

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

OPTICIS CO., LTD

Petitioner,

v.

INNEOS LLC,

Patent Owner.

Case IPR2023-01256

Patent 7,198,416

PATENT OWNER'S NOTICE OF APPEAL

Notice is hereby given, pursuant to 35 U.S.C. §§ 141 & 142 and 37 C.F.R. § 90.2(a), that Patent Owner Inneos LLC (“Inneos”) hereby appeals to the United States Court of Appeals for the Federal Circuit from the Final Written Decision in IPR2023-01256 entered on January 29, 2025 (the “Final Written Decision,” Paper 36) of the Patent Trial and Appeal Board (“PTAB”) of the United States Patent and Trademark Office, and from all underlying findings, determinations, rulings, opinions, orders, issues and decisions. A copy of the Final Written Decision is attached.

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), Inneos further indicates that the issues on appeal include, but are not limited to, the following:

- 1) The Board’s determination that claims 1-2, 6-7, and 9 of U.S. Patent 7,198,416 (“the ’416 patent”) are unpatentable for obviousness over the asserted prior art, as set forth in the Final Written Decision;
- 2) The Board’s claim construction decisions underpinning its unpatentability determination;
- 3) The Board’s determination of the level of ordinary skill in the art;
- 4) The Board’s consideration of the expert testimony, prior art, and other evidence in the record;
- 5) The Board’s factual findings, conclusions of law, evidentiary rulings, and/or other determinations supporting or relating to the above issues; and

6) The Board's compliance, or lack thereof, with its rules, regulations, and the Administrative Procedures Act.

This Notice of Appeal is timely, having been filed within 63 days after the Board issued its Final Written Decision. 37 C.F.R. § 90.3(a)(1). Copies of this Notice of Appeal are being filed simultaneously with the Director, the Board, and the Clerk of the United States Court of Appeals for the Federal Circuit, along with the Court's requisite filing fee.

Date: February 25, 2025

Respectfully submitted,

By: /s/ Barry J. Herman

Barry J. Herman (Reg. No. 51,254)

Christian E. Mammen (*pro hac vice*)

Counsel for Patent Owner Inneos LLC

CERTIFICATE OF FILING AND SERVICE

The undersigned hereby certifies that, in addition to being filed with the Patent Trial and Appeal Board through the PTAB E2E System, a true and correct copy of the foregoing NOTICE OF APPEAL TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT BY PATENT OWNER INNEOS LLC, is being sent to the Director of the United States Patent and Trademark Office by delivering a copy via electronic mail to the following:

Office of the General Counsel
U.S. Patent and Trademark Office
efileSO@uspto.gov

I also certify that a true and correct copy of the foregoing NOTICE OF APPEAL TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT BY PATENT OWNER INNEOS LLC and the prescribed fees were filed via the electronic filing system, CM/ECF and pay.gov, on this 25th day of February 2025, with the Clerk's Office of the United States Court of Appeals for the Federal Circuit.

I also certify that a true and correct copy of the foregoing NOTICE OF APPEAL TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT BY PATENT OWNER INNEOS LLC was served on Petitioner by delivering a copy via electronic mail to the following:

IPR2023-01256
U.S. Patent No. 7,198,416

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Dated: February 25, 2025

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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 B2

Before TERRY J. OWENS, JON B. TORNQUIST, and
DANIEL J. GALLIGAN, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

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

I. BACKGROUND

Opticis Co., Ltd. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1, 2, 6, 7, and 9 (“the challenged claims”) of U.S. Patent No. 7,198,416 B2 (Ex. 1001, “the ’416 patent”). Inneos LLC (“Patent Owner”) filed a Preliminary Response (Paper 12). Petitioner filed a Reply (Paper 13) to which Patent Owner filed a Sur-reply (Paper 14). Applying the standard in 35 U.S.C. § 314(a), we instituted an *inter partes* review (Paper 15) of all challenged claims on all grounds asserted in the Petition.

After we instituted trial, Patent Owner filed a Patent Owner Response (Paper 18, “PO Resp.”), Petitioner filed a Reply (Paper 24, “Reply”), and Patent Owner filed a Sur-reply (Paper 26, “Sur-reply”).

An oral hearing was held on November 12, 2024, and a copy of the transcript was entered in the record (Paper 35).

We have jurisdiction pursuant to 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 as to the patentability of the claims on which we instituted trial.

Petitioner bears the burden of proving unpatentability of the challenged claims (*Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015)). To prevail, Petitioner must prove unpatentability by a preponderance of the evidence (*see* 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d)).

For reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that all challenged claims of the ’416 patent are unpatentable.

A. Related Proceedings

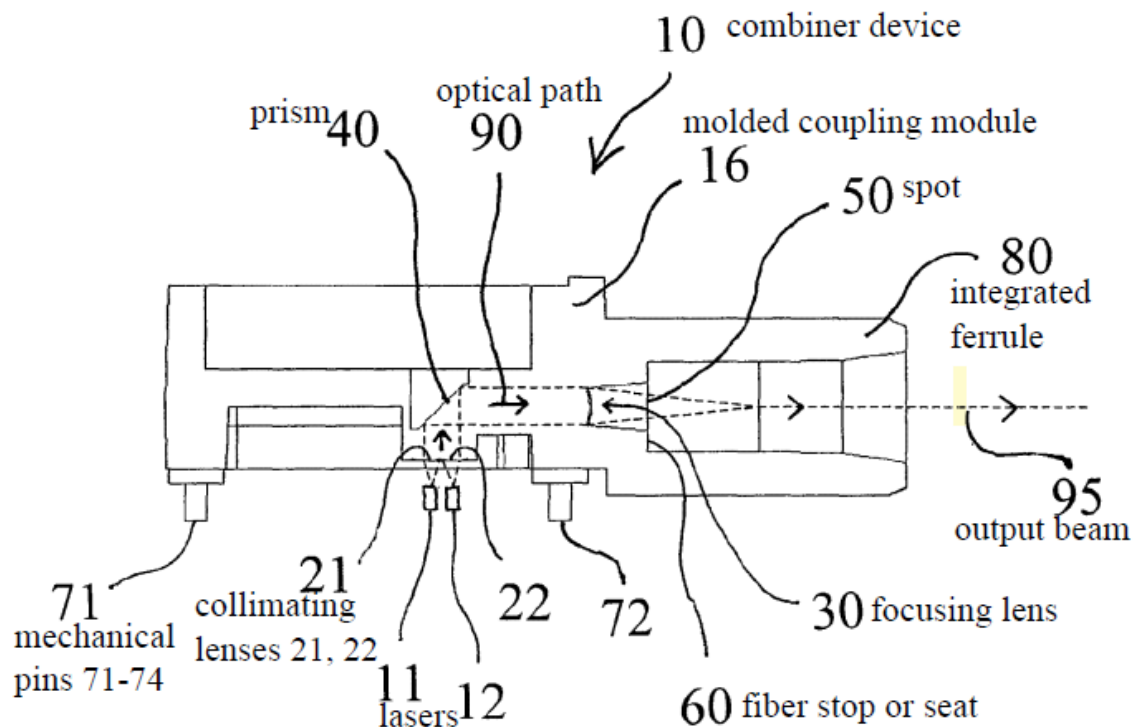
The parties indicate that the '416 patent is the subject of *Inneos LLC v. Opticis Co., Ltd.*, No. 8-23-cv-00185-MCS-ADS (C.D. Cal) (Pet. 1; Paper 4, 1).

