

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN RONGLIDA TECHNOLOGY CO. LTD.

Petitioner,

v.

PATHWAY IP LLC

Patent Owner.

U.S. Patent No. 7,841,729

Case No. IPR2025-01231

PATENT OWNER'S RESPONSE

UNDER 35 U.S.C. § 42.107

April 10, 2026

TABLE OF CONTENTS

I. INTRODUCTION	1
II. OVERVIEW OF THE '729 PATENT	2
III. CLAIM CONSTRUCTION.....	3
IV. LEVEL OF ORDINARY SKILL IN THE ART	4
V. GROUND 1A: CLAIMS 1–6 ARE PATENTABLE OVER NAGHI AND DINE	4
A. The Record Confirms Petitioner Argued Substitution, Not Shape Modification.....	4
A.1. The Petition Argued Substitution	6
A.2. The Pattison Declaration Confirmed Substitution.....	11
B. Neither the Petition nor the Pattison Declaration Supports the Board’s Shape-Modification Reading	16
B.1. The Board Misread the Petition	17
B.2. The Board Misread the Pattison Declaration.....	18
C. The Naghi-Dine Combination Fails Under Petitioner’s Substitution Theory	23
C.1. Naghi’s Low-Voltage DC Power System and Dine’s High-Voltage Flash Gun Are Categorically Incompatible.....	23
C.2. Dine’s Flash Operation Is Incompatible with Continuous Webcam Illumination.....	25
C.3. A POSITA Reading Naghi Would Have No Motivation to Incorporate Dine-Type Technology.....	27
C.4. Dine’s Shadow-Free Illumination Depends on Concentric Lens Mounting That Is Unavailable in Naghi.....	30
C.5. Petitioner’s Stated Motivation Contradicts Itself	32
D. Even Under the Board’s Alternative Reading, the Combination Fails	33
D.1. Naghi’s Own Disclosure Already Provides a Path to the Stated Goal Without Any Modification	34
D.2. The Board’s “Naturally, Some Adaptation” Finding Has No Evidentiary Foundation	38

D.3. Petitioner Has Not Shown the Adapted Device Would Preserve Naghi’s Core Characteristics	41
D.4. Petitioner Has Not Identified a Toroidal LED in This Record, and No Reference Teaches How to Make One	43
D.5. Petitioner Bears the Burden; Patent Owner Need Not Rebut a Theory Petitioner Never Argued.....	44
E. Claims 2–6 Are Patentable for the Same Reasons as Claim 1.....	46
VI. GROUND 1B: CLAIM 7 IS PATENTABLE OVER NAGHI, DINE, AND CHENG	46
VII. GROUND 1C: CLAIMS 8 AND 9 ARE PATENTABLE OVER NAGHI, DINE, AND COOK	47
VIII. GROUND 2A: CLAIMS 1–7 ARE PATENTABLE OVER NELSON AND LUO.....	47
IX. GROUNDS 2B AND 2C: CLAIMS 8 AND 9 ARE PATENTABLE OVER NELSON, LUO, AND COOK.....	49
X. GROUND 3A: CLAIMS 1–4 AND 7 ARE PATENTABLE OVER CHENG AND MASAYUKI	50
XI. GROUNDS 3B AND 3C: CLAIMS 5, 6, 8, AND 9 ARE PATENTABLE OVER CHENG, MASAYUKI, AND NELSON OR COOK.....	51
XII. GROUND 4A: CLAIMS 10–13 ARE PATENTABLE OVER DU BREUIL AND DINE	52
XIII. RPI.....	55
XIV. CONCLUSION.....	55
Word Count Certification.....	57
Certificate of Service	58

TABLE OF AUTHORITIES

Cases

<i>DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.</i> , 567 F.3d 1314 (Fed. Cir. 2009)	35
<i>Elekta Ltd. v. ZAP Surgical Sys., Inc.</i> , 81 F.4th 1368 (Fed. Cir. 2023).....	35, 42
<i>In re Fine</i> , 837 F.2d 1071 (Fed. Cir. 1988)	passim
<i>In re Keller</i> , 642 F.2d 413 (CCPA 1981)	34
<i>In re Magnum Oil Tools Int’l, Ltd.</i> , 829 F.3d 1364 (Fed. Cir. 2016)	passim
<i>In re Nievelt</i> , 482 F.2d 965 (CCPA 1973)	34
<i>In re NuVasive, Inc.</i> , 841 F.3d 966 (Fed. Cir. 2016)	20, 47
<i>In re Sneed</i> , 710 F.2d 1544 (Fed. Cir. 1983)	34
<i>Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.</i> , 821 F.3d 1359 (Fed. Cir. 2016)	42, 44, 46, 47
<i>Koninklijke Philips N.V. v. Google LLC</i> , 948 F.3d 1330 (Fed. Cir. 2020).....	40
<i>KSR Int’l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007)	passim
<i>Lear Siegler, Inc. v. Aeroquip Corp.</i> , 733 F.2d 881 (Fed. Cir. 1984)	34
<i>Netflix, Inc. v. DivX, LLC</i> , 84 F.4th 1371 (Fed. Cir. 2023)	20
<i>Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.</i> , 520 F.3d 1358 (Fed. Cir. 2008).....	54
<i>SAS Institute Inc. v. Iancu</i> , 138 S. Ct. 1348 (2018)	5
<i>Worlds Inc. v. Bungie, Inc.</i> , 903 F.3d 1237 (Fed. Cir. 2018).....	55

Statutes and Rules

35 U.S.C. § 103	passim
37 C.F.R. § 42.23(b)	47
37 C.F.R. § 42.108(a).....	5

Other Authorities

MPEP § 2143.01.V	16
------------------------	----

PATENT OWNER'S EXHIBIT LIST

Exhibit 2001: Notification of Affiliates (Doc. 159), filed in Pathway IP LLC v. The Individuals et al., 24-cv-5218 (N.D. Ill. 9/10/2024)

Exhibit 2002: First Amended Complaint (Doc. 85, with Schedule A and Exhibits 1-6 (Docs. 85-1, 85-2, 85-3, 85-4, 85-5, 85-6, 85-7) filed in Pathway IP LLC v. The Individuals et al., 24-cv-5218 (N.D. Ill. 8/12/2024)

Exhibit 2003: Defendants IPHOTOXX, LIXINSHUNYI, PHOTO GUARD, RUIHOTOR, CATCHPICCUS, HIFOCUSIUS, QIHUICHANG, SHIQIAOSHANG, VIVIDNWUS, XINGBOOM, XUANXIUUS, JINSNOW, and SHUTTERLIGHT Answers and Affirmative Defenses to First Amended Complaint (Doc. 117) filed in Pathway IP LLC v. The Individuals et al., 24-cv-5218 (N.D. Ill. 8/26/2024)

Exhibit 2004: Minute Entry (Doc. 113), filed in Pathway IP LLC v. The Individuals et al., 24-cv-5218 (N.D. Ill. 8/21/2024)

Exhibit 2005: Documents produced as NGD000132, NGD000137, NGD000142, NGD000146, NGD000152, and NGD000186 in Pathway IP LLC v. The Individuals et al., 24-cv-5218 (N.D. Ill.)

Exhibit 2006: Document produced as NGD000189 in Pathway IP LLC v. The Individuals et al., 24-cv-5218 (N.D. Ill.)

Exhibit 2007: Defendants' Supplemental Responses to Plaintiff's First Set of Requests for Production in Pathway IP LLC v. The Individuals et al., 24-cv-5218 (N.D. Ill.)

Exhibit 2008: U.S. TM Serial No. 79269469

Exhibit 2009: U.S. TM Serial No. 98304743

Exhibit 2010: U.S. TM Serial No. 98249311

Exhibit 2011: U.S. TM Serial No. 79082534

Exhibit 2012: U.S. TM Serial No. 79141410

Exhibit 2013: U.S. TM Serial No. 79214020
Exhibit 2014: U.S. TM Serial No. 79243553
Exhibit 2015: U.S. TM Serial No. 79301558
Exhibit 2016: U.S. TM Serial No. 85946985
Exhibit 2017: U.S. TM Serial No. 97245221
Exhibit 2018: U.S. TM Serial No. 98422419
Exhibit 2019: U.S. TM Serial No. 98553808
Exhibit 2020: U.S. TM Serial No. 98554952
Exhibit 2021: U.S. TM Serial No. 98958307
Exhibit 2022: U.S. TM Serial No. 98958334
Exhibit 2023: U.S. Pat. No. D887,590
Exhibit 2024: U.S. Pat. No. D929,007
Exhibit 2025: U.S. Pat. No. D956,129
Exhibit 2026: U.S. Pat. No. D983,862
Exhibit 2027: U.S. Pat. No. D979,633
Exhibit 2028: Declaration of Allen Justin Poplin
Exhibit 2029: Complaint (Doc. 9, with Exhibit H-5 (Doc. 9-21)) filed in
SHENZHEN NEEWER TECHNOLOGY CO., LTD. v. ALLISMAN
(SHENZHEN) TECHNOLOGY CO., LTD. and SHENZHEN MAITEWEI
INVESTMENT AND DEVELOPMENT CO., LTD., 1:20-cv-09446-KPF
(S.D. NY 11/12/2020)
Exhibit 2030: Reexam Request in Control No. 90/019,924 (4/22/2025)
Exhibit 2031: Proposed ground of unpatentability in Control No. 90/019,924
(4/22/2025)
Exhibit 2032: Grant of Reexam Request in Control No. 90/019,924 (5/20/2025)
Exhibit 2033: Office Action in Control No. 90/019,924 (8/25/2025)
Exhibit 2034: Grounds of rejection in Control No. 90/019,924 (8/25/2025)

Exhibit 2035: Additional references discussed in Control No. 90/019,924
(8/25/2025)

Exhibit 2036: Declaration of Eric Bretschneider, Ph.D.

Exhibit 2037: Supplemental Declaration of Eric Bretschneider, Ph.D.

Exhibit 2038: Gerald Millerson, *Lighting for Television and Film* (3d ed. 1991),
pp. 72-80.

Exhibit 2037: Declaration of Justin Poplin

Exhibit 2038: Supplemental Declaration of Eric Bretschneider, Ph.D.

Exhibit 2039: Gerald Millerson, *Lighting for Television and Film* (3d ed. 1991),
pp. 72-80.

I. INTRODUCTION

Patent Owner Pathway IP LLC submits this Patent Owner Response to the Petition for *Inter Partes* Review of claims 1–13 of U.S. Patent No. 7,841,729 (“the ‘729 Patent”). Patent Owner respectfully requests that the Board confirm the patentability of all challenged claims.

The Board substantively evaluated Ground 1A and found that “Petitioner has shown, sufficiently and persuasively at this stage, that the Naghi and Dine combination teaches or suggests all the limitations of claim 1.” Inst. Dec. at 29. The Board instituted the remaining grounds pursuant to 37 C.F.R. § 42.108(a) and *SAS Institute Inc. v. Iancu*, 138 S. Ct. 1348 (2018), without substantive analysis of those grounds.

Petitioner challenged independent claim 1 on three Grounds (Grounds 1A, 2A, and 3A), each built on the same theory: substitute the secondary reference’s lighting module for the primary reference’s existing light source. The Board did not evaluate that theory. For Ground 1A, the Board recharacterized Petitioner’s argument *sua sponte*, concluding that Petitioner proposed to keep Naghi’s light source in place and only reshape it into toroidal geometry by borrowing the circular form factor of Dine’s lighting module. Under its reading, the Board held Petitioner met its burden for institution.

Petitioner’s actual substitution theory fails on the merits for the reasons set forth below. The Board’s shape-only theory fails for a separate and threshold reason: the Board may not sustain a ground on a rationale Petitioner never argued. *In re*

Magnum Oil Tools Int'l, Ltd., 829 F.3d 1364, 1380–81 (Fed. Cir. 2016). In any event, the Board’s shape-only theory also fails on the merits. Grounds 1B, 1C, 2B, 3B, and 3C fall with their independent claim bases. Ground 4A fails for independent reasons addressed in Section XII. Patent Owner’s expert Dr. Eric Bretschneider, Ph.D. supports this Response. Ex. 2036 (“Bretschneider Decl.”); Ex. 2037 (“Bretschneider Supp. Decl.”).

