

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD**

CORETRONIC CORPORATION and
OPTOMA CORPORATION,
Petitioners,

v.

MAXELL, LTD.,
Patent Owner.

Case No.: IPR2025-00476

U.S. Patent No. 9,547,226

**DECLARATION OF MICHAEL LEBBY D. ENG., PH.D., MBA,
REGARDING THE VALIDITY OF U.S. PATENT NO. 9,547,226**

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and/or imprisonment under Section 1001 of Title 18 of the United States Code, and such willful false statements may jeopardize the validity of the patent which is under review in this proceeding.

Dated: June 10, 2025



Michael Lebbly, D. Eng., Ph.D., MBA

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. QUALIFICATIONS AND EXPERIENCES	1
III. METHODOLOGY AND MATERIALS CONSIDERED	9
IV. LEGAL UNDERSTANDING	11
A. Claim Construction.....	12
B. Obviousness.....	14
V. OVERVIEW OF THE '226 PATENT	16
VI. LEVEL OF ORDINARY SKILL IN THE ART	19
VII. CLAIM CONSTRUCTION	21
A. “a light-condensing position” (Claim 8)	24
1. “An emission side of the excitation light relative to the fluorescent material” is not ambiguous and should be construed as “an excitation light’s exit side of the fluorescent material that faces away from the excitation light source” as supported by disclosures in the specifications.....	32
2. Dr. Sasian and Petitioners’ proposed construction that a light-condensing position of the excitation light is positioned on “the surface of the fluorescent material on the side facing the excitation light source” contradicts disclosures in the specifications.....	42
VIII. SUMMARY OF PETITIONERS’ PROPOSED GROUNDS.....	44
A. Miyamae.....	45
B. Kurosaki '087	46
C. Kitano	46
IX. GROUND 1: KUROSAKI '087 (CLAIMS 8, 10, 12) – ISSUES REGARDING IMPROPER CLAIM CONSTRUCTIONS	47
X. GROUND 2: MIYAMAE (CLAIMS 8, 10) – ISSUES REGARDING IMPROPER CLAIM CONSTRUCTIONS	50

XI.	GROUND 3: MIYAMAE IN VIEW OF KUROSAKI '087 (CLAIM 12)	57
A.	Issues Regarding Improper Claim Constructions	57
B.	Issues Regarding Improper Combination of References	58
XII.	GROUND 4: KITANO IN VIEW OF KUROSAKI '087 (CLAIMS 8, 10, AND 12)	66
A.	Issues Regarding Improper Claim Constructions	66
B.	Issues Regarding Improper Combination of References	72
XIII.	CONCLUSION.....	85

I. INTRODUCTION

1. My name is Michael Lebby, and I have prepared this declaration at this request of the Patent Owner, Maxell, Ltd. (“Maxell”). This declaration provides my opinion with respect to various aspects of the Petition filed by Petitioners relating to the U.S. Patent No. 9,547,226 (“the ’226 Patent”).

2. Depending on new information learned, including positions taken by Petitioners and Petitioners’ expert, I reserve the rights to supplement my opinions included herein.

3. I am being compensated at my usual consulting rate of \$550 per hour for my time reviewing materials and preparing this declaration. My opinions expressed here are my own. My compensation does not depend on the outcome of this case, and I have no other financial interest in this matter or the parties thereto.

4. In forming my opinions, I have relied on my knowledge and experience, as well as the documents and information referenced in this report.

II. QUALIFICATIONS AND EXPERIENCES

5. A detailed description of my professional qualifications, including a listing of my specialties/expertise and professional activities, is contained in my *curriculum vitae*. **EX2018**. In what follows, I provide a short summary of my qualifications.

6. I am an engineer with a Ph.D. in Electrical and Electronic Engineering and have worked extensively with optoelectronics, photonics, electrical and electronic circuits, optical systems, as well as integrated circuit semiconductors for both optoelectronic and electronic solutions. Overall, I have approximately 40 years working in industry to develop new electronic, photonic, display, optics-based products where I have taken them from research to manufacturing.

7. I received a Bachelor of Engineering degree in Electrical and Electronic Engineering in 1984 from the University of Bradford, United Kingdom. I also received a Ph.D. in Electrical and Electronic Engineering in 1987 from the University of Bradford, United Kingdom. I also received a Doctor of Engineering degree in electrical and electronic engineering in 2004 from the University of Bradford, United Kingdom.

8. I am currently Chief Executive Officer (CEO) and Chief Technology Officer (CTO) of GenusTechnik Inc. GenusTechnik Inc., is my consulting company, through which I engage in my expert witness work.

9. I recently retired as Chairman and CEO of Lightwave Logic Inc. (NASDAQ: LWLG) in 2024, where I served as a Director of the Board of Directors since 2015.

10. I am a named inventor on over 225 issued USPTO utility patents. My work has also led to either being an inventor or co-inventor in subjects such as:

semiconductors, electronics, optics, displays, high frequency optical and electronic products such as lasers and LEDs, as well as photonic integrated circuits. I am the author of more than 60 publications.

11. I am a Fellow grade of 3 professional organizations: IEEE (Institute of Electrical and Electronic Engineers), NAI (National Academy of Inventors), and Optica (Optical Society of America).

12. As described in this Section, and further detailed in my curriculum vitae (Appendix A) over the course of my 40-year career in electronics and optoelectronics, I have worked in nearly every aspect of the electronic, semiconductor, and optoelectronics business, ranging from wafers to components, to modules, displays, optics, connectors and cable technology. At the wafer level, I have experience in epitaxial wafer growth (compound semiconductors), electrical and optoelectronic device and circuit design, using modeling and simulation, electrical and optoelectronic device and component fabrication, testing, and qualification, to the implementation of devices such as laser diodes, light emitting diodes, photodetectors etc., into packages, connectors, and panels, both hermetic and non-hermetic, as well as analysis of package/panel materials such as organics, plastics (including plastic housings such as resin-packaged lead frame housings), optical plastics, metallic-based packages, semiconductor-based packages, and ceramic-based packages for fiber optics, displays, and data-communications

industries. I have also designed device packages (through-pin, surface mount, flip-chip, and various combinations thereof) for printed circuit board mounting as well as electrical and optical components for various industrial and environmental applications. Many of the designed components were implemented into technology applications both as manufactured products as well as testing, characterization and analysis of qualified product for volume scaling. The modules/panels have been designed to work at both at optical and RF frequencies that include both optical and RF wireless as well as fiber-optics based applications. I have also worked in commercially based industrial research-and-development laboratories to bring new high-performance optoelectronic- and photonic-based technologies from the research proof-of-concept phase through prototyping and qualified manufacturing for volume release. This has included both transfer as well as the design of optics and optical systems for various system commercial use.

13. I have been both an entrepreneur (e.g., Ignis Optics Inc, One Chip Photonics, Lightwave Logic Inc.), as well as an intrapreneur (e.g., Motorola, Intel, TE Connectivity (previously Tyco Electronics), AT&T Bell Labs), creating innovative new high technology programs, both as venture backed start-ups as well as corporate funded divisions. I have built these entities to develop optical, electronic, optoelectronics, and photonics technology from the laboratory and fabrication clean room to production factories.

14. My career started in the late 1970s at the Ministry of Defense in the United Kingdom where I spent time at their R&D facility in Malvern (RSRE – Royal Signals and Radar Establishment). I worked on electronic and optoelectronic semiconductor device design, as well as basic and high frequency telecommunications and data-communications electronics for module, cable, connector, and circuit implementation. My research work electronics then took me to AT&T Bell Laboratories in 1985, where I pursued research in novel electronic and optoelectronic semiconductor material systems that included laser diodes, LEDs, photodetectors, optical waveguides, optics, as well as standard electronic devices. The devices researched at Bell Labs became in part the subject of my Ph.D. thesis that was granted in 1987.

15. I moved to Motorola in 1989 to further develop my consumer commercial application of technology field and focused on optoelectronics, semiconductor engineering and development skills, and I became a Research and Development Manager in Motorola, until I left the company in 1998. During my time at Motorola, I worked on many photonic, electronic, and optical technology projects that included projection, display, optics, LEDs, OLEDs, laser diodes, phosphors, as well as the packaging and reliability of mobile product prototypes. At that time, I was particularly interested in miniaturization of electronics, optics, and optoelectronics, and worked on novel optical designs that included portable heads-

up displays, optical heads for storage, and various light-based prototypes as well as advanced prototypes of futuristic communications and consumer hardware.

16. The research work at Motorola also included work on displays and in particular, miniature displays, projection systems, and optics for pagers, clam-shell phones, and head-mounted displays that included mounting onto eyeglasses (similar in concept to Google glass™) as well as techniques for electrical and optical connections in these applications.

17. I also initiated Motorola's work in optical interconnect (Optobus™) technology, that incorporated both transfer and injection molded optical parts that included the design of electrical and optical connector technology. This project involved the research and development of a multi-channel electronic IC chip for parallel optical interconnect.

18. I was one of Motorola's most prolific inventors, having over 150 issued utility patents as an inventor or a co-inventor by the late 1990s. Many of the photonics and optical prototypes with which I was involved were subject to reliability and stress testing as well as optical measurement analysis. These consumer products all were driven using standard electronic ICs and electronic signaling where I had a role in design and simulation of these circuits.

19. Between 1998 and 1999, I worked as the Director of Technology/ BD (Fiber Optics) for Tyco Electronics (previously AMP). I joined Tyco Electronics as

a business development director and director of advanced technology for the telecommunications and data-communications industries. I was responsible for growing optical and optoelectronic technology through external interactions that included mergers, acquisitions, strategic alliances, and technical strategic planning as well as leading new technology projects. Much of that work involved the application of telecommunication based electronic and optoelectronic transceiver modules, electrical and optical connectors, plugs, jacks, and cables for customer qualification specifications.

20. In 1999, I left Tyco and started employment at Intel. At Intel, I was involved heavily in photonic technology, especially technology that supported silicon photonic device platforms with different types of displays and optical systems. As a culmination of this work, I was one of Intel's founders of its silicon photonics division in the year 2000, and worked to set up a fabrication facility in South San Jose. The work involved integrating silicon FET electronics with optoelectronics and optics onto the same silicon semiconductor wafer. I was also part of Intel Capital's optical investment team, and participated in over 30 photonics investments into photonics, optics, and optoelectronics. Focus included optical devices, packaging and modules for optical storage, consumer applications such as displays and projection, communications and sensing. Technologies investigated included lasers, LEDs, optics, LCDs, optical waveguides, and optical displays.

21. At the end of 2000, I left Intel and raised venture capital funding for a company called Ignis Optics Inc. The main goal of the company was to design and manufacture, in high volume, very high-performance optoelectronic modules. The fiber optic transceiver modules have the capability of transmitting and receiving optical signals that are controlled using programmable electronics and packaged optoelectronics chips, such as laser diodes, optical lenses, and photodetectors.

22. In 2005, I took up employment for a trade association, based in Washington, D.C., called IEEE Optoelectronics Industry Development Association (OIDA). As head of this trade association, and with electronics, photonics and optics manufacturers that included projection displays, optical systems, fiber optics, display, cameras, sensing, defense, aerospace, LED lighting, and automotive vendors as members, I was responsible, in part, for industry-based technology roadmaps; and I implemented common industry roadmap methodologies with common features such as “Red Brick Walls” and transferred them into technology roadmaps for the industry in which displays, optics, optical sensors, telecommunications cables, fiber-optic cables, fiber, cameras, and their associated technology platforms, were featured. OIDA roadmaps featured purple brick walls, to show differentiation from the semiconductor industry.

23. In 2010, I became the General Manager and CTO of Translucent, Inc., a high-tech start-up company which developed and manufactured silicon and rare

earth oxide based epitaxial semiconductor wafers. I patented a number of optoelectronic and electronic device designs using rare earth oxides and phosphors while employed at Translucent.

24. Throughout my career, I have also had an active role in a number of technical professional organizations, including, among others, IEEE Components, Packaging, and Manufacturing Technology (CPMT), IEEE Electronic Components and Technology Conferences (ECTC); IEEE TC-10 (Technical Committee on Optoelectronics), and IEEE Optoelectronics Industry Development Association (OIDA). Through these organizations, I have consistently been a part of committees, events, and workshops relating to semiconductor, optoelectronics, electronics, and packaging technology.

25. I also serve as a Technical Expert/Consultant for the European Commission. In my work at the European Commission, I review and advise on general optics, photonics, electronics, telecommunications, semiconductors, optoelectronics, projection technology, imaging, sensing, display (e.g., LCD, LED, OLED, etc.), and associated Information and Communications Technology (ICT).

III. METHODOLOGY AND MATERIALS CONSIDERED

26. I have relied upon my education, knowledge, and industrial field and academic experiences with optical systems, as well as other materials discussed in this declaration in forming my opinions.

27. For this work, I have considered the materials cited herein, including those items in the Exhibit Table below.

Exhibit	Description
EX1001	U.S. Patent No. 9,547,226 (the “’226 Patent”)
EX1002	Prosecution History of the ’226 Patent
EX1003	CV of Dr. Jose Sasian
EX1004	Declaration, dated January 17, 2025, of Dr. Jose Sasian.
EX1005	U.S. Patent No. 8,721,087 B2 (“Kurosaki”)
EX1006	Japanese Patent Publication 2012-199075 (“Miyamae”)
EX1007	U.S. Patent Application Publication No. 2013/0088471 A1 (“Kitano”)
EX1008	First Amended Docket Control Order, <i>Maxell, Ltd. v. Coretronic Corp. et al.</i> , Case No. 5:24-cv-00088 (E.D. Tex. Jan. 7, 2025)
EX2001	Complaint, <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex. Jul. 9, 2024) (“Complaint”)
EX2002	March 26, 2025, Memorandum to All PTAB Judges from Coke Morgan Stewart, Acting Secretary of Commerce for Intellectual Property, Regarding the Interim Processes for PTAB Workload Management (“Memo”)
EX2003	First Amended Docket Control Order, <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 91) (April 24, 2025)
EX2004	Order Resetting <i>Markman</i> Hearing, <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 91) (April 24, 2025)
EX2005	Order Denying Motion to Transfer, <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 85) (March 25, 2025)
EX2006	Order Granting Motion to Dismiss, <i>Optoma Technology, Inc. v. Maxell, Ltd.</i> , No. 3:24-cv-08147-TLT (N.D. Cal.) (Dkt. 58) (March 14, 2025)
EX2007	Plaintiff’s Preliminary Election of Asserted Claims, <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 78) (March 11, 2025)

EX2008	Petitioners' Invalidity Contentions for <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (served on December 27, 2024)
EX2009	Petitioners' Preliminary Election of Asserted Prior Art for <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (served on March 25, 2025)
EX2010	U.S. Pub. No. 2010/0328628 ("Masuda")
EX2011	U.S. Pub. No. 2010/0328628 ("Matsubara")
EX2012	U.S. Pub. No. 2010/0328632 ("Kurosaki '632")
EX2013	USPTO Rescinds Memorandum Addressing Discretionary Denial Procedures (February 28, 2025), https://www.uspto.gov/about-us/news-updates/uspto-rescinds-memorandum-addressing-discretionary-denial-procedures
EX2014	March 24, 2025, Memorandum to Members of the Patent Trial and Appeal Board from Scott R. Boalick, Chief Administrative Patent Judge, Guidance on USPTO's Recission of "Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation" ("Memo 2")
EX2015	USPTO, <i>FAQs for Interim Processes for PTAB Workload Management</i> , https://www.uspto.gov/patents/ptab/faqs/interim-processes-workload-management (last visited May 7, 2025)
EX2016	Joint Claim Construction, <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 89) (April 22, 2025)
EX2017	Preliminary Constructions, <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (May 9, 2025)
EX2018	CV of Michael Lebby, D. Eng., Ph.D., MBA

IV. LEGAL UNDERSTANDING

28. I am not an attorney. I have been informed about legal standards of patent law, which I have used in developing my opinions expressed herein.

29. I understand that a patent may include two types of claims: independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend from an independent claim or another dependent claim and includes all the limitations that it recites in addition to all the limitations recited in the claim or claims from which it depends.

A. Claim Construction

30. I understand that the claim construction exercise begins with the language of the claims themselves, and that the general rule is that claim terms are given their plain and ordinary meaning to a POSITA, in view of the specification of the patent, at the time of the invention. I also understand that the intrinsic evidence (*i.e.*, the claims, written description, and prosecution history) are the primary sources used in interpreting claim language.

31. I understand that if disputed claim language is clear on its face, the intrinsic evidence should be consulted to determine whether some deviation from the ordinary meaning of the claim language is warranted.

32. When the disputed claim language is not clear on its face, I understand that the intrinsic evidence should be used to resolve, if possible, the lack of clarity. I also understand that the specification is the best evidence of what the patentee intended the term to mean when there is no clear meaning of a claim term, and that the prosecution history may also shed light on the meaning of ambiguous terms.

However, I understand that it is improper to import limitations from the specification into a patent claim through claim construction.

33. I have been informed that sometimes the ordinary meaning of claim language as understood by a POSITA may be readily apparent even to lay persons. I understand that claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words.

