

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LUXOTTICA OF AMERICA INC.,
Petitioner,

v.

E-VISION OPTICS, LLC,
Patent Owner.

IPR2024-01030
U.S. Patent No. 8,708,483

DECLARATION OF JOHN FELAND, PH.D.

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I, John Feland, Ph.D., declare as follows:

1. I am making this declaration at the request of Luxottica of America Inc. (“Luxottica”). I have been retained by Luxottica as a technical expert in this matter.

2. I am being compensated for my work in this matter and I am being reimbursed at cost for my expenses. My compensation in no way depends upon the outcome of this proceeding. I do not own any stock in Luxottica and, to my knowledge, I have no financial interest in Luxottica.

3. In preparing this declaration, I considered the following materials:

Exhibit No.	Description
1001	U.S. Patent No. 8,708,483 (“the ’483 patent”)
1003	U.S. Patent Publication No. 2005/0230596 (“Howell-596”)
1004	U.S. Patent No. 7,581,833 (“Howell-833”)
1005	U.S. Patent No. 6,857,741 (“Blum-741”)
1006	English Translation, Declaration, and Original of Japanese Unexamined Patent Application Publication JPS58-113912 (“Hattori-912”)
1007	U.S. Patent No. 6,091,546 (“Spitzer”)
1008	International Patent Publication No. WO2005/119344 (“Ogren”)
1009	U.S. Patent No. 5,760,868 (“Jannard-868”)
1010	Excerpts from McGraw-Hill Dictionary of Engineering (2d ed. 2003)
1011	Excerpts from Walter Sikonowiz, Designing and Creating Printed Circuits (1981) (“Sikonowiz”)

Exhibit No.	Description
1012	Excerpts from Merriam Webster's Collegiate Dictionary (10th ed. 1997)
1013	Gian Carlo Corazza, <i>Marconi's History</i> , 86 Proceedings of the IEEE 1307-11 (1998) ("Corazza")
1014	U.S. Patent No. 5,980,037 ("Conway")
1015	U.S. Patent Publication No. 2005/0248719 ("Howell-719")
1016	U.S. Patent Publication No. 2006/0001827 ("Howell-827")
1017	U.S. Patent No. 6,719,425 ("Conner")
1018	Sandra Corns Pickel, <i>The Evolution of the Modern Spectacle Frame</i> , 136 Review of Optometry 9 (1999) ("Pickel")
1019	Excerpts from the File History of the '483 Patent

I have also relied on my education, training, and experience, and my knowledge of pertinent literature in the field of the '483 patent.

I. BACKGROUND

A. Experience and Qualifications

4. My experience and qualifications are summarized in my *curriculum vitae*, a copy of which is provided as Exhibit 1020.

5. I have over 30 years of experience in mechanical engineering, electromechanical engineering, and mechatronics. I graduated from the Massachusetts Institute of Technology with a bachelor of science degree in mechanical engineering in 1994. After graduating from MIT, I attended Stanford

University, where I received an M.S. in 1996 and then a Ph.D. in 2005, both also in mechanical engineering. Although my degrees were in mechanical engineering, I completed coursework and research involving electronic circuitry, electromechanical engineering, and mechatronics.

6. Beginning in June 1996, I worked as a mechatronic design engineer for IDEO Product Development. From March 1997 to April 1999, I worked for the National Air Intelligence Center as a Program Manager, Defense Intelligence Systems, managing mission requirements and software development for an \$18 billion missile warning satellite program. From April to July 1999, I served as Director, Measurement and Signals Intelligence Systems, for the Joint Analysis Center, supervising classified intelligence support for Operation Allied Force in Kosovo. From August 1999 to July 2001, I was an Assistant Professor of Engineering Mechanics for the United States Air Force Academy. In that time, I launched the Academy's first mechatronics course. From 2002 to 2004, I worked as a design strategy consultant for Trusted Nomad, taught at Stanford, and worked as Senior Mechanical Engineer for Symyx Technologies, developing MEMS industrial sensors.

7. From December 2004 to August 2008, I worked at Synaptics. While at Synaptics, I designed and built several mobile devices and mobile-device accessories. The team I managed retrofitted or designed from scratch hundreds of

capacitive touch interfaces for multiple consumer electronic devices. Through this work, I gained deep experience with manufacturing electronic assemblies and integrating them into a wide array of consumer electronics. This work also provided me with significant experience in the path to mass production, including how to deliver technological improvements that could be mass produced, as we recommended these prototypes as potential product features for customers. My work at Synaptics included architecting the Onyx, a working multitouch-controlled mobile phone prototype, which gained international recognition in 2006, winning the Red Dot Design Concept Award months ahead of Apple's 2007 launch of the iPhone. Also at Synaptics, I both developed and evaluated gesture interactions on multiple consumer devices, including audits of the then-nascent iPhone interface and attempts by competitors to leverage Synaptics's touch technology to compete in the market. This included work on designing improved capacitive touch switches for integration into consumer electronics. After Synaptics, I was Chief Technologist at SK Telecom Americas from September 2008 to September 2009. While at SK Telecom Americas, I evaluated several user experience designs across a range of interfaces, including voice, touch, and gesture. From October 2009 to September 2011, I held positions at Stanford, including Executive Director of the Global Design Innovation course that connects graduate students with corporate partners, as well as Consulting Assistant Professor in the Design Group of the Mechanical

Engineering department. In 2012, I served as Distinguished Lecturer at Cogswell Polytechnical College, teaching courses in robotics and entrepreneurship.

8. After leaving SK Telecom in September 2009, I founded Argus Insights, a consulting firm that I have run for nearly 15 years. Some of my projects have included analyzing what UX aspects are driving adoption in autonomous vehicles and designing UX for industrial cutting tools to lower training requirements and increase operator effectiveness. I am currently a Principal Strategist at CableLabs, a non-profit think tank for the broadband industry. I pursue a mixture of quantitative and qualitative research on consumer behaviors and preferences. I also coach innovation teams and work extensively in artificial intelligence strategy. From April 2017 to September 2018, I served as forum chair and moderator for the IoT (Internet of Things) Forum in Silicon Valley. Since August 2018, I have also taught engineering at the Nueva School.

9. As shown in my CV, I have authored or co-authored over 30 publications, most of which relate to engineering or design. I am a named inventor on at least six issued patents, including patents on technology involving capacitive touch sensing.

B. Applicable Legal Standards

10. I have been asked to provide my opinion as to whether certain claims of U.S. Patent No. 8,708,483 (“the ’483 patent”) are anticipated by and/or would

have been obvious to a person of ordinary skill in the art at the time of the alleged invention, in view of the prior art.

11. I am an engineer and product designer by training and profession. The opinions I am expressing in this report involve the application of my training and technical knowledge and experience to the evaluation of certain prior art with respect to the '483 patent.

12. Although I have been involved as a technical expert in patent matters before, I am not an expert in patent law. Therefore, the attorneys from Knobbe, Martens, Olson & Bear, LLP have provided me with guidance as to the applicable patent law in this matter. The paragraphs below express my understanding of how I must apply legal principles relating to patent validity in my analysis.

13. It is my understanding that in determining whether a patent claim is anticipated by or obvious in view of the prior art, the Patent Office construes the claim by giving the claim its ordinary and customary meaning ascribed to it by a person of ordinary skill in the art at the time of the invention, consistent with the specification. I also understand that in reading the claim, I must not import limitations from the specification into the claim terms; in other words, I must not narrow the scope of the claim terms by implicitly adding disclosed limitations that have no express basis in the claims.

14. It is my understanding that a claim is “anticipated” if a prior art reference describes, either expressly or inherently, each limitation of the claim. I understand that this description must be recognizable to a person of ordinary skill in the art at the time of the alleged invention.

15. It is my understanding that a claim is “obvious” if the claimed subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time of the alleged invention. I also understand that an obviousness analysis takes into account the scope and content of the prior art, the differences between the claimed subject matter and the prior art, and the level of ordinary skill in the art at the time of the invention.

16. In determining the scope and content of the prior art, it is my understanding that a reference is considered appropriate (e.g., analogous) prior art if it falls within the field of the inventor’s endeavor. In addition, a reference is prior art if it is reasonably pertinent to the particular problem with which the inventor was involved. A reference is reasonably pertinent if it logically would have commended itself to an inventor’s attention in considering his problem. If a reference relates to the same problem as the claimed invention, that supports use of the reference as prior art in an obviousness analysis.

17. To assess the differences between prior art and the claimed subject matter, it is my understanding that the law requires the claimed invention to be

considered as a whole. This “as a whole” assessment requires showing that one of ordinary skill in the art at the time of invention, confronted by the same problems as the inventor and with no knowledge of the claimed invention, would have selected the elements from the prior art and combined them in the claimed manner.

18. It is my understanding that something is “inherent in,” and therefore taught by, the prior art, if it necessarily flows from the explicit disclosure of the prior art. I understand that the fact that a certain result or characteristic may be present in the prior art is not sufficient to establish inherency. However, if the result or characteristic is necessarily present based upon the explicit disclosure in the prior art, it is inherent in the prior art and is therefore disclosed.

19. It is my further understanding that the law recognizes several rationales for combining references or modifying a reference to show obviousness of claimed subject matter. Some of these rationales include: combining prior art elements according to known methods to yield predictable results; simple substitution of one known element for another to obtain predictable results; a predictable use of prior art elements according to their established functions; 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; and some teaching, suggestion, or motivation in

the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

20. I understand that a prior art reference may also suggest a limitation of the claims. In that case, even if the prior art reference does not explicitly or inherently disclose the limitation, the motivation to modify the prior art reference to include the limitation may exist within the prior art reference itself. Thus, the limitation would have been obvious over that prior art reference alone. This is the case if a person of ordinary skill in the art would have had a simple design choice or a finite number of identified, predictable solutions, for example, and if the modification furthers the goals of the prior art reference.

21. I further understand that the obviousness analysis must be performed from the perspective of a person of ordinary skill in the art at the time of the alleged invention. This is to avoid using impermissible hindsight in the analysis. The claims of the patent must not be used to provide a road map for obviousness; instead, the claims would have been obvious if a person of ordinary skill in the art would have been motivated to combine the teachings of the prior art to arrive at the claimed invention and had a reasonable expectation of success in doing so.

22. I also understand that an obviousness analysis must consider whether there are additional factors that would indicate that the invention would not have been obvious. These factors include whether there was: (i) a long-felt need in the

industry; (ii) any unexpected results; (iii) skepticism of the invention; (iv) a teaching away from the invention; (v) commercial success; (vi) praise by others for the invention; and (vii) copying by other companies. I am not aware of any evidence that would suggest that the claims of the '483 patent would have been non-obvious. To the extent Patent Owner submits such evidence during the course of the *inter partes* review, I may provide my opinion on such evidence if asked to do so by counsel.

C. Person of Ordinary Skill in the Art

23. It is my understanding that when interpreting the claims of the '483 patent, I must do so based on the perspective of a person of ordinary skill in the art at the relevant priority date. As discussed below, I understand the earliest possible priority date to be May 4, 2007.

24. The '483 patent describes the use of well-known technologies relating to eyewear with electronics integrated into the eyewear frame. Based on my review of the specification and claims of the '483 patent, it is my opinion that a person of ordinary skill in the art would have had a minimum of 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. A POSITA would have also had at least 2 years of experience designing consumer electronics, such as eyewear with

electronics. Additional work experience could serve as a substitute for a formal degree and vice versa. However, my opinions do not turn on this specific definition of the level of ordinary skill. The claims would be anticipated and/or obvious from the perspective of a person of ordinary skill under any reasonable definition.

25. I am able to make this assessment because in the 2000s, I was familiar with design and operation principles common in the mechanical, manufacturing, and mechatronic arts. I, and the engineers that I worked with during the 2000s, had the requisite knowledge to make and use eyewear as described in the claims of the '483 patent. Because I have worked with and supervised engineers, I know very well what their capabilities were in the 2000s, how those engineers would interpret and understand the claims of the '483 patent, and how they would understand the disclosures in the prior art discussed herein.

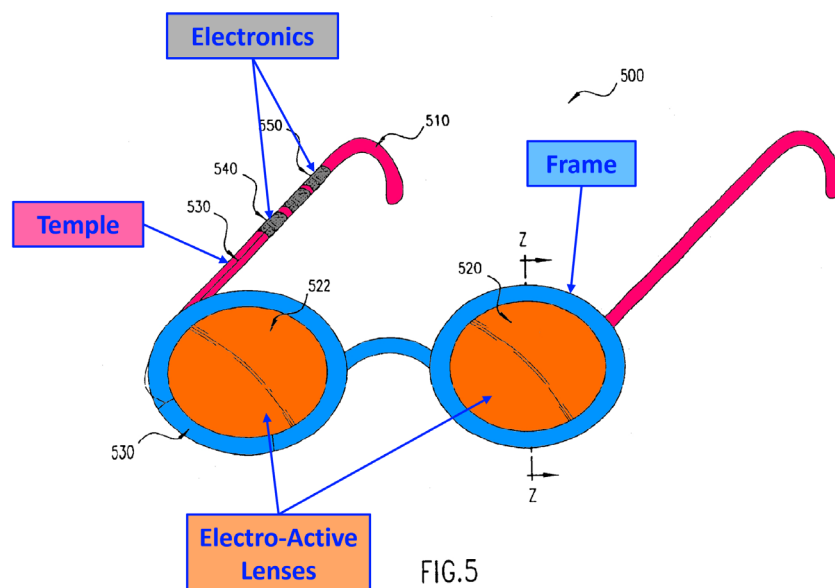
26. In my opinion, as set forth in more detail below, a person having ordinary skill in the art at the time of the invention would have considered the devices and methods claimed in the '483 patent to be anticipated by and/or obvious in view of the prior art.

II. THE TECHNOLOGY

27. The '483 patent states that its invention is directed to “integrating electronic components into an electro-active frame for driving electro-active

focusing lenses.” Ex.1001 (’483 patent), Abstract. Eyewear with electro-active lenses was well known at the time of the ’483 patent’s priority date of May 2007.

28. For example, in 2005, Blum-741 disclosed eyewear having an electro-active lens system, including electronics (e.g., a controller and power source) connected to the lenses. *E.g.*, Ex.1005 (Blum-741), 7:52-8:2.