II. OVERVIEW OF THE ‘729 PATENT

U.S. Patent No. 7,841,729, titled “Webcam Illuminator Device,” issued November 30, 2010, and claims priority to January 26, 2007. The ‘729 Patent addresses a specific and well-recognized problem: “poor lighting is one of the primary reasons for the poor appearance of facial images” in webcam feeds, and “there is a need to provide proper lighting for users that are viewed through a webcam to ensure that they appear aesthetically pleasing.” ‘729 Patent col. 1, ll. 29–36.

Claims 1 and 10 are independent. Claim 1 is directed to a portable illuminator device comprising a toroidal bulb, a conforming circular reflector, and a flexible arm that allows the bulb to be positioned relative to the webcam. ‘729 Patent claim 1. Claims 2–9 depend from claim 1 and add limitations including a proximate reflector, reflective lining, flexible arm, clamp connection, movable clamp, and fabric diffuser. Independent claim 10 is directed to a different embodiment in which a plurality of bulbs are disposed in the frame of the communication terminal itself,

with one of the bulbs surrounding the webcam. ‘729 Patent claim 10. Claims 11–13 depend from claim 10.

III. CLAIM CONSTRUCTION

Both parties agree that no express claim construction is necessary to adjudicate the merits of this Petition. Pet. at 14–17; Bretschneider Decl. ¶ 51. The Board reached the same conclusion at institution. Inst. Dec. at 14. Petitioner has not shown unpatentability of any of claims 1–13 under any reasonable construction. Bretschneider Decl. ¶ 51. Patent Owner preserves all claim construction positions advanced in the parallel district court litigation.

The Board identified one claim construction issue for Ground 4A: the meaning of “surrounds” in claim 10. Inst. Dec. at 30. Patent Owner submits that “surrounds” requires that one of the plurality of bulbs encircles or encloses the webcam. This construction is compelled by the plain meaning of the word, by the specification’s description of the toroidal bulb surrounding the webcam to cast diffuse light from all directions, and by the prosecution history in which the applicant distinguished Du Breuil precisely on the ground that none of Du Breuil’s bulbs surrounds the webcam. ‘729 Patent col. 2, ll. 20–23; col. 3, ll. 50–55; Ex. 1002 at 66. Under this construction, Du Breuil does not teach claim 10 for the reasons set forth in Section XII below.

IV. LEVEL OF ORDINARY SKILL IN THE ART

A POSITA would have at least a bachelor's degree in electrical engineering, optical engineering, or a related field, two years of practical experience designing and developing lighting systems integrated with electronic devices such as webcams or computer monitors, and knowledge of user-interface considerations for consumer electronics. Bretschneider Decl. ¶ 48. The Board's definition at institution is consistent with this. Inst. Dec. at 13.

V. GROUND 1A: CLAIMS 1–6 ARE PATENTABLE OVER NAGHI AND DINE

A. The Record Confirms Petitioner Argued Substitution, Not Shape Modification

Petitioner challenges claims 1–6 as obvious over Naghi and Dine. Pet. at 17. Naghi discloses a portable LED reading light with a bendable arm that clamps to a laptop computer. Naghi col. 7, ll. 18–37. Claim 1 of the '729 Patent requires “an arm disposed between said bulb and the terminal for connection to the terminal.” '729 Patent claim 1. Petitioner argues Naghi meets that limitation. Pet. at 22. Claim 1 also requires “a bulb having a toroidal shape for emitting light” and “a reflector having a circular configuration to conform to the toroidal shape of said bulb....” '729 Patent claim 1. Naghi discloses neither.

To meet the toroidal bulb and circular reflector limitations, Petitioner relied on Dine, a 1952 gaseous discharge flash unit for film photography comprising “a gaseous discharge tube 10 of glass or quartz within which is sealed a suitably

ionizable gas, such as xenon, krypton or the like....” Dine col. 2, ll. 8–16. Petitioner’s theory was explicit substitution: “the use of Dine’s lighting module in place of Naghi’s existing light source 124/124a-e would have amounted to a simple substitution of one element for another known in the field....” Pet. at 22. Petitioner’s expert Dr. Pattison concurred: “Substituting Naghi’s light source (124e) with Dine’s toroidal shaped bulb would have been an obvious substitution of one known illumination means for another....” Pattison Decl. ¶ 63.

The Board did not evaluate Petitioner’s substitution theory. Inst. Dec. at 26–27. Instead, the Board recharacterized Petitioner’s argument *sua sponte*, concluding that Petitioner proposed only to “substitute Dine’s bulb *shape*, not bulb type,” leaving Naghi’s LED in place and reshaping Naghi’s LED into toroidal form. Inst. Dec. at 26–27 (emphasis in original). The Board then dismissed Patent Owner’s arguments against the actual substitution theory as “irrelevant” because Patent Owner’s arguments “largely do not address the combination as proposed.” Inst. Dec. at 27. Patent Owner addresses both theories below.

Petitioner’s actual substitution theory fails on multiple grounds, including: power incompatibility, fundamental operating-mode incompatibility between a flash unit and a continuous-illumination webcam device, and the absence of any motivation to combine a 1952 film photography flash lamp with an LED laptop light in the January 2007 timeframe.

The Board’s shape-modification theory fails for separate and distinct reasons. First, Petitioner never advanced that theory and the Board may not sustain a ground on a rationale Petitioner never argued. *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d

1364, 1380–81 (Fed. Cir. 2016). But even if Petitioner had advanced the shape-modification theory, which Petitioner did not, the theory fails on the merits. Petitioner does not rely on any reference that discloses a toroidal LED, and Petitioner has not acknowledged, let alone addressed, the substantial fabrication challenges a POSITA would face in attempting to reshape Naghi’s LED into toroidal geometry. Bretschneider Supp. Decl. ¶¶ 118-119, 126. Moreover, even if modification of Naghi’s LED into toroidal geometry was possible, it would be unnecessary. Petitioner’s stated motivation for the combination is illuminating the webcam user’s face “without casting unflattering shadows.” Pet. at 21; *see* Pattison Decl. ¶ 60. Naghi’s own disclosure already provides a path to that result without any secondary reference or any modification. Naghi discloses a two-source embodiment. Naghi col. 6, ll. 15–20; Fig. 10. A POSITA seeking shadow elimination would simply clip a second Naghi light 800 on the opposing side of the webcam without modifying anything. Bretschneider Supp. Decl. ¶¶ 131–132. *See infra* Section D.1.

A.1. The Petition Argued Substitution

The Petition does not describe modifying or reshaping Naghi’s LED. Instead, the Petition repeatedly frames the proposed combination as replacing Naghi’s light source with Dine’s entire lighting module. For example, the Petition states:

Thus, the use of Dine’s lighting module in place of Naghi’s existing light source 124/124a-e would have amounted to a simple ‘substitution of one element for another known in the field’ to ‘yield a predictable result’

(uniform, shadow-free illumination of the webcam's user's face).

Pet. at 22 quoting *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). This language is explicit. The Petition identifies Naghi's "existing light source" and proposes using "Dine's lighting module in place of" that source. Petitioner's own word for this operation was "substitution." The Petition does not describe adopting a shape while retaining Naghi's LED.

In the same paragraph, the Petition frames the combination in the same module-level terms:

Thus, a POSITA would have been motivated to incorporate Dine's lighting module comprising a toroidal bulb shape and conforming reflector into Naghi's lighting apparatus.

Pet. at 22. The object of incorporation is Dine's lighting module. The toroidal bulb shape and conforming reflector are characteristics of that module, not geometric concepts to be extracted and applied to Naghi's LED.

Petitioner reiterates the same theory for Ground 1C:

Having incorporated Dine's toroidal bulb and conforming reflector into Naghi's portable lighting apparatus, a POSITA would have recognized that the resulting apparatus could be further improved by disposing a piece of fabric....

Pet. at 27. Petitioner describes Dine’s toroidal bulb and reflector as physical components already present in Naghi’s apparatus. The toroidal shape in the combined device is a property of Dine’s physical tube. The toroidal shape arrived with Dine’s bulb, not with any modification of Naghi’s LED.

The Petition confirms this throughout the dependent claim analysis in Ground 1. When addressing dependent claim 2, the Petition states that “Dine’s toroidal bulb is encased within the annular chamber 21 of the housing 17” and that “the housing of Dine’s lighting module acts as a reflector and is positioned proximate the bulb to redirect light towards the photographic subject.” Pet. at 23 (citing Dine col. 2, ll. 30–35; col. 3, ll. 49–61; Pattison Decl. ¶ 68). Petitioner concludes its claim 2 analysis as follows:

More specifically, when incorporated into Naghi’s portable lighting apparatus, Dine’s housing would be projecting the light towards the face of the webcam user.

Pet. at 23 (citing Pattison Decl. ¶ 69). In the combined device as Petitioner describes it, each of the bulb, the reflector, and the light projection belongs to Dine’s lighting module, not to a reshaped Naghi LED.

When addressing claim 3, the Petition is explicit about which device is emitting light in the combined apparatus:

the light emitted by the tube is ‘projected axially forward of the center of the tube.’

Pet. at 23–24 (quoting Dine col. 3, ll. 58–60). The Petition does not state that light is emitted by a modified Naghi LED. Dine’s tube is the operating light source in the combined device.

The Petition identifies what Dine contributes as complete physical components:

Dine’s portable photographic light unit contains both [claimed] elements. First, it contains a bulb in the shape of a toroid (circular tube 10).

Pet. at 19.

Second, Dine’s portable light unit includes a circular reflector that conforms to the toroidal shape of the bulb. Specifically, Dine teaches that the tube 10 is housed within an annular (circular) chamber of a housing 17... Dine’s housing thereby functions as a reflector for projecting forward light that would otherwise radiate backwards.

Pet. at 20. Dine contributes a tube, a housing, and a reflector: complete physical components, not a geometric abstraction. Dine does not disclose LEDs and does not teach reshaping an LED into a toroid. Dine does not disclose toroidal geometry as an abstract design principle. In Dine's disclosure, toroidal geometry derives from a single physical object: gaseous discharge tube 10. Petitioner has not identified any other source of toroidal geometry in this record. Bretschneider Supp. Decl. ¶ 120.

Petitioner argued that “a POSITA would have recognized that Dine’s teachings could be readily applied in the webcam context, because the same general

lighting principles apply to all camera types (e.g., analog and digital, photo and video).” Pet. at 22. “Dine’s teachings” invoked by Petitioner are Dine’s toroidal gaseous discharge tube and conforming housing, the only components in Dine that are argued to satisfy claim 1’s requirements for “a bulb having a toroidal shape” and “a reflector having a circular configuration to conform to the toroidal shape of said bulb.” Petitioner resolves any doubt about which of “Dine’s teachings” are at issue in the very next sentence: “Thus, the use of Dine’s lighting module in place of Naghi’s existing light source 124/124a-e would have amounted to a simple substitution of one element for another known in the field” to ‘yield a predictable result.’” Pet. at 22 quoting *KSR*, 550 U.S. at 416. Applying “Dine’s teachings,” by Petitioner’s own account, means substituting Dine’s lighting module for Naghi’s light source, not borrowing a shape.

This substitution formula is not unique to Ground 1A (or Ground 1C) discussed above. Petitioner challenged claim 1 separately under each of Ground 2A and Ground 3A. Pet., at 2. And Petitioner employed the same substitution formula in each ground.

For Ground 2A:

Thus, a POSITA would have been motivated to incorporate Luo’s lighting module comprising a toroidal lamp tube and conforming reflector into Nelson’s lighting apparatus.

Pet. at 31.

Thus, the use of Luo’s lighting module in place of Nelson’s existing light source would have amounted to a simple ‘substitution of one element for another known in the field’ to ‘yield a predictable result’ (uniform, shadow-free illumination of the webcam user’s face.)

Pet. at 31-32 *citing KSR*, 550 U.S. at 416.

