

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LUXOTTICA OF AMERICA INC.,

Petitioners

v.

E-VISION OPTICS, LLC

Patent Owner

Case No. IPR2024-01030

Patent No. 8,708,483

**DECLARATION OF PROFESSOR JAMES H. OLIVER, Ph.D.
IN SUPPORT OF PATENT OWNER'S RESPONSE**

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EXHIBIT LIST

Exhibit	Description
2001	<i>eVision Optics, LLC and Vision Smart Optics, Inc. v. Luxottica Group S.P.A. and Luxottica of America Inc.</i> , Case No. 8:23-cv-02013 AB (SHK) Order Denying Defendants’ Motion to Stay, Dkt. 75 (Aug. 21, 2024 C.D. Cal.)
2002	<i>eVision Optics, LLC and Vision Smart Optics, Inc. v. Luxottica Group S.P.A. and Luxottica of America Inc.</i> , Case No. 8:23-cv-02013 AB (SHK) Order Re Civil Jury/Court Trial, Dkt. 54 (April 4, 2024 C.D. Cal.)
2003	<i>eVision Optics, LLC and Vision Smart Optics, Inc. v. Luxottica Group S.P.A. and Luxottica of America Inc.</i> , Case No. 8:23-cv-02013 AB (SHK) Order Scheduling Additional Dates and Correcting Scheduling Order, Dkt. 58 (April 18, 2024 C.D. Cal.)
2004	<i>eVision Optics, LLC and Vision Smart Optics, Inc. v. Lenovo Group, Ltd., et al.</i> , Case No. 8:23-cv-01860 AB (SHK) Defendants’ Preliminary Invalidity Contentions (July 19, 2024 C.D. Cal.) (excerpted)
2005	<i>eVision Optics, LLC and Vision Smart Optics, Inc. v. Luxottica Group S.P.A. and Luxottica of America Inc.</i> , Case No. 8:23-cv-02013 AB (SHK) Defendants’ Invalidity Contentions (July 12, 2024 C.D. Cal.)
2006	<i>eVision Optics, LLC and e-Vision Smart Optics, Inc. v. Lenovo Group, Ltd. et al.</i> , Case No. 8:23-cv-01860-AB-SHK, Order re Civil Jury/Court Trial, Dkt. 54 (April 3, 2024 C.D. Cal.)
2007	Lex Machina – Federal Court – Federal District Court Cases in C.D. Cal, Pending Between 2019-09-01 and 2024-09-19
2008	Vacancies in the Federal Judiciary 118th Congress, last updated on 9/23/2024, https://www.uscourts.gov/judges-judgeships/judicial-vacancies/current-judicial-vacancies
2009	<i>eVision Optics, LLC and Vision Smart Optics, Inc. v. Luxottica Group S.P.A. and Luxottica of America Inc.</i> , Case No. 8:23-cv-02013 AB (SHK) Order Scheduling Additional Dates and Correcting Scheduling Order, Dkt. 58 (April 18, 2024 C.D. Cal.)

Exhibit	Description
2010	<i>eVision Optics, LLC and e-Vision Smart Optics, Inc. v. Lenovo Group, Ltd. et al.</i> , Case No. 8:23-cv-01860-AB-SHK, Order Granting Joint Stipulation to Schedule Additional Dates, Dkt. 56 (April 18, 2024 C.D. Cal.)
2011	U.S. Patent Application Pub. No. 2006/0023158 A1, Eyeglasses With Electrical Components, Thomas A. Howell et al., dated Feb. 2, 2006 (“Howell-158”)
2012	U.S. Patent Application Pub. No. 2005/0264752 A1, Eyewear Supporting After-Market Electrical Components, Thomas A. Howell et al., dated Dec. 1, 2005 (“Howell-752”)
2013	U.S. Patent No. 6,491,394, Method For Refracting and Dispensing Electro-Active Spectacles, Ronald D. Blum et al., dated Dec. 10, 2002 (“Blum-394”)
2014	U.S. Patent Application Pub. No. 2005/0140924 A1, Electro-Active Multi-Focal Spectacle Lens, Ronald D. Blum et al., dated June 30, 2005 (“Blum-924”)
2015	<i>eVision Optics, LLC and Vision Smart Optics, Inc. v. Luxottica Group S.P.A. and Luxottica of America Inc.</i> , Case No. 8:23-cv-02013 AB (SHK) (IN CHAMBERS) Order Continuing Claim Construction Hearing, Dkt. 97 (Oct. 7, 2024 C.D. Cal.)
2016	<i>eVision Optics, LLC and e-Vision Smart Optics, Inc. v. Lenovo Group, Ltd. et al.</i> , Case No. 8:23-cv-01860-AB-SHK, (IN CHAMBERS) Order Continuing Claim Construction Hearing, Dkt. 74 (Oct. 7, 2024 C.D. Cal.)
2017	U.S. Patent No. 7,030,411, Electronic Unit Integrated Into A Flexible Polymer Body, Peter A. Krulevitch et al. dated Apr. 18, 2006 (“Krulevitch”)
2018	<i>eVision Optics, LLC and Vision Smart Optics, Inc. v. Lenovo Group, Ltd., et al.</i> , Case No. 8:23-cv-01860 AB (SHK), Dkt. 78, Order dated Dec. 4, 2024
2019	Declaration of Professor James H. Oliver, Ph.D
2020	<i>Curriculum Vitae</i> of Professor James H. Oliver, Ph.D.
2021	Point-to-point construction, Wiki page available online at: https://en.wikipedia.org/wiki/Point-to-point_construction

Exhibit	Description
2022	Air tightness vs water tightness, Physics Forum webpage available online at: https://www.physicsforums.com/threads/air-tightness-vs-water-tighness.142407/#post-1161525
2023	Exclusive Media Event Marks Debut of OAKLEY THUMP, available online at: https://www.globenewswire.com/news-release/2004/11/15/318738/2175/en/Exclusive-Media-Event-Marks-Debut-of-OAKLEY-THUMP.html
2024	Oakley Thump, available online at: https://museumoffailure.com/exhibition/oakley-thump
2025	Oakley Thump review: Oakley Thump, available online at: https://www.cnet.com/reviews/oakley-thump-review/

I, Professor James H. Oliver, Ph.D., declare as follows:

1. I have been engaged by King & Spalding LLP on behalf of eVision Optics, LLC (“Patent Owner”), to provide this Declaration concerning the technical subject matter relevant to Petitioner Luxottica’s petition for Inter Partes Review (“Petition”) of U.S. Patent 8,708,483 (“the ’483 patent”).

2. I am over 18 years of age. I have personal knowledge of the facts stated in this Declaration and could testify competently to them if asked to do so.

3. I have reviewed and am familiar with the specification and the claims of the ’483 patent. In general, I will cite to the specification of a United States patent using the following formats: (Exhibit No. Col.:Line Number(s)) or (Exhibit No. Paragraph Number(s)). For example, the citation (EX-1001, 1:1–10) points to the ’483 patent specification at column 1, lines 1–10. Also, for convenience, I use italics to denote limitations from the challenged claims.

4. All the opinions in this Declaration are based on the documents I reviewed and my knowledge and professional judgment. In forming the opinions expressed in this Declaration, I reviewed the Petition for *Inter Partes* Review of U.S. Patent No. 8,708,483 and supporting exhibits.

5. I have been asked to provide my technical opinions regarding how a person of ordinary skill in the art would have understood the claims of the ’483 patent at the time of the alleged invention. I have also been asked to provide my

technical opinions on how concepts in the '483 patent specification relate to claim limitations of the '483 patent. In reaching the opinions provided herein, I have considered the '483 patent, its prosecution history, and the references cited above and have drawn as appropriate on my own education, training, research, knowledge, and personal and professional experience.

6. I am being compensated at my standard rate of \$500 per hour for my time, plus reasonable out-of-pocket expenses. I have received no additional compensation for my work in this litigation, and my compensation does not depend upon the contents of this report, any testimony that I may provide, or the ultimate outcome of this litigation.

I. QUALIFICATIONS

7. In formulating my opinions, I have relied on my knowledge, training, and experience in the relevant field, which I will summarize briefly. A more detailed summary of my background, experience, and publications is set forth in my curriculum vitae (CV), which is submitted as Exhibit 2020.

8. I currently hold the rank of University Professor and serve as the Pithan Director of Innovation at Iowa State University. For more than forty years, I have studied, worked in, and taught mechanical engineering, computer graphics, software development, and human-computer interaction, as well as virtual and augmented reality.

9. I received a Bachelor of Science in Mechanical Engineering degree from Union College in Schenectady, New York in 1979. My earliest engineering experience exposed me to advanced analysis of dynamic mechanical systems. While working at Mechanical Technology Inc., I conducted computational analyses of operating rotor-bearing systems, including critical speed, unbalanced response, and stability in both torsional and lateral machine dynamics. This experience led to a graduate fellowship at Michigan State University in East Lansing, Michigan, where my Master's thesis focused on harmonizing computational modal analysis (i.e., vibrational characteristics) of mechanical systems with equivalent experimental results. In 1981, I received a Master of Science degree in Mechanical Engineering from Michigan State University. In 1986, I received a Ph.D. in Mechanical Engineering, also from Michigan State University.

10. I have taught at different universities as a professor in Mechanical Engineering, Electrical and Computer Engineering, and Aerospace Engineering. Starting in August 1988 until August 1991, I was an Assistant Professor in the Department of Mechanical and Aerospace Engineering at the State University of New York at Buffalo, New York. I have also held various professor positions at Iowa State University, including Assistant Professor in the Department of Mechanical Engineering starting in August 1991, before becoming an Associate Professor in April 1993. I held that position until July 2000, and eventually returned to the same

position in September of 2001, before being promoted to the rank of Professor in April 2004. In August 2012, I became a University Professor, an honorary title acknowledging lasting impact on the entire university. In addition to teaching as part of the Department of Mechanical Engineering at Iowa State University, I have received courtesy appointments to the Department of Aerospace Engineering since March 2005; the Department of Electrical and Computer Engineering since June 2005; and the Department of Industrial and Manufacturing Systems Engineering since May 2007—appointments which I still hold. From May 2010 to July 2011, I was a Visiting Professor at Image Institute in the Ecole Nationale Supérieure d'Arts et Métiers, ParisTech in Chalon-sur-Saône, France.