B. Real Parties in Interest

Petitioner identifies itself as the real party in interest (Pet. 1). Patent Owner identifies itself as the real party in interest (Paper 4, 1).

C. The '416 Patent

The '416 patent, titled "OPTICAL COMBINER DEVICE," "relates to an optical multiplexing device which spatially combines multi-wavelength light from a plurality of lasers into an optical fiber" (Ex. 1001, code (54), 1:14–16). The optical combiner (10) is illustrated in a first embodiment as follows (*id.* at Fig. 1 (annotated to include descriptions of numbered elements)):



The annotated image is the '416 patent's Figure 1 showing the optical combiner.

The '416 patent explains that “[l]asers 11,12 are located at the focal points of the input lenses [(not shown)] and the light is collimated [by collimating lenses 21 and 22], reflected off a prism 40 and focused by the focusing lens 30 onto a spot at which a single optical fiber (not shown) is stopped by fiber stop or seat 60 formed in ferrule 80” (*id.* at 3:7–15).

D. The Challenged Claims

The challenged claims are:

1. An optical combiner usable in data communication systems for multiplexing the outputs of a plurality of n lasers wherein each of said n outputs has a different output wavelength, for transmission into and through a stopped single optical fiber, comprising:
 - a plurality of n collimating lenses, said lenses being spaced apart and positioned to receive and collimate the output of said n laser output beams, said n laser output beams have n different output wavelengths, and
 - focusing means for focusing said n collimated output beams onto a single spot at said stopped single optical fiber, said focusing means having n separate radial sectors on its surface, and each of said n collimated beams passes through a separate one of said n sectors of said focusing means whereby said n output beams having n different wavelengths are coupled into said single fiber.
2. The optical combiner of claim 1 wherein $n=4$ and wherein said four lasers and four collimating lenses are each formed in a two-dimensional, two by two array, wherein said focusing means is a single focusing lens, and wherein each radial sector is a pie-shaped quadrant.
6. The optical combiner of claim 1 wherein said optical combiner does not require the use of dielectric filters or waveguides.

7. An optical combiner usable in data communication systems for multiplexing the outputs of a plurality of lasers wherein each of said outputs has a different wavelength, for transmission into and through a stopped single optical fiber, comprising:
an array of four lasers, formed in a two-dimensional, two by two array, each of said lasers having an output beam with a different wavelength,
an array of four collimating lenses, said lenses being formed in a two-dimensional, two by two array and positioned to receive and collimate the output of said laser output beams, and
focusing means for focusing said collimated output beams onto a single spot at said stopped single optical fiber, said focusing means having four separate quadrants on its surface, and each of said four collimated beams passes through a separate one of said quadrants of said focusing means whereby said output beams of said four lasers are coupled into said single fiber.

9. The optical combiner of claim 7 wherein said optical combiner does not require the use of dielectric filters or waveguides.

Ex. 1001, 5:24–45, 6:16–39, 6:45–47.

E. Evidence

Petitioner relies on the following evidence.

Name	Patent Document	Exhibit
Kurita (original and certified translation)	JP 2848279 B2 (published Jan. 20, 1999)	1004
LaMarche	US 5,078,499 (issued Jan. 7, 1992)	1005
Lemoff	US 6,870,195 B2 (issued Mar. 22, 2005)	1006
Bhandarkar	US 2005/0069013 A1 (published Mar. 31, 2005)	1013

Petitioner relies also upon a Declaration and a Supplemental Declaration of Alan E. Willner, Ph.D (Ex. 1003, “Willner Decl.”; Ex. 1016, “Willner Supp. Decl.”). Patent Owner relies upon a Declaration and a

Supplemental Declaration of Michael Lebby, Ph.D. (Ex. 2003, “Lebby Decl.”; Ex. 2049, “Lebby Supp. Decl.”).

F. Prior Art and Asserted Grounds

Petitioner asserts that the challenged claims are unpatentable on the following grounds (Pet. 3):

Ground	Claim(s) Challenged	35 U.S.C. § ¹	Reference(s)/Basis
1	1, 2, 6, 7, 9	103(a)	Kurita
2	1, 2, 6, 7, 9	103(a)	Kurita in view of LaMarche and/or Lemoff
3	1, 2, 6, 7, 9	103(a)	Lemoff
4	1, 2, 6, 7, 9	103(a)	Lemoff, LaMarche
5	1, 2, 6, 7, 9	103(a)	Bhandarkar

II. ANALYSIS

A. Legal Standards

A patent claim is unpatentable “if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains” (35 U.S.C. § 103(a)). “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results” (*KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007)). Similarly, “if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the application from which the ’416 patent issued was filed before this date, the pre-AIA version of § 103 applies.

similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill” (*id.* at 417). Often, it will be necessary for courts to consider the interrelated teachings of multiple patents, the effects of demands known to the design community or present in the marketplace, and the background knowledge possessed by a person having ordinary skill in the art to determine whether there was any apparent reason to combine the known elements in the manner claimed by the patent at issue (*id.* at 418).

The question of obviousness is resolved based on underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of non-obviousness such as commercial success, long felt but unsolved needs, and failure of others (*see Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966)).

B. Level of Ordinary Skill in the Art

Petitioner asserts that “[a] POSITA [(person of ordinary skill in the art)] would have had at least a bachelor’s degree in electrical engineering, physics, or a related field, and at least two years of practical experience in optical technologies” (Pet. 10 (citing Ex. 1003 ¶ 105)). According to Petitioner, “[t]hese descriptions are approximate and a higher level of education or skill might make up for less experience, and vice versa” (*id.* at 10–11).

Patent Owner adopts Petitioner’s definition of the ordinarily skilled artisan (PO Resp. 13).

We accept the level of ordinary skill in the art stated by Petitioner and agreed with by Patent Owner with the exception of the open-ended language

“at least” (*see* Paper 15 at 3 (not including this language at institution)), as it appears consistent with the ’416 patent and the prior art of record.

C. Claim Interpretation

We interpret the claims “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)” (37 C.F.R. § 42.100(b)). “It is a ‘bedrock principle’ of patent law that ‘the claims of a patent define the invention to which the patentee is entitled the right to exclude’” (*Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Innova/Pure Water, Inc. v Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004))). “Claim construction requires determining how a skilled artisan would understand a claim term ‘in the context of the entire patent, including the specification’” (*Grace Instrument Indus., LLC v. Chandler Instruments Co., LLC*, 57 F.4th 1001, 1008 (Fed. Cir. 2023) (quoting *Phillips*, 415 F.3d at 1313)). However, although claim terms are interpreted in the context of the entire patent, it is improper to import limitations from the specification into the claims (*see Phillips*, 415 F.3d at 1323). As stated by the Federal Circuit in *Markman v Westview Instruments, Inc.*, 52 F.3d 967, 980 (Fed. Cir. 1995), “[t]he written description part of the specification itself does not delimit the right to exclude. That is the function and purpose of claims.”

Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy (*see Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)))). In the present case, the claim terms having disputed meanings are “optical combiner” and “stopped

single optical fiber” (PO Resp. 16–31; Reply 4–9).² We address both disputed claim terms below.

1. optical combiner

a. Petitioner’s argument

Petitioner argues (Reply 4–5 (second and third alterations in original)):

As claim 1’s preamble says, it [(optical combiner)] 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)

b. Patent Owner’s argument

Patent Owner argues that “[t]he ’416 Patent’s ‘optical combiner’ is ‘an integrated subassembly of optical components for multiplexing light of different wavelengths, which includes an integrated pre-aligned connector with a stop to hold the single fiber optic cable’” (PO Resp. 16).³ According to Patent Owner, the claimed optical combiner is comprised of optical components that are sufficiently integrated to utilize passive alignment, and

² Petitioner and Patent Owner agree that the term “focusing means for focusing said n collimated output beams onto a single spot at said stopped single optical fiber” is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6 and that the corresponding structure is a focusing lens (PO Resp. 26; Reply 9).

³ This definition of “optical combiner” does not appear in the ’416 patent.

“is not a collection of discrete optical components” that are merely “placed in alignment relative to each other” (*id.*) (asserting the claimed “optical combiner” is a “package”).

Patent Owner contends the written description of the ’416 patent supports its construction requiring that the “optical combiner” be comprised of optical components that are integrated sufficiently to utilize passive alignment (PO Resp. 16).⁴ Specifically, Patent Owner argues that portions of the ’416 patent describe the optical combiner as being “one piece” (Ex. 1001, 2:12), and in the first embodiment, “a single piece plastic molded coupling module” (*id.* at 3:33) is described that contains, within a single part, a collimating lens array, a redirectional prism, a focusing lens, a fiber optic ferrule, and mechanical pins for alignment of the coupling module to an array of four lasers (*id.* at 3:39–44) (PO Resp. 17–18).⁵

Patent Owner also argues (*id.* at 25–26):

To the extent “optical combiner” has a broader meaning in the field of optics, the ’416 Patent disavows claim scope beyond the “optical combiner” that is described in the specification. EX2049 ¶38; *Poly-America*,^[6] 839 F.3d at 1136. . . . [T]he specification defines the “present invention” as “a compact and cost effective optical combiner” that is a “single molded device” or “two or more parts” that “can be combined to accomplish the same function,” with an integrated pre-aligned connector for the fiber. EX1001 1:50-55, 2:21-26. Nowhere in the specification has the ’416 Patent used the term

⁴ This disclosure is in the ’416 patent, but is not recited in the challenged claims. “Another object of the present invention is to integrate a fiber optic connector within the optical module, to passively align an optical fiber to the coupling optic” (Ex. 1001, 2:38–40). “The plastic molded coupling module 16 is formed by integrating” various components within a single part 16” (Ex. 1001, 3:39–44).

⁵ Patent Owner provides additional similar arguments (PO Resp. 19–20).

⁶ *Poly-America, L.P. v API Indus., Inc.*, 839 F.3d 1131 (Fed. Cir. 2016).

“the present invention” in a way that expressly contradicts the specification’s defining of the invention in such a way.

c. Analysis

Patent Owner’s first argument is that the claim term “optical combiner” includes device characteristics disclosed in the ’416 patent’s specification that are not recited in the challenged claims (i.e., “integrated pre-aligned connector,” “integrated sufficiently to utilize passive alignment,” “one piece,” “single piece plastic molded coupling module,” and “plastic molded coupling module” formed by integrating a collimating lens array, a redirectional prism, a focusing lens, a fiber optic ferrule, and mechanical pins for alignment of the coupling module to an array of four lasers, all within a single part) (PO Resp. 16–22).⁷ It is the function and purpose of the claims, not the specification, to delimit the right to exclude, and Patent Owner is impermissibly reading limitations from the specification into the challenged claims (*see Markman*, 52 F.3d at 980; *Phillips*, 415 F.3d at 1323; *Innova/Pure Water*, 381 F.3d at 1115–17 (“It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude,” and “particular embodiments appearing in the written description will not be used to limit claim language that has broader effect.”)).

The ’416 patent specification indicates that the claimed optical combiner can have the characteristics argued by Patent Owner, but it does not describe the invention as necessarily having any of those characteristics. For example, the written description states that “[t]he present invention provides, for the first time, an inexpensive, injection molded, one piece

⁷ Claim 3, which depends from claim 1, requires “a prism” and “a single, monolithic molded block,” but Petitioner does not challenge that claim.

optical combiner” (Ex. 1001, 2:11–12). Yet, despite describing “the present invention” as providing a “one piece optical combiner,” the written description and dependent claims make clear that a one piece combiner is not required (*id.* at 1:50–55, 2:17–18, 5:24–40, 3:46–50). Likewise, the ’416 patent states that “[o]ne of the key objects of the present invention is to provide a compact and cost effective optical combiner . . . all without requiring the use of dielectric filters and the alignment necessitated by those filters or expensive waveguides.” (*id.* at 2:21–26). Despite this being a key object “of the present invention,” the claims make clear that the “optical combiner” of claim 1 may “require the use of dielectric filters or waveguides.” (*id.* at 6:16–18 (dependent claim 6 reciting “wherein said optical combiner does not require the use of dielectric filters or waveguides”); see *Littlefuse, Inc. v. Mersen USA EP Corp.*, 29 F.4th 1376, 1380 (Fed. Cir. 2022) (“By definition, an independent claim is broader than a claim that depends from it.”)). In addition, the written description explains that passive alignment is not required, but rather is optional (Ex. 1001, 4:59–60 (noting that all optical components “could utilize passive alignment mechanisms”).

Given the broad use of “the present invention” in the ’416 patent to describe elements that are not affirmatively recited in the claims, and in view of the “bedrock principle of patent law that the claims of a patent define the invention,” we conclude that none of the unrecited limitations identified by Patent Owner are required by the claims. See *Thorner v. Sony Entm’t Am. LLC*, 669 F.3d 1362, 1366 (Fed. Cir. 2012) (explaining that the standard for disavowal is “exacting,” and the use of “the present invention” is not necessarily sufficient to meet this standard).

Patent Owner’s second argument is that, to the extent “optical combiner” has a broader meaning in the field of optics, the ’416 patent disavows claim scope beyond the “optical combiner” that is described in the specification (PO Resp. 25–26). “[T]he standard for disavowal is exacting, requiring clear and unequivocal evidence that the claimed invention includes or does not include a particular feature” (*Poly-America, L.P. v API Indus., Inc.*, 839 F.3d 1131, 1136 (Fed. Cir. 2016)). “[A]n inventor may disavow claims lacking a particular feature when the specification describes ‘the present invention’ as having that feature” (*id.*).