34. I further understand that a patentee may act as his own lexicographer by giving a definition for a particular claim term. I understand that, in order for this principle to apply, the patentee must clearly set forth a definition and clearly express an intent to define that term. Simply disclosing a single embodiment is not sufficient.

35. I understand that if the intrinsic evidence fails to clearly disclose the meaning of a claim term, the court may look to extrinsic evidence outside the patent and prosecution history, such as expert testimony, treatises, and dictionaries.

36. I have also been informed that there is a presumption that the use of different terms in the claims connotes different meanings, in the absence of any evidence to the contrary.

37. In addition to my own analysis of the claims as set forth below, it is my understanding that, to the extent the parties have agreed on particular construction of the claim terms, that agreement is set forth in the Joint Claim Construction Statement in the underlying District Court Litigation. EX2016.

B. Obviousness

38. I understand that when determining whether a claim is “obvious,” the analysis is based on underlying factual issues including the content of the prior art and the level of ordinary skill in the art. I further understand that for a single reference or a combination of references to render the claimed invention obvious, a POSITA must have been able to arrive at the claims by modifying or combining the references.

39. I have further been informed and understand that a claim is unpatentable as obvious if the difference 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 POSITA.

40. I understand that to obtain a patent, the claims must have, as of the effective filing date, been nonobvious in view of the prior art in the field. I understand that a claim is obvious when 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 to a POSITA at the time the invention was made.

41. I understand that obviousness can be established by combining multiple prior art references to meet each and every claim element, but I also understand that a proposed combination of references can be susceptible to hindsight bias. This

means that even if all of the requirements of the claim cannot be found in a single prior art reference that would anticipate the claim, the claim can still be invalid.

42. As part of this inquiry, I have been asked to consider the level of ordinary skill in the field that someone would have had at the time the claimed invention was made. In determining the level of ordinary skill, I considered the following: (1) the levels of education and experience of persons working in the field; (2) the types of problems encountered in the field; and (3) the sophistication of the technology.

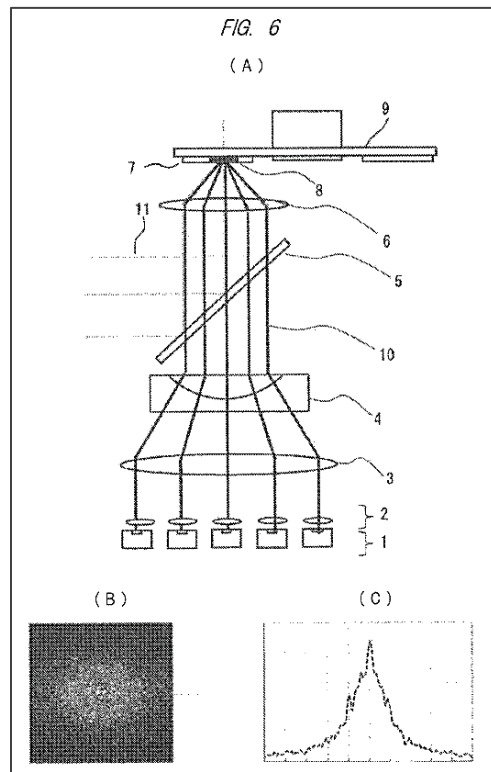
43. I understand that an invention is obvious when the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a POSITA.

44. I understand that to prove that prior art or a combination of prior art renders a patent obvious, it is necessary to: (1) identify the particular references that, individually or in combination, make the patent obvious; (2) specifically identify which elements of the patent claim appear in each of the asserted references; and (3) explain how the prior art references could have been combined or modified to create the invention claimed. I understand that, to support a conclusion of obviousness, there must be an apparent reason for a skilled artisan to combine or modify the prior art references as recited in the claims.

V. OVERVIEW OF THE '226 PATENT

45. The '226 Patent has a priority date of November 1, 2012, issued on January 17, 2017, and is entitled “Light Source Device and Projection-Type Image Display Device.” The '226 Patent is directed to a light source device and a projection-type image display device which can improve light emitting efficiency and service life of a fluorescent material.’226 Patent at Abstract.

46. At the time of the priority date of the '226 Patent (around November 1, 2012), projection-type image display devices were designed to have the excitation light irradiated onto only a concentrated portion of fluorescent material.’226 Patent at 1:34-38. This manner of concentrating the excitation light on only certain parts of the fluorescent material caused deterioration in the fluorescent material and decreased light-emitting efficiencies and the service life of the fluorescent material, which in turn shortened the life of the light source device. '226 Patent at 1:34-38.



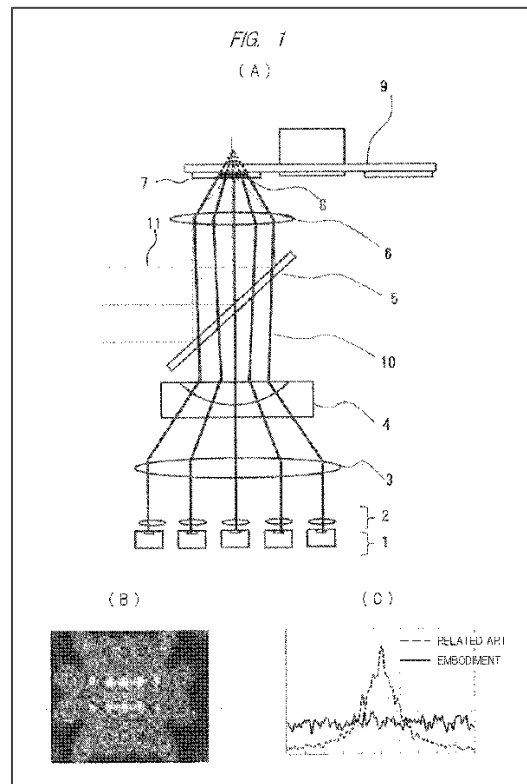
'226 Patent at Figs. 6(A) – 6(C)

47. The problems with these configurations are also illustrated in Fig. 6 (reproduced above). '226 Patent at 2:27-29, Fig. 6. As illustrated in Fig. 6(A), the excitation light 10 passes through collimate lens 2, convex lens 3, concave lens 4, a dichroic mirror 5, and condenser lens 6, which is made incident on a disc 9 that is coated with a fluorescent material 7. '226 Patent at 2:30-54.

48. The problems in these earlier projection-type image display devices are further illustrated in Fig. 6(B) and Fig. 6(C)—how the light is made incident on the fluorescent material. Fig. 6(B) is a 2D distribution drawing of excitation light on the fluorescent material, where the luminance distribution in which the center portion is bright with peripheral portion being dark. '226 Patent at 2:57-58, 59-62. Fig. 6(C)

shows a luminance distribution in one cross-section, which also illustrates the concentration of luminance distribution in the center. '226 Patent at 2:58-59. Further, high luminance in the center of the irradiation region causes the fluorescent material to generate excessive heat due to the energy difference between absorbed and emitted light, reducing the material's efficiency and lifespan. '226 Patent at 2:62-3:3.

49. The '226 Patent's inventors solved this problem by re-designing arrangement and curvatures of the optical member to direct the excitation light that passes through the optical member to be made incident on the fluorescent material to improve the light emitting efficiency and service life of the fluorescent material. '226 Patent at 1:46-62. One embodiment disclosed in the '226 Patent achieves this goal by making adjustments in the luminance distribution of excitation light that is irradiated onto the fluorescent material. '226 Patent at 1:45-48. By increasing the area of where the excitation light is irradiated onto the fluorescent material, which in turn distributes the light more evenly across the fluorescent material, as shown, for example, in Fig. 1(C), the temperature of the fluorescent material will be lowered. This reduction of temperature would extend the lifespan of the fluorescent material and that of the light emitting device.



'226 Patent at Figs. 1(A) – 1(C)

VI. LEVEL OF ORDINARY SKILL IN THE ART

50. I understand that claim construction and definiteness are examined through the eyes of a POSITA. I am informed that the factors to be considered in determining the level of ordinary skill in the art are: (1) the education level of active workers in the field; (2) the type of problems encountered in the art; (3) prior art solutions to those problems; (4) the speed with which innovations are made; and (5) the sophistication of the technology in the art.

51. For purposes of this declaration, I have also been asked to assume that the relevant time period for determining the level of skill in the art for the '226 Patent is the earliest claimed priority date, November 1, 2012.

52. In my opinion, at the time of the priority date of the '226 Patent, a POSITA would have had a Bachelor of Science degree in Electrical Engineering, Physics, Optics or an equivalent degree, and at least one year of industrial field experience working in the field of optical engineering, optical design, or a related field. Additional education and/or industrial field experience may provide a substitute for one of the qualifications of a POSITA.

53. I understand that Petitioners and Dr. Sasian contend that the level of ordinary skill in the art at the time of the priority date for the '226 Patent requires a Ph.D. in electrical engineering, physics, optical sciences, optical engineering, or a related scientific or engineering field, and at least one to two years of work or research experience in optical engineering, optical design, or a related field. EX1004 ¶ 31. I believe the level of ordinary skill in the art that I propose better aligns with the technology disclosed in the '226 Patent.

54. As a result of my education and experience, I was at least a POSITA at the priority date of the '226 Patent, and I continue to be at least a POSITA. Here, I have applied the perspective of a POSITA throughout my analysis.

VII. CLAIM CONSTRUCTION

55. For any terms not specifically construed, I have applied the ordinary and customary meaning that these terms would have had to a POSITA at the time of the invention in view of the patent's specification. In other words, I have interpreted the remaining terms in accordance with the "plain and ordinary" meaning.

56. I understand that, in the District Court litigation, there has been a claim construction hearing on two phrases of the '226 Patent, and the parties have agreed on the construction of one term of the '226 Patent. EX2016.

57. I have also been informed that prior to the *Markman* hearing, Magistrate Judge Boone Baxter provided preliminary constructions. EX2017. I note that this long phrase in the preliminary construction also includes the other term ("an emission side of the excitation light relative to the fluorescent material") that the parties are disputing—in addition to "a light-condensing position" which I analyze below.

58. I agree with the Court's preliminary construction of the phrase "the optical member has a curvature that is set such that *a light-condensing position* of the excitation light is positioned on *an emission side of the excitation light relative to the fluorescent material*" is "plain and ordinary meaning" or "the optical member has a curvature that causes *a light-condensing position* of the excitation light to be

positioned on *an excitation light's exit side of the fluorescent material that faces away from the excitation light source.*" EX2017 at 4.

Term	Maxell's Construction	Petitioner and Dr. Sasian's Construction	Preliminary Construction in the District Court Litigation
"the optical member has a curvature that is set such that <i>a light-condensing position</i> of the excitation light is positioned on <i>an emission side of the excitation light relative to the fluorescent material</i>" ('226 Patent, cl. 8)	Plain and ordinary meaning, for example, the optical member has a curvature that causes <i>a light-condensing position</i> of the excitation light to be positioned on <i>an excitation light's exit side of the fluorescent material that faces away from the excitation light source</i>	If the Court determines that this term is amenable to construction, then Defendants propose that "a light-condensing position" be construed to mean: An illumination region formed by converging light rays	Plain and ordinary meaning OR "the optical member has a curvature that causes <i>a light-condensing position</i> of the excitation light to be positioned on <i>an excitation light's exit side of the fluorescent material that faces away from the excitation light source</i>"

59. More specifically, I agree with the preliminary construction in which the plain and ordinary meaning of "a light-condensing position" is used without further construction of the term. EX2017.

60. I also agree with the construction in which “an emission side of the excitation light relative to the fluorescent material” is construed as “an excitation light’s exit side of the fluorescent material that faces away from the excitation light source.” EX2017.

61. I provide my reasoning regarding this phrase by addressing my positions on “a light-condensing position” and “emission side of the excitation light relative to the fluorescent material.”

62. I also understand that both Petitioners and Maxell has an agreement on construction of “a front side of the fluorescent material,” ’226 Patent, claim 10, should be construed to mean “the surface of the fluorescent material on the side facing the excitation light source.” EX2016 at 5. I have incorporated this agreed construction into my analysis below.

Term	Agreed Construction (EX2016 at 5)
“a front side of the fluorescent material” (’226 Patent, cl. 10)	“the surface of the fluorescent material on the side facing the excitation light source”

63. Further, in my opinion, construction of the following terms are critical to my analysis. These terms, in my view, encompass the key invention of the ’226 Patent, which is intended to increase the lifespan of the fluorescent material by changing “a light-condensing position” to the “emission side of excitation light

relative to the fluorescent material.” This modification was designed to avoid deterioration of the fluorescent material due to overheating. My overview of the ’226 Patent in Section V provides more detailed explanations.

64. In particular, while these disputed terms are very clear to a POSITA, Dr. Sasian and Petitioners attempt to mischaracterize them as ambiguous in support of their misinterpretations. These misinterpretations are then used as a basis to support their invalidity positions by conflating the scope of disclosures in their references with the inventions claimed in the ’226 Patent.

A. “a light-condensing position” (Claim 8)

Term	Proposed Construction Based on Preliminary Construction in the District Court Litigation (EX2017 at 4)
“a light-condensing position” (’226 Patent, cl. 8)	Plain and ordinary meaning

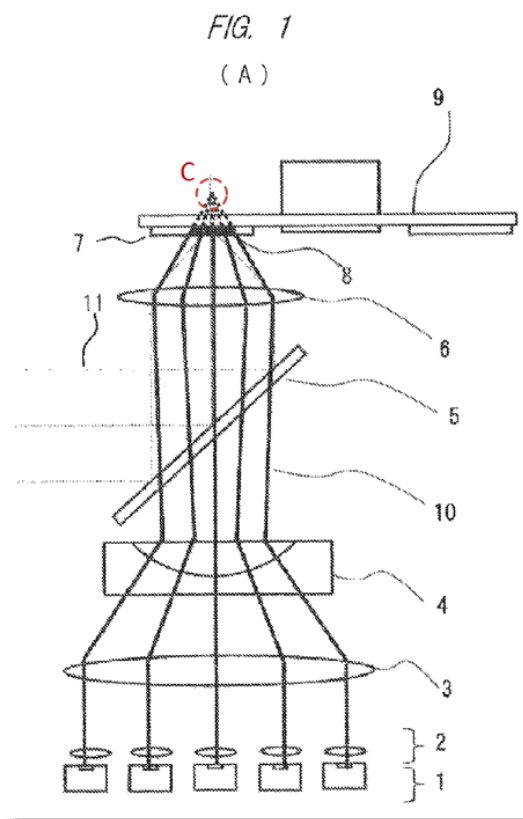
65. I agree with the above preliminary construction in the District Court Litigation. EX2017 at 4. In my opinion, no construction is necessary for the term “a light-condensing position” because that the plain and ordinary meaning of this claim term is abundantly clear, especially in view of the specification.

66. I disagree with Dr. Sasian’s assertion that “a light-condensing position” needs explicit construction. EX1004 at ¶ 25.

67. I also disagree with Dr. Sasian's opinion that "a light-condensing position" does not have an ordinary and customary meaning to a POSITA. EX1004 at ¶ 27.

68. In fact, Dr. Sasian acknowledges that to a POSTIA, "a light-condensing position" "could mean a location where light rays come to a point, as indicated by the annotation 'C' in Fig. 1, reproduced below, of the '226 Patent." EX1004 at ¶ 27. I agree with this interpretation of "a light-condensing position" in the context of the claim and specification, which also aligns with an ordinary and customary meaning of "a light-condensing position." EX1004 at ¶ 27.

