

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

OPTICIS CO., LTD.,
Petitioner,

v.

INNEOS LLC,
Patent Owner.

IPR2023-01256
Patent 7,198,416

PETITIONER'S REPLY
TO PATENT OWNER'S RESPONSE TO PETITION

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Petitioner's Exhibit List

Exhibit No.	Description
1001	U.S. Patent No. 7,198,416 to Ray et al. (the “416 Patent”).
1002	File History of U.S. Patent No. 7,198,416.
1003	Supplemental Declaration of Dr. Alan E. Willner, Ph.D.
1004	Certified Translation of Japanese Patent No. 2848279 to Kurita et al. (“Kurita”).
1005	U.S. Patent No. 5,078,499 to LaMarche (“LaMarche”).
1006	U.S. Patent No. 6,870,195 to Lemoff et al. (“Lemoff”).
1007	U.S. Patent No. 5,715,270 to Zediker et al. (“Zediker”).
1008	Kiniry, Joseph R. “Wavelength division multiplexing: ultra high speed fiber optics,” IEEE Internet Computing 2.2 (1998): 13-15.
1009	United States Provisional Application Ser. No. 60/541,573 filed Feb. 4, 2004 (“416 Patent’s Provisional Application”).
1010	Karstensen, H. “Laser diode to single-mode fiber coupling with ball lenses,” Journal of optical communications 9.2 (1988): 42-49.
1011	Chen, Hao-Lin, et al. “Collimating diode laser beams from a large-area VCSEL-array using microlens array,” IEEE Photonics Technology Letters 11.5 (1999): 506-508.
1012	Claim Chart attached to Complaint [Dkt. 1, Ex. B in <i>Inneos LLC v. Opticis Co. Ltd. et al.</i> , No. 8-23-cv-00185 (C.D. Cal. January 30, 2023)].
1013	U.S. Patent Publ. No. 2005/0069013 to Bhandarkar et al. (“Bhandarkar”).
1014	Complaint, Dkt. 1, <i>Inneos LLC v. Opticis Co. Ltd. et al.</i> , No. 8-23-cv-00185 (C.D. Cal. January 30, 2023) .

Exhibit No.	Description
1015	U.S. Provisional Patent Application Ser. No. 60/506,795 entitled “GSE Laser Enabled WDM Mux,” filed on Sep. 29, 2003 (“Bhandarkar Provisional Application”)
1016	Supplemental Declaration of Dr. Alan E. Willner, Ph.D.
1017	Transcript from Deposition of Curtis A. Ray
1018	Transcript from Deposition of Dr. Michael Lebby
1019	Definition from Photonics Dictionary of “Optical Combiner”
1020	U.S. Patent No. 6,396,978 (“Grann ’978 Patent”)

I. Introduction

Faced with invalidating prior art, Inneos seeks through claim construction to read in embodiments from the specification. Nothing in Inneos's Response should alter the Board's initial determination that the claims are not limited in the way Inneos argues. D.I., pp. 7-11.

Notwithstanding, the prior art teaches what Inneos seeks to read into the claims. Integrating components (such as by housing them in a packaging) and providing for passive alignment were known techniques with known advantages as of the priority date. *E.g.*, EX1016, ¶¶64-74; EX1001, 4:42-45 (parts may be combined "by means known to those skilled in the art"). And as explained below, an integrated subassembly of optical components and a pre-aligned connector with a stop were features that were borrowed from Inneos's earlier patents. Even if the Board accepts Inneos's constructions, they do not make the claims non-obvious.

Inneos also takes an improperly narrow view of a POSITA. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) ("A person of ordinary skill is also a person of ordinary creativity, not an automaton."); D.1., pp. 13-14 ("Ground 1 is based upon obviousness, not anticipation."). Both passive alignment and packaging were known techniques with known advantages. But because Kurita does not *explicitly* refer to packaging or passive alignment, Inneos's expert posits that a POSITA would not have had the creativity to use these known tools when implementing Kurita. Instead,

Inneos's position is that Kurita would only ever be implemented on a lab workbench. POR, 34. This defies common sense. EX1016, ¶¶66. Inneos's attacks on the other grounds similarly rely on a POSITA that lacks ordinary creativity.

Finally, Inneos must reckon with Bhandarkar. That it teaches every element of the claims under either party's constructions is undisputed. Inneos argues only that it is not prior art. But the Board already found that Inneos's evidence is not "sufficient to establish reasonably continuous diligence," and Inneos has not provided anything new in the relevant timeframe. D.I., p. 26. This is fatal to patentability of the Challenged Claims.