We discern no clear and unequivocal evidence that the claimed invention excludes all optical combiners that are not disclosed in the ’416 patent. Indeed, as discussed above, the specification uses the term “present invention” with respect to several features of the optical combiner, but several dependent claims contain the very claim limitations that Petitioner contends are required of an optical combiner. Thus, we are not persuaded that the ’416 patent disavows claim scope regarding the “optical combiner.”

d. Conclusion

We construe the claim term “optical combiner” as having its ordinary meaning in view of the specification. The ’416 patent is titled “OPTICAL COMBINER DEVICE” (Ex. 1001, code (54)). The ’416 patent’s specification states that “[a]n optical device for combining optical signals of different wavelengths is described wherein an array of laser output beams are collimated, directed to propagate along a similar path, and coupled into an optical fiber through a single molded part” (*id.* at code (57)), and describes the device as “an optical multiplexing device which spatially combines multi-wavelength light from a plurality of lasers into an optical fiber” (*id.* at 1:14–16). Those disclosures are consistent with the meaning of

“optical combiner” indicated by the dictionary definition of record, i.e., “[a]n optical combiner, in the context of optics and display technologies, refers to a device or component that combines multiple optical signals or images into a single output” (Ex. 1019, 1) as well as with Petitioner’s construction of “optical combiner” (Reply 4–5). Thus, in view of the ’416 patent’s specification, we construe the claim term “optical combiner” as meaning “an optical device that couples optical signals of different wavelengths into an optical fiber.”

2. *stopped single optical fiber*

a. *Petitioner’s argument*

Petitioner contends that the term “‘stopped’ is not typically used to describe optical fibers in this field,” but in view of the how the term is used in the written description and claims, the term “stopped” would have been understood by a POSITA to mean “fixed,” such that movement would be substantially limited (Pet. 13–14).

b. *Patent Owner’s argument*

Patent Owner argues that “‘[s]topped single optical fiber’ as used in the ’416 Patent means ‘a single optical fiber that has been inserted into the optical combiner until it abuts a physical structure that prevents the fiber from being inserted further into the optical combiner’” (PO Resp. 26). Patent Owner also argues that “[d]ictionary definitions also support [its] construction,” defining “stopped” to mean “[t]o arrest the progress or motion of; cause to halt.” (*id.* at 30 (citing Ex. 2004, 1161)).

c. *Analysis*

The ’416 patent’s independent claims (1 and 7) require an optical combiner that is usable in data communication systems for transmission of laser outputs into and through a stopped single optical fiber. When

determining the meaning of the claim term “stopped single optical fiber,” “the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification” (*Phillips*. 415 F.3d at 1313). The specification indicates that the stopped single optical fiber recited in the claims is one that is configured to be inserted into the optical combiner until it cannot be inserted further, at which point it is stopped (“a single optical fiber (not shown) is stopped by fiber stop or seat 60 formed in ferrule 80” (Ex. 1001, 3:13–15); “the fiber (not shown) inserted into the ferrule 80, seated at the fiber stop 60” (*id.* at 3:23–24)).

d. Conclusion

In view of the ’416 patent’s specification, we construe the claim term “stopped single optical fiber” as meaning “a single optical fiber that is configured to be inserted into the optical combiner until it cannot be inserted further.” This is generally consistent with both parties’ constructions requiring that the fiber be fixed (Petitioner) and arrested in progress or motion (Patent Owner).

In its claim construction arguments, Patent Owner suggests there must be a structure to stop the fiber from extending through a ferrule or pre-aligned connector (PO Resp. 27). Although the specification discloses that the stopped single optical fiber can be stopped by a fiber stop or seat (60) formed in a ferrule (80), and that the ferrule (80) can be integrated to enable the stopped single optical fiber to be placed into a pre-aligned connector (Ex. 1001, 3:17–18), the claim term “stopped single optical fiber” does not require the stop to be in a ferrule. Patent Owner’s above-stated meaning of that claim term also does not require that the stop is in a ferrule. As indicated

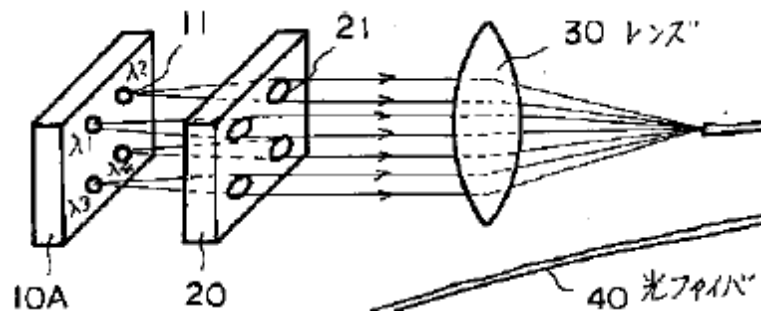
by the discussion of Lemoff below, the claim term “stopped single optical fiber” encompasses a single optical fiber that is fixed in a ferrule that is inserted into a device until the ferrule hits a stop that prevents the ferrule and the single optical fiber fixed within it from being further inserted into the device.

D. Claims 1, 2, 6, 7, and 9 over Kurita in View of LaMarche and/or Lemoff

Petitioner contends claims 1, 2, 6, 7, and 9 would have been obvious in view of five different grounds (Pet. 3). Because our analysis of Petitioner’s obviousness ground based on Kurita in view of LaMarche and/or Lemoff is dispositive of all challenged claims, we limit our analysis to this ground.

1. Kurita

Kurita discloses a light connection element illustrated as follows (Ex. 1004, Fig. 3 (cropped)):