EX1004 at ¶ 27 (Dr. Sasian's Annotation of Fig. 1)



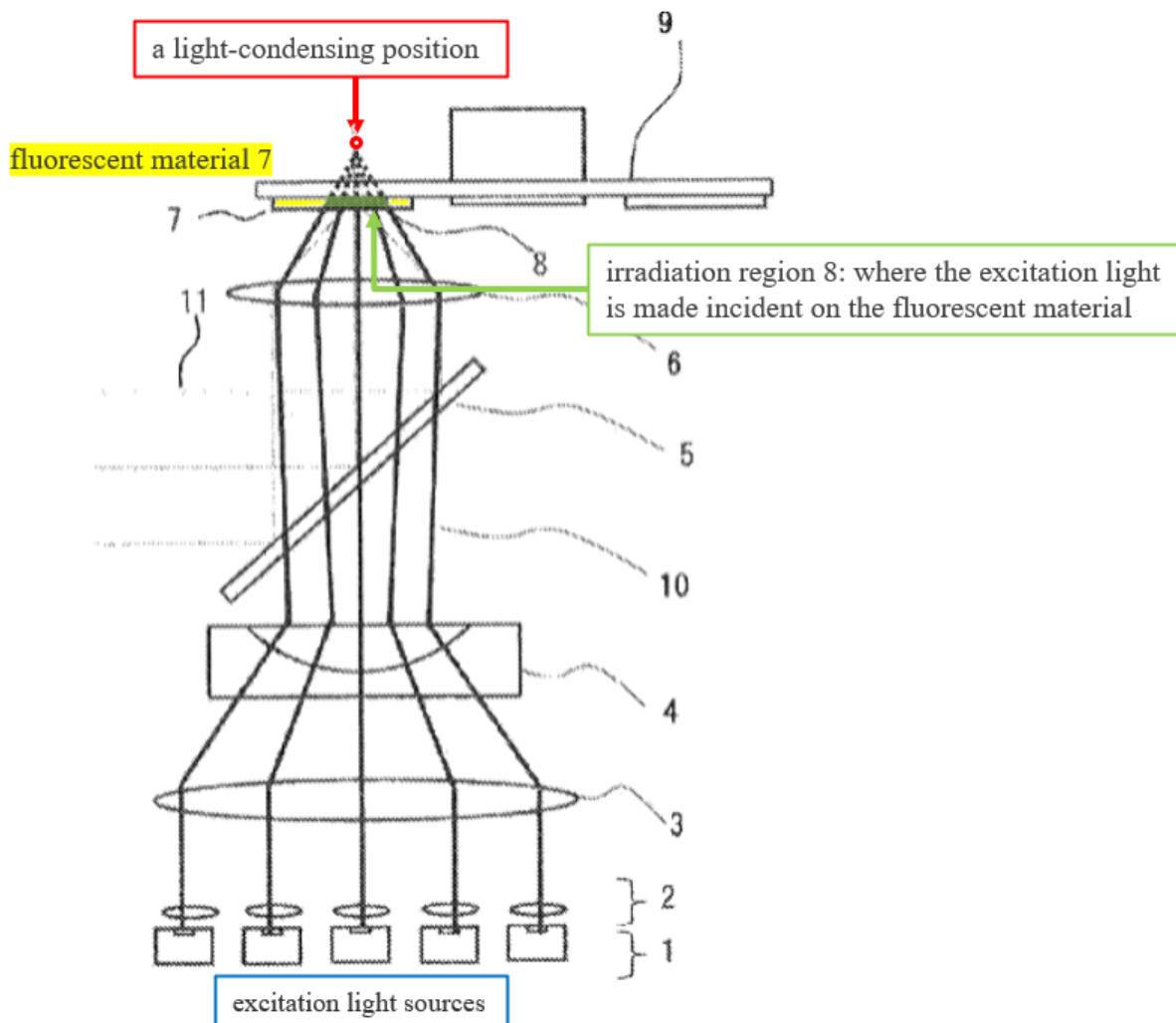
EX1001, FIG. 1 (annotated)

69. Further, “an illumination *region* formed by converging light rays” (a proposed construction of “a light-condensing *position*” by Dr. Sasian) would be a better construction of “an irradiation *region* 8,” rather than “a light-condensing *position*.” EX1004 at ¶ 28.

70. Specifically, I disagree with Dr. Sasian that the “light-condensing *position*” should be a *region* (irradiation region 8) illuminated by converging light rays on the side of the fluorescent material (7) facing the excitation light source (1). EX1004 at ¶ 28.

71. In my opinion, “a light condensing *position*” “where light rays come to a point,” EX1004 at ¶ 27, should also be distinguished from “a *region* (irradiation region 8) illuminated by...excitation light source 1,” EX1004 at ¶ 28.

72. I annotated below Fig. 1(A) with “a light-condensing position” and “irradiation region 8.”



73. As an initial matter, the “irradiation ***region 8***” has an assigned number in the figures. EX1004 at 3:60, 3:64, 4:2 (“irradiation ***region 8***”—while referencing the first embodiment depicted in Fig. 1); 4:37, 4:41, 4:45, 4:49, 4:55 (“irradiation ***region 8***”—while referencing the second embodiment depicted in Fig. 2); 5:18, 6:11 (“irradiation ***region 8***”—while referencing the third embodiment depicted in Fig. 3).

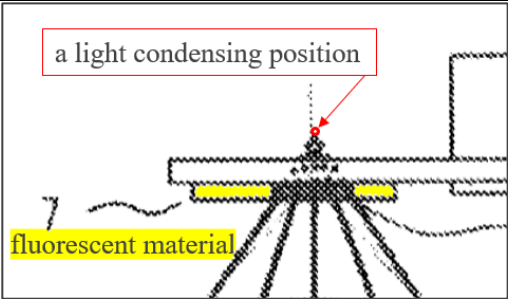
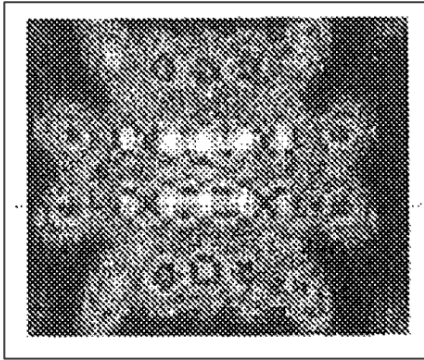
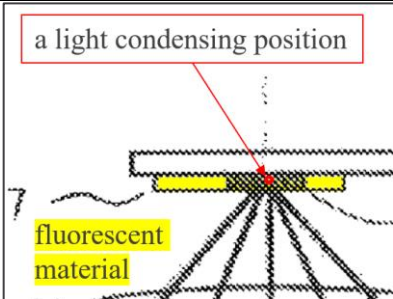
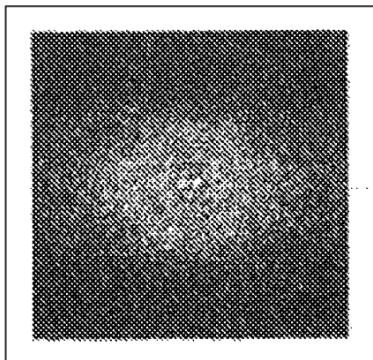
74. As described by the specification, “irradiation region 8” of the excitation light is where “a plurality of excitation light rays are irradiated ***not*** onto one position, but onto positions that are substantially scattered evenly, thereby consequently forming a substantially uniform luminance distribution slightly defocused.” EX1001 at 3:60-4:1. In other words, “irradiation region 8” is referring to the part of the fluorescent material where the excitation lights meets and interacts with the fluorescent material where the lights have “a substantially ***uniform luminance distribution***” as also depicted, for example, in Figs. 1(B) and 1(C). EX1001 at 5:50-55.

75. To a POSITA, a light-condensing position is “a location where light rays come to a point” as described by Dr. Sasian with annotations of Fig. 1 reproduced above. EX1004 at ¶¶ 27-28.

76. As such, “a light-condensing ***position***” and “irradiation ***region***” reference two distinct parts of the figures in embodiments of the ’226 Patent.

EX1001 at 3-6 (Figs 1-4). To a POSITA, it should be clear that the terms (“*position*” and “*region*”) connote two different things in this context, especially when reading specification (e.g., EX1001 at 3:39-4:23) in view of the figures of the embodiments (e.g., Fig. 1) while comparing them to the *conventional art* (Fig. 6). EX1001 at 3:39-4:23; Fig. 1, 6.

77. For further context, Fig. 6(B) depicting the *conventional art* shows “the irradiation region 8 of the excitation light 10 on the fluorescent material 7, [and] Fig. 6(B) is a two-dimensional distribution drawing of excitation light.” EX1001 at 2:55-58. Fig. 1(B) depicting one of the embodiments shows “irradiation region 8 of the excitation light 10 on the fluorescent material 7, [and] Fig. 1(B) is a two-dimensional distribution drawing of excitation light.” EX1001 at 3:60-64. When comparing the distribution of light on Fig. 1(B) with Fig. 6(B), a POSITA would note that the light that was concentrated on the fluorescent material as depicted on the *conventional art*—Fig. 6(B), no longer has this sharp focus on the fluorescent material in the embodiment of the ’226 Patent as shown in Fig. 1(B). EX1001 at Fig. 1, 6.

Exemplary Embodiments of the Invention	Conventional Light Source Device
 Fig. 1(A) (annotation added)  Fig. 1(B)	 Fig. 6(A) (annotation added)  Fig. 6(B)

78. The dispersion of excitation light incident on the fluorescent material is the key to the invention of the '226 Patent, which solves the issue of deterioration of fluorescent materials caused by extreme heat resulting from the way light converged onto the surface of the fluorescent material. EX1001 at 1:30-62, 2:66-3:3, 3:39-59, Fig. 1, 6. A POSITA would understand that the terms “a light-condensing position” and “an irradiation region 8” are used to describe how the optical elements were modified to alter the manner in which light incident on the fluorescent material. As illustrated above, this dispersion of light on the fluorescent material was achieved by shifting the “light-condensing position” (“a location where light rays come to a

point,” EX1004 at ¶ 27) from the surface of the fluorescent material to the emission side. EX1001 at Fig. 1-4, 6. Whereas “an irradiation region” is used to reference the area of the fluorescent material that interacts with the excitation light, which subsequently changed with the shifting the location of “a light-condensing position.”

79. Thus, in the embodiments of the ’226 Patent, “a light-condensing position” must be referencing a *position* that is different from the *region* of the fluorescent material where the light meets the fluorescent material.

80. For reasons described above, in my opinion, “a light-condensing position” does not need any further construction, and the term “a light-condensing *position*” should be distinguished from the “an irradiation *region* 8.”

B. “an emission side of the excitation light relative to the fluorescent material” (Claim 8)

Term	Preliminary Construction in the District Court Litigation (EX2017 at 4)
“an emission side of the excitation light relative to the fluorescent material” (’226 Patent, cl. 8)	“an excitation light’s exit side of the fluorescent material that faces away from the excitation light source”

81. I agree with the above preliminary construction in the District Court Litigation. EX2017 at 4. In my opinion, the intrinsic evidence makes clear that “an emission side of the excitation light relative to the fluorescent material” should be

construed as “an excitation light’s exit side of the fluorescent material that faces away from the excitation light source.”

82. I disagree with Dr. Sasian that “an emission side of the excitation light relative to the fluorescent material” is ambiguous. EX1004 at ¶ 29. I also disagree with Dr. Sasian that the phrase should be construed as “the surface of the fluorescent material on the side facing the excitation light source” for reasons I explain below. EX1004 at ¶ 29.

1. **“An emission side of the excitation light relative to the fluorescent material” is not ambiguous and should be construed as “an excitation light’s exit side of the fluorescent material that faces away from the excitation light source” as supported by disclosures in the specifications.**

83. In my opinion, the phrase “an emission side of the excitation light relative to the fluorescent material” provides a clear, objective, and well-defined spatial relationship for a POSITA; it is not ambiguous. EX1004 at ¶ 29.

84. A POSITA would understand from the disclosures of the intrinsic evidence that there are two sides to the fluorescent material: (1) the front side and (2) the emission side. EX1001 at 3:45-59.

85. First, parties are in agreement that “a front side of the fluorescent material” should be construed as “the surface of the fluorescent material on the side facing the excitation light source.” EX2016 at 5. In my opinion, this agreed construction is supported by the specification; the front side is where the excitation

light “that has passed through the condenser lens is made incident on the fluorescent material.” EX1001 at 3:45-47. In other words, “a front side” is the side of the fluorescent material that faces the excitation light sources.

86. Second, a POSITA, reading the recited part of the claim would understand that “an emission side of the excitation light relative to the fluorescent material” is where the light-condensing position is located, describing how such a dispersed distribution of light on the fluorescent material can be achieved through the arrangement and configuration of the optical member, thereby avoiding issues caused by hot spots in the fluorescent material. EX1001 at claim 8; Figs. 1-4.

87. The spatial relationship between the fluorescent material and emission side that is defined by the location of a light-condensing position can be confirmed in claim 8:

the optical member has a curvature that is set such that *a light-condensing position* of the excitation light is positioned on **an emission side of the excitation light relative to the fluorescent material**

EX1001 at cl. 8 (emphasis added).

88. The specification also provides consistent explanations about “an emission side of the excitation light relative to the fluorescent material.” The

emission side is where “the light-condensing position is positioned...relative to the fluorescent material 7,” EX1001 at 3:48-51.

89. Based on the claim language and specifications, I annotated Fig. 1(A):

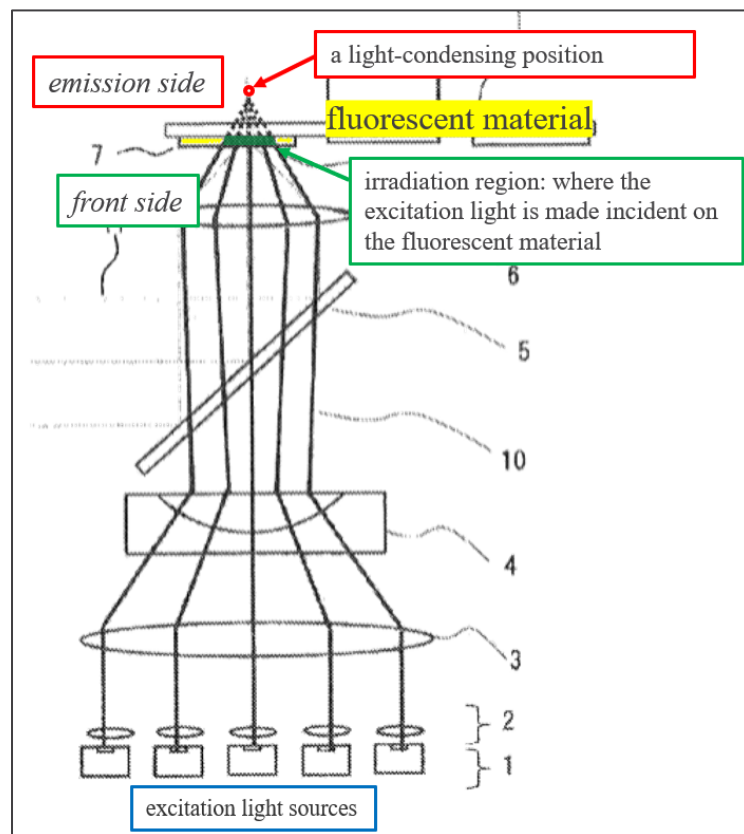
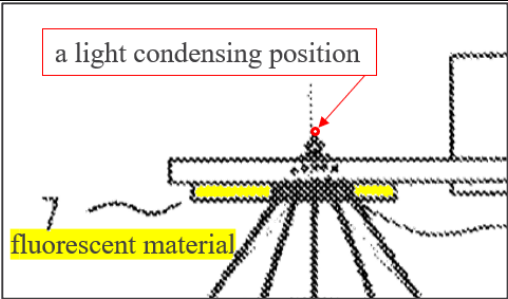
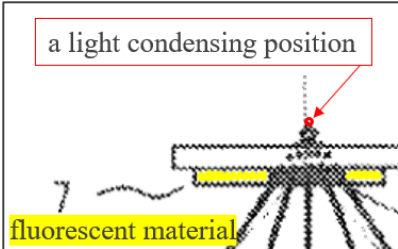
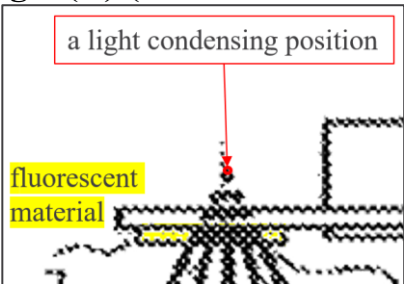
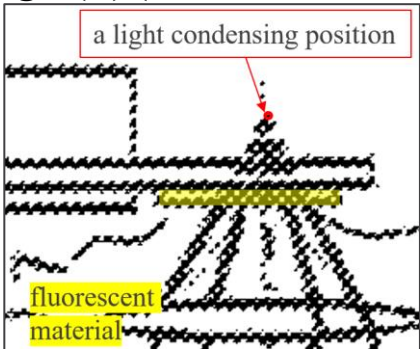
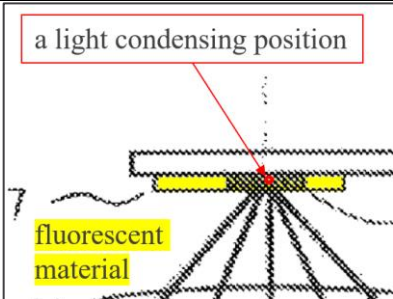


Fig. 1(A) (annotation added)

90. Specification also provides further context and explanations of “an emission side of the excitation light relative to the fluorescent material.” As I have provided in the Section V, the '226 Patent “improve[s] the light-emitting efficiency and service life of the fluorescent material” by adjusting distribution of the light incident on the fluorescent material, EX1001 at 1:39-43—to avoid having the sharp

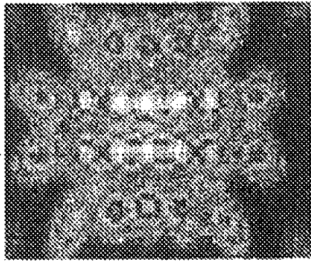
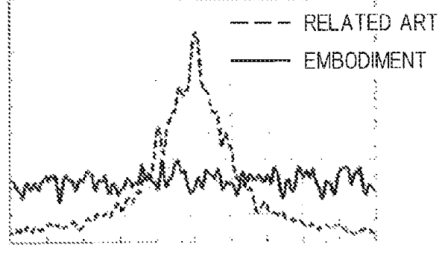
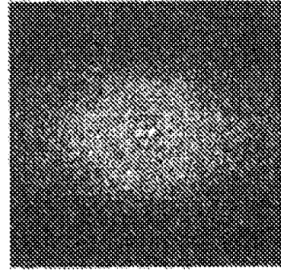
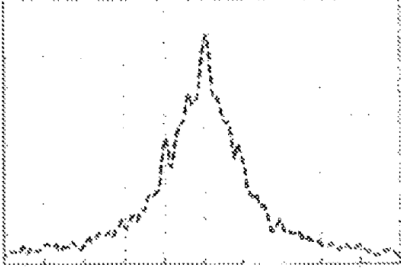
focus that leads to excessive heat on the fluorescent material that causes shortened service life. EX1001 at 3:64-4:5.