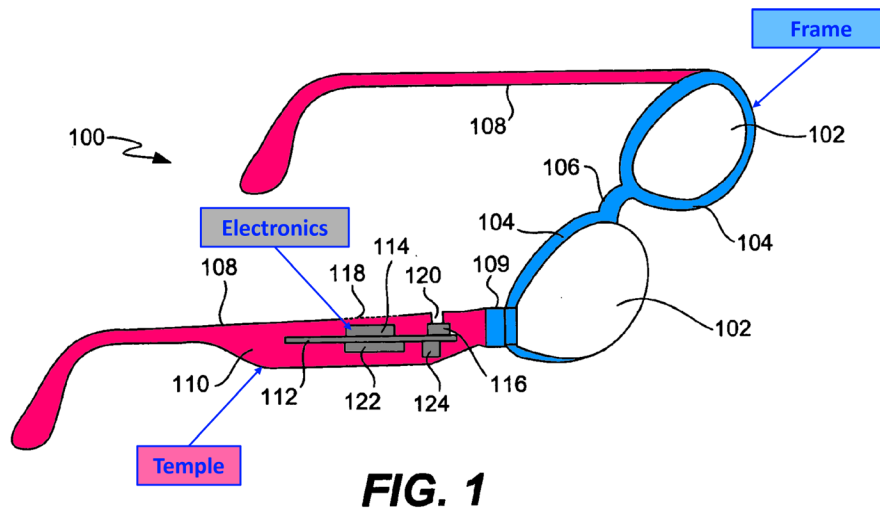
Id., Fig. 5.¹

29. Most of the ’483 patent’s claims are not limited to eyewear with electro-active lenses, but are directed to eyewear having electronics contained in a sealed module in the eyewear frame. *E.g.*, *id.*, independent claims 1, 19. Such eyewear was also well-known at the time of the ’483 patent’s earliest possible priority date

¹ Figures in this declaration are colored and annotated for clarity.

in May 2007. There are multiple examples of such eyewear disclosed in the prior art.

30. In 2005, Howell-596 disclosed eyewear with an integrated radiation detection module. Ex.1003 (Howell-596), Abstract, ¶¶[0194]-[0196]. Howell's eyewear includes electronic components mounted in the temple region of an eyewear frame, and these components may be enclosed in a waterproof protective module housing. *Id.*



Id., Fig. 1.

31. In 1983, Hattori-912, disclosed eyewear that includes a small display driven by an electronics module located in the eyewear frame. Ex.1006 (Hattori-912), 63. The display operates with electronics, such as sensors, power supply, and processing circuitry, that are embedded in the eyewear frame and inside a portion of the frame sealed by a waterproof ring. *Id.*, 63-65.

Figure 1

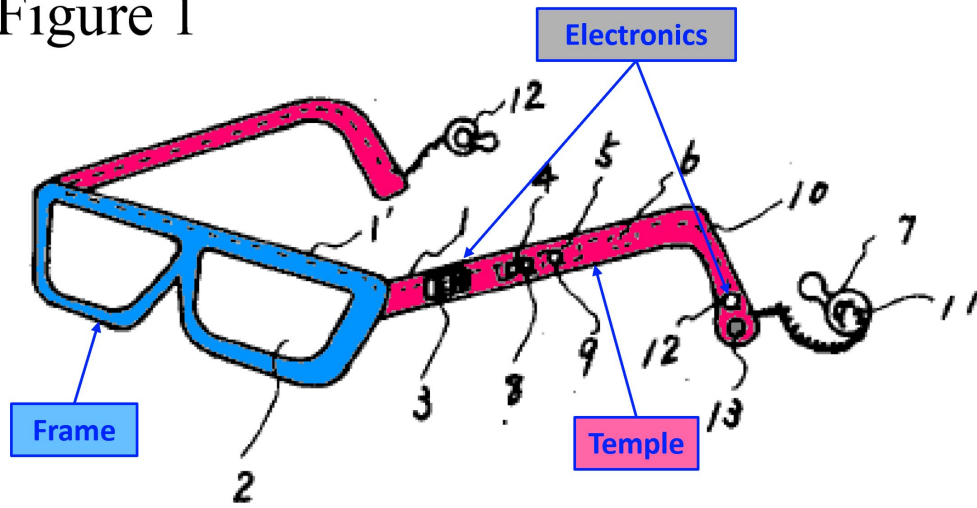
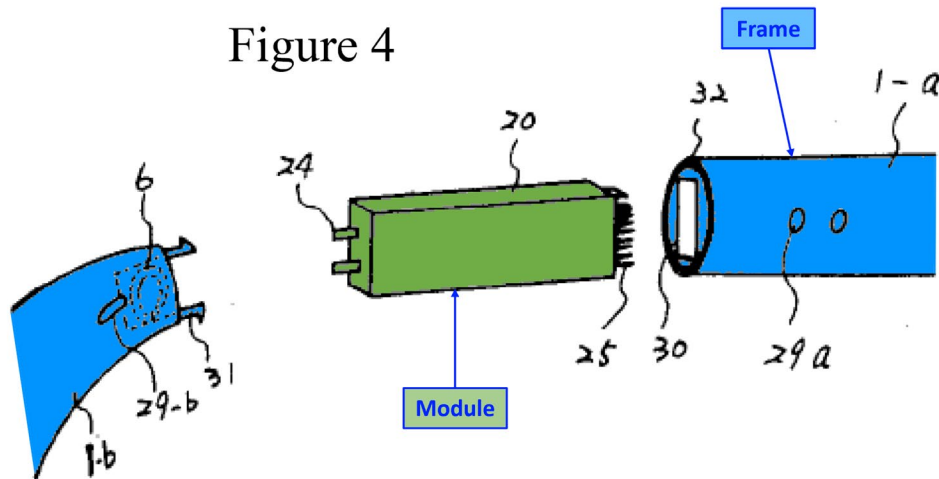


Figure 4



Id., Figs. 1, 4.

32. In 2000, Spitzer disclosed an electronic eyewear system that includes a display system, a camera system, and various sensors mounted on an eyeglass frame.

Ex.1007 (Spitzer), Abstract.

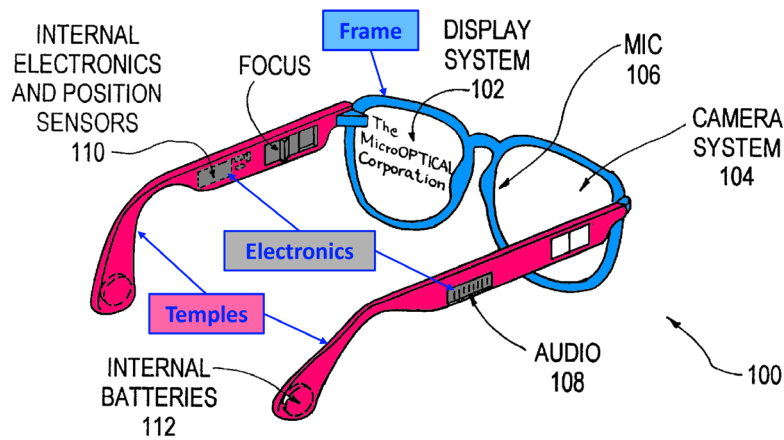


FIG. 1

Id., Fig. 1.

33. In a 2006 patent application, Howell-833 disclosed an electronic eyewear system that included various electronic components mounted on an eyeglass frame. Ex.1004 (Howell-833), Abstract.

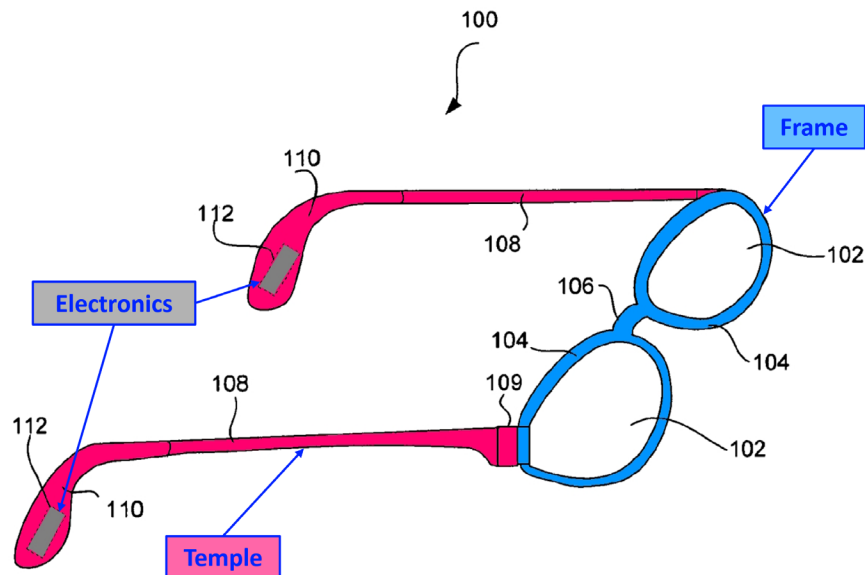


FIG. 1

Id., Fig. 1.

34. Thus, eyewear with integrated electronics, including electronics integrated in a sealed module, was well-known to persons of ordinary skill in the art.

III. THE '483 PATENT

A. Summary of the '483 Patent

1. The Specification

35. The patent describes an eyewear frame with attached and/or embedded electronic components. *E.g.*, Ex.1001 ('483 patent), 2:51-3:21. One example of the disclosed eyewear frame is shown in Figure 8B:

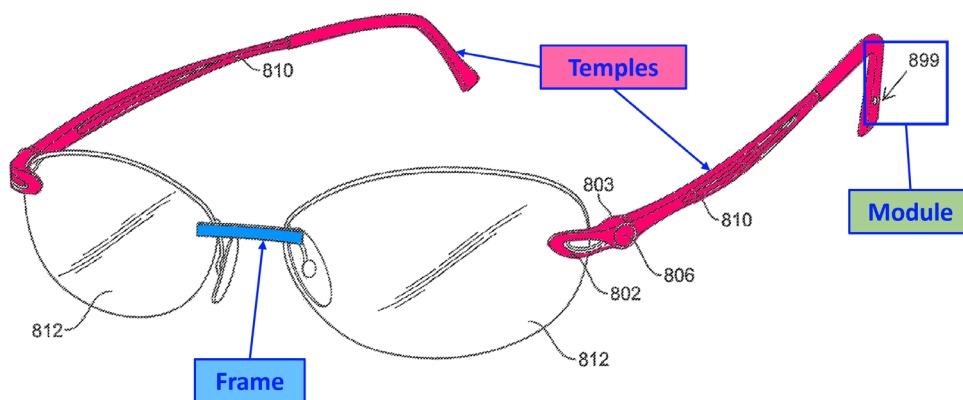


FIG. 8B

Id., Fig. 8B. At least some electronic components, including a power source, may be contained within a module located on or in the temple of the eyewear frame. *Id.* The '483 patent discloses that the module may be sealed to be waterproof. *Id.*, 10:47-50.

36. According to the patent specification, the eyewear may include various electronic components, such as electro-active lenses, switches, detectors, sensors,

transceivers, and the like, which are either inside or outside the module. *E.g., id.*, 2:55-67 (describing electro-active lenses located outside the module), 10:40-47 (describing additional components inside the module).

2. The Claims

37. The '483 patent includes 37 claims, of which two (claims 1 and 19) are independent. I address all 37 claims in this declaration.

38. Claim 1 is set forth below:

Claim 1	
Preamble	Eyewear comprising:
1[a]	a frame; and
1[b]	a sealed moisture resistant module attached to the frame,
1[b][i]	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,
1[c]	wherein the frame comprises a first temple and a second temple, and
1[c][i]	wherein the module is disposed within the first temple.

39. Independent claim 19 is generally the same, except it recites that the module is “disposed, at least partially, on a portion of the frame configured to be behind the ear of a wearer.”

B. Priority Date of the '483 Patent

40. For purposes of this analysis, I have been asked to assume that the '483 patent's earliest possible priority date is its earliest claimed priority date, May 4, 2007.

C. Claim Construction

41. I understand that claim construction in this proceeding requires that claims be construed by giving the claim language its ordinary and customary meaning as understood by a person of ordinary skill in the art at the time of filing and in accordance with the specification and prosecution history. I have applied that standard in my analysis. Further, I note that claim terms may be specifically defined by the patentee. Here, the claim term "frame" is defined to mean the "complete wearable housing that secures both spectacle lenses and aligns them in the proper place relative to the wearer's eyes when being worn." Ex.1001, 4:49-51. And "rimless frame" is defined as a "frame that is designed without eye-wires." *Id.*, 5:18. These definitions are consistent with the plain meaning, and I have used these definitions in my analysis.

IV. THE PRIOR ART

42. In forming my opinions, I have relied on several references that are prior art to the '483 patent. These references, some of which are referenced above, include Howell-596 (U.S. Patent Publication No. 2005/0230596) (Ex.1003);

Howell-833 (U.S. Patent No. 7,581,833) (Ex.1004); Blum-741 (U.S. Patent No. 6,857,741) (Ex.1005); Hattori-912 (Japanese Unexamined Patent Application Publication JPS58-113912, translated into English) (Ex.1006); Spitzer (U.S. Patent No. 6,091,546) (Ex.1007); Ogren (International Patent Publication No. WO2005/119344) (Ex.1008); and Jannard-868 (U.S. Patent No. 5,760,868) (Ex.1009).

A. Howell-596

43. Howell-596 discloses eyewear with a radiation (e.g. ultraviolet (UV) radiation) monitoring system integrated in the eyewear. Ex.1003 (Howell-596), Abstract. As shown in Figure 1, the UV-monitoring eyewear includes electronic components mounted in the temple of the eyewear frame:

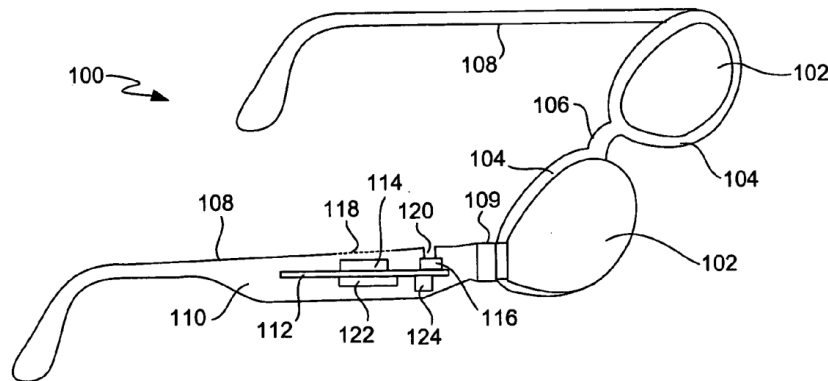


FIG. 1

Id., Fig. 1. Howell-596 describes that all components of the UV monitoring system may be contained within one or both temples of the eyewear frame. *Id.* ¶[0007]. Howell-596 discloses that an embodiment of the eyewear includes a detector,

electrical circuitry, an output device, one or both of a battery and a solar cell to power the electrical circuitry, one or more sensors, and communication capabilities. *Id.* ¶[0008].