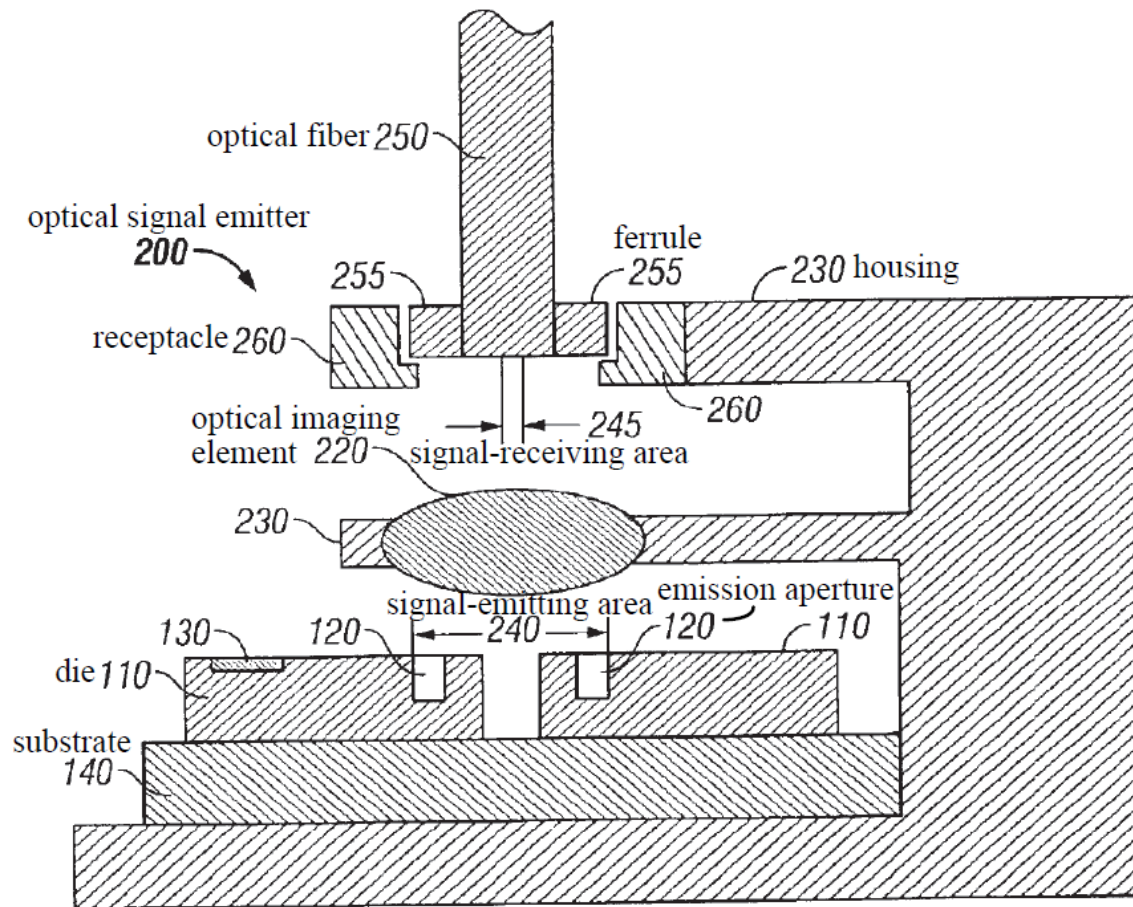
The image is a portion of Kurita’s Figure 3 showing Kurita’s light connection element.

As shown above, the light connection element comprises: 1) a planar monochromatic light source array (10A) of integrally-formed surface emitting lasers (11) each emitting light having a different wavelength (λ_1 – λ_4); 2) a collimating lens array (20) each lens (21) of which corresponds to a different one of the lasers (11); and 3) a lens (30) that receives in different

sectors the light emitted from each of the lasers (11) and converges the light from each sector onto one point to be entered into one end portion of a single optical fiber (40) (*id.* ¶¶ 1, 6–11, 15).

2. Lemoff

Lemoff discloses a multi-channel, optical signal emitter for a wavelength division multiplexed (WDM) communication system that combines multiple signal components into a multi-channel optical signal without using an optical multiplexer or other device external to the emitter (Ex. 1006, 1:52–55). The optical signal emitter (200) is illustrated as follows (*id.* at Fig. 2 (annotated to provide descriptions of certain numerical identifiers)):

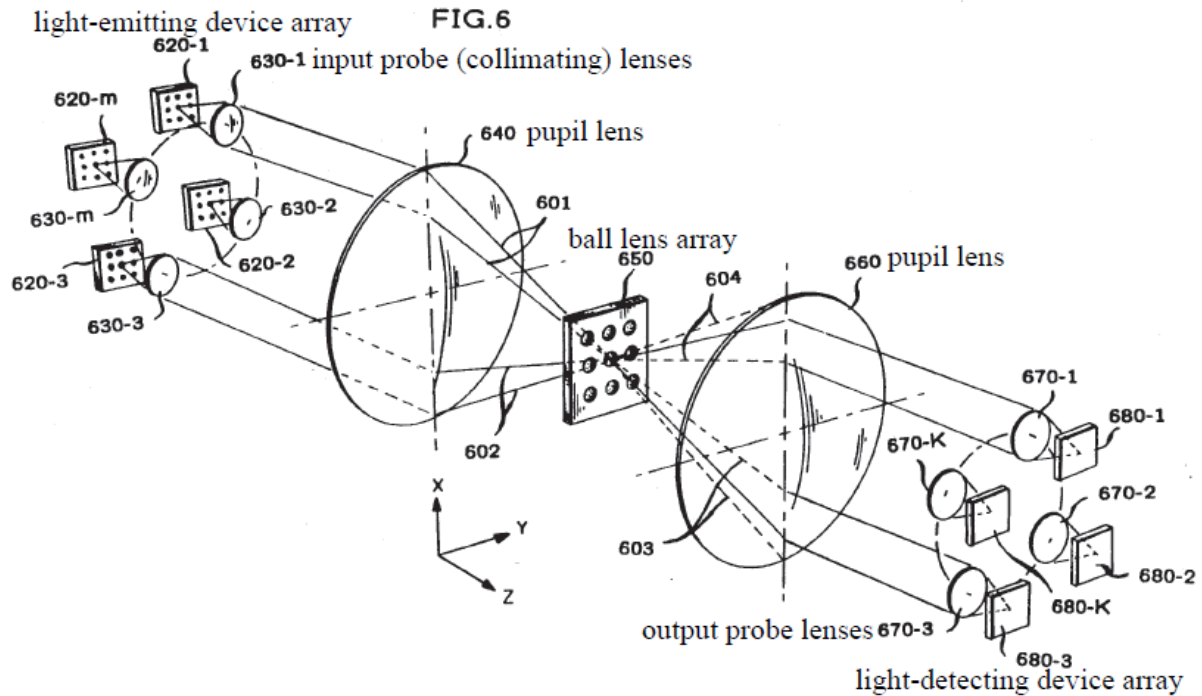


The image is an annotated version of Lemoff's Figure 2 showing Lemoff's optical signal emitter.

The multi-channel optical signal emitter (200) includes multiple semiconductor dies (110) each attached to a substrate (140) and configured to emit a channel of the multi-channel optical signal from an emission aperture (120) offset from the die's center toward an aperture corner of the die (Ex. 1006, 1:58–61). The emission apertures (120) collectively define a signal-emitting area (240), and the aperture corners of each die (110) point toward the center of the signal-emitting area (240) (*id.* at 1:61–65, 5:50–54, 6:3–4). Signals from the signal-emitting area (240) pass through an optical imaging element (220) that images the optical signals emitted from the signal-emitting area (240) into the signal-receiving area (245) of an optical fiber (250) (*id.* at 6:7–11, 16–22). The optical fiber (250) is surrounded and secured by a ferrule (255) inserted into a receptacle (260) that surrounds and secures the fiber (250) and ferrule (255) assembly (*id.* at 5:55–65). The end of the optical fiber (250) and the bottom of the ferrule (255) may be, but need not be, polished together to form a smooth surface which aids in coupling efficiency (*id.* at 5:60–63). Coupling efficiency also can be increased by proper selection of the relative diameters and/or numerical apertures of the emitter and fiber (*id.* at 5:2–42; 6:23–32). A housing (230) holds the receptacle (260), imaging element (220), and substrate (140) in alignment with each other (*id.* at 6:33–36).

