

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

OPTICIS CO., LTD

Petitioner,

v.

INNEOS LLC,

Patent Owner.

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

SUPPLEMENTAL DECLARATION OF MICHAEL LEBBY, PH.D.

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I, Michael Lebby, Ph.D., hereby declare as follows:

I. SCOPE OF THE ENGAGEMENT

1. I have been retained by Womble Bond Dickinson (US) LLP (“WBD”) on behalf of Inneos, LLC (hereinafter “Patent Owner” or “Inneos”) in connection with the above-captioned *Inter Partes* Review (“IPR”) proceeding involving U.S. Patent No. 7,198,416 (“the ’416 Patent”) (EX1001) that is assigned to Inneos.

2. I understand that this declaration (“Supplemental Declaration”) will be submitted in support of Patent Owner’s Response to the Petition for IPR. This Supplemental Declaration supplements my prior declaration in support of Patent Owner’s Preliminary Response for this IPR Proceeding (Ex. 2003, “Prior Declaration”). In my Prior Declaration, I address many topics, including (but not limited to) my background and qualifications, an overview of the ’416 Patent and its claim construction, certain legal standards explained to me by counsel, and my opinions as to the validity of claims 1, 2, 6, 7, and 9 of the ’416 Patent (collectively, the “Challenged Claims”) in view of the grounds set forth in the Petition.

3. I maintain all of my earlier analysis and continue to hold the opinions expressed in my Prior Declaration. This Supplemental Declaration is in response to the Institution Decision (Paper 15, “Decision”) and Dr. Willner’s deposition testimony in this proceeding. The two declarations are complementary and should be read in tandem.

4. In addition to the materials identified in my Prior Declaration, I have also reviewed the Board's Decision Granting Institution, the Deposition Transcript of Dr. Alan Willner (Ex. 2048), and the Declaration of Dr. Willner submitted in *Inneos v. Opticis Co. Ltd.*, Case No. 8:23-cv-00185 (N.D. Cal.).

II. PERSON HAVING ORDINARY SKILL IN THE ART

5. Petitioner has argued that "A POSITA 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. EX1003, Section VII(D)(i)." In my Prior Declaration, I have adopted this as the definition of a POSITA, and do so here. Accordingly, my opinions contained herein are based on this level of ordinary skill in the art at the time of the invention.

III. OPTICAL DESIGN

A. Integration Versus Alignment (Manual or Passive)

6. Integration is a separate concept than alignment. A POSITA would understand that individual optical components are capable of being aligned, for example, in a laboratory using laboratory equipment, without being integrated.

7. I agree with Dr. Willner that alignment in simple terms is the optical path is such that the light goes where it is supposed to go. A system may be out of alignment for many reasons. For example, the optical components may not be lined up relative to one another, or the end of the fiber may be out of alignment with the optical components such that the light does not go where it is supposed to go.

Alignment in optics is tricky and highly sensitive, especially for optical components and fiber to stay in alignment when deployed in a commercial setting.

8. Optical components and systems are often set up in optical labs to test their feasibility. To do this, optical benches or tables are used because they are helpful in conducting experiments. As Dr. Willner explained at deposition, the optical tables are flat surfaces and typically have holes that one would screw something into the table to hold or fix a discrete component in place. For example, a clamp can be screwed into the table to hold an item in place, such as a discrete optical lens.

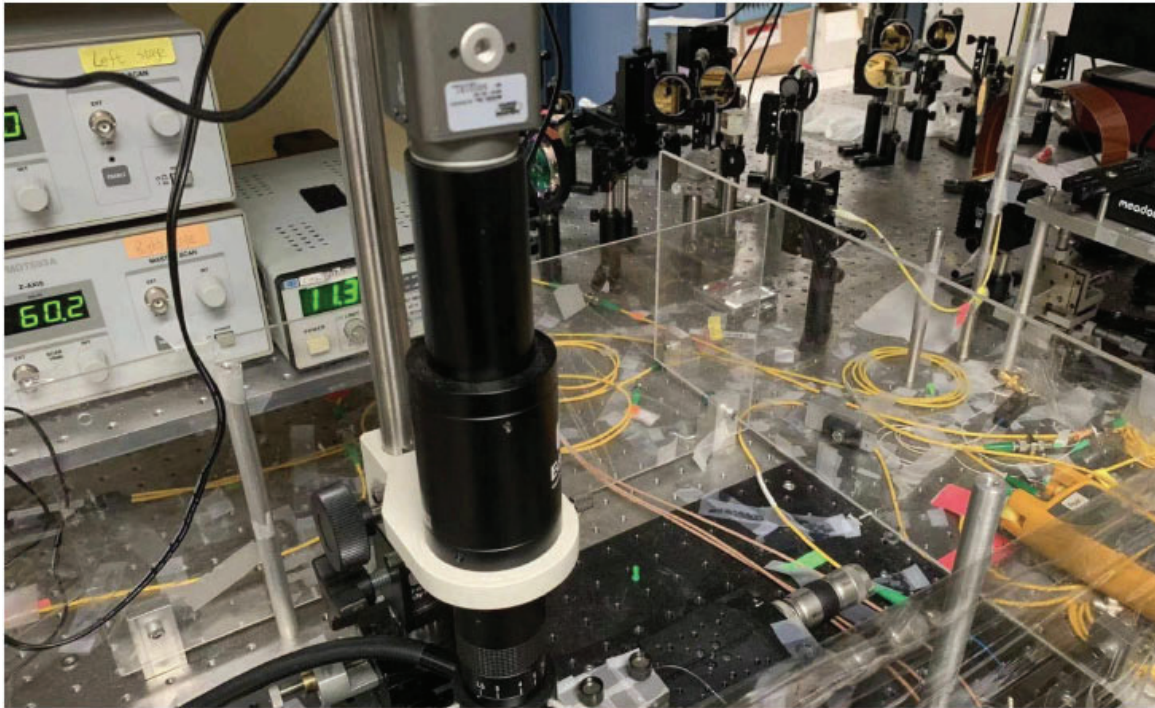
9. Also, XYZ stages or translation stages can be screwed into the table, or a clamp screwed into the table may hold the stage. The translation stage may have a holder to hold optical components, such as a lens. The stage can be moved in the X, Y, Z planes to allow a person to move the optical components around until they are aligned.

10. Fibers can also be aligned in a similar way. A fiber may also be aligned using a translation stage. A fiber mount may also be screwed into the table to hold the fiber in place.