44. An embodiment of the UV detection system is depicted in Figure 15A:

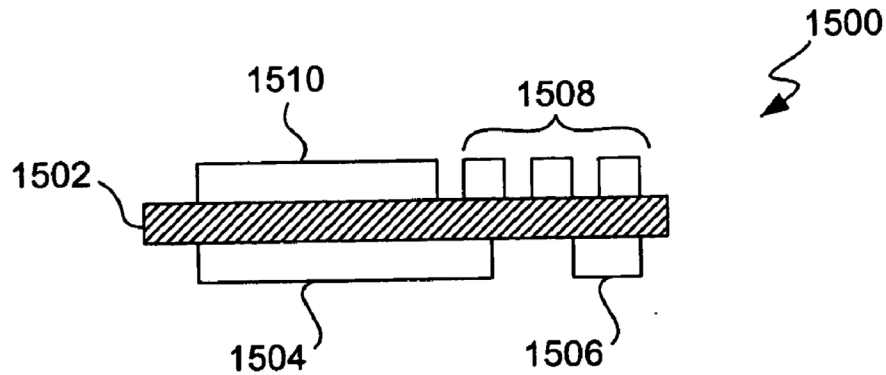


FIG. 15A

Id., Fig. 15A. As shown, the UV detection system 1500 includes a substrate, e.g., a printed circuit board, 1502. *Id.* ¶[0184]. The system includes a UV sensor 1506, a power source 1504 (either a battery or solar cell), a display device 1510, and electrical circuitry 1508. *Id.*

45. Howell-596 also describes that the UV detection system can be contained within a module housing such as depicted in Figure 17A:

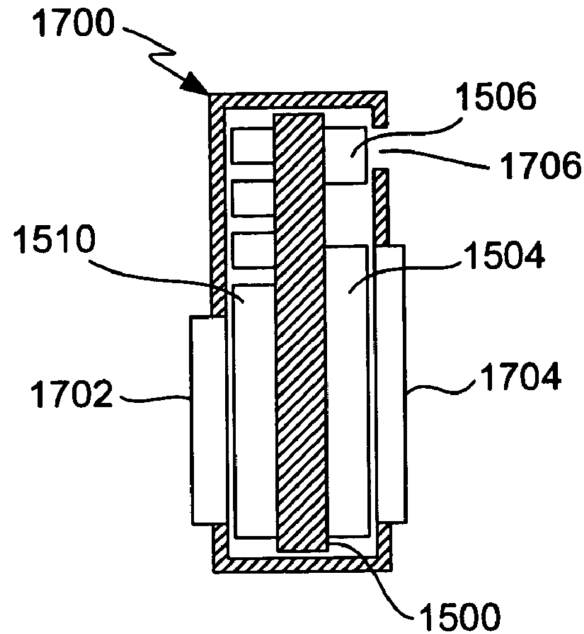


FIG. 17A

Id., Fig. 17A. The module housing 1700 includes window 1702 for the display device and window 1704 for when the power supply 1504 is a solar cell. *Id.* ¶[0194]. Howell 596 describes that the housing 1700 can have an opening, such as depicted above, or it can also be water-resistant or water-proof. *Id.* The module can be “placed into an opening, cavity or container of any eyewear housing, such as a temple region of the eyewear housing.” *Id.* ¶[0195]. The module housing allows one “to regularize or standardize the form factor for the UV detection system, such that the opening, cavity or container of the eyewear housing can be regularized or standardized.” *Id.*

B. Howell-833

46. Howell-833 discloses various techniques for integrating electronic components into eyewear frames. *E.g.*, Ex.1004 (Howell-833), Abstract. For example, Howell-833 discloses that electronic components “can be partially or completely internal to eyewear” and can be provided “without having to substantially compromise aesthetic design principles of the eyewear.” *Id.* Howell-833’s Figure 1 shows one example, where electronic components (112) are integrated into an eyewear frame at the end of each temple piece, behind the ear of a wearer of the eyewear:

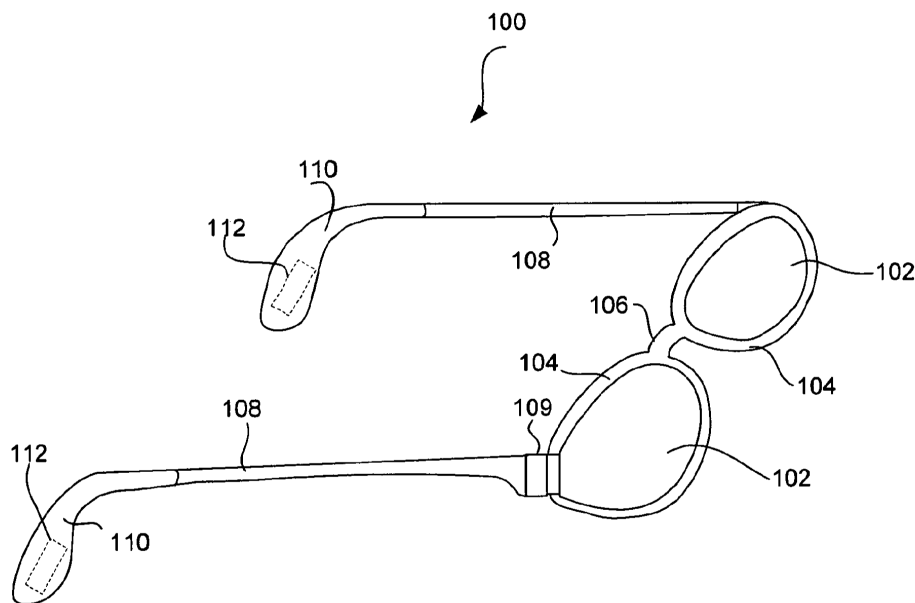


FIG. 1

Id., Fig. 1.

C. Blum-741

47. Blum-741 discloses eyewear with electro-active lenses. Ex.1005 (Blum-741), 1:20-47. Blum-741's eyewear includes various electronic components that power and/or control the electro-active lenses. *E.g., id.*, 7:52-8:2, 29:66-30:13. One embodiment of Blum-741's eyewear is shown in Figure 5:

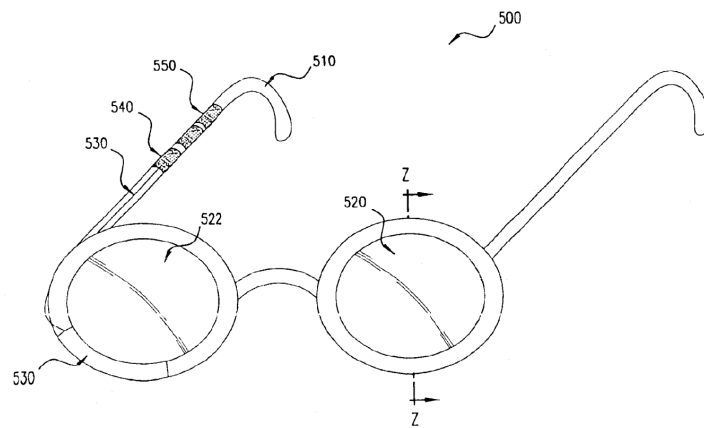


FIG.5

Id., Fig. 5.

48. Blum-741 further discloses that the electro-active lenses 520 are electrically connected to various other eyewear components, including “by connecting wires 530 to electro-active eyewear controller 540 [e.g., a processor] and power source 550.” *Id.*, 7:52-58. The electrical components are contained within the temple of frame 510. *Id.*

49. Blum-741 discloses that its eyewear frame's temple includes a power source, such as batteries. *Id.*, 29:66-30:13. Blum-741 further discloses that the

batteries “are rechargeable, for example, by placing in a portable A.C. charging unit which charges ... by magnetic induction.” *Id.*, 37:49-65.

50. Blum-741 describes various advantages of electro-active lenses, including, for example, providing multiple vision correction zones. *Id.*, Abstract. Blum-741 discloses, for example, that its electro-active lenses “hav[e] the necessary electro-active means to change focus electrically.” *Id.*, 11:53-59. For example, Blum-741 provides that “the first electro-active element 5020 may be used to focus the image 5010 along the z-axis by adjusting the optical power of the system 5000 to a more positive or more negative optical power, depending on the desired location of the resulting image.” *Id.*, 52:50-65. Blum-741 also discloses that its electro-active lenses may include an electro-active layer that “create[s] an electronic tint or sunglass effect.” *Id.*, 26:27-48; *id.*, 27:12-16, 37:3-13.

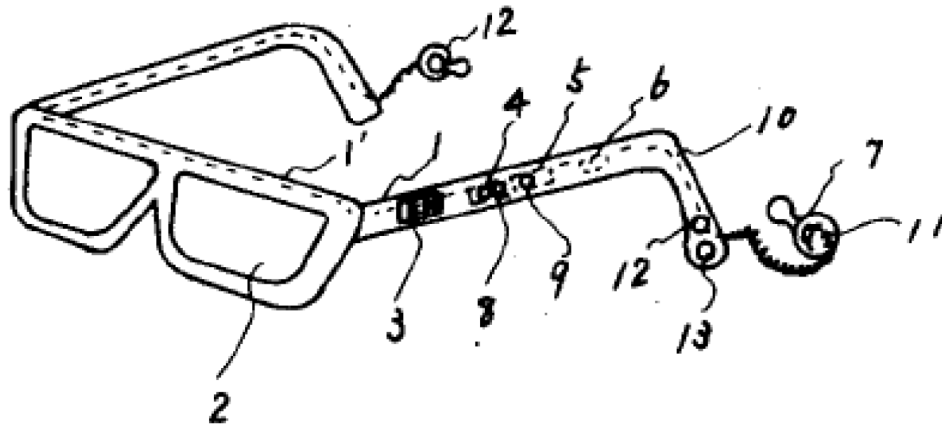
51. Blum-741 discloses that its electro-active lenses are used to determine a patient’s eyewear prescription and then the eyewear may “simply display ... the patient or wearer’s best corrected prescription.” *Id.*, 7:22-29; *see also id.*, 6:10-19 (electro-active lens 220 connected to controller 280 “that provides a prescription display 290”).

D. Hattori-912

52. Hattori-912 discloses eyewear that includes a small display mounted to an eyewear frame. Ex.1006 (Hattori-912), 63. Hattori-912’s eyewear includes

electronics, such as sensors, power supply, and processing circuitry, that are embedded in the eyewear frame and operate the display. *Id.*, 63-65. Hattori-912's eyewear is shown in Figure 1:

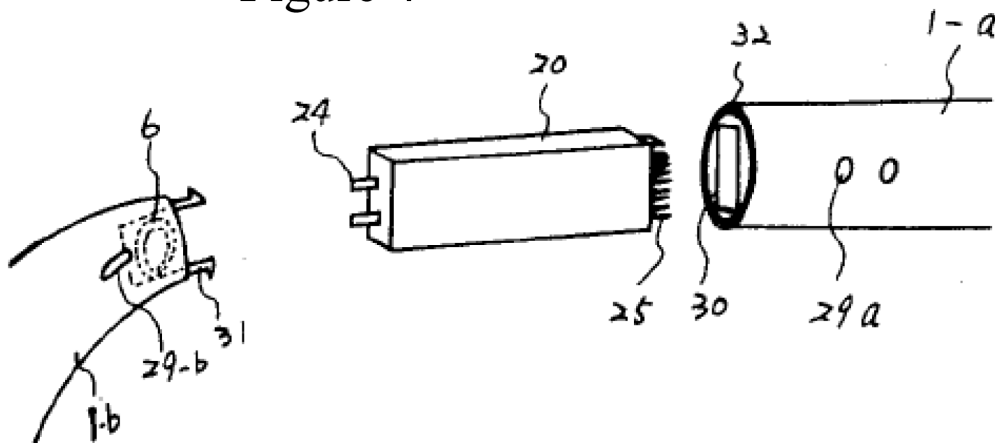
Figure 1



Id., Fig. 1.

53. Furthermore, Hattori-912 discloses that the eyewear frame may include a portion sealed by a waterproof ring (32). *Id.*, 64.

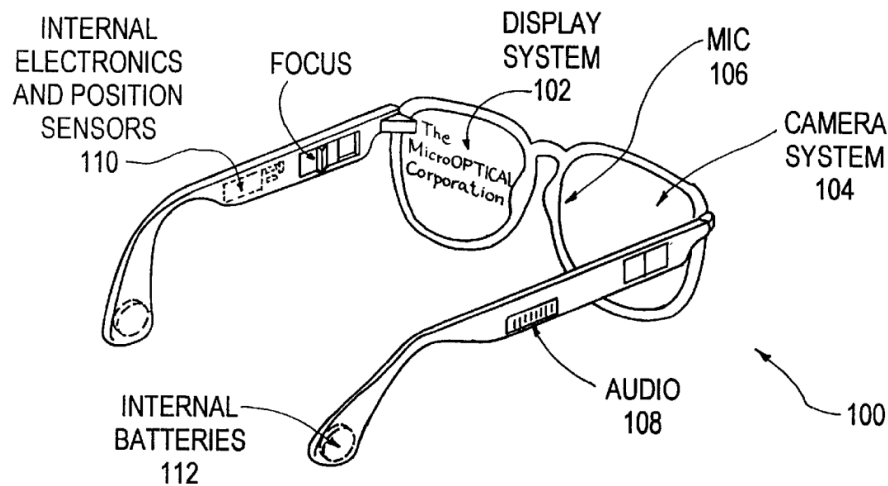
Figure 4



Id., Fig. 4.

E. Spitzer

54. Spitzer discloses an electronic eyewear system that includes a display system, a camera system, and various sensors mounted on an eyeglass frame. *E.g.*, Ex.1007 (Spitzer), Abstract. One embodiment of Spitzer’s system is shown in Figure 1:

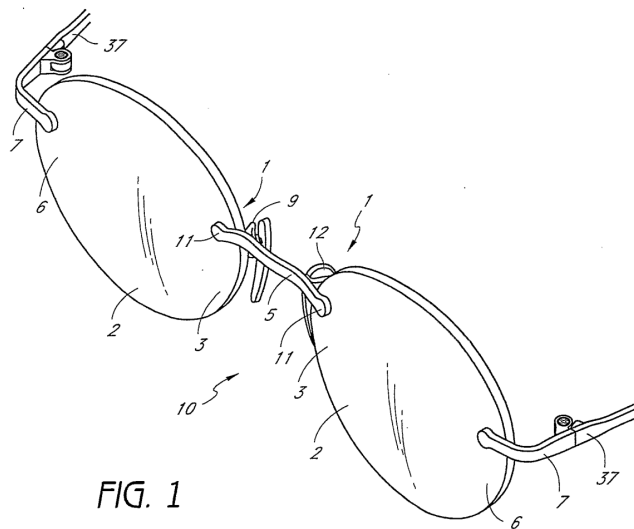


Id., Fig. 1.