3. *LaMarche*

LaMarche couples multiple light-emitting devices (620-1 – 620-m) to respective light detecting devices (680-1 – 680-m) by use of the structure illustrated as follows (Ex. 1005 Fig. 6 annotated):



The image is an annotated version of LaMarche's Figure 6 showing LaMarche's optical interconnection arrangement.

Light rays from each of a number of light-emitting devices (620) are collimated by a respective input probe lens (630) and then pass through a pupil lens (640) that focuses the light rays onto a ball lens array (650) that fans out the light rays so they substantially fill the aperture of a receiving pupil lens (660) from which they pass to a respective output probe lens (671) and light detecting device (660) (Ex. 1005, 4:19–22, 43–60; 5:27–33, 60–62; 6:26–31, 45–47; 7:4–7).

4. Claim 1

a. Petitioner's argument

Petitioner contends that Kurita discloses every limitation of claim 1 and that, to the extent Kurita does not disclose every limitation of claim 1, the combination of Kurita and Lemoff does (Pet. 19–25, 31–33). In particular, Petitioner contends that Kurita discloses an “optical combiner” that is usable in a data communications system for multiplexing outputs of a

plurality of *n* lasers each having a different output wavelength, and transmission through a stopped single optical fiber (*id.* at 19 (citing Ex. 1004 ¶¶ 1, 4, 7–11, 13, 15, Figs. 1–3)). Petitioner further contends that Kurita discloses, and illustrates in Figure 3, an optical combiner that comprises a) four lasers (11) each aligned with one of four collimating lenses (21) spaced apart in a two-dimensional, two-by-two array and positioned to receive and collimate the output of the *n* laser output beams having different wavelengths; and b) a focusing lens (30) having four separate pie-shaped radial sector quadrants on its surface such that light of a different wavelength from each laser (11) passes through a different quadrant and is coupled into a single optical fiber (40) (Pet. 20–25; Reply 12–15).

Petitioner argues that Kurita discloses an optical fiber 40 and it would have been “a natural extension to apply Lemoff’s teachings of a receptacle and ferrule arrangement for securing an optical fiber” to Kurita (Pet. 29). Petitioner further argues that using Lemoff’s receptacle and ferrule arrangement for securing an optical fiber would represent the use of a known device, that is ready for improvement, to yield a predictable result, as well as the use of a known method (arranging elements of an optical device) to yield predictable results (e.g., a functioning optical device) (*id.* at 30). Finally, Petitioner contends that “Lemoff teaches that the receptacle and ferrule arrangement form a connector that supports improved installation and maintenance of the optical device and allows optical fibers to be plugged into or out of the optical device based on changing circumstances” (Pet. 31 (citing Ex. 1006, 5:63–6:2)).

Petitioner also contends that, to the extent that passive alignment is required by the claims (as asserted by Patent Owner), Dr. Lebby admitted on cross-examination that both passive and active alignment were known in the

art, were tools an engineer would have been aware of, and that both active and passive alignment have advantages (Reply 18 (citing Ex. 1018, 31:8–33:5, 38:10–12, 39:7–40:19, 83:13–22; 290:14–16)).⁸

b. Patent Owner's argument

Patent Owner contends the combination of Kurita and Lemoff does not render challenged claim 1 obvious because: 1) Kurita's lasers (11), collimating lenses (21), and focusing lens (30) depicted in Figure 3 are discrete, individual components that are not integrated and cannot use passive alignment (PO Resp. 32–34, 36–37); 2) Kurita's fiber (40) is not a stopped optical fiber because fixing it in place does not passively align it with the optical components (*id.* at 35–37); and 3) the light from each of Kurita's lasers (11) depicted in Figure 3 cannot pass through a separate focusing lens (30) pie shaped sector because the lasers (11) and collimating lenses (21) are arranged linearly rather than being arranged about a circular axis (*id.* at 37–42). Patent Owner argues that Petitioner's reliance on Lemoff for a receptacle and ferrule arrangement for securing an optical fiber does not overcome the shortcomings of Kurita and, therefore, the combination of

⁸ Patent Owner asserts that “Petitioner has improperly introduced new arguments and evidence, including expert testimony either uncited or incorporated by reference in its Reply, as well as expert testimony that contradicts his deposition. This improper material should be disregarded” (Sur-reply 1–6). In particular, Patent Owner objects to reliance on patents issued to Grann (Exs. 1020, 2018) and Dr. Willner's supplemental declaration discussing these patents. (*Id.*). We need not further address Patent Owner's assertion because in our decision we do not rely upon these allegedly new arguments or evidence in the Reply or to any paragraphs of Dr. Willner's supplemental declaration that are allegedly incorporated by reference.

Kurita and Lemoff does not render claim 1 obvious (*id.* at 43 (citing Pet. 33)).

Patent Owner further argues that one of ordinary skill in the art would not have modified Kurita in view of Lemoff because: 1) Lemoff discourages using optical wavelength multiplexers for short distances because the complexity of the design is often cost prohibitive; 2) Lemoff discloses that its signal emitter can be used in a WDM communication system without using an optical multiplexer or other device external to the emitter as used by Kurita (i.e., Lemoff positions the signal emitters near the fiber to emulate WDM without the need for an external optical multiplexer or similar device); 3) Kurita's fiber must be fixed and aligned manually with or without a ferrule; and 4) Lemoff's device is not physically combinable with Kurita's WDM multiplexer due to Lemoff's device's small size (PO Resp. 47–48). Patent Owner also argues that a fiber inserted into Lemoff's ferrule and receptacle would not satisfy the '416 patent's "stopped optical fiber" limitation because Lemoff's ferrule does not include a stop and is removable rather than being integrated (*id.* at 49).

c. Analysis

Regarding Patent Owner's argument that Kurita's Figure 3's lasers (11), collimating lenses (21), and focusing lens (30) are discrete, individual components that are not integrated and cannot use passive alignment (PO Resp. 32–34, 36–37), for the reasons set forth above, we do not construe the term "optical combiner" as requiring an integrated assembly or one that uses passive alignment. Moreover, the '416 patent discloses an embodiment wherein "the combiner shown generally as 310 includes a two-piece molded module including a separately molded output lens 350 and separately molded collimating lenses 321-324" (Ex. 1001, 4:36–39, Fig. 10).

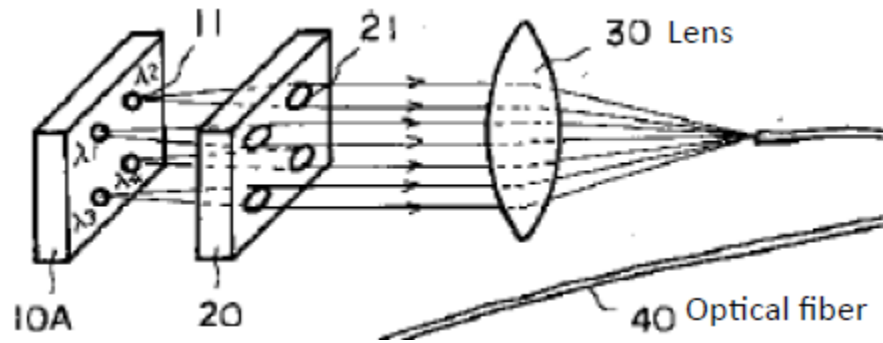
With respect to that embodiment, the patent states that “[t]he focusing lens 350 is supported in its position shown in FIG. 10 by means known to those skilled in the art which are deleted in the interest of brevity” (*id.* at 4:42–45).