11. In this laboratory setting example, a POSITA would understand an optical lens held in place by holder or translation stage that is screwed into an optical table is a discrete component that is not integrated with other components it may be

in placed into alignment with. A POSITA would also understand that the components are “fixed” in place.

12. EX2023 depicts a typical optical bench with discrete optical components bolted to a metallic platform tabletop. The holes on the optical bench can be seen in the photograph. The lab equipment can be screwed into these holes to be held in place when conducting experiments.



13. When using an optical table, to align the components, a POSITA would understand that active, manual alignment is required. During the active alignment process, the lasers must be turned on and the optical components are moved around

to be in line with the optical path until a sufficient amount of light is received by the fiber—that is until there is alignment.

14. Passive alignment, on the other hand, is alignment when the laser or light is not being used. It includes the concept of pre-alignment. Because the components are integrated and pre-aligned, the components are capable of being passively aligned. In other words, passive alignment allows the ability to assemble the optical path without having to turn on the device to get everything into alignment. This means that there is enough tolerance to get good alignment without the need to look at perform active alignment with the light. As described in the '416 Patent, one aspect of the invention is to “integrate a fiber optic connector within the optical module, to passively align an optical fiber to the coupling optic.” EX1001 2:27-30. This means that once the fiber is inserted into the pre-aligned connector, it is in alignment. No manual or active alignment is necessary.

IV. CLAIM CONSTRUCTION

A. “Optical combiner”

15. I understand that in the Institution Decision, the Board gave weight to the term “optical combiner” because “it is needed to specify the type of device being claimed.” Decision, p.9. I understand that the Board did not adopt a complete construction of “optical combiner,” but states that “During trial, the parties can address what the ordinary and customary meaning of the claim term ‘optical

combiner’ would be to one of ordinary skill in the art in view of ‘the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.’” Decision p.9.

16. I understand that Petitioner’s Preliminary Reply to Patent Owner’s Preliminary Response (Paper 13, “Prelim. Reply”) contends that to the extent “optical combiner” is limiting, it “should be given its plain meaning – *a device that combines multiple optical outputs into an output.*” Prelim. Reply p.2.

17. In the Institution Decision, the Board found the “specification discloses an integrated, monolithic molded optical combiner, but also indicates that the optical combiner claimed in the challenged claims is not limited to such a structure but, rather, includes an optical combiner comprised of components that are integrated sufficiently to combine multiple optical inputs into an optical output focused onto a spot on an optical fiber but are not integrated in a pre-aligned unit.” Decision p.8-9.

18. I disagree with Petitioner’s construction that the optical combiner in the ’416 Patent should be construed as a device that combines multiple optical outputs into an output.

19. Petitioner’s construction would cover discrete optical components that are not integrated, not capable of using passive alignment, and not pre-aligned. The specification of the ’416 Patent clearly describes the invention as integrating the

optical components to form a compact, cost-effective package. The specification describes a package that is either formed as a one-piece combiner or a two piece combiner that performs the same function. The '416 Patent specification states “the present invention” as “provid[ing] for the first time, an inexpensive, injection molded, one-piece optical combiner capable of combining, separately collimating and focusing the output of multiple lasers into a single optical fiber with a uniform, high coupling efficiency.” EX1001 2:11-15. The specification further provides, “[w]hile a single molded device can be constructed to create one embodiment of the present invention, two or more parts can be combined to accomplish the same function...” EX1001 1:51-55.

20. A POSITA would understand that by describing the optical combiner as a “compact” device it is referring to a singular unit with integrated optical components, rather than individually distributed optical components.

21. A POSITA reading the specification would understand that the claimed optical combiner’s optical components are integrated. The Board’s Decision appears to agree, but states the integrated components are not part of a pre-aligned unit.

22. A POSITA would understand that the integrated optical components are part of a unit or subassembly that can utilize passive alignment because the '416 Patent specification, for example, discloses the optical components can utilize passive alignment: “[a]nother 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.” EX1001 2:38-41. The ’416 Patent specification further describes the key aspects of the invention as utilizing replication procedures to reproduce the device and the optical components utilizing passive alignment mechanisms. EX1001 4:55-60.

23. Thus, the inventors of the ’416 Patent invented a way to passively align the fiber with the optical components using a package so as to eliminate “dielectric filters requiring alignment or expensive waveguides.” EX1001 1:42-51. The specification states that the “combiner/WDM device described herein utilizes plastic-mold injection to create a compact device capable of combining multiple optical signals into a single optical fiber, and which avoids the use of dielectric filters and the use of expensive waveguides” or using “two or more parts” that “can be combined to accomplish the same function.” EX1001 1:51-55. The specification describes that a key feature of the invention is passive alignment where “[a]ll of the optical components within the multiplexer could utilize passive alignment mechanisms.” EX1001 4:58-60.

24. Thus, the ’416 Patent utilizes integration with passive alignment techniques. Petitioner’s construction ignores these aspects of the invention. Discretely placed optical components and a fiber using manual alignment is clearly not what the ’416 Patent specification is describing. For example, because the

components are integrated, the claimed optical combiner can utilize passive alignment, as described in the specification. EX1001 2:38-40, 4:58-59. Because the optical components are combined together they can be pre-aligned. This is not possible if the components are individually placed relative to each other. For passive alignment to be possible, a POSITA would understand that the optical components must be integrated, so they are already in alignment. This means the device must come pre-aligned.

25. Petitioner's Reply points to the fact that the '416 Patent specification refers to Lee as an "combiner" but it overlooks the fact that the specification first identifies Lee as an "optical power combiner" then refers to Lee as a "combiner" for short. EX1001 1:56-2:10. Lee is an "optical power combiner" and the specification explains what that is—it "utilizes collimators and a focusing lens to concentrate multiple output beams to increase power density." *Id.* 1:57-58. The specification explains, "[t]he Lee et al device combines the outputs of, for example, 19 passive optical fibers arranged concentrically together with 19 collimating lenses and a Fresnel focusing lens." *Id.* 1:59-62. In other words, Lee is a fiber bundle with aligned micro lenses so that optical power from each of the fibers are accumulated into a single fiber. Lee does not disclose WDM. I would refer to Lee as a power fiber combiner. The specification explains ways in which the present invention differs from Lee. *Id.* at 1:65-2:10. Thus a POSITA reading the specification would not think

that the “optical power combiner” defines what the claimed optical combiner is in any way.

