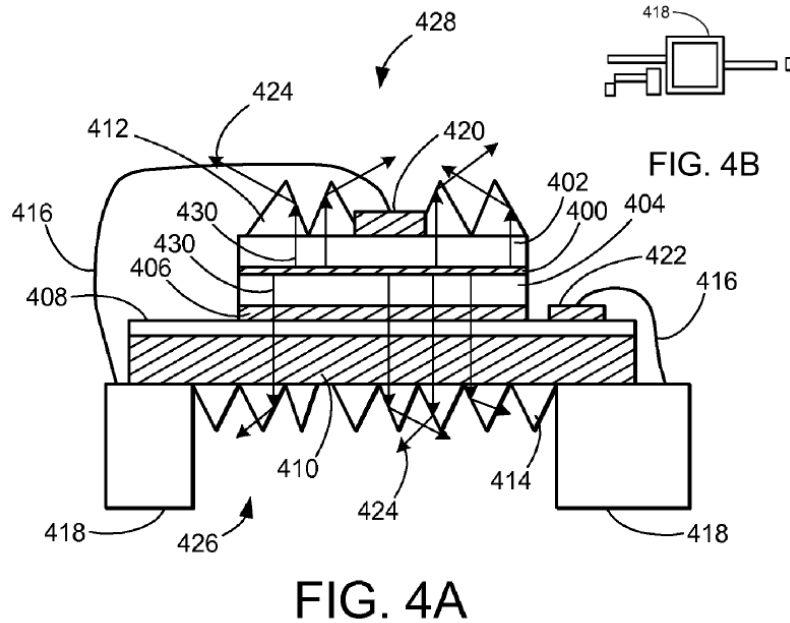
The parties identify several related district court cases, including *Satco Products, Inc. v. The Regents of the University of California*, 2:19-cv-06444, in the Eastern District of New York (“the Satco Litigation”). Pet. 1–2; Paper 3, 2–3. In the Satco Litigation, Petitioner filed a complaint seeking a declaratory judgment of non-infringement. Pet. 4. In addition, there are several other pending petitions for IPRs challenging patents related to the ’916 patent, including IPR2020-00579, IPR2020-00695, IPR2020-00813, IPR2021-00661, IPR2021-00662, and IPR2021-00794. Some of these

related patents are also at issue in a proceeding before the International Trade Commission (ITC), *In the Matter of Certain Filament Light-Emitting Diodes and Products Containing Same (II)*, Inv. No. 337-TA-1220.

*B. The '916 Patent*

The '916 patent, entitled “Transparent Light Emitting Diodes,” describes a light emitting diode (LED) that is “comprised of a plurality of III-nitride layers, including an active region that emits light, wherein all of the layers except for the active region are transparent for an emission wavelength of the light.” Ex. 1001, 8:11–15. In particular, the '916 patent discloses that “[i]n conventional LEDs, in order to increase the light output power from the front side of the LED, the emitting light is reflected by the mirror on the backside of the sapphire substrate or the mirror coating on the lead frame.” *Id.* at 10:20–24. Because the energy of the photons in the emitted light is close to the band-gap energy of the emitting layer of the LED, reflected light may be re-absorbed by the emitting layer. *Id.* at 10:26–29. This reduces the efficiency and output power of the LED. *Id.* at 10:29–31. To increase efficiency of the LED, the '916 patent minimizes internal reflections within the LED by eliminating mirrors and/or mirrored surfaces, “in order to minimize re-absorption of the light by the active region.” *Id.* at 8:38–48. To achieve this, all layers of the LED, except the emitting layer, may be transparent for the emission wavelength of the LED. *Id.* at 11:6–15.

Figures 4A and 4B of the '916 patent are reproduced below:



Figures 4A and 4B of the '916 patent are schematic illustrations of an LED that emits light from multiple sides of the LED as described in the patent. *Id.* at 9:3–5. The LED chip comprises emitting layer 400, n-type GaN layer 402, p-type GaN layer 404, and glass plate 410. *Id.* at 11:18–21. “The LED is wire bonded 416 to a lead frame 418 via bonding pads 420, 422.” *Id.* at 11:25–27. Because lead frame 418 “supports the LED at the edges of the glass 410 leaving the emitting surface of the glass 410 and LED unobstructed,” the '916 patent states that the LED “is designed to effectively extract light 424 from both sides of the LED, because the frame 418 does not obstruct the surfaces 412 and 414, i.e., the back side 426 of the LED as well as the front side 428 of the LED.” *Id.* at 11:36–43.

*C. The Challenged Claims*

Claim 1 exemplifies the challenged claims and reads as follows:

1. A light emitting device, comprising:

a lead frame having a transparent plate therein; and

a light emitting diode (LED) chip, mounted on the lead frame and placed on or above the transparent plate in the lead frame, emitting light through at least front and back sides of the LED chip;

wherein the transparent plate in the lead frame allows the light emitted from the LED chip to be extracted out of the LED chip from the front or back sides of the LED chip and through the transparent plate in the lead frame.

Ex. 1001, 20:54–63.

Claim 14 is substantively similar to claim 1, but claims a method of making the light emitting device of claim 1. To the extent our analysis herein focuses on claim 1, it should be understood to apply equally to claim 14. The parties do not provide separate analyses for the device and method claims.

Claims 5, 6, 7, 9, and 13 depend directly or indirectly from claim 1, while claims 18, 19, 20, 22, and 26 depend directly or indirectly from claim 14. The additional limitations of the dependent claims are mirrored across each set (i.e., the additional limitations of claims 5 and 18 are the same, claims 6 and 19 are the same, etc.).

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