For Ground 3A:

Thus, the use of Masayuki’s lighting module in place of Cheng’s existing lamp would have amounted to a simple ‘substitution of one element for another known in the field’ to ‘yield a predictable result’ (uniform, shadow-free illumination of the webcam user’s face).

Pet. at 41 *citing KSR*, 550 US at 416.

The Board’s shape-only reading of Ground 1A is irreconcilable not only with Ground 1A’s own language but with how Petitioner argued every other combination challenging independent claim 1 and associated dependent claims. The Petition contains no language suggesting a shape-only modification of Naghi’s existing LED.

A.2. The Pattison Declaration Confirmed Substitution.

The Pattison Declaration provided by Petitioner independently and expressly confirms the substitution theory. Dr. Pattison opens the Ground 1A analysis by identifying what Dine contributes as complete physical components:

Dine discloses a portable photographic light unit that contains both claim 1 elements (1a) and (1b). First, it discloses a bulb in the shape of a toroid (circular tube 10).

Pattison Decl. ¶ 57 (citing Dine col. 2, ll. 8–9; col. 3, ll. 1–2). Dr. Pattison further states, on the reflector:

Second, Dine’s portable light unit includes a circular reflector that conforms to the toroidal shape of the bulb. Specifically, Dine teaches that the tube 10 is housed within an annular (circular) chamber of a housing 17...all surfaces of the housing, except the front-facing circular portion overlying the tube 10, are rendered opaque using a reflective coating 42, so that light emitted from the tube 10 is projected axially forward towards the photographic subject.

Pattison Decl. ¶ 58 (citing Dine col. 2, ll. 28–34; col. 3, ll. 49–57). Dine contributes a tube, a reflective coating, and a housing: complete physical components.

Dr. Pattison states:

Substituting Naghi’s light source (124e) with Dine’s toroidal shaped bulb would have been an obvious substitution of one known illumination means for another, with the expectation of achieving the very uniform lighting effect that Dine taught using a continuous circular tube - i.e., a toroidal light source. Thus, Dine contributes the toroidal bulb element, and the motivation to use it is that it explicitly solves the known lighting problem

identified in the '729 Patent, as well as in the broader field of imaging technology.

Pattison Decl. ¶ 63.

This is not a description of shape modification. It is an explicit substitution of Naghi's light source with Dine's bulb. Petitioner's Dr. Pattison identifies two distinct elements, Naghi's light source and Dine's toroidal shaped bulb, and proposes replacing one with the other. The uniform lighting effect is achieved using Dine's tube. Dine contributes its bulb element to the combination.

In paragraph 64, Dr. Pattison describes:

It would be a matter of common sense to use illumination technology from other mature imaging applications, such as film photography, digital photography, and videography and apply the technology to webcam imaging.

Pattison Decl. ¶ 64. The "mature imaging application" at issue is Dine, a 1952 film photography flash unit, and the "illumination technology" being transferred is Dine's gaseous discharge tube technology, not a geometric abstraction. Petitioner's Dr. Pattison concludes:

A POSITA would have had a high expectation of success in using Dine's toroidal bulb as part of this combination.

Pattison Decl. ¶ 64. The Board relied on this paragraph for the proposition that "combining Naghi with Dine's bulb shape would have been 'straightforward and predictable.'" Inst. Dec. at 26 quoting Pattison Decl. ¶ 64. **But Dr. Pattison's**

conclusion is about using Dine’s toroidal bulb as part of the combination, not fabricating a toroidal LED from Naghi’s existing LED light source. Naghi’s light source is the starting point: a “wide-angle, white LED.” Naghi col. 3, ll. 18–19. Dr. Pattison never explains how that device would be transformed into toroidal geometry. *See* Pattison Decl. ¶ 64. Dr. Pattison provides no analysis of LED fabrication and no description of what a toroidal LED would look like or how Naghi’s LED could be modified to make a toroidal LED. Dr. Pattison also does not rely on any reference that discloses a toroidal LED. That silence reflects the theory Petitioner actually advanced: substitution of Naghi’s light source with Dine’s lighting module. Under Petitioner’s substitution theory, there is nothing to say about reshaping Naghi’s LED because Naghi’s LED is being replaced. Under the Board’s shape-only theory, the modification of Naghi’s LED into a toroidal LED is a central technical question. Petitioner’s expert never addressed that question because Petitioner never advanced that theory.

Dr. Pattison’s Paragraph 65 also uses the phrase “Having decided to use Dine’s toroidal bulb teaching to modify Naghi’s light source....” Pattison Decl. ¶ 65. Read in context, “modify” refers to the overall modification of Naghi’s apparatus by substituting Dine’s lighting module, not to the physical reshaping of Naghi’s LED chip. Paragraph 63 expressly states that “Dine contributes the toroidal bulb element....” Pattison Decl. ¶ 63. If Dine is contributing the toroidal bulb element, Naghi’s LED is being replaced, not reshaped. The Board placed on “modify” a burden it cannot bear.

When describing the combined device for claim 2, Dr. Pattison states that “Dine’s toroidal bulb is encased within the annular chamber 21 of the housing 17” and that “all surfaces of the housing 17 except the front portion overlaying the bulb are painted with a reflecting coating, the light emitted by the bulb is projected forward towards the photographic subject.” Pattison Decl. ¶ 68 (citing Dine col. 2, ll. 30–35; col. 3, ll. 49–61). Dr. Pattison further states: “The housing of Dine’s lighting module acts as a reflector and is positioned ‘proximate’ the bulb to redirect light towards the photographic subject.” Pattison Decl. ¶ 69. In the combined device as Dr. Pattison describes it, gaseous discharge tube 10 is the bulb and Dine’s lighting module housing is the reflector. Naghi’s LED plays no role. There is nothing left to reshape.

Dr. Pattison used the same substitution formula for every other ground challenging claim 1. For Ground 2A, Dr. Pattison states:

A POSITA would have been motivated to improve Nelson’s portable illuminating device by incorporating Luo’s integrated toroidal lamp tube and conforming circular reflector system.

Pattison Decl. ¶ 88. Luo’s toroidal lamp tube and conforming circular reflector are described as an integrated system being incorporated into Nelson’s device. That is substitution of a physical module, not borrowing a shape. Dr. Pattison confirms as much in the next paragraph:

This localized change would merely be a simple substitution of one element for another by a POSITA to

produce an expected improvement in the lighting and illumination of a subject.

Pattison Decl. ¶ 89.

For Ground 3A, Dr. Pattison was also unambiguous:

I believe that substituting Masayuki's lighting module in place of Cheng's existing lamp would have amounted to a simple 'substitution of one element for another known in the field' which would have produced a predictable result that includes uniform, shadow-free illumination of the webcam user's face.

Pattison Decl. ¶ 117.

The substitution formula is not Patent Owner's construction of Ground 1A. It is Petitioner's own expert's consistent and deliberate framing across every ground challenging independent claim 1.

B. Neither the Petition nor the Pattison Declaration Supports the Board's Shape-Modification Reading

The Board derived a shape-only reading from selected paragraphs of the Pattison Declaration while ignoring language throughout the Petition and Pattison Declaration that expressly and unambiguously describes substitution.

B1. The Board misread the Petition

The Board's shape-only conclusion rests on its characterization of Petitioner's claim 1 argument. Inst. Dec. at 24–29. That argument does not support the shape-modification theory.

The Board may have focused on Petitioner's statement:

As explained by Dr. Pattison, a POSITA would have been motivated to incorporate Dine's toroidal bulb shape and conforming reflector into Naghi's portable lighting apparatus.

Pet. at 20 (citing Pattison Decl. ¶ 60). That statement does not describe shape modification. The phrase "toroidal bulb shape" describes a characteristic of Dine's lighting module, the same module Petitioner proposed to incorporate into Naghi's apparatus. The "toroidal bulb shape" arrives with Dine's physical tube. It is not a geometric concept extracted and applied to Naghi's LED.

Paragraph 60, which Petitioner cited in support, confirms the proposed substitution, as discussed below in Section B.2. In the very same subsection, Petitioner made its substitution theory explicit: "a POSITA would have been motivated to incorporate Dine's lighting module comprising a toroidal bulb shape and conforming reflector into Naghi's lighting apparatus," Pet. at 22 (citing Pattison Decl. ¶¶ 60, 65, 66). Petitioner confirmed that "the use of Dine's lighting module in place of Naghi's existing light source 124/124a-e would have amounted to a simple 'substitution of one element for another known in the field' to 'yield a predictable result' (uniform, shadow-free illumination of the webcam user's face)." Pet. at 22

(citing *KSR*, 550 U.S. at 416; Pattison Decl. ¶ 63). As demonstrated in Section A.1, the Petition consistently and exclusively describes the combination as substituting Dine’s lighting module for Naghi’s light source. The Board’s shape-only reading finds no support in the Petition language it cited or elsewhere.

B.2. The Board Misread the Pattison Declaration.

As best understood, the Board derived its shape-only reading in part from selected paragraphs of the Pattison Declaration. The Board cited paragraph 61 for Dr. Pattison’s explanation that a toroidal light source “provides for light being emitted from a larger area which thereby provides the opportunity for brighter, more uniform illumination....” Inst. Dec. at 26 (citing Pattison Decl. ¶ 61). The Board cited paragraph 64 for the proposition that “combining Naghi with Dine’s bulb shape would have been ‘straightforward and predictable.’” Inst. Dec. at 26 (quoting Pattison Decl. ¶ 64). The Board cited paragraph 65 for the proposition that “there is nothing challenging about integrating Dine’s circular reflector teaching into Naghi’s lighting system.” Inst. Dec. at 26 (quoting Pattison Decl. ¶ 65). The Board also cited paragraphs 43 and 44 for the evolution of bulb shape and the use of reflectors with incandescent bulbs and LEDs. Inst. Dec. at 26 (citing Pattison Decl. ¶¶ 43–44). The Board then concluded that “Petitioner proposes to substitute Dine’s bulb *shape*, not bulb type.” Inst. Dec. at 26-27 (emphasis in original). Paragraph 65 is addressed above in Section A.2. None of the remaining paragraphs set out the shape-modification theory the Board adopted.

Paragraphs 59, 60, and 61 are motivation paragraphs. Paragraph 59 states that “a POSITA would have been motivated to modify Naghi’s portable lighting apparatus by incorporating Dine’s Toroidal bulb shape and conforming reflector.” Pattison Decl. ¶ 59. Paragraph 60 states the same proposition and elaborates: “a POSITA would have been motivated to modify Naghi’s portable lighting apparatus by incorporating Dine’s Toroidal bulb shape and conforming reflector for several reasons.” Pattison Decl. ¶ 60. Paragraph 61 explains that a toroidal light source “provides for light being emitted from a larger area which thereby provides the opportunity for brighter, more uniform illumination of the object and for light to reach the object to be imaged at different angles and reflect from the object to the imaging device, whether it be a film camera, digital camera, video camera, web camera, or other imaging device.” Pattison Decl. ¶ 61.

None of paragraphs 59, 60, or 61 describes reshaping Naghi’s LED. None addresses LED fabrication. None of the paragraphs rely on a prior art toroidal LED. A reading of these paragraphs that ignores paragraph 63 strips them of their context. Paragraph 63 states: “Substituting Naghi’s light source (124e) with Dine’s toroidal shaped bulb would have been an obvious substitution of one known illumination means for another, with the expectation of achieving the very uniform lighting effect that Dine taught using a continuous circular tube — i.e., a toroidal light source.” Pattison Decl. ¶ 63. Dr. Pattison then concludes: “Thus, Dine contributes the toroidal bulb element, and the motivation to use it is that it explicitly solves the known lighting problem identified in the ‘729 Patent, as well as in the broader field of imaging technology.” Pattison Decl. ¶ 63. Paragraphs 59, 60, and 61 describe why a

POSITA would want to incorporate Dine's toroidal bulb into Naghi's apparatus. Paragraph 63 identifies what that toroidal bulb element is, where it comes from, and how it gets there: substitution. The Board read the motivation without reading what was being motivated.