11. Over my career, I have taught numerous other university courses, including “Mechanical Systems Design,” “Virtual Environments, Virtual Worlds and Applications”; Computer Graphics and Geometric Modeling; “Computer-Aided Design Applications;” and “Computer-Integrated Manufacturing.” For example, I co-developed the content for the introductory design course, ME 270 Introduction to Mechanical Engineering Design. Referred to as our “cornerstone” design course, ME 270 is intended to provide students with context for the in-depth analysis-intensive courses they encounter later in our curriculum. It provides a broad introduction to contemporary mechanical design practice, while incorporating technical modeling and analysis techniques drawn from the basic physics and

calculus courses that students have completed to that point in their overall curriculum. Specific course topics include market evaluation, customer requirements, ideation, conceptual design, mathematical modeling and analysis, business case development, detail design, prototype fabrication, prototype testing, resolving analysis predictions with test results, cost analysis, and final product proposal. At the senior undergraduate level, I teach ME 415 Mechanical Systems Design. This course is referred to as our “capstone” design course because it draws from all of the student’s experience gained through the core curriculum to provide an integrative, culminating, and in-depth product design experience. Design challenges for this course are typically solicited from regional industry partners. Students often work in close collaboration with industry colleagues on design problems with actual market impact. Many of the projects focus on electro-mechanical systems.

12. In addition to teaching at Iowa State University, I have also been involved in the University’s research and development efforts. I have served as an Associate Director from April 1993 to July 1997 at the Iowa Center for Emerging Manufacturing Technology (later renamed as the Virtual Reality Applications Center), where I assisted in building a world-renowned research center for applied virtual reality. In fall 2003 I was named director of the Virtual Reality Applications Center and fostered its continued growth until July 2019. Under my leadership the

Virtual Reality Applications Center's ongoing contract research has increased from \$9M to \$20M, and faculty involvement has broadened to encompass colleagues from all Iowa State University colleges. From 2005 to 2007, I led fundraising, technical specification, bid process, and vendor management for a \$5M upgrade of our flagship device, the C6—now the world's highest resolution immersive VR facility—and in 2008 led an \$800K upgrade of Lee Liu Auditorium in Howe Hall, making it the world's highest resolution stereoscopic immersive theater.

13. I have also had extensive experience in the software industry, including as Director, Senior Director, and Vice President of Product Development for various companies. From April 1987 to August 1988, I was a Software Research Engineer at International TechneGroup, Inc., where I conducted software research and development and provided engineering consulting. From 1997-2001, I took a leave from my university position to work in the software industry. I joined Engineering Animation Inc. to lead their core technology team, focused on CAD-independent, large model visualization to facilitate virtual product prototyping. In 1999, I conceptualized, planned, and led development of e-Vis, the first commercial software product to combine high-performance product visualization with secure Internet-based collaboration capabilities to empower distributed product development and supply chain integration. After several corporate acquisitions,

these technologies are now referred to as TeamCenter Visualization, part of the Siemens PLM Software tool suite, and are used by manufacturers around the world.

14. In 2007, I co-founded BodyViz, a high technology startup focused on low cost, easy-to-use medical visualization with sales in the medical, education, veterinary, and legal markets. BodyViz delivers access to real human anatomy by creating easy to use, interactive 3D MRI and CT scan experiences. BodyViz won the Prometheus Award for “Start up Company of the Year” from the Technology Association of Iowa in 2008, and also won first place in the John Pappajohn Iowa Business Plan Competition in 2009.

15. I have received financial support for my research programs from several federal sources, including the National Science Foundation, NASA, and the research branches of the Navy, Air Force, and Army. Industry sponsors of my research include John Deere, Rockwell Collins, and Boeing. I have received numerous professional honors and awards, including the Gustus L. Larson Memorial Award from the American Society of Mechanical Engineering, recognizing early career achievement, and the National Science Foundation’s prestigious Young Investigator Award. I served six years as Associate Editor of the ASME Transactions, Journal of Computing and Information Science in Engineering. I am a Fellow of the American Society of Mechanical Engineering. I have been a member of the Institute of Electrical and Electronics Engineers since 1983, and the

Association for Computing Machinery since 2010. I was also elected Fellow of the American Society of Mechanical Engineers in 2006. I hold four US patents on innovations in mechanical design and manufacturing as well as virtual reality.

II. UNDERSTANDING OF RELEVANT LEGAL PRINCIPLES

16. I am not a lawyer, and I will not provide any legal opinions. Although I am not a lawyer, I have been advised that technical experts apply certain legal standards when they form opinions about the meaning and validity of patent claims.

17. I understand the claims, not a patent's disclosure, define the scope of the patented inventions. I further understand 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.

18. I also understand certain claims are "comprising" claims. I am informed that this means that the claim encompasses all the elements listed, but that other additional, unnamed elements may also be present.

19. I understand that a patent claim is invalid if it is anticipated or obvious in view of the prior art, and that a claim can be unpatentable even if all of the requirements of the claim cannot be found in a single prior-art reference. I further understand that invalidity of a claim requires that the claim be anticipated or obvious

from the perspective of a person of ordinary skill in the art at the time the invention was made.

20. I have been informed that a patent claim is invalid if it would have been obvious to a person of ordinary skill in the art. In analyzing the obviousness of a claim, I understand the following factors may be taken into account: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims; (3) the level of ordinary skill in the art; and (4) any so called “secondary considerations” of nonobviousness if they are present.

21. I have been informed that a claim can be obvious in light of a single prior art reference or multiple prior art references. 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, singly 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 why a person of ordinary skill in the art would have combined the references, and how they would have done so, to create the inventions claimed in the patent. I further understand that exemplary rationales that may support a conclusion of obviousness include:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of a known element for another to obtain predictable results;
- Use of known technique(s) to improve similar devices (methods or products) in the same way;
- Applying a known technique to a known device (method or product) ready for improvement to yield predictable results;
- Choosing from a finite number of identified, predictable solutions with a reasonable expectation of success, which I am informed is the “obvious to try” standard;
- Known work in one field of endeavor may prompt variations of the work for use in either the same field or a different field based on design incentives or other market forces if the variations are predicable to a person of ordinary skill in the art; and
- Some teaching, suggestion, or motivation in the prior art that would have led a person of ordinary skill in the art to modify the prior art reference or to combine the prior art reference teachings to arrive at the claimed invention.

22. I have been informed that, in considering obviousness, hindsight reasoning derived from the patent at issue may not be used.

III. STATE OF THE PRIOR ART

23. At the time of the '483 patent, the trend of “utilizing electronics in eyewear” appeared to be accelerating, and “the applications being developed by others are expanding.” (EX-1001, '483 patent at 2:5-7.) Examples of electronics that were being incorporated into eyewear included MP3 players, electro-active lenses, and electronic displays. (EX-1001, '483 patent at 1:56-2:5.)

24. As an example, at the time of the '483 patent, Oakley had commercialized electronic eyewear named Oakley Thump, which incorporated a MP3 player into the temple of the eyewear. (EX-1001, '483 patent at 1:57-60.) According to public information, Oakley launched Oakley Thump in November 2004. (EX-2023, Global News Wire, at 1.) A photo of Oakley Thump is reproduced below. (EX-2024, Museum of Failure, at 1.)



25. Customer reviews of Oakley Thump verified the challenges the industry was facing. For example, one review pointed out the “decidedly plastic feel” of Oakley Thump, revealing the limitation on materials that can be used in the frame.

(EX-2025, at 3.) Another review went directly to the aesthetic of the eyewear by calling them “hideously ugly.” (EX-2024, Museum of Failure, at 1.)¹

26. Indeed, the challenge was to “not limit the fashion design of the eyeglass frame or limit the materials which the eyeglass frame can be made of.” (EX-1001, ’483 patent at 2:10-17.) In other words, it was desirable to incorporate electronics into eyewear while maintain the flexibility to use different materials for the frame and implement different industrial designs.

27. It was also challenging to “maintain as few completed eyeglass frames or eyeglass frame components (frame fronts, bridges, temples) stock keeping units (SKUs) as possible, allow for robust placement of the electronics, and in a way that can be manufactured so that it remains affordable, and aesthetically desirable.” (EX-1001, ’483 patent at 2:10-17.)

28. Accordingly, there was a long-felt need for “enabling electronic frames” while at the same time “minimizing the number of frame part SKUs ... and maintaining the aesthetics of the frame.” (EX-1001, ’483 patent at 2:23-26.)

¹ <https://museumoffailure.com/exhibition/oakley-thump>.

IV. THE '483 PATENT

A. Summary Of The '483 Patent

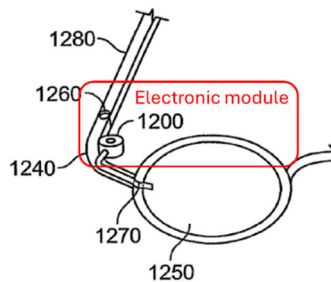
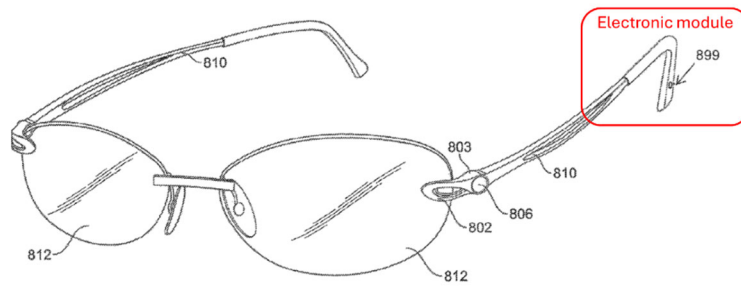
29. The '483 patent “generally relates to integrating electronic components into an electronic eyeglass frame.” (EX-1001, '483 patent at 1:31-40.) The electronic components can be configured for driving electronic applications, such as electroactive lenses and electronic display. *Id.*