II. Reply to Inneos's Claim Construction Arguments

A. "Optical Combiner"

When instituting, the Board gave "weight to the preamble claim term 'optical combiner' because it is needed to specify the type of device being claimed." D.I., pp. 8-9. Consistent with its ordinary meaning, the type of device being claimed is "a device that combines multiple optical inputs into an output." EX1016, §II(C). As claim 1's preamble says, it is a device used to "multiplex[]" (i.e., combine) the optical inputs from "a plurality of n lasers" into an output on the "single stopped optical fiber." The specification also refers to the combiner as being a "combiner/WDM device" that is "capable of combining multiple optical signals into a single optical fiber...." EX1001, 1:46-51. This is also consistent with how the

term is used elsewhere in the patent. *See* EX1001, 3:19-21, 1:56-62. Likewise, it is consistent with extrinsic evidence. The Photonics Dictionary defines “optical combiner” as “a device or component that combines multiple optical signals or images into a single output” (EX1019), and this is how the term was used as of the priority date (EX1016, ¶14).

Despite the Board’s invitation to do so (D.I., pp. 8-9), Inneos does not directly address the ordinary and customary meaning of “optical combiner.” *See* POR, 16-26. Instead, Inneos maintains that the patent defined the claim term or disavowed claim scope. POR, pp. 21, 25-26. But this is an “exacting” bar, which Inneos cannot meet. *Thorner v. Sony Computer Ent. Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (holding that “the patentee must clearly express an intent to redefine the term”) (cleaned up). Indeed, the Board already rejected Inneos’s position. D.I., pp. 8-9 (noting, for example, claim differentiation principles based on claim 3’s requirement of integrating the components as “a single, monolithic molded block”).

Moreover, Inneos *selectively* parses the parts of the specification it relies on, undercutting its proposed “re-definition.” Specifically, many of the statements Inneos points to also note the invention is “injection molded.” POR 17-20 (citing EX1001, 1:47-51 (“plastic-mold injection”), 2:11-18 (“injection molded”), 1:51-55 (“molded device”), 3:32-34 (“plastic molded”), 3:39-44 (“plastic molded”), 4:61-63 (“plastic-molded device”)). The patent explains that “[t]he combiner/WDM device

described herein utilizes plastic-mold injection,” and further notes that “[t]he present invention provides, for the first time, an inexpensive, injection molded, one piece optical combiner....” EX1001, 1:46-51, 2:11-15. Despite all of this, Inneos leaves injection molding out when arguing that the use of the word “invention” in the specification necessitates a re-definition of claim terms. POR, pp. 17-19, 21.

Similarly, the patent explains that “Offset Launch Spots” are one of the “Key Features” of the invention. EX1001, 4:66-5:3. This was the concept that originally led to the patent, and what one of its inventors testified that the invention is about. EX1002, 74; EX1017, 44:12-45:6. Again, Inneos leaves this out when asserting that “key feature[s]” define claim scope. *See* POR, pp. 19-20. Also left out is the feature that “[e]ach laser output beam of the present invention therefore has the same degree of refraction as it passes through the focusing lens....” EX1001, 1:67-2:5; *see also* EX1002, 32, 37 (deleting feature from claim after examiner indicated there was no evidence of conception for it).¹ There is no justifiable basis for reading in the subset of features Inneos points to, while leaving others out.

Underlying Inneos’s purported re-definition is an attempt to read *permissive* and *optional* features as mandatory. For instance, the patent explains that a single-part combiner may be provided, or the combiner may be made from two or more

¹ Inneos also points to *some* of the benefits and objects of the invention to support its construction. POR, pp. 19-21. As a general matter, these are not limiting. *Praxair, Inc. v. ATMI, Inc.*, 543 F.3d 1306, 1325 (Fed. Cir. 2008).

parts. EX1001, 1:47-55; 2:11-15. The single-part embodiment “can be constructed in various ways to achieve the desired configuration.” *Id.*, Abstract. In “[o]ne example,” it “contain[s] mechanical alignment features, an array of collimating lenses, and a focusing lens housed within a fiber optic connector ferrule.” *Id.* The patent also explains that “[t]he invention includes optional passive alignment pins molded into the combiner.” *Id.*, 2:15-16. Further underscoring the *optional* nature of passive alignment, it is described as something that “could” be utilized, not something that must be. *Id.*, 4:58-59. Similarly, the optical components are described as integrated “in most embodiments.” *Id.*, 4:61-63; EX1016, ¶32 (explaining third embodiment differs from the first embodiment because additional, discrete components are mounted on a support structure separate from the molded optical module); EX1001, FIGS. 7-9 (showing third embodiment). These are not “words or expressions of manifest exclusion or restriction” and do not support re-definition or disavowal. *Liebel-Flarsheim Company v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004).

Finally, Inneos’s construction is inconsistent with how the ’416 Patent uses the term, as it expressly acknowledges that an optical combiner *does not* have to be “for multiplexing light of different wavelengths.” EX1001, 2:5-7 (“[T]he Lee et al [optical] combiner does not multiplex n different wavelength channels[.]”); EX1016, ¶¶15-17 (rebutting Dr. Lebby). It is also inconsistent with how the claims

use the term. The claims specify that “said n laser output beams have n different output wavelengths,” and also refer to “multiplexing,” which would be superfluous if already encompassed by “optical combiner.”