Paragraph 64 fares no better. The Board cited paragraph 64 for the proposition that combining Naghi with Dine's bulb shape would have been "straightforward and predictable." Inst. Dec. at 26 (citing Pattison Decl. ¶ 64). But paragraph 64 says nothing about reshaping Naghi's LED. Dr. Pattison never identified a toroidal LED in the prior art. Dr. Pattison never explained how Naghi's LED could be modified to achieve toroidal geometry. Dr. Pattison never identified any reference that discloses such a process. What is "straightforward and predictable" according to Dr. Pattison is using Dine's toroidal bulb as part of the combination, not the modification of Naghi's LED into toroidal geometry. Pattison Decl. ¶ 64. Under a shape-modification theory, the way in which the Naghi LED is modified into toroidal geometry is a central technical question. Paragraph 64 does not answer it. It does not even ask it.

Paragraphs 43 and 44 further undermine the Board's reading. In paragraph 43, Dr. Pattison surveys light source types available prior to 2007. Dr. Pattison describes LED fixtures as using "numerous individual LED devices integrated behind a diffuser and on a reflector to direct light towards a target." Pattison Decl. ¶ 43. Dr. Pattison identifies the toroidal options as "circular or toroidal shaped lamps such as the circline lamp type or compact fluorescent lamp (CFL) 'twister' lamps." Pattison Decl. ¶ 43. Dr. Pattison discusses LEDs but does not identify a prior art toroidal LED

anywhere in the Declaration. In paragraph 44, when reaching for a prior art device most similar to the claimed invention, Dr. Pattison's chosen example is "a fluorescent circline or toroidal lamp within a reflective holder with an articulating arm and a clamp to mount to a desktop." Pattison Decl. ¶ 44. Petitioner's own expert, when illustrating the closest prior art device, reached for a fluorescent toroidal device. The Board found that toroidal bulbs were known and inferred that a toroidal LED could therefore be fabricated from Naghi's existing LED light source. Dr. Pattison never drew that inference. No reference in this proceeding addresses how Naghi's LED could be adapted to form a toroidal-shaped LED. Petitioner has not pointed to a toroidal LED on this record. The evidentiary record is silent on the central technical question that the shape-modification theory requires Petitioner to answer.

Paragraphs 68 and 69 confirm the substitution reading of the combined device. Dr. Pattison states that "Dine's toroidal bulb is encased within the annular chamber 21 of the housing 17" and that "all surfaces of the housing 17 except the front portion overlaying the bulb are painted with a reflecting coating, the light emitted by the bulb is projected forward towards the photographic subject." Pattison Decl. ¶ 68. Dr. Pattison further states: "The housing of Dine's lighting module acts as a reflector and is positioned 'proximate' the bulb to redirect light towards the photographic subject." Pattison Decl. ¶ 69. In the combined device as Dr. Pattison describes it, Dine's gaseous discharge tube is the bulb and Dine's lighting module housing is the reflector. Naghi's LED plays no role. There is nothing to reshape.

The record admits of only one reading. Petitioner proposed substituting Dine’s lighting module for Naghi’s light source. The Board’s conclusion that “Petitioner proposes to substitute Dine’s bulb *shape*, not bulb type,” Inst. Dec. at 26-27 (emphasis in original), finds no support in the Petition or the Pattison Declaration. The Board may not sustain a ground on a rationale Petitioner never advanced. *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380–81 (Fed. Cir. 2016) (“the Board must base its decision on arguments that were advanced by a party, and to which the opposing party was given a chance to respond”); *In re NuVasive, Inc.*, 841 F.3d 966, 972–73 (Fed. Cir. 2016).

As shown above, the Petition argued substitution exclusively and unambiguously. The Board derived its shape-modification reading from selected Pattison Declaration paragraphs read in isolation, divorced (for example) from paragraph 63, which expressly states that “Dine contributes the toroidal bulb element” through substitution. Pattison Decl. ¶ 63. The clear and unmistakable language of paragraph 63 forecloses the Board’s shape-modification reading entirely.

Even if the Petition could be read as advancing both theories, which it cannot, that ambiguity resolves against Petitioner. “It is the petitioner’s burden to make clear when alternative arguments are being presented and to sufficiently expound on each one.” *Netflix, Inc. v. DivX, LLC*, 84 F.4th 1371, 1380 (Fed. Cir. 2023). Petitioner made no such clarification. Petitioner made the substitution argument expressly, *see* Sections A.1, A.2, B.1, *supra*, and never stated that it was also making an alternative argument. The shape-modification theory appears nowhere in the Petition as an

alternative. Under *Netflix*, that failure resolves against Petitioner. Patent Owner addresses the shape-modification theory on the merits below in Section D, but does so under protest and at the cost of word count that would otherwise be devoted to rebutting the theory Petitioner actually argued.

C. The Naghi-Dine Combination Fails Under Petitioner’s Substitution Theory

Patent Owner does not argue that Naghi must use LEDs or that any substitution of Naghi’s LED is *per se* nonobvious. Rather, Patent Owner argues that a POSITA would not have been motivated to substitute Naghi’s LED with Dine’s 1952 gaseous discharge flash technology specifically.

C.1. Naghi’s Low-Voltage DC Power System and Dine’s High-Voltage Flash Gun Are Categorically Incompatible

Naghi’s light source 124 is “a wide-angle, white LED.” Naghi col. 3, ll. 18–19. Naghi discloses a range of power sources for that LED: “a small, low-voltage power source such as, but not limited to, an AA battery, an AAA battery, an AAA battery [sic], or a watch battery.” Naghi col. 3, ll. 54–57. Naghi designed light 800 (shown in Naghi FIG. 11 at right) to be “similar in construction to the reading light

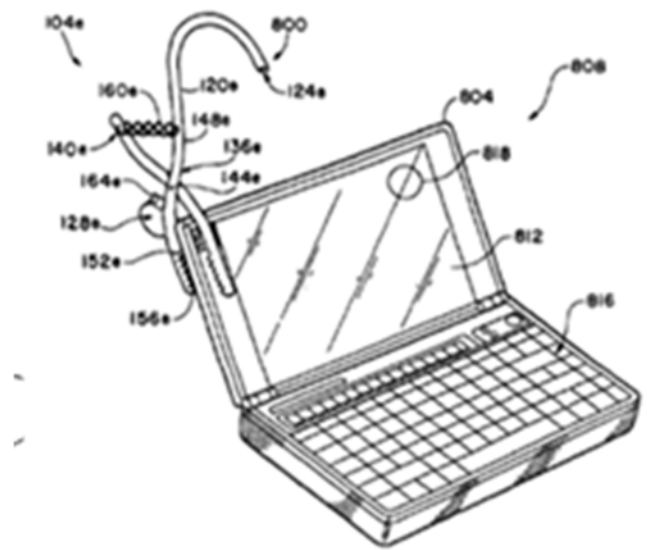
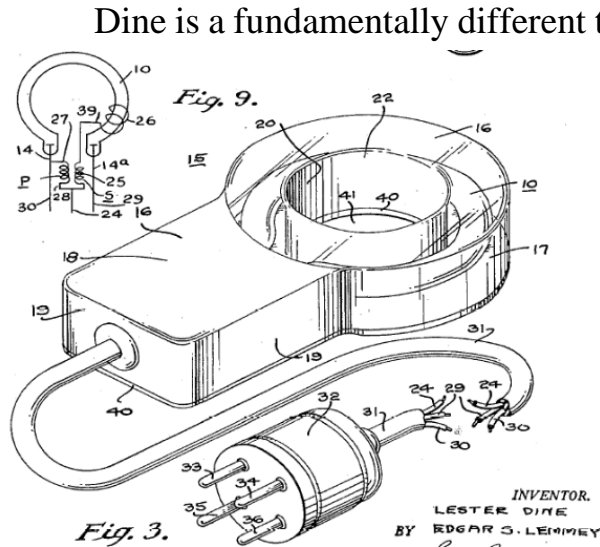


FIG. 11

100.” Naghi col. 7, ll. 18–20. That construction achieves its small form factor because “a low power draw allows for a small power source, and, hence, a small reading light.” Naghi col. 3, ll. 23–26.



Dine is a fundamentally different technology. Dine’s light source is a gaseous discharge tube made of glass or quartz “within which is sealed a suitably ionizable gas, such as xenon, krypton or the like.” Dine col. 2, ll. 8–10; *see* Dine FIGS. 3 and 9 at left. Dine’s tube “emits light as a consequence of current passing through an ionized gas.” Bretschneider

Decl. ¶ 61. That process “is a description of a plasma discharge and while brief represents a very high energy density and subsequently high heat generation.” *Id.* To initiate that discharge, Dine requires “a spark coil 25 of conventional type having a secondary winding S suitably connected to a high-voltage spark trigger or trip wire electrode 26.” Dine col. 2, ll. 54–57. The complete power system consists of “a three-wire cable 31 of suitable length fitted at its end with a connector plug 32” for insertion “in the lamp socket of the flash gun unit 37.” Dine col. 3, ll. 20–25.

“Naghi’s low-voltage, DC powered LEDs are utterly incompatible with Dine’s high voltage, single pulse electronics.” Bretschneider Decl. ¶ 89. Petitioner has not shown how any of Naghi’s disclosed power sources could operate Dine’s gaseous discharge tube. Bretschneider Supp. Decl. ¶ 127. Multiple batteries in series still deliver DC voltage measured in single digits. Bretschneider Supp. Decl. ¶ 127.

Fuel cells are also low-voltage DC devices incapable of powering Dine’s gaseous discharge tube. *Id.* A POSITA with experience in both LED lighting and gaseous discharge technology would immediately recognize that none of Naghi’s disclosed power sources can operate Dine’s gaseous discharge tube. *Id.*

Dr. Pattison never addressed this incompatibility. Pattison Decl. ¶¶ 59–65. He declares the substitution “obvious” without explaining how Dine’s tube would be powered in the combined device. Pattison Decl. ¶ 63. He does not identify what modifications to Naghi’s power system would be required. *Id.* He does not address whether those modifications were within ordinary skill. *Id.* That silence is dispositive. There is no motivation to attempt a combination that a POSITA would know would not work. Where the proposed combination would produce a nonfunctional result, no rational basis for the combination exists. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

C.2. Dine’s Flash Operation Is Incompatible with Continuous Webcam Illumination

Dine produces a “brilliant flash of actinic light” delivered “when the unit is thus mounted directly upon the camera, and is energized through operation of the flash gun in synchronization with actuation of the camera shutter.” Dine col. 3, l. 71 through col. 4, l. 2. This is a single-burst event. It is triggered once per photograph. It is synchronized with a mechanical shutter that exposes film for a fraction of a second.

The ‘729 Patent is directed to continuous illumination of a webcam user’s face during live video sessions. ‘729 Patent col. 1, ll. 10–13, 34–36. Unlike a film camera,

“a webcam captures continuous frames using a digital image sensor.” Bretschneider Supp. Decl. ¶ 124. “There is no shutter event.” *Id.* Digital photography “relies on an array or matrix of electronic light sensors or pixels to capture an image.” Bretschneider Decl. ¶ 43. “The read out of information from the matrix of sensors occurs sequentially.” *Id.* That sequential readout makes digital photography “subject to artifacts known as rolling shutter artifacts,” including “a series of light and dark bands if the light source illuminating a scene is not constant during the entire read out process.” Bretschneider Decl. ¶ 46.

“Even if Dine’s flash lamp could be modified to produce a flash of a suitable duration for electronic image capture, it would still need to be modified to produce a continuous sequence of flashes that were synchronized with the frame rate of a digital camera for use with video capture.” Bretschneider Decl. ¶ 62. “By itself this would require large amounts of electrical power and result in generation of significant amounts of heat.” *Id.* Adapting Dine’s flash technology for continuous webcam illumination would also require “replacing Dine’s flash gun with a regulated AC power supply capable of driving repeated plasma discharges at the frame rate of a digital video camera.” Bretschneider Supp. Decl. ¶ 124. “Using such a flash lamp for video capture would amount to positioning a person directly in front of a strobe and would be at best distracting and disorienting.” Bretschneider Decl. ¶ 63. None of this is suggested anywhere in the record. This is not obvious substitution. A combination that renders the primary reference inoperable for its intended purpose of continuous illumination cannot support a finding of obviousness. MPEP § 2143.01.V.