30. At the time of the '483 patent, the trend of incorporating electronics into spectacle eyewear started accelerating. (EX-1001, '483 patent at 1:56-2:7.) But as introduced above, the industry faced serious challenges “to incorporate electronics into eyewear without harming the aesthetics and functionality of the eyewear.” (EX-1001, '483 patent at 2:8-10.) More specifically, incorporating electronics into eyewear would “limit the fashion design of the eyeglass frame or limit the materials which the eyeglass frame can be made of.” (EX-1001, '483 patent at 2:10-17.) Take Oakley Thump as an example (*see* photo above in Section III): the thick temple housing the electronics “distract[ed] from the aesthetic appearance of the eyeglass frames.” (EX-1001, '483 patent at 1:57-64.) In addition, incorporating electronics into eyewear would also require that manufacturers maintain a large number of stock keeping units (SKUs) of “completed eyeglass frames or eyeglass frame components (frame fronts, bridges, temples),” thereby increasing the complexity and cost of manufacturing. (EX-1001, '483 patent at 1:57-64.) Further

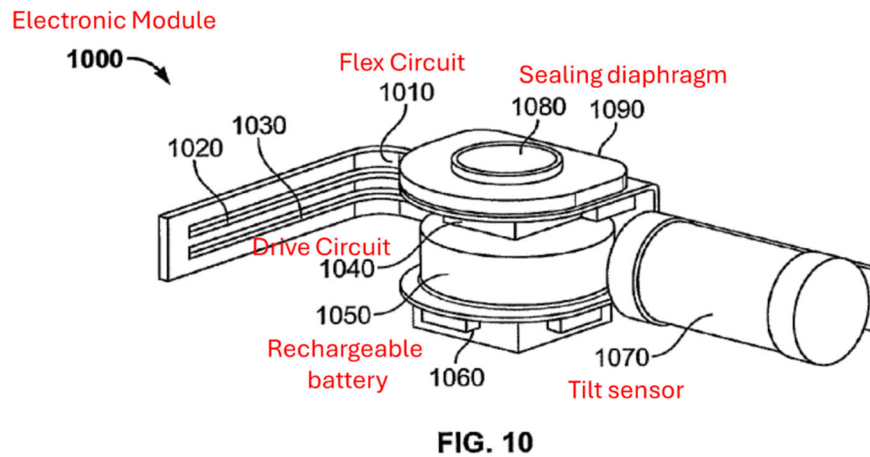
challenge for incorporating electronics into eyewear was to “allow for robust placement of the electronics, and in a way that can be manufactured so that it remains affordable, and aesthetically desirable.” (EX-1001, ’483 patent at 2:8-17.)

31. Inventors of the ’483 patent developed various embodiments of inventive electronic eyewear frames to address the above challenges. These embodiments leverage integrated modular design, balanced location distribution, and flexible wiring. Figure 8B of the ’483 (annotated and reproduced below) patent illustrate an example of the inventive electronic eyewear frame, in which an electronic module is 899 disposed within a temple 810 and behind the ear of the wearer. (EX-1001, ’483 patent at 8:42-54.)

32. The electronic module 899 can enable functions of electroactive lenses 812 in the eyewear. *Id.* For example, the electronic module can contain various electronic components that enable electronic functions of the eyewear, such as a power source, drive circuit, sensing mechanism (e.g., tilt sensor), an antenna, a receiver, a transmitter, a transceiver, a rangefinder, a micro-processor, and a controller. (Ex-1001, ’483 patent at 5:54-63.) Alternatively, the electronic module can also be placed before the ear of the wearer (e.g., near the hinge of the frame), as illustrated in Figure 12C of the ’483 patent (annotated and reproduced below).



33. Figure 10 of the '483 patent (annotated and reproduced below) illustrates more details of the electronic module. The electronic module, labeled as 1000, includes a drive circuit 1040 placed above a rechargeable battery 1050, a tilt sensor 1070, and a manual switch 1080 attached to the top of the electronic module and integrated with a sealing diaphragm 1090. (Ex-1001, '483 patent at 9:8-25.) The electronic module 1000 further includes a flex circuit 1010 configured to connect the electronic module 1000 with external devices, such as electroactive lenses. (*Id.*)



34. In the electronic module 1000, a charging coil 1060 is employed to inductively charge the rechargeable battery 1050. (*Id.*) The electronic module 1000 can be hermetically sealed while still allowing the battery to be recharged without breaking the seal. (*Id.*) The electronic components as mentioned above can be contained within a housing, which is substantially wear resistant, moisture resistant, and is preferably hermetically sealed. (Ex-1001, '483 patent at 10:40-59.)

35. Because embodiments described above use a rugged housing (e.g., wear resistant and hermetically sealed) to house highly integrated electronics and the flex circuit to connect the module with external devices, the inventive electronic eyewear frames “enabl[e] electronic frames and electro-active lenses ... while minimizing the number of frame part SKUs [] and maintaining the aesthetics of the frame.” (EX-1001, '483 patent at 2:18-26.)

36. These inventive embodiments also “allow[] for a mostly universal electronics module or modules that can be applied to most eyeglass frames,” thereby

saving cost by decreasing SKUs of frames or frame components. (EX-1001, '483 patent at 1:40-49.) In addition, “conductive wiring of the temples and the frame front is minimized, cosmetics and form factor of the eyeglass frame is maintained, and complicating issues of connecting electrical current thru the bridge or hinge of the eyeglass frame are mitigated.” (EX-1001, '483 patent at 1:40-49.)

B. Claim Construction

37. Petitioner does not construe any claim terms in its Petition and “accorded all claim terms their plain and ordinary meaning.” (Petition at 9.) For the purpose of my analysis, I also use plain and ordinary meaning unless otherwise specified.

C. Level Of Ordinary Skill In The Art

38. I understand that certain issues relating to the validity of the '483 patent must be judged from the perspective of a person of ordinary skill in the relevant art, as I discuss below. I have been asked to define the level of a “person having ordinary skill in the art” or “POSITA” that someone would have had at the time the alleged invention as claimed was made. In deciding the level of ordinary skill, I have considered the following factors, which I have been informed are relevant in determining the level of ordinary skill in the art:

- The levels of education and experience of persons working in the field;
- The types of problems encountered in the art;

- The prior art solutions to these problems;
- The rapidity with which innovations are made; and
- The sophistication of the technology.

39. A POSITA at the time of the invention of the '483 patent would have had a bachelor's degree in mechanical engineering, electrical engineering, or computer engineering, or an equivalent degree and, in addition, approximately two years of work experience in mechanical, electrical, and industrial design, such as with embedded electronic devices. More advanced degrees or training in a related discipline or both can compensate for shorter work experience.

40. I understand that Petitioner has defined the level of ordinary skill in the art as:

Based on the relevant factors, In *re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995), a hypothetical person of ordinary skill in the art ("POSITA") would have had at least a bachelor's degree in mechanical or manufacturing engineering; mechatronics; electrical engineering plus coursework in mechanical engineering, manufacturing engineering, or mechatronics; or a similar technical degree, and at least 2 years of experience designing consumer electronics, such as eyewear with electronics. Ex.1002 ¶¶23-25. Work experience could substitute for formal education and additional formal education could substitute for work experience. *Id.*

(Petition at 8.)

41. My opinions as expressed in this Declaration would be the same when viewed under either party's definition of the level of ordinary skill in the art. The minor variations between them are immaterial.

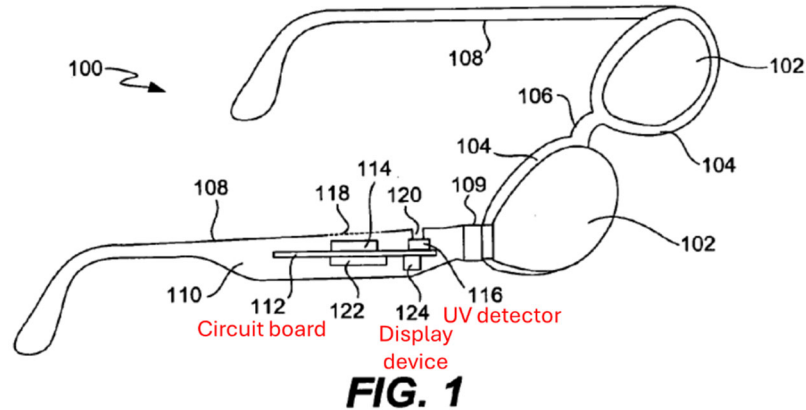
42. Based on either standard, I was at least a person of ordinary skill in the art at the time of the invention of the '483 patent.

V. OVERVIEW OF PRIOR ART

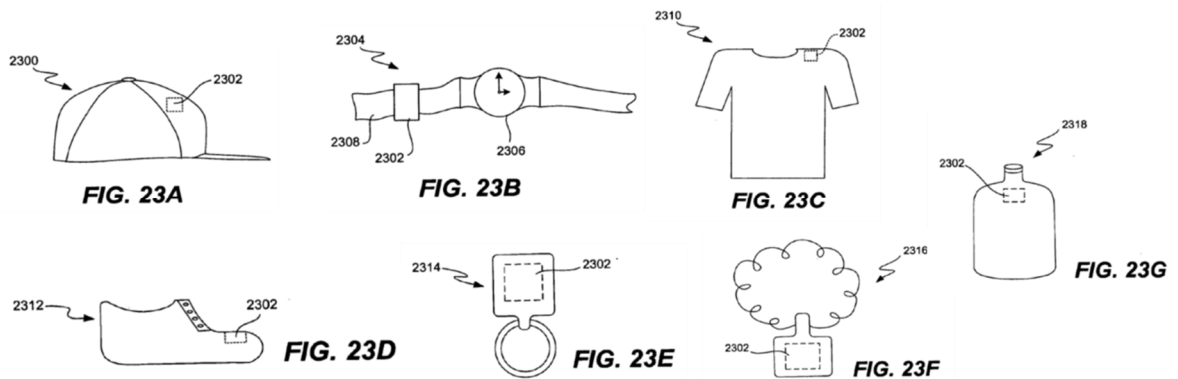
A. Overview Of Howell-596

43. Howell-596 concerns radiation detection and, more specifically, ultra-violet (UV) detection. (Ex-1003, Howell-596 at [0003]-[0005].) In view of the "need for improved approaches to measure and inform persons of UV radiation levels," Howell-596 discloses integrated UV detection systems that can be mounted on various systems (also referred to as end products). (*Id.*)

44. Figure 1 of Howell-596 (annotated and reproduced below) illustrates a UV detection system mounted on an eyewear. The UV detection system includes a circuit board 112 that can be used as a substrate onto which other components can be integrated, such as a UV detector 116 to monitor the UV level through an opening 120 and a display 124 to display results measured by the UV detector 116.