B. “Stopped”

The Board correctly noted that the patent “does not appear to limit the claim term ‘stopped single optical fiber’ to a fiber having a connector that abuts against a fiber stop or seat but, rather, appears to *include a fiber that is fixed in other ways* that enable the collimated output beam to be focused onto a single spot on the optical fiber.” D.I., p. 11 (emphasis added). The Board further invited the parties to “address methods for stopping an optical fiber.” *Id.*

Methods for stopping an optical fiber would include the connector of the patent’s first embodiment. As explained below, this connector was described in prior Inneos patents and was standard by the priority date. *See* Section III; *see also* EX1013, FIGs. 1, 5, 8A. Lemoff also discloses a connector with a stop for limiting movement of the fiber. EX1016, ¶121; EX1006, 5:65-6:2; EX1018, 272:18-273:21 (Dr. Lebby: “receptacle 260 in Lemoff’s Figure 2 certainly has a stop”).² Other ways for stopping an optical fiber were also known. EX1016, ¶¶53-56.

² Although the fiber in Lemoff is “stopped,” Inneos further narrows its own proposed construction by arguing that in Lemoff “a stop is not part of the ferrule.” POR, 49. Lemoff’s connector “stops” the optical fiber and prevents the fiber from being inserted further into the combiner. *See* EX1006, FIG. 2; EX1018, 260:15-17 (“But I would agree with you that the fiber is stopped on 260, but it’s not a stop within the ferrule, so it’s a completely different design”).

What matters is that the “stopped optical fiber” is stopped, or “fixed.” *See* EX1016, §II(E). As the Board recognized, there are other ways to stop an optical fiber than the one example described in the ’416 Patent.

C. “Focusing Means”

Inneos now “agrees that the corresponding structure is a focusing lens.” POR, 26. Because the prior art teaches a “focusing lens,” there can be no legitimate dispute that claim element [1.5] (“focusing means for...”) is in the prior art. *Microsoft Corp. v. Uniloc 2017 LLC*, No. IPR2020-00103, 2020 WL 2478533, at *4 (P.T.A.B. May 11, 2020) (“[A] challenger who seeks to demonstrate that a means-plus-function limitation was present in the prior art must prove that the corresponding structure—or an equivalent—was present in the prior art.”) (cleaned up); EX1004, ¶[0015] (“a lens 30 for focusing”); EX1006, 2:20-23 (“a lens focuses”).

III. What Inneos Calls Inventive Is Borrowed From Its Earlier Patents

Inneos’s Response hinges on the idea that an integrated sub-assembly of optical components with a pre-aligned connector is the “invention” of the ’416 Patent. *See, e.g.*, POR, pp. 1, 5, 18-20, 25-27, 32, 35, 49. By “integrated,” Inneos also imports the idea of passive alignment. POR, p. 16. As explained in the preceding sections, the claimed optical combiner is not so limited. But Inneos’s Response is further undermined because these alleged innovations were admittedly known and commonplace—and borrowed from earlier Inneos patents.

When designing the '416 Patent's optical combiner, the inventors decided to re-use the "pre-existing mechanical design" for a housing that was "used in U.S. Patent Number 6,396,978." *See* EX2045, ¶15. This earlier patent (EX1020) was by Eric Grann, one of the '416 Patent inventors, and is a continuation-in-part of another Grann patent, U.S. Patent No. 6,201,908 (EX2018).³ In his deposition, Mr. Ray confirmed that the earlier housing design was also used in commercial products, and that the connector or ferrule that was part of the housing was standard by the '416 Patent's priority date. EX1017, 83:17-86:8 (explaining that the "same basic form factor" of the pre-existing "CWDM mux that includes filters" was used for the '416 Patent's housing), 89:19-90:13, 93:15-18, 98:10-100:3 (explaining that "[t]his type of a ferrule would be standard"); EX1015, 3 (showing Aduro's commercial product in 2003). This pre-existing mechanical design is reflected in the first embodiment of the '416 Patent. EX2045, ¶15; EX1017, 94:8-95:13, 100:6-101:9.

The two earlier Grann patents relate "to an optical multiplexing device with passively aligned molded optics." EX2018, 1:8-11. They aim to provide a device with "preformed and premolded passively aligned optics." *Id.*, 2:51-56. They also aim "to integrate a fiber optic connector within the optical module to passively align an optical fiber to the coupling optic." *Id.*, 2:65-67. This fiber optic connector

³ Figure 1 (including its housing and pre-aligned connector) is common in both patents. *See* EX1020, 3:9-11, FIG. 1; EX2018, FIG. 1.

includes “a receptacle seat 81” that stops a fiber optic cable. *Id.*, 3:66-4:3, FIG. 1; *see also* EX1020, FIG. 1, 2:41-50, 3:20-61, 4:40-46. This is nearly identical to what Inneos now argues is inventive about the ’416 Patent.