C.3. A POSITA Reading Naghi Would Have No Motivation to Incorporate Dine-Type Technology

Naghi exists precisely to solve the problems caused by the technology Dine represents. Naghi's Background section enumerates them specifically: prior lights "consume a relatively large amount of electricity," "generate heat," "require relatively large light housings to accommodate the heat," and "provide unsatisfactory lighting" of the reading materials. Naghi col. 1, ll. 18–29. Naghi also specifically rejects lights that "give only partial lighting across the entire visible spectrum," precisely the deficiency of Dine's actinic, blue-heavy discharge lamp. Naghi col. 1, ll. 18–29; Dine col. 1, ll. 8–18; Bretschneider Decl. ¶ 57. This is Naghi's inventor identifying, with specificity, the failures of the prior technology that Naghi was designed to correct.

Every one of those identified failures is a characteristic of Dine's gaseous discharge flash technology. Dine's tube "emits light as a consequence of current passing through an ionized gas," which "is a description of a plasma discharge and while brief represents a very high energy density and subsequently high heat generation." Bretschneider Decl. ¶ 61. Dine's power system requires "a spark coil 25 of conventional type having a secondary winding S suitably connected to a high-voltage spark trigger or trip wire electrode 26." Dine col. 2, ll. 54–57. Dine's complete power system consists of a three-wire cable, spark coil, and flash gun unit. Dine col. 3, ll. 20–25. Dine's enclosure "is necessarily large because it must house a spark coil, high-voltage electrode, three-wire cable assembly, and gaseous

discharge tube.” Bretschneider Supp. Decl. ¶ 124. Dine is the prior art that Naghi was built to replace.

Naghi’s solution to each of those problems is the LED. Naghi col. 3, ll. 18-53. The LED “draws little electrical power during operation,” Naghi col. 3, ll. 21-23, the direct answer to Dine’s high power demand. The LED “does not emit heat” and “can be formed into plastic without heat-warping effects,” Naghi col. 3, ll. 33-36, the direct answer to Dine’s plasma heat. The LED Naghi chose is “small, lightweight,” Naghi col. 3, ll. 29-31, the direct answer to Dine’s large, heavy enclosure. The LED “emits the full spectrum of visible light,” Naghi col. 3, ll. 47-51, the direct answer to the partial, actinic spectrum of prior discharge lights like Dine that Naghi’s Background specifically rejects. Naghi col. 1, ll. 18-29. A POSITA reading Naghi would understand that its Background section is a substantive technical rejection of high-voltage, heat-generating, high-power discharge lighting in favor of LED technology. Dine is precisely the technology Naghi’s Background rejects. Petitioner identified no motivation to reach to Dine that does not require a POSITA to ignore those express teachings.

The Board’s shape-modification theory does not escape this problem. That theory assumes toroidal geometry can be extracted from Dine as an abstract design principle and applied to Naghi’s LED independently of the technology that carries it. But Dine does not disclose toroidal geometry as an abstract design principle. Dine discloses a single physical object from which that geometry derives: gaseous discharge tube 10. Dine col. 2, ll. 8-16; Fig. 1. That tube is the only toroidal element in Dine’s disclosure. To obtain toroidal geometry from Dine, a POSITA takes tube

10. Bretschneider Supp. Decl. ¶ 120. There is no other path. Petitioner has not identified any other source of toroidal geometry in this record. Bretschneider Supp. Decl. ¶ 129. A POSITA who understood Naghi’s express rejection of discharge technology would have no motivation to reach into Dine’s disclosure and extract the one component that embodies that rejected technology. *See infra* Section D.

Petitioner’s stated motivation for reaching to Dine is illuminating the webcam user’s face “without casting unflattering shadows.” Pet. at 21; Pattison Decl. ¶ 60. Naghi’s own disclosure already provides a path to that result without any secondary reference or modification. Naghi discloses a two-source embodiment with light sources at opposite terminal portions. Naghi col. 6, ll. 15–20; Fig. 10. Two LED light sources that illuminate from two opposing directions eliminate the unflattering directional shadows that result from single-source lighting, without modifying Naghi’s device, without introducing new technology, and using only what Naghi already discloses. Bretschneider Supp. Decl. ¶¶ 131-132. This solution does not require the geometric precision of coaxial ring illumination because unflattering facial shadows depicted in webcam video are directional shadows that opposing sources eliminate, not the complex geometric shadows that Dine’s coaxial ring design addresses. Bretschneider Supp. Decl. ¶ 133. Where Naghi’s own disclosure already provides a path to the stated goal, there is no motivation to reach for a secondary reference. Patent Owner addresses this argument in more detail in Section D below.

C.4. Dine’s Shadow-Free Illumination Depends on Concentric Lens Mounting That Is Unavailable in Naghi

Petitioner’s stated motivation is to achieve “uniform illumination” and eliminate “unflattering shadows.” Pet. at 20–22; Pattison Decl. ¶¶ 60. The shadow-free illumination Dine achieves is not a product of toroidal shape in the abstract. It is a product of a specific mounting geometry. Dine’s circular tube is disposed “concentrically about the camera lens,” with the optical axis of the lens passing through the center of the ring. Dine col. 1, ll. 12–16. When a ring light surrounds the camera lens concentrically, it casts no shadows because the light source and the imaging axis are coaxial. Dine col. 1, ll. 11-18; Bretschneider Supp. Decl. ¶ 120.

Dine achieves that concentric positioning through a specific mechanical mechanism. The back plate of Dine’s enclosure is fitted with “an externally threaded annulus 43, suitably secured in position by rivets 44 or the like, upon which may be threaded a suitable adapter ring 45 for mounting the unit upon the lens mount of the camera.” Dine col. 3, ll. 60-70. That mechanism requires a camera with a removable, threaded lens mount. Naghi’s laptop light 800 clips to “display frame 804 of laptop computer 808” and illuminates “an object of a digital camera 818” via a bendable arm. Naghi col. 7, ll. 18-37. That camera is a webcam embedded in the laptop’s display frame. Naghi col. 7, ll. 18-37. Petitioner has not identified a lens mount, adapter thread, or mechanism for concentric ring attachment on Naghi’s webcam.

The Board found that Dine’s bulb and reflector “are also movable and may (but are not required to) be concentrically mounted about the lens” and that “Naghi’s device, when modified as proposed, would be similarly capable of being positioned

concentrically about a lens as in Dine.” Inst. Dec. at 27. The Board’s finding does not address the functional requirement that shadow-free ring illumination imposes. Approximate concentricity achieved by manually bending Naghi’s flexible arm is not the same as the fixed, precise coaxial alignment that produces Dine’s shadow-free illumination. “Dine’s shadow-free illumination requires that the lens axis pass precisely through the geometric center of the ring and that this coaxial relationship be maintained throughout the illumination event.” Bretschneider Supp. Decl. ¶ 135. Naghi’s arm is bendable by design. It does not lock into position. Any contact with the laptop, incidental or otherwise, can shift the arm and break whatever approximate concentricity the user achieved. *Id.* Dine’s threaded mounting mechanism is rigid and fixed precisely to maintain the coaxial relationship. *Id.* Furthermore, a user bending a flexible arm by eye cannot achieve the geometric precision required by a shadow-free illumination ring. *Id.* “An off-center ring light does not eliminate shadows. It changes their direction.” *Id.* The functional benefit Petitioner relies upon disappears unless concentricity is both precise and maintained throughout use. *Id.*

The Board supplied no evidence for its finding that the modified device would be “similarly capable” of concentric positioning or that it would “possess the same advantages touted in Dine.” Inst. Dec. at 27. Petitioner offered no testimony, no prior art, and no technical analysis on either point. The Board may not fill that evidentiary void with its own unsupported conclusions. *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380–81 (Fed. Cir. 2016).

Without precise and stable concentric lens mounting, a toroidal light source positioned near a laptop camera provides no particular optical advantage over any

other light source geometry. Bretschneider Supp. Decl. ¶ 135. The motivation for adopting Dine’s circular shape collapses when the mounting geometry that makes that shape valuable is unavailable. *Id.* Surrounding Naghi’s laptop camera with a ring enclosure would also necessarily obfuscate portions of the laptop display and render it largely unreadable, and would dramatically increase the size and weight of the clamshell of the laptop computer in direct violation of the primary design objectives for laptop clamshells. Bretschneider Decl. ¶¶ 91–92.

C.5. Petitioner’s Stated Motivation Contradicts Itself

Petitioner’s stated motivation is to optimize the laptop user’s on-camera appearance by providing “even, flattering lighting” for webcam users. Pattison Decl. ¶ 64. Dine’s actinic light achieves the opposite result for digital video of human faces.

Dine’s light source produces “an intense flash of actinic light.” Dine col. 1, ll. 8–18. A POSITA understands that actinic light sources contain significant amounts of blue light. Bretschneider Decl. ¶ 57. When a human face is illuminated by actinic light and captured by a digital sensor, that blue-heavy spectrum “would lend a bluish hue to skin tones, giving the perception that the user was anemic and perhaps hypoxic or cyanotic (decidedly unhealthy looking and unflattering).” Bretschneider Decl. ¶ 88. This is the opposite of the flattering, natural-looking illumination that the ‘729 Patent is designed to provide.

Dr. Pattison declares that a POSITA would combine Naghi and Dine to achieve “even, flattering lighting” for webcam users. Pattison Decl. ¶ 64. Dine’s

actinic light does not produce even, flattering lighting for digital video of human faces. The motivation Petitioner identifies is directly undermined by the properties of the reference Petitioner proposes to use. *KSR*, 550 U.S. at 418.

D. Even Under the Board's Alternative Reading, the Combination Fails

The Board dismissed Patent Owner's arguments by invoking the principle that obviousness does not require the features of a secondary reference to be bodily incorporated into the structure of the primary reference, and that the test for obviousness is what the combined teachings of the references would have suggested to a person of ordinary skill in the art. Ins. Dec., at 27 citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981), *In re Sneed*, 710 F.2d 1544, 1550 (Fed. Cir. 1983), and *In re Nievelt*, 482 F.2d 965, 968 (CCPA 1973). The Board further noted that a practitioner is not compelled to adopt every aspect of a reference's teaching without the exercise of independent judgment. Ins. Dec., at 27 citing *Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 889 (Fed. Cir. 1984). The Board noted that a person of ordinary skill is a person of ordinary creativity, not an automaton. *KSR*, 550 U.S. at 421. Each of those propositions is correct as a statement of law. None of them excuses the requirement of motivation to combine. None of them supplies the evidentiary foundation that Petitioner failed to provide. None of them shows how Naghi's LED can be adapted into toroidal form. None of them identifies a toroidal LED in this record. The bodily incorporation cases address physical combinability where motivation to combine is present. They are a response to the argument that the combined device would not work, despite motivation for the combination,

because the secondary device cannot be bodily incorporated into the primary device. Put differently, the lack of direct physical combinability does not defeat an otherwise motivated combination. These cases say nothing about whether a POSITA would have been motivated to attempt the combination in the first place. Patent Owner does not argue that Dine’s gaseous discharge tube cannot be physically inserted into Naghi’s device, or that a POSITA lacks the skill to modify components when combining references. A POSITA is presumed capable of adaptation. The question is not whether modification is physically achievable but whether any evidence in this record supports a motivation to attempt it and a reasonable expectation that the result would work.

Even where motivation exists, obviousness requires a separate showing that a person of ordinary skill would have had a reasonable expectation of success. *Elekta Ltd. v. ZAP Surgical Sys., Inc.*, 81 F.4th 1368, 1375-76 (Fed. Cir. 2023). A finding of motivation does not establish a finding of reasonable expectation of success. *Id.* at 1377. The combination must also have worked for its intended purpose. *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009). Petitioner has satisfied neither requirement on this record.