45. Eyewear is not the only end product on which the UV detection system is mounted. Instead, Howell-596 discloses various other options, as illustrated in Figures 23A-23G (reproduced below). These options include hat, watch, shirt, shoe, keychain, bracelet, necklace, bottle, and tube. (EX-1003, Howell-596 at [0232].)



46. Throughout the disclosure of Howell-596 (e.g., as illustrated in Figures 1 and 23A-23G), the UV detection system is configured as an integrated module, instead of being distributed across different locations on the end product. Indeed, Howell-596 expressly discloses that “[i]n one embodiment, *all components* for monitoring radiation can be integrated with eyewear, such as a frame (e.g., a temple

of the frame) of the eyewear ... As an example, these components can be formed together on a substrate as a module.” (EX-1003, Howell-596 at [0007].)

B. Overview Of Howell-833

47. Howell-833 “pertains to techniques for providing eyewear with electrical components.” (EX-1004, Howell-833 at 3:6-15.) To this end, Howell-833 discloses several options for attaching electrical components to eyewear, including via temple arrangement (e.g., attached to or at least partially embedded in the temple arrangement), via temple adapter (e.g., mechanically coupled to a temple), via swappable temple portions, or via an extended endpiece where electrical components can be placed. (EX-1004, Howell-833 at 3:16-55.)

48. Figure 1 of Howell-833 (reproduced below) illustrates an eyewear with electrical components 112 located at the tip of both temples. Although the associated description of Figure 1 does not specify what can be included in the electrical components 112, Figure 4 of Howell-833 does provide a laundry list, such as an electrical connector, an electrical switch, a power source, a circuit board, an indicator, a display, a speaker, a controller, a memory device, a frequency receiver, a sensor, a motion detector, or a radio frequency identification (RFID) tag. (EX-1004, Howell-833 at 16:11-17:12.)

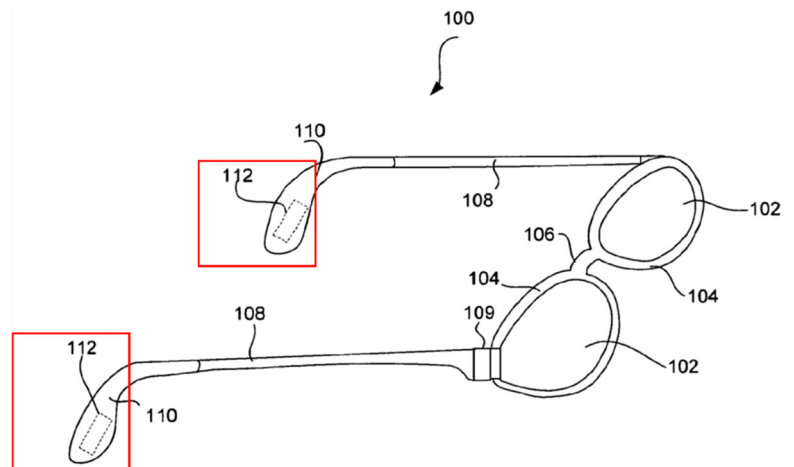


FIG. 1

C. Overview of Blum-741

49. Blum-741 “relates to the field of optics” and “[m]ore particularly, the present invention relates to vision correction with a multi-focal electro-active spectacle lens.” (EX-1005, Blum-741 at 1:15-18.) With this goal in mind, Blum-741 discloses a spectacle having an electro-active lens that is formed by a stack of at least two electro-active regions to produce zones with different viewing corrections and a controller for independently activating each electro-active region. Figure 55a of Blum-741 illustrates an example of an electroactive lens including two zones 5560 and 5565, each one of which can be independently activated. (EX-1005, Blum-741 at 41:26-39.) For example, when both zones are activated, near vision correction may be present, while if only one of the two regions is activated, such as 5565 but not 5560, near-intermediate vision is present. (*Id.*)

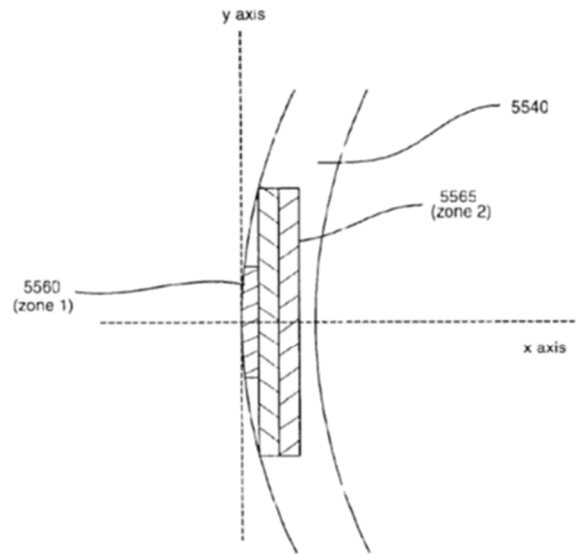


Fig. 55a

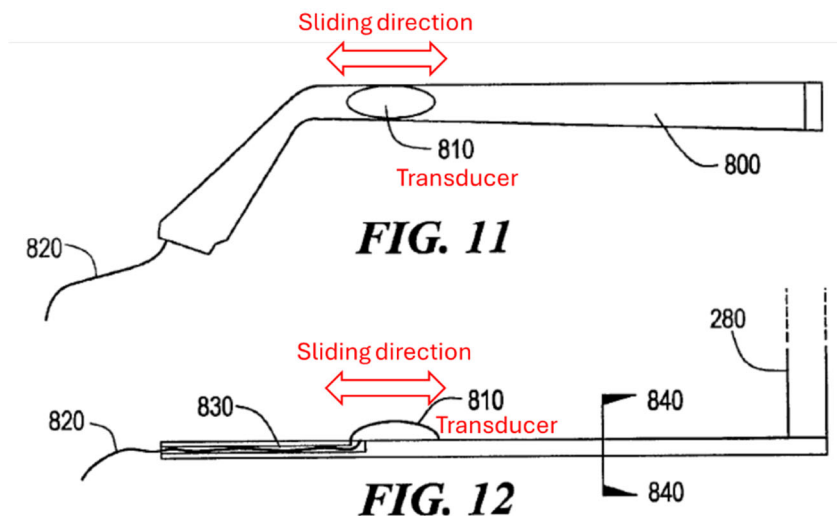
50. Blum-741 also discloses a few other variations, such as an electroactive lens having at least one electro-active region to produce a plurality of zones with different viewing corrections and at least one blending zone between the plurality of vision correction zones, or an electroactive lens having two stacked electro-active regions in which a first region produces a near and near-intermediate viewing correction zone and a second region produces a far-intermediate viewing correction zone. (EX-1005, Blum-741 at 1:22-47.)

D. Overview of Spitzer

51. Spitzer concerns “portable applications” of “[i]nformation storage and processing, electronic recording of sound and images, electronic communications, and electronic entertainment systems.” (EX-1007, Spitzer at 1:16-18.) Realizing that “it is desirable to have an audio/video interface which is compact and allows hands-

free or nearly hands-free operation,” Spitzer discloses eyeglasses as the end product to integrate the complete audio/video interface. (EX-1007, Spitzer at 1:53-61.)

52. As an example, Figures 11-12 of Spitzer (annotated and reproduced below) illustrate an eyewear, where a bone conductivity transducer (e.g., microphone and/or speaker) 810 is mounted on the frame. (EX-1007, Spitzer at 7:44-60.) The transducer 810 is mounted on the inside of the temple for adequate contact to the wearer’s head and has a sliding mechanism that allows the user to adjust the position for best fit. *Id.* The transducer 810 is in communication with the rest of the system through leads 820 as illustrated in Figure 12. *Id.* The leads may be made from flexible stranded insulated wire, flexible coaxial cable, or flexible circuitry based on Kapton or other polymeric material such that the transducer 810 can be adjusted without strain to the leads. *Id.*



53. Figure 20 of Spitzer (annotated and reproduced below) illustrates another example system in which a plug-in module 1001 is located on a strap 1002

behind the head of the wearer. (EX-1007, Spitzer at 9:55-10:4.) The strap may be flat if it contains Kapton flex circuitry, or it may have a rectangular or other cross-section. *Id.* This configuration would mitigate any discomfort to the wearer due to the large contact area between the strap and the wearer. To this end, the width of the strap is preferably 1.5 inches or larger. Spitzer further discloses that “[i]f the circuitry is too large ... for head mounting, the strap 1002 may be lengthened so that the plug-in module 1001 can be placed in a pocket or worn on a belt.” (*Id.*)

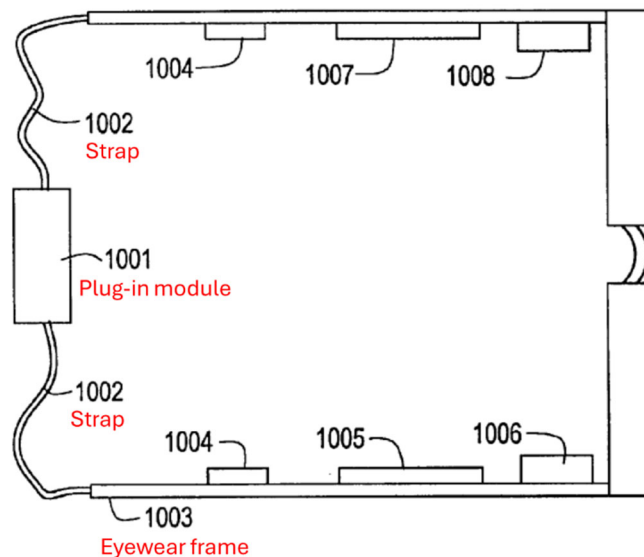
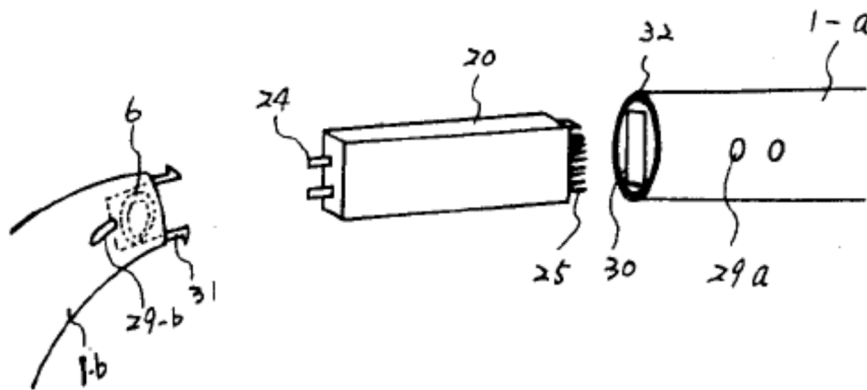


FIG. 20

E. Overview of Hattori-912

54. Hattori-912 concerns “eyeglasses with additional functions,” such as a display and a radio. (EX-1006, Hattori-912 at 7.) As an example, Figure 4 of Hattori-912 (reproduced below) illustrates a semiconductor integrated circuit 20 is embedded within a hollow part 30 in frame part 1-a. (EX-1006, Hattori-912 at 8.)