55. Spitzer discloses that components located on various parts of an eyewear frame may be connected via “flexible stranded insulated wire, flexible coaxial cable, or flexible circuitry based on Kapton or other polymeric material.” *Id.*, 7:44-60. Spitzer further discloses that such flexible circuitry is used to connect to an external device not mounted on the eyewear frame, such as one “placed in a pocket or worn on a belt.” *Id.*, 9:49-10:4.

F. Ogren

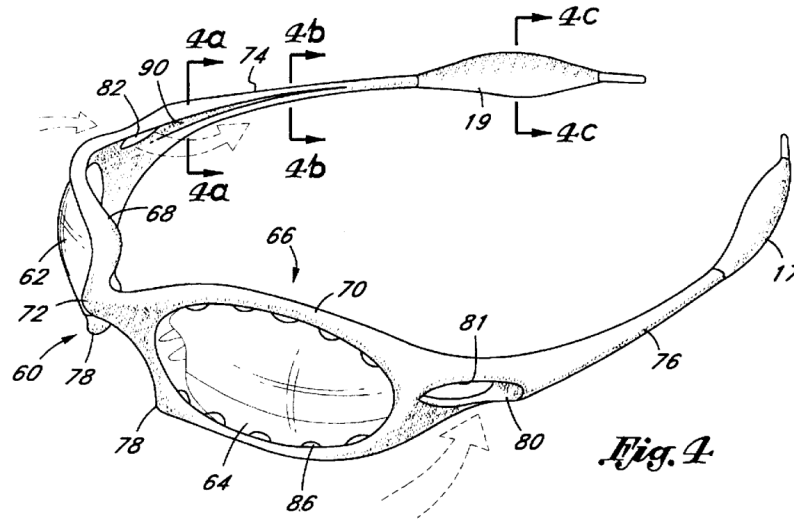
56. Ogren discloses eyewear, and in particular a system for connecting together various components of eyewear such as lenses, temples, hinges, and the like. *See, e.g.*, Ex.1008 (Ogren), 1. A rimless embodiment of Ogren's eyewear is shown in Figure 1:



Id., Fig. 1.

G. Jannard-868

57. Jannard-868 discloses a hingeless eyewear frame designed to increase the retentive force between the eyewear and the head and to allow for ventilation. Ex.1009 (Jannard-868), Abstract. One embodiment of Jannard-868's eyewear is shown in Figure 4:



Id., Fig. 4. This embodiment of Jannard-868 is a “dual-lens hingeless eyeglass system” where the temples “are molded in a hingeless singular piece construction with the eyeglass frame.” *Id.*, 7:63-8:11.

V. HOWELL-596 ANTICIPATES CLAIMS 1, 9-10, 14-15, AND 18

58. As I explain below, Howell-596 discloses each element of claims 1, 9-10, 14-15, and 18, and thus anticipates those claims.

A. Claim 1

1. Preamble

59. The preamble of claim 1 recites “[e]yewear.” Howell-596 discloses eyewear. *E.g.*, Ex.1003 (Howell-596), Abstract, ¶[0007], Fig. 1.

2. Frame

60. Claim 1 recites “a frame.” Howell-596 discloses that its eyewear comprises a frame. *E.g.*, Ex.1003 (Howell-596) ¶¶[0073] (“The UV monitoring

glasses 100 include a frame”), [0203]-[0206], Figs. 1, 19-22. The frame is shown in Figure 1:

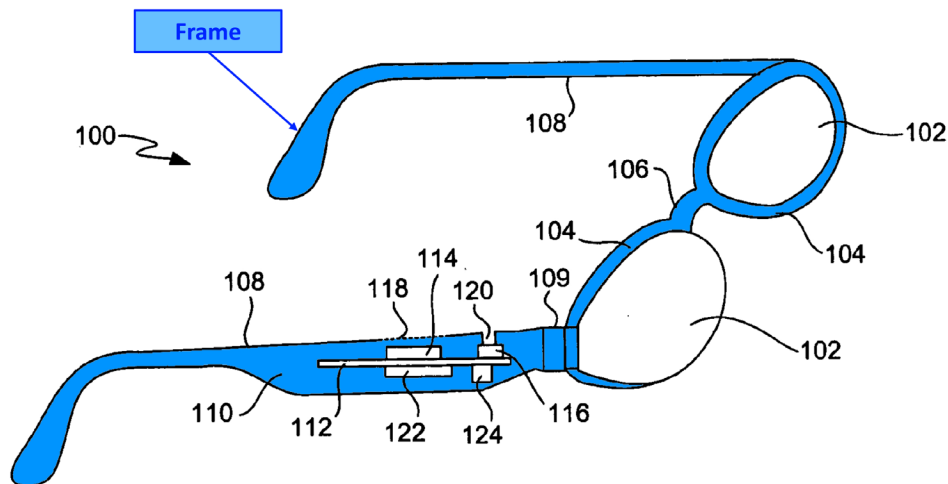


FIG. 1

Id., Fig. 1. Thus, Howell-596 discloses this limitation.

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.

4. Components Within the Module

62. Claim 1 recites that “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.” Howell-596 discloses that its module comprises various electrical components. The components include, for example, a power source (one or both of a battery and a solar cell) and a UV detector. *See, e.g.*, Ex.1003 (Howell-596) ¶[0194] (power source 1504 and UV detector 1506 contained within sealed module housing 1700).

63. Howell-596 discloses that its UV detection system 1500 includes “power source 1504 [which] is, for example, a battery or a solar panel of one or more solar cells.” *Id.* ¶[0184]; *see id.* ¶[0073] (discussing “solar cell 114”). Howell-596 also discloses that the power source 1504 is included within the sealed module. *Id.* ¶[0194] (module may house UV detection system 1500), ¶[0184] (UV detection system 1500 includes power source 1504).

64. The ’483 patent discloses several types of detectors, including a photo detector, a motion detector, and a view detector. Ex.1001 (’483 patent), 10:40-59. Howell-596 likewise discloses a “UV detector 306” that may comprise “a photodetector 305 and an optical filter 308.” Ex.1003 (Howell-596) ¶[0078]; *see also id.* ¶¶[0073]-[0075], [0078]-[0082], [0211]-[0212]. Howell-596 also discloses that a UV detector is included within the sealed module. *Id.* ¶[0194] (“the module housing 1700 can operate as a housing for the UV detection system 1500”).

65. Howell-596’s power source and UV detector are shown within the module in Figure 17A:

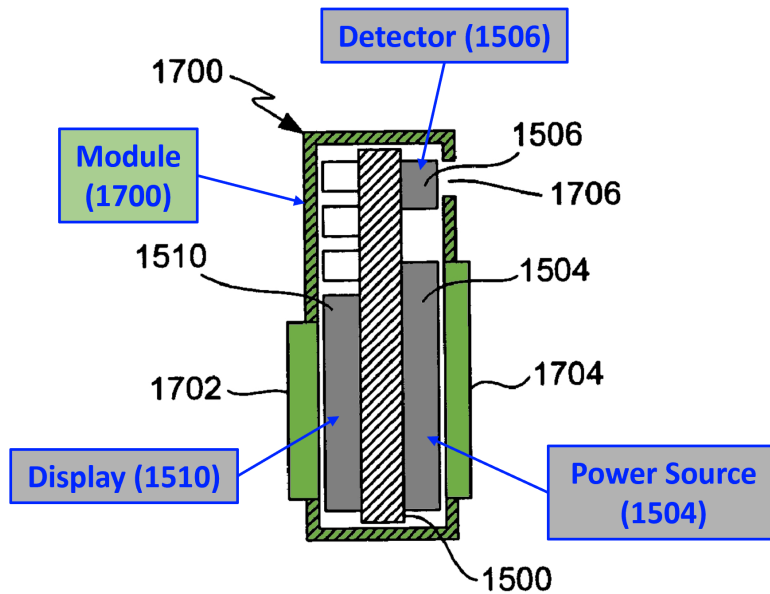


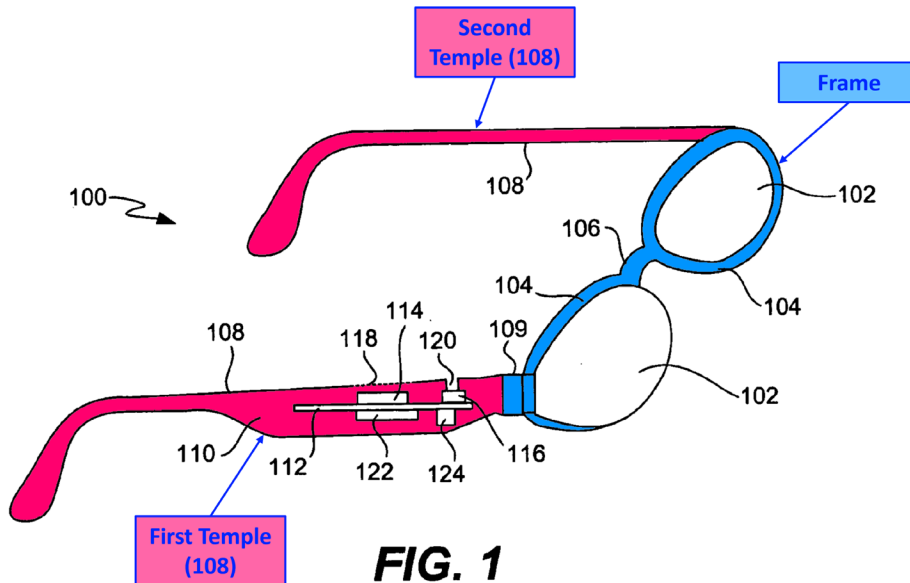
FIG. 17A

Id., Fig. 17A; *id.* ¶¶[0184], [0194].

66. Because Howell-596 discloses that its sealed module includes at least a power source and a detector, Howell-596 discloses this limitation.

5. First and Second Temple

67. Claim 1 recites that “the frame comprises a first temple and a second temple.” Howell-596 discloses a frame having first and second temples. *E.g.*, Ex.1003 (Howell-596) ¶¶[0007], [0073]. For example, Howell-596 discloses that “[t]he UV monitoring glasses 100 also include a pair of temples (or arms) 108” which “are considered part of the frame.” *Id.* ¶[0073]. This is shown, for example, in Figure 1:



Id., Fig. 1; *see also id.* ¶¶[0068], [0203]-[0206], Figs. 19-22. Thus, Howell-596 discloses this limitation.

6. Module Disposed Within First Temple

68. Claim 1 recites that “the module is disposed within the first temple.” Howell-596 discloses that the module is disposed within a temple of the eyewear frame. Ex.1003 (Howell-596) ¶¶[0195], [0197]. Thus, Howell-596 discloses this limitation.

69. Because Howell-596 discloses each element of claim 1, Howell-596 anticipates the claim.

B. Claim 9

70. Claim 9 depends from claim 1 and further recites that “the module is removably attached to the frame.” Howell-596 discloses this limitation because

Howell-596 discloses that its “module housing 1700 is contained by the eyewear housing 1720” and “can, for example, be held in position with respect to the eyewear housing 1720 by ... an interference fit.” Ex.1003 (Howell-596) ¶[0196]. Based on my experience, one of skill would understand an interference fit would provide a removable connection. *See, e.g.*, Ex.1010 (McGraw-Hill Engineering Dictionary), 298. Accordingly, Howell-596 discloses each limitation of claim 9 and thus anticipates the claim.

C. Claim 10

71. Claim 10 depends from claim 1 and further recites that “the module is affixed directly to the frame.” Howell-596 discloses this limitation because it discloses that “[t]he module housing 1700 can, for example, be held in position with respect to the eyewear housing 1720 by an adhesive[.]” Ex.1003 (Howell-596) ¶[0196]. Accordingly, Howell-596 discloses each limitation of claim 10 and thus anticipates the claim.

D. Claims 14-15

72. Claim 14 depends from claim 1 and further recites that “the module is substantially water-proof.” Claim 15 likewise depends from claim 1 and further recites that “the module is water-proof.” Howell-596 discloses that the module may “not include vents or holes, so as to be water-resistant or water-proof.” Ex.1003 (Howell-596) ¶[0194]. Thus, Howell-596 discloses that the module is water-proof

(and, thus, substantially water-proof). *Id.* Accordingly, Howell-596 discloses each limitation of claims 14 and 15 and thus anticipates the claims.

E. Claim 18

73. Claim 18 depends from claim 1 and further recites that “the module includes electronic components configured to enable an electronic display.” Howell-596 discloses that its module may include electronic components configured to enable an electronic display because Howell-596 discloses that its module may include an electronic display. *E.g.*, Ex.1003 (Howell-596) ¶¶[0184], [0194], Figs. 15A, 17A-17B. In particular, Howell-596 discloses that its module includes “electrical circuitry 1508 and a display device 1510 (e.g., LCD or LED),” which are electronic components configured to enable an electronic display. *Id.* ¶¶[0184] (disclosing 1508 and 1510 as part of UV detection system 1500), [0194] (UV detection system 1500 is contained in module). Accordingly, Howell-596 discloses each limitation of claim 18 and thus anticipates the claim.

VI. HOWELL-596 RENDERS CLAIMS 1-2, 6-10, 13-16, AND 18 OBVIOUS

74. As I explain below, Howell-596 discloses each element of claims 1-2, 6-10, 13-16, and 18, and renders those claims obvious as a whole.

A. Claims 1, 9-10, 14-15, and 18

75. Because, as I have described above in Paragraphs 58-73, Howell-596 discloses each limitation of claims 1, 9-10, 14-15, and 18, those claims would have

been obvious to a person of ordinary skill in the art in view of Howell-596. To the extent there were any difference between these claims and what is disclosed in Howell-596, the claims nonetheless would have been obvious to a person of ordinary skill. For example, to the extent Howell-596 does not disclose one or more limitations of those claims, such limitation(s) are at least suggested by Howell-596 for the reasons discussed above. *See* ¶¶58-73, above. Further, a person of ordinary skill would have found a motivation to modify Howell-596 and would have had a reasonable expectation of success in doing so, based on the suggestion in Howell-596 itself and/or based on the person of ordinary skill's own knowledge. For example, the other prior art references I rely on in this declaration establish that the features recited in the claimed invention were well-known in the art and represent known techniques, which one of ordinary skill would have recognized could be used to modify the Howell-596 device in the same way. Accordingly, claims 1, 9-10, 14-15, and 18 would have been obvious to a person of ordinary skill in the art in view of Howell-596.