D.1. Naghi’s Own Disclosure Already Provides a Path to the Stated Goal Without Any Modification

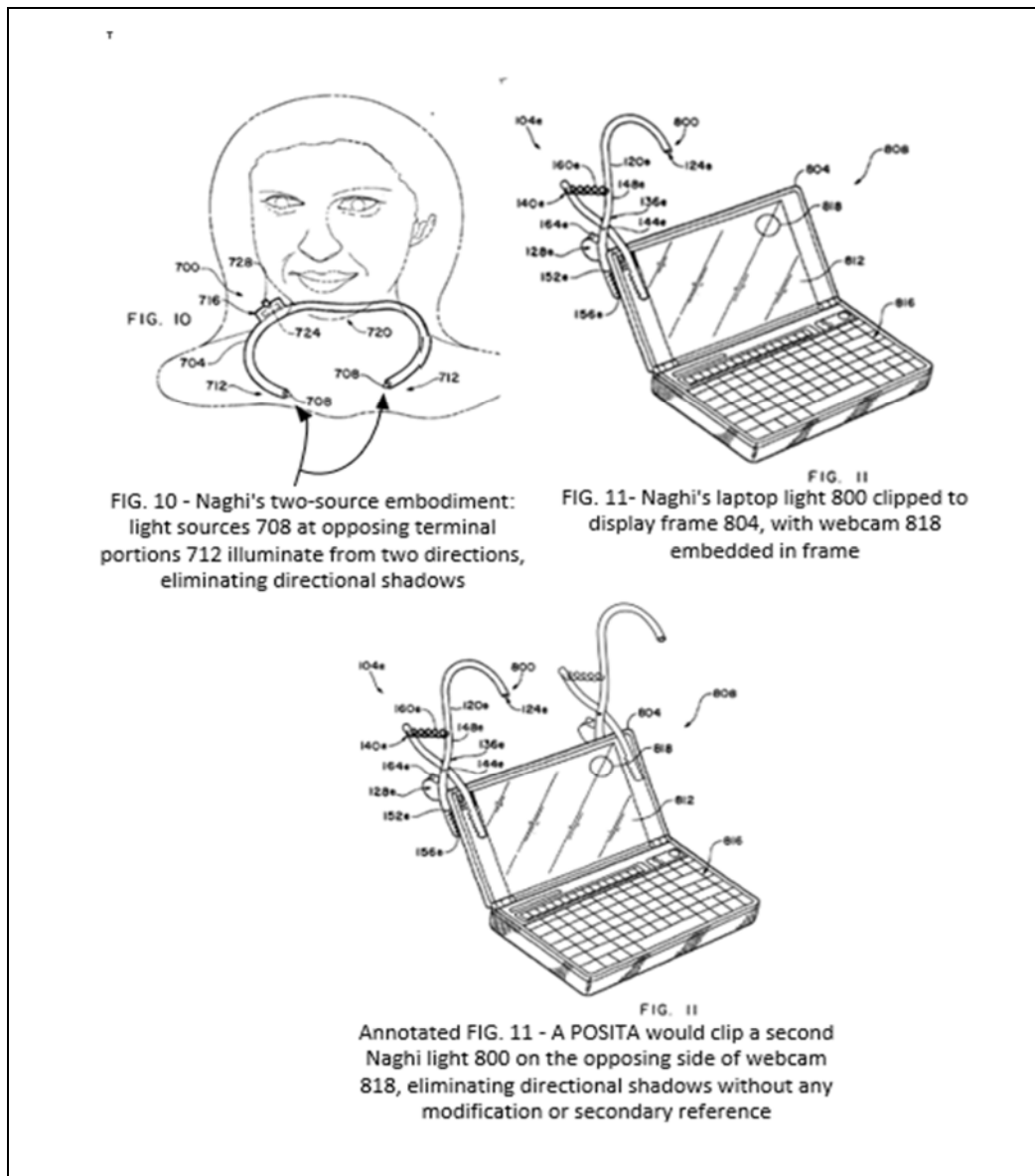
Petitioner’s stated motivation for reaching to Dine is illuminating the webcam user’s face “without casting unflattering shadows.” Pet. at 21; Pattison Decl. ¶ 60. That motivation is the foundation of the entire combination. Without it, there is no reason to look beyond Naghi. That motivation is also fatal to Petitioner’s position.

Naghi's own disclosure already provides a path to Petitioner's claimed result without any secondary reference, without any modification to the primary reference, and without any of the engineering consequences that the Board's shape-modification theory entails.

Naghi discloses a two-source embodiment that demonstrates the principle of opposing light sources. Figure 10 of Naghi discloses reading light 700 with "light sources 708 located at opposite terminal portions 712 of the bendable body 704." Naghi col. 6, ll. 15-20; Fig. 10. That embodiment is designed to be worn around the user's neck, with one light source on each side of the face. Naghi col. 6, ll. 40-50. The light sources 708 are preferably white LEDs. Naghi col. 6, ll. 19-21. Naghi thus discloses two flexible LED light sources working together to illuminate from two opposing directions. Two light sources positioned on opposing sides substantially eliminate directional shadows because each source fills the shadows cast by the other. Bretschneider Supp. Decl. ¶ 131. This principle was well understood in the field of lighting design well before January 2007. Bretschneider Supp. Decl. ¶ 131. It was known even to those of lesser skill. *Id.*

A POSITA reviewing Naghi's Figure 10 embodiment would therefore understand that applying this principle to the webcam illumination problem Petitioner identifies in the Figure 11 embodiment requires nothing more than a second Naghi device 800 on the opposing side of the notebook such that light sources 124e are positioned on opposing sides of digital camera 818. In particular, a POSITA seeking to eliminate unflattering facial shadows on webcam video would recognize that clipping a second Naghi light 800 on the opposite side of the webcam from the

first achieves exactly what Petitioner attributes to Dine. Bretschneider Supp. Decl. ¶ 132; *see* Naghi FIG. 10, FIG. 11, and annotated FIG. 11 below. Dine allows the subject to “photographed ... virtually free of any shadow.” Dine, col. 1, ll. 15-17. The two-unit Naghi solution achieves at least the same shadow elimination Petitioner attributes to Dine, and likely more. Bretschneider Supp. Decl. ¶ 133.



This solution requires no new technology, no redesign of the light source, no change in power system, and no secondary reference. Bretschneider Supp. Decl. ¶ 132. It uses the same LED, the same flexible arm, and the same clamp that Naghi already discloses. *Id.* Unlike a toroidal ring enclosure, it does not obstruct any portion of the laptop display. Bretschneider Supp. Decl. ¶ 134. As shown in Naghi's Figure 11, camera 818 is embedded within display frame 804, surrounded by display area on all sides. A ring enclosure surrounding that camera would extend inward over the visible display area in every direction, blocking a portion of the screen regardless of where within the frame the camera sits. Bretschneider Supp. Decl. ¶ 134. Petitioner has not addressed this simpler path anywhere in the record. Pattison Decl. ¶¶ 59-65.

The two-unit Naghi solution is not merely simpler, it is also more effective for the specific problem Petitioner identifies. Petitioner's concern is unflattering directional shadows on a webcam user's face. Bretschneider Supp. Decl. ¶ 133. Facial shadows on webcam video are directional shadows that result from single-source lighting hitting the face from one angle. They are not the complex geometric shadows found in close-up photography of objects with deep recesses or irregular surfaces. Bretschneider Supp. Decl. ¶ 133. Two independently adjustable Naghi arms eliminate those directional shadows by providing opposing illumination from two directions. Each arm can be bent to direct light precisely where compensation is needed. That directional control is not available with a fixed toroidal ring. Bretschneider Supp. Decl. ¶ 133.

The two-unit solution also carries a significant cost advantage over the Board's proposed modification. A second Naghi light 800 requires no additional development and no custom fabrication. The Board's shape-modification theory has not been shown to be achievable without additional components that each add cost and complexity. Bretschneider Supp. Decl. ¶¶ 128, 132. A POSITA comparing these two paths to the same goal would not reach for the more costly and technically uncertain option when a lower-cost solution is already disclosed in the primary reference.

Where Naghi's own disclosure already provides a direct path to the POSITA's stated goal, there is no motivation to reach for a secondary reference that requires fundamental redesign of the primary reference. Petitioner has not explained why a POSITA would abandon Naghi's simpler, cheaper, more practical, and already-disclosed solution in favor of the complex, untested, and record-unsupported modification the Board posits. That silence is dispositive on motivation.

D.2. The Board's "Naturally, Some Adaptation" Finding Has No Evidentiary Foundation

The Institution Decision states: "Naturally, some adaptation of Naghi's LED would be required to form a toroidal-shaped bulb with a reflector." Inst. Dec. at 27. The word "naturally" characterizes the adaptation as routine, straightforward, and within ordinary skill. That characterization is not a finding of fact based on evidence in the record. It is an assumption that the record does not support.

No prior art reference in this proceeding discloses a toroidal LED. Dr. Pattison does not describe how such a device would be fabricated. Dr. Pattison does not call

the adaptation “natural” or “routine.” Dr. Pattison never addressed it at all, because the shape-only theory was never his theory. The Board supplied both the theory and the characterization of its difficulty. It had no witness testimony, no prior art, and no technical analysis to support either. The Board may not fill the evidentiary void left by Petitioner’s silence with the word “naturally.” *Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1336 (Fed. Cir. 2020); *In re Magnum Oil Tools*, 829 F.3d at 1380-81.

Petitioner has not shown that Naghi’s LED can be modified into toroidal form. Petitioner has not even identified what toroidal shape the adapted device would take. Petitioner has not addressed how the adaptation would be accomplished. Petitioner has not shown that the adaptation would preserve the semiconductor junction that makes Naghi’s LED function. Bretschneider Supp. Decl. ¶¶ 118-119. The light-emitting properties of an LED arise from a p-n junction formed by depositing precisely doped semiconductor materials on a substrate through epitaxial growth processes. *Id.* The geometry of that junction is determined at fabrication by photolithographic processes operating at tolerances measured in micrometers. *Id.* An LED is not a gas discharge tube. Petitioner has not shown that changing the external geometry of Naghi’s LED package would preserve that junction. *Id.* Petitioner has not shown that a toroidal LED could be produced without fundamental alteration of the device’s semiconductor architecture. *Id.* The Board supplied no testimony, no prior art, and no technical analysis on any of these questions.

Independently, Petitioner has not identified any prior art device in this record that constitutes a toroidal LED. Petitioner has not identified any reference that

discloses the structure of a toroidal LED. Petitioner has not identified any reference that teaches how a toroidal LED would be fabricated. The Board supplied no such reference either. The shape-only theory rests entirely on the assumption that a toroidal LED is a known, available device that a POSITA could simply adopt. Nothing in this record supports that assumption.

Naghi's light source is "a wide-angle, white LED." Naghi col. 3, ll. 18-19. The wide-angle illumination it produces and the low power draw that makes Naghi's small power source viable, Naghi col. 3, ll. 21-23, are products of that internal semiconductor architecture. Bretschneider Supp. Decl. ¶¶ 118-119. They are not properties of an external housing shape that can be altered after the fact. That is not adapting Naghi's LED. It is designing a new device with no precedent anywhere in this record. The Board may not presume what Petitioner failed to prove. *In re Magnum Oil Tools*, 829 F.3d at 1380-81.

The record establishes three independent and un rebutted reasons why reshaping Naghi's LED into toroidal geometry is not a simple adaptation. First, producing a toroidal LED would require fundamental alteration of the device's semiconductor architecture, not merely a change in external shape. Bretschneider Supp. Decl. ¶ 119. There is no evidence that a POSITA would have understood what would be required to form a toroidal LED merely by viewing Dine's toroidal gaseous tube. Second, Naghi's LED is most likely a T1-3/4 through-hole device whose epoxy lens is molded directly over the semiconductor die and forms a unified optical system with the die geometry and reflector cup. That system cannot be reshaped without rebuilding it entirely. *Id.* ¶ 126. Third, converting Naghi's single LED into

a toroidal configuration would require consideration of, at minimum, a circuit board, a heatsink, optical diffusion elements, a larger power source, a stiffer arm, and stronger clamps, each of which directly contradicts Naghi’s explicit design objectives. *Id.* ¶¶ 128, 136-137. Petitioner has not addressed any of these consequences. Dr. Pattison’s declaration is silent on all of them. Pattison Decl. ¶¶ 59-65. The Board’s characterization of this modification as something that would “naturally” occur is unsupported by any evidence in this record.