The semiconductor integrated circuit 20 is used to drive the display device (not shown in Figure 4) included in the eyewear. (EX-1006, Hattori-912 at 9.) Frame part 1-b can be locked with frame part 1-a via biting part 31. (EX-1006, Hattori-912 at 8.) In addition, at the interface between frame part 1-a and frame part 1-b, a waterproof ring 32 is included. (*Id.*) Battery 6 is separate from the semiconductor integrated circuit 20 and is located in frame 1-a to power the semiconductor integrated circuit 20. (*Id.*)



VI. NONE OF PETITIONER'S PROPOSED COMBINATIONS RENDERS OBVIOUS THE CHALLENGED CLAIMS 3, 13, 16, AND 19-37

55. The Petitioner and its expert contend that claims 3, 13, 16, and 19, 21, 32, and 35 of the '483 patent are invalid because they are obvious over various combination of references set forth below:

Claim Number	Grounds
3	Ground 5: obvious in view of the combination of Howell-596, Howell-833, Blum-741, and Spitzer. Ground 9: Obvious in view of the combination of Blum-741, Hattori-912, and Spitzer.
13	Ground 2: obvious over Howell-596 Ground 8: obvious over the combination of Blum-741 and Hattori-912.
16	Ground 2: obvious over Howell-596 Ground 8: obvious over the combination of Blum-741 and Hattori-912.
19	Ground 3: obvious over the combination of Howell-596 and Howell-833. Ground 8: obvious over the combination of Blum-741 and Hattori-912.
21	Ground 5: obvious in view of the combination of Howell-596, Howell-833, Blum-741, and Spitzer. Ground 9: Obvious in view of the combination of Blum-741, Hattori-912, and Spitzer.
32	Ground 3: obvious over the combination of Howell-596 and Howell-833. Ground 8: obvious over the combination of Blum-741 and Hattori-912.
35	Ground 3: obvious over the combination of Howell-596 and Howell-833. Ground 8: obvious over the combination of Blum-741 and Hattori-912.

56. I disagree with the arguments in the Petition and the opinions set forth by Dr. Feland for at least the reasons that I discuss in further detail below. In particular, it is my opinion that claims 3, 13, 16, and 19, 21, 32, and 35 are patentable over the grounds Petitioner has relied on. In addition, because claims 20-37 depend on claim 19 and they are patentable as well.

A. Claim 3

57. Claim 3 is a dependent claim that depends on claim 2 and claim 2 depends on claim 1. Therefore, claim 3 incorporates the subject matter of both claims 1 and 2.

1. Eyewear comprising:
a frame; and
a sealed moisture resistant module attached to the frame, wherein the module comprises within the seal any two of: a switch, a detector, a processor, a power source, a drive circuit, a transmitter, a receiver, a transceiver, and a sensor,
wherein the frame comprises a first temple and a second temple, and wherein the module is disposed within the first temple.
2. The eyewear of claim 1, wherein the module includes an electrical connector configured to connect the any two of switch, detector, processor, power source, drive circuit, transmitter, receiver, transceiver, and sensor with an external device.
3. The eyewear of claim 2, wherein the module is electrically connected to the external device by a flex circuit.

58. Petitioner relies on two grounds to challenge claim 3, including Ground 5 (i.e., obvious in view of the combination of Howell-596, Howell-833, Blum-741, and Spitzer) and Ground 9 (i.e., obvious in view of the combination of Blum-741, Hattori-912, and Spitzer). I will discuss each ground separately.

1. Ground 5: The Combination Does Not Render Claim 3 Obvious Because a POSITA Would Not Have Been Motivated to Combine Howell-596 with The Other Cited References

59. Petitioner and Dr. Feland contends that “[a] person of ordinary skill would have been motivated to connect the sealed module I discuss in Paragraph 61

to either an external device mounted on the eyewear, such as Blum-741's electro-active lenses (*see* ¶¶118-124, above), using a flex circuit in view of Spitzer." (EX-1002, Feland Decl. at ¶¶146-147.)

146. Claims 3 and 21 depend from claims 2 and 20, respectively, and further recite that "the module is electrically connected to the external device by a flex circuit." Spitzer discloses that components located on various parts of an eyewear frame, or external to the frame, may connected via "flexible circuitry based on Kapton or other polymeric material" (e.g., a flex circuit). Ex.1007 (Spitzer), 7:44-60, 9:49-10:4.

147. A person of ordinary skill would have been motivated to connect the sealed module I discuss in Paragraph 61 to either an external device mounted on the eyewear, such as Blum-741's electro-active lenses (*see* ¶¶118-124, above), using a flex circuit in view of Spitzer for several reasons.

EX-1002, Feland Decl. at ¶¶146-147

60. At paragraph 61, Dr. Feland points to the module housing 1700 of Howell-596 as "a sealed moisture resistant module." (EX-1002, Feland Decl. at ¶61.)

3. Sealed Moisture Resistant Module

61. Claim 1 recites “a sealed moisture resistant module attached to the frame.” Howell-596 discloses that “[in some embodiments.] the module housing 1700 does not include vents or holes, so as to be water resistant or water-proof.” Ex.1003 (Howell-596) ¶[0194]. The module housing 1700 “is then placed into an opening, cavity or container of an eyewear housing” and is thus attached to the eyewear frame. *Id.* ¶[0195]. Thus, Howell-596 discloses this limitation.

EX-1002, Feland Decl. at ¶61

61. Combining paragraphs 61 and 146-147, Petitioner and Dr. Feland rely on a combination of three references, including Howell-596 (for its purported disclosure of a sealed module), Blum-741 (for its purported disclosure of electro-active lenses), and Spitzer (for its purported disclosure of flex circuit).

62. It is my opinion that Ground 5 does not render claim 3 obvious because a POSITA would not have been motivated to combine Howell-596 with the other cited references including Blum-741 and Spitzer.

63. First, it is my opinion that a POSITA would not have been motivated to incorporate the flex circuit in Spitzer into the combination of Howell-596 and Blum-741 because the flex circuit in Spitzer is either unnecessary and wasteful or inapplicable in this combination.

64. Petitioner and Dr. Feland points to two embodiments where flex circuitry is allegedly disclosed in Spitzer, including EX-1007, at 7:44-60 and 9:49-

10:4. (Petition at 44.) The disclosed flex circuitry in neither embodiment, however, is applicable in Howell-596 or Blum-741 because the reason for Spitzer to use the flex circuitry is absent and/or a POSITA would need substantial redesign or reconstruction to make the revision proposed by Petitioner and Dr. Feland.

65. In the first embodiment pointed out by Petitioner and Dr. Feland, flexible circuitry is used to connect a transducer that has a “sliding mechanism” to allow the user to “adjust the position for best fit.” (Ex-1007, Spitzer at 7:44-60.) But neither the sealed module allegedly disclosed in Howell-596, nor the electroactive lenses allegedly disclosed in Blum-741, has any sliding mechanism. In fact, these components do not appear to allow users to adjust their position. Therefore, the reason underlying Spitzer’s flexible circuitry does not exist in Howell-596 or Blum-741. It is my opinion that, a POSITA after reviewing the entirety of Howell-596, Blum-741, and Spitzer, would have realized that it would be unnecessary to use the flexible circuitry of Spitzer in either Howell-596 or Blum-741 because there are no movable components to connect as in Spitzer.

66. In addition, Howell-596, throughout its specification, discloses various embodiments where a printed circuit is used to connect different components. (*See, e.g.,* EX-1003, Howell-596 at [0148]-[0150], [0152], [1053], [0155], [0184], and [0192].)

[0148] In one embodiment, a radiation detector can be mounted on a substrate and couple to other circuitry so that radiation monitoring can be performed. The manner in which the radiation detector is mounted to the substrate can vary with implementation. In one implementation, the substrate is a printed circuit board (PCB) that supports not only the radiation detector but also the other circuitry. FIGS. 14G-14I illustrate examples of a few possible implementations in the case where the radiation detector is a UV detector; however, other implementations can be utilized.

EX-1001, Howell-596, at [0148]

67. Therefore, a POSITA, in view of the various disclosures of printed circuit and no disclosure of flexible circuit in Howell-596, would be motivated to use printed circuit for connecting any additional elements.

68. Furthermore, compared to printed circuit, using flexible circuitry for point-to-point wiring as disclosed in Spitzer would likely require more manual assembly during manufacturing, thereby increasing the cost. For example, a POSITA would have understood that point-to-point wiring is carried out manually and is not suitable for automated assembly. Point-to-point wiring would be more expensive and more susceptible to wiring errors than PCBs, at least because connections are determined by the person doing assembly rather than by an etched circuit board. (EX-2021, at 1.) I understand that date of EX-2021 may be after the priority date of the '483 patent. Based on my experience in electrical and mechanical design, a POSITA at the time of the '483 patent would have understood the same disadvantages of point-to-point wiring described in EX-2021. Accordingly, a

POSITA would not have been motivated to use the flexible circuitry in Spitzer to connect two fixed components (e.g., sealed module and electroactive lenses) in the combination of Howell-596 and Blum-741. This is especially true when all other electronic components in Howell-596 are integrated on a PCB.

69. In addition, throughout the disclosure of Howell-596, “*all components* for monitoring radiation are integrated” and as an example, “these components can be *formed together on a substrate* as a module.” (EX-1003, Howell-596 at [0007] and [0068]) (emphasis added).) A POSITA would therefore understand that Howell-596 chose to integrate different components together as a single unit, instead of distributing different components across different locations. A POSITA would also understand that all components in Howell-596 are fixed (e.g., on a substrate) and Howell-596 does not teach any components that are slidable or otherwise movable. (EX-1003, Howell-596 at [0007].) The lack of disclosure on distributing components across different locations would have motivated a POSITA to integrate the electroactive lens of Blum-741 with the electronics module of Howell-596, instead of using the flexible circuitry in Spitzer.