26. Another example, the Background Section of the ’416 Patent refers to “[p]rior art wavelength division multiplexed (WDM) devices.” EX1001 1:44-45. This does not transform the claimed optical combiner into any WDM device. The ’416 Patent is pointing out reasons why the claimed optical combiner is different from these devices.

27. It leaves a POSITA with no doubt what the inventors conceived of and claimed—“The present invention provides, for the first time, an inexpensive, injection molded, one-piece optical combiner capable of combining, separately collimating and focusing the output of multiple lasers into a single optical fiber with a uniform, high coupling efficiency,” EX1001 2:11-15, which at times can be a “two piece combiner,” *id.* 2:17.

28. Every embodiment in the ’416 Patent includes integrated optical components. Under Petitioner’s construction, discrete optical components that are manually aligned can satisfy the “optical combiner” limitation, but this clearly conflicts with the specification. No embodiment consists of discrete components. FIGS. 7–9 show a monolithic block that is on a substrate. The collimating lenses, prism, and focusing means are formed from the monolithic block.

29. FIGS. 10 and 11 show a combiner that includes two-separately molded optical components. As described in the specification, “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.” EX1001 4:35-39 (“the combiner 310 includes two separate molded optics.”). The specification further explains that the “[c]ollimating lenses 321–324 are supported by the top of housing 319” and the “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.” EX1001 4:42-45.

30. A POSITA understands the focusing lens can be supported in place by the housing. A POSITA would also understand in view of the specification that the focusing lens is integrated into the optical combiner.

1. File history supports the optical combiner is a subassembly of integrated optical components.

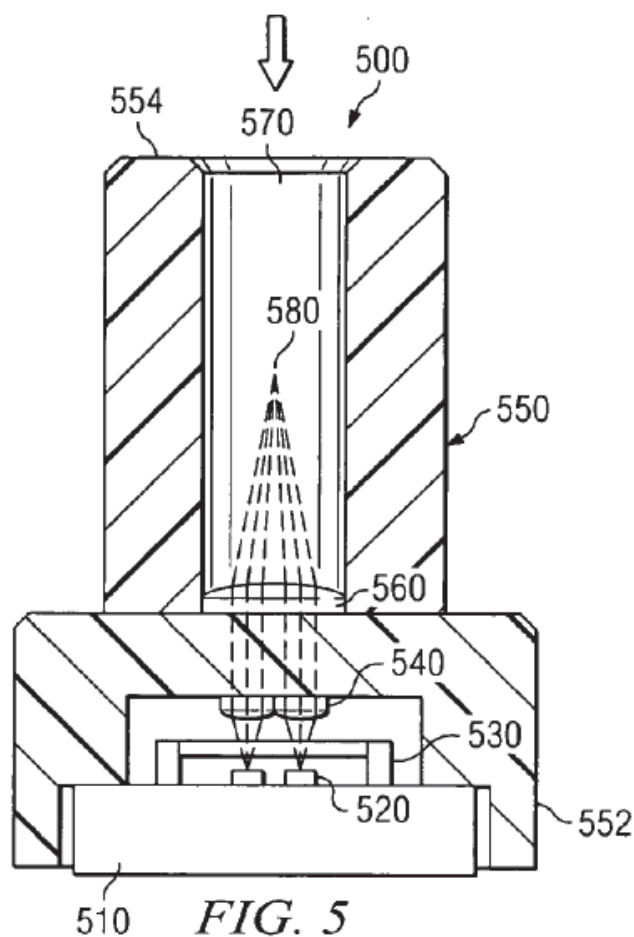
31. During prosecution of the '416 Patent, the Examiner gave structural meaning to the term “optical combiner.” EX1002 p.139. In the Office’s October 5, 2005 Non-Final Rejection, the Examiner gave structural meaning to part of preamble in determining that Bhandarkar discloses each of the limitations of the claimed invention—namely the “optical combiner” limitation and the “for multiplexing the outputs of a plurality of n lasers.” The Examiner stated the following:

Referring to claims 1, 2, and 6, the Bhandarkar et al. reference discloses all the limitations of the claimed invention. The Bhandarkar et al. reference discloses an optical combiner (500) for multiplexing the outputs of a plurality of n lasers (520) wherein each of then outputs has a different output wavelength, for transmission into and through a stopped single optical fiber, comprising: a plurality of n collimating lenses (540), the lenses being spaced apart and positioned to receive and collimate the output of the n laser output beams, and focusing means (560) for focusing the n collimated output beams onto a single spot at the stopped single optical fiber, the focusing means having n separate radial sectors on its surface, and each of the n collimated beams passes through a separate one of the n sectors of the focusing beams and each of the n collimated beams is refracted through the same angle as it passes through the focusing

EX1002 at 139 (emphasis added).

32. Element 500 of Bhandarkar refers to the WDM multiplexer. EX1013 at [0038] (“As shown in FIG. 5, the WDM multiplexer 500 includes a substrate 510 upon which are positioned an array of GSE lasers 520 in a hermetic enclosure 530.”); *see also id.* at [0039] (“A narrower portion 554 of the receptacle 550 provides a mechanism for connecting the WDM multiplexer 500 to a fiber optic connector (not

shown) that carries the multiplexed signal to the outside world.”) EX1013 at [0038], [0039] and FIG. 5.



EX1013 FIG. 5.

33. Also, the inventor’s conception evidence includes an optical combiner that is an integrated device. EX1002 p.80-81.

34. Inventor Curtis Ray’s lab notebook states “concept to make a new mux.” EX1002 at 79. A POSITA would understand “mux” means multiplexer. This

is what the inventors originally called the optical combiner. Eric Grann's declaration also states the concept is a "WDM coupler." EX1002 p.119-120, 126. Inventor Grann also references Inventor's Ray's computer modeling of their concept. *Id.* p.99. He explained "the three-dimensional models show on page 18 were generated on July 17, 2003 and are essentially the same images that were carried forward into the '475 patent application." EX1002 120.

35. The next page of Ray's lab book shows computer renderings of the optical combiner that are nearly the same figures that are FIGS. 1–4 of the '416 Patent. *Id.* at 59. These Figures clearly depict a combiner device with integrated optical components, and a pre-aligned connector with a stop.

36. Inventor Curtis Ray explained in his February 21, 2006 declaration, "As shown on pages 17 and 18 . . . , I performed initial computer modeling of the concept The computer generated three-dimensional models shown on page 18 were generated on July 17, 2003 and are essentially the same images that were carried forward into the '475 patent application which was filed in early 2004; those images all illustrate the optical combiner with off-set launch." EX1002 p.75.