91. At the priority date of the '226 Patent, the light-condensing position was embedded within the fluorescent material, as illustrated in Fig. 6(A); the proposed arrangement is intended “so that the excitation light **10** is prevented from being condensed onto the single portion on the fluorescent material **7**.” EX1001 at 2:55-66; 3:10-16. In contrast, the disclosures of the '226 Patent, as exemplified in each of the Figs. 1–4, place the light-condensing position on “an excitation light’s exit side of the fluorescent material that faces away from the excitation light source.” “A main difference between FIG. 1(A) and FIG. 6(A) lies in that by devising the convex lens **3** and the concave lens **4**, or the positions and curvature radiuses of the two lenses, the excitation light **10** is made incident on the condenser lens **6** in a manner *so as to be diffused*.” EX1001 at 3:40-45 (emphasis added).

Exemplary Embodiments of the Invention	Conventional Light Source Device
 Fig. 1(A) (annotation added)  Fig. 2(A) (annotation added)  Fig. 3(A) (annotation added)  Fig. 4(A) (annotation added)	 Fig. 6(A) (annotation added)

92. In the disclosed embodiments illustrated in the Fig. 1, this diffused light would then “consequently form[] a substantially uniform luminance distribution

slightly defocused” on the fluorescent material. EX1001 at 3:64-4:4. For example, Fig. 1(B) is “a two-dimensional distribution drawing of excitation light” and Fig. 1(C) “shows a luminance distribution on one cross-section.” EX1001 at 3:60-64. The corresponding figures (Fig. 6(B), 6(C)) are visual illustrations for the *conventional art*—comparison of these figures with those for the exemplary embodiments provides clear visualizations of how the change in the location of “a light-condensing” position” resulted in changes in the way the lights are dispersed on “an emission side of the excitation light relative to the fluorescent material.” EX1001 at 3:64-4:4. Specifically, Fig. 1(B) and 1(C) shows that, “in the irradiation region 8, a plurality of excitation light rays are irradiated not onto one portion, but onto positions that are substantially scattered evenly, thereby consequently forming a substantially uniform luminance distribution slightly defocused.” EX1001 at 3:64-4:1.

Exemplary Embodiments of the Invention	(B)  (C)  Figs. 1(B), (C)
Conventional Light Source Device	(B)  (C)  Figs. 6(B), (C)

93. In sum, “an emission side of the excitation light relative to the fluorescent material” is not ambiguous and should be construed as “an excitation light’s exit side of the fluorescent material that faces away from the excitation light source” as supported by disclosures in the specifications.

94. Below I explain how a POSITA would interpret the scope of “emission side” and “relative to the fluorescent material” as used in the disputed phrase.

a. “Emission Side” In the Specification Has an Established Meaning in Optical Systems

95. The “emission side” represents an inherently physical characteristic—light has a definable propagation direction that can both be measured and verified.

This term does not require subjective interpretation; rather, it refers to an objectively determinable feature of the system that establishes an a objective and measurable relationship between the light and the components of a projection-type image display device, as denoted in the specification.

96. In the context of the '226 patent, a POSITA would also understand that “emission *side*” should be distinguished from the *surface* of the fluorescent material. Specifically: (1) the term “emission *side*” refers to the side where a light-condensing position is located, EX1004 at Fig. 1(A), 2(A), 3(A), 4(A); and (2) the *surface* of fluorescent material is where the excitation light interacts with the fluorescent material to produce fluorescent light. EX1001 at 2:30–54. The Figs. 3(B) and 4(B), which illustrates the “luminance distribution of the emission *surfaces*,” further confirms that *surface* of the fluorescent material should be distinguished from “emission *side*,” as illustrated in Figs. 1(A), 2(A), 3(A), and 4(A), where the light-condensing positions are located. '226 Patent at 4:34-38.

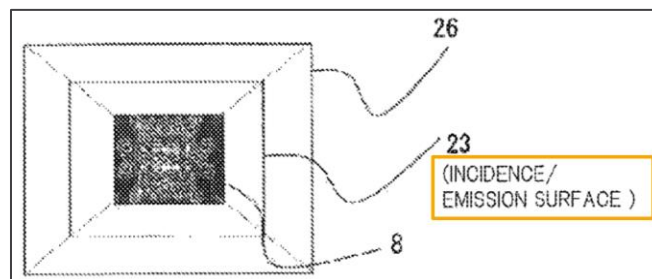


Fig. 3(B) (annotation added)

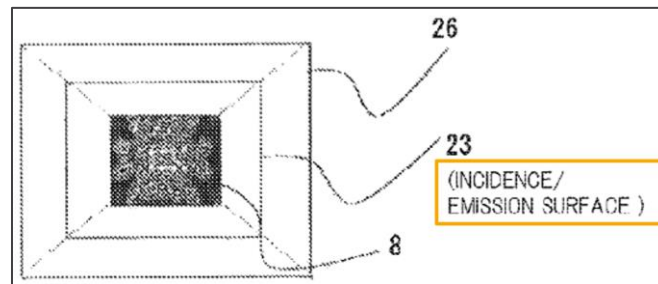


Fig. 4(B) (annotation added)

97. The specification provides illustrations and descriptions demonstrating how excitation light interacts with the fluorescent material and is subsequently emitted. In my opinion, this further supports my position that “emission side” is well-defined in the specification.

b. “Relative to the Fluorescent Material” Provides a Clear Reference Point

98. The phrase “relative to the fluorescent material” eliminates any ambiguity by defining the emission side in relation to a fixed, well-known component of the system. The fluorescent material serves as a clear reference, which is labeled consistently as “7” across all the figures. In this exemplary embodiment, “the light-condensing position is positioned on the emission side of the excitation light **10** relative to the fluorescent material **7**.” EX1001 at 3:49-51.

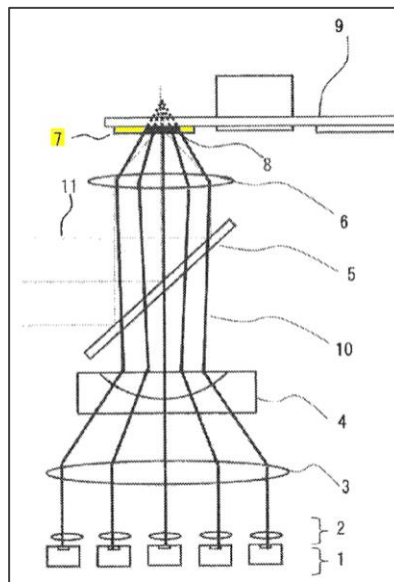


Fig. 1(A) (annotation added)

99. These disclosures ensure that a POSITA can determine the emission side examining the arrangement of the fluorescent material, especially in relation to the light rays. To a POSITA, the disclosures in the specifications of the '226 Patent should make clear which side of the fluorescent material corresponds to the “emission side” for the specific exemplary embodiment.

100. Thus, a POSITA reading “an emission side of the excitation light relative to the fluorescent material,” in claim 8, in light of the specification, would have informed the scope of the with reasonable certainty because a POSITA would understand which side of the fluorescent material would correspond to the emission side.

101. Therefore, in my opinion, “an emission side of the excitation light relative to the fluorescent material” is not ambiguous.

102. Additionally, “an emission side of the excitation light relative to the fluorescent material” should be construed as “an excitation light’s exit side of the fluorescent material that faces away from the excitation light source” as supported by disclosures in the specifications.

2. Dr. Sasian and Petitioners’ proposed construction that a light-condensing position of the excitation light is positioned on “the surface of the fluorescent material on the side facing the excitation light source” contradicts disclosures in the specifications.

103. In my opinion, Dr. Sasian’s construction that the light-condensing position should be located on “the *surface* of the fluorescent material on the *side facing the excitation light source*” contradicts the core principle of the disclosures in the ’226 Patent. EX1004 at ¶ 29.

104. First, the “emission side” cannot be located on the *surface* of the fluorescent material. The specification identifies that the problem with prior light source devices stems from high irradiation region in the center, as illustrated in Fig. 6, which places the light-condensing position on the *surface* of the fluorescent material. EX1001 at 3:4-35. The disclosed arrangements are designed “so that the

excitation light is prevented from being condensed on the single portion on the fluorescent material.” EX1001 at 3:14-16, 3:29-32.

105. As this focused condensing of light on the fluorescent material is precisely what the '226 Patent—and specifically claim 8—sought to overcome, the Dr. Sasian’s proposed construction would preclude exemplary embodiments. I understand that doing so is legally improper.

106. Second, Dr. Sasian’s proposed construction of having a light-condensing position to be located on “the surface of the fluorescent material *on the side facing the excitation light source*” precludes embodiments disclosed in this '226 Patent. EX1004 at ¶ 29.

107. Dr. Sasian’s proposed construction places the light-condensing position on the other side of the fluorescent material (“the fluorescent material that faces the excitation light source”—marked with green circle in the annotated Fig. 1(A) below) as illustrated in the annotated figure below. EX1004 at ¶ 29. This side of the fluorescent material is not where the light condensing position of claim 8 is located, as intended by the arrangements of the optical member.

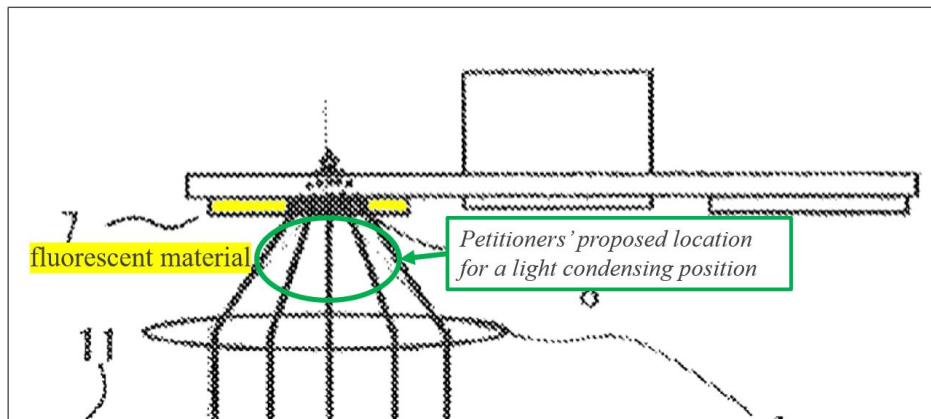


Fig. 1(A) (Annotated)

108. Consequently, Dr. Sasian's proposed construction excludes the exemplary embodiment of placing the light-condensing position at "an excitation light's exit side of the fluorescent material that faces away from the excitation light source" as illustrated in Fig. 1(A), 2(A), 3(A), and 4(A) and described, for example, in 3:39-59 which discusses Fig. 1(A). EX1004 at ¶ 29. I understand that it is legally inappropriate to interpret a term in a manner that excludes the disclosed embodiments.

VIII. SUMMARY OF PETITIONERS' PROPOSED GROUNDS

109. Petitioners allege that claims 8, 10, and 12 are unpatentable based on four grounds. Pet. at 12. Ground 1 includes a challenge to claims 8, 10, and 12 under pre-AIA 35 U.S.C. §§ 102(e)(2) and/or 103(a) as being anticipated by, or obvious over, Kurosaki '087 (EX1005). Ground 2 includes a challenge to claims 8 and 10 under pre-AIA 35 U.S.C. § 102(a) and/or 103(a) as being anticipated by, or obvious over, Miyamae (EX1006a, EX1006b, EX1006c). Ground 3 includes a challenge to

claim 12 under pre-AIA 35 U.S.C. § 103(a) as being obvious over Miyamae in view of Kurosaki '087 (EX1005). Ground 4 includes a challenge to claims 8, 10, and 12 under pre-AIA 35 U.S.C. § 103(a) as being obvious over Kitano (EX1007) in view of Kurosaki '087 (EX1005).

110. The alleged invalidity grounds are summarized as follows:

Ground	Patent Claims	Type of Challenge	Primary Reference	Secondary References
1	8, 10, 12	pre-AIA 35 U.S.C. §§ 102(e)(2) and/or 103(a)	Kurosaki '087	
2	8, 10	pre-AIA 35 U.S.C. § 102(a) and/or 103(a)	Miyamae	
3	12	pre-AIA 35 U.S.C. § 103(a)	Miyamae	Kurosaki '087
4	8, 10, 12	pre-AIA 35 U.S.C. § 103(a)	Kitano	Kurosaki '087

111. My opinions in this declaration are focused solely on the motivation to combine (1) Miyamae with Kurosaki '087 and (2) Kitano with Kurosaki '087, and what a POSITA would understand at the time with respect to those proposed combinations.

A. Miyamae

112. Miyamae, titled “Light Source Device and Projector,” was filed on March 22, 2011 and published on October 18, 2012.

113. Miyamae discloses a light source device and projector that improve phosphor luminous efficiency by using a specialized optical setup: an excitation light

source directs light to a phosphor layer, which emits fluorescence at a different wavelength; a reflector behind the phosphor layer bounces both excitation and fluorescent light, while a wavelength-selecting reflective layer between the source and phosphor transmits or reflects excitation light based on its angle of incidence, ensuring optimal delivery of excitation light to the phosphor and enhancing overall efficiency. EX1006b at 3.

B. Kurosaki '087

114. Kurosaki '087, titled “Light Source Device and Projector,” was filed on March 30, 2012 and published on May 13, 2014.

115. Kurosaki '087 discloses a light source device and projector that achieves high luminance with a simplified, cost-effective structure. EX1005 at 2:52-56. The device arranges multiple light sources, such as laser diodes, in a plane, each paired with a collimator lens whose optical axis is shifted parallel to the light source's axis. EX1005 at 2:4-13. This configuration focuses the emitted light beams onto a specific region of a phosphor wheel, enhancing light intensity and efficiency while reducing the size and cost of required optical components. EX1005 at Abstract.

C. Kitano

116. Kitano, titled “Light Source Device and Image Display Device,” was filed on October 4, 2012 and published on April 11, 2013.

117. Kitano discloses a light source device with light source component with laser, fluorescent component, illuminance homogenizer, and relay optical system that guides laser light emitted from the first illuminance homogenizer to the fluorescent component. EX1007 at Abstract. Kitano discloses technology where “an illumination spot that is smaller than that with prior art can be focused on the phosphor” EX1007 at [0020].

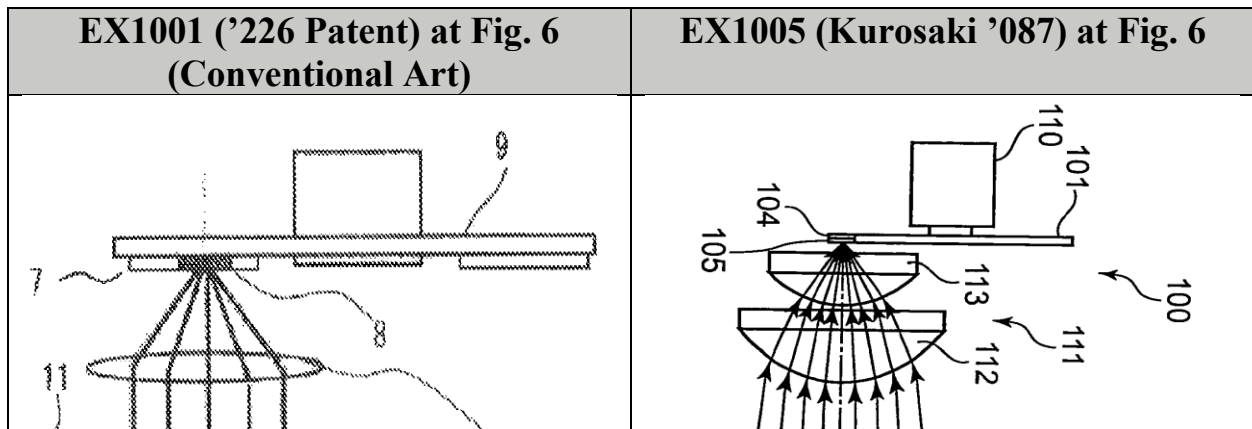
IX. GROUND 1: KUROSAKI '087 (CLAIMS 8, 10, 12) – ISSUES REGARDING IMPROPER CLAIM CONSTRUCTIONS

118. Ground 1 relies on Kurosaki '087 with no secondary references.¹ In my opinion, Dr. Sasian has not shown a likelihood of prevailing with respect to Ground 1 because Dr. Sasian’s analysis of Kurosaki '087 for claim element “[8.8] the optical member has a curvature that is set such that a light-condensing position of the excitation light is positioned on an emission side of the excitation light relative to the fluorescent material” is based on Dr. Sasian’s interpretation of the claim that is

¹ It is unclear whether Dr. Sasian’s position for Ground 1 is based on (1) anticipation, (2) obviousness, or (3) both anticipation and obviousness. Dr. Sasian asserts that “Kurosaki anticipates, or renders obvious, Claims 8, 10, and 12.” EX1004 at 35. However, in other parts of Ground 1, Dr. Sasian appears to rely solely on anticipation grounds. See the following examples: EX1004 at ¶ 96 (“In summary, claim 8 is anticipated by Kurosaki.”); EX1004 at ¶ 101 (“In summary, claim 10 is anticipated by Kurosaki.”); EX1004 at ¶ 104 (“In summary, claim 12 is anticipated by Kurosaki.”). As there is no secondary evidence and Dr. Sasian’s summaries for each claim are limited to anticipation, I focus only on Dr. Sasian’s analysis based on anticipation for this declaration.

not only inconsistent with the District Court’s preliminary constructions but also reads out the key inventions of the ’226 Patent. EX1004 at ¶¶ 25-29, ¶ 87.