70. In the second embodiment of flexible circuit disclosed in Spitzer, Petitioner points to the flex circuitry is used in a *strap* 1002, which connects a plug-in module 1001 *behind the head* of the wearer with the temples of an eyewear. (Petition at 44; Ex-1007, Spitzer at 9:49-10:4 and FIG. 20.)

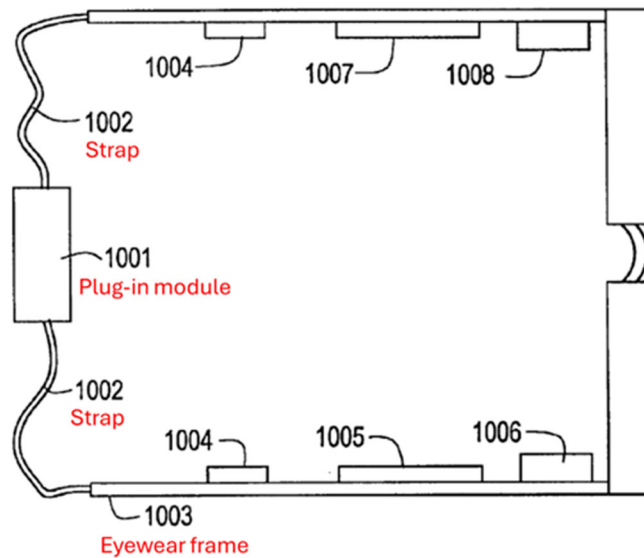


FIG. 20

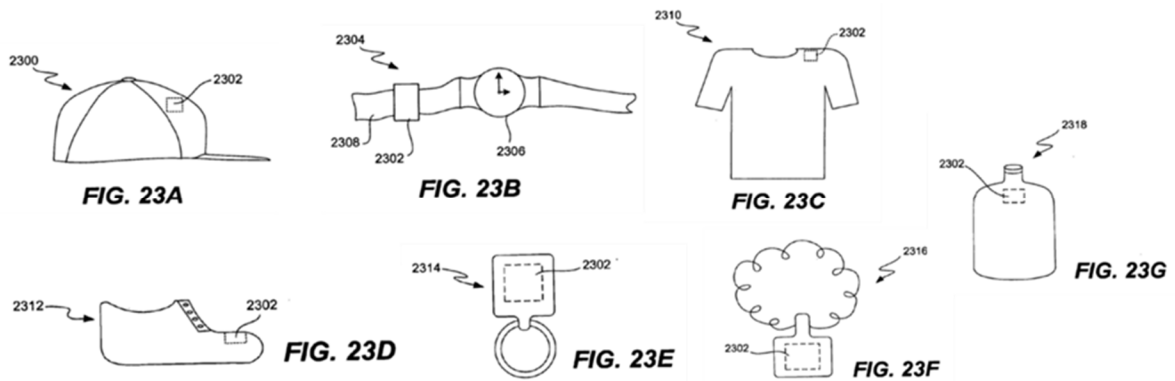
71. But a strap as illustrated in Figure 20 of Spitzer is typically significantly larger than any wires used in connecting electronic components within an eyewear frame. For example, in order to mitigate or eliminate any discomfort caused by the strap to the wearer, the width of the strap typically would be 1.5 inches or larger. In contrast, the width (or height) of an eyewear frame would be around half an inch or less, much smaller than the size of the strap. One can of course increase the size of the eyewear frame but that would make the resulting eyewear thicker or bulkier, which is exactly the problem the '483 patent addresses.

72. Therefore, Petitioner fails to explain how a POSITA would use the strap to connect the UV detection system located on a temple in Howell-596 with the electroactive lens located within the spectacle frame in Blum741. In view of the significant difference in sizes between the strap in Spitzer and the electronic

components in Howell-596, a POSITA would not have been able to incorporate the strap of Spitzer into the combination of Howell-596 and Blum-741 without substantial reconstruction or redesign.

73. In addition, as set forth above, all components in Howell-596 are integrated within the eyewear and no component is behind the head of wearer or outside the eyewear. Therefore, the reason underlying the use of the flexible strap in Spitzer is totally absent from Howell-596. Accordingly, a POSITA would have found no reason to use the flex circuitry in Spitzer to connect different components in Howell-596.

74. Second, a POSITA would not have been motivated to combine Howell-596 with Blum-741 in the first place because these two prior art references are in different fields and aim to solve different problems. More specifically, Howell-596 is in the field of radiation detection and concerns “improved approaches to measure and inform persons of UV radiation levels.” (EX-1003, Howell-596 at [0003]-[0005].) The eyewear disclosed in Howell-596 is merely one of numerous end products to hold the UV detection system. For example, Figures 23A-23G illustrate “examples of various end products having radiation monitoring capability,” such as hat, watch, shirt, shoe, keychain, bracelet, necklace, bottle, and tube. (EX-1003, Howell-596 at FIGS. 23A-23G and [0232].)



EX-1003, Howell-596 at FIGS. 23A-23F

75. In contrast, Blum-741 expressly sets forth in its “FIELD OF INVENTION” that “[t]he present invention relates to the field of *optics*. More particularly, the present invention relates to vision correction with a multi-focal electro-active spectacle lens.” (EX-1005, Blum-741 at 1:15-19 (emphasis added).) A POSITA, after reviewing Howell-596 and Blum-741, would have realized that they are in different fields (i.e., radiation detection versus optics) and aim to solve different problems (i.e., UV detection versus vision correction with electroactive lenses). Accordingly, a POSITA would not be motivated to combine Howell-596 with Blum-741.

76. I understand that Petitioner lists multiple purported rationales for combining prior art teachings. (Petition, at 45-46.) However, it is my opinion that none of the purported rationales consider or acknowledge the fact that Howell-596, Blum-741, and Spitzer are implemented in dissimilar environments with unrelated goals.

77. As an example, Petitioner contends that Spitzer discloses the benefits of flex circuits, including the ability to adjust the position of components without strain on the lead. Petition, at 45. But as discussed above, neither Howell-596 nor Blum-741 discloses any movable components, and Petitioner also does not point to any. Accordingly, Petitioner's alleged benefit of Spitzer's flex circuit would not apply to the combination Petitioner proposes.

78. In another example, Petitioner also makes the conclusory argument that "flex circuits were well-known in the art, leading a POSITA to reasonably expect success in the combination." (Petition, at 45.) But as set forth above in paragraphs 71-72, Petitioner ignores the significant difference in size between Spitzer's strap in Spitzer and the relevant components in Howell-596 and further fails to explain how a POSITA would have implemented the proposed combination without significant redesign.

- 2. Ground 9: the combination does not render claim 3 obvious because a POSITA would not have been motivated to combine Blum-741 with the other cited references and because Petitioner’s combination fails to disclose “a sealed moisture resistant module attached to the frame”**

79. Petitioner’s ground 9 is dependent on ground 8. More specifically, Petitioner first contends that, under ground 8, the combination of Blum-741 and Hattori-912 renders obvious independent claim 1. (Petition at 55-65.) Petitioner then contends that, under ground 9, “[a] POSITA would have been motivated to combine Spitzer with Blum-741 and Hattori-912” to yield the subject matter in claim 3, which ultimately depends on claim 1. (Petition at 78.)

80. It is my opinion that Ground 9 does not render claim 3 obvious because the combination of Blum-741 and Hattori-712 still fails to disclose “a sealed moisture resistant module attached to the frame” as recited in independent claim 1 and further because there is no motivation to combine Blum-741 with Hattori-912.

81. As a preliminary matter, it is not entirely clear which component in Hattori-912 allegedly satisfies the claim requirement of a sealed moisture resistant module attached to the frame. On the one hand, Petitioner contends that “Hattori-912 discloses a sealed moisture resistant module (contents sealed in the hollow part 30 by waterproof ring 32),” which may include the parts 1-a, 1-b, as well as the waterproof ring 32. (Petition at 55.) On the other hand, however, Petitioner also points to the semiconductor integrated circuit 20 in Figure 4 (reproduced below) of

Hattori-912, highlights it in green, and labels it as “module” in the Petition. (Petition at 55.)

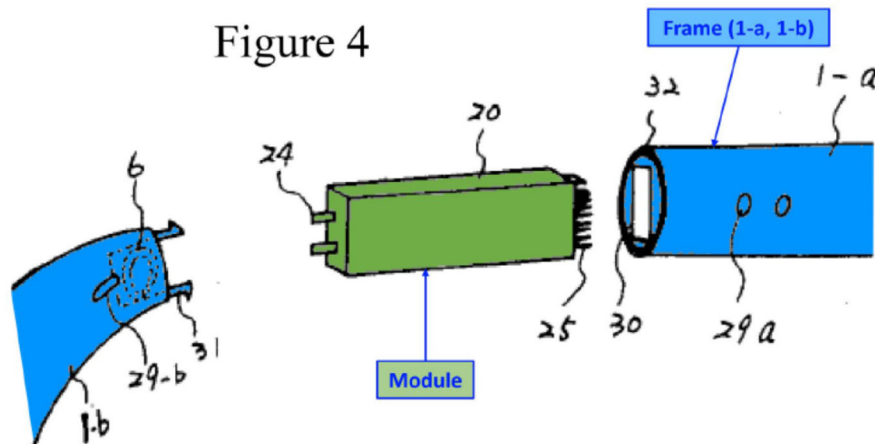


Figure 4 of Hattori-912, reproduced from Petition at 55.

82. Under either mapping, Ground 9 does not render claim 3 obvious.

83. First, the integrated semiconductor circuit 20 is clearly not “a sealed moisture resistant module” because as expressly disclosed in Hattori-912, and admitted by Petitioner, any sealing in Hattori-912 is achieved by the waterproof ring 32. (Petition at 55.) A POSITA would therefore understand that the integrated semiconductor circuit 20 itself, or anything within the hollow part 30, is not sealed – otherwise the waterproof ring 32 would be redundant.