A POSITA would have known of the earlier Grann patents, and they confirm Petitioner’s position that a POSITA would have had the motivation and knowledge to add integration, passive alignment, and a pre-aligned connector with a stop to any of the grounds. EX1016, §II(A). This is further confirmed by Kurita, Lemoff, and Bhandarkar. Each came up with optical multiplexers that do not use dielectric filters or waveguides. Lemoff and Bhandarkar both show housings with integrated, pre-aligned connectors. That so many inventors came up with the same idea, at around the same time (a time when the increased bandwidth needs brought about by the rise of the Internet compelled research into optical technologies), is “persuasive evidence that the claimed apparatus was the product only of ordinary mechanical or engineering skill.” *Geo. M. Martin Co. v. All. Mach. Sys. Int’l LLC*, 618 F.3d 1294, 1305 (Fed. Cir. 2010) (cleaned up).

Dr. Lebby does not address these issues. The Ray Declaration admitting the use of the pre-existing mechanical housing was submitted with the POR. *See* EX2045. Dr. Lebby cited one of the Grann patents (EX2018) in his own report. EX2003, 122. Even so, during his deposition Dr. Lebby was unaware that the

molded housing and integrated, pre-aligned connector used in embodiments of the '416 Patent (*i.e.*, its packaging) was taken from pre-existing designs, and consistently referred to the packaging as being a source of novelty. EX1018, 27:19-20, 28:21-29:2, 31:15-32:6, 33:2-5, 40:2-8, 42:19-43:1, 45:22-46:5, 63:18-64:3, 87:7-88:15, 96:7-98:4, 99:9-18, 212:1-3, 261:1-262-2, 263:2-264:3, 265:14-266:9, 268:12-18, 269:10-16, 271:7-12.

The grounds here are “based upon obviousness, not anticipation,” and to properly evaluate them it is necessary to take into account what a POSITA would have known at the priority date. *See* D.I., pp. 13-14. Because Dr. Lebby does not do that (and does not even appear to be aware that a POSITA would have this background knowledge), his testimony should be heavily discounted.

IV. Reply to Inneos’s Arguments Regarding Ground 1

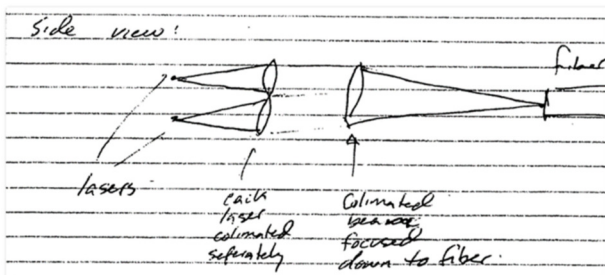
If Inneos’s constructions are rejected, the only dispute that would remain is whether Kurita teaches light passing through separate radial sectors of the focusing lens (claim element [1.6]). POR, 37-41. It does. But even if Inneos’s constructions are adopted, the claims would have been obvious. *See supra*, §III; EX1016, §III(A).

A. Kurita Discloses “Separate Radial Sectors”

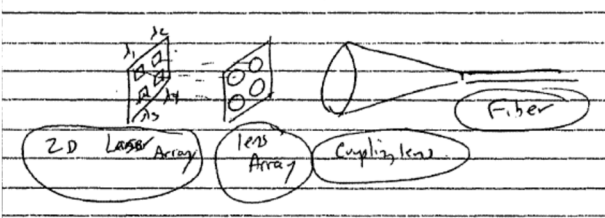
Inneos’s arguments that Kurita does not teach this element are puzzling. Kurita teaches the exact same two-by-two layout of the laser array and collimating lenses, next to the focusing lens, as the '416 Patent. EX1003, ¶143; EX1016, ¶¶88-

89. The “separate radial sectors” requirement of claim 1 (and claim 7’s similar requirement) follows directly from this layout. EX1003, ¶¶179-185; EX1016, ¶¶85-92. This is because the collimated beams output from the collimating lenses form a pattern on the focusing lens based on their arrangement, and when in a two-by-two arrangement the pattern results in separate quadrants (radial sectors) of the focusing lens being impinged by each collimated beam. *Id.* Dr. Lebby acknowledges the two-by-two pattern formed on the focusing lens—but he re-labels it “linear” by association with other embodiments in Kurita that show a three-by-three array. EX1018, 170:1-172:7, 188:9-197:20. This is not credible. The lasers and lenses have the same arrangement in the ’416 Patent as in Kurita, and result in the same pattern on the focusing lens.