119. Kurosaki ’087 discloses the arrangements and curvatures of the lenses that result in a light-condensing position on the surface of the fluorescent material that mirrors that of the *conventional art* disclosed in the ’226 Patent. EX1004 at ¶ 87 (citing Fig. 6 of Kurosaki ’087); EX1001 at Fig. 6. In other words, the ’226 Patent was intended to improve upon precisely the type of art disclosed in Kurosaki ’087. EX1004 at ¶ 87; EX1005 at Fig. 6.



120. Yet, Dr. Sasian claims that Kurosaki ’087 discloses “the excitation light is incident on the fluorescent material as a light-condensing position that is an emission light of the excitation light relative to the fluorescent material.” EX1004 at ¶ 87. This statement is based on an incorrect interpretation of “a light-condensing position” and “an emission light of the excitation light relative to the fluorescent material.” EX1004 at ¶¶ 25-29.

121. For Kurosaki '087 to read on claim 8 (and specifically [8.8]) of the '226 Patent, the “excitation light” should be incident on the *irradiation region* of fluorescent material—not “a light-condensing position.” I incorporate my discussion regarding claim constructions set forth in Section VII.

122. As Dr. Sasian bases the analysis on the flawed claim constructions (inconsistent with the preliminary constructions in the District Court that also reads out the key invention of the '226 Patent), Dr. Sasian is silent regarding how Kurosaki '087 discloses “a light-condensing position” that is located on “an emission side of the excitation light relative to the fluorescent material”—or the exit side of the fluorescent material that faces away from the excitation light source. EX1004 at ¶ 87.

123. Moreover, Dr. Sasian’s description of Kurosaki '087 further confirms that Kurosaki '087 resembles the *conventional art* as described in the specification of the '226 Patent. EX1001 at 2:15-3:3. For example, as disclosed in Kurosaki '087 “the beams from the excitation light sources 71 are more *concentrated* in the rectangular area $L_x \times L_y$ on the phosphor layer 104” EX1004 at ¶ 87 (emphasis added). As I have described in Sections V and VII, the invention of the '226 Patent was to avoid such concentration of light on specific portions of the fluorescent material to overcome the subsequent issues of hot spots in the *conventional art*. EX1001 at 2:15-3:3, Figs. 1-4, and 6.

124. As such, Dr. Sasian's analysis fails to show that Kurosaki '087 discloses the key inventive feature of the '226 Patent, as Dr. Sasian relies on a flawed claim interpretation as described above. Kurosaki '087 largely mirrors *conventional art* as disclosed in the '226 Patent.

125. At a minimum, Dr. Sasian's analysis of Kurosaki '087 for claims 10 and 12 fails with respect to their dependence on claim 8.

X. GROUND 2: MIYAMAE (CLAIMS 8, 10) – ISSUES REGARDING IMPROPER CLAIM CONSTRUCTIONS

126. Ground 2 relies on Miyamae with no secondary references.² In my opinion, Dr. Sasian has not shown a likelihood of prevailing with respect to Ground 2 because Dr. Sasian's analysis of Miyamae for claim element "[8.8] the optical member has a curvature that is set such that a light-condensing position of the excitation light is positioned on an emission side of the excitation light relative to the fluorescent material" is based on Dr. Sasian's interpretation of the claim that is not only inconsistent with the District Court's preliminary constructions but also reads out the key inventions of the '226 Patent. EX1004 at ¶¶ 125-28.

127. Miyamae discloses the arrangements and curvatures of the lenses that result in a light-condensing position being embedded on the fluorescent material that

² It is unclear whether Dr. Sasian's position for Ground 2 is based on (1) anticipation, (2) obviousness, or (3) both anticipation and obviousness. Dr. Sasian asserts that "Miyamae anticipates, or renders obvious, Claims 8, 10, and 12." EX1004 at 46.

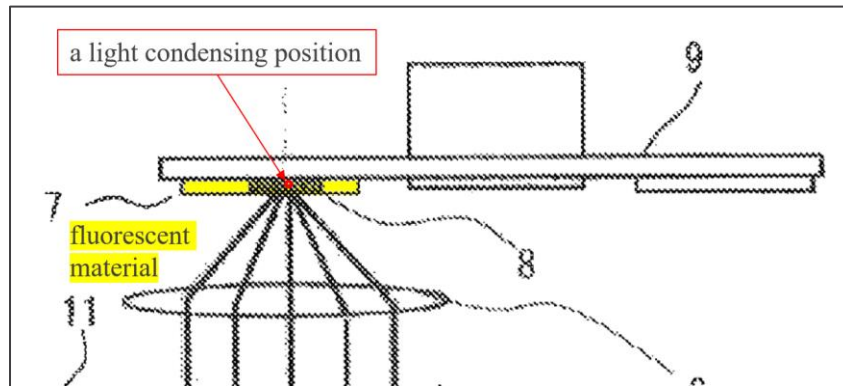
mirrors that of the conventional art disclosed in the '226 Patent. EX1004 at ¶ 126 (citing Fig. 1 and 5 of Miyamae); EX1001 at Fig. 6. In other words, the '226 Patent was intended to improve upon precisely the type of art disclosed in Miyamae. EX1004 at ¶¶ 125-28; EX1005 at Fig. 6.

128. Before my further analysis of Miyamae, I note that for a POSITA in this field, a phosphor layer made of phosphor material (in Miyamae) is used synonymously with the fluorescent material (in the '226 Patent). EX1004 at Fig. 1, 3, and 5; EX1001 at Fig 1-4, 6. A POSITA will also understand that there are many different types of the fluorescent/phosphor material; therefore, the “fluorescent material 7” in the '226 Patent may or may not be same type of fluorescent material as disclosed in Miyamae.

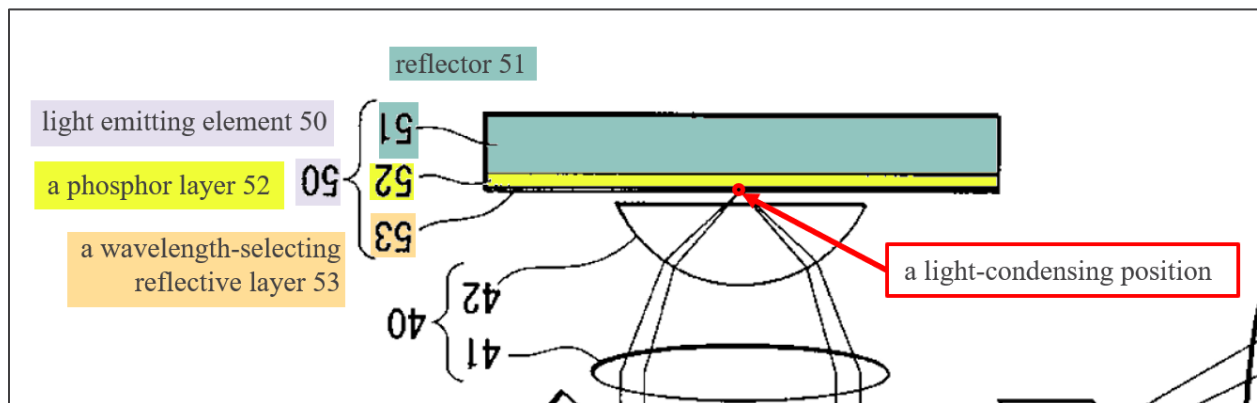
129. I compared the conventional art in the '226 Patent as depicted in Fig. 6 with the disclosures of Miyamae in Fig. 3 and Fig. 5 which provide a more detailed view of the fluorescent material (also known as phosphor material/layer) and light

However, in other portions of Ground 2, Dr. Sasian appears to rely exclusively on anticipation. For example: EX1004 at ¶ 141 (“In summary, claim 8 is anticipated by” Miyamae. I note that Dr. Sasian’s declaration actually states “Kurosaki” here, but I assume this is a typographical error, as the discussion is limited to Miyamae); EX1004 at ¶ 101 (“In summary, claim 10 is anticipated by Kurosaki.”); EX1004 at ¶ 147 (“In summary, claim 12 is anticipated by” Miyamae. Again, Dr. Sasian’s declaration states “Kurosaki,” but I assume this should be Miyamae, given the context). Because there is no secondary evidence and Dr. Sasian’s summaries for each claim are limited to anticipation, I address only Dr. Sasian’s anticipation analysis in this declaration.

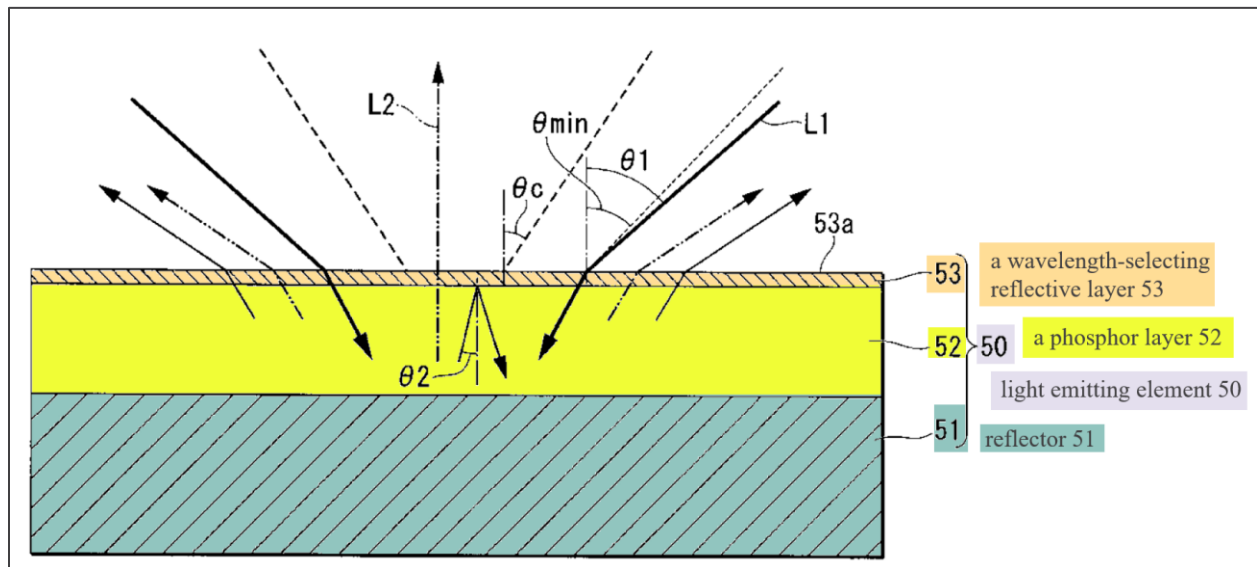
paths in Fig. 1. EX1001 at Fig. 6 (annotated); EX1006 at Fig. 3 and Fig. 5 (annotated).



EX1001 ('226 Patent) at Fig. 6 (Conventional Art) (annotated)



EX1006 (Miyamae) at Fig. 3 (annotated)



EX1006 (Miyamae) at Fig. 5 (annotated)

130. As shown in the annotated figures of Miyamae, the light-condensing positions are positioned somewhere within the “a phosphor layer 52.” EX1006 at Fig. 3, 5. Specifically, the light paths do not reach any point that goes beyond a phosphor layer 52 in Miyamae. EX1006 at Fig. 3, 5.

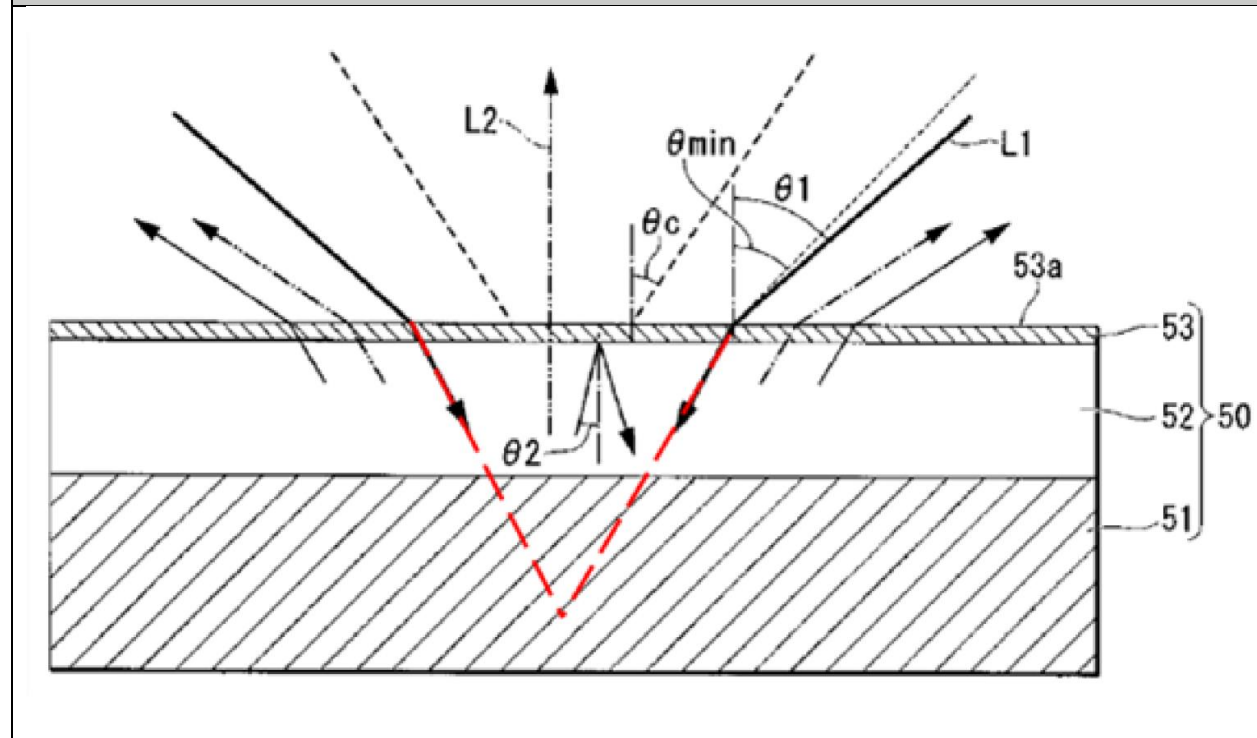
131. Yet, Dr. Sasian claims that Miyamae discloses the following: “a light-condensing position of the excitation light is positioned on an emission side of the excitation light relative to the fluorescent material.” EX1004 at ¶ 128. This statement is based on an incorrect interpretation of “a light-condensing position” and “an emission light of the excitation light relative to the fluorescent material.” EX1004 at ¶¶ 25-29.

132. As I have described in detail in Section VII, which I incorporate here, “emission side” in the ’226 Patent is referring to the side of the fluorescent material

that faces away from the excitation light source—the “emission side” is not embedded within the fluorescent material.³ EX1006 (Miyamae) at Fig. 3, 5. Thus, Miyamae does not disclose the light-condensing position on the “emission-side” as disclosed in the ’226 Patent; as described, in Miyamae, the light-condensing positions are embedded on the fluorescent material as found on the conventional arts of the ’226 Patent. EX1001 at Fig. 6.

133. Dr. Sasian also states that the “imaginary extensions of the excitation light rays substantially meet at a point in annotated Fig. 5 on the opposite side of the fluorescent layer 52 from the excitation light sources 102, just as shown in the Fig. 1 of the ’226 Patent.” EX1004 at ¶¶ 126, 128.

³ Based on the specifications of Miyamae and ’226 Patent, it should be clear to a POSITA that the “fluorescent material” in the ’226 Patent would correspond to “the light emitting element 50” in Miyamae.

EX1004 at ¶ 126 (Dr. Sasian's Annotation of Fig. 5 in Miyamae)

134. Yet, these imaginary lines drawn by Dr. Sasian are inconsistent with teachings of Miyamae. EX1004 at ¶ 126. “Reflector 51 has a surface that *reflects* light (blue light as excitation light and yellow light as fluorescence); a reflective metal material sheet such as an aluminum substrate, or a light transmissive sheet of forming material.” EX1006b at [0062]. Consequently, any light that strikes the reflector 51 will be reflected, and light cannot pass through the reflector as depicted by Dr. Sasian in the annotated figure. EX1004 at ¶ 126. Dr. Sasian fails to address or explain what this “imaginary lines” means when the specification specifically suggests that the light will not be passing through the reflector.