84. Second, to the extent that Petitioner may argue that the purported sealed moisture resistant module includes the waterproof ring 32 plus the frames 1-a and 1-b, such argument fails as well because the resulting module would be the entire frame, instead of a module “attached to the frame” as required by claim 1.

85. Petitioner further points to the protective film disclosed in Hattori-912 and contends that a POSITA would have understood “this to disclose that components of Hattori-912’s eyewear that are coated with protective film 41 form a sealed moisture resistant module.” (Petition at 55-56.) I disagree. The mere disclosure of a protective film does not teach or suggest a sealed moisture resistant module.

86. For example, a protective film can cover only the top of an integrated semiconductor circuit but not the substrate, and a POSITA would not have understood that the protective film forms a sealed module because the substrate is still exposed to the external environment. In another example, a protective film may protect a module from damage other than water or moisture, such as friction. In this example, a POSITA would have understood that the protective film is wear resistant instead of moisture resistant. In view of all these different options for a protective film, a POSITA, after reviewing Hattori-912, would *not* have understood that components of Hattori-912’s eyewear that are coated with protective film 41 form a sealed moisture resistant module.

87. In addition, there is no motivation to combine Blum-741 with Hattori-912. As set forth above, Blum-741 “relates to the field of optics” and more specifically “relates to vision correction with a multi-focal electro-active spectacle lens.” (EX-1005, Blum-741 at 1:15-19.) Hattori-912, in contrast, “relates to

eyeglasses with additional functions in which a display device has been mounted at the desired location of the eyeglasses and to which a radio has been added.” (EX-1006, Hattori-912 at 7.) In addition, the objective of Hattori-912 is to add “information functions” to eyewear by “mounting a radio and providing a display device to display the time, date, and image information or the like in the desired location of the eyeglasses.” (EX-1006, Hattori-912 at 7.)

88. A POSITA, after reviewing Blum-741 and Hattori-912, would have realized that they are in different fields (i.e., optics versus electronics) and aim to solve different problems (i.e., vision correction with electroactive lenses versus adding electronics to eyewear). Accordingly, a POSITA would not be motivated to combine Blum-741 with Hattori-912.

89. I understand that Petitioner lists multiple purported rationales for combining prior art teachings of Blum-741 and Hattori-912. (Petition, at 62-63). Petitioner again fails to consider or acknowledge that Blum-741 and Hattori-912 are implemented in dissimilar environments with unrelated goals. Adding Spitzer’s teachings to those taught by the combination of Blum-741 and Hattori-912 further weakens Petitioner’s argument because Petitioner merely refers back to its defective rationales for a different combination, i.e., Spitzer with Howell-596 and Blum-741. (Petition, at 78). Petitioner does not explain at all how the same (defective) rationales might be applicable in a different combination. Accordingly, Petitioner fails to

sufficiently demonstrate a POSITA's motivation to combine relevant teachings of Spitzer, Blum-741, and Hattori-912.

B. Claim 13

90. Claim 13 depends on claim 1 and further recites that “the module is hermetically sealed.”

1. Eyewear comprising:
a frame; and
a sealed moisture resistant module attached to the frame, wherein the module comprises within the seal any two of: a switch, a detector, a processor, a power source, a drive circuit, a transmitter, a receiver, a transceiver, and a sensor,
wherein the frame comprises a first temple and a second temple, and wherein the module is disposed within the first temple.

...

13. The eyewear of claim 1, wherein the module is hermetically sealed.

91. Petitioner challenges Claim 13 under two grounds: Ground 2 (i.e., obvious over Howell-596) and Ground 8 (i.e., obvious over the combination of Blum-741 and Hattori-912). It is my opinion that neither ground renders claim 13 obvious.

1. Ground 2: the Combination Does Not Render Claim 13 Obvious Because Howell-596 Does Not Disclose or Suggest the Claimed Hermetically Sealed Module

92. In challenging claim 13 under Ground 2, Petitioner first defines “hermetically sealed” as airtight and then points to paragraph [0194] of Howell-596, which discloses a housing that includes “vents or holes” to circulate air. (Petition at 28-29.) Petitioner then argues that a POSITA would have understood that in Howell-

596's configuration that does **not** include vents or holes, the resulting module would be hermetically sealed. (*Id.*) I disagree.

As discussed above, Howell-596 discloses that the module may be waterproof. *Supra* §VI.E. For the same reasons, a POSITA would have understood Howell-596 to disclose that the module is hermetically sealed. Something that is hermetically sealed is sealed so as to be airtight. Ex.1010, 269; Ex.1002 ¶103. Howell-596 contrasts its waterproof arrangement without vents or holes with one that “include[s] one or more vents or holes ***so that air can circulate through the module housing 1700.***” Ex.1003 ¶[0194] (emphasis added). A POSITA would have understood that in Howell-596's configuration that does not include vents or

holes, air could not circulate through the module (and thus it would be air-tight). *Id.*; Ex.1002 ¶103. Thus, Howell-596 discloses, or at least suggests, that the module is hermetically sealed.

Petition at 28-29

93. Paragraph [0194] of Howell-596 (reproduced below), which was relied on by Petition, expressly states that “[a]lternatively, the module housing 1700 does not include vents or holes, so as to be ***water-resistant or water-proof.***” (EX-1003, Howell-596 at [0194] (emphasis added).)

[0194] **FIG. 17A** is a cross-sectional view of a module housing **1700** according to one embodiment of the invention. As shown in **FIG. 17A**, the module housing **1700** can operate as a housing for the UV detection system **1500** shown in **FIG. 15A**. The module housing **1700** includes a first window **1702** and a second window **1704**. The first window **1702** can be proximate to the display device **1510**, and the second window **1704** can be proximate to the power supply **1504**, which would in such an embodiment be a solar panel. The first and second windows **1702** and **1704** can be clear or colored so long as adequate light passes through. In one embodiment, the thickness of the first and second windows **1702** and **1704** is greater than the thickness of the walls of the module housing **1700**. The module housing **1700** can also include an opening **1706** that is positioned proximate to the UV sensor **1506**. Still further, although not illustrated in **FIG. 17A**, the module housing **1700** can further include one or more vents or holes so that air can circulate through the module housing **1700**. Alternatively, the module housing **1700** does not include vents or holes, so as to be water-resistant or water-proof.

EX-1003, Howell-596 at [0194]

94. Therefore, in Howell-596's configuration that does not include vents or holes, the resulting module is still water-resistant or water-proof, not hermetically sealed as Petitioner contends. The teaching is plain, and a POSITA does not have to infer whether the resulting module is hermetically sealed or not – it is not.

95. In addition, a POSITA would have understood that airtight provides a higher degree of protection than waterproof. For example, water vapor is a constituent of air, so a seal that is airtight would also be watertight. In addition, a POSITA at the time of the '483 patent also understood that water molecules are larger than air molecules. (EX-2022, at 2 and 4.) In other words, airtight often

requires waterproof but mere disclosure of waterproof, on the other hand, does not teach or suggest airtight. Due to its higher degree of protection, an airtight seal is generally more costly than watertight seal, and a POSITA would not have been motivated to replace a water-tight seal with an airtight one. Accordingly, Howell-596 fails to disclose or suggest a hermetically sealed module.

2. Ground 8: The Combination Does Not Render Claim 13 Obvious Because a POSITA Would Not Have Been Motivated to Combine Blum-741 with the Other Cited References and Because Petitioner's Combination Fails to Disclose Key Limitations

96. As I discussed above in paragraphs 79-89, the combination of Blum-741 and Hattori-912 fails to render claim 1 obvious because there is no motivation to combine them, and the combination still fails to disclose key limitations in claim 1. Claim 13 depends on claim 1, and for this reason alone, the combination of Blum-741 and Hattori-912 fails to render obvious claim 13 as well.

97. In addition, Petitioner again erroneously equates “hermetically sealed” with “waterproof” by arguing “something that is sealed with water-proof ring or coating is also air-tight.” (Petitioner at 75-76.) I disagree. As understood by a POSITA, a hermetically sealed module must be both airproof and waterproof and therefore has a higher level of protection than a module that is merely waterproof. Accordingly, the mere disclosure of waterproof module does not teach or suggest that the module is also hermetically sealed.

C. Claim 16

98. Claim 16 depends on claim 1 and further recites that the module is substantially wear resistant.

1. Eyewear comprising:
a frame; and
a sealed moisture resistant module attached to the frame, wherein the module comprises within the seal any two of: a switch, a detector, a processor, a power source, a drive circuit, a transmitter, a receiver, a transceiver, and a sensor,
wherein the frame comprises a first temple and a second temple, and wherein the module is disposed within the first temple.

...
16. The eyewear of claim 1, wherein the module is substantially wear resistant.

99. Petitioner challenges claim 16 under two grounds, i.e., Ground 2 (i.e., obvious over Howell-596) and Ground 8 (i.e., obvious over the combination of Blum-741 and Hattor-912). It is my opinion that both grounds fail to render claim 16 obvious.

1. Ground 2: Howell-596 does not teach or suggest a substantially wear resistant module

100. According to the Petitioner, because Howell-596 discloses that “[t]he module housing 1700 protects the module,” a POSITA would have understood this disclosure to mean that “the module housing (e.g., the outer portion of the module) protects the inner portions of the module from damage and is thus wear resistant.” (Petition at 29.) I disagree.

101. The general protective function of the housing is not the same as being wear resistant even under Petitioner's own definition of wear resistant, i.e., "resistant to deterioration from damage *caused by relative motion* between the module and *another surface*." Petition at 29 (emphasis added).) In this definition, being wear resistant is the ability to resist friction.

102. Under this definition, mere disclosure of a protective housing does not teach or suggest that the housing is wear resistant. For example, the housing may protect the module from damages caused by water, moisture, electromagnetic interference, and chemicals, among others. A POSITA would have understood that none of these damages is caused by relative motion between the module and another surface. Accordingly, a POSITA would not have understood that Howell-596 discloses any wear resistant module.

103. In addition, it would not have been obvious for a POSITA to configure the housing in Howell-596 as substantially wear resistant because the electronic module is fixed within the eyewear frame or any other end products. A POSITA would not have expected that the housing would have any "relative motion ... with another surface." Therefore, a POSITA would not be motivated to using a substantially wear resistant housing for the electronic module.