D.3. Petitioner Has Not Shown the Adapted Device Would Preserve Naghi’s Core Characteristics

Obviousness requires a reasonable expectation of success in combining references to meet the limitations of the claimed invention. *Elekta Ltd. v. ZAP Surgical Sys., Inc.*, 81 F.4th 1368, 1375-76 (Fed. Cir. 2023). Even assuming Naghi’s LED could be adapted into a toroidal configuration, Petitioner has not shown that the resulting device would preserve the characteristics that make Naghi suitable for its intended purpose, as discussed below. Petitioner is silent on the Board’s theory on each of these questions. Dr. Pattison’s declaration does not address any of them. Pattison Decl. ¶¶ 59-65.

Wide-angle illumination. Naghi’s LED is specifically “a wide-angle” LED. Naghi col. 3, ll. 18-19. It “broadly cast[s] light across the entire page 112 or adjacent pages 112 of the reading publication 116.” Naghi col. 3, ll. 38-41. That wide-angle performance is a product of the LED’s internal optical architecture, including its die geometry, reflector cup, and integrated lens, all established at fabrication. Bretschneider Supp. Decl. ¶¶ 118-119. Based on Naghi’s figures, power source, and

the 2001 timeframe of Naghi’s filing, Naghi’s LED is most likely a T1-3/4 through-hole LED. Bretschneider Supp. Decl. ¶ 126. In that device, the epoxy lens is molded directly over the semiconductor die and is not a separable housing. *Id.* It works together with the die geometry and reflector cup as a unified optical system. *Id.* That system cannot be reshaped without rebuilding it entirely. *Id.* Petitioner has not identified which LED Naghi uses, has not shown what adaptation of that optical architecture would be required to preserve wide-angle performance in a toroidal configuration, and has not shown that such an adaptation is feasible. Bretschneider Supp. Decl. ¶¶ 118-119, 126. Dr. Pattison does not address any of these questions. Pattison Decl. ¶¶ 59-65.

Spectral output. Naghi’s LED “emits the full spectrum of visible light, unlike conventional light bulbs used in prior art reading lights.” Naghi col. 3, ll. 47-51. That spectral output is determined by the LED’s semiconductor architecture and phosphor coating, not its external shape. Bretschneider Supp. Decl. ¶ 118. Petitioner’s stated motivation is achieving “even, flattering lighting” for webcam users. Pattison Decl. ¶ 64. Whether the combined device achieves that motivation depends on whether the adapted LED preserves the spectral output of Naghi’s existing LED. Petitioner has not addressed that question. Pattison Decl. ¶¶ 59-65.

The cumulative effect of these unanswered questions is that the Board’s shape-only theory rests entirely on the unsupported assumption that Naghi’s LED can be adapted into toroidal form while everything that matters about it remains intact. That assumption is not evidence. It is not expert testimony. It is not prior art.

The Board may not presume what Petitioner failed to prove. *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369-70 (Fed. Cir. 2016).

D.4. Petitioner Has Not Identified a Toroidal LED in This Record, and No Reference Teaches How to Make One

The Board's shape-only theory requires that a toroidal LED was a known, available device that a POSITA could incorporate into Naghi's system as of January 2007. Petitioner has not established that premise on this record.

Petitioner has not identified which LED Naghi uses. Bretschneider Supp. Decl. ¶ 125. Without identifying which LED Naghi uses, Petitioner cannot show that modification into toroidal form is feasible. *Id.* Petitioner has not shown that Naghi's LED can be modified into toroidal form. Petitioner has not identified what toroidal shape the adapted device would take. Petitioner has not addressed how the adaptation would be accomplished. Petitioner has not shown that the adaptation would preserve the semiconductor junction that makes Naghi's LED function. Bretschneider Supp. Decl. ¶¶ 118-119. The Board supplied no testimony, no prior art, and no technical analysis on any of these questions.

Independently, no reference in these proceedings discloses a toroidal LED. Not Naghi, not Dine, not any of the references Petitioner relies upon across all grounds. Bretschneider Supp. Decl. ¶ 129. The toroidal light sources that appear in this record are gaseous discharge tubes and fluorescent lamps. None is an LED. None teaches anything about LED fabrication in a toroidal form factor. *Id.*

Dr. Pattison's own survey of prior art light sources identifies no toroidal LED. In paragraph 43, Dr. Pattison describes LED fixtures as using "numerous individual

LED devices integrated behind a diffuser and on a reflector.” Pattison Decl. ¶ 43. He identifies the toroidal light source options separately as “circular or toroidal shaped lamps such as the circline lamp type or compact fluorescent lamp (CFL) ‘twister’ lamps.” *Id.* He places LEDs in a distinct category from toroidal light sources. *Id.* He does not identify a toroidal LED. He does not cite any reference disclosing a toroidal LED. In paragraph 44, Dr. Pattison illustrates the prior art device most structurally similar to the claimed invention. Pattison Decl. ¶ 44. His chosen example is a fluorescent lamp, not a toroidal LED. *Id.* Petitioner’s own expert, when illustrating available toroidal light sources, relied on fluorescent devices. Bretschneider Supp. Decl. ¶ 129.

Importantly, Dr. Pattison does not identify any reference that teaches how a toroidal LED would be fabricated. Petitioner has not shown through any reference or testimony in this proceeding that such a fabrication process was known as of January 2007. These gaps exist because Petitioner could not support and never advanced the Board’s shape-only theory. Where the record contains no evidence that an adaptation was feasible or that the required device existed in this record, the Board may not presume either. *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369-70 (Fed. Cir. 2016).

D.5. Petitioner Bears the Burden; Patent Owner Need Not Rebut a Theory Petitioner Never Argued

The record on the shape-only theory is empty because Petitioner never developed it. Petitioner chose a substitution theory, developed evidence for a substitution theory, and submitted expert testimony supporting a substitution theory.

When the Board adopted a different theory at institution, it acted without the evidentiary foundation that the AIA requires a petitioner to supply. *In re Magnum Oil Tools*, 829 F.3d at 1380-81; *In re NuVasive, Inc.*, 841 F.3d 966, 972-73 (Fed. Cir. 2016).

Patent Owner's arguments in the Preliminary Response addressed the combination as Petitioner actually proposed it. The Board found those arguments "largely do not address the combination as proposed." Inst. Dec. at 26. But Patent Owner's arguments were directly responsive to what Petitioner proposed. They were non-responsive only to the Board's *sua sponte* recharacterization. Patent Owner had no prior opportunity to address that recharacterization because Petitioner had never argued it. *Magnum Oil* and *Koninklijke Philips* prohibit exactly this. The Board may not adopt a theory Petitioner never argued, find Patent Owner's response inadequate for failing to rebut it, and sustain the ground on that basis.

Petitioner may not use its Reply to supply the evidentiary foundation that is absent from the Petition. The shape-modification theory was never advanced in the Petition. Petitioner submitted no evidence in support of it. Dr. Pattison provided no analysis of it. A reply may only respond to arguments raised in the patent owner response. It is not an opportunity to introduce a new theory or to fill evidentiary gaps that the Petition left open. *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369-70 (Fed. Cir. 2016). The expedited nature of IPR proceedings brings with it an obligation for petitioners to make their case in their petition. *Id.* Any attempt by Petitioner to adopt the Board's shape-modification theory in its

Reply would be precisely the kind of new argument that 37 C.F.R. § 42.23(b) prohibits. *In re Magnum Oil Tools*, 829 F.3d at 1380-81.

E. Claims 2-6 Are Patentable for the Same Reasons as Claim 1.

Claims 2-6 depend directly or indirectly from claim 1. Because Petitioner has not demonstrated that the Naghi and Dine combination teaches or suggests the limitations of claim 1, the challenges to claims 2-6 necessarily fail. *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988).

VI. GROUND 1B: CLAIM 7 IS PATENTABLE OVER NAGHI, DINE, AND CHENG

Claim 7 depends from claim 1 and adds that the arm has a base that supports the illuminator device on a flat surface adjacent to the terminal. Petitioner argues that Cheng's base supplies this limitation. Pet. at 25–26.

Claim 7 is patentable for the same reasons as claim 1. Because the Naghi-Dine combination fails for the reasons set forth in Section V above, the addition of Cheng does not cure those failures. *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988). Moreover, Cheng is a digital presenter designed to photograph flat objects such as books placed beneath a camera. Cheng ¶ 0015. Cheng's camera images objects placed on a flat surface beneath it. It does not illuminate a user's face in front of a webcam. Bretschneider Decl. ¶¶ 70–73. Petitioner offers no explanation for why a POSITA would combine Cheng's base with a webcam illuminator. The motivation for that modification is unsupported in the record.

VII. GROUND 1C: CLAIMS 8 AND 9 ARE PATENTABLE OVER NAGHI, DINE, AND COOK

Claims 8 and 9 depend from claim 1 and add a fabric diffuser. Because the Naghi-Dine combination fails for the reasons set forth in Section V above, the addition of Cook does not cure those failures. *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988).

Cook is a collapsible fabric light modifier for photographers designed to create non-uniform lighting with deliberate shadow and depth effects. Cook ¶¶ 0001, 0003, 0013–0015. It has no arm or clamp and has no relationship to laptop computers or webcams. Cook is used to create dramatic lighting effects for photography. Cook ¶ 0003. Cook expressly states that its purpose is to “produce a lighting and shadowing effect on the subject that is similar to the lighting patterns utilized by the old masters in their oil paintings.” Cook ¶ 0003. That goal is the opposite of the uniform, flattering, shadow-free illumination the ‘729 Patent is designed to provide.

Petitioner offers no credible explanation for why a POSITA would incorporate Cook into a laptop-mounted webcam illuminator.

VIII. GROUND 2A: CLAIMS 1–7 ARE PATENTABLE OVER NELSON AND LUO

Petitioner’s theory for Ground 2A mirrors Ground 1A. Petitioner proposes substituting Luo’s lighting module for Nelson’s existing light source. Pet. at 31–32. That substitution theory fails for the same fundamental reasons as the Naghi-Dine substitution.

Nelson is a portable LED book light designed specifically for low light environments. Nelson ¶¶ 0001–0002. Nelson’s light source is an LED powered by batteries. Nelson ¶¶ 0021–0022. Nelson never mentions cameras, webcams, or facial illumination. Bretschneider Decl. ¶¶ 64–67. Nelson’s design goal is to be unobtrusive. Bretschneider Decl. ¶ 67. Use as a camera illuminator would require increasing the size and light output of Nelson’s device, resulting in precisely the obtrusive light source Nelson was designed to avoid. Bretschneider Decl. ¶ 67. A POSITA would have no motivation to modify Nelson in a direction that directly contradicts its stated design objective.

Luo is a gaseous discharge ring flash for film photography. Ex. 1013 at 1. Luo’s toroidal lamp tube is a gaseous discharge device powered by a dedicated power supply inserted into the flash socket of a camera. Ex. 1013 at 2. Luo friction-fits onto a camera lens mount. *Id.* The same power incompatibility that defeats the Naghi-Dine combination defeats the Nelson-Luo combination. Nelson’s LED light source operates on low-voltage direct current from batteries. Luo’s gaseous discharge tube requires high-voltage pulse power. Bretschneider Decl. ¶ 96. No combination of Nelson’s disclosed batteries can power Luo’s gaseous discharge tube. *Id.* Petitioner does not address this incompatibility anywhere in the Petition. Pet. at 27–34.

The same operating-mode incompatibility also applies. Luo produces a single burst flash synchronized with a film camera shutter. Ex. 1013 at 1–2. Nelson is designed for continuous low-level illumination. Nelson ¶ 0002. A webcam requires continuous illumination. Bretschneider Decl. ¶¶ 62–63. Adapting Luo’s flash

technology for continuous illumination would require the same fundamental redesign that defeats the Naghi-Dine substitution theory.

Luo friction-fits onto a camera lens mount. Ex. 1013 at 2. Nelson has no camera, no lens mount, and no mechanism for concentric ring attachment. Petitioner does not address how Luo's friction-fit mechanism would attach to Nelson's device or how shadow-free coaxial illumination would be achieved without a lens mount. Pet. at 27–34. The same coaxial mounting failure that defeats Ground 1A applies here with equal force.

Nelson already provides a path to shadow elimination without Luo. A POSITA would recognize that clipping a second Nelson device on the opposing side of the webcam eliminates directional shadows without any secondary reference or modification. Nelson ¶¶ 0030, 0032, 0037; Bretschneider Supp. Decl. ¶¶ 131–132.

Claims 2–7 depend from claim 1. Because Petitioner has not demonstrated that the Nelson-Luo combination teaches the limitations of claim 1, the challenges to claims 2–7 necessarily fail. *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988).

IX. GROUNDS 2B AND 2C: CLAIMS 8 AND 9 ARE PATENTABLE OVER NELSON, LUO, AND COOK

Claims 8 and 9 depend from claim 1. The Nelson-Luo combination fails for the reasons set forth in Section VIII above, and the addition of Cook does not cure those failures. *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988).

X. GROUND 3A: CLAIMS 1–4 AND 7 ARE PATENTABLE OVER CHENG AND MASAYUKI

Petitioner proposes substituting Masayuki’s lighting module for Cheng’s existing lamp. Pet. at 41. That theory fails on multiple independent grounds.

Cheng is a digital presenter designed to photograph flat objects such as books placed beneath the camera. Cheng ¶ 0015. Cheng’s lamp illuminates the book being imaged, not a user’s face. Bretschneider Decl. ¶¶ 70–73. Nothing in Cheng suggests use as a webcam face illuminator. Bretschneider Decl. ¶¶ 72–73. Petitioner argues Cheng can be used for videoconferencing, but the only subject Cheng images is a book placed beneath its camera. Cheng ¶¶ 0015, 0020; Bretschneider Decl. ¶¶ 99–100.

Masayuki is a fiber optic ring illumination device for stationary CCD cameras used in manufacturing inspection. Masayuki ¶¶ 0001–0002. Its light source is a separate external source connected by a fiber bundle. Masayuki ¶ 0008. The ring-shaped light emitting body is made of transparent acrylic, not a bulb. Masayuki ¶ 0010. The casing mounts rigidly around the lens of a CCD camera. Masayuki ¶ 0012. It has no arm, no clamp, and no adjustability. Bretschneider Decl. ¶¶ 74–75. Masayuki’s ring illumination depends on fixed, precise coaxial alignment with the camera lens axis. Masayuki ¶ 0012. Cheng has no lens mount and no mechanism for coaxial attachment. Cheng ¶¶ 0015, 0020. The same coaxial mounting failure that defeats Ground 1A applies here with equal force. Bretschneider Supp. Decl. ¶ 135.

Petitioner argues that Cheng’s lamp satisfies the arm limitation because the camera’s flexible arm allows the lamp to be repositioned relative to the camera. Pet.

at 38-39. That argument fails. Cheng's flexible arm is disposed between the camera and the base, not between the lamp and any terminal. Cheng ¶ 0015. The lamp is connected to the base directly. *Id.* No arm in Cheng is disposed between a bulb and a terminal as claim 1 requires.

Masayuki's priority date is August 11, 1997. Cheng's priority date is December 28, 2005. Petitioner proposes to improve in 2007 a recently developed LED-based presenter with a 1997 fiber optic industrial inspection device. A POSITA would not look to older, outdated fiber optic industrial inspection technology to improve a newer LED-based device. Bretschneider Decl. ¶ 106.

Claims 2–4 and 7 depend from claim 1. Because Petitioner has not demonstrated that the Cheng-Masayuki combination teaches claim 1, the challenges to those dependent claims necessarily fail. *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988).

XI. GROUNDS 3B AND 3C: CLAIMS 5, 6, 8, AND 9 ARE PATENTABLE OVER CHENG, MASAYUKI, AND NELSON OR COOK

Claims 5, 6, 8, and 9 depend from claim 1. Because the Cheng-Masayuki combination fails for the reasons set forth in Section X above, the addition of Nelson or Cook does not cure those failures. *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988).

XII. GROUND 4A: CLAIMS 10–13 ARE PATENTABLE OVER DU BREUIL AND DINE

Claim 10 requires “a plurality of bulbs, wherein said plurality of bulbs are disposed in the frame of the terminal and one of said plurality of bulbs surrounds the web camera.” ‘729 Patent, claim 10. The Board encouraged the parties to explore the construction of “surrounds.” Inst. Dec. at 30. As set forth in Section III above, Patent Owner submits that “surrounds” requires that one of the plurality of bulbs encircles or encloses the webcam.

Under any construction that requires a bulb to encircle or enclose the webcam, Du Breuil does not teach this limitation. Du Breuil’s Figure 1 shows a single contiguous light element circumscribing the screen, with the camera positioned above the screen. Du Breuil ¶ 0011. The light source circumscribes the screen, not the camera. Du Breuil’s Figure 2 shows two discrete vertical light elements placed on either side of the screen. Du Breuil ¶ 0018. Neither element surrounds the camera. Du Breuil’s Figure 7 shows discrete light sources dispersed around the screen. Du Breuil ¶ 0052. None of these light sources surrounds the camera.

Du Breuil expressly teaches recessing the light source behind the screen to prevent light from shining directly into the camera and distorting the image. Du Breuil ¶ 0016. Du Breuil also teaches placing light elements to the sides of the screen rather than near the camera “or the advantage of shining less light into or near camera 215.” Du Breuil ¶ 0018. Du Breuil’s express warnings against placing lights near the camera undermine any motivation to rearrange its lights to surround the camera. Petitioner has not addressed these warnings. Bretschneider Decl. ¶¶ 110–113.

Dr. Pattison characterizes Du Breuil’s Figure 2 as showing bulbs “positioned on either side of the webcam 215 to achieve a surrounding effect projecting light from various positions around the webcam 215.” Pattison Decl. ¶ 139. That characterization misreads Du Breuil. Figure 2 shows two discrete vertical light elements placed parallel to the left and right edges of the screen. Du Breuil ¶ 0018. Those elements are positioned on either side of the screen, not on either side of the webcam. The webcam in Du Breuil’s Figure 2 is positioned above the screen, separate from the light elements entirely. Du Breuil ¶ 0018. Two vertical light elements flanking a screen do not surround the webcam under any reasonable construction of “surrounds.” They flank the screen. Du Breuil itself confirms this: it teaches placing light elements to the sides of the screen specifically to avoid shining light “into or near camera 215.” Du Breuil ¶ 0018. A configuration expressly designed to keep light away from the camera does not surround the camera.

Petitioner argues it would have been obvious to try rearranging Du Breuil’s light elements because there are only four possible locations for the lights. Pet. at 48–49. That argument fails for two independent reasons. First, the characterization of four locations is wrong. Du Breuil discloses three distinct light configurations, and in each example the lights are positioned relative to the screen and below the camera. Du Breuil ¶¶ 0011, 0017–0018, 0052. There are not four options but effectively infinite placement options (above the camera in any one of many placement options, to left of camera in any one of many placement options, to right of camera in any one of any placement options, et cetera), which defeats obvious to try. *See Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.*, 520 F.3d 1358, 1364 (Fed.

Cir. 2008) (expert “simply retraced the path of the inventor with hindsight, discounted the number and complexity of the alternatives, and concluded that the invention ... was obvious.”). Second, Du Breuil expressly teaches keeping lights away from the camera to avoid distortion. Du Breuil ¶¶ 0016, 0018. A POSITA reading Du Breuil would be led away from placing any light to surround the camera, not toward it. Bretschneider Decl. ¶¶ 109–112.

Petitioner’s alternative argument that Dine supplies the surrounding limitation also fails. Petitioner’s stated motivation for combining Du Breuil with Dine is that the combined device would illuminate the subject uniformly free of any shadows. Pet. at 49. Du Breuil already recognized and addressed that precise problem. Du Breuil ¶ 0002 identifies poor lighting and shadow distortion as problems in video telephony. Du Breuil ¶ 0012 states that its lighting system solves those problems by improving image quality and reducing shadows. Petitioner identifies a problem Du Breuil does not have and proposes to solve it with a 1952 film photography flash device. There is no motivation to reach for Dine to solve a problem the primary reference already solved.

Dine attaches to a camera with a removable threaded lens mount. Dine col. 4, ll. 20–30. Du Breuil’s video telephone camera has no removable lens mount. Petitioner provides no explanation for how Dine’s threaded attachment mechanism would be applied to Du Breuil’s integrated camera. Pet. at 49–50. Petitioner has not shown that such an adaptation was feasible, was within ordinary skill, or would have preserved the functional benefit Dine provides. Bretschneider Decl. ¶ 113; Bretschneider Supp. Decl. ¶ 135. Additionally, Dine’s gaseous tube 10 has

substantially parallel portions that do not form a complete enclosure around the lens. Dine does not teach a bulb that surrounds the webcam under any construction of “surrounds.”

Claims 11–13 depend from claim 10. Because Petitioner has not demonstrated that Du Breuil alone or in combination with Dine teaches the limitations of claim 10, the challenges to claims 11–13 necessarily fail.

XIII. RPI

Patent Owner raised grave issues with Petitioner’s named Real Party in Interest in Patent Owner’s Preliminary Response (Paper 24) at pp. 3-10. As set forth therein, Petitioner and the other Newer Defendants are blatantly monkeying with the RPI requirement by not only shielding the real parties behind this IPR’s filing and prosecution, but also trying to have estoppel attach to only the defendant in the ‘5218 Litigation that has almost nothing to lose. The PTAB left the issue open at institution, allowing the parties to further develop the record. See Ins. Dec., at p. 11.

Patent Owner respectfully asserts that the evidence provided with the POPR is sufficient to meet its burden to “produce some evidence to support its argument that a particular third party should be named a real party in interest,” under *Worlds Inc. v. Bungie, Inc.*, 903 F.3d 1237, 1242 (Fed. Cir. 2018) and that Petitioner has failed to carry its burden of persuasion that the named RPI is correct. See *Id.* Patent Owner reserves all rights regarding this issue.

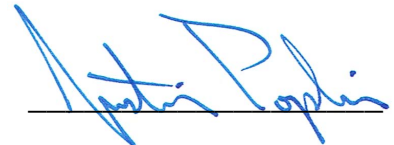
XIV. CONCLUSION

For the foregoing reasons, Patent Owner Pathway IP LLC respectfully requests that the Board confirm the patentability of claims 1–13 of U.S. Patent No. 7,841,729 and deny all grounds of unpatentability advanced in the Petition.

WORD-COUNT CERTIFICATE

The undersigned certifies that the foregoing Patent Owner's Response complies with the type-volume limitation of 37 C.F.R. § 42.24(a) and (b) and contains 13,656 words in 14-point Times New Roman font as calculated by the word count feature of Microsoft Office. This word count is inclusive of all text and footnotes but does not include the table of contents, table of authorities, certificates of service or word count, or exhibit list.

Dated: April 10, 2026

A handwritten signature in blue ink, appearing to read "Justin Poplin", is written over a horizontal line.

A. Justin Poplin, #53,476

CERTIFICATE OF SERVICE

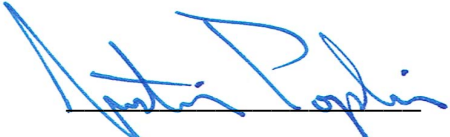
The undersigned certifies that the foregoing Patent Owner's Response was served on April 10, 2026 on counsel of record by filing this document through P-TACTS as well as by electronic mail to Petitioner's counsel at the following addresses indicated in Petitioner's Mandatory Notices:

Raymond Y. Chan
raymond.chan@glacier.law

Benjamin E. Weed
ben.weed@glacier.law

Wei Wang
wei.wang@glacier.law

Dated: April 10, 2026



A. Justin Poplin, #53,476

Dated: April 10, 2026

Respectfully Submitted,


/s/ Justin Poplin

A. Justin Poplin, #53,476
Hissan Anis, #65,943
Avek IP, LLC
7285 W. 132nd St., Suite 340
Overland Park, KS 66213
Phone: (913) 303-3841
jpoplin@avekip.com
hanis@avekip.com
Counsel for Patent Owner