135. Next, Dr. Sasian's annotations and descriptions of Fig. 5 in Miyamae further confirm that the disclosures in Miyamae reflect the conventional technology discussed in the '226 Patent. Even if there is a "light-condensing position" indicated by the imaginary lines, this position does not extend to the opposite side of the fluorescent material, unlike the embodiments of the inventions described in the '226 Patent. EX1004 at ¶¶ 126, 128; EX1001 at Figs. 1-4. This location of the light-condensing position within the "light emitting element 50" (and arrangements of the optical member that allows for such light path) is more closely aligned with the conventional art discussed in the '226 Patent and as depicted in the Fig. 6. EX1001 at Fig. 6; 2:27-3:3.

136. Dr. Sasian also notes that "Miyamae discloses that '[o]n light emitting element 50, the individual spots of the laser light sources 12 incorporated in light source portion 10A are set so that their focusing positions do not completely overlap...'" EX1004 at ¶ 127 (citing EX1006, [0046]). This fails to resolve the deficiencies of Miyamae because the '226 Patent specifically disclosed an arrangement of optical members that moved the light condensing position away from the surface of the fluorescent material. In Miyamae, the light condensing positions are positioned "*on* light emitting element," as found in the conventional art of the '226 Patent. EX1004 at ¶ 127 (citing EX1006, [0046]); EX1001 at Fig. 6.

137. As such, Dr. Sasian's analysis fails to show that Miyamae discloses the key inventive feature in claim 8 of the '226 Patent, as Dr. Sasian relies on a flawed claim interpretation. Miyamae largely mirrors conventional art as disclosed in the '226 Patent.

138. Dr. Sasian's analysis of Miyamae for claim 10 fails at least for its dependence to claim 8.

XI. GROUND 3: MIYAMAE IN VIEW OF KUROSAKI '087 (CLAIM 12)

A. Issues Regarding Improper Claim Constructions

139. I incorporate my discussion regarding Miyamae in Section X into my analysis of Dr. Sasian's improper application of claim constructions of the '226 Patent, which are not only inconsistent with the District Court's preliminary constructions but also read out the key invention of the '226 Patent.

140. I incorporate my discussion regarding Kurosaki '087 in Section IX into my analysis of Dr. Sasian's improper application of claim constructions of the '226 Patent, which are not only inconsistent with the District Court's preliminary constructions but also read out the key invention of the '226 Patent.

141. As discussed above, both references exhibit similar deficiencies with respect to the same claim element of the '226 Patent. Even if combining these two references were appropriate, such a combination would not resolve the deficiencies

of Miyamae and Kurosaki '087 described in Sections X and IX. This is at least problematic for claim 12, as claim 12 depends on claim 8.

B. Issues Regarding Improper Combination of References

142. Ground 3 relies on the purported combination of Miyamae and Kurosaki '087. It is my opinion that Petitioners and Dr. Sasian have not shown a likelihood of prevailing with respect to Ground 3 because a POSITA would not have been motivated to combine Miyamae and Kurosaki '087 at the time of the invention of the '226 Patent. Pet. at 47-48; EX1004 at ¶¶ 148-57.

143. While I may develop additional opinions as to the merits of a Miyamae and Kurosaki '087 combination or other Grounds presented in the Petition, for this sub-section of my declaration, I focus on a POSITA's motivation, or lack thereof, to combine Miyamae and Kurosaki '087 because failure of a motivation to combine is fatal to Ground 3.

144. Petitioners' expert, Dr. Sasian, alleges that a POSITA would have recognized that Kurosaki '087's optical subsystems would have been compatible with system described in Miyamae and that "combining Miyamae and Kurosaki ['087] would have amounted to simple substitution of one known element for another to obtain predictable results." EX1004 at ¶ 150. I disagree.

145. Combining Miyamae and Kurosaki '087 is not "a simple substitution" and its result is not easily predictable. EX1004 at ¶ 150. In my opinion, Dr. Sasian

failed to demonstrate that a combination of Kurosaki '087 and Miyamae are compatible that such simple substitution of parts in the projector would result in an operable system. For instance, Dr. Sasian's declaration lacks any simulation or modeling to demonstrate how the lenses in these systems operate upon substitution of the light sources. EX1004 at ¶¶ 149-57. At minimum, for the combined system to be operable to project an acceptable quality of image, the optical lenses would very likely need to be swapped out and respecified using optical simulation tools because these systems have different lenses that were specifically configured for its corresponding light sources.

146. From counsel, I also understand that it is not sufficient to show that the systems of the two arts are compatible—but rather that a POSITA should have been motivated to make the modifications of prior art to arrive at the claimed invention. In my opinion, neither Dr. Sasian nor Petitioners demonstrated how the combination of these two references would have been compatible, nor did they provide sufficient rationale for a POSITA to be motivated to make such combinations.

147. Dr. Sasian fails to show sufficient motivation to combine Miyamae and Kurosaki '087. I disagree that a POSITA would have “naturally looked to both Miyamae and Kurosaki ['087]” due to the inherent differences between Miyamae and Kurosaki '087. EX1004 at ¶ 154.

148. Miyamae and Kurosaki '087 had different intentions behind their inventions, disclosing different optical systems. Miyamae is focused on optimal delivery of excitation light to the phosphor to enhance overall efficiency whereas Kurosaki '087 was focused on developing a simplified and cost-effective structure. Miyamae is a light valve device, whereas Kurosaki '087 is a commercial projector device using DMD. Although Miyamae mentions DMD and Liquid Crystal on Silicon (LCoS) that combines both LCD and DLP projectors, Kurosaki '087 and Miyamae are different systems composed of different optical elements. Specifically, Miyamae does not expressly teach how to set up optics for a DMD nor LCoS projector—a POSITA would not have been motivated to combine these two systems.

149. Dr. Sasian failed to provide any convincing rationale as to why a POSITA would have reasonably expected that “substitution of light source of Kurosaki ['087] for the light source of Miyamae” would have resulted in “an efficient light source for projectors,” nor did Dr. Sasian address the technical challenges and incompatibilities that arises from making such substitution of light sources. EX1004 at ¶ 151. For instance, Dr. Sasian did not address what about the light source of Miyamae would offer “certain advantages” over the light source of Kurosaki '087; Dr. Sasian did not address how the substitution of light source will predictably result in “an efficient light source for projectors.” EX1004 at ¶ 151. Altering a light source almost always requires subsequent alterations to the

remainder of the projector—the combination is not straightforward nor predictable without detailed analysis involving modeling and simulation.

150. Before providing further context regarding the complicated nature of substitution of light sources in a projector, I note that Dr. Sasian's proposal to combine Miyamae and Kurosaki '087 through substitution of light sources also overlooks critical details—not indicating which type of the light sources would be subject to this substitution. EX1004 at ¶¶ 152-57. Dr. Sasian fails to specify whether (i) the laser light source 10A in Miyamae would be replaced with a light source of Kurosaki '087 or (ii) the LED light source of 10B would be replaced with the light source of Kurosaki '087. EX1004 at ¶¶ 152-57. In both cases, simulation and modeling of the combined system will be necessary—neither of which Dr. Sasian provided.

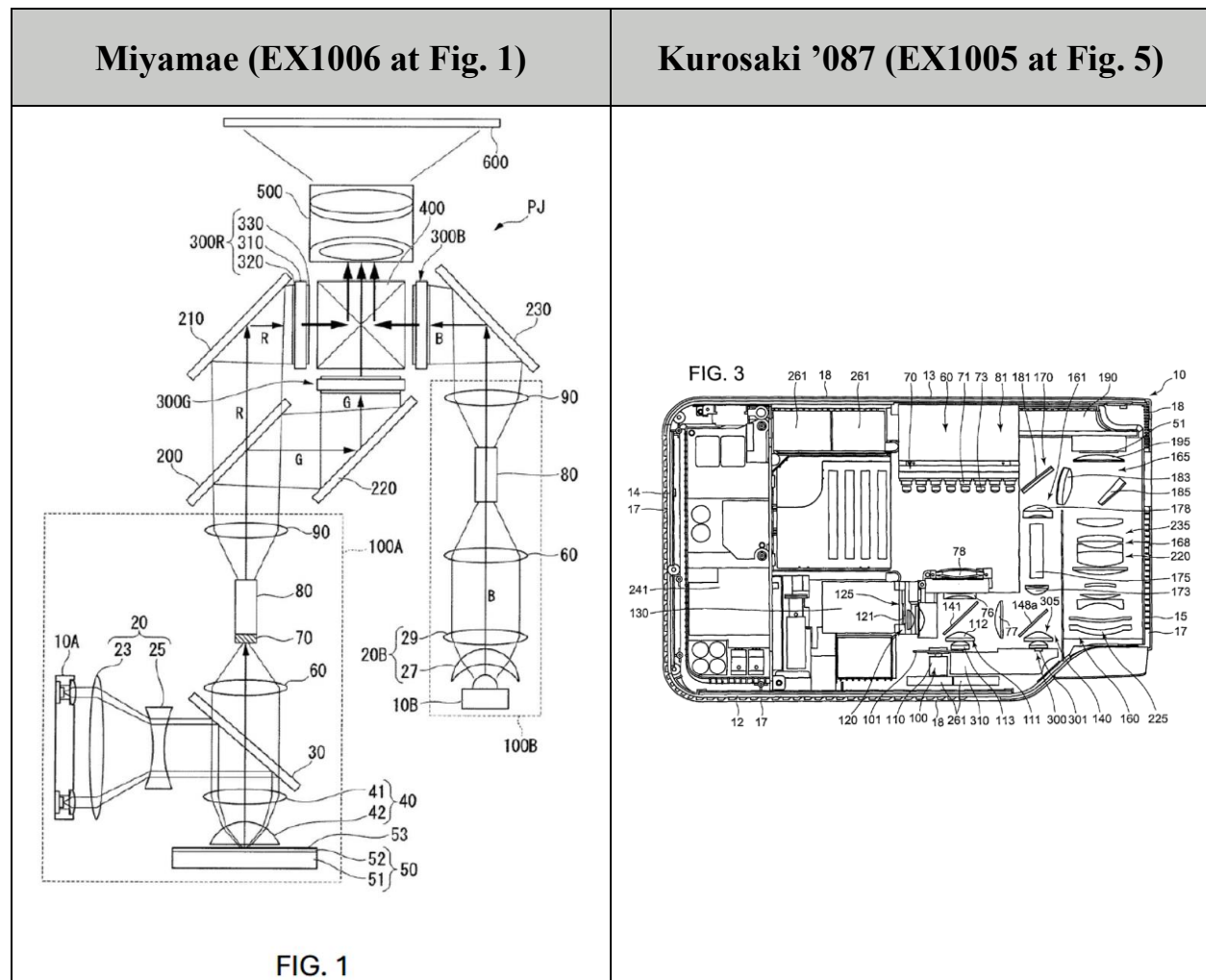
151. Miyamae and Kurosaki '087 have different types of light sources. For example, Miyamae includes laser and Light Emitting Diode (LED) light sources with light crystal light valves 300R, 300G, and 300B. EX1006b at Fig. 1. On the other hand, Kurosaki '087 only includes laser as its light source. EX1005 at Fig. 7.

152. LEDs and lasers have completely different optical characteristics as light sources for projectors. For example, LEDs are incoherent light sources with Lambertian light distributions, meaning they emit light that diverges in many directions. As a result, the optical system must be designed to efficiently collect light

from these wide angles. In contrast, lasers are coherent light sources with narrow far-field light distributions, allowing them to be easily focused into a line or point. This requires a different set of optical lenses to achieve the necessary convergence.

153. Additionally, when designing the optical structures, the thermal performance of the light source is a critical consideration because it directly impacts the lifetime and reliability of projectors. Excess heat can lead to accelerated deterioration of projector components. Since LEDs and lasers exhibit different thermal characteristics, their integration requires distinct structural arrangements—such as specifically designed heat sinks and fans—to effectively manage these differences and ensure optimal performance and durability.

154. Further, both Miyamae and Kurosaki '087 utilize different combinations of lenses that vary in number, position, size, performance, and cost. Each lens configuration is specifically designed to accommodate the particular light source used in its embodiment. The figures of the two references below visually demonstrates these differences between Miyamae and Kurosaki '087. Therefore, substituting the light source would necessitate a re-evaluation and likely require reconfiguration and modification of the lens arrangements.



155. In view of the differences between Miyamae and Kurosaki '087 and the complications associated with substituting light sources, certain functional similarities between “rod integer 80” in Miyamae (EX1005 at [0051]) and the “light tunnel” in Kurosaki '087 (EX1006 at 6:10-13) do not provide a sufficient basis for a POSITA to make such alterations to the light sources, especially when the advantage of such substitution is not apparent. EX1004 at ¶ 151.

156. Further, specifications of “rod integer 80” and “light tunnel” are different from one another. EX1004 at ¶ 151. For example, “rod integer 80” in Miyamae is prism-shaped optical member. EX1006b at [0051]. The “light tunnel” in Kurosaki ’087 has a rectangular cross section, though it may be an arbitrary shape such as a circle or an ellipse. EX1005 at 6:7-16. These differences in the specifications means they were be optically designed, modeled, and simulated using software in different ways. Additionally, their costs might vary, and the materials used would be different (such as plastics, glass, or perspex). Their sizes would also differ significantly, to the extent that one might be too large to be used in the application intended for the other. None of these factors were even acknowledged nor considered by Dr. Sasian.

157. Cost is a fundamental and immediate consideration for any optical engineer developing new systems, and should be considered in assessing the motivation to combine the teachings of Miyamae with those of Kurosaki ’087. A POSITA would readily recognize that every component in an optical system—whether it be light sources, lenses, or thermal management elements—carries its own cost implications. The choice of light source, for example, is not merely a technical decision; it directly influences the design and expense of associated components such as heat sinks and fans.

158. Moreover, the integration of two distinct optical systems usually requires additional rounds of modeling and simulation, each incurring further expense. These costs must be justified by clear, tangible benefits—otherwise, the combination is not practical from a POSITA’s perspective. The selection of compatible lenses, tailored to the specific beam characteristics and power output of the chosen light source, further compounds the overall system cost. Each design decision has cascading effects, making substitutions of light sources far from “simple.”

159. Dr. Sasian’s assertion that such substitutions are straightforward overlooks the real-world complexities and cost drivers that optical engineers must address. In practice, cost and engineering complexity are inseparable from the design process, and any integration of Miyamae and Kurosaki ’087 would be evaluated through this lens by a POSITA. The realities of system integration demand a careful assessment of both technical and economic factors—an approach that is standard in the industry and cannot be disregarded.

160. To conclude, Dr. Sasian and Petitioners failed to show that a POSITA would have been motivated to combine Miyamae and Kurosaki ’087.

XII. GROUND 4: KITANO IN VIEW OF KUROSAKI '087 (CLAIMS 8, 10, AND 12)

A. Issues Regarding Improper Claim Constructions

161. In my opinion, Dr. Sasian has not shown a likelihood of prevailing with respect to Ground 4 because Dr. Sasian's analysis of Kitano and Kurosaki '087 for claim element "[8.8] the optical member has a curvature that is set such that a light-condensing position of the excitation light is positioned on an emission side of the excitation light relative to the fluorescent material" are based on Dr. Sasian's interpretation of the claim that is not only inconsistent with the District Court's preliminary constructions but also reads out the key inventions of the '226 Patent. EX2017 at 4; EX1004 at ¶¶ 187-93.

162. Kitano utilizes both LEDs and lasers as light sources but fails to address the hotspot issues on fluorescent materials that can significantly shorten the lifespan of an optical system—a key invention of the '226 Patent. Kitano discloses lens arrangements and curvatures that create a light-condensing position being embedded on the fluorescent material that mirrors that of the *conventional art* disclosed in the '226 Patent. EX1004 at ¶¶ 187-192; EX1001 at Fig. 6. In other words, the '226 Patent was intended to improve upon precisely the type of art disclosed in Kitano. EX1004 at ¶¶ 187-92; EX1007 at Fig. 3.

163. Before my further analysis of Kitano, I note that for a POSITA in this field, phosphor (in Kitano) is used synonymously with the fluorescent material (in the '226 Patent). EX1007 at Figs. 1-4, 6-10; EX1001 at Fig 1-4, 6. Specifically, when comparing Fig. 3 of Kitano with the '226 Patent, the “phosphor 302” in Kitano corresponds to the “fluorescent material” in '226 Patent for the purposes of this claim element [8.8]. EX1007 at Fig. 3; EX1001 at Fig. 1-4, 6. Yet, a POSITA will also understand that there are many different types of the fluorescent/phosphor material (as shown through disclosures of Kitano); therefore, the “fluorescent material 7” in the '226 Patent may or may not be same type of fluorescent material as disclosed in this second embodiment of Kitano. EX1007 at [0061]-[0088].