2. Ground 8: There is No Motivation to Combine Blum-741 with Any of the Cited References and Key Limitations are Still Missing in the Combination of Blum-741 and Hattori-912

104. As I discussed in paragraphs 79-89 above, the combination of Blum-741 and Hattori-912 fails to render claim 1 obvious because there is no motivation to combine them, and the otherwise impermissible combination still fails to disclose key limitations in claim 1. Claim 16 depends on claim 1, and therefore the combination of Blum-741 and Hattori-912 fails to render obvious claim 16 as well.

D. Claim 19-37

105. Claim 19 is an independent claim and is reproduced below:

19. Eyewear comprising:
a frame; and
a sealed moisture resistant module attached to the frame, wherein the module comprises within the seal any two of a switch, a detector, a processor, a power source, a drive circuit, a transmitter, a receiver, a transceiver, and a sensor,
wherein the module is disposed, at least partially, on a portion of the frame configured to be behind the ear of a wearer of the eyewear.

106. Petitioner challenges claim 19 under two grounds, including Ground 3 (i.e., obvious over the combination of Howell-596 and Howell-833) and Ground 8 (i.e., obvious over the combination of Blum-741 and Hattori-912). It is my opinion that both grounds fail to render claim 19 obvious.

1. Ground 3: a POSITA would not have been motivated to place all or part of the UV detection system to be behind the ear of the wearer

107. Petitioner contends that “[a] POSITA would have been motivated to place Howell-596’s sealed module on the temple at least partially behind the wearer’s ear in view of Howell-833.” (Petition at 31-33.) Petitioner relies on Howell-833 solely for the purported disclosure of different locations of electronics. (Petition at 31.) I disagree.

108. First, placing the whole UV detection system of Howell-596, which is mapped as the sealed module by Petitioner, behind the ear of the wearer would render the resulting system unfit for its intended purpose, i.e., detecting the level of UV radiation.

109. A POSITA would have understood that UV detection requires an opening or a clear window for the sensor to receive UV radiation from the surrounding environment without obstruction. In fact, Howell-596 discloses that the UV detection system includes openings “so that light can impinge upon the solar cell 114 and the UV detector 116.” (EX-1003, Howell-596 at [0075], reproduced below.)

[0075] FIG. 2A shows a first side of the circuit board 112. Typically, the first side would be positioned adjacent a top side or outer side of the temple 108. As shown in FIG. 2A, the first side of the circuit board 112 has the solar cell 114 and the UV detector 116 attached thereto. The first side of the circuit board 112 should be exposed at least partially to external light (e.g., sunlight). Hence, the openings 118 and/or 120 of the temple 108 shown in FIG. 1 can provide openings so that light can impinge upon the solar cell 114 and the UV detector 116.

110. Placing the entire UV detection system, including the sensor, behind the user's ear would introduce various potential obstructions that might block the sensor from receiving the UV radiation. For example, user's long hair may block the UV sensor. The user's ear may also block the UV sensor. The user's apparel, such as scarf and hat, may also block the UV sensor. As compared to the configuration where the sensor is placed on the front of the user's face, Petitioner's proposed modification (i.e., placing the UV detection system behind the ear) would likely compromise the detection capability of the resulting system. Therefore, a POSITA would not have been motivated to place the UV detection system of Howell-596 behind the user's ear.

111. Second, to the extent that Petitioner argues that a POSITA may place only a portion of Howell-596's UV detection system behind the ear of the wearer, such modification would contradict Howell-596's clear teaching. More specifically, throughout the disclosure of Howell-596, "***all components*** for monitoring radiation are integrated" and as an example, "these components can be ***formed together on a***

substrate as a module.” (EX-1003, Howell-596 at [0007] (emphasis added).) A POSITA would therefore understand that Howell-596 teaches integration, instead of distributing different components across different locations. Accordingly, a POSITA would not have been motivated to place a portion of Howell-596’s UV detection system behind the ear of the wearer while leaving the rest on the front.

112. Third, placing a portion of the UV detection system of Howell-596 behind the user’s ear also contradicts Petitioner’s own position. Petitioner’s expert, Dr. Feland, testifies that “including as many components as possible in the sealed module would allow the system to be easily removable and swappable because it is self-contained, and would have benefits for maintenance and cleaning of the eyewear generally.” (EX-1002, Feland Decl. at ¶204.)

204. First, a person of ordinary skill would have been motivated to include each component in Hattori-912’s sealed module to obtain the benefits of doing so; for example, to protect each of the components from potentially harmful moisture, dirt, or chemicals that could cause them to stop working temporarily or permanently. Ex.1011 (Sikonowiz) at 135-136. Furthermore, including as many components as

possible in the sealed module would allow the system to be easily removable and swappable because it is self-contained, and would have benefits for maintenance and cleaning of the eyewear generally. Cf. Ex.1005 (Blum-741), 37:49-65. It would also make the eyewear easier to manufacture and assemble.

EX-1002, Feland Decl. at ¶204

113. Following Petitioner's own reasoning, a POSITA would not be motivated to place a portion of Howell-596's UV detection system in one place and another portion in another place because such configuration would make the system less easily removable and swappable. Petitioner's proposed distributed configuration would also be difficult for maintenance and cleaning of the eyewear generally according to their own expert Dr. Feland.

114. I understand that Petitioner lists reasons that a POSITA allegedly would have been motivated to "place Howell-596's sealed module on the temple at least partially behind the wearer's ear in view of Howell-833." (Petition, at 31-33). But Petitioner does not address the undesirable effect of the proposed combination or Howell-596's contradictory suggestion to integrate all components into a single module. For example, Petitioner contends that a POSITA would have recognized the benefits of placing electronics behind the ear of the wearer, such as reducing design impact and balancing weight. (Petition, at 31-32.) But a POSITA would also have recognized that Petitioner's proposed modification would render the resulting system unfit for its intended purpose of UV detection, thereby defeating any purported benefits.

115. In another example, Petitioner contends that "attaching components to or embedding components within an eyewear frame behind the ear of a wearer" would lead a POSITA to "reasonably expect success." (Petition, at 32.) I disagree.

Because the proposed modification would likely inhibit UV sensing or contradict the express teaching of Howell-596 discussed above, a POSITA would not reasonably expect to succeed.

2. Ground 8: There is No Motivation to Combine Blum-741 with Any of the Cited References and Key Limitations are Still Missing in the Combination of Blum-741 and Hattori-912

116. As I discussed above, there is no motivation to combine Blum-741 with Hattori-912 in the first place, and the combination still fails to disclose the limitation “a sealed moisture resistant module attached to the frame,” which is also recited in claim 19. Accordingly, the combination of Blum-741 and Hattori-912 does not render claim 19 obvious.

117. Because neither Ground 3 nor Ground 8 renders obvious claim 19, Petitioner fails to show that claim 19 is unpatentable. Claims 20-37 depend on claim 19 and are therefore patentable as well.

E. Claim 21

118. Claim 21 depends on claim 20 that further depends on 19. Claims 19-21 are reproduced below:

19. Eyewear comprising:
a frame; and
a sealed moisture resistant module attached to the frame, wherein the module comprises within the seal any two of a switch, a detector, a processor, a power source, a drive circuit, a transmitter, a receiver, a transceiver, and a sensor, wherein the module is disposed, at least partially, on a portion of the frame configured to be behind the ear of a wearer of the eyewear.

20. The eyewear of claim 19, wherein the module includes an electrical connector configured to connect the any two of switch, detector, processor, power source, drive circuit, transmitter, receiver, transceiver, and sensor with an external device.

21. The eyewear of claim 20, wherein the module is electrically connected to the external device by a flex circuit.

119. Petitioner challenges claim 21 under two grounds, including Ground 5 (i.e., obvious over the combination of Howell-596, Howell-833, Blum-741, and Spitzer) and Ground 9 (i.e., obvious over the combination of Blum-741, Hattori-912, and Spitzer).

120. As I discussed above in paragraphs 102-117, neither the combination of Howell-596 and Howell-833 nor the combination of Blum-741 and Hattori-912 renders obvious the independent claim 19. Claim 21 ultimately depends on claim 19, and for this reason alone, neither combination of Howell-596, Howell-833, Blum-741, and Spitzer, nor the combination of Blum-741, Hattori-912, and Spitzer renders claim 21 obvious either.

121. In addition, as I discussed above in paragraphs 57-89, there is no motivation to combine Howell-596 with Blum-741 or Spitzer. For this additional reason, Petitioner's Ground 5 fails.

F. Claim 32

122. Claim 32 depends on claim 19 and further recites that the module is hermetically sealed. Petitioner challenges claim 32 under two grounds, including Ground 3 (i.e., obvious over the combination of Howell-596 and Howell-833) and Ground 8 (i.e., obvious over the combination of Blum-741 and Hattori-912).

123. As I discussed in paragraphs 102-117, neither the combination of Howell-596 and Howell-833 nor the combination of Blum-741 and Hattori-912 renders obvious the independent claim 19. Claim 32 depends on claim 19, and therefore neither combination of Howell-596 and Howell-833, nor the combination of Blum-741 and Hattori-912 renders claim 21 obvious either.

124. In addition, as I discussed above in paragraphs 90-97, Howell-596 does not disclose or suggest a hermetically sealed module. For this additional reason, Petitioner's Ground 8 fails.

G. Claim 35

125. Claim 35 depends on claim 19 and further recites that “the module is substantially wear resistant.” Petitioner challenges claim 35 under two grounds, including Ground 3 (i.e., obvious over the combination of Howell-596 and Howell-833) and Ground 8 (i.e., obvious over the combination of Blum-741 and Hattori-912).

126. As I discussed in paragraphs 102-117, neither the combination of Howell-596 and Howell-833 nor the combination of Blum-741 and Hattori-912 renders obvious the independent claim 19. Claim 32 depends on claim 19, and therefore neither combination of Howell-596 and Howell-833, nor the combination of Blum-741 and Hattori-912 renders claim 21 obvious either.

127. In addition, as I discussed above in paragraphs 98-104, Howell-596 does not teach or suggest a substantially wear resistant module. For this additional reason, Petitioner's Ground 8 fails.

VII. CONCLUSION

128. For at least the foregoing reasons, it is my opinion that Petitioner's grounds do not render obvious claims 3, 13, 16, and 19-37 of the '483 Patent.

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 or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Executed this 31st day of March, 2025 in Des Moines, Iowa.

Respectfully submitted,



James H. Oliver, Ph.D.