B. Claim 2

76. Claim 2 depends from claim 1 and further recites that “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.” Howell-596 discloses this limitation because

Howell-596 discloses that its eyewear “can also include one or more connectors” which “facilitate electrical or mechanical interconnection with an external electrical device (e.g., computing device, media player, headset, power source).” Ex.1003 (Howell-596) ¶[0215]; *see also id.* ¶¶[0220]-[0221]. A person of ordinary skill in the art would have understood that such a connector would connect the sealed module (which, as discussed above, contains at least the detector and power source) to the external electrical device because those portions of the eyewear are what would be connected to the external devices disclosed by Howell-596. For example, the power source of the eyewear would be connected to an external power source to facilitate charging. The detector of the eyewear would be connected to an external computing device to facilitate calibration. *Id.* ¶[0220].

77. To the extent Howell-596 does not explicitly disclose that the sealed module includes Howell-596’s electrical connector, Howell-596 suggests it for the reasons I discussed in the previous paragraph. A person of ordinary skill in the art would have been motivated to include the electrical connector in the sealed module to facilitate, for example, charging and calibration. *See id.* ¶¶[0220]-[0221]. Furthermore, a person of ordinary skill would have had a reasonable expectation of success in doing so based on Howell-596’s disclosure, including that the sealed module contains “the UV detection system,” which Howell-596 discloses includes such functionality. *Id.*; *id.* ¶[0194].

78. Accordingly, Howell-596 discloses, or at least suggests, each limitation of claim 2 and the claim would have been obvious to a person of ordinary skill in the art in view of Howell-596.

C. Claim 6

79. Claim 6 depends from claim 1 and further recites that “the module includes each of drive circuit, a sensor, and a power source.”

1. Drive Circuit

80. A drive circuit is a circuit used to control another component, such as a display, speaker, LED indicator, or capacitive touch sensor. *See, e.g.*, Ex.1012 (Merriam Webster’s Collegiate Dictionary), 354 (defining “driver” as “an electronic circuit that supplies input to another electronic circuit”). This definition, which would have been well-known to a person of ordinary skill, is consistent with the term’s use in the ’483 patent.

81. Howell-596 discloses that its UV detection system may include a drive circuit for driving a LCD display. Ex.1003 (Howell-596) ¶¶[0140], [0145], [0164]-[0175], Figs. 14O-14Q. Under certain conditions, “the LCD driver 1430 causes an output indication to be provided on a LCD display 1432.” *Id.* ¶[0140]. Howell-596 discloses at least three embodiments of “driver circuitry” providing an output indication on a LCD display. *Id.* ¶¶[0164]-[0175], Figs. 14O-14Q.

82. Thus, Howell-596 discloses that its eyewear comprises a drive circuit. To the extent Howell-596 does not explicitly disclose that the drive circuit is included in the sealed module, a person of ordinary skill would have been motivated to configure Howell-596's eyewear that way for the reasons I discuss below in Paragraphs 88-93.

2. Sensor

83. The '483 patent discloses several examples of sensors, including "one or more miniature or micro tilt switches, accelerometer, micro gyro, range finder, view detector, [and] imager," but does not limit sensors to these examples. Ex.1001 ('483 patent), 10:40-59.

84. Howell-596 also discloses several types of sensors. For example, Howell-596 discloses that its UV detection system may include one or more "auxiliary sensors 402" providing additional information. Ex.1003 (Howell-596) ¶[0079], Fig. 5. One such auxiliary sensor is a "being-worn" sensor, which includes a "thermal sensor" or a "stress sensor." *Id.* ¶¶[0080], [0086]-[0087]. Howell-596 also discloses that an auxiliary sensor may be an "environmental sensor" that senses environmental conditions like temperature, pressure, humidity, and/or the presence of toxins. *Id.* ¶[0089]. Further, Howell-596 discloses that an auxiliary sensor may be a "physical sensor," such as pedometer or heart-beat sensor, that senses some physical condition of the user. *Id.* ¶¶[0090]-[0091].

85. The '483 patent also states that a sensor may be a switch or detector. Ex.1001 ('483 patent), 10:44-46. Accordingly, each of the components I have discussed above as a detector is also a sensor. See ¶¶62-66, above.

86. Thus, Howell-596 discloses that its eyewear comprises a sensor. To the extent Howell-596 does not explicitly disclose that the sensor is included in the sealed module, a person of ordinary skill would have been motivated to configure Howell-596's eyewear that way for the reasons I discuss below in Paragraphs 88-93.

3. Power Source

87. As I have discussed above in Paragraphs 62-66, Howell-596 discloses that its sealed module includes a power source.

4. Components Included Within the Sealed Module

88. To the extent Howell-596 does not explicitly disclose that one or more of the above components is included within the sealed module, it would have been obvious to a person of ordinary skill in the art to configure Howell-596's eyewear to include those components within the sealed module for several reasons.

89. First, Howell-596 suggests doing so. Howell-596 states that the sealed module houses "the UV detection system 1500." Ex.1003 (Howell-596) ¶[0194]. Because, as discussed above, Howell-596 describes each of the components as part of a UV detection system, Howell-596 suggests their inclusion in the sealed module.

This disclosure of Howell-596 also provides the person of ordinary skill with a reasonable expectation of success in configuring the sealed module to include the entire UV detection system, including each of the components above. A person of ordinary skill would have reasonably expected success because each of the components was well known, as evidenced by Howell-596's disclosure, and based on my experience, integrating each of the components into a single module was well within such a person's skill.

90. Second, a person of ordinary skill would have been motivated to include each component in the sealed module to obtain the benefits of doing so; for example, to protect each of the components from potentially harmful moisture that could cause it to stop working temporarily or permanently. Furthermore, including as many components of the UV detection system as possible within the sealed module furthers Howell-596's goal of "regulariz[ing] or standardiz[ing] the form factor for the UV detection system." Ex.1003 (Howell-596) ¶[0195]. This 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. It would also make the eyewear easier to manufacture and assemble. *Id.* ¶[0201] ("By having the switch in the module, the manufacture and assembly of the end-product having the UV detection system can be simplified.").

91. Third, such a modification represents nothing more than the simple addition of one known element (one or more of the components described above) to another known element (Howell-596's sealed module) to obtain predictable results (a sealed module as in Howell-596 that includes the one or more components).

92. Fourth, the combination represents the use of a known technique (including one or more of the components described above) to improve a similar device and method (Howell-596's UV detection system contained in a sealed module) in the same way.

93. Fifth, the combination applies a known technique (including one or more of the components described above) to a known device and method (Howell-596's UV detection system contained in a sealed module) that is ready for improvement and yields predictable results (a sealed module as in Howell-596 that includes the one or more components).

94. Accordingly, Howell-596 discloses each limitation of claim 6 and the claim would have been obvious to a person of ordinary skill in view of Howell-596.

D. Claim 7

95. Claim 7 depends from claim 1 and further recites that "the module includes an antenna and at least one of a transmitter, a receiver or a transceiver." Howell-596 discloses that its UV detection system may include "a communication module [which] would allow data transmission to and from the radiation monitoring

system (namely, the eyewear) and an external device.” Ex.1003 (Howell-596) ¶[0221]. “The data transmission can be wireless[.]” *Id.* A person of ordinary skill in the art would have understood this disclosure to encompass an antenna, transmitter, and receiver, or a transceiver, because such features are necessary to provide the disclosed functionality: namely, wireless “data transmission to and from” the eyewear.

96. Even if Howell-596 did not disclose including an antenna, transmitter, and receiver, or a transceiver, doing so would have been obvious in view of Howell-596’s suggestion. A person of ordinary skill would have been motivated to include an antenna, transmitter, and receiver (or transceiver) in view of Howell-596’s disclosure of wireless data transmission, and would have had a reasonable expectation of success, because those features have long been known for achieving wireless data transmission. For example, Corazza (Ex.1013) describes Marconi’s transmitter and receiver setup for wireless data transmission in 1895.

97. Thus, Howell-596 discloses, or at least suggests, that its eyewear comprises an antenna, transmitter, receiver, and/or transceiver. To the extent Howell-596 does not explicitly disclose that the antenna, transmitter, receiver, and/or transceiver are included in the sealed module, a person of ordinary skill would have been motivated to configure Howell-596’s eyewear that way for the same reasons I have discussed above in Paragraphs 88-93.

98. Accordingly, Howell-596 discloses each limitation of claim 7 and the claim would have been obvious to a person of ordinary skill in view of Howell-596.

E. Claim 8

99. Claim 8 depends from claim 1 and further recites that “the module includes a sensor” and “the sensor comprises a manual switch.” According to the ’483 patent, a manual switch is “for example, a touch button, photo-detector, motion detector, [or] capacitive touch sensor[.]” Ex.1001 (’483 patent), 10:40-42.

100. Howell-596 discloses that its system may include a “‘being-worn’ sensor” that “can be implemented as a switch.” Ex.1003 (Howell-596) ¶[0088]. Howell-596 further discloses that such a switch utilizes “optical, magnetic-, or mechanical means,” which means the switch is a manual switch responsive to user action. *Id.*

101. As another example, Howell-596’s UV detector is, or at least comprises, a UV sensor. *See* ¶¶64-65, above. Howell-596 discloses that its UV sensor system may include switches such as a “skin type [switch], reset switch and/or an on/off switch.” Ex.1003 (Howell-596) ¶[0099]. These switches are manual switches because they are responsive to user actions. *E.g., id.* ¶¶[0099]-[0100], [0181], [0193], [0216].

102. Accordingly, Howell-596 discloses each limitation of claim 8 and the claim would have been obvious to a person of ordinary skill in view of Howell-596.

F. Claim 13

103. Claim 13 depends from claim 1 and further recites that “the module is hermetically sealed.” As I have discussed above in Paragraph 72, Howell-596 discloses that the module may be waterproof. For the same reasons, a person of ordinary skill would have understood Howell-596 to disclose that the module is hermetically sealed. Something that is hermetically sealed is sealed so as to be air-tight. Ex.1010 (McGraw-Hill Engineering Dictionary), 269 (defining “hermetic seal” as “[a]n airtight seal”). Howell-596 contrasts its water-proof arrangement that has no vents or holes with an arrangement that “include[s] one or more vents or holes so that air can circulate through the module housing 1700.” Ex.1003 (Howell-596) ¶[0194]. A person of ordinary skill would have understood that a configuration without vents or holes would prevent air circulation through the module (and thus it would be air-tight). *Id.* Thus, Howell-596 discloses, or at least suggests, that the module is hermetically sealed. Accordingly, Howell-596 discloses, or at least suggests, each limitation of claim 13 and the claim would have been obvious to a person of ordinary skill in view of Howell-596. Moreover, even if a hermetically sealed module were not taught or suggested by Howell-596, a person of ordinary skill in the art would have known to hermetically seal the module for a variety of reasons, for example, to keep the components clean, dust-free, etc.

G. Claim 16

104. Claim 16 depends from claim 1 and further recites that “the module is substantially wear resistant.” A person of ordinary skill would have understood “wear resistant” to mean resistant to deterioration from damage caused by relative motion between the module and another surface. *E.g.*, Ex.1010 (McGraw-Hill Engineering Dictionary), 613. Howell-596 discloses this limitation because it discloses that “[t]he module housing 1700 protects the module.” Ex.1003 (Howell-596) ¶[0195]. A person of ordinary skill 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. Accordingly, Howell-596 discloses each limitation of claim 16 and the claim would have been obvious to a person of ordinary skill in view of Howell-596. Moreover, designing products to be wear resistant is a conventional aspect of product design well known to a person of ordinary skill in the art, even if it were not taught by Howell-596.

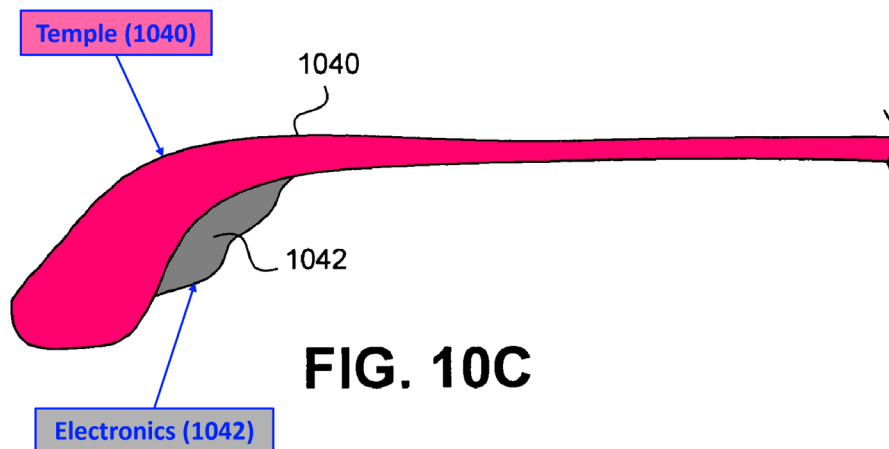
VII. HOWELL-596 AND HOWELL-833 RENDER CLAIMS 19-20, 24-28, 31-35, AND 37 OBVIOUS

105. As I explain below, Howell-596 and Howell-833 together disclose each element of claims 19-20, 24-28, 31-35, and 37, and render those claims obvious as a whole.

A. Claim 19

106. Independent claim 19 recites many of the same limitations as claim 1. These limitations are disclosed by Howell-596 for the reasons I have discussed above in Paragraphs 59-69. Claim 19 also recites that “the module is disposed, at least partially, on a portion of the frame configured to be [sic] behind the ear of a wearer of the eyewear.”

107. Howell-833 discloses several different locations on an eyewear frame where electronics could be placed. *E.g.*, Ex.1004 (Howell-833), 21:41-22:2, Figs. 10A-10C. One such location is “in the vicinity of the user’s ear, such as behind the user’s ear.” *Id.*, 21:62-22:2, Fig. 10C. This placement is shown in Figure 10C of Howell-833:



Id., Fig. 10C; *see also id.*, Fig 1.

108. A person of ordinary skill would have been motivated to place Howell-596’s sealed module at least partially behind the wearer’s ear in view of Howell-

833's disclosure for several reasons. First, Howell-833 discloses the benefits of such a configuration when it discloses that "[t]he placement of the [components] in this embodiment can reduce impact to the design of the eyeglasses." *Id.*, 21:67-22:2. A person of ordinary skill would have also recognized additional benefits; for example, placing the sealed module behind the wearer's ear can improve the balance of the eyewear (particularly when other components, such as a display, may be located at the front of the eyewear, as I have discussed with respect to other prior art references). Furthermore, placing the sealed module behind the wearer's ear would distribute the weight of the module to the ear rather than the more sensitive facial regions.