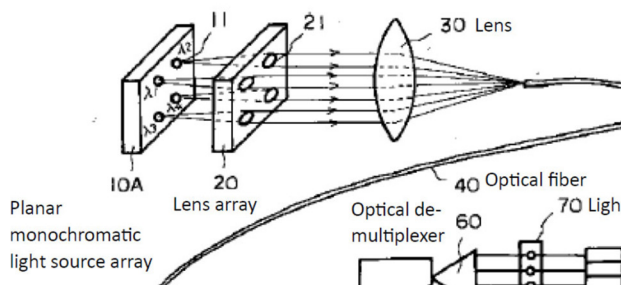
The inventors’ lab notebooks show diagrams remarkably similar to FIG. 3 of Kurita. Below on the left are two diagrams from the inventors’ lab notebooks—on the right, FIG. 3 of Kurita.



POR, p. 72.



EX1002, p. 36.



EX1004, FIG. 3 (cropped).

In explaining the diagrams from the lab notebook, Mr. Ray noted that collimated beams would impinge on the focusing lens “in the same pattern as what you see on the lens array.” EX1017, 51:2-52:21; *see also id.*, 51:22-53:10 (explaining it would be “obvious” that the four collimated beams would be in separate quadrants on the focusing lens); EX1018, 156:9-157:8 (“certainly a radial design”). The same setup in Kurita results in the same pattern on the focusing lens, and therefore the same separate radial sectors—as required by claim element [1.6].

B. Kurita Teaches or Would Have Suggested All Limitations of the Challenged Claims Even Under Inneos’s Constructions

Even if Inneos’s constructions are adopted, the Challenged Claims would still have been obvious. Integration, passive alignment, and a pre-aligned connector

having a physical structure that prevents a fiber abutting against it from being further inserted were well known and standard concepts in optoelectronic devices as of the priority date. *See supra*, §III; EX1016, ¶¶65-74 (noting that integrated, passively aligned components are less costly and labor intensive compared to active alignment, and would have been valuable in commercial implementations); EX1018, 84:13-15 (“And if you want to have something practical for commercial applications, you want to use passive alignment.”); 84:16-22 (passive alignment “saves a lot of time and it saves a lot of cost”); 85:1-4 (“And you want to, as much as possible, avoid the optical bench scenarios....”). At most, Inneos argues that a connector with a stop being “typical” does not satisfy the motivation to combine analysis. POR, 35-36. This ignores the motivation provided in the Petition: fixing the fiber is necessary to make sure it is not free floating in space. EX1016, ¶83; *see also id.*, ¶¶77-80 (noting also that it would have been necessary in a data communication system and obvious to try).

V. Reply to Inneos’s Arguments Regarding Grounds 2-4

A. Summary of Petitioner’s Obviousness Combinations

Inneos attempts to re-cast Grounds 2-4 as complex and extensive reconfigurations of the devices described in the prior art. Not so:

- In *Ground 2*, it would have been obvious to use Lemoff’s integrated connector. The fiber in Kurita needs to be fixed in place, and this was

a known way to fix or “stop” the fiber. *See* Petition, 30-32, 34; EX1006, 5:65-6:2 (Lemoff notes the benefit that “various optical fibers may be plugged into or removed... when the emitter is initially installed in an optical communication system or when maintenance is performed.”).

- In *Grounds 3 and 4*, it would have been obvious to use collimating lenses in the device of Lemoff. Lemoff itself contemplates arrangements of “one or more optical components” together with imaging element 220; collimating lenses were well known in the art to improve efficiency; and LaMarche explicitly shows examples of such lenses. *See, e.g.*, Petition, 36-39.

Besides exaggerating the proposed combinations, Inneos’s arguments are improperly premised on bodily incorporation. *E.g.*, POR, 48 (“Lemoff is not physically combinable with Kurita due to Lemoff’s small size”), 52 (“Lemoff and LaMarche ... are not capable of being physically combined due to the size differences...”). But “[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.” *Intel Corp. v. PACT XPP Schweiz AG*, No. 2022-1038, 2023 WL 2198649, at *3 (Fed. Cir. Feb. 24, 2023) (cleaned up); *see also id.*, at *3 (quoting *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (obviousness “does not require an actual, physical substitution of elements”)).

B. Kurita and Lemoff (Ground 2)

1. *Motivation to Combine Kurita and Lemoff*

Inneos misunderstands Lemoff, arguing that it teaches away from using an optical multiplexer, and merely “emulates” one. *See, e.g.*, POR, 47. But Lemoff is a WDM device—“The invention provides a multi-channel optical signal emitter for a wavelength division multiplexed (WDM) communication system....” EX1006, 1:51-56. Rather than using an *external* optical multiplexer, Lemoff instead teaches an optical multiplexer that is part of the emitter (e.g., optical signal emitter 200 of FIG. 2). This multiplexer uses a focusing lens to focus the multiplexed signal onto the optical fiber, just like the multiplexers disclosed in Kurita and the ’416 Patent. EX1016, ¶¶107-114. Inneos’s arguments are contrary to the express teachings of Lemoff itself. *See* EX2018, 241:13-22 (Dr. Lebby refused to agree with a direct statement from Lemoff regarding how signal emitter 200 performs WDM).