Furthermore, even if we agreed with Patent Owner that the light connection device in Kurita’s Figure 3 “uses an arrangement of discrete optical components to multiplex the light from multiple fibers onto a single optical fiber” and that “[t]hese discrete, individual component parts are not integrated and do not disclose an integrated optical combiner, as FIG. 3 shows” (PO Resp. 33 (citing Ex. 1004 ¶ 15; Ex. 2003 ¶¶ 123–129)), that is not the end of the obviousness inquiry. In particular, Patent Owner argues that a person of ordinary skill in the art “would be familiar with how to set up Kurita’s optical arrangement in a laboratory using an optical bench” and that “[t]he discrete components would be secured in place attached to the optical bench, utilizing specialized tools for precise alignment of the optical components and the fiber.” PO Resp. 34 (citing Ex. 2049 ¶¶ 8–13, 57; Ex. 2048, 43:21–49:4). This argument shows that, to the extent Kurita’s Figure 3 shows discrete components, Kurita’s disclosure at least suggests assembling those components, at which point the assembled components are an assembled optical combiner, even if on a bench in a laboratory. The challenged claims recite no limitations on the size of the optical combiner.

Patent Owner’s argument that Kurita’s optical fiber (40) is not a stopped single optical fiber because fixing it in place does not passively align it with the optical components (PO Resp. at 35–37) is not persuasive because fixing Kurita’s fiber (40) in place in accord with Lemoff’s teaching regarding the ferrule (255) inserted until being stopped by the receptacle (260) (Ex. 1006, 5:50–6:15, Fig. 2) would align Kurita’s optical

fiber (40) with Kurita's optical components (light source array (10A), lens array (20), and lens (30)) (Ex. 1004 Fig. 3) passively in the same manner that Lemoff's ferrule (255), after being inserted until stopped by the receptacle (260), passively aligns the optical fiber (250) with the optical components (optical imaging element 220 and light emitters within emission apertures 120) (Ex. 1006, 5:50–6:15, Fig. 2; Reply 15–16).

Regarding Patent Owner's argument that the light from each of Kurita's lasers (11) depicted in Figure 3 cannot pass through a separate focusing lens (30) pie shaped sector because the lasers (11) and collimating lenses (21) are arranged linearly rather than being arranged about a circular axis (PO Resp. at 37–42), we do not agree. Claim 1 requires "focusing means having n separate radial sectors on its surface, and each of said n collimated beams passes through a separate one of said n sectors of said focusing means" (Ex. 1001, 5:34–37), claim 2 requires "four lasers and four collimating lenses are each formed in a two-dimensional, two by two array [centered on the focal axis of lens 30], wherein said focusing means is a single focusing lens, and wherein each radial sector is a pie-shaped quadrant" (*id.* at 5:41–44), and claim 7 requires "focusing means having four separate quadrants on its surface, and each of said four collimated beams passes through a separate one of said quadrants of said focusing means" (*id.* at 6:35–38). Kurita meets those claim requirements. Kurita's two by two array (10A) of lasers (11), collimating lens (21) array (20), and focusing lens (30) are shown in Kurita's Figure 3 (cropped) as follows:



The image is a portion of Kurita's Figure 3 showing Kurita's laser array, collimating lens array, and focusing lens (30).

Relative to a point at the center of the laser array (10A) or the collimating lens array (20), each laser (11) and each collimating lens (21) is in a separate quadrant that can be a quadrant of a circle (pie-shape) on lens 30 (Reply 12–13, Ex. 1003 ¶¶ 85–91).

Patent Owner criticizes Petitioner's declarant, Dr. Willner, for not answering whether Kurita's Figures 1 and 2 disclose a radial arrangement (PO Resp. 40 (citing Ex. 138:18–142:11; Ex. 1003 ¶ 182)). But Dr. Willner does not rely on Kurita's Figures 1 and 2, which show three lens portions 21 in three rows, to show a radial arrangement (Ex. 1003 ¶ 182). Rather, Dr. Willner testifies that "a two-by-two array of plural lens portions 21" as "expressly shown by FIG. 3" in Kurita "results in radially arranged lenses that will each pass their respective collimated light to a separate radial portion (or sector) of the lens 30" (Ex. 1003 ¶ 182; *see* Ex. 1003 ¶ 183 ("[T]he separate radial sectors are achieved as a result of the arrangement of the lasers and collimating lenses radially with respect to a center focal axis of the focusing lens.")). Dr. Willner testifies that Kurita shows the four lens portions in Figure 3 "radially arranged, in a two-by-two array, with respect to a center focal axis of the focusing lens (lens 30)" (Ex. 1003 ¶ 183). We

credit this testimony because it is consistent with Kurita's express disclosure in Figure 2.

Dr. Lebby's contrary testimony does not undermine Petitioner's showing. Dr. Lebby testifies:

Dr. Willner opines that the 2x2 array of lens portion 21 *results in* radially aligned lenses and cites to FIGS. 1–3. EX1003, ¶182. This is not taught in Kurita. Kurita's optical lenses are integrated in rows, and are not integrated in a radial alignment. This is confirmed by FIGS. 1 and 2 in Kurita that show a 3x3 lens array. EX1004, FIGS. 1–2. This alignment shows the lenses are integrated in rows. Thus, Kurita does not teach a radial set up of “n” lenses in lens array 20.

(Ex. 2003 ¶ 155). But Petitioner and Dr. Willner rely on Figure 3 to show a radial arrangement (Pet. 21–25; Ex. 1003 ¶¶ 182–183, 186–191). In Kurita's Figure 3 the 2x2 arrangement of lens portions results in light hitting lens 30 in pie-shaped quadrants just as the corners of a square imposed on a circle would be in four quadrants of the circle. Dr. Lebby's focus on Kurita's Figures 1 and 2 misses the point because they are not relied on to teach this aspect of the claims.

Regarding Patent Owner's argument that one of ordinary skill in the art would not have modified Kurita in view of Lemoff because Lemoff positions the signal emitters near the fiber to emulate WDM without the need for an external optical multiplexer or a similar device and discourages using optical wavelength multiplexers for short distances because the complexity of the design is often cost prohibitive (PO Resp. 47–48), Lemoff does not appear to limit the usefulness of the fiber connector to any particular optical signal transmission distance. Petitioner relies upon Lemoff for a suggestion to combine Lemoff's fiber connector configuration teachings with Kurita's multiplexer teachings to enable fibers to be plugged

in and removed during installation or maintenance (Ex. 1006, 5:55–6:2, Fig. 2) (Pet 29, 31; Reply 17–18).