37. Inventor Ray also explained that "Between the date of concept, approximately July 17, 2003, until the final disclosure was generated on January 27, 2004, I worked together with Eric Grann and Brian Peters in updating the computer

modeling of the mechanical and optical aspects of the design.” *Id.* The mechanical aspects relate to the housing of the optical components.

38. While I disagree with the notion that there is a plain and ordinary meaning for optical combiner in general, even if Petitioner’s definition is the starting point for the meaning of “optical combiner,” it is clear from the specification that the optical combiner is not simply anything that combines multiple optical signals into an output. Thus, if that is the plain and ordinary meaning one wants to assign to an “optical combiner” there is a clear disavowal of scope to narrow the patent to the particular optical combiner the inventors of the ’416 Patent conceived of. To hold otherwise would completely ignore the entire specification that discloses the optical combiner that has been invented, the entire file history of relying on this term as limiting, which includes conception evidence of an integrated optical device and the invention disclosure forms that state the inventors were inventing a compact and cost effective single monolithic plastic-molded device that can sometimes be molded into two parts.

B. “Stopped single optical fiber” / Optical combiner includes an “integrated, pre-aligned connector with a stop to align the single fiber optic cable”

39. The Board’s Institution Decision states that “[t]he ’416 patent’s specification, however, 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.” Decision p.11. The Board further stated that “[d]uring trial the parties can further address the meaning of “stopped single optical fiber” and address methods for stopping an optical fiber.” *Id.*

40. As discussed in my Prior Declaration, a POSITA would understand that the optical combiner includes an pre-aligned connector and that a “stopped single optical fiber” is a fiber that has been inserted into the pre-aligned connector of the optical combiner.

41. No other methods are disclosed in the ’416 Patent’s specification for stopping an optical fiber. It is quite clear from the specification as a whole that the stopped optical single fiber is a fiber that has been inserted into the pre-aligned connector of the optical combiner, which contains a stop that allows the fiber to be placed in position so that it is in alignment with the optical path.

42. The ’416 Patent specification discloses that “[a]nother 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.” EX1001 2:38-41. Thus, a POSITA would understand that the “stopped single optical fiber” is a fiber that has been pre-aligned with the optical components.

43. Fixing the fiber in place is not the same thing as passively aligning or pre-aligning the fiber, as discussed above. Fixing the fiber is the same as mounting the fiber onto a fixture and bolting that fixture to the metallic surface of an optical table. Simply fixing the fiber spatially means that it also has to be manually aligned with the optical components—turning on the light to adjust the fiber so the light goes where it is supposed to go. Thus, fixing the fiber does not ensure that the light will be focused onto a spot of the fiber or that the optical combiner will work. A fiber may be fixed using a fiber mount and an optical table, but this setup would require manual alignment. Also, this is a typical technique for conducting optical experiments. A POSITA would not refer to the fiber held by a fiber mount as a stopped optical fiber.

44. Further, it is possible for the fiber to be inserted into the optical combiner without actually being fixed spatially if the package itself is not secured.

45. At deposition, Dr. Willner's only examples of a fixed fiber he provided are fibers that has been inserted into a ferrule such as in Lemoff or Bhandarkar. EX2048 96:3-103:6. Dr. Willner also referred to his District Court declaration. In the District Court declaration, he discussed methods for semiconductor etching might be used to fix a fiber. This is a fragile and difficult procedure as the etching needs to be the same every time. With the integrated pre-aligned connector approach disclosed in the '416 Patent, the alignment is automatic and controlled by the

integration of the pre-aligned connector. A POSITA would not rely on these references to construe the meaning of “stopped single optical fiber” as nothing of the sort is disclosed in the specification of the ’416 Patent, and they require semiconductor etching and manual alignment.

46. Petitioner’s Reply argues that not all embodiments shown in the Figures of the ’416 Patent include a stop or a pre-aligned connector. However, a POSITA reading the specification would understand that the combiners do include a stop with an integrated pre-aligned connector based on a complete reading of the specification that defines the invention.

47. It should be undisputed that FIGS. 1–6 show a complete optical combiner that includes an integrated pre-aligned connector at element 80 or 180. A stop or seat 60 is also illustrated to the first embodiment (FIGS. 1–4) and also FIGS. 5–6. The stop or seat is not called out using an element number in FIGS. 5–6, but its stop or seat is still depicted in the Figures and is identical to the seat shown in FIGS. 1 and 4. Also, the specification describes the second embodiment as being “similar” to the first embodiment. EX1001 3:54.

48. As I stated in my Prior Declaration, each of the Figures of the third and fourth embodiments do not illustrate the complete optical combiner. This is apparent from reading the description in the specification, which refers to the third embodiment as having a stop because the fiber is described as a “stopped single fiber

optic” and “stopped fiber optic” even though the stop is not shown. EX1001 4:24-26.

49. Thus, this only leaves the fourth embodiment where a stop is not shown in FIGS. 10–11 or referenced in the description. For FIGS. 10–11, however, the combiner is only shown “generally.” EX1001 4:36-37. The fiber is not shown, nor is the way in which the focusing means is supported in its position. *Id.* at 4:42-45. Thus, it is clear from these disclosures that the Figures do not show the complete combiner. A POSITA reading the specification’s description of the fourth embodiment would understand that the combiner described as a “two-piece molded module” is an example of a module that is formed from two pieces to form a subassembly. The specification provides, “FIGS. 10 and 11 illustrate a fourth embodiment of the invention. In this embodiment, 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.” EX1001 4:35-39. The specification also states that the “collimating lenses 321–324 are preferably molded into a single but separate monolithic block of molded material so that the combiner 310 includes two separate molded optics.” *Id.* 4:39-42. The specification explains that the “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.* 4:42-45.

50. A POSITA reading this would understand that the combiner includes the separately molded collimating lenses and is holding the separately molded focusing lens in place, i.e., the focusing lens is integrated.

51. Thus, a POSITA reading the claim in the context of the specification would understand that a “stopped” fiber is a fiber that has been inserted into a ferrule with a stop. A POSITA would look to other disclosures in the specification regarding what the invention is to understand that the optical combiner includes a stop and a pre-aligned connector. If the specification describes what a stop is and explains where the stop is located—in the ferrule, it follows that a POSITA would understand a “stopped” optical fiber to be a fiber that is inserted into the optical combiner’s ferrule.