164. I compared the *conventional art* in the '226 Patent as depicted in Fig. 6 with the disclosures of Kitano in Fig. 3 as referenced by Dr. Sasian. EX1004 at ¶ 188.

EX1004 at ¶ 188 (Dr. Sasian's Annotation of Fig. 3 in Kitano)

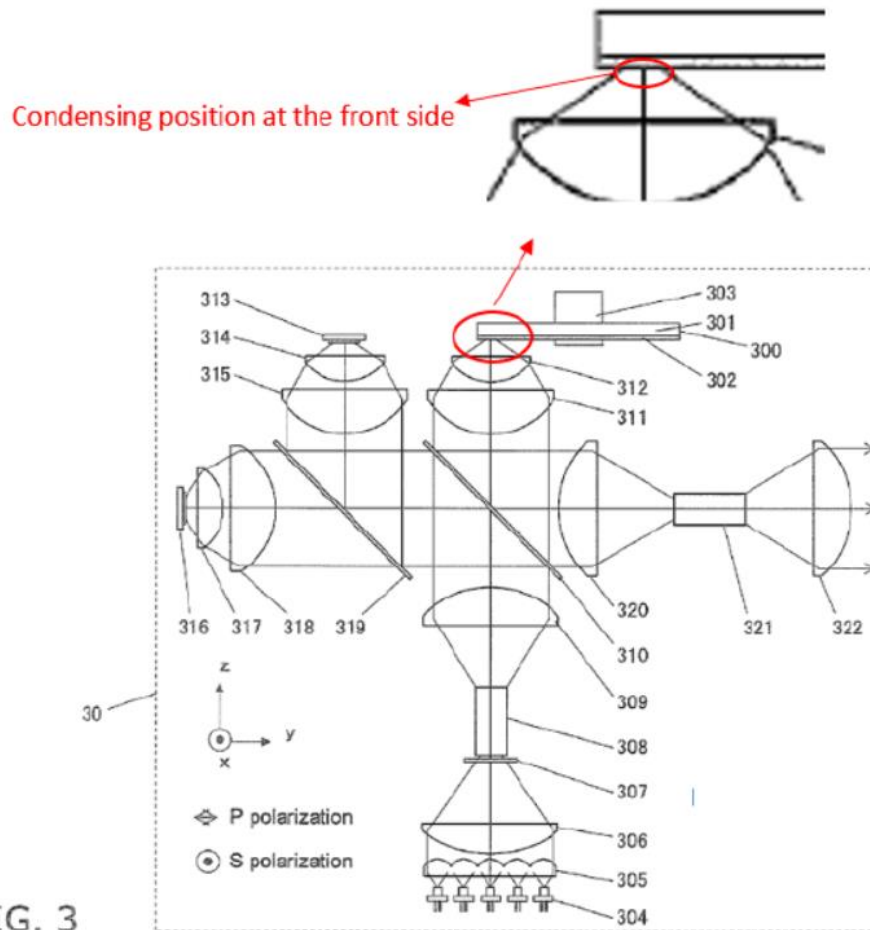


FIG. 3

EX1007, FIG. 3 (annotated)

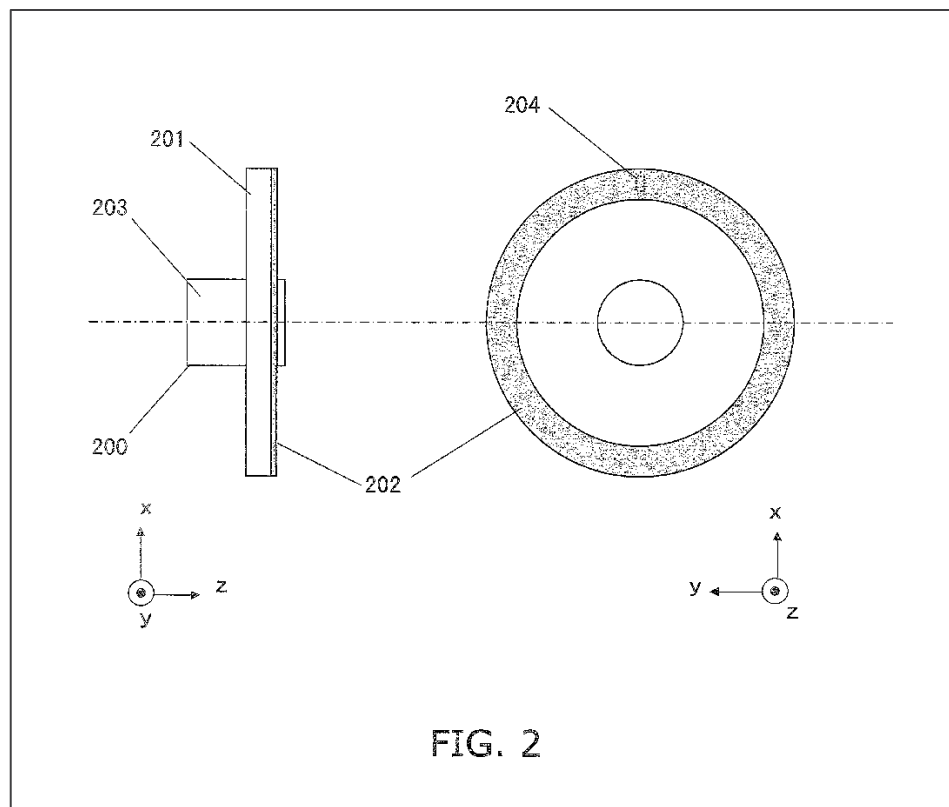
165. As shown with Dr. Sasian's annotation to Fig. 3 of Kitano, a light-condensing position is located within the "phosphor 302." EX1004 at ¶ 188. Further, Dr. Sasian's annotation indicates that this light-condensing position is on the "front side" of the fluorescent material, which is "the surface of the fluorescent material on

the side facing the excitation light source.” EX2016 at 5. This is precisely what is depicted on Fig. 6 of the ’226 Patent as the *conventional art*.

166. Dr. Sasian’s description of Kitano in ¶ 189 does not address anything specific to the “light-condensing position.” EX1004 ¶ 189. Yet, the language of Kitano as recited by Dr. Sasian further confirms that disclosures in Kitano mirrors the *conventional art* disclosed in the ’226 Patent. EX1004 ¶ 189.

167. For example, in Kitano, “FIG. 2 shows a specific configuration of the phosphor wheel...as seen in the z axis direction...The shape of a laser light irradiation *spot* 204 on the phosphor 202 is indicated by the broken line.” EX1004 ¶ 189 (citing EX1007 at [0052]) (emphasis added). “The laser light flux...is condensed or focused...and is incident on the phosphor...The *spot* of the laser light flux formed on the phosphor measures 2×1.5 mm.” EX1004 ¶ 189 (citing EX1007 at [0062]-[0070]) (emphasis added).

168. As found on *conventional art* of the ’226 Patent, the light is incident on the *spot* of the phosphor/fluorescent material. EX1004 ¶ 189. This resembles the way the light is incident on the fluorescent material as discussed in describing *conventional art* in the ’226 Patent. EX1001 at Fig. 6; 2:27-3:3.

**EX1004 at ¶ 189 (Kitano at Fig. 2)**

169. Further, Dr. Sasian and Petitioners state that “the imaginary extensions of the excitation light rays substantially meet at a point on the opposite side of the phosphor layer from the excitation light source, just as shown in Fig. 1 of the ’226 Patent.” Pet. at 67 (citing EX1004 at ¶ 192). I disagree.

170. Even if the “imaginary extensions of the excitation light rays” were to be extended, as suggested by Dr. Sasian and Petitioners, the convergence of the light (a light-condensing position) will be located on “substrate 301.” Pet. at 67; EX1004 at ¶ 192. As such, the location of “a light-condensing position” fails to reach the other side of the fluorescent material as shown in embodiments in the ’226 Patent.

EX1004 at ¶ 192; EX1001 at Figs. 1-4. Hence, the light-condensing position would not be located on the opposite side of the phosphor layer as shown in Fig. 1 of the '226 Patent. Rather, as Dr. Sasian noted in the annotated Fig. 3 of Kitano, the light-condensing position is on the front side of the fluorescent material. EX1004 at ¶ 188.

171. Accordingly, Dr. Sasian's analysis fails to show that Kitano discloses the key inventive feature in claim 8 of the '226 Patent, as Dr. Sasian relies on an inconsistent claim interpretation. Even when the correct claim interpretation is applied Kitano fails to disclose claim element [8.8] because the condensing position is located on the "front side" of the fluorescent material rather than the "emission side." Pet. at 64-67 (citing EX1004 at ¶ 188).

172. I incorporate my discussion regarding Kurosaki '087 in Section IX into my analysis of Dr. Sasian's improper application of claim constructions of the '226 Patent, which are not only inconsistent with the District Court's preliminary constructions but also read out the key invention of the '226 Patent.

173. As discussed above, both references exhibit similar deficiencies with respect to the same claim element of the '226 Patent. Even if combining these two references were appropriate, such a combination would not resolve the deficiencies of Kitano and Kurosaki '087 described above, which is problematic for claim 8. Because claims 10 and 12 depend on claim 8, this deficiency is also problematic for claims 10 and 12 at least due to their dependency on claim 8.

B. Issues Regarding Improper Combination of References

174. Ground 4 relies on the purported combination of Kitano and Kurosaki '087. It is my opinion that Petitioners and Dr. Sasian have not shown a likelihood of prevailing with respect to Ground 4 because a POSITA would not have been motivated to combine Kitano and Kurosaki '087 at the time of the invention of the '226 Patent. Pet. at 54-55; EX1004 at ¶¶ 158-64.

175. While I may develop additional opinions as to the merits of a Kitano and Kurosaki '087 combination or other Grounds presented in the Petition, for this sub-section of my declaration, I focus on a POSITA's motivation, or lack thereof, to combine Kitano and Kurosaki '087 because failure of a motivation to combine is fatal to Ground 4.

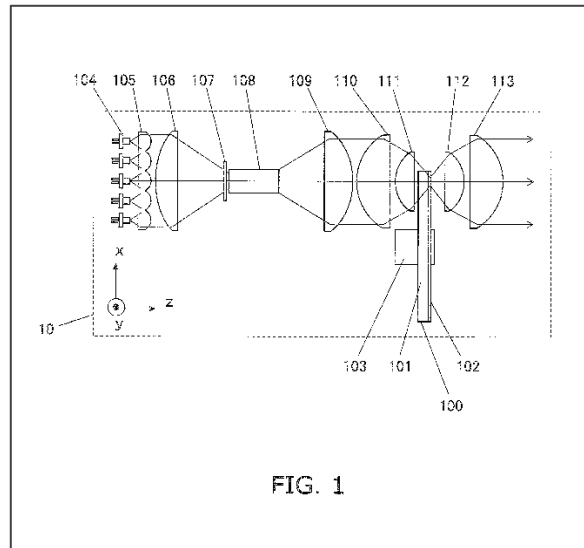
176. Dr. Sasian alleges that a POSITAs would have naturally looked to both Kitano and Kurosaki '087 in their work because they are in the "same field of endeavor." EX1004 at ¶ 161. I disagree.

177. In my opinion, Dr. Sasian fails to provide sufficient explanation as to why a POSITA would have been motivated to combine Kitano and Kurosaki '087. Combination of Kitano and Kurosaki '087, or how such combination compatible a functional image display device with higher reliability and lifetime of fluorescent material.

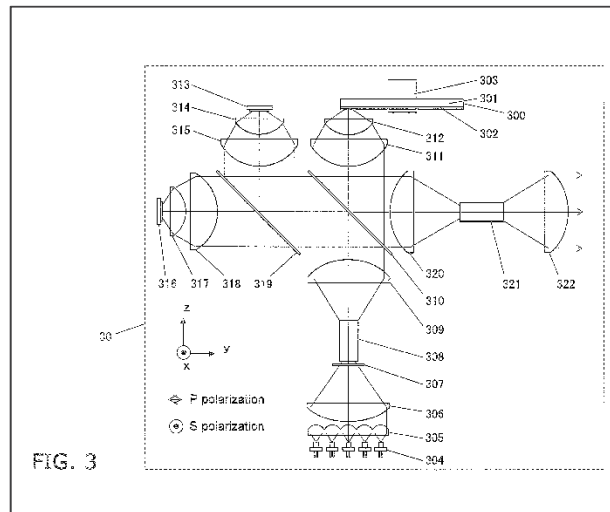
178. Dr. Sasian fails to provide the essential technical details required to demonstrate how the substitution would yield “predictable results”—specifically, how the integration of a phosphor or fluorescent wheel from Kurosaki ’087 or the integration of convex lens and concave lens from Kurosaki ’087 will work with the projectors disclosed in Kitano. EX1004 at ¶¶ 158-64.

179. Dr. Sasian’s proposal to combine Kitano with Kurosaki ’087 overlooks the critical details—not indicating which one of the embodiments in Kitano would be subject to this substitution. EX1004 at ¶¶ 158-64. For example, Kitano discloses different embodiments, each with different phosphor/fluorescent wheel and lens configurations. EX1007 at [0025] (“FIG. 1 is a diagram of the configuration of the light source device pertaining to a first embodiment”); [0027] (“FIG. 3 is a diagram of the configuration of the light source device pertaining to a second embodiment”); [0028] (“FIG. 4 is a diagram of the configuration of the light source device pertaining to a third embodiment”); [0031] (“FIG. 7 is a diagram of the configuration of the light source device pertaining to the fourth embodiment”), [0033] (“FIG. 9 is a diagram of the configuration of the light source device pertaining to a fifth embodiment”); [0034] (“FIG. 10 is a diagram of the configuration of the light source device pertaining to another embodiment”). Yet, Dr. Sasian does not address which one of the embodiments in Kitano should be used for the combination here nor why

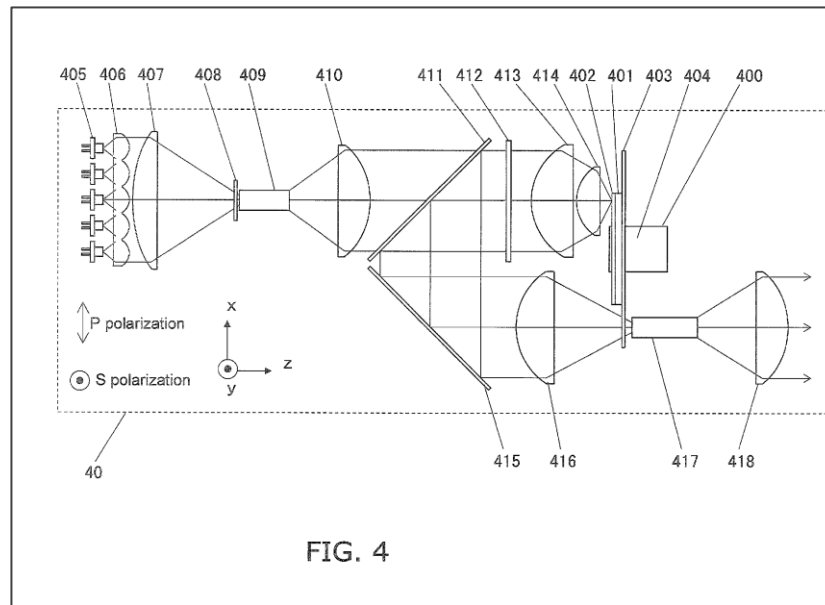
selection of the particular embodiment would be preferred over others. EX1004 at ¶¶ 158-64.