109. Second, attaching components to or embedding components within an eyewear frame behind the ear of a wearer was well-known, leading a person of ordinary skill to reasonably expect success in the modification. For example, in addition to the disclosure from Howell-833 I have discussed above, Howell-596 discloses an optical sensor positioned behind the ear of a wearer (Ex.1003 (Howell-596) ¶[0205], Fig. 21) and Hattori-912 discloses a temperature sensor positioned behind the ear of a wearer (Ex.1006 (Hattori-912), 64, Fig. 1).

110. Third, such a modification represents nothing more than the simple addition of one known element (components located behind a wearer's ear) to another known element (an eyewear frame with a sealed module) to obtain

predictable results (a sealed module positioned at least partially behind the ear of the wearer).

111. Fourth, the modification represents the use of a known technique (positioning electronic components behind the wearer's ear) to improve a similar device and method (an eyewear frame including a sealed module) in the same way.

112. Fifth, the combination applies a known technique (positioning electronic components behind the wearer's ear) to a known device and method (an eyewear frame including a sealed module) that is ready for improvement and yields predictable results (a sealed module positioned at least partially behind the ear of the wearer).

113. Sixth, the positioning of the module at least partially behind the wearer's ear represents a choice from a finite number of identified, predictable solutions (e.g., in front of or behind the wearer's ear), each of which would have been obvious to try.

114. Accordingly, Howell-596 and Howell-833 disclose each limitation of claim 19 and the claim would have been obvious to a person of ordinary skill in view of Howell-596 and Howell-833.

B. Claim 31

115. Claim 31 depends from claim 19 and further recites that "the module is disposed, at least partially, on a temple portion of the frame." As I have discussed

above in Paragraphs 68 and 107-113, Howell-596 and Howell-833 each disclose that a module is disposed on a temple portion of the frame. Accordingly, Howell-596 and Howell-833 disclose each limitation of claim 31, and claim 31 would have been obvious to a person of ordinary skill in view of Howell-596 and Howell-833.

C. Claims 20, 24-28, 32-35, and 37

116. Claims 20, 24-28, 32-35, and 37 depend from claim 19 and parallel the limitations of claims 2, 6-10, 13-16, and 18. Because, as I have discussed above, Howell-596 discloses the additional limitations of each of claims 2, 6-10, 13-16, and 18, claims 20, 24-28, 32-35, and 37 are also rendered obvious by Howell-596 and Howell-833 for the same reasons. *See* ¶¶70-104, above.

VIII. HOWELL-596, HOWELL-833, AND BLUM-741 RENDER CLAIMS 4-5, 7, 17, 22-23, 25, AND 36 OBVIOUS

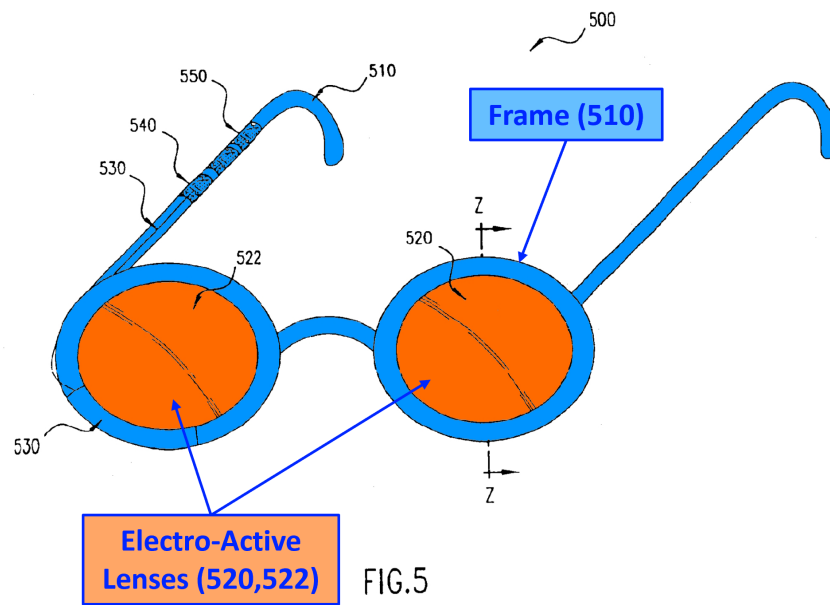
117. Claims 4-5, 7, 17, 22-23, 25, and 36 depend, directly or indirectly, from the claims I have discussed above in Paragraphs 58-116. Because my analysis above shows that the limitations of those claims are disclosed or suggested by the prior art, I will only address the additional limitations of claims 4-5, 7, 17, 22-23, 25, and 36 here. As I explain below, Howell-596, Howell-833, and Blum-741 together disclose each element of claims 4-5, 7, 17, 22-23, 25, and 36, and render those claims obvious as a whole.

A. Claims 4 and 22

118. Claims 4 and 22 depend from claims 2 and 20, respectively, and further recite that “the external device includes an electro-active lens mounted to the frame.”

Blum-741 discloses eyewear that includes a pair of electro-active lenses mounted to an eyewear frame. *E.g.*, Ex.1005 (Blum-741), 1:20-47, 7:52-58. This is shown in

Figure 5:



Id., Fig. 5. Blum-741 further discloses that the electro-active lenses are electrically connected to at least a processor and a power source. *Id.*, 7:52-58.

119. A person of ordinary skill would have been motivated to combine Blum-741’s electro-active lenses with Howell-596’s eyewear, including by connecting Blum-741’s electro-active lenses to Howell-596’s sealed module, for several reasons.

120. First, Blum-741 discloses the benefits of electro-active lenses. For example, Blum-741 discloses that electro-active lenses may be used to correct various vision errors present in the user's eye (e.g., myopia, astigmatism, etc.) leading to a vision "better than 20/10." Ex.1005 (Blum-741), 9:4-18. According to Blum-741, this is "far better than the level of vision which is currently obtained by way of ... conventional spectacle lenses." *Id.*, 4:31-44. A person of ordinary skill would have been motivated to integrate Blum-741's electro-active lenses into Howell-596's eyewear to gain the advantages Blum-741 discloses. A person of ordinary skill would have reasonably expected success in the combination because electro-active lenses were well-known, as evidenced by Blum-741's disclosure, and integrating such lenses into eyewear was well within such a person's skill.

121. Second, such a modification, i.e. incorporating electro-active lenses, represents nothing more than the simple addition of one known element (electro-active lenses as in Blum-741) to another known element (Howell-596's eyewear) to obtain predictable results (eyewear including a sealed module that is connected to electro-active lenses).

122. Third, the combination represents the use of a known technique (using electro-active lenses as in Blum-741) to improve a similar device and method (Howell-596's eyewear) in the same way.

123. Fourth, the combination applies a known technique (using electro-active lenses as in Blum-741) to a known device and method (Howell-596's eyewear) that is ready for improvement and yields predictable results (eyewear including a sealed module that is connected to electro-active lenses).

124. Accordingly, Howell-596, Howell-833, and Blum-741 disclose each limitation of claims 4 and 22, and those claims would have been obvious to a person of ordinary skill in view of those references.

B. Claims 5 and 23

125. Claims 5 and 23 depend from claims 4 and 22, respectively, and further recite that “the electro-active lenses are configured to change at least one of focus, tint, and a display.” Blum-741's electro-active lenses are configured to change each of these.

126. First, Blum-741 discloses that its electro-active lenses “hav[e] the necessary electro-active means to change focus electrically.” Ex.1005 (Blum-741), 11:53-59; 52:50-65. Thus, Blum-741 discloses that its electro-active lenses are configured to change focus.

127. Second, Blum-741 discloses that its electro-active lenses create “an electronic tint or sunglass effect[.]” *Id.*, 26:27-48; *id.*, 27:12-16, 37:3-13. Thus, Blum-741 discloses, or at least suggests, that its electro-active lenses are configured to change tint.

128. Third, Blum-741 discloses that its electro-active lenses may “display ... the patient or wearer’s best corrected prescription[.]” *Id.*, 7:22-29; *see also id.*, 6:10-19. Thus, Blum-741 discloses, or at least suggests, that its electro-active lenses are configured to change a display (e.g., to cause the display to output the patient’s prescription).

129. Furthermore, a person of ordinary skill would have understood that when Howell-596’s eyewear is combined with Blum-741’s electro-active lenses, the wearer would view Howell-596’s LCD display, which I have discussed above in Paragraph 73, through Blum-741’s electro-active lenses. Accordingly, a person of ordinary skill would have understood that when Blum-741’s electro-active lenses are used to change focus and/or tint, the wearer’s view of Howell-596’s LCD display would correspondingly change. Thus, Howell-596 and Blum-741 when combined together disclose, or at least suggest, that Blum-741’s electro-active lenses are configured to change a display (e.g., to change the wearer’s view of Howell-596’s LCD display).

130. Accordingly, Howell-596, Howell-833, and Blum-741 disclose each limitation of claims 5 and 23, and those claims would have been obvious to a person of ordinary skill in view of those references.

C. Claims 7 and 25

131. Claims 7 and 25 depend from claims 1 and 19, respectively, and further recite that “the module includes an antenna and at least one of a transmitter, a receiver or a transceiver.” Blum-741 discloses that its eyewear frame may include a receiver and antenna that communicate with a “controller-based switch” for controlling the lenses. Ex.1005 (Blum-741), 32:7-52. Blum-741 provides that the switch need not “be on the spectacles themselves” but could be “in a pocket in the user’s clothing.” *Id.* In one such embodiment, “the switch contains a small microwave or radio-frequency short-range transmitter which sends a signal regarding switch position to a tiny receiver antenna mounted conformably on the spectacle frames.” *Id.* Accordingly, Blum-741 discloses a receiver and antenna to receive transmissions from an external switching device. *Id.*

132. A person of ordinary skill would have been motivated to include this receiver and antenna in Howell-596’s sealed module for several reasons. First, a person of ordinary skill would have been motivated to include these components in the sealed module to obtain the benefits of doing so; for example, to protect the receiver and antenna from potentially harmful moisture that could cause them to stop working temporarily or permanently. Furthermore, including as many electronic components as possible in the sealed module furthers Howell-596’s goal of “regulariz[ing] or standardiz[ing] the form factor.” Ex.1003 ¶[0195]. This 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. It would also make the eyewear easier to manufacture and assemble. Ex.1003 ¶[0201] (“By having the [component] in the module, the manufacture and assembly of the end-product ... can be simplified.”). A person of ordinary skill would have reasonably expected success in the combination because antennas and transmitters were long-known and well-understood features. *See generally, e.g.,* Ex.1013 (Corazza).

133. Second, such a modification represents nothing more than the simple addition of one known element (an antenna and receiver to control electro-active lenses as in Blum-741) to another known element (Howell-596’s sealed module) to obtain predictable results (eyewear including a sealed module that includes an antenna and receiver).

134. Third, the combination represents the use of a known technique (using an antenna and receiver to control electro-active lenses as in Blum-741) to improve a similar device and method (Howell-596’s sealed module) in the same way.

135. Fourth, the combination applies a known technique (using an antenna and receiver to control electro-active lenses as in Blum-741) to a known device and method (Howell-596’s sealed module) that is ready for improvement and yields

predictable results (eyewear including a sealed module that includes an antenna and receiver).

136. Accordingly, Howell-596, Howell-833, and Blum-741 disclose, or at least suggest, each limitation of claims 7 and 25, and those claims would have been obvious to a person of ordinary skill in view of those references.

D. Claims 17 and 36

137. Claims 17 and 36 depend from claims 1 and 19, respectively, and further recite that “the module includes a power source” and “the power source comprises an inductively rechargeable battery.” Blum-741 discloses that its eyewear frame’s temple includes inductively rechargeable batteries. Ex.1005 (Blum-741), 29:66-30:13, 37:49-65.

138. As I have noted above, Howell-596 discloses that a battery may be included as a power source in the sealed module. *See* ¶¶62-66, above. A person of ordinary skill would have been motivated in view of Blum-741’s disclosure to use an inductively rechargeable battery in Howell-596’s eyewear for several reasons.

139. First, a person of ordinary skill would have recognized the benefits of inductive recharging, including that it allows for easy and convenient recharging without needing to plug in cables or maintain a stock of single-use batteries. In my experience, inductive charging was a popular technology in consumer electronic devices in the early 2000s. For example, the Alliance for Wireless Power

(“WiPower”), an industry standard group for inductive power transfer, was formed in 2004. Inductive charging was also widely used in, for example, electronic toothbrushes around this time.

140. Second, Howell-596 suggests the combination because it states that “[t]he size and configuration of the battery 790 can also vary.” Ex.1003 (Howell-596) ¶[0098]. A person of ordinary skill would have reasonably expected success in the combination based on Howell-596’s disclosure.

141. Third, such a modification represents nothing more than the simple addition of one known element (inductive charging as in Blum-741) to another known element (Howell-596’s battery) to obtain predictable results (a sealed module that includes an inductively rechargeable battery).

142. Fourth, the combination represents the use of a known technique (using inductive charging as in Blum-741) to improve a similar device and method (Howell-596’s battery) in the same way.

143. Fifth, the combination applies a known technique (using inductive charging as in Blum-741) to a known device and method (Howell-596’s battery) that is ready for improvement and yields predictable results (a sealed module that includes an inductively rechargeable battery).

144. Accordingly, Howell-596, Howell-833, and Blum-741 disclose each limitation of claims 17 and 36, and those claims would have been obvious to a person of ordinary skill in view of those references.

IX. HOWELL-596, HOWELL-833, BLUM-741, AND SPITZER RENDER CLAIMS 3 AND 21 OBVIOUS

145. Claims 3 and 21 depend, directly or indirectly, from claims I have discussed above in Paragraphs 58-116. Because my analysis above shows that the limitations of those claims are disclosed or suggested by the prior art, I will only address the additional limitations of claims 3 and 21 here. As I explain below, Howell-596, Howell-833, Blum-741, and Spitzer together disclose each element of claims 3 and 21, and render those claims obvious as a whole.

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 be 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.

148. First, Spitzer discloses the benefits of flex circuits, including that they allow that “the position of [components] may be adjusted without strain to the leads.” Ex.1007 (Spitzer), 7:56-60. Furthermore, the connection has a flat cross-section, which a person of ordinary skill would have recognized would be advantageous in locations where space is at a premium (for example, in the temple of an eyeglass frame). *Id.*, 9:60-61.