V. RESPONSE TO INSTITUTION DECISION AND INVALIDITY ARGUMENTS

A. Ground 1: Kurita (EX1004)

1. Kurita’s Optical Components Are Not Integrated.

52. The Board’s Decision states that “the light source array (10A), the collimating lens array (20), the focusing lens (30), and the optical fiber (40) [of Kurita] **appear to be integrated as needed** to enable the light connection device **to function properly.**” Decision p.13 (emphasis added).

53. However, Kurita does not discuss integration or teach integration of light source array (10A), the collimating lens array (20), and the focusing lens (30).

54. Kurita discloses “[p]lural light emitting portions 11 of the planar monochromatic light source 10 and plural lens portions 21 of the lens array 20 **are placed at respectively corresponding planar positions.**” EX1004 ¶[0006]. A POSITA reading Kurita would understand the components are not integrated – the components are placed physically away from each other - so that cannot be integrated at all.

55. Dr. Willner provided no opinion that Kurita’s optical components are integrated. He confirmed this at deposition. EX2048 129:19-131:12.

56. As stated in my Prior Declaration, Kurita’s the light source array (10A), the collimating lens array (20), and the focusing lens (30) are discrete, individual components. These components must be manually aligned with each other and with optical fiber (40). As discussed above in describing the differences between alignment and integration, the optical components and fibers can be physically aligned manually without being integrated. For the arrangement disclosed in Kurita to function properly, the optical components must be in alignment with each other and with the core of the fiber, so the light goes where it is supposed to go.

57. A POSITA would understand how to reproduce the setup taught in Kurita using a traditional optical bench. The optical components would be held in place by lab equipment that would be screwed into a table. Then the components

could be manually aligned using equipment such as XYZ stages or other lab equipment, with the laser light being on.

58. A POSITA would understand the optical components in Kurita are not integrated, nor does Kurita teach integrating the optical components, but are discrete components as shown in FIG. 3.

2. Kurita Does Not Disclose or Teach a Stopped Single Optical Fiber, Nor Would A POSITA Be Motivated to Add A Stopped Single Optical Fiber to Kurita.

59. The Board's Decision states that because "Ground 1 is based upon obviousness, not anticipation" that "Patent Owner's argument [that Kurita does not disclose a stopped single optical fiber] is not well taken because it does not address what Kurita would have suggested to one of ordinary skill in the art regarding fixing Kurita's single optical fiber (40) in place."

60. As discussed in my Prior Declaration, I explained that Kurita teaches a system that must be manually aligned. Kurita does not disclose that the fiber is pre-aligned or inserted into a pre-aligned connector of the optical combiner. This means the fiber must be manually placed in alignment with the light as it leaves the focusing lens.

61. Kurita functions properly because the optical components are assumed to be in alignment. Kurita does not teach or suggest any way of pre-aligning the fiber with the focusing lens, as required by the claims. Kurita discloses that the elements

are placed in planar position and physically apart from each other such that there is no pre-alignment or integration of components, teaching manual alignment. Kurita discloses “[p]lural light emitting portions 11 of the planar monochromatic light source 10 and plural lens portions 21 of the lens array 20 **are placed at respectively corresponding planar positions.**” EX1004 ¶[0006].

62. As discussed above, manual alignment means that each of the individual components must be physically set up by a person and actively aligned. At best, Kurita teaches a tabletop set up of optical components. A POSITA would understand the fiber can be fixed in place using a fiber mount to reproduce the Kurita arrangement. This is not a “stopped” fiber, but a fiber connected to a clamp screwed into an optical bench, to suspend the fiber in position.

63. Under Dr. Willner’s construction of “stopped,” the “fixed” fiber is not pre-aligned. As discussed above regarding alignment, a fiber can be fixed but not in alignment with the optical components. A fiber can be manually aligned with the optical components by setting the fiber up using a fiber mount, but this is not pre-alignment using a pre-aligned connector as claimed in the ’416 Patent.

64. Dr. Willner argues that Kurita teaches, or would have suggested, a stopped optical fiber because the fiber in Kurita would have been fixed. EX1003 ¶172. Dr. Willner opined that “[f]ixing the optical fiber therefore allows for proper operation of the device in Kurita....” EX1003 ¶172. I disagree with

Petitioner's construction, as discussed in my Prior Declaration. A "stopped optical single fiber" is one that has been placed inside the optical combiner's pre-aligned connector, or ferrule, which allows for passive alignment or pre-alignment of the fiber. Kurita does not teach pre-aligning the fiber with the optical components. Nor is a "fixed" fiber one that is pre-aligned or passively aligned.

65. Further, Dr. Willner opines, it would have been obvious to a POSITA at the time of the alleged invention, that a "fiber stop or seat 60 formed in ferrule 60" or similar structure would have been used in the setup of Kurita. EX1003 ¶173. Dr. Willner identifies no other "structure" that would have been used with such a setup. As I stated, a POSITA would have used a fiber mount in a laboratory setting, but this is not a similar structure to a "fiber stop or seat 60 formed in ferrule 60." The mount would be screwed into an optical bench to suspend the fiber in position. This is not a "stopped" optical fiber as claimed in the '416 Patent.