Regarding Patent Owner’s argument that one of ordinary skill in the art would not have combined Lemoff’s receptacle and ferrule with discrete components in Kurita because the fiber would need to be manually fixed and aligned with or without a ferrule and, therefore, would serve no purpose (PO Resp. 48), Lemoff’s fiber connector appears to fix and align the fiber adequately for wavelength division multiplexing without manual fixation or alignment being required (Ex. 1006, 5:65–6:2, Fig. 2; Reply 18). The challenged claims do not require any greater degree of fixing and alignment than that provided by Lemoff’s fiber connector.

Regarding Patent Owner argument that Lemoff’s device is not physically combinable with Kurita’s WDM multiplexer due to Lemoff’s device’s small size (PO Resp. 47–48; Reply 17–18), “[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.... Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art” (*In re Keller*, 642 F.2d 413, 425 (CCPA 1981)). Accordingly, we are not persuaded by Patent Owner’s argument.

As for Patent Owner’s argument that a fiber inserted into Lemoff’s ferrule and receptacle would not satisfy the ’416 patent’s “stopped optical fiber” limitation because Lemoff’s ferrule does not include a stop and is removable rather than being integrated (PO Resp. at 49), as discussed above, the challenged claims do not recite a ferrule, let alone a ferrule that is integrated and non-removable, nor do the claims preclude the use of a ferrule and fiber that are, in combination, stopped by another portion of the device. Nor does Patent Owner’s construction of this term, discussed above, require

or preclude a ferrule. Patent Owner is reading those limitations from the specification into the claims, which is improper (*see Phillips*, 415 F.3d at 1323).

The '416 patent discloses an optical combiner (10) having an integrated ferrule (80) into which a single optical fiber is inserted until it reaches a stop or seat (60) in the ferrule (80) (Ex. 1001, 3:11–18, Fig. 1). In Lemoff's optical signal emitter (200), a ferrule (255) that surrounds and secures an optical fiber (250) therein is inserted into a receptacle (260) that surrounds and secures the ferrule (255)/optical fiber (250) assembly (Ex. 1006, 5:58–65, Fig. 2). "Receptacle 260 and ferrule 255 constitute a connector, by means of which various optical fibers may be plugged into or removed from optical signal emitter 200 when the emitter is initially installed in an optical communication system or when maintenance is performed" (*id.* at 5:65–6:2). Lemoff's device differs from the device disclosed in the '416 patent specification in that instead of the optical fiber (250) being inserted into the optical signal emitter (200) until it hits a stop in the ferrule (255), the ferrule (255) having an end of the optical fiber (250) secured therein is inserted into the optical signal emitter (200) until it hits a receptacle (260) that functions as a stop. The '416 patent's claims are not patentably distinguished over Lemoff's fiber connector because they are not limited to an integral ferrule into which an optical fiber is inserted until it hits a stop in the ferrule but, rather, are sufficiently broad to encompass Lemoff's structure wherein a ferrule/optical fiber combination is inserted until it hits a stop.

d. Conclusion

Upon review of the prior art of record and the parties' arguments, we determine that Petitioner has demonstrated by a preponderance of the

evidence that the subject matter of claim 1 would have been obvious in view of the combined disclosures of Kurita and Lemoff.

5. Claims 2, 6, 7, and 9

Petitioner contends that the subject matter of claims 2, 6, 7, and 9 would also have been obvious over Kurita in view of Lemoff and/or LaMarche (Pet. 24–25, 33–35). In particular, regarding claim 2, Petitioner contends that “it would have been obvious to a POSITA at the time of the invention to arrange the light emitting portions 11 and lens portions 21 in Kurita radially around the lens 30, in a two-by-two array, centered on the focal axis of lens 30, such that the resulting four radial sections on the surface of the focusing lens are each a pie-shaped quadrant. *See* EX1003, §VIII(C)(iv)” (*id.* at 34). With respect to claim 6, Petitioner contends that nothing in the applied references requires the use of dielectric filters or waveguides” (*id.*). With respect to claim 7, Petitioner contends that claim 7 has essentially the same scope as claim 2, and Petitioner relies upon its analysis regarding claim 2 for claim 7 (*id.*). As for claim 9, Petitioner states that claim 9 differs from claim 6 only in that it depends from claim 7 instead of claim 1, and Petitioner relies upon Petitioner’s analysis regarding claim 6 (*id.* at 35).

Patent Owner does not address Petitioner’s specific arguments with respect to claims 2, 6, 7, and 9, but contends these claims would not have been obvious over Kurita in view of Lemoff and/or LaMarche for the reasons discussed above with respect to independent claim 1 (PO Resp. 65–66 (“Because Lemoff and/or LaMarche are not combinable and do not disclose all elements of claim 1 from which claim 2 depends . . . this combination does not disclose claim 2”)).

Upon review of Petitioner's arguments and supporting evidence, we determine that Petitioner identifies where every limitation of claims 2, 6, 7, and 9 is taught or suggested in Kurita in view of Lemoff. And, for the reasons discussed above, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 1 would have been obvious in view of Kurita and Lemoff. Thus, Petitioner demonstrates by a preponderance of the evidence that claims 2, 6, 7, and 9 would have been obvious over the combined disclosures of Kurita and Lemoff.

III. CONCLUSION

Petitioner has shown by a preponderance of the evidence that claims 1, 2, 6, 7, and 9 would have been obvious over the combination of Kurita, LaMarche, and Lemoff (Ground 2).

In summary:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1, 2, 6, 7, 9	103(a)	Kurita, Lemoff	1, 2, 6, 7, 9	
1, 2, 6, 7, 9	103(a)	Kurita, LaMarche, Lemoff ⁹		
1, 2, 6, 7, 9	103(a)	Kurita ¹⁰		
1, 2, 6, 7, 9	103(a)	Lemoff ¹¹		
1, 2, 6, 7, 9	103(a)	Lemoff, LaMarche ¹²		
1, 2, 6, 7, 9	103(a)	Bhandarkar ¹³		
Overall Outcome			1, 2, 6, 7, 9	

⁹ Because we find that claims 1, 2, 6, 7, and 9 would have been obvious over Kurita in view of Lemoff, we need not address the combination of Kurita and LaMarche or the combination of Kurita, LaMarche, and Lemoff.

¹⁰ Because we find that claims 1, 2, 6, 7, and 9 would have been obvious over Kurita and Lemoff, we do not address whether these same claims would have been obvious in view of Kurita.

¹¹ Because we find that claims 1, 2, 6, 7, and 9 would have been obvious over Kurita and Lemoff, we do not address whether these same claims would have been obvious in view of Lemoff.

¹² Because we find that claims 1, 2, 6, 7, and 9 would have been obvious over Kurita and Lemoff, we do not address whether these same claims would have been obvious in view of Lemoff and LaMarche.

¹³ Because we find that claims 1, 2, 6, 7, and 9 would have been obvious over Kurita and Lemoff, we do not address whether these same claims would have been obvious in view of Bhandarkar.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 2, 6, 7, and 9 of US 7,198,416 B2 have been shown unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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