149. Second, flex circuits were well-known in the art, leading a person of ordinary skill to reasonably expect success in the combination. For example, in addition to the disclosure from Spitzer I have discussed above (*e.g.*, Ex.1007 (Spitzer), 7:44-60, 9:49-10:4), Conway also describes the use of a flex circuit to connect electronic components within eyewear. Ex.1014 (Conway), 2:25-29, 3:27-34. Hattori-912 also describes the use of a flexible circuit to connect components within eyewear. Ex.1006 (Hattori-912), 64 (discussing use of “zebra type connector”). Furthermore, in my experience, flex circuits were commonplace in consumer electronics in the early 2000s, for example in iPods.

150. Third, such a modification represents nothing more than the simple addition of one known element (flex circuits as in Spitzer) to another known element (eyewear with electronic components as in Howell-596, Howell-833, and/or Blum-741) to obtain predictable results (electronic eyewear that connects components using flex circuits).

151. Fourth, the combination represents the use of a known technique (using flex circuits as in Spitzer) to improve a similar device and method (eyewear with electronic components as in Howell-596, Howell-833, and/or Blum-741) in the same way.

152. Fifth, the combination applies a known technique (using flex circuits as in Spitzer) to a known device and method (eyewear with electronic components as in Howell-596, Howell-833, and/or Blum-741) that is ready for improvement and yields predictable results (electronic eyewear that connects components using flex circuits).

153. Accordingly, Howell-596, Howell-833, Blum-741, and Spitzer disclose each limitation of claims 3 and 21, and those claims would have been obvious to a person of ordinary skill in view of those references.

X. HOWELL-596, HOWELL-833, AND OGREN RENDER CLAIMS 11 AND 29 OBVIOUS

154. Claims 11 and 29 depend, directly or indirectly, from claims I have discussed above in Paragraphs 58-116. Because my analysis above shows that the limitations of those claims are disclosed or suggested by the prior art, I will only address the additional limitations of claims 11 and 29 here. As I explain below, Howell-596, Howell-833, and Ogren together disclose each element of claims 11 and 29, and render those claims obvious as a whole.

155. Claims 11 and 29 depend from claims 1 and 19, respectively, and further recite that “the module is included in a rimless frame.” The ’483 patent shows an example of a rimless frame in Figure 8B:

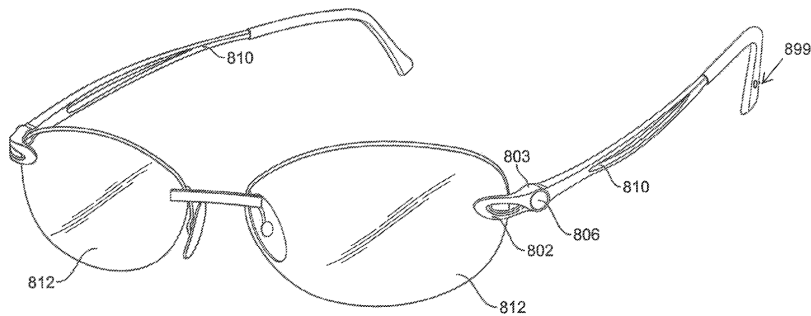


FIG. 8B

Ex.1001 (’483 patent), Fig. 8B; *see id.*, 5:9-21, 8:43-54.

156. Ogren discloses a very similar rimless frame in its Figure 1:

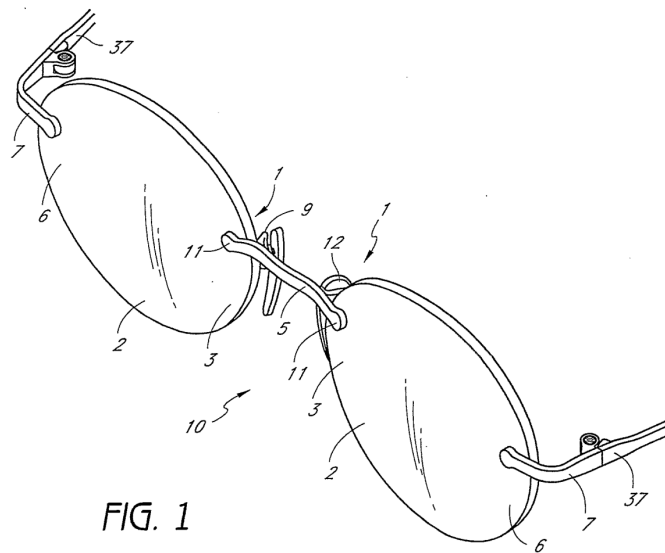


FIG. 1

Ex.1008 (Ogren), Fig. 1. Indeed, Ogren states that “Figure 1 is a ... view of a rimless eyeglass system.” *Id.*, 1. Thus, Ogren discloses a rimless frame.

157. A person of ordinary skill in the art would have been motivated to include a sealed module (for example, as disclosed in Howell-596) in Ogren’s rimless frame for several reasons. First, Ogren discloses the benefits of a rimless frame: “rimless eyeglass systems ... reduce stress and fractures in the lenses.” *Id.*, 1. Thus, a person of ordinary skill would have understood that Ogren’s rimless frame would be more resilient and resistant to damage than other frame solutions.

158. Second, rimless frame eyewear was well-known in the art, leading a person of ordinary skill to reasonably expect success in the combination. For example, in addition to the disclosure I have discussed above from Ogren (*e.g.*, Ex.1008 (Ogren), 1, Fig. 1), Howell-719 and Howell-827 each disclose the use of rimless frames for eyewear with electronic components. Ex.1015 (Howell-719) ¶[0107]; Ex.1016 (Howell-827) ¶[0074]. This disclosure strengthens the person of ordinary skill’s reasonable expectation of success. *Id.*

159. Third, such a modification represents nothing more than the simple addition of one known element (a rimless frame as in Ogren) to another known element (a sealed module as in Howell-596) to obtain predictable results (a rimless frame including a sealed module).

160. Fourth, the combination represents the use of a known technique (using a rimless frame) to improve a similar device and method (an eyeglass frame including a sealed module) in the same way.

161. Fifth, the combination applies a known technique (using a rimless frame) to a known device and method (an eyeglass frame including a sealed module) that is ready for improvement and yields predictable results (a rimless frame including a sealed module).

162. Finally, the use of a rimless frame represents a choice from a finite number of identified, predictable solutions (e.g., a rimless frame, a partially rimless frame, or a fully rimmed frame), each of which would have been obvious to try. A person of ordinary skill would have been motivated to use a rimless frame so as to gain the benefits of such a frame, including those discussed in Ogren.

163. Accordingly, Howell-596, Howell-833, and Ogren disclose each limitation of claims 11 and 29, and those claims would have been obvious to a person of ordinary skill in view of those references.

XI. HOWELL-596, HOWELL-833, AND JANNARD-868 RENDER CLAIMS 12 AND 30 OBVIOUS

164. Claims 12 and 30 depend, directly or indirectly, from claims I have discussed above in Paragraphs 58-116. Because my analysis above shows that the limitations of those claims are disclosed or suggested by the prior art, I will only address the additional limitations of claims 12 and 30 here. As I explain below,

Howell-596, Howell-833, and Jannard-868 together disclose each element of claims 12 and 30, and render those claims obvious as a whole.

165. Claims 12 and 30 depend from claims 1 and 19, respectively, and further recite that “the module is included in a hinge-less frame.” The ’483 patent shows an example of a hingeless frame in Figure 8B:

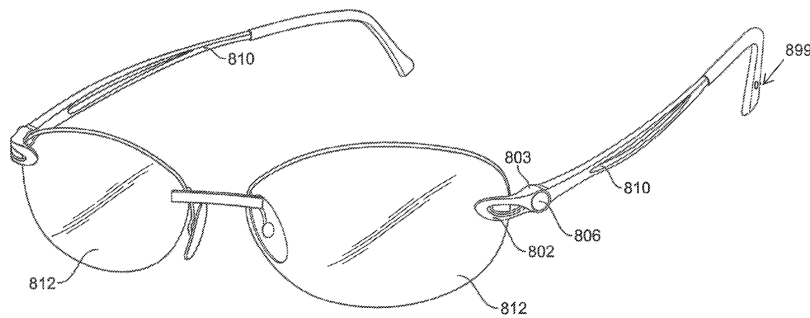
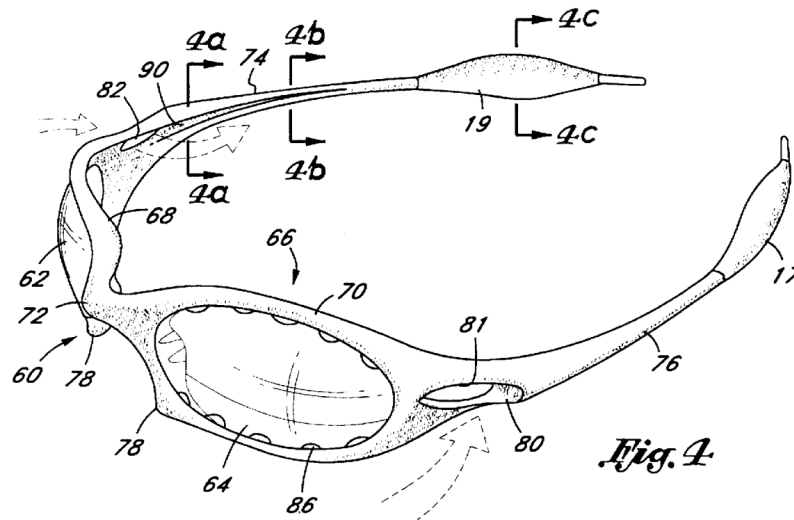


FIG. 8B

Ex.1001 (’483 patent), Fig. 8B. As shown in Figure 8B, the ’483 patent discloses that a hingeless frame is one where the temple “connects to the frame front without a hinge attachment mechanism.” *Id.*, 4:56-59.

166. Jannard-868 discloses such a hingeless frame, as shown in Figure 4:



Ex.1009 (Jannard-868), Fig. 4; *see also id.*, 7:63-8:11.

167. A person of ordinary skill would have been motivated to include a sealed module (for example, as disclosed in Howell-596) in Jannard-868's hingeless frame for several reasons. First, Jannard-868 discloses the benefits of its frame, including that its design provides for an increased retentive force between the eyewear and the head (Ex.1009 (Jannard-868), Abstract, 8:12-22), and that it includes ventilation apertures that reduce fogging of the lenses (*id.*, 10:13-20). Furthermore, a person of ordinary skill would have recognized additional benefits when combining Jannard-868's hingeless frame with a sealed module and/or electro-active lenses, including that electronic components would not have to navigate a complicated hinge joint, and that a hingeless frame would be stronger and easier to manufacture than a hinged frame. Thus, a person of ordinary skill would have motivated to use Jannard-868's hingeless frame design to achieve these benefits.

168. Second, hingeless frame eyewear was well-known in the art, leading a person of ordinary skill to reasonably expect success in the combination. For example, in addition to the disclosure I have discussed above from Jannard-868 (*e.g.*, Ex.1009 (Jannard-868), 7:63-8:11, Fig. 4), Conner also discloses the use of hingeless frames for eyewear. *E.g.*, Ex.1017 (Conner), Abstract, Fig. 1. This disclosure strengthens the person of ordinary skill's reasonable expectation of success. *Id.*

169. Third, such a modification represents nothing more than the simple addition of one known element (a hingeless frame as in Jannard-868) to another known element (a sealed module as in Howell-596) to obtain predictable results (a hingeless frame including a sealed module).

170. Fourth, the combination represents the use of a known technique (using a hingeless frame) to improve a similar device and method (an eyeglass frame including a sealed module) in the same way.

171. Fifth, the combination applies a known technique (using a hingeless frame) to a known device and method (an eyeglass frame including a sealed module) that is ready for improvement and yields predictable results (a hingeless frame including a sealed module).

172. Finally, the use of a rimless frame represents a choice from a finite number of identified, predictable solutions (*e.g.*, a hinged frame or a hingeless frame), each of which would have been obvious to try. A person of ordinary skill

would have been motivated to use a hingeless frame so as to gain the benefits of such a frame, including simplicity, strength, and ease of manufacturing.

173. Accordingly, Howell-596, Howell-833, and Jannard-868 disclose each limitation of claims 12 and 30, and those claims would have been obvious to a person of ordinary skill in view of those references.

XII. BLUM-741 AND HATTORI-912 RENDER CLAIMS 1-2, 4-10, 13-20, 22-28, AND 31-37 OBVIOUS

174. As I explain below, Blum-741 and Hattori-912 together disclose each element of claims 1-2, 4-10, 13-20, 22-28, and 31-37, and render those claims obvious as a whole.

A. Claim 1

1. Preamble

175. The preamble of claim 1 recites “[e]yewear.” Blum-741 discloses eyewear. *E.g.*, Ex.1005 (Blum-741), Abstract (“Electro-active multi-focal spectacles are disclosed”), Fig. 5.

2. Frame

176. Claim 1 recites “a frame.” Blum-741 discloses that its eyewear has a frame. *E.g.*, Ex.1005 (Blum-741), 7:52-58 (eyewear includes “frames 510”), 13:65-14:29 (discussing manufacturing of suitable frames), Fig. 5. The frame is shown in Figure 5:

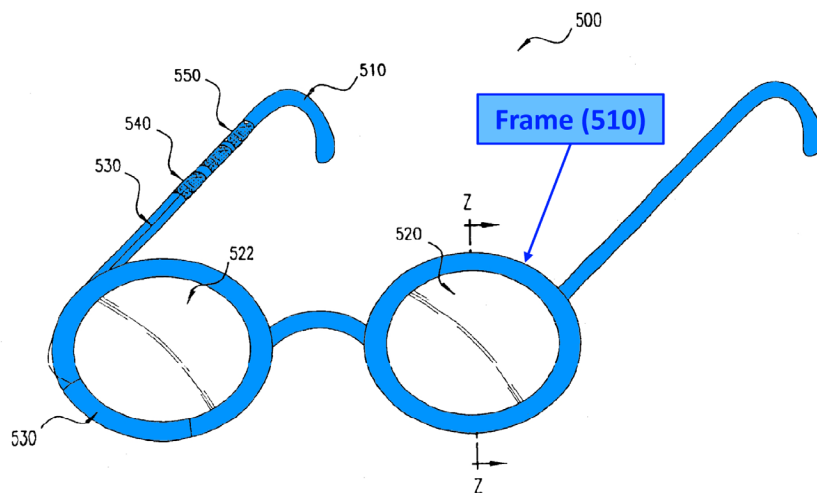


FIG.5

Id., Fig. 5. Thus, Blum-741 discloses this limitation.