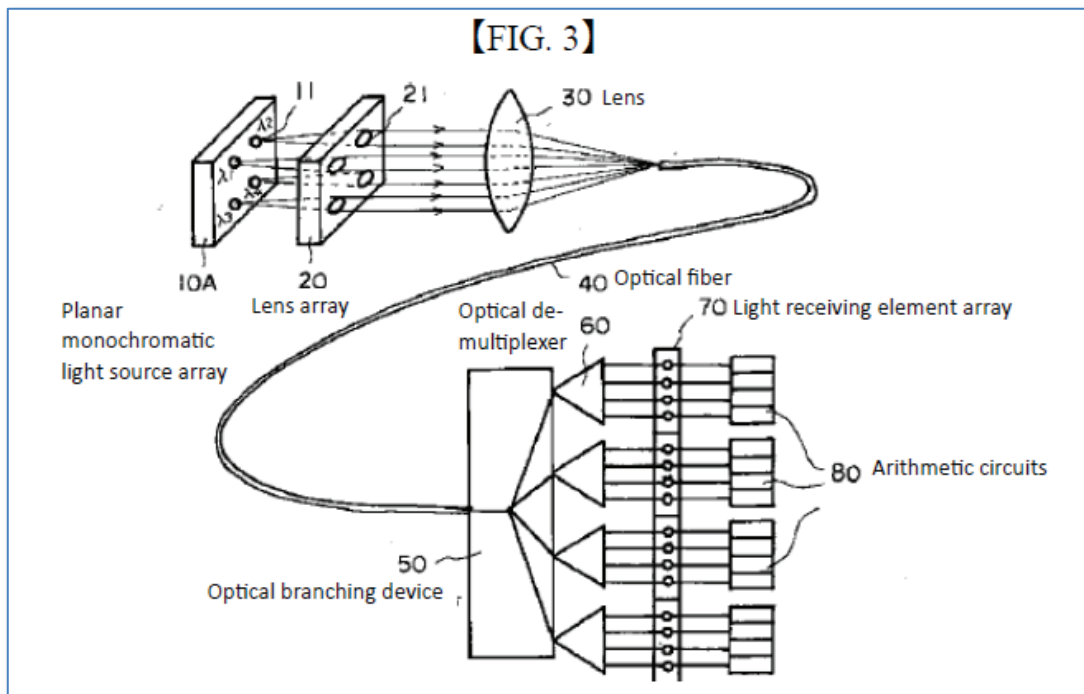
66. Additionally, Dr. Willner provides no rationale as to why fiber stop or seat 60 formed in ferrule 60 would be used, other than it is a "typical way" of securing an optical fiber. EX1003 ¶173. Using a "fiber stop or seat 60 formed in ferrule 60" in connection with discrete components disclosed in Kurita is not typical and would be pointless. Kurita's system is of discrete individual, components requiring manual alignment with the fiber. A POSITA would understand that because of the manual alignment, there is no benefit of adding a receptacle or stop

to Kurita's system because the stop would need to be manually aligned as would a ferrule or fiber. Kurita is not a package. There is nothing to attach the ferrule to—Kurita's components are discrete.

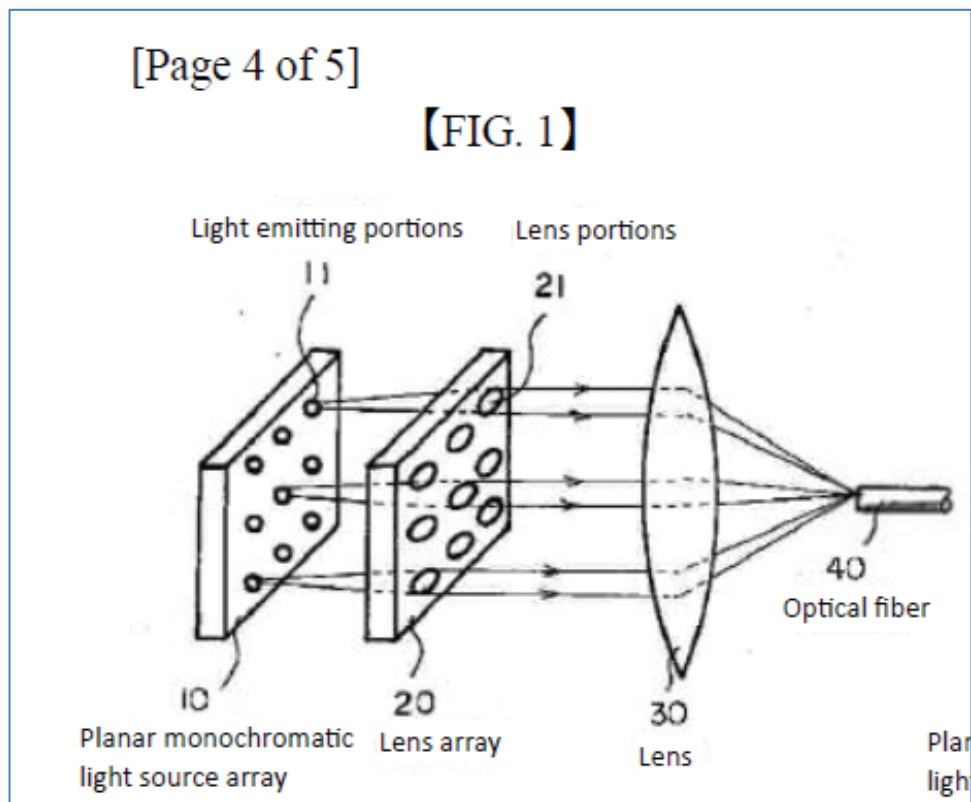
3. Kurita Does Not Disclose or Teach Radial Alignment.

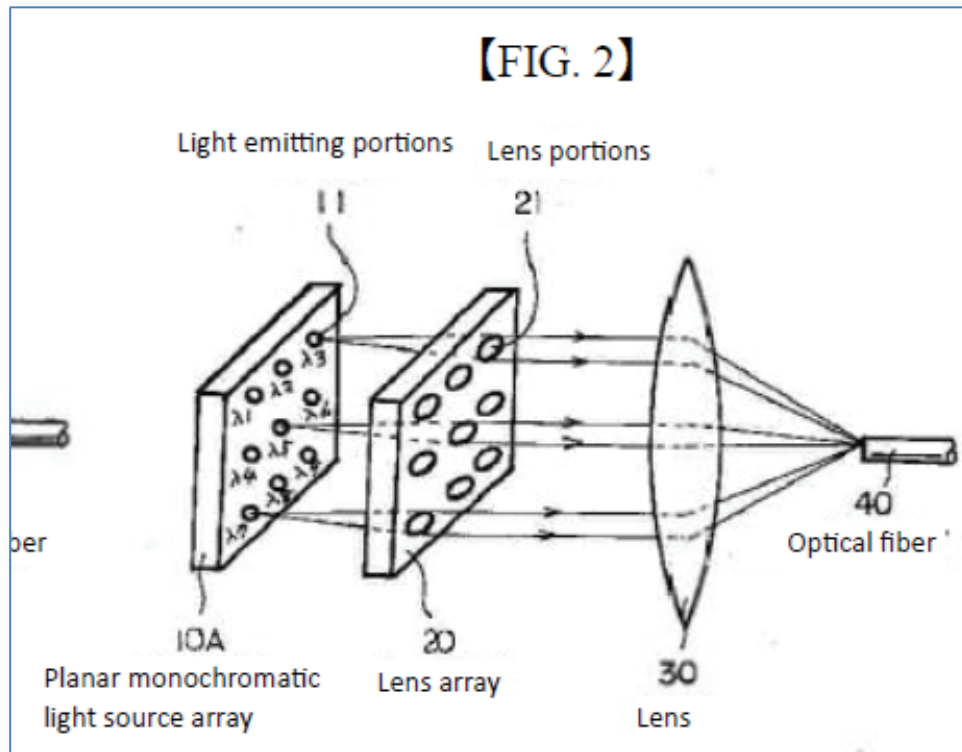
67. The Board's Decision states that "Dr. Willner testifies that Kurita's two-by-two array of plural lens portions 21 'results in radially arranged lenses that will each pass their respective collimated light to a separate radial portion (or sector) of the lens 30' (Ex. 1003 ¶ 182)."

68. Kurita does not teach that the collimating lenses are positioned around a center axis in FIG. 3, as shown in FIG. 3.



69. Figures 1 and 2 also show lenses that are not radially arranged. The lenses are not positioned around a center axis. Kurita's system is based on a square array of lasers - which are typically laid out in a matrix formation in the fabrication plant. Kurita teaches the lenses are positioned in a matrix format. A POSITA looking at the laser array layout would see a $n \times n$ 2D layout which is common for active aligned optical systems. Also, by observation, the lens portions in FIG. 3 are in a collinear arrangement. The lenses are not offset in a radial direction. This is shown in FIGS. 1 and 2 as well.





70. The Board’s Decision also stated it would have been obvious that “the lens portions 21 are aligned around the center axis of the focusing lens 30 in such a way that the collimated light passes through separate radial sectors because doing so would have resulted in better coupling efficiency.” Decision p.14.

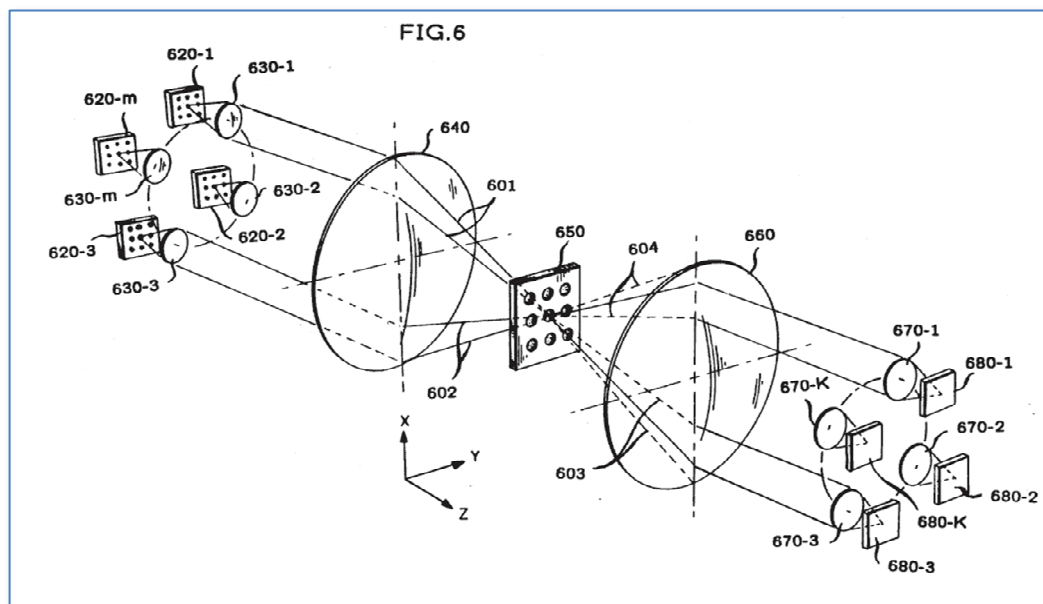
71. As discussed in my Prior Declaration, there are a number of factors that would impact efficiency in designing the arrangement of lenses. For example, Kurita does not disclose or teach that a radial arrangement of the lenses would improve coupling efficiency over the linear array of lenses and square array of lasers taught in Kurita. Kurita’s system is not integrated; a POSITA would need to actively align the discrete components by moving the components along the optical path. This type of alignment is time consuming and not commercially practical. Radial alignment of

the lenses does not solve these problems or improve coupling. Kurita's laser chips are also a square layout. There are limited commercial reasons where a POSITA would even consider a radial solution; thus, any such system requiring a matrix layout would be inoperable. Matrix formation is a typical layout for a 2D array of lasers as this is what industrial typically utilizes. We see this in displays for pixel layouts as well as images such as CMOS (complementary metal oxide semiconductor) images where 2D layouts are very common. Thus, a POSITA would not be motivated to overhaul Kurita to change the arrays of lasers and lenses to a radial arrangement.

B. Grounds 2 and 4: A POSITA would not have been motivated to add one collimating lens per laser of Kurita or per aperture of Lemoff based on the teachings of LaMarche.

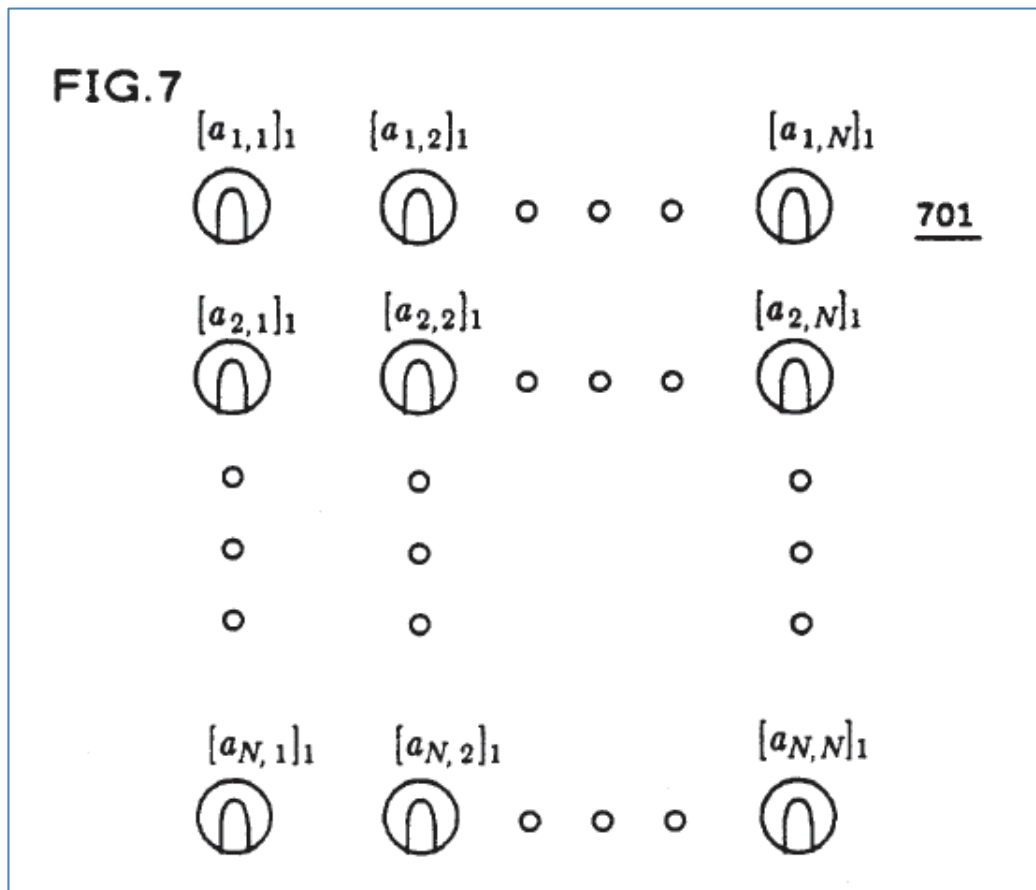
72. As shown in FIGS. 7 and 8 of LaMarche, and as described in the specification, LaMarche teaches using one collimating lens *per array* which forms a pattern of light entering on the surface of the pupil lens—not one light per radial sector. EX1005 4:43-49, 5:27-38 (“Each of the **M** **N** **X** **N** arrays of light emitting

devices, 620-1 through 620-M, is placed at the focal plane of input probe lenses, 630-1 through 630-M, respectively.”). Thus, LaMarche teaches M input probe lenses and M arrays.



EX1005 FIG. 6.

73. FIG. 7 represents the “cross-sectional view of light emitting device array 620-1.” EX1005 at 6:3-6. Each of the other arrays, 620-2 through 620-M will have an identical pattern as 620-1. EX1005 at 6:5-7. This means that the light emitted from each of the arrays does not pass through a separate sector of the pupil lens, but repeats the same pattern shown in FIG. 7 along the perimeter of the pupil lens.

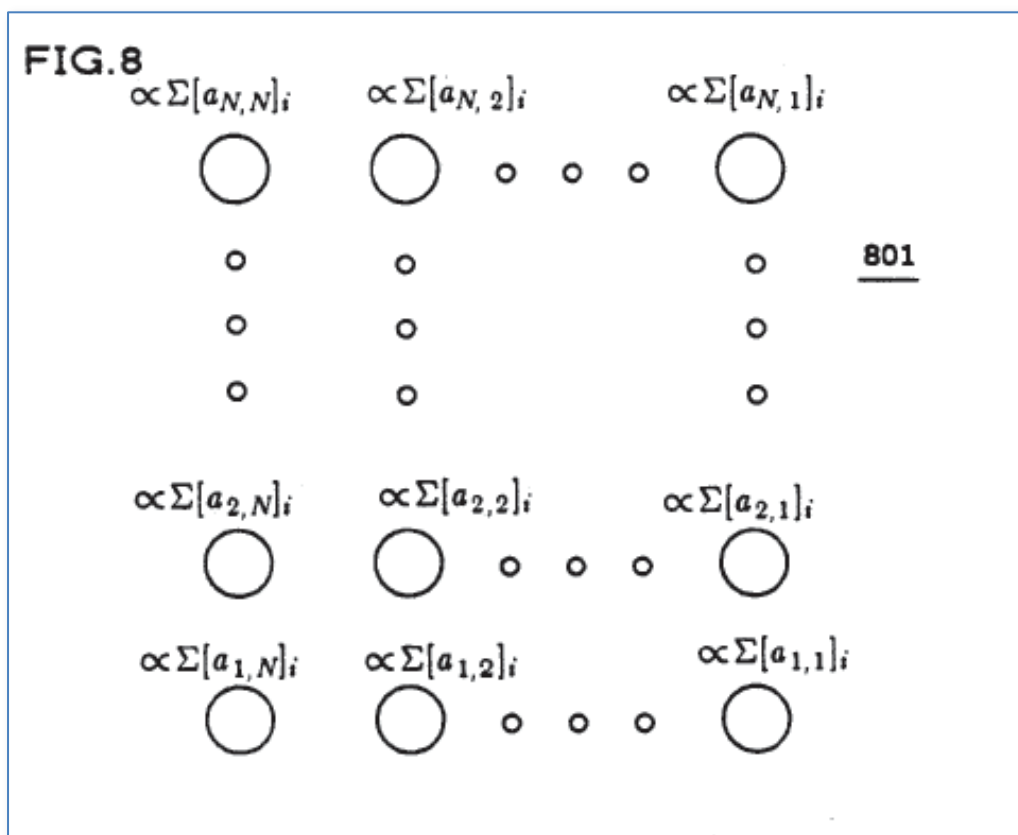


74. LaMarche further explains that “a coincident pattern identical to the pattern associated with the light emitting devices will be formed at the focal plan of pupil lens 640.” EX1005 5:62-66. “Coincident pattern 801 comprises a pattern of discrete finite images. Thus array 650 comprising high index of refraction and short

focal length ball lenses is arranged in a pattern identical to coincident pattern 801.”

EX1005 6:68-7:4.

75. As shown in FIG. 8, the light as it leaves the pupil lens is not focused to a single point but forms the coincident pattern that is identical to the pattern of the arrays.



EX1005 FIG. 8.

76. Even if the three-by-three array shown in FIG. 6 were reduced to a two-by-two array, the light would not pass-through separate sectors of pupil lens 640. It could create a box pattern in four locations around the perimeter of the pupil lens.

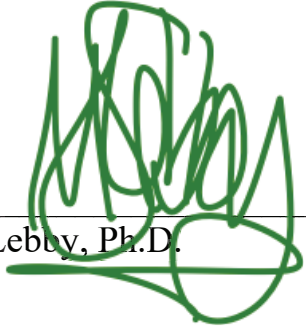
EX1005 5:62-6:34. Thus, the collimated light does not enter into separate radial sectors of the pupil lens.

VI. REVISION OR SUPPLEMENTATION

77. In this report, I have presented my opinions regarding the invalidity of the claims of the '416 Patent based on the information available to me. My opinions are subject to change in view of opinions provided by the Patent Owner or its expert, or any additional information that I may receive. I reserve the right to supplement my opinions accordingly.

I hereby declare that all statements made herein of my own knowledge are true and that all opinions expressed herein are my own; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: April 26, 2024



Michael Lebbey, Ph.D.