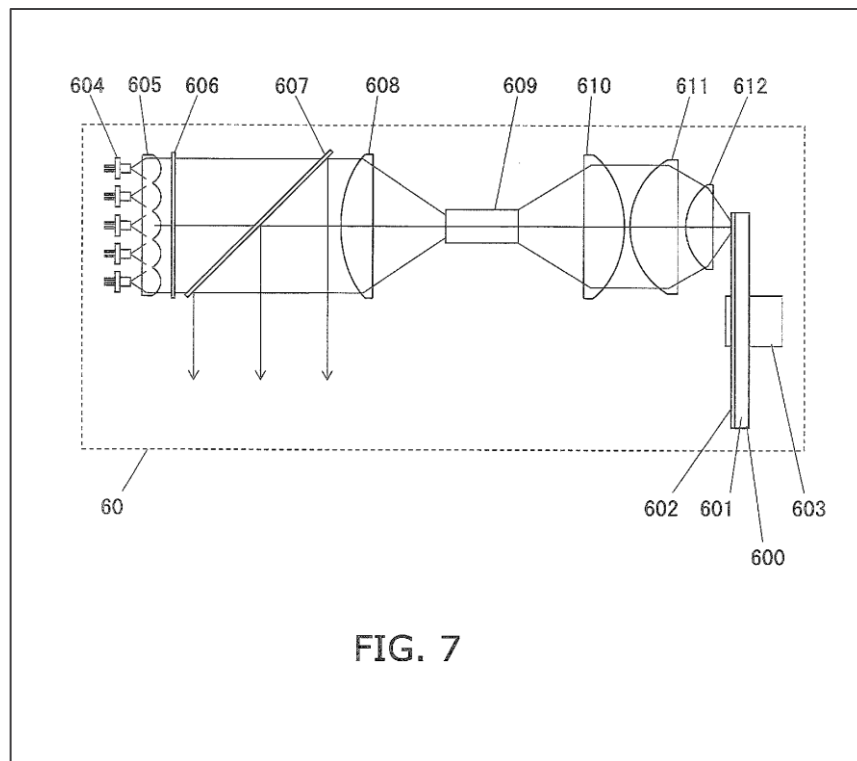
EX1007 at Fig. 1



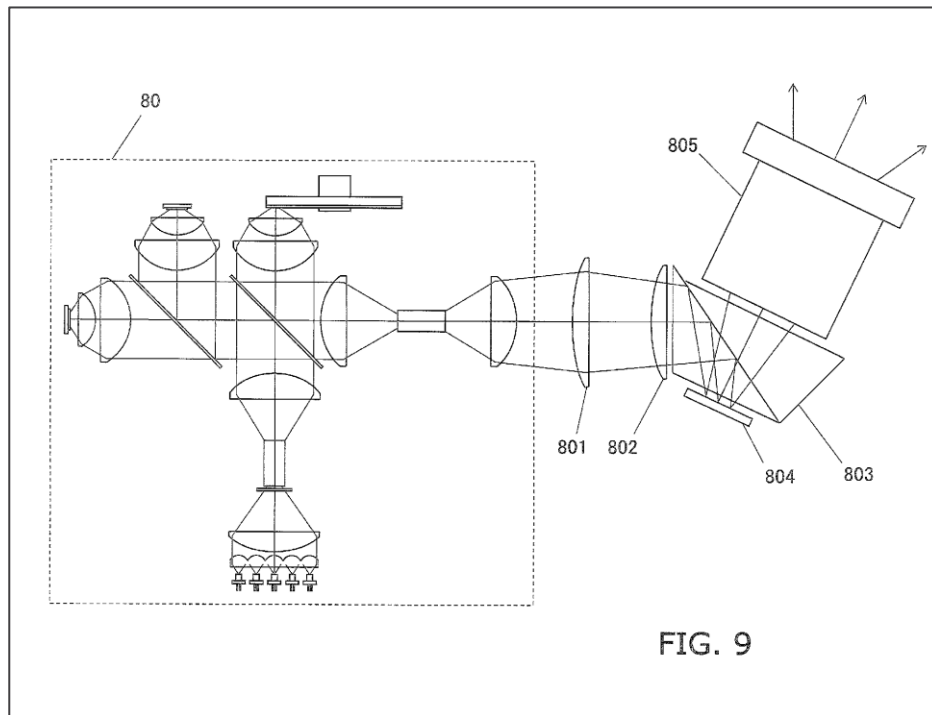
EX1007 at Fig. 3



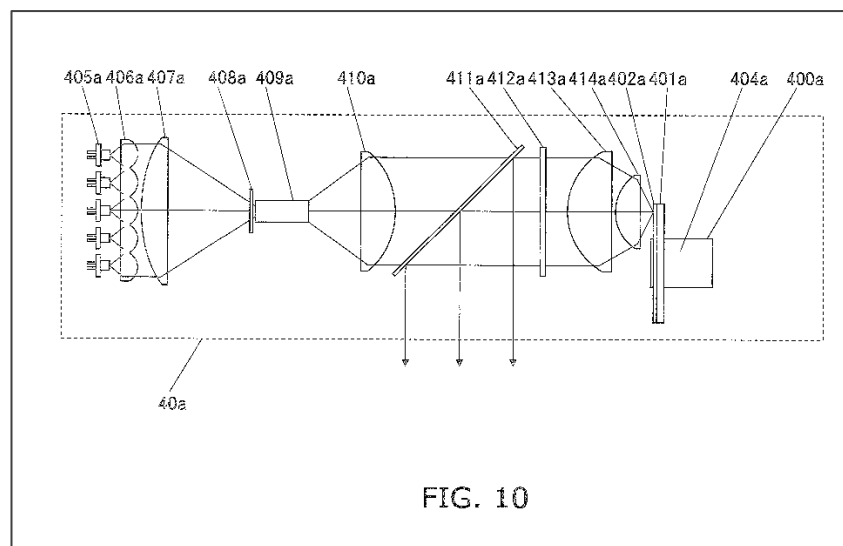
EX1007 at Fig. 4



EX1007 at Fig. 7



EX1007 at Fig. 9



EX1007 at Fig. 10

180. I disagree with Dr. Sasian that “Kurosaki [’087] describes optical subsystems, such as fluorescent-material (phosphor)-based light sources that are

compatible with system described in Kitano, and that combining Kitano and Kurosaki ['087] would have amounted to simple substitution of one known element for another to obtain predictable results.” EX1004 at ¶ 161.

181. By concluding that such substitution is “simple,” Dr. Sasian fails to provide the essential technical details required to demonstrate how such substitution of the fluorescent wheel of one with another lead to predictable results. EX1004 at ¶ 161.

182. The choice of phosphor material is also carefully selected to match the specific system, taking into account factors such as the types and arrangements of lenses and light sources in the system. EX1007 at [0055], [0096]. So, even when using the same type of phosphor or fluorescent wheel, each system is configured to function specifically with its own set of concave and convex lenses. Subsequently, this combination also fails to address how such a substitution in the phosphor wheel would extend its lifespan and improve its reliability.

183. Therefore, substituting one phosphor or fluorescent wheel from prior art with another is not a straightforward process, even if they are of the same type. Thus, a POSITA would not expect that taking a phosphor or fluorescent wheel from one projector and installing it in a different projector would result in a functional device because such a substitution would very likely lead to incompatibility and operational issues.

184. While Dr. Sasian claims that “Kurosaki [’087] describes optical subsystems, such as fluorescent-material (phosphor)-based light sources that are compatible with the system described in Kitano,” and Dr. Sasian does not articulate the practical steps or engineering considerations necessary to ensure such compatibility. EX1004 at ¶ 161.

185. Similar to the combination of Miyamae with Kurosaki ’087 in Ground 3, where no modeling or simulation was performed, such analysis is also missing here in the combination of Miyamae and Kurosaki ’087. As I explain in further detail below, such a “simple” substitution of the fluorescent material is unlikely to result in an operable projector with acceptable image quality—and may not even be structurally be feasible given the differences in the sizes of the fluorescent wheels. There are also many different types of fluorescent materials, and each one is chosen for a particular performance and specification. It would not be that obvious for a POSITA to figure out the correct fluorescent material unless there was experimental testing and evaluation (different chemical composition, and different optical system set up for wavelength engineering/organic material performance such as output power at certain wavelengths etc.). This analysis is missing in Dr. Sasian’s declaration.

186. Dr. Sasian also did not provide any cost analysis regarding this combination of Miyamae and Kurosaki ’087. Using different fluorescent materials

involves not only the use of distinct substances, but also requires different fabrication processes and, as a result, different optical arrangements. Each of these factors necessitates additional experiments and analysis. All of these steps incur extra costs that a POSITA would take into account when determining whether such a combination would be a worthwhile investment.

187. Additionally, the reliability and durability of the fluorescent material would be questionable, as such a mere substitution would not account for optimizations regarding how the light is incident on the fluorescent material, nor for the thermal control of the optical system.

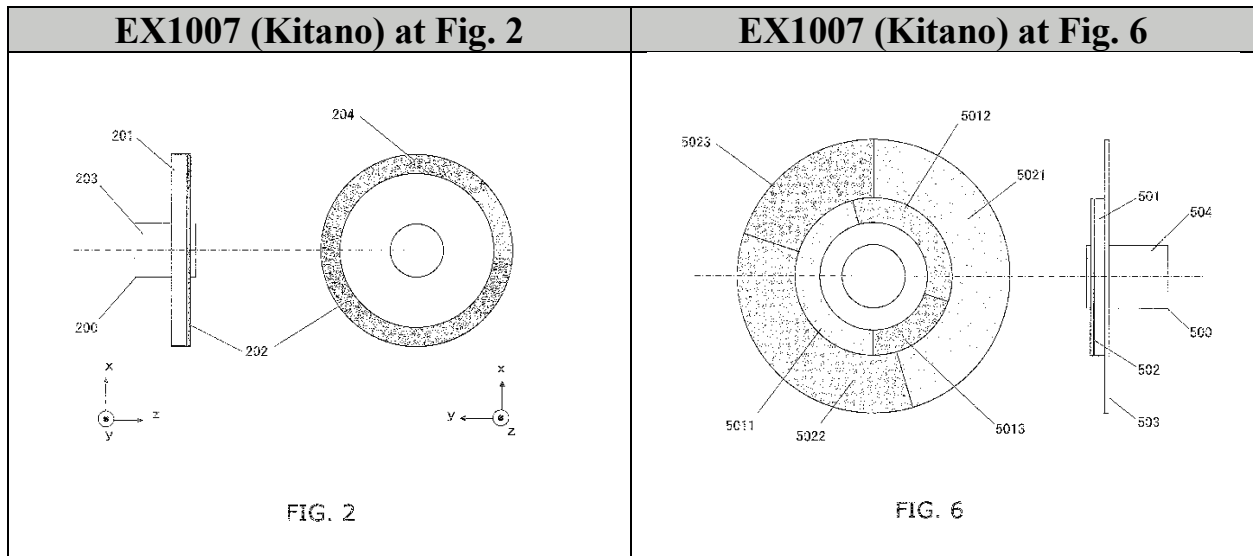
188. The process of replacing or integrating optical subsystems, such as a phosphor or fluorescent wheel, is not a “simple” task. EX1004 at ¶ 161. As detailed in Kitano, the design and operation of a light source device that utilizes a laser and phosphor involve a number of interdependent components and parameters. For example, Kitano describes the need for a first illuminance homogenizer (such as a rod integrator) and a relay optical system to ensure that the laser light is properly conditioned before it excites the phosphor, all of which are designed specifically for the phosphor wheel in the system. EX1007 at [0019], [0020]. None of these are considered in Dr. Sasian’s suggested combination of Kitano with Kurosaki ’087; none of these showed how such combination will result in an optical system of higher reliability and longer lifespan.

189. Further, there are different types of phosphor wheels that are disclosed in Kitano, yet Dr. Sasian does not explain which one of these phosphor wheels should be substituted with the one from Kurosaki '087; different phosphor wheels disclosed in Kitano include at least the following: 100 (Fig. 1), 200 (Fig. 2), 300 (Fig. 3), 400 (Fig. 4), 500 (Fig. 6), 600 (Fig. 7) 700 (Fig. 8), and 400a (Fig. 10). Phosphor wheels have a wide variety of specifications—and it is unclear from Dr. Sasian's combination whether if a copy of one phosphor wheel from one optical system will work in another.

190. For example, "FIG. 2 shows a specific configuration of the phosphor wheel 100 as seen in the z axis direction. The diameter of a substrate 201 is 60 mm. The outermost peripheral portion of the substrate 201 is coated with a phosphor 202 in a ring shape with a width of 4 mm. The shape of a laser light irradiation spot 204 on the phosphor 202 is indicated by the broken line." EX1007 at [0052]. "There are no particular restrictions on the material of the phosphor 202, such as a green phosphor. For example, besides a phosphor with a cerium-doped garnet structure, examples include $(\text{Ba},\text{Sr})_2\text{SiO}_4:\text{Eu}^{2+}$, $\text{SrSi}_2\text{O}_2\text{N}_2:\text{Eu}^{2+}$, $\text{Ba}_3\text{Si}_6\text{O}_{12}\text{N}_2:\text{Eu}^{2+}$, $\text{Sr}_3\text{Al}_3\text{Si}_{13}\text{N}_{23}:\text{Eu}^{2+}$, and $\beta\text{-SiAlON}:\text{Eu}^{2+}$ as phosphors with which green fluorescent light can be obtained with a blue laser having a wavelength of 445 nm." EX1007 at [0055].

191. As another example of a phosphor wheel, “Fig. 6 shows the specific configuration of the phosphor wheel 400. A phosphor 502 (402) is made up of three spatial segments. The three spatial segments are made up of a red phosphor layer 5011, a green phosphor layer 5012, and a phosphor uncoated face 5013. The red phosphor and the green phosphor are applied by coating a substrate 501, whose surface has been given a mirror finish. The phosphor uncoated face 5013 is a metal mirror face.” EX1007 at [0095]. “The material used for the green phosphor is the same as that in the first embodiment. In this embodiment, the red phosphor is $\text{CaAlSiN}_3\text{:Eu}^{2+}$. Examples of other phosphors that are excited by a blue laser with a wavelength of 445 nm and with which red fluorescent light can be obtained include $\text{Sr}_2\text{Si}_5\text{N}_8\text{:Eu}^{2+}$ and $\text{SrAlSi}_4\text{N}_7\text{:Eu}^{2+}$.” EX1007 at [0096].

192. The fabrication for coating phosphors varies on both the specific phosphor material and its design. These differences in fabrication directly impact the performance characteristics of the phosphor, such as efficiency, operational lifetime, and emission properties. Additionally, the excitation wavelength of the laser plays a critical role in determining the behavior of the phosphor. For instance, a change in the laser wavelength—from 445 nm to 450 nm—leads to differences in efficiency, output power, and overall performance. As a result, simply substituting one phosphor or coating process for another, without careful consideration of these variables, may not yield equivalent or optimal results in a different optical system.



193. It appears that Dr. Sasian has focused on the embodiments of Kitano with phosphor wheels that are disclosed as 200 (Fig. 2) and 300 (Fig. 3), but fails to address why a POSITA would have been motivated to combine these specific embodiments of Kitano over other phosphor wheels in other embodiments of Kitano with that of Kurosaki '087. EX1004 at ¶¶ 158-64, ¶¶ 181-85, ¶¶ 189-93.

194. In my opinion, a POSITA must be able to find a clear advantage that supersedes all of these complications for there to be sufficient motivation to substitute a phosphor or fluorescent wheel with a different one from a different system. Yet, Dr. Sasian does not provide any advantage of substituting the phosphor or fluorescent wheel of Kitano with that of Kurosaki '087.

195. Accordingly, Dr. Sasian has not established a motivation to combine Kitano with Kurosaki '087, especially with respect to substituting the phosphor/fluorescent wheel.

196. Dr. Sasian argues that “a POSITA would have recognized that substituting certain components by those disclosed in Kurosaki [’087] offer certain advantages” such as the “combination of convex lens 78 and concave lens 76.” EX1004 at ¶ 162. However, Dr. Sasian does not identify which “certain components” of Kitano should be combined with these specific combination of lenses from Kurosaki ’087, nor does Dr. Sasian clarify how such a combination would be implemented within Kitano’s system. EX1004 at ¶¶ 158-64, 193.

197. The purported “certain advantages” from “arrangements of lenses, 78 and 76,” in Kurosaki ’087 that “permit[] adjusting the width of the light source to the width of the lenses downstream, and also allows the control of light collimation.” do not provide a sufficient reason for a POSITA to be motivated to substitute Kitano’s lens system with the concave and convex lenses of Kurosaki ’087. EX1004 at ¶ 163. In fact, Kitano already discloses its own arrangement of convex and concave lenses, specifically designed for its system and tailored to the requirements of its optical path, including the light sources, phosphor wheel, and dichroic mirrors. EX1007 at Figs. 1, 3, 4, 7, 9, 10. More specifically, “the laser light source 104” in Kitano is “collimated by a collimator lens array 105. A single laser diode is disposed for each lens cell of the collimator lens array 105.” EX1007 at [0040]. These laser beams form “a substantially parallel light flux.” EX1007 at [0041].

198. Thus, the advantages Dr. Sasian attributes to Kurosaki '087 are already present in Kitano. Dr. Sasian's motivation to combine the lens systems of Kurosaki '087 with those of Kitano because Kurosaki's embodiments that allows for "a relatively small projector" would not have been a good enough reason to combine with Kitano that intended to provide "a bright, highly efficient light source device" with a solid-state light source. EX1004 at ¶ 162 (citing EX1006 at 14:8-20); EX1007 at [0023].

199. A POSITA would also recognize that altering Kitano's optical system by substituting lenses as proposed by Dr. Sasian would inevitably alter the light paths, necessitating comprehensive re-analysis, modeling, and simulation to ensure the system remains operable and capable of projecting acceptable-quality images. Any adjustment in the widths or collimation of the light would require a redesign of the entire system, including reconfiguration of the light paths and reassessment of heat dissipation to prevent overheating and maintain system reliability. Accordingly, substitution of lenses that will inevitably alter the light paths will need further analysis such as modeling and simulation to account for those changes—accounting for such details of the new light paths. None of these technical aspects were considered by Dr. Sasian.

200. Accordingly, Dr. Sasian has not established a motivation to combine Kitano with Kurosaki '087, especially with respect to substituting the convex and concave lenses.

201. To conclude, Dr. Sasian and Petitioners failed to show that a POSITA would have been motivated to combine Kitano and Kurosaki '087.

XIII. CONCLUSION

202. In addition to the opinions and evidence expressed herein, I reserve the right to rebut any arguments made or evidence presented in response to this report. I also reserve the right to supplement this report based on further investigation or analysis.