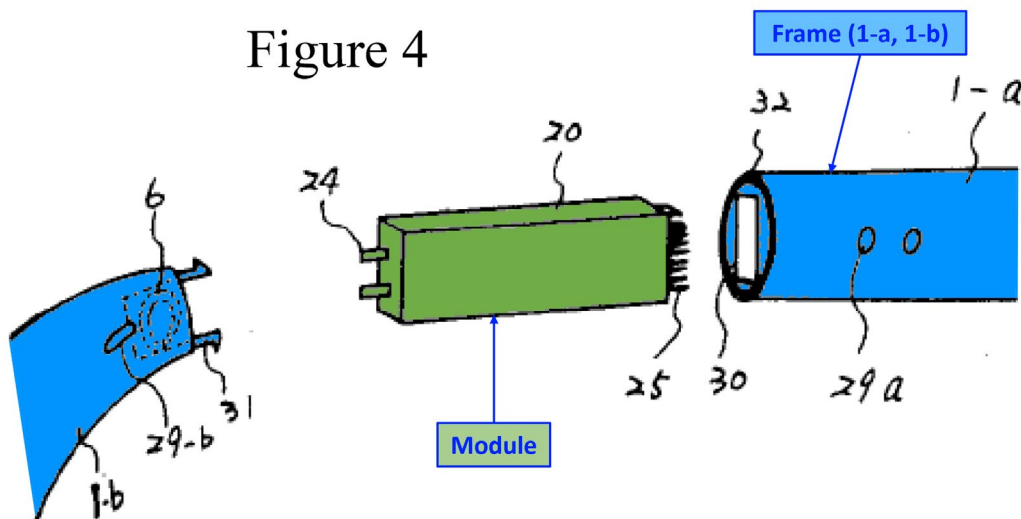
3. Sealed Moisture Resistant Module

177. Claim 1 recites “a sealed moisture resistant module attached to the frame.” Hattori-912 discloses that an eyewear frame may include a “hollow part 30” in which electronic components are embedded. Ex.1006 (Hattori-912), 64. Hattori-912 further discloses that the hollow part 30 is sealed by a “[w]aterproof ring 32.”

Id. Thus, Hattori-912 discloses a sealed moisture resistant module (contents sealed in the hollow part 30 by waterproof ring 32). Because hollow part 30 is “provided ... in frame 1-a,” the contents of the hollow part 30 are attached to the frame. *Id.*

Figure 4 shows this:

Figure 4



Id., Fig. 4.

178. Additionally, Hattori-912 discloses that components of its eyewear may be “covered by protective film 41.” *Id.*, 65. A person of ordinary skill 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.

179. A person of ordinary skill would have been motivated to incorporate Hattori-912’s sealed module into Blum-741’s eyewear, for example by placing some or all of Blum-741’s electronic components in a recess sealed by a waterproof ring and/or coating some or all of Blum-741’s electronic components with a protective film, for the reasons I discuss below in Paragraphs 203-208.

180. Thus, Hattori-912 discloses this limitation.

4. Components Within the Module

181. Claim 1 recites that “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.” Blum-741 and/or Hattori-912 disclose that an eyewear system may comprise several components, including at least a switch, a detector, a processor, a power source, a drive circuit, a transmitter, a receiver, a transceiver, and a sensor.

a. Processor

182. Blum-741 discloses a “[c]ontroller 540” which “acts as the ‘brains’ of the electro-active eyewear 500.” Ex.1005 (Blum-741), 7:59-8:2. Controller 540 “can contain at least one processor component.” *Id.* A person of ordinary skill would have been motivated to enclose Blum-741’s processor in Hattori-912’s sealed module for the reasons I discuss below in Paragraphs 203-208.

183. Similarly, Hattori-912 discloses that the sealed module includes “semiconductor integrated circuit 20,” which a person of ordinary skill would have understood to include a processor. Ex.1006 (Hattori-912), 64.

b. Power Source

184. Blum-741 discloses a battery configured “[t]o provide electric power to the optical assemblies” of its electro-active lens system. Ex.1005 (Blum-741), 29:66-30:13. A person of ordinary skill would have been motivated to enclose

Blum-741's battery in Hattori-912's sealed module for the reasons I discuss below in Paragraphs 203-208.

185. Similarly, Hattori-912 discloses that “[b]attery 6 for the power supply of drive circuit 4 and the radio receiving circuit 5 is removably embedded in temple 1” and is thus within the sealed module. Ex.1006 (Hattori-912), 64.

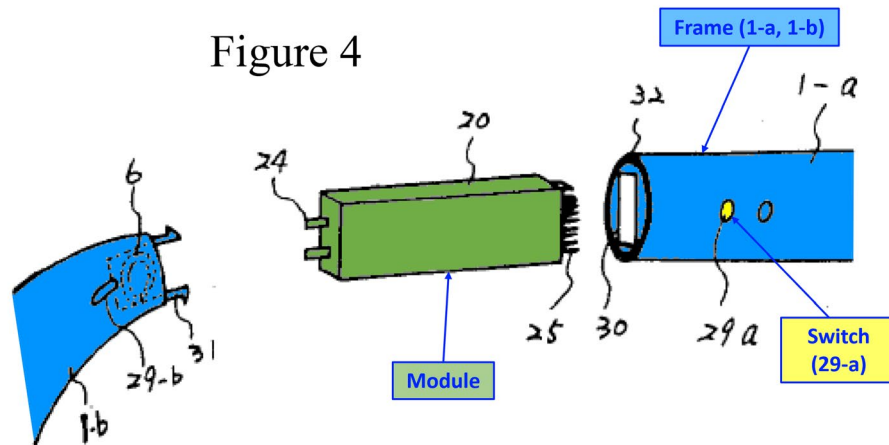
186. Because Blum-741 and Hattori-912 together disclose that the sealed module includes at least a processor and a power source, the references disclose this limitation. Blum-741 and/or Hattori-912 disclose the remaining components listed in claim 1 as well.

c. Switch

187. The '483 patent discloses that the module may comprise “a manual switch (for example, a touch button, photo-detector, motion detector, capacitive touch sensor)” and/or “one or more miniature or micro tilt switches.” Ex.1001 ('483 patent), 10:40-59.

188. Blum-741 discloses a switch that is used to control various properties of its electro-active lenses. Ex.1005 (Blum-741), 31:29-32:57, 36:7-31; *see* ¶131, above. A person of ordinary skill would have been motivated to enclose Blum-741's switch in Hattori-912's sealed module for the reasons I discuss below in Paragraphs 203-208.

189. Additionally, Hattori-912 discloses that its eyewear includes “control switch 29-a.” Ex.1006 (Hattori-912), 64. As shown in Figure 4, control switch 29-a is provided adjacent to, and extending into, the sealed module:



Id., Fig. 4. A person of ordinary skill would have understood that because Hattori-912’s switch is configured to control the display, the switch must be coupled to and communicate with semiconductor integrated circuit 20, which is part of the sealed module. Thus, Hattori-912 discloses, or at least suggests, that the sealed module includes a switch.

d. Detector

190. The ’483 patent discloses several types of detectors, including a photo detector, a motion detector, and a view detector. Ex.1001 (’483 patent), 10:40-59.

191. Blum-741 discloses a “radiation or light detector 2980” (e.g., a photo detector) used as part of “a range finder to help focus the electro-active refractive matrix 2990,” which enables the operation of Blum-741’s electro-active lens system.

Ex.1005 (Blum-741), 45:49-46:42. A person of ordinary skill would have been motivated to enclose Blum-741's radiation or light detector in Hattori-912's sealed module for the reasons I discuss below in Paragraphs 203-208.

e. Drive Circuit

192. Hattori-912 discloses a "drive circuit 4" which is used to drive a display. Ex.1006 (Hattori-912), 64. Hattori-912 further discloses "semiconductor integrated circuit 20," which a person of ordinary skill would have understood to be at least in part a drive circuit because Hattori-912 discloses that the semiconductor integrated circuit 20 implements drive circuit 4 and/or radio receiving circuit 6. *Id.* Furthermore, because Hattori-912 discloses that semiconductor integrated circuit 20 is included within the sealed module (*id.*), Hattori-912 discloses including a drive circuit within the sealed module.

193. A person of ordinary skill would have been motivated to include Hattori-912's electronic display, and thus the drive circuit that controls it, in Blum-741's eyewear for several reasons. First, a person of ordinary skill would have been motivated to make the combination to achieve the benefits Hattori-912 discloses. For example, Hattori-912 discloses that the display may be used to provide "the time, date, and image information or the like" to users, and that such functionality is commercially desirable. Ex.1006 (Hattori-912), 63, 65.

194. Second, such a modification represents nothing more than the simple addition of one known element (a display and accompanying drive circuit as in Hattori-912) to another known element (Blum-741's eyewear) to obtain predictable results (eyewear as in Blum-741 that includes a display as in Hattori-912).

195. Third, the combination represents the use of a known technique (including a display and accompanying drive circuit as in Hattori-912) to improve a similar device and method (Blum-741's eyewear) in the same way.

196. Fourth, the combination applies a known technique (including a display and accompanying drive circuit as in Hattori-912) to a known device and method (Blum-741's eyewear) that is ready for improvement and yields predictable results (eyewear as in Blum-741 that includes a display as in Hattori-912).

f. Transmitter/Receiver/Transceiver

197. As I have discussed above in Paragraph 131, Blum-741 discloses a receiver and antenna to receive transmissions from an external switching device. Ex.1005 (Blum-741), 32:7-52. A person of ordinary skill would have been motivated to include this receiver and antenna in Hattori-912's sealed module for the reasons I discuss below in Paragraphs 203-208.

198. Blum-741 also discloses a "range finder transmitter 2160 and/or receiver 2170," which are used as a range finding system to control electro-active lenses on the eyewear. Ex.1005 (Blum-741), 32:58-34:62. A person of ordinary

skill would have been motivated to include Blum-741's transmitter and/or receiver in Hattori-912's sealed module for the reasons I discuss below in Paragraphs 203-208.

199. Furthermore, a person of ordinary skill would have understood Blum-741 to disclose a transceiver. A transceiver is simply a transmitter and a receiver together. *See, e.g.*, Ex.1010 (McGraw-Hill Engineering Dictionary), 576 (defining transceiver as “[a] radio transmitter and receiver combined in one unit and having switching arrangements such as to permit both transmitting and receiving.”). A person of ordinary skill would therefore have understood Blum-741's disclosure of a range finder transmitter and receiver to disclose a range finder transceiver.

200. Similarly, Hattori-912 discloses a “radio receiving circuit” which is used to receive FM radio signals. Ex.1006 (Hattori-912), 64. Thus, Hattori-912 discloses a receiver. Because Hattori-912 discloses that radio receiving circuit 6 is implemented by semiconductor integrated circuit 20, Hattori-912 discloses that its receiver is contained within the sealed module. *Id.*

g. Sensor

201. The '483 patent discloses several examples of sensors, including “one or more miniature or micro tilt switches, accelerometer, micro gyro, range finder, view detector, [and] imager,” but does not limit sensors to these examples. Ex.1001 ('483 patent), 10:40-59.

202. Blum-741 discloses several sensors that may be used for controlling its electro-active lenses. For example, Blum-741 discloses a “micro-gyroscope or micro-accelerometer” (Ex.1005 (Blum-741), 34:63-35:15), a “tilt switch” (*id.*, 35:16-36:19), a “manual switch” (*id.*, 36:20-30), and an “eye-tracker” consisting of “at least two adjacent photo-sensors” (*id.*, 36:47-61). Blum-741 also discloses a “miniature thermistor, thermocouple, or other temperature sensor” to sense changes in temperature that may affect the operation of the lenses. *Id.*, 37:14-24. Thus, Blum-741 discloses several sensors. A person of ordinary skill would have been motivated to enclose one or more of these sensors in Hattori-912’s sealed module for the reasons I discuss below in Paragraphs 203-208.

h. Motivation to Combine and/or Modify

203. A person of ordinary skill would have been motivated to enclose the various electronic components disclosed by Blum-741 and/or Hattori-912 and discussed above within a sealed module as disclosed in Hattori-912 for several reasons.

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.

205. Second, sealed modules like those in Hattori-912 were well-known, leading a person of ordinary skill to reasonably expect success in the combination. For example, in addition to the disclosure I have discussed above from Hattori-912 (*e.g.*, Ex.1006 (Hattori-912), 64-65, Fig. 4), Howell-596 also discloses a sealed module (*e.g.*, Ex.1003 (Howell-596) ¶¶[0194]-[0195]). Furthermore, Sikonowiz discloses a sealed module in the form of a component covered with a conformal coating. Ex.1011 (Sikonowiz) at 135-136.

206. Third, such a modification represents nothing more than the simple addition of one known element (a sealed module as in Hattori-912) to another known element (Blum-741's eyewear) to obtain predictable results (eyewear as in Blum-741 including a sealed module that includes various electronic components).

207. Fourth, the combination represents the use of a known technique (using a sealed module as in Hattori-912) to improve a similar device and method (Blum-741's eyewear) in the same way.

208. Fifth, the combination applies a known technique (using a sealed module as in Hattori-912) to a known device and method (Blum-741's eyewear) that

is ready for improvement and yields predictable results (eyewear as in Blum-741 including a sealed module that includes various electronic components).

209. Thus, Blum-741 and Hattori-912 disclose this limitation.

5. First and Second Temple

210. Claim 1 recites that “the frame comprises a first temple and a second temple.” Blum-741 discloses a frame that comprises a first and second temple. *E.g.*, Ex.1005 (Blum-741), 5:61-67, 37:49-65, Fig. 5. This is shown, for example, in Figure 5:

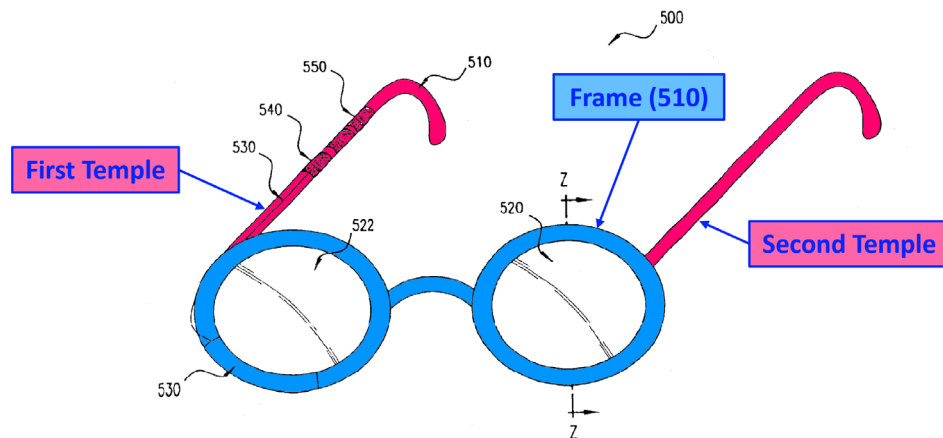


FIