UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JOHNSON & JOHNSON SURGICAL VISION, INC.,
Petitioner

v.

ALCON INC.,
Patent Owner.

IPR2021-00899
U.S. Patent No. 9,849,036

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

*All emphases and coloring added unless otherwise noted.

TABLE OF AUTHORITIES

Page(s)

Cases

Statutes

Other Authorities

TABLE OF EXHIBITS

Exhibit No.	Description
2001	Declaration of Edward A. DeHoog, Ph.D.
2002	Curriculum Vitae of Edward A. DeHoog, Ph.D.
2003	Joint Claim Construction Chart (August, 13 2021)
2004	International Publication No. WO 2019/118756 ("Bhawalkar")
2005	U.S. Patent No. 9,155,465 ("Abramoff I")
2006	U.S. Patent No. 10,694,945 ("Abramoff II")
2007	File History of U.S. Patent No. 6,561,166
2008	E. DeHoog et al., *Relating Wavefront Error to Visual Acuity in Pre and Post-LASIK eyes: A Comparison of Methods*, 37 JOSA 192–198 (2019)

I. INTRODUCTION

U.S. Patent No. 9,849,036 ("the '036") is a continuation of U.S. Patent No. 9,622,913 ("the '913").[1] The claims of the '036 are directed to imaging-based laser systems, methods, and computer readable medium storing instructions for performing a capsulotomy cut during cataract surgery. Like its parent, the '036's claims all require a "tracking band" with a "non-uniform z-depth." Ex.1001 at cls. 1, 7, 13. This feature was the focus of a lengthy prosecution of the '913, and ultimately found to be missing from the prior art. None of the references cited by Petitioner disclose this feature. A benefit of the '036's claimed invention is an increase in precision and control over cataract treatment procedures, especially when a lens is tilted relative to the optical axis (or z-axis) of the system. Petitioner's IPR petition against the '036 should be denied on discretionary grounds ***and*** on the merits.

The '036's parent—the '913—issued after prosecution spanning more than three years, six RCEs, and four Examiners, during which the Office applied the same reference Petitioner relies on, Angeley, in each of seven rejections, two interviews, two advisory actions, and a pre-appeal conference. Despite this extensive

[1] Petitioner has also requested *Inter Partes* Review of the '913. *See* IPR2021-00898.

examination of Angeley at every step of the way, the time and attention the four Examiners demonstrably spent reviewing Angeley, the 152 combined pages of discussion and analysis between the Office and Patent Owner ("PO") concerning Angeley, Petitioner requests that the Office now expend additional resources analyzing Angeley, incorrectly contending that this would be "***the first time***" the Office considered the full disclosure of Angeley. Pet. at 2. But Petitioner contends only that the Office failed to appreciate Angeley's paragraph [0090] and Figure 15 purportedly illustrating a capsulotomy of a tilted lens. However, Angeley's paragraph [0078], which is Angeley's primary teaching of a capsulotomy cut on a tilted lens, was discussed over and over again during the parent prosecution, and the Office concluded by allowing the '913 and '036 claims that it did not disclose or render obvious the claimed "tracking band" having "non-uniform z-depth." The generalized disclosure of paragraph [0090] is duplicative of the more specific teachings of paragraph [0078] and simply fails to teach the claimed tracking band. The Office did not err in allowing these claims over Angeley and the Board need not revisit Angeley.

The same is true for Palanker, which is the only reference besides Angeley asserted in the Petition. Pet. at 2. As Petitioner concedes, Palanker is merely a commercial embodiment of Angeley, and it is thus far from new compared to what the Office already considered when reviewing Angeley. Moreover, Petitioner's use

of Palanker depends on a flawed interpretation of Palanker's Figure 3A. Cited solely for its alleged teaching of the claimed "tracking band," Palanker does not even address the circumstance of a tilted lens and is, thus, irrelevant. Even so, Petitioner presents with Palanker the same arguments already considered by the Office—and overcome by PO—during its thorough evaluation of Angeley's paragraph [0078]. Thus, the Board should exercise its discretion and deny institution because the same art and substantially the same arguments were previously presented to the Office, and Petitioner failed to demonstrate that the Office erred in a manner material to the patentability of the Challenged Claims.

Beyond these discretionary reasons, the Board should deny institution on the merits. Across its three redundant grounds, Petitioner fails to identify any prior art with the claimed "tracking band" having a "non-uniform z-depth." Petitioner's anticipation ground, Ground 1, fails because Angeley—as the Office previously concluded—does not disclose every limitation of any Challenged Claim. Angeley's paragraph [0090] is consistent with the decision by the Office to allow these claims and the Office's apparent realization that Angeley as a whole teaches nothing more than a prior art solution.

Petitioner implicitly acknowledges Angeley's deficiency by proposing alternative obviousness arguments in Ground 2 (obvious over Angeley) and Ground 3 (obvious over Angeley and Palanker). Yet, Palanker provides no instruction on

how to perform a capsulotomy when a lens is tilted. Left with a bare obviousness argument over Angeley and no secondary reference disclosing the claimed feature, Petitioner fails to explain why a person of ordinary skill in the art ("POSITA") would have modified Angeley in the manner proposed, relying instead on hindsight-inspired rationales.

Because Petitioner fails to establish a reasonable likelihood that the Challenged Claims are unpatentable, seeks review based on prior art that is the same as (Angeley) or cumulative of (Palanker) art and arguments the Office previously considered, and fails to demonstrate that the Office materially erred, the Board should deny institution.

II. BACKGROUND

A. The '036

The '036 relates to improvements in laser cataract surgery. Ex.1001 at 1:7–11. During a laser cataract surgery, a femtosecond laser is used to perform the capsulotomy and lens fragmentation procedures. *Id.* at 1:21–53. The capsulotomy[2] procedure involves forming a circular cut on the anterior (or top) portion of the capsular bag of the lens with the laser, while lens fragmentation involves using the

[2] The capsulotomy cut is also referred to as a capsulorhexis, and these terms will be used interchangeably in this Response.

laser to cut or fragment the clouded, cataractous lens into many pieces. *Id*. The cut generated during the capsulotomy procedure allows the surgeon to access and remove the lens fragments. *Id.* While these two steps can be performed sequentially in either order, the first procedure performed necessarily compromises the precision of the second procedure. *Id.* at 1:61–2:25. The '036 is directed to this challenge. *Id.* In particular, the '036 describes an imaging-based laser system for controlling the power of a pulsed ophthalmic laser during the capsulotomy procedure in order to improve overall precision and control during cataract surgery. *Id.*; *see also* Ex.2001, ¶¶35–50.

In general, the capsulotomy cut can be made by directing the laser pulses along a scanning circle 254 having the desired capsulotomy diameter and along a depth-range in the z-direction (*i.e*., parallel to the optical axis of the laser system) that ensures the complete transection of the lens capsule. Ex.1001 at 5:59–6:5. This scanning pattern for the laser can be referred to as the "cut-cylinder" and is illustrated in Figure 4A of the '036, which has been annotated and is reproduced below. The "cut-cylinder" is the blue-shaded region having a height of "Dcut," while the actual capsulotomy cut 250 occurs where the cut-cylinder 260-c intersects the lens capsule 222. *Id.* at 5:65–67; *see also* Ex.2001, ¶38.

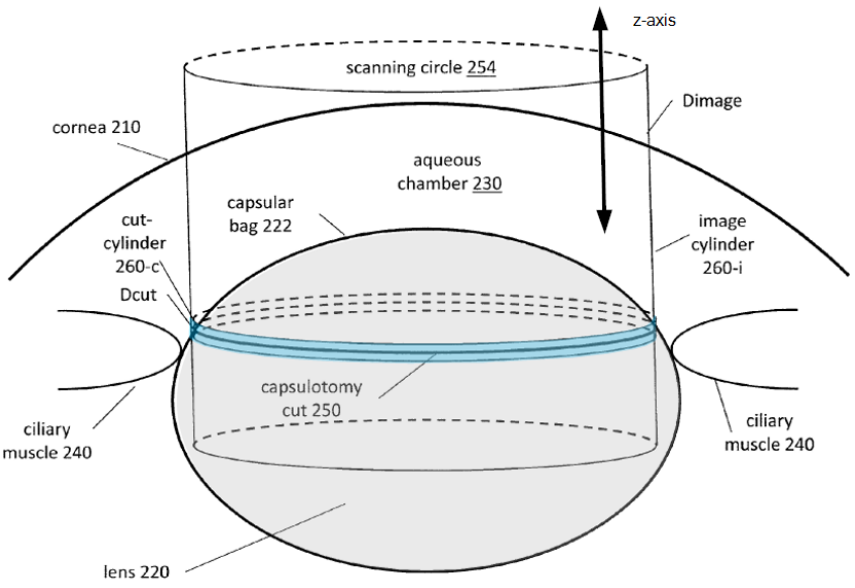


FIG. 4A

This step is complicated when the lens has an uneven shape or is tilted relative to the z-axis of the laser system. Ex.1001 at 2:10–20, 11:5–26. Tilt, for example, can occur when docking the surgical system to the eye pushes the lens sideways. *Id.* at 6:24–30. Applying suction to immobilize the eye during surgery can also cause lens tilt. *Id*. Lens tilt can also arise due to previous ophthalmic trauma or a prior lens fragmentation. *Id.* at 11:9–11. The inability to adjust to a tilted lens can lead to incomplete transection of the capsule. *Id.* at 6:36–39; *see also* Ex.2001, ¶39.

Prior art systems adjusted for a tilted lens by cutting with a much-enlarged depth range. This approach uses a much thicker cut-cylinder to make the capsulotomy cut, as illustrated in Figure 4B of the '036, reproduced below with the cut-cylinder again, shaded blue.

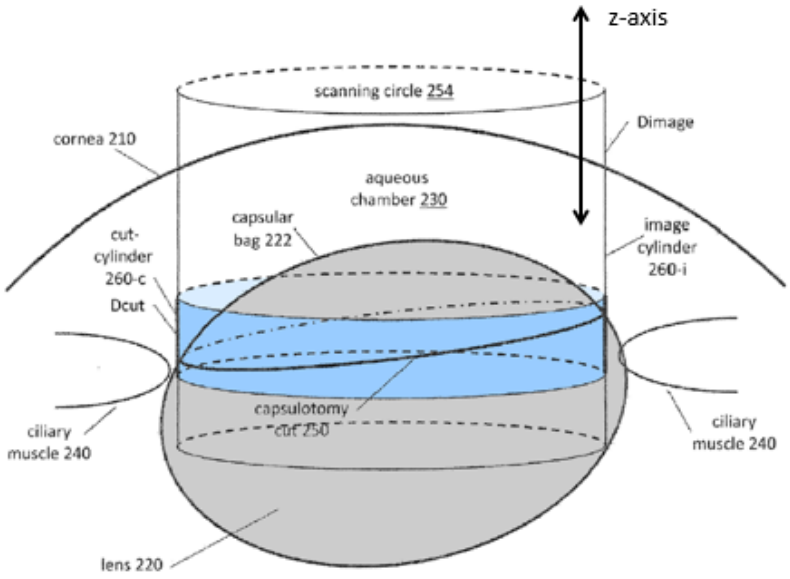
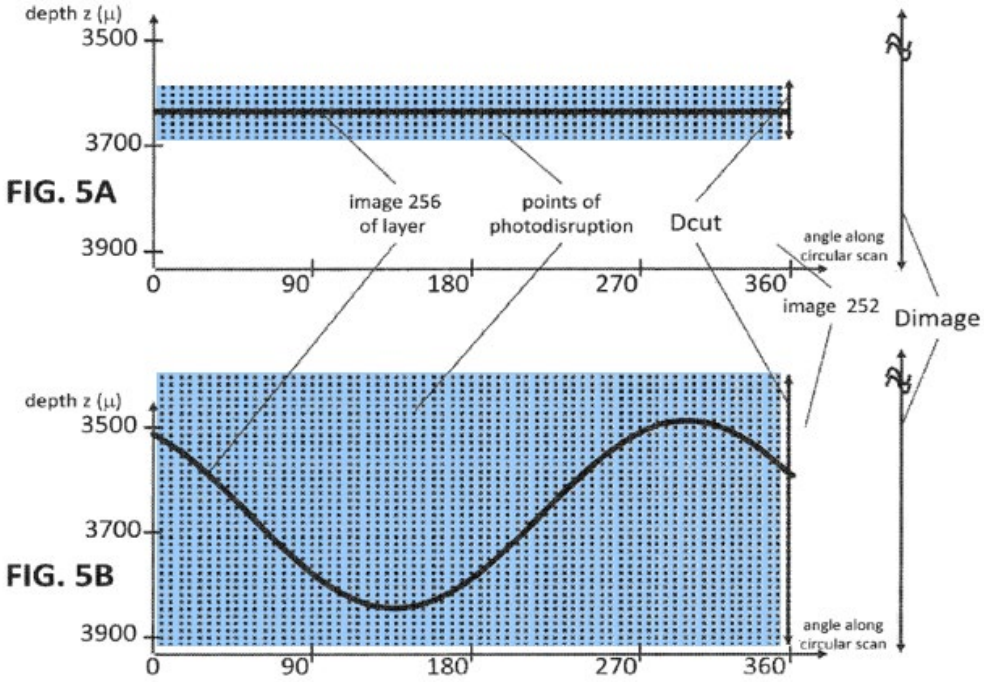


FIG. 4B

Ex.1001 at 6:35–47, Fig. 4B; Pet. at 6. This enlarged cut-cylinder thickness, hereinafter referred to as the "prior art solution," ensures proper transection of the capsule even though tilted relative to the z-axis. *Id.* at 6:35–47. The prior art solution, however, has several disadvantages. *Id.*; *see also id.* at 2:10–20, 6:10–16, 10:12–32; *see also* Ex.2001, ¶¶40–41. For example, this approach can create 4–6 times more photodisrupted bubbles than the procedure for a non-tilted lens. Ex.1001 at 6:35–47; Ex.2001, ¶41. Such an increased quantity of capsulotomy bubbles can substantially scatter the laser pulses of a subsequent lens fragmentation step, compromising surgical precision and efficacy. Ex. 1001 at 6:35–47. Figures 5A and 5B, annotated and reproduced below, illustrate this increase in photodisrupted bubbles by

contrasting the cut-cylinder of the non-tilted lens (Fig. 5A) with the cut-cylinder of the tilted lens (Fig. 5B).



The '036's inventive solution improves upon the prior art by substantially reducing the number of photodisrupted bubbles in proximity of the capsulotomy cut. Ex.1001 at 7:5–15; *see also* Ex.2001, ¶42. By adjusting a power parameter of the laser based on a "tracking band," which defines the cut to be made in the eye, the '036 may reduce the scattering of the lens-fragmenting bubbles by a factor of 4–6. Ex.1001 at 7:5–15; *see also id.* at cls. 1, 7, 13. This is illustrated, for example, in Figure 6B, reproduced below, where the points with high laser-power are placed within the tracking band, which is shaded green. *Id.* at 7:19–24, cls. 1, 7, 13. The tracking band

has a non-uniform z-depth, and the illustrated "points with low laser-power" outside the tracking band have insufficient power to photodisrupt and cut the tissue.

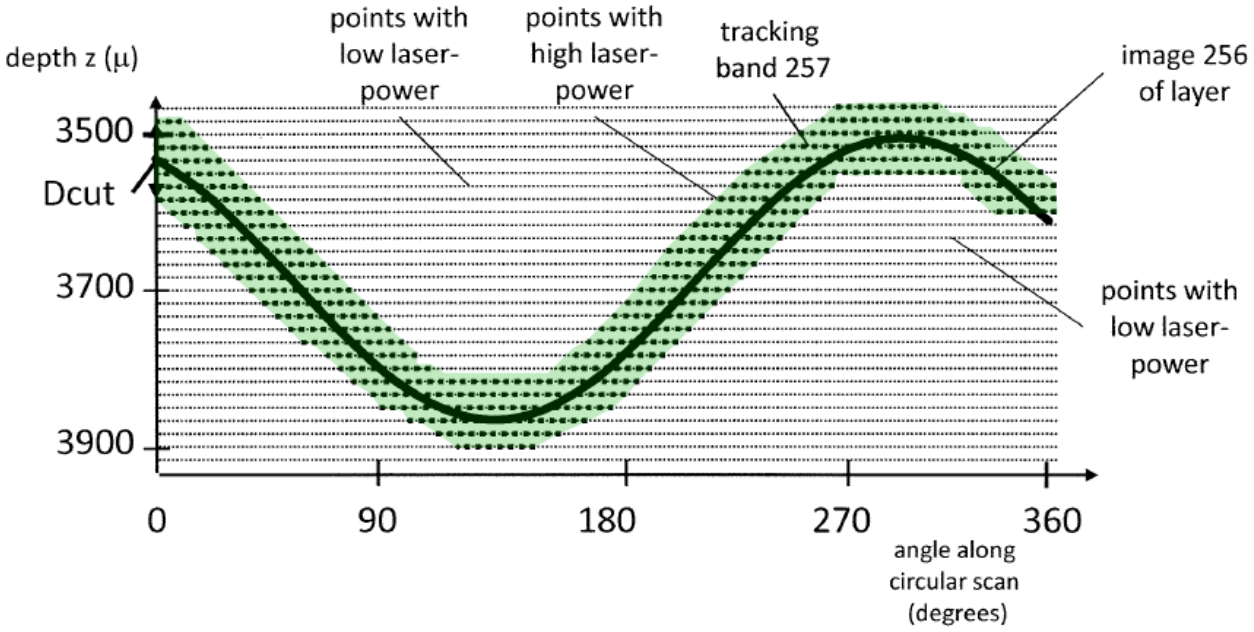


FIG. 6B

The location and shape of the "tracking band" are determined based on an image showing the tilt of the lens relative to the optical axis (or z-axis) of the laser system.[3] *Id.* at cls. 1, 7, 13; *see also* Ex.2001, ¶43. Through analysis of the image (*e.g.*, via feature recognition techniques or operator review), the z-depths of a sequence of points that correspond to a tilted layer can be determined. Ex.1001 at cls. 1, 7, 13; *see also id.* at 7:60–9:8, 9:38–67; *see also* Ex.2001, ¶¶43–45. The

[3] Optical and z-axis are used interchangeably. Ex.1001 at cls. 1, 7, 13. *See, e.g., id.* at 5:56–7:29, Figs. 4B, 6A.

tracking band is then generated from these z-depths having a lower boundary at a non-uniform z-depth that varies according to the determined z-depths. Ex.1001 at cls. 1, 13, 17*; see also* Ex.2001, ¶43.

The claimed technique not only reduces the laser energy incident on (and absorbed by) tissue in the eye, but also allows the capsulotomy step to be performed before a lens fragmentation step, further reducing surgical time, patient discomfort, and operational efficacy. Ex.1001 at 10:12–39; Ex.2001, ¶¶45–50. Moreover, reducing the photodisrupted bubbles that scatter the laser during the fragmentation procedure results in "a considerable gain in precision and control." Ex.1001 at 7:10–15.

B. Overlap with the '913

The '036 is a continuation of the '913, and the '036 and '913 have identical specifications. As explained above and as shown in the table below, all claims of both the '913 and the '036 include the "tracking band" feature,[4] which was the central focus of the extensive '913 prosecution.

'913 Claim 1	**'036 Claim 1**
generate a tracking band within the cylindrical scan pattern defining a cut to	generate a tracking band within the scan pattern defining the incision to be made

[4] Words in red show difference between the two claims.

be made in the eye, wherein a lower boundary of the tracking band has a non-uniform z-depth that varies according to the determined z-depths of the sequence of points corresponding to the imaged layer	in the eye, wherein a lower boundary of the tracking band has a non-uniform z-depth that varies according to the determined z-depths of the sequence of points corresponding to the imaged layer
'913 Claim 1	**'036 Claim 7**
generate a tracking band within the cylindrical scan pattern defining a cut to be made in the eye, wherein a lower boundary of the tracking band has a non-uniform z-depth that varies according to the determined z-depths of the sequence of points corresponding to the imaged layer	generating, with the imaging-based laser-controller, a tracking band within the scan pattern defining the incision to be made in the eye, wherein a lower boundary of the tracking band has a non-uniform z-depth that varies according to the determined z-depths of the sequence of points corresponding to the image of the layer
'913 Claim 1	**'036 Claim 13**
generate a tracking band within the cylindrical scan pattern defining a cut to be made in the eye, wherein a lower boundary of the tracking band has a non-uniform z-depth that varies according to the determined z-depths of the sequence of points corresponding to the imaged layer	generate a tracking band within the scan pattern defining the incision to be made in the eye, wherein a lower boundary of the tracking band has a non-uniform z-depth that varies according to the determined z-depths of the sequence of points corresponding to the image of the layer

Petitioner has requested IPR of both the '913 and '036 patents. *See* IPR2021-00898. The three grounds asserted in the '036 Petition are identical to the three grounds asserted in the '913, and are deficient for the same reasons. Namely, the Petitioner has failed to show the Office erred with respect to art and arguments already considered by the Office during prosecution of the '913. Additionally, no reference in the Petition teaches the above "tracking band" limitation, nor does any reference or combination cited in the Petition render it obvious. Accordingly, the Board should deny institution of the '036 Petition for substantially the same reason as the '913 Petition, which are repeated herein.

III. OVERVIEW OF ASSERTED REFERENCES

A. Angeley

Angeley describes a laser system for cataract surgery. *See* Ex.1006 at cl. 1, Abs. In particular, Angeley recognizes that the placement of capsulotomy and other ocular incisions can benefit from visualization of the capsule. *Id.* [0005]–[0007]. For example, capsulorhexis incisions that are off-center can lead to undesirable cuts in the iris or other regions of the eye. *Id.* [0006]; *see also* Ex.2001, ¶57. Thus, Angeley is largely focused on integration of a laser treatment system with an optical imaging system capable of imaging internal structures of the eye. Ex.1006, [0008]–[0012].

With respect to the capsulotomy procedure in particular, Angeley describes centering or "image guided alignment of a capsulorhexis incision." *See id.* [0013].

Angeley provides extensive discussion regarding methods for determining the placement of the capsulorhexis cut, *i.e.*, adjusting the location and diameter of the cut so that it is properly centered on the capsule. *Id.* [0066]–[0077]. Once the location is determined, Angeley's system creates a capsulorhexis cut by scanning a laser beam in a pattern that is cylindrical in shape. *Id.* [0078], Fig. 9. As illustrated in Figure 9 of Angeley, reproduced below, the lower boundary of this cut-cylinder (*see* 400B) has a uniform z-depth. *See id.* at Fig. 9 below (the cut-cylinder is shaded blue)*; see also* Ex.2001, ¶58.

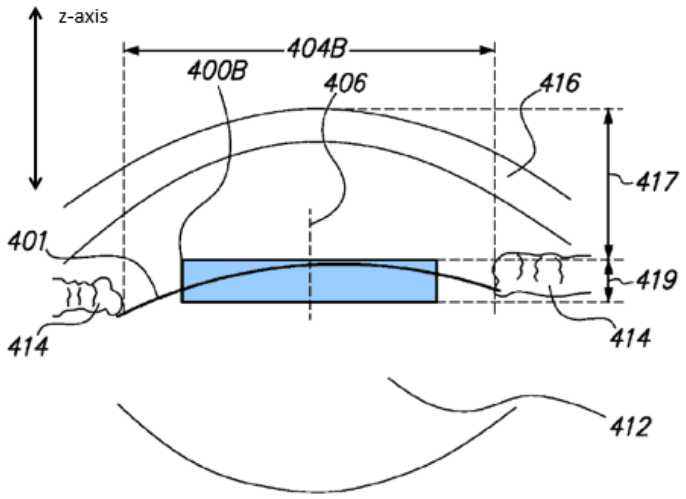


FIG. 9

Angeley goes on to explain in paragraph [0078] how to use the "depth thickness 419" to compensate for a "tilt of the capsule:"

> There is an extent to the cut in Z, i.e. the depth thickness 419, in order to take into account variations in the depth of the targeted capsule cut locations throughout the entire cutting procedure. These variations can arise ***from tilt of the capsule***, decentration of the capsule, movement of structures, and tolerances in the UF, OCT, & video systems. The process of cutting the capsule involves stepping an amount 419 in depth to ensure that the capsule is intersected by the cutting mechanism (e.g. the plasma) generated by the UF beam.

In other words, Angeley's approach uses the "extent" or "depth-thickness 419" of the cut-cylinder to take into account lens tilt. Thus, Angeley teaches the same prior art solution described above in Section II. Ex.2001, ¶59. Although Angeley describes using high-resolution OCT images of the eye in order to determine and minimize the depth thickness 419 of the cut, this determined depth thickness has a uniform z-depth. Unlike the claimed solution, Angeley does not teach generating a tracking band having a non-uniform z-depth. *Id.*

Angeley's paragraph [0090] and Figure 15, which are the focus of Petitioner's arguments, are less informative but consistent with the teachings of paragraph [0078]. Ex. 2001, ¶60. As shown below, Figure 15 illustrates how the lens can be

tilted relative to the optical axis. There is no cut or scan pattern illustrated in Figure 15.

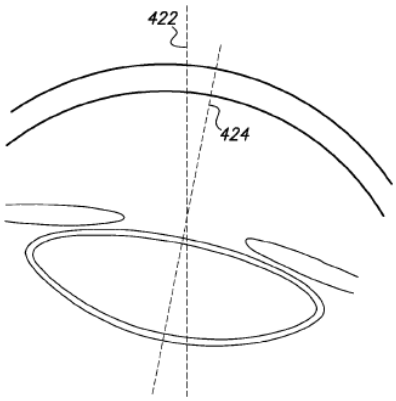


FIG. 15

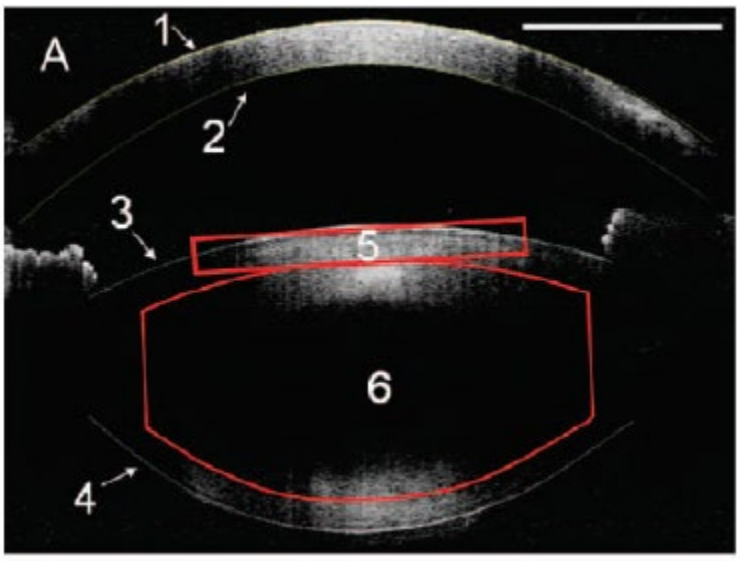
Paragraph [0090] states, in part: "FIG. 15 is a cross-sectional schematic of the eye showing a tilted capsulorhexis incision plane. Its [sic] shows a tilted lens and ideally the cut for the capsule will follow this tilt." Ex.1006, [0090]. However, a "tilted capsulorhexis incision plane" also occurs with the prior art solution—*i.e.*, it is the natural result when the cut-cylinder intersects the tilted lens creating the capsulotomy cut. Ex.2001, ¶60; *see also infra* Section V.A. Likewise, as Angeley explains in paragraph [0078], the prior art solution "follows" the tilt by enlarging the cut-cylinder depth thickness to fully transect the lens capsule. *See, e.g.*, Ex.1006 [0078] ("stepping an amount 419 in depth to ensure that the capsule is intersected by the cutting mechanism"). Thus, as explained in further detail below, a POSITA would have understood paragraph [0090] to disclose the prior art solution described in paragraph [0078]. Ex.2001, ¶60.

B. Palanker

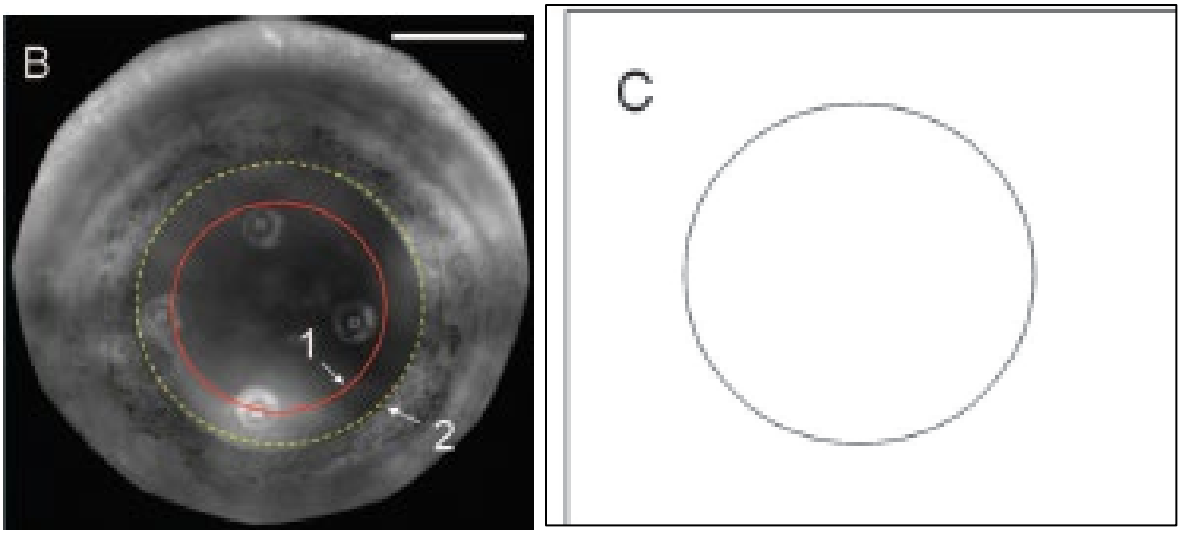
Palanker describes the results from a study in which a femtosecond laser-assisted cataract surgery system with integrated optical coherence tomography is used to perform a capsulotomy, lens segmentation, and corneal incisions. Ex.1009 at 2–3. Similar to Angeley,[5] the placement of the cuts were determined by imaging the anterior segment of the eye using optical coherence tomography. *Id.* at Abs. Also similar to Angeley, Palanker states that a "typical pattern for a capsulotomy (Fig. 3C) is a cylinder …." *Id.* at 8; *see also* Ex.2001, ¶61.

Palanker's Figure 3 provides further illustrations of the performed capsulotomy. In particular, Figure 3A (reproduced below) states that it shows a "capsulotomy pattern (5)."

[5] Indeed, Petitioner asserts that Angeley and Palanker describe the same alleged prior art system. *See* Pet. at 53 ("The Palanker article thus discloses the commercial embodiment of Angeley's laser-based system for cataract surgery.").

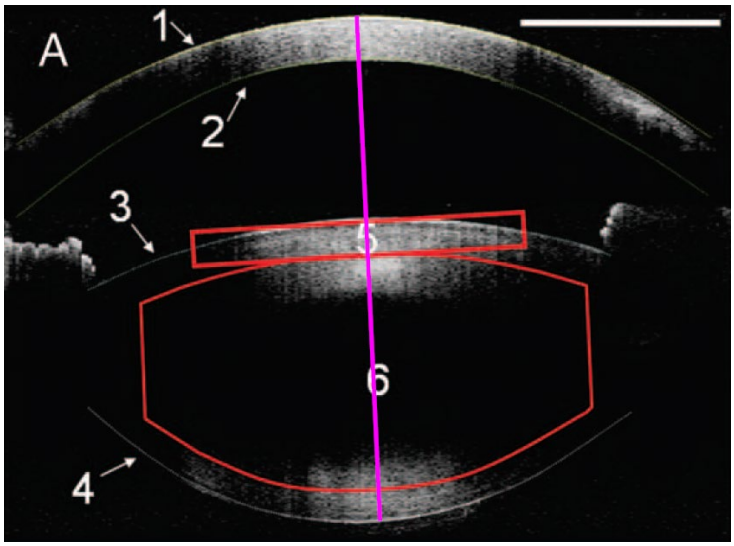


Although the red box labeled as "5" appears tilted relative to the boundaries of this image, the teachings in Palanker clarify that neither the red box 5 nor the lens are tilted relative to the optical axis of the laser system. Ex.1009 at 4; Ex.2001, ¶62. For example, were the cut to be tilted, it would appear from the top view as an ellipse, not a circle. Ex.2001, ¶62. However, Palanker's capsulotomies, also illustrated in Figures 3B and 3C, are circular. Specifically, Figure 3B shows a "[v]iew of the eye via the near-infrared video camera, with overlaid guidance lines indicating a planned capsulotomy pattern (1)," and Figure 3C shows a "[t]op view of the circular capsulotomy pattern …" at left. Ex.1009 at 4. Both of these figures are reproduced below, and both are circles.



Moreover, Figure 4 shows and describes the "circular line" of the capsulotomy cut. *Id.* at 5. Thus, Palanker discloses a capsulotomy cut applied to a non-tilted lens Ex.2001, ¶62.

This conclusion is further supported by Figure 3A itself, which includes regions of higher intensity (appearing in the image as white areas) that are characteristic of the higher intensity scattering expected along the optical axis of the imaging system. Ex.2001, ¶63. Consequently, the POSITA would place the optical axis of the system at a slight tilt, as shown below in purple. *Id.* But, consistent with above, neither the red box nor the lens is tilted with respect to the optical axis. *Id.*



Palanker's description of the laser scanning pattern used to generate the capsulotomy also supports this understanding of the optical axis location. In particular, Palanker describes the capsulotomy pattern as a "spiral pattern" that was "applied from posterior to anterior, thereby ensuring intersection of the incision with the anterior lens capsule in between." Ex.1009 at 4–5. A POSITA would have understood that a "spiral" pattern would have been centered on the optical axis of the system, with each consecutive turn of the spiral tracing out a circle of the same diameter, thereby creating the rectangular shape shown as #5 in Figure 3A when viewed from the side and with the optical axis shown in purple. Ex.2001, ¶64.

Petitioner's interpretation of Palanker's Figure 3A is incorrect: Palanker does not disclose a "tilted red box 5" or a "tilted lens." Ex.2001, ¶¶61–64; *C.f.* Pet. at 13.

IV. PERSON OF ORDINARY SKILL

Petitioner asserts that a POSITA related to the '036 would have had "at least a Bachelors' degree in a laser-related engineering or physics field, and several years of work experience in designing laser-based systems for eye surgery." Pet. at 17. Petitioner also asserts that a POSITA "may have worked with an ophthalmologist." *Id.* PO's expert, Edward A. DeHoog, Ph.D., satisfied Petitioner's definition of a POSITA by the date of the invention in 2011, and in fact he has far more education and training than Petitioner would require. Ex.2001, ¶¶5–16, 51–55.

V. THE BOARD SHOULD DENY INSTITUTION UNDER § 325(D)

The Petition presents the same art and arguments that the Office previously analyzed and fails to show that the Office materially erred during prosecution. The Board should thus exercise its discretion under § 325(d) and deny institution.

The Board's most recent precedential decision addressing § 325(d) provides a two-part framework. *See Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (designated precedential on March 24, 2020). First, the Board considers "whether the same or substantially the same" art or arguments "previously were presented to the Office." *Id*. Second, if the first prong is met, the Board then considers "whether the petitioner has demonstrated that the office erred in a manner material to the patentability of challenged claims." *Id.*

Within the two-part framework, six non-exclusive *Becton Dickinson* factors guide the Board's discretion:

> (a) the similarities and material differences between the asserted art and the prior art involved during examination;
> (b) the cumulative nature of the asserted art and the prior art evaluated during examination;
> (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
> (d) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art;
> (e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and
> (f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments.

Id. at 9–10 (citing *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17–18 (PTAB Dec. 15, 2017) (designated precedential on March 24, 2020)). Factors (a), (b), and (d) relate to the first prong, while factors (c), (e), and (f) relate to the second. *See Advanced Bionics* at 10.

With respect to the first prong, Petitioner concedes this is met. Pet. at 56. The Petition asserts three grounds: (1) anticipation by Angeley, (2) obviousness over Angeley, and (3) obviousness over Angeley in view of Palanker. Pet. at 2. The Office

closely examined Angeley, the sole or primary art applied in all three grounds of the Petition, and the Palanker reference is cumulative of Angeley and of arguments already considered during prosecution.

Regarding the second prong, Petitioner fails to meet its burden of showing a material error by the Office. Petitioner argues that the Office "erred in a manner material to the patentability of the challenged claims by overlooking key portions of Angeley." Pet. at 55. This alleged "key portion" is Angeley paragraph [0090] and Figure 15. *Id.* at 57–58. As discussed in more detail below, this portion of Angeley is duplicative of paragraph [0078], which was discussed at length during the parent prosecution. Further, the Office considered and reconsidered Angeley's "generalized teachings" throughout the '913's extensive examination. The omission of a citation to paragraph [0090] speaks louder to its irrelevance than to any material error on the part of the Office.

The Board should thus deny institution to avoid wasting its limited resources on duplicating the Office's prior thorough and proper analysis of the same art and arguments.

A. Petitioner Fails to Show that the Office Materially Erred in Evaluating Angeley.

Each ground in the Petition depends primarily upon Angeley—the very prior art reference at issue at each and every stage throughout the parent prosecution

spanning over three years, six RCEs, four examiners, seven rejections, two interviews, two advisory actions, and a pre- appeal conference. Yet despite the countless hours and a combined 152 pages of argumentation between PO and the Office regarding the teachings of this single reference, Petitioner wants a do-over. Petitioner's position that, at no point throughout this extensive prosecution of the '913 did either of the Examiners, or the two SPEs sitting on the pre-appeal panel, appreciate the teachings of paragraph [0090] and Figure 15 is not just implausible, it is not credible.

In addition to the reasonable inference that at least one of the four Examiners took it upon themselves to read Angeley's entire disclosure at some point during the parent prosecution, the record also makes clear that the Examiner endeavored to review and re-review Angeley's disclosure in order to understand the reference as a whole. For example, the Examiner summarized his July 2, 2015 interview with PO as follows:

> 1. Applicant reads Angeley as not teaching a three-dimensional path for cutting that has local variations in depth. (While the instant invention does not utilize feedback during the cutting process, the instant invention pre-determines the cutting path which has local variations in depth.) ***Examiner will review Angeley*** to determine whether there is sufficient suggestion in Angeley to construe "3-dimensional path for the cutting" to include local variations in depth.

> 2. Applicant reads Angeley as not teaching variations of laser-power parameters. See, e.g., para [0039], which appears to disclose holding pulse duration constant (while utilizing compensation by other optical components). ***Examiner will review Angelely*** [sic].

See Ex.1003 at 967; *see also id.* at 876 (interview summary noting that "***Examiner will reconsider [Angeley]***"). Although representing just one aspect of a robust prosecution, the interview summaries highlight that when PO pressed the Examiner to substantiate the positions in his rejections, including whether Angeley teaches a tracking band having a non-uniform z-depth, the Examiner expressly indicated that he would yet again reevaluate the reference to determine if it does in fact read on the claims.

Consistent with these statements, the Examiner repeatedly noted Angeley's more generalized teachings throughout the parent prosecution. *See, e.g.*, Ex.1003 at 1154 ("However, Angeley's disclosure, ***considered as a whole***, strongly suggests that variations in depth of cut are within the scope of Angeley's teachings."); *id.* at 1115 ("Applicant cites para [0078] in Angeley for the proposition that the teaching, as a whole, is narrowly limited to 'a uniform lower boundary z-depth.' However, ***read in its entirely*** [sic], ***Angeley's disclosure is more generalized***."); *id.* ("Therefore, although Fig, 9 depicts a special case, ***Angeley's teaching is more general***, strongly suggesting a lower boundary of a tracking band that has a non-

uniform z-depth that varies according to the determined z-depths of the sequence of points corresponding to the imaged layer."); *id.* at 1116, 1123 ("given ***Angeley's generalized teaching***, it would be obvious …").

If Petitioner were indeed correct that the Office did not consider paragraph [0090], it would mean that the Examiner, while repeatedly straining to piece together evidence from within a single reference to support the argument that Angeley teaches or suggests the claimed tracking band having non-uniform z depth, failed to find the very thing he was looking for: Angeley's capsulotomy cutting procedure for a tilted lens. Indeed, it strains credulity to suggest that none of the four Examiners that considered Angeley chose to search Angeley for the word "tilt"—especially given that claim 1 of the '913 expressly recites an "eye that is tilted." This word appears only in Angeley's paragraphs [0078], [0090] and the description of Figure 15.

Rather, the more logical—and correct—explanation is that Angeley's paragraph [0090] simply does not teach the claimed tracking band having non-uniform z depth. This disclosure is entirely duplicative of paragraph [0078], which was heavily discussed throughout the parent prosecution. *See, e.g.*, Ex.1003 at 444, 815–18, 827–29, 868–71, 876, 925–27, 935, 995, 998, 1013–14, 1054, 1083, 1108, 1115, 1145–47, 1154–58. Angeley's paragraph [0078] is the primary portion of Angeley teaching Angeley's method for performing a capsulotomy cut, and this

paragraph also provides Angeley's method for adjusting for the tilt of the lens. Consequently, this paragraph was, not surprisingly, the central focus of at least ***sixteen*** correspondences during prosecution of the '913. *Id.*

Paragraph [0078] explains that the capsulorhexis cut is created by scanning a laser through "a cylindrical shape (extruded circle or ellipse)" scan pattern depicted in Figure 9 as a box (below, shaded blue) with a uniform z-depth. Angeley states that the "entire cut circumscribes a volume with a Z location 417 and a depth thickness 419." Ex. 1006.

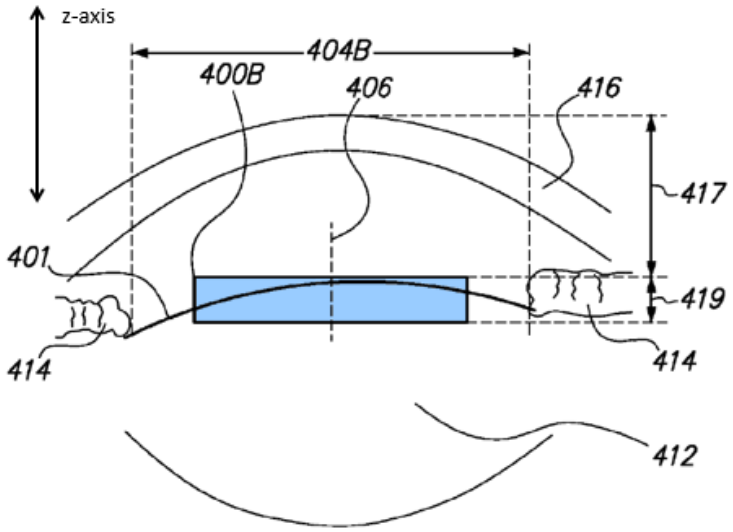


FIG. 9

Paragraph [0078] goes on to explain that "variations in the depth of the targeted capsule" can occur when the lens is tilted. Angeley uses "the extent to the cut in Z, *i.e*. the depth thickness 419, in order to take into account" these variations. *Id.* Thus,

Angeley uses the "depth thickness 419" to adjust for tilt, which is exactly the prior art solution of the '913 and '036, illustrated below in Figure 4B. Ex.2001, ¶¶69–71.

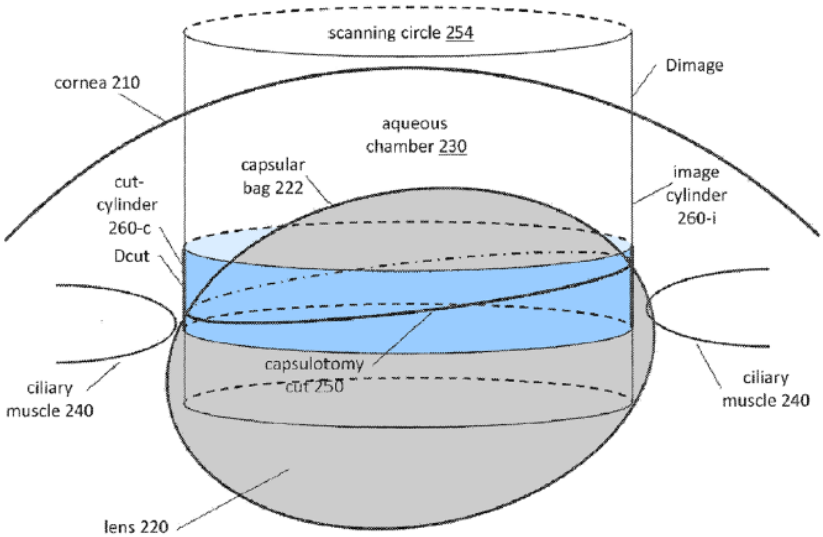


FIG. 4B

That this teaching in Angeley is ***not*** the claimed solution is also clear by comparing the "Dcut" parameter of the '036's Figure 6A (illustrating an embodiment of the '036 invention) with "Dcut" in the '036's Figure 5A (illustrating a cut on a non-tilted lens) and Figure 5B (illustrating a cut on a tilted lens using the prior art solution). Notably, the patented invention has the advantage that Dcut for a tilted lens is similar to the Dcut of the non-tilted lens. *See* Ex.1001 at 7:5–15; *see supra* Section II. By contrast, Angeley clearly requires that Dcut be extended to account for the tilt. Ex.1006 [0078] ("there is … the depth thickness 419, in order to take into account variations in the depth of the targeted capsule cut locations");

Ex.2001, ¶¶59, 69–79.[6] Thus, the Office did not err in allowing the '913 (and subsequently the '036) over Angeley and, explicitly, over this particular disclosure.

Paragraph [0090] and Figure 15 provide no additional teachings over paragraph [0078], which is the likely reason these portions of Angeley were never cited during prosecution. As shown in its original form without Petitioner's groundless annotations, Figure 15 illustrates a lens tilted relative to the optical axis of the laser system:

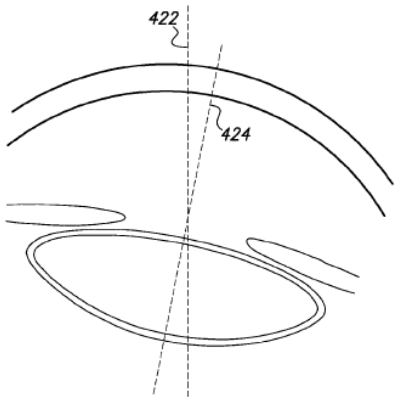


FIG. 15

Paragraph [0090] describes this figure as follows: "FIG. 15 is a cross-sectional schematic of the eye showing a tilted capsulorhexis incision plane. Its [sic] shows a tilted lens and ideally the cut for the capsule will follow this tilt." Ex.1006 at [0090].

[6] PO and the Office belabored this point of contention throughout the parent prosecution, *see* Ex.1003 at 826–28, 934–36, 1013–16, 1145–47, 1155–57, further illustrating the duplicative nature of this Petition.

But Figure 15 does not show a capsulorhexis incision or a scan pattern. Nor does paragraph [0090] explain what it means to "follow this tilt." Thus, the POSITA would have concluded that the phrase "follow this tilt" means accounting for the tilt by increasing the depth thickness of the cut-cylinder, as described in paragraph [0078]—the only other teachings in Angeley that describe performing a capsulotomy on a tilted lens. Accordingly, paragraph [0090] is consistent with, and duplicative of, paragraph [0078].

In particular, paragraph [0090]'s description of a "titled capsulorhexis incision plane" is nothing more than a description of the tilted cut that results whenever the lens capsule is tilted—including when the prior art solution is applied. *See* Ex.2001, ¶¶73–74. As illustrated below by annotating Figure 4B of the '036, the prior art solution (which Angeley instructs to apply in paragraph [0078]) has a "tilted capsulorhexis incision plane."

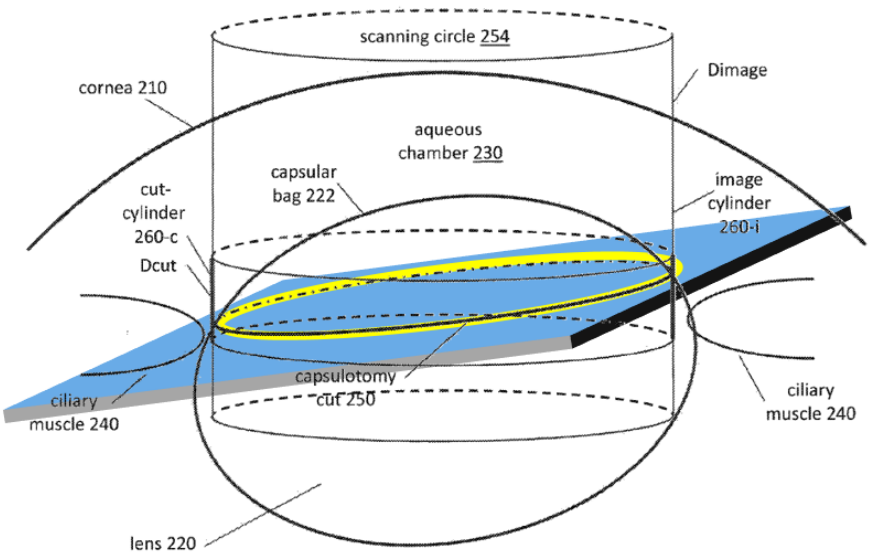
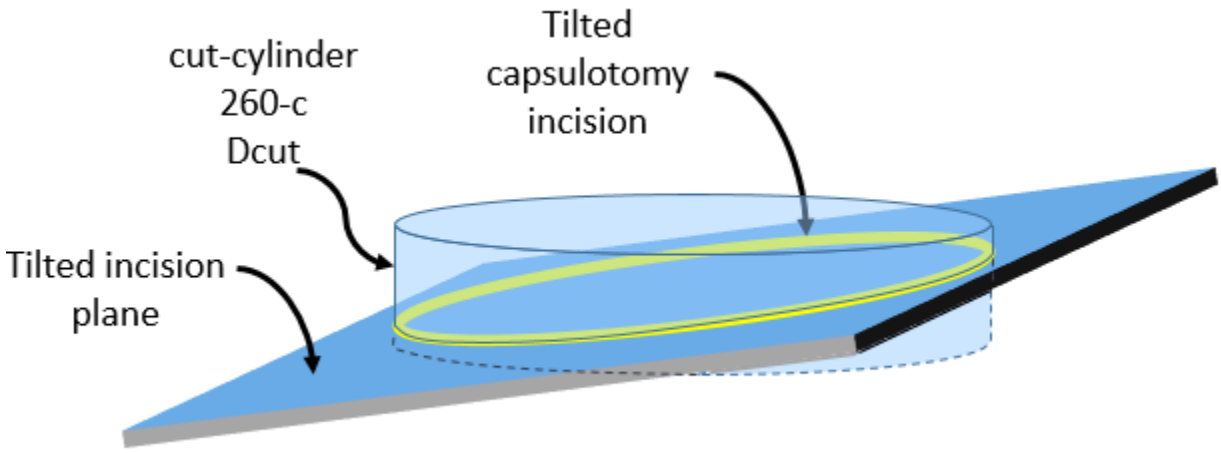


FIG. 4B



A tilted cut is the natural result of the lens surface itself being tilted. Ex.2001, ¶¶73–74. This is because the intersection of the cut-cylinder and the tilted lens capsule will be a tilted circle. *Id.* Thus, Petitioner's repeated characterization of the '036 invention as a "tilted capsulotomy" is a red herring. *See, e.g.*, Pet. at 1, 6–7, 13–14, 16, 20–21, 26–30, 45–49, 58. Likewise, the prior art capsulotomy cut illustrated

above "follow[s] the tilt" because the depth of the cut-cylinder (which corresponds to Angeley's depth thickness 419) is adjusted to cover the full extent of the difference between the high and low points of the tilted lens capsule. By contrast, if the cut-cylinder were to have a shorter depth-range, the cut would be incomplete and it would not "follow the tilt." Ex.2001, ¶74. Thus, paragraph [0090] merely describes the prior art solution.

The Petition ascribes additional meaning to the general statements of paragraph [0090] where none is warranted. Indeed, Petioner provides no explaination or rationale for the inventive leap they claim the POSITA would have made from the generialized teachings of paragraph [0090] to its annotated Figure 15. Pet. at 27–28. Petitioner's annotations of Angeley's Figure 15 (Pet. at 28) are inspired only by hindsight since Angeley's paragraph [0090] does not instruct a POSITA to generate the claimed tracking band having a non-uniform z-depth. Rather, a POSITA reading Angeley's suggestion to "follow the tilt" would have understood that this was done using the established prior art solution, taught by Angeley in paragraph [0078], which entailed making a cut with enough depth to ensure full transection of the tilted lens using a cut-cylinder ***with a uniform z-depth***. *See* Ex.1001 at 6:17–47; *see also* Section II, *supra*. This is illustrated below using Angeley's Figure 15, with the cut-cylinder shaded blue.

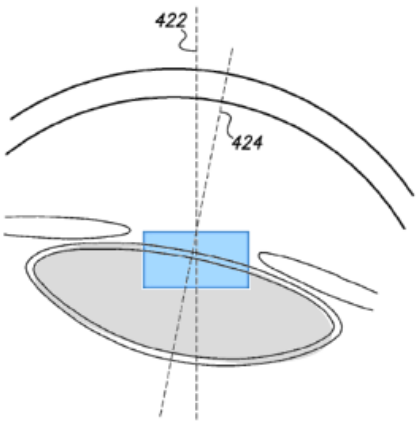


FIG. 15

Thus, the Office did not materially err by not citing paragraph [0090], specifically, during prosecution. Rather, the record supports the conclusion that the Office ***did*** in fact consider these teachings and determined that they added nothing to the prior art solution the '036 describes in Figure 4B. Indeed, the Office's decision to allow the patent over Angeley after years of prosecution and a pre-appeal conference underscores the thoroughness of the examination and the duplicity of paragraph [0090]. Moreover, the Office surely revisited these same issues once again during its examination of the claims of the '036 continuation. To proceed with an IPR under such circumstances would be an inefficient use of the Board's resources.

Petitioner's case law is also distinguishable. In particular, Petitioner's reliance on *Volkswagen* is misplaced. Pet. at 56–57. Critically, the Board in *Volkswagen* granted institution because the "highly pertinent additional embodiment of Kern, namely the Figure 7 embodiment" ***specifically disclosed the limitation in question***. *See Volkswagen Grp. of Am., Inc. v. Mich. Motor Techs. LLC,* IPR2020-00452,

Paper 12 (PTAB Sept. 9, 2020) at 31–33. That simply is not the case here. As set forth above and in Section III.A, Figure 15 and its accompanying paragraph [0090] are in no way a "highly pertinent additional embodiment of [Angeley]." *Id.* They do not disclose the limitation in question, either expressly or inherently. Rather, they are duplicative of the heavily prosecuted prior art solution described in paragraph [0078] (and illustrated in Figure 9). Angeley's paragraph [0078] fully describes how the cut shown in Figure 9 applies to a tilted lens. Figure 15 does not show a cut, and paragraph [0090] merely reiterates the teachings of paragraph [0078]. This is in direct contrast to the facts of *Volkswagen,* where Kern's Figure 7 embodiment was actually distinct from the embodiment considered during prosecution, and more importantly, ***specifically disclosed the limitation in question***.

Volkswagen is also inapposite considering the striking disparity between the Office's extensive engagement with Angeley (seven office actions, two interviews, six RCEs, and a pre-appeal conference) compared to the Office's more typical engagement with Kerns (two office actions and no RCEs). *Compare* Ex.1003 *with* Ex.2007. These critical distinctions present this Board with an entirely different

calculus of *Becton Dickinson* factors (c), (e), and (f),[7] each of which weigh much more heavily against institution than the facts in *Volkswagen* permitted.

The other cases cited in the Petition where the Board granted institution despite a Petition's reliance on references discussed during prosecution are also different from the facts here. In *NRG Energy*, the examiner failed to reconsider an earlier-cited reference during prosecution of ***materially different*** claims that "underwent significant amendments." *NRG Energy, Inc. v. Midwest Energy Emissions Corp.*, IPR2020-00834, Paper 18 at 39–40 (PTAB Oct. 26, 2020). Here, the Examiner repeatedly cited Angeley in response to the ***same*** tracking band limitation. In *Comcast*, the examiner overlooked a reference's "specific teaching of the limitations that were the basis for allowance of the challenged claims." *Comcast Cable Commc'ns, LLC v. Rovi Guides, Inc.*, IPR2020-00806, Paper 10 at 11 (PTAB

[7] These factors are as follows: "(c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection; e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and (f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments." *See Advanced Bionics*, Paper 6 at 9 n. 10.

Oct. 6, 2020). Angeley's general statements in paragraph [0090] does not constitute a "specific teaching," and paragraph [0078], providing specific instructions for performing capsulotomies on tilted lenses, was expressly considered by the Examiner. *Id.* at 10–11. And, in *Google*, the petitioner applied one reference "in a substantially different way to materially different claims" than the examiner. *Google, LLC v. Personalized Media Commc'ns*, LLC, IPR2020-00721, Paper 11 at 16 (PTAB Oct. 2, 2020). Here, the Petition repeats the same arguments against the same limitations as during prosecution of the '913. Further, the reference in *Google* was buried amongst "thousands of other references," and had not been scrutinized to the same extent as Angeley. *Id*. at 12–13.

By contrast, the Board has denied institution under 35 U.S.C. §325(d) when, similar to the facts here, an examiner had extensively considered the same reference. *See, e.g*, *Dropworks, Inc. v. Univ. of Chicago*, IPR2021-00100, 2021, Paper 9 at 17 (PTAB May 14, 2021) (noting that evidence that an "error 'warrants reconsideration' must be sufficient to outweigh the multiple prior considerations"); *Flex Logix Techs., Inc. v. Konda*, IPR2020-00262, 2020, Paper 12 at 11 (PTAB Aug. 3, 2020) (denying institution when "[p]etitioner's arguments amount to a disagreement with Patent Owner" over a reference's teachings); *Gardner Denver, Inc. v. Utex Indus., Inc*., IPR2020-00333, Paper 12 at 15 (PTAB Aug. 5, 2020) (denying institution when Examiner's acceptance of applicant's arguments did not rise "to the level of a clear

and material error about which reasonable minds could not disagree."). As cautioned by *Advanced Bionics*, "[i]f reasonable minds can disagree regarding the purported treatment of the art or arguments, it cannot be said that the Office erred in a manner material to patentability." *Advanced Bionics*, Paper 6 at 9.

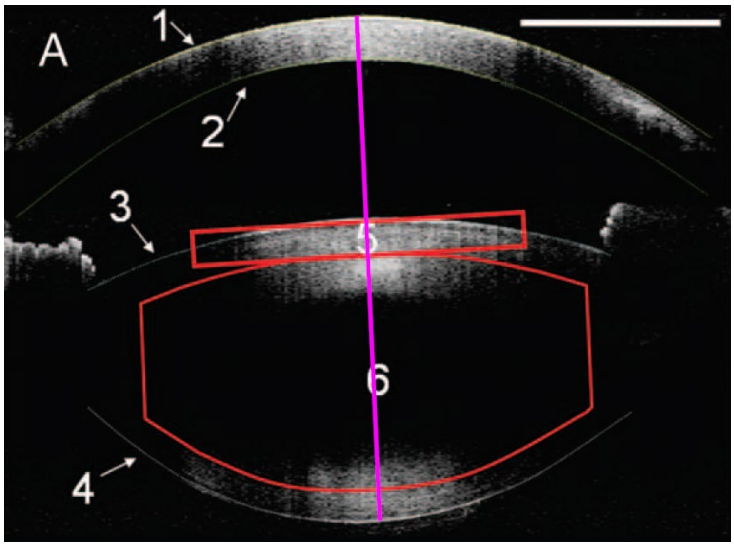
Indeed, each *Becton, Dickinson* factor germane to the second prong analysis—factors (c), (e), and (f)—weighs heavily in favor of the Board's exercise of discretion. *Becton, Dickinson* at 17–18. Regarding factor (c), the Office applied Angeley in all seven rejections during examination of the '913, and cited Angeley during examination of the '036. This factor thus weighs strongly against institution. As to factor (e), Petitioner fails to point out sufficiently how the Examiner erred in its evaluation of Angeley, which does not teach or suggest a tracking band having a non-uniform z-depth. Therefore, this factor also weighs strongly against institution. Finally, regarding factor (f), the only allegedly "additional" evidence and facts the Petition presents consists of a paragraph and a figure in Angeley that the Office already considered during prosecution, and an expert declaration. However, to make a difference, the declaration must set forth additional facts and evidence. *See Juniper Networks, Inc. v. Mobile Telecomms. Techs., LLC,* IPR2017-00642, Paper 31 at 23 (PTAB Mar. 14, 2018) ("providing a declaration alone is insufficient."). Petitioner's expert declaration largely parrots the Petition, relying on the same disclosures and

arguments on which the Petition relies, without presenting any new facts or evidence. Accordingly, all three factors weigh strongly against institution.

B. The Palanker Article Is Cumulative.

To present at least one reference that the Office did not repeatedly analyze during prosecution, Petitioner tacks on Palanker to its third and final ground. Although failing to explain *how* a POSITA would have combined the teachings of Angeley and Palanker, Petitioner asserts, incorrectly, that Palanker "shows a tilted capsulotomy pattern with non-uniform z-depth in Figure 3A." Pet. at 58. In fact, Palanker does not even address capsulotomies performed on tilted lenses and therefore provides nothing new over the teachings of Angeley.

Petitioner relies solely on the red box of Palanker's Figure 3A. Pet. at 50–52. However, the red box is not, as Petitioner's contends, tilted relative to an optical axis of the laser system. Ex.2001, ¶¶62–64, 91–94. To the contrary, the POSITA would instead conclude that the optical axis of Palanker's system is tilted relative to the borders of this image and that neither the lens nor the red box is tilted relative to that optical axis. *Id.* This understanding of the POSITA is illustrated below. *Id.*; *see also* Ex.1009 at 4 (Fig. 3A is reproduced below with the optical axis illustrated in purple).



Petitioner asks the Board to consider Figure 3A in isolation, divorced from the context of the Palanker article. *See* Pet. at 51–52. As explained above, Palanker, considered as a whole, unambiguously teaches that the lens in this image is ***not*** tilted relative to the optical axis of the laser system. *Supra* Section III.B; *see also* Ex.2001, ¶¶62–64, 91–94. Palanker teaches nothing more than a red box with uniform z-depth and is therefore irrelevant.

Even so, Petitioner's arguments with respect to Palanker are duplicative of arguments already considered by the Office during prosecution of the '913. *See Dropworks, Inc. v. Univ. of Chicago*, IPR2021-00100, Paper 9 at 14, 19 (PTAB May 14, 2021) (denying institution where the petitioner asserted the same primary reference applied during prosecution and new secondary references that were substantially the same as those previously presented to the Office); *Becton, Dickinson*, Paper 8 at 17–18 (the Board should consider "(d) the extent of the overlap

between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art" when assessing the first prong).

In particular, Palanker's Figure 3A does not show the actual cut or "live" image of the eye, which appear instead in Figure 4 and video S1. Ex.1009 at 4. Rather, Figure 3A shows a "software overlay[]" of the "prospective capsulotomy … onto OCT data for the physician's review on a graphical interface." *Id.* at 3. Palanker provides no description of how the red box is generated or what its relation to the executed cut may be. Palanker is, at most, cumulative of Angeley's Figure 9 and paragraph [0078], discussed extensively during prosecution.

Indeed, by Petitioner's own concession, it asks the Board to review the same system again, just in another format. Pet. at 53 ("Palanker article thus discloses the commercial embodiment of Angeley's laser-based system for cataract surgery."); *see also id.* at 53–54 (Angeley and Palanker "would have been combined because they both arise from the same company, share the same authors, and describe the same laser cataract surgery system. … Indeed, the Palanker article describes test results from the commercial embodiment of Angeley's system and thus the teachings of both references *were combined*."). Petitioner also concedes that a "[POSITA] would have been motivated to reference Angeley for details on how to design the laser system described in the Palanker article." *Id.* at 53. Accordingly, Palanker is

cumulative of Angeley, which was thoroughly considered by the Office. *See supra* Section V.A.

Moreover, Petitioner argues in Ground 3 that Palanker's red box with ***uniform*** z-depth teaches the claimed tracking band with ***non-uniform*** z-depth. Pet. at 50–52. Yet, the Examiner also considered this argument during prosecution with respect to Angeley's box 400B. *See* Ex.1006, Fig. 9; *see also, e.g.,* Ex.1003 at 815, 868–72, 925–927, 933–36, 1013–14, 1053–54, 1083, 1108, 1144–47, 1155–58. For example, the obviousness rejection that the Examiner advanced, and PO successfully overcame, proposed that a POSITA in light of Angeley's "generalized teaching" would have found it obvious to modify Angeley's box 400B in Figure 9 to have a non-uniform z-depth. *E.g.*, Ex.1003 at 1123. The Examiner argued that doing so would "provide a more accommodative tracking band that more precisely tracks determined z-depths of the sequence of points corresponding to the imaged layer." *Id.*

This is the exact same modification to Angeley and hindsight-inspired rationale Petitioner now asks the Office to reconsider in Ground 3 in view of Palanker. Pet. at 50–52. Whether it is Angeley's box 400B or Palanker's red box, the insufficient case for obviousness is the same. *See Dropworks,* Paper 9 at 13–14 ("But [the Board's] analysis under § 325(d) does not require that the teachings be identical or entirely cumulative, only that they are substantially the same."). Thus,

the first prong of the Board's test for exercising discretionary denial under § 325(d) is easily met, and Petitioner makes no argument regarding any material err with respect to Palanker. Pet. at 58.

Accordingly, Ground 3 asks the Board reconsider arguments that the Office already considered many times over and ultimately determined did not render the '913 claims, or the '036 claims, unpatentable. Also, the Petitioner fails to demonstrate that the Office materially erred in allowing the '913 and the '036 over these arguments. *See supra* Section V.A. The Board should exercise its discretion under 35 U.S.C. § 325(d) and deny institution.

VI. THE BOARD SHOULD DENY INSTITUTION ON ALL GROUNDS ON THE MERITS

To the extent the Board considers the merits of the Petition (and, for the reasons discussed above, it need not reach the merits), the Petition still fails to establish a reasonable likelihood of prevailing with respect to at least one of the Challenged Claims.

A. Ground 1 Fails: Angeley Does Not Anticipate Any Challenged Claim at Least Because It Does Not Disclose the Claimed "Tracking Band."

Petitioner fails to demonstrate that Angeley anticipates any Challenged Claim. *See Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987) ("A claim is anticipated only if each and every element as set forth in the claim

is found, either expressly or inherently described, in a single prior art reference."). In particular, Angeley fails to disclose all elements of independent claims 1, 7, and 13. And by virtue of their dependence upon these respective independent claims, Angeley does not anticipate dependent claims 2–6, 8–12, and 14–17 for the same reasons. *See* 37 C.F.R. § 1.75(c) ("Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim"). The Board therefore should decline to institute IPR on Ground 1.

Each independent claim requires generating, with a laser controller "a tracking band within the scan pattern defining the incision to be made in the eye, wherein a lower boundary of the tracking band has a non-uniform z-depth that varies according to the determined z-depths of the sequence of points corresponding to" the imaged layer/image of the layer. Ex.1001 at cls. 1, 7, 13. However, no disclosure in Angeley, either alone or in combination, amounts to the generation of a tracking band having a non-uniform z-depth. Instead, Angeley merely describes the prior art solution explained above and in the '036, in which the depth-range of a cut-cylinder having a constant z-depth is adjusted to ensure that the capsulotomy cut follows the tilt of the lens. *See supra* Section II.

Specifically, Angeley's paragraph [0078], which was discussed extensively during prosecution of the '913, describes Angeley's lens tilt solution. Pet. at 20–21, 25–26, 32; *see supra* Sections III.A & V.A. This paragraph states that the

capsulorhexis cut has "a cylindrical shape (extruded circle or ellipse)," as depicted in Figure 9, reproduced below. Further, the "entire cut circumscribes a volume with a Z location 417 and a depth thickness 419," which is shaded blue. Thus, Angeley's Figure 9 depicts the cut-cylinder of the prior art solution described in the '036.

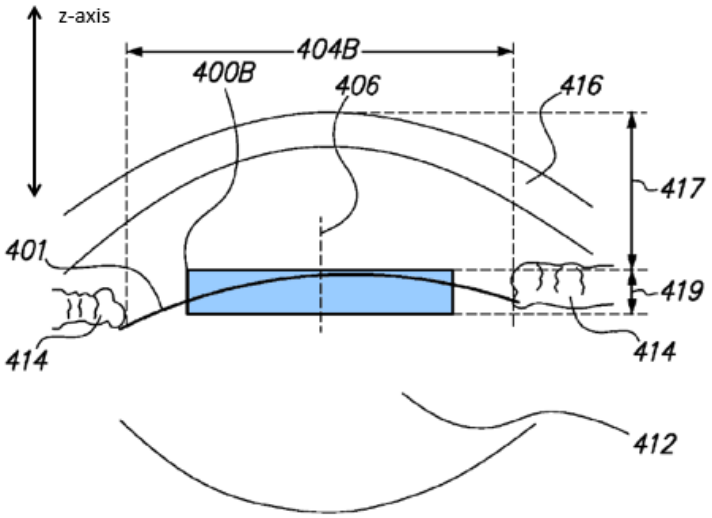


FIG. 9

To ensure complete transection of the curved capsule, "the entire cut circumscribes a volume with a Z location 417 and a depth thickness 419." Ex.1006 [0078]. Angeley also teaches that, in order to "take into account variations in the depth of the targeted capsule" that might arise from a tilted lens, "[t]here is an extent to the cut in Z, i.e. the depth thickness 419" of the cut-cylinder 400B. *Id.* In other words, Angeley's cutting process "involves stepping an amount 419 in depth to ensure that the capsule is intersected by the cutting mechanism." *Id.* [0078]. Thus, Angeley's solution for a titled lens is exactly the prior art solution of the '036, illustrated below in Figure 4B

of the '036.[8] Ex.2001, ¶¶59, 68–71. Namely, the extent of the cut in the z-direction (*i.e.*, the depth-range) is enlarged so that the capsule is fully incised despite the tilt.

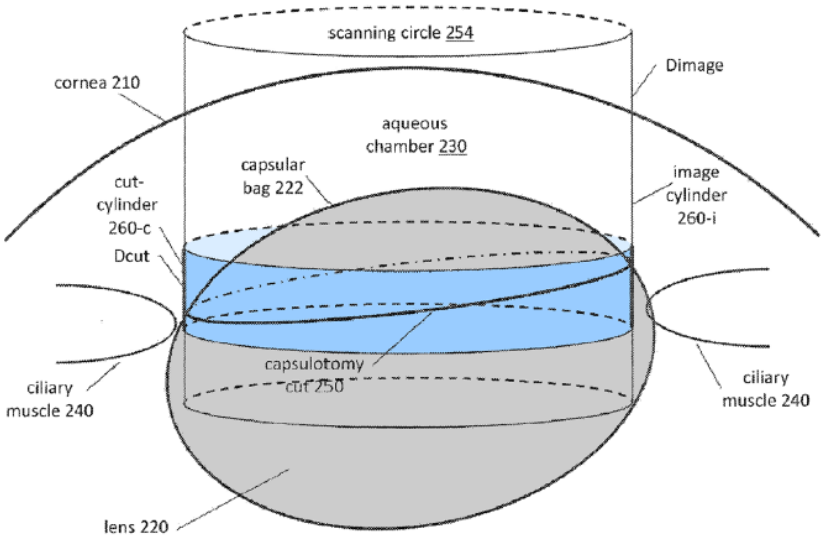


FIG. 4B

Petitioner equates Angeley's 400B in Figure 9 with the claimed "tracking band within the scan pattern." *See* Pet. at 9–10, 26–27; Ex.1006 at Fig. 9. Yet, as

[8] PO and the Office discussed this paragraph of Angeley throughout prosecution of the '913, *see* Ex.1003 at 826–28, 934–36, 1013–16, 1145–47, 1155–57, and the Office ultimately concluded in allowing the '913 and subsequently the '036 that Angeley did not teach or render obvious the claimed "tracking band." *See also supra* Section V.

shown in Figure 9 above, this disclosure of Angeley describes a cut-cylinder with a ***uniform*** z-depth—not the claimed solution.

Petitioner attempts to find a "non-uniform z-depth" in Angeley's Figure 15 and paragraph [0090]. Pet. at 2, 27–29. As shown below, however, Figure 15 merely illustrates a tilted lens. It does not convey to a POSITA where or how an incision is to occur. *See* Ex.2001 ¶¶72–73.

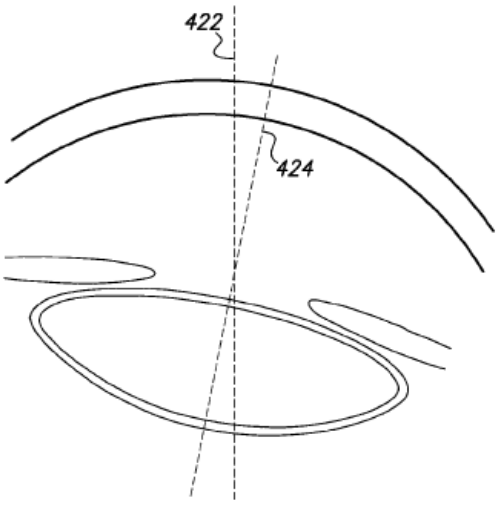


FIG. 15

The text accompanying Figure 15, paragraph [0090], likewise falls well short of disclosing a "non-uniform z-depth." Paragraph [0090] merely states that "FIG. 15 is a cross-sectional schematic of the eye showing a tilted capsulorhexis incision plane. Its [sic] shows a tilted lens and ideally the cut for the capsule will follow this tilt." Ex.1006 at [0090]. This is consistent with, and no more informative than, the disclosures of paragraph [0078] and Figure 9. The prior art solution (which Angeley instructs to apply in paragraph [0078] and is also described in the '913 and '036) has

a "tilted capsulorhexis incision plane," as explained above in Section V.A. Likewise, in the prior art solution, the depth of the cut-cylinder, Dcut, is adjusted to cover the full extent of the difference between the high and low points of the lens tilt, so that the capsulotomy cut follows the tilt. *See supra* Section II.A. The Angeley disclosures Petitioner points to simply do not describe a "tracking band" having a "non-uniform z-depth"—instead, they describe the prior art.

Petitioner points to nothing in Angeley that would lead a POSITA to conclude that "follow[ing] this tilt" requires a tracking band having a non-uniform z-depth. *See* Pet. at 28–29; Ex.2001, ¶¶72–73. Indeed, a POSITA reading paragraph [0090] would look to Angeley's paragraph [0078] to understand how Angeley teaches performing a capsulotomy cut when the lens is tilted. Ex.2001, ¶¶72–73. Since paragraph [0078] teaches the prior art solution, the POSITA would have applied that solution to the tilted lens in Figure 15—not Petitioner's hindsight motivated annotations to Figure 15. *See* Pet. at 27. Illustrated below are annotated Figure 4B of the '036 (left) showing the prior art solution as described in the '036 and annotated Figure 15 of Angeley (right) applying the prior art solution also taught by Angeley. *See id.* ¶¶72–76; *see also* Section V.A.

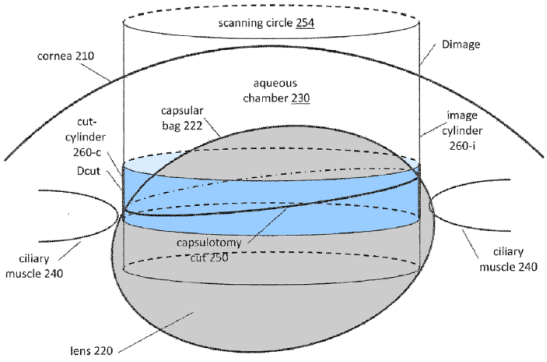


FIG. 4B

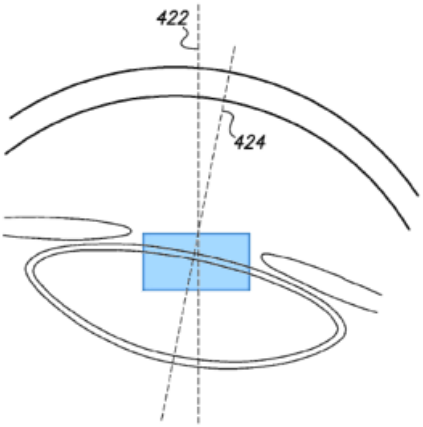


FIG. 15

Thus, Angeley fails to disclose at least a tracking band having a non-uniform z-depth and cannot anticipate the Challenged Claims.[9] Likewise, Angeley cannot enable a POSITA to practice the claimed subject matter, Ex.2001, ¶78, and it cannot anticipate any Challenged Claim. *See Sanofi-Synthelabo v. Apotex, Inc.*, 550 F.3d 1075, 1082 (Fed. Cir. 2008) ("An anticipating reference must be enabling; that is, the description must be such that a person of ordinary skill in the field of the invention can practice the subject matter based on the reference, without undue

[9] Since Angeley at best discloses the prior art solution wherein the lower boundary of the tracking band comprises a uniform z-depth, by definition it also cannot "var[y] according to the determined z-depths of the sequence of points corresponding to" the imaged layer/image of the layer, as claimed. *See* Ex.1001 at cls. 1, 7, 13.

experimentation."). For at least these reasons, the Board should deny institution on Ground 1.

B. Ground 2 Fails: Petitioner Has not Articulated a Proper Motivation to Modify Angeley.

Essentially conceding that Angeley fails to anticipate the Challenged Claims, Petitioner asserts in Ground 2 that Angeley also renders these same claims obvious. Pet. at 45. However, neither Angeley nor the knowledge of a POSITA remedy Angeley's deficiencies described above in Section VI.A. Petitioner fails to demonstrate that a POSITA would have been motivated to modify Angeley as proposed. Moreover, Petitioner remains entirely silent regarding whether a POSITA would have done so with a reasonable expectation of success. Therefore, the Board should deny institution of Ground 2.[10]

Petitioner first attempts to find motivation for its proposed modification within the bare text of Angeley. Pet. at 45–46. Specifically, Petitioner argues that even if Angeley's paragraph [0090] does not disclose a tracking band with non-

[10] Petitioner's obviousness challenges in Grounds 2 and 3 only attempt to rectify Angeley's deficiency as to the "tracking band" limitation discussed in Section VI.A above. Therefore, Petitioner forfeits its ability to argue that any other claim limitation is obvious.

uniform z-depth, "it would have been obvious to combine or modify the tilted capsulotomy incision disclosed in Angeley paragraph [0090] with the disclosed 'depth thickness 419' described in paragraph [0078] to arrive at the claimed tracking band with non-uniform z-depth." *Id.* at 45–49. As its only rationale, Petitioner argues that Angeley's cut-cylinder "depth thickness" is akin to a "margin of error" and a POSITA "would also know that such margin of error should follow the tilt of the lens." *Id*. at 46. Yet, as explained above, Angeley's statement that the "cut for the capsule will follow [the] tilt" merely describes the prior art solution of compensating for the differences in capsule z-depth as a result of the tilt by increasing the depth-thickness in order to fully transect the lens. Ex.1006 [0090]. The "depth thickness" already follows the cut in the prior art solution. Ex.2001, ¶81. If a POSITA were to combine paragraphs [0078] and [0090], she would do nothing more than perform a capsulotomy cut according to the prior art solution.

Plainly absent from Petitioner's argument is any reason why a POSITA would have been motivated to pursue the claimed solution. Given that Angeley already expressly adopts the prior art solution for a tilted lens, the POSITA would not have been motivated to modify Angeley or to look outside of Angeley for any other way to address lens tilt. Indeed, neither Petitioner nor Angeley identify any problems with or disadvantages of Angeley's express teachings. Pet. 46. Angeley's disclosure would not have suggested to a POSITA to pursue the claimed solution. *Id.* To the

contrary, Angeley's paragraph [0078] teaches away from the proposed modification by requiring that the depth-thickness 419 of the cut-cylinder be extended in order to account for tilt—which renders the claimed solution unnecessary. Petitioner's proposed modification of Angeley is a clear exercise of impermissible hindsight reasoning.

Given Angeley's shortcomings, Petitioner then argues a POSITA's "knowledge" alone would motivate her to modify Angeley to arrive at the claimed invention. For example, Petitioner argues that a POSITA "would have known that a tilted (non-uniform z-depth) tracking band would have been preferred for a tilted capsulotomy." Pet. at 46–47. Yet, none of the three references Petitioner cites suggests that a POSITA would have thought of, let alone preferred, the claimed solution.

As with Angeley, Frey et al. (WO 2012/134986 A1) ("Frey" Ex.1008) would not have motivated the POSITA to modify Angeley's capsulotomy procedure. Pet. at 47–48. The Petition points to two paragraphs in Frey. *Id.* First, Frey's paragraph [0040] merely describes the prior art solution and in no way teaches or suggests a tracking band having a non-uniform z-depth. Specifically, paragraph [0040] describes a capsulotomy performed according to the prior art solution in the following way: "the intersection of a ***cylinder*** of the diameter of the capsulotomy … with the anterior capsule surface provides the three-dimensional trajectory of the

ideal ***laser capsulotomy pattern.***" Ex.1008 [0040]. Frey's "ideal capsulotomy pattern" is nothing more than the prior art cut-cylinder having a uniform z-depth, as described in Angeley and in the '913. *Id.* Indeed, Frey's statement that "the ideal capsulotomy will be tilted" is entirely duplicative of Angeley's paragraph [0090]. Ex.1008 [0040]; Ex.1006 [0090] (stating Fig. 15 shows "a tilted capsulorhexis incision plane"). "Capsulotomy" in this sentence refers to is the cut itself, and, as explained above, the prior art solution results in a tilted capsulotomy incision.

Second, Petitioner cites Frey's background discussion in paragraph [0004], but this paragraph is equally immaterial and duplicative. Pet. 48. Paragraph [0004] advises that the edge height of a capsulotomy scan pattern should be small to minimize bubble formation and reduce surgical time, but not so small that the lens capsule is not fully incised. Petitioner fails to articulate how or why a POSITA, faced with this challenge would have invented the claimed solution. Ex.2001, ¶¶84–85. Indeed, paragraph [0004] does not even address lens tilt. In view of this disclosure, a POSITA would have followed the prior art solution of stepping the depth of a cut-cylinder up and down to ensure that the capsule is fully transected. *Id.; see also* Ex.1006 [0078]; Ex.1001 at Fig. 4B. Thus, Frey's disclosure—of the same prior art solution as Angeley—would not have motivated a POSITA to modify Angeley to have a tracking band having a non-uniform z-depth. Ex.2001, ¶¶84–85.

The Schuele application also would not have motivated the POSITA to modify Angeley's capsulotomy procedure. Specifically, Petitioner cites to paragraph [0057], which merely describes the known practice of reducing the amount of bubbles by reducing the axial extent of the capsulotomy pattern and is duplicative of Frey paragraph [0004]. Pet. at 48; *see also* Ex.1010 [0057], Figs. 7–8, below.

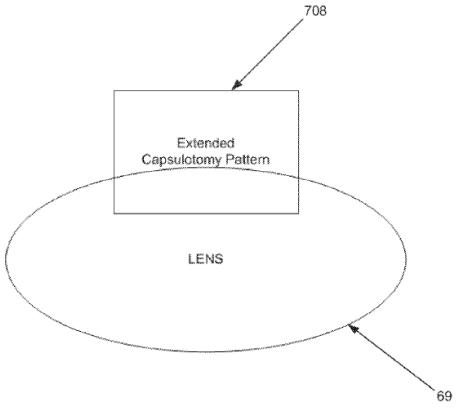


Figure 7

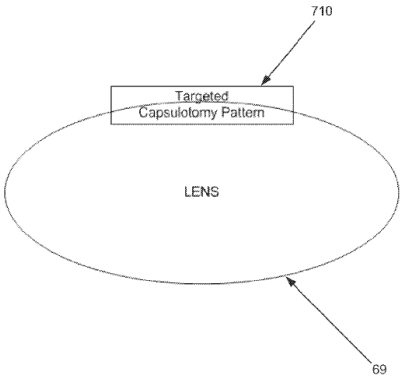


Figure 8

Schuele does not even address lens tilt. As abundantly clear from Figures 7–8 of the Schuele application shown above, a POSITA would have been instructed by Schuele to apply the prior art solution and nothing more. Petitioner's hindsight-inspired argument does not explain why a POSITA would have been motivated to account for lens tilt using the claimed solution.

Petitioner also argues that a POSITA "would have known (as confirmed by the contemporaneous Palanker article) that a capsulotomy pattern on an eye with a tilted lens should be applied within a band that follows the tilt of the lens." Pet. at

48. However, as discussed in detail above and below, Palanker's Figure 3A does not show a tilted lens. *See supra* Sections III.B & V.B. Palanker cannot, therefore, motivate Angeley to change how it compensates for tilt. Palanker falls far short of disclosing or even suggesting a tracking band having a lower boundary with a non-uniform z-depth.

Finally, common to each of Petitioner's arguments discussed above is a failure to specify what it means to "combine or modify" Angeley. Pet. at 45–46. Petitioner fails to address how the combinations or modifications would affect the existing features and functionality of Angeley. Indeed, it is Petitioner's burden to show a POSITA would have had a reasonable expectation of success for the proposed modification, yet Petitioner is entirely silent on this point. *See Veterinary Orthopedic Implants, Inc. v. Depuy Synthes Prods., Inc.*, IPR2019-01332, Paper 17 at 36 (PTAB Jan. 22, 2020) ("Petitioner's analysis does not even make passing mention to any reasonable expectation of success in achieving the invention of claim 12 with Forstein's plates (through adding features or otherwise), thus sidestepping an important legal hurdle that its challenge must, but has not, overcome.").

Surely, a POSITA would have understood that modifying or combining Angeley's prior art solution to arrive at the claimed solution would require substantial reconstruction and redesign of the device and algorithms and/or change the basic principle of operation of the hardware and software architecture. Ex.2001,

¶¶87–89. The '036's inventive solution incorporates additional processing and beam attenuation functionalities that enable the system to control the laser-power parameters of laser pulses for points of the scan pattern. Further, a POSITA would have understood that the lower boundary of Angeley's cut-cylinder has a uniform z-depth and appreciated that such systems had uniform cut-cylinders for convenience and for system performance. Ex.2001, ¶¶87–89. Petitioner makes no mention of these technical details.

Petitioner's failure to articulate a single substantiated reason as to why a POSITA would have been motivated to modify Angeley to arrive at the claimed invention rather than applying the prior art solution, or how Angeley could be successfully redesigned to incorporate the claimed tracking band, strongly indicates that Petitioner has engaged in improper hindsight reasoning. *See Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143 (Fed. Cir. 1985). Accordingly, the Board should deny institution of Ground 2.

C. Ground 3 Fails: Angeley in View of the Palanker Article Does Not Render Any Challenged Claim Obvious.

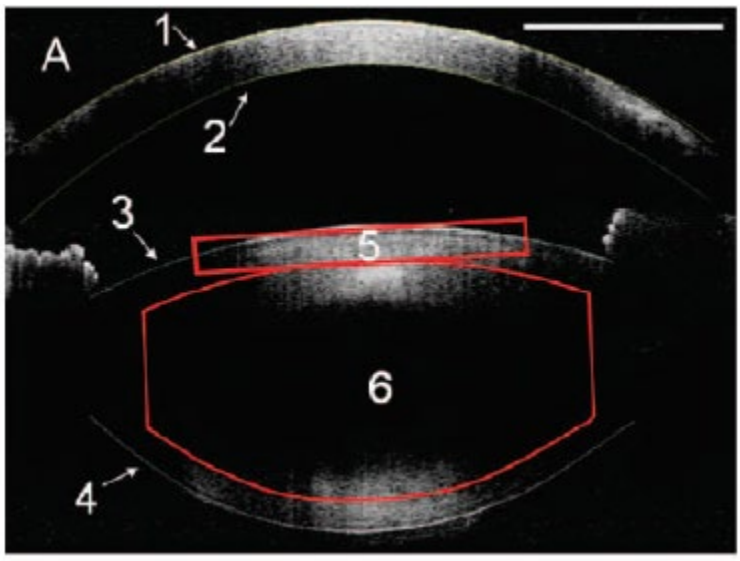
Petitioner asserts in Ground 3 that it would have been obvious, in light of Palanker, to apply "a tracking band with non-uniform z-depth to the tilted capsulotomy of Angeley." Pet. at 49. However, Palanker fails to remedy Angeley's deficiencies described above in Section VI.A. Specifically, Palanker does not

disclose a tracking band having a non-uniform z-depth. And even if it did, which it does not, a POSITA certainly would not have found any motivation to modify Angeley to arrive at the claimed invention. Therefore, the Board should deny institution of Ground 3.[11]

1. Palanker Does Not Disclose Generating a Tracking Band with Non-Uniform Z-Depth.

Petitioner asserts that Palanker's "capsulotomy pattern (5)" shown as a red box in Figure 3A, reproduced below, teaches the claimed tracking band having a non-uniform z-depth. Pet. at 49, 51–52. It does not. In fact, Palanker does not show any tilted lens, nor does it teach performing capsulotomies on a tilted lens. Ex.2001, ¶91.

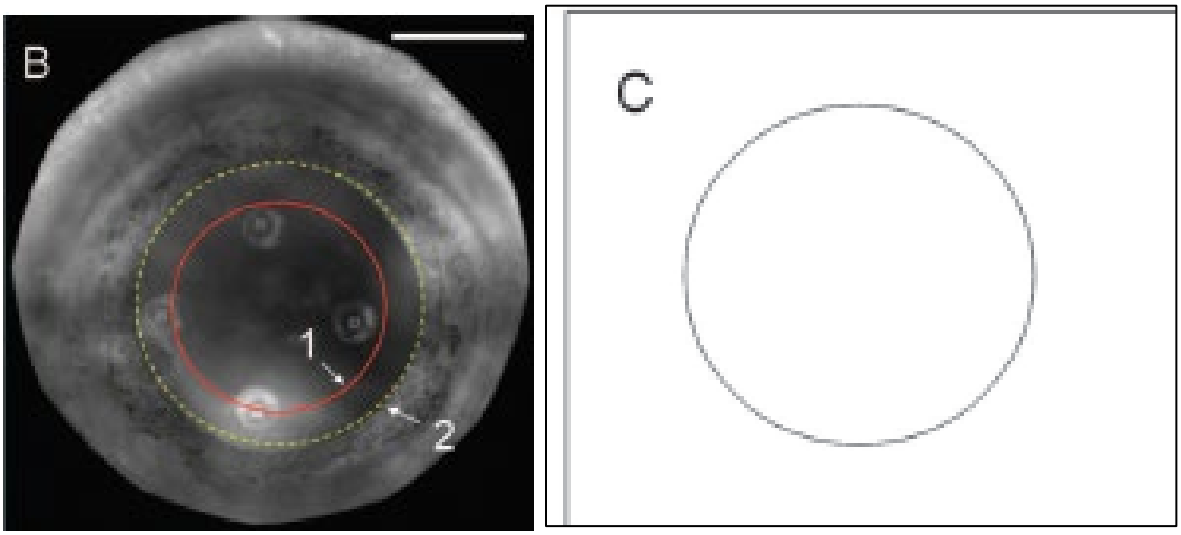
[11] Petitioner's obviousness challenges in Grounds 2 and 3 only attempt to rectify Angeley's deficiency as to the "tracking band" limitation discussed in Section VI.A above. Therefore, Petitioner forfeits its ability to argue that any other claim limitation is obvious.



Petitioner's misunderstanding of Palanker's Figure 3A relies upon a frame of reference that is irrelevant to the requirements of the Challenged Claims. While claim 7, for example, requires that the lower boundary of the tracking band is "tilted ***relative to a z-axis of an incision to be made in the eye***," (*i.e.,* the optical or z-axis of the laser system), Petitioner measures "tilt," arbitrarily, relative to an axis aligned with the edge of the image. *See* Pet. at 49, 51–52. Palanker's red box 5 is not in fact tilted relative to an optical axis of the laser system. This is evident through review of the Palanker reference as a whole. Ex.2001, ¶¶91–94; *see also supra* Section III.B.

For example, Figure 3B shows a "[v]iew of the eye via the near-infrared video camera, with overlaid guidance lines indicating a planned capsulotomy pattern (1)," and Figure 3C shows a "[t]op view of the circular capsulotomy pattern …" at left. Ex.1009 at 3. Because Palanker makes cylindrical cuts, a tilted cylinder viewed from above would be elliptical in shape. Ex.2001, ¶¶62, 92. However, Figures 3B and 3C,

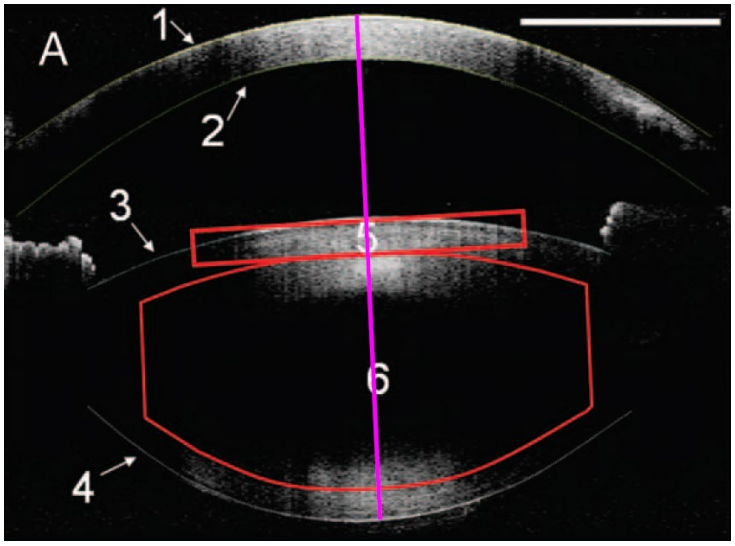
reproduced below, show circular cuts. Thus, the lens being cut is aligned with (*i.e.*, not tilted relative to) the laser system's optical axis.



Ex.1009 at 3*; see also id.* at 4 (Figure 4 showing and accompanying text describing the "circular line" of the capsulotomy cut).

Figure 3A itself also shows the lens is not tilted relative to the optical axis of the laser system. In particular, the image includes regions of higher intensity scattering, appearing as white, along an axis that is tilted relative to the edge of the image. Ex.2001, ¶¶63, 93. A POSITA would have understood that higher intensity scattering occurs along the optical axis of the imaging system. *Id*. Thus, using this known characteristic of OCT imaging as a guide, the POSITA would have understood the Palanker system to have an optical axis (shown below in purple) tilted with respect to the edge of the image, but aligned with the cylindrical cut. *Id*. With this appropriate frame of reference in mind, the POSITA would also have

appreciated the lack of lens tilt by observing the relative positions of the iris along the optical axis. *C.f.* Pet. at 51–52 ("the iris on the left is lower than the iris on the right, a clear indication of lens tilt.").



The manner in which Palanker generates laser scanning patterns further corroborates this understanding. Specifically, Palanker describes the capsulotomy pattern as a "spiral pattern" that was "applied from posterior to anterior, thereby ensuring intersection of the incision with the anterior lens capsule in between." Ex.1009 at 3–4. A POSITA would have understood that a "spiral" pattern would center around the optical axis, with each consecutive turn of the spiral tracing out a circle of the same diameter. Ex.2001, ¶¶64, 94. Such a pattern is consistent with the rectangular shape of Palanker's "capsulotomy pattern (5)" shown in Figure 3A centered around the optical axis shown in purple. *Id*.

Accordingly, since Palanker does not even address tilt, let alone teach or suggest the generation of a tracking band having a non-uniform z-depth, it would not have been obvious to a POSITA to combine the teachings of Angeley and Palanker to arrive at the claimed invention. *Id.*

2. A POSITA Would Not Have Been Motivated to Combine Angeley and Palanker.

Unsurprisingly, Petitioner provides a mere page and a half discussion regarding the reasons why it believes a POSITA would have been motivated to combine Angeley and Palanker. *See* Pet. at 53–54. None of these reasons includes an explicit teaching, suggestion, or motivation found within Palanker. Petitioner instead provides only superficial similarities between Angeley and Palanker that are immaterial in light of Palanker's hollow disclosure. For example, Petitioner contends, without providing adequate support, that the Palanker article "discloses the commercial embodiment of Angeley's laser-based system for cataract surgery." Pet. at 53. Petitioner also suggests that a POSITA would have combined Angeley and Palanker "because they both arise from the same company, share the same authors, and describe the same laser cataract surgery system." *Id*. at 53–54. However, to the extent the references are similar, that alone is insufficient to conclude that a POSITA would have been motivated to combine the references or make the modifications to Angeley that Petitioner suggests. Petitioner fails to

identify a single reason why a POSITA in possession of Palanker would have been motivated to modify Angeley to include the claimed tracking band.

Petitioner further argues that because Palanker lists the Angeley provisional as one of the patents OptiMedica filed "on the technology described in the paper," Ex.1009 at 9, a POSITA "would have been motivated to reference Angeley for details on how to design the laser system described in the Palanker article." Pet. at 53. This argument contradicts Petitioner's proposed modification in Ground 3, in which it allegedly would have been obvious to modify Angeley, the primary reference, in view of Palanker, the secondary reference. Even if Petitioner's argument were accepted as true, it is unclear how it would make it more likely that the proposed combination would have been obvious.

Finally, Petitioner concludes that a POSITA "seeking a 'more optimized targeted capsulotomy pattern' (*see* Schuele application (Ex. 1010), [0057]) on a tilted lens would have combined the two references with a reasonable expectation of success (as the engineers at OptiMedica did)." Pet. at 54. However, as discussed above, neither Angeley's suggestion that "ideally the cut for the capsule will follow this tilt," Ex.1006 [0090], Fig. 15, nor Palanker's red box, teach or suggest generating a tracking band having a non-uniform z-depth. On the contrary, a POSITA seeking a "more optimized targeted capsulotomy pattern," *see* Ex.1010

[0057], would have done so by employing the prior art solution described in Section II. Ex.2001, ¶¶95–97.

As explained above in Section VI.B with respect to Ground 2, Petitioner fails to articulate a single substantiated reason as to why a POSITA would have been motivated to modify Angeley to arrive at the claimed invention rather than applying the prior art solution, or how Angeley could be successfully redesigned to incorporate the claimed tracking band. Petitioner's Ground 3 fairs no better. Accordingly, the Board should deny institution on Ground 3.

VII. CLAIM CONSTRUCTION

For purposes of this proceeding, PO does not believe that any claim terms need construction to resolve the prior art grounds raised in the Petition. However, PO notes that, although Petitioner does not formally advance any proposed claim constructions in the Petition, on page 36 it implicitly construes claim 1. *See, e.g.*, Pet. at 36 ("Angeley's laser does not emit any pulses for cutting outside the tracking and so the laser power there is zero, below the photo-disruption threshold"). In contradiction to that implicit construction, Petitioner proposes claim construction of this same term in the Delaware Litigation. *See* Ex.2003 (proposing that "a tracking band within the [cylindrical] scan pattern" means "a subset of points selected from the [cylindrical] scan-pattern that are within a preselected distance from the imaged layer" and that a "scan-pattern" is "a set of points surrounding the image of the layer

to which a beam of laser pulses is directed"). The Petition is deficient for the additional reason that Petitioner has failed to show how the references applied in the grounds of the Petition fall within the scope of claim construction Petitioner asserts in the Delaware Litigation.

The Board should not reward Petitioner's gamesmanship with institution. Doing so would violate the age-old principle that patents "may not, like a nose of wax, be twisted" in two opposite directions—one to support an argument of invalidity, and another to support an argument of non-infringement. *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1351 (Fed. Cir. 2001) (citations and internal quotation marks omitted); *see also OrthoPediatrics Corp. v. K2M, Inc.*, IPR2018-01546, Paper 10 at 12 (PTAB Feb. 14, 2019) (denying institution, noting that "[b]y failing to reconcile its proffered claim construction here with its very different construction proffered in District Court … Petitioner fails to satisfy this burden.").

VIII. CONCLUSION

For the reasons above, the Board should deny institution.

Date: August 16, 2021

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

This paper complies with the type-volume limitations of 37 C.F.R. § 42.24. This paper contains approximately 11,904 words, excluding the portions of the paper exempted by § 42.24(a). This paper also complies with the typeface requirements of 37 C.F.R. § 42.6(a)(ii) and the type style requirements of § 42.6(a)(iii) and (iv).

/s/ *Kristen P.L. Reichenbach*
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CERTIFICATE OF SERVICE

The undersigned hereby certifies that, pursuant to 37 C.F.R. § 42.6(e), a true and correct copy of the foregoing Patent Owner's Preliminary Response and all Exhibits were served on the 16th day of August 2021, via electronic mail directed to counsel of record for the Petitioner:

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