Nor would any issues with size (as Inneos argues) negate a POSITA’s motivation to combine these references. *First*, Kurita is silent on size; Dr. Lebby admits that the individual components would be about the same size as in the ’416 Patent, and only concludes that Kurita is unmanageably large due to his mistaken insistence that Kurita’s system could *only* be implemented on a lab workbench.⁴

⁴ It became clear during Dr. Lebby’s deposition that his only support for the size/workbench argument was his assertion that Kurita is about “optical computing.” *See, e.g.*, EX1018, 137:9-19, 282:22-283:17, 286:7-14, 307:2-8. This is directly

EX1016, ¶114. *Second*, a POSITA need not bodily incorporate Lemoff's integrated connector. Lemoff teaches that its connector is integrated with a housing to secure it and hold it in alignment. EX1016, ¶114. Integrated, pre-aligned connectors were known; it was in a POSITA's toolbox to use these; and Lemoff teaches it. *See* EX1006, FIG. 2. In short, a POSITA would have been motivated to combine Kurita and Lemoff. EX1016, §III(B)(3).

2. Lemoff Remedies Any Alleged Deficiencies of Kurita

To the extent Kurita does not suggest a "stopped single optical fiber," Lemoff teaches this under either party's construction. The connector in Lemoff has a stop in the receptacle 260 for preventing movement of the fiber. It is also integrated in a housing to hold it in alignment. EX1016, ¶¶119-122; *see also* EX1018, 260:15-17 ("But I would agree with you that the fiber [in Lemoff] is stopped on 260...."). In addition to Lemoff's teaching, pre-alignment and passive alignment were admittedly known "tools" to a POSITA with known advantages, and it would have been obvious to modify Kurita to have an integrated, pre-aligned connector in view of Lemoff. EX1016, ¶¶63-74, 100; EX1018, 31:8-33:5, 38:10-12, 39:7-40:19, 83:13-22, 290:14-16 (Dr. Lebby: "a person of ordinary skill in the art could actually apply active alignment as well as passive alignment to Kurita.").

contrary to the text of Kurita. EX1004, 8 (referring to "optical communications, laser processing, etc."). Also, the '416 Patent itself contemplates optical computing. EX1001, 5:5-11; EX1016, ¶73.

C. Lemoff (Ground 3) or Lemoff and LaMarche (Ground 4)

The Petition explained that a POSITA would have known to use collimating lenses with a focusing lens to improve coupling efficiency. Petition, pp. 7-8, EX1003, §VI(B), (C) (further showing collimating lens associated with each laser source). Given this, a POSITA would have been motivated to use collimating lenses with each laser source when implementing the “one or more optical components” that Lemoff explains can be part of imaging element 220. *Id.*; *see also* EX1016, ¶¶141-146. To the extent Lemoff alone does not suggest collimating lenses, LaMarche clearly does, and a POSITA would have been motivated to use LaMarche’s collimating lenses with each laser source in the Lemoff device at least for improving coupling efficiency. EX1003, §VIII(D); EX1016, §III(C).

In attacking Lemoff, Inneos fixates on the “butt coupled” embodiment of FIGS. 1A, 1B and not the imaging element of FIG. 2 that Petitioner actually relies on. *E.g.*, POR, 56. Indeed, Inneos argues there is “no imaging element when the apertures are arranged circular[ly].” POR, 63. This misreads Lemoff, which indicates that the emission apertures in the FIG. 2 embodiment are similar to what is shown in FIGS. 1A, 1B. EX1006, 5:50-54; *see also* EX1016, ¶¶147-155. In the FIG. 2 embodiment, imaging element 220 is a focusing lens, and there is no reasonable dispute that it literally meets the structure for the “focusing means” element. *See above*, Section II(C); EX1016, ¶¶137-139. It is not reasonable to argue

that “focusing” is non-obvious in view of a reference that states the “lens focuses” the laser input “into an optical fiber.” EX1006, 2:20-23.

As to the combination in Ground 4, LaMarche teaches an optical interconnect device that has many of the same optical elements at issue, and would have commended itself to a POSITA. EX1003, §VIII(D); EX1016, §III(C). Inneos’s argument that it is not analogous, or not combinable because of bodily incorporation, simply gets the law wrong. LaMarche confirms that using collimating lenses as proposed was an obvious design choice for implementing the “one or more optical components” of Lemoff discussed in Ground 3.

VI. Reply to Inneos’s Arguments Regarding Ground 5

Inneos does not dispute that the Challenged Claims are obvious over Bhandarkar. *See* POR, Section V(D). Any challenge to the merits is thus waived.⁵

Inneos argues *only* that Bhandarkar is not prior art—a position the Board preliminarily rejected. D.I., p. 26. Inneos has not identified new activities during the critical period that would constitute reasonably continuous diligence. Instead, Inneos continues to rely exclusively on inventor prior art searching for the entirety

⁵ Inneos did not, for instance, rebut the Board’s preliminary determination that Bhandarkar discloses a “stopped single optical fiber” under Inneos’s construction. D.I., p. 11. Regardless, Bhandarkar renders the claims obvious even under Inneos’s narrow constructions. EX1016, §III(D). There is no dispute that it discloses an integrated subassembly of optical components for multiplexing that includes an integrated, pre-aligned connector with a stop. *See* EX1013, FIGs. 1, 5, 7, 8A-8C.

of the 60-day period from November 10, 2003 to January 9, 2004. *See* POR, p. 80 (noting only: “Inventors update prior art searches.”). This is insufficient.

A. Inneos’s Diligence Theory is Legally Unsupported

To establish that “[p]rior art searching is sufficient activity for diligence,” Inneos relies on two cases: *Correge v. Murphy*, 705 F.2d 1326 (Fed. Cir. 1983) and *In re Enhanced Sec. Rsch., LLC*, 739 F.3d 1347 (Fed. Cir. 2014). POR, p. 76. As previously explained (*see* Paper 13, pp. 9-10), neither case supports its position.

Correge relates to post-reduction abandonment, where a prototype (*i.e.*, an actual reduction to practice) was completed approximately 1.5 years before filing. *Id.*, 705 F.2d at 1327-28. After the prototype was finalized, a prior art search was approved, the inventor “responded to the search results,” and two months later the invention was disclosed during business meetings. *Id.* at 1330-1331. On the facts of *Correge*, these activities were sufficient to “rebut any inference ... of abandonment.” *Id.* *Correge* does not address prior art searching performed by inventors, or diligence towards a constructive reduction to practice. Indeed, as an abandonment case, it does not address any activities occurring before reduction to practice. *See id.* at 1328 (“Without an actual reduction to practice there is no invention in existence which can be abandoned.”).

In re Enhanced relates to the diligence of an attorney, which carries its own unique factors and does not inform the question of inventor diligence. *Id.*, 739 F.3d

at 1358-59. In that case, prior art searching is addressed only in passing, and the Court held that the attorney was *not* diligent. *Id.* This does not support the broad proposition that prior art searching by an inventor, without other activities in the relevant time period, is a legally-recognized or sufficient form of diligence.

B. The Inventors Were Not Diligent

Even if inventor prior art searching were a recognized form of diligence, Inneos's arguments still fail for at least three reasons.

First, for the two-month period at issue, Inneos relies on the following activity from one of the inventors, Eric Grann: “Following the November meeting, I conducted prior art searches *several days* from November 10, 2003, through January 15, 2004.” EX2046, ¶19 (emphasis added); POR, p. 80. While Mr. Grann goes on to discuss his “usual” practices, there are no other affirmative statements regarding activity *in this instance* beyond those “several days” of searching. *See id.* Several days of sporadic work over a two-month period is not reasonably continuous diligence. *See Tesla, Inc. v. Charge Fusion Techs., LLC*, No. IPR2023-00062, 2024 WL 1642657, at *5 (P.T.A.B. Apr. 16, 2024) (finding lack of diligence where no evidence of activity occurred over a 26-day period); *In re Meyer Mfg. Corp.*, 411 F. App'x 316, 319–20 (Fed. Cir. 2010) (finding lack of diligence for “an unexplained gap of just over two months”).

Second, the broader period between conception (July 2003) and constructive

reduction to practice (February 2004) shows a lack of urgency by the inventors. *Perfect Surgical Techniques, Inc. v. Olympus Am., Inc.*, 841 F.3d 1004, 1009 (Fed. Cir. 2016) (“One must weigh the collection of evidence over the entire critical period....”).

For instance, the lack of progress towards a constructive reduction to practice is evident from the three drafts of the invention disclosures. EX1002, 84-94 (first draft), 95-105 (second draft), 106-116 (third draft).⁶ Nearly all of the disclosures were completed by the first draft prepared on October 16, 2003, which *included all of the figures used in the provisional application. Compare* EX1002, 89-94 *with* EX1009, 2-7 (provisional application). Two subsequent revisions over the next 3 months (November 10th and January 27th) did little more than rephrase terms and add a few lines of description. Notably, following the 60 days of prior art searching, the January 27th revision contained *no changes* to the “Problem the Invention Overcomes,” “Description of the Related Art,” or “Unique Features” sections. *See* EX1002, 106-109. This directly contradicts Inneos’s assertion that “revised invention disclosure forms reflect the impact of the prior art search results” and that “[u]nderstanding how the invention is intended to work against the backdrop of the state of the art is important to preparing a patent application.” *See* POR, p. 77.

⁶ Inneos does not allege that any work was done on the disclosure forms during the period between November 10, 2003 – January 9, 2004.

Inneos also glosses over the fact that there was *another* two-month period of searching.⁷ EX2046, ¶11. Taken together, Inneos is relying on *four months of inventor prior art searching* to support its swear-behind. The inventor declarations offered no explanation as to why this amount of prior art searching was needed. And despite the length of the first search, the result was nothing more than a list of patents taken directly from an earlier Grann patent, which issued in 2001. *Compare* EX2018, cover page, 1:30-2:25 *with* EX1002, 86. As a whole, the prior art searching in this case does not suggest reasonably continuous diligence, but rather, an attempt to back-fill gaps in an unpersuasive diligence story. *See Meta Platforms, Inc. v. Angel Techs. Grp. LLC*, No. IPR2023-00059, 2023 WL 5158227, at *8-9 (P.T.A.B. May 11, 2023) (“Unlike *Perfect Surgical*, the record does not exhibit an overall indication of progress on the invention, with some individual gaps that may be insignificant in view of the activity during the entirety of the critical period, or otherwise accounted for.”).

Third, the manner in which the search results were used is telling. Inneos emphasizes that “[t]he Lee reference found during these searches appears in the [] ’416 Patent’s specification background section and explains how the invention differs from Lee.” POR, p. 77. However, this discussion of Lee *was not included*

⁷ The “several hours each week, over many weeks” spent on the first search stands in stark contrast to the “several days” total spent on the second search (November-January). *Compare* EX2046, ¶11 *with* EX2046, ¶19.

in the provisional application that forms the basis of Inneos’s alleged reduction to practice—it was not added until January 2005 with the filing of the non-provisional application. *See* EX1009, 8-12. Indeed, *none* of the prior art identified in the November 2003–January 2004 prior art search was explained, distinguished, or even acknowledged in the provisional application. *Id.* The “Description of the Related Art” in the provisional application is *identical* to that found in the October 16, 2003, revision. *See* EX1002, 85. In other words, the relied-upon prior art searching had no effect on the constructive reduction to practice. Again, the disclosures were largely complete by October 16, 2003.

There are various references to computer modeling performed between June 17, 2003, and January 27, 2004. *See, e.g.*, EX1002, 75-76. However, Inneos has not identified any *specific* work or corroborating evidence relating to such activities within the November 10, 2003 to January 9, 2004 window. This is unsurprising—the bulk of the relevant work occurred in June 2003, and “[b]y mid-October, the inventors circulated mechanical models of how the optical combiner module could house the optical components.”⁸ POR, p. 77.

⁸ In the POR, the discussion of modeling, analysis, and simulation jumps from “mid-November” to “mid-January” without discussion of any activity within the relevant window. *See* POR, pp. 77-78. This is reflected in the evidence and inventor declarations as well. *See, e.g.*, EX2045, ¶¶11-15; EX2046, ¶¶13-16, 23.

Critically, the computer-generated models from October 2003 were *identical* to those used in the provisional application. *Compare* EX1009, 2-6 (provisional) *with* EX1002, 89-94 (drawings from October 16, 2003); *see also* EX1002, 75 (“The [models] were generated on July 17, 2003 and are essentially the same images that were carried forward into the ’475 patent application....”). On the record evidence, computer modeling or similar work cannot form the basis of diligence in the critical window because the relevant work was completed by October 2003 (or earlier). As confirmed by its summary of evidence, Inneos can only point to several days of prior art searching for the period from November 10, 2003 to January 9, 2004. POR, pp. 76-80. This is plainly insufficient, and reflects the overall unreasonable delay of the inventors between June 2003 and filing in February 2004.

VII. Dr. Willner Thoroughly Explained Why the ’416 Patent is Invalid

Unable to distinguish the prior art, Inneos instead attacks Dr. Willner. In doing so, Inneos mischaracterizes Dr. Willner’s testimony and his cross-examination. *See* EX1016, §IV. But Inneos fails to show any shortcomings in the substance of Dr. Willner’s actual opinions. This can be contrasted with Dr. Lebby’s testimony on cross-examination, which made clear that his opinions are unsupported by and contrary to the express language of the prior art, and inconsistent with the permissive statements of the ’416 Patent and Inneos’s own admissions.

VIII. Conclusion

For all of these reasons, the Challenged Claims are invalid.

Dated: July 26, 2024

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CERTIFICATE OF COMPLIANCE

I, the undersigned, certify that the above **PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE TO PETITION** complies with the applicable type-volume limitations of 37 C.F.R. § 42.24(c)(1). Exclusive of the portions exempted by 37 C.F.R. § 42.24(a)-(c), this Petition, including footnotes, contains 5,597 words, as counted by the word count function of Microsoft Word and as counted manually with respect to the included figures with annotations. This is less than the limit of 5,600 words as specified by 37 C.F.R. § 42.24(c)(1).

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CERTIFICATE OF SERVICE

I hereby certify that on July 26, 2024, I electronically served the document described as **PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE TO PETITION** on the following counsel of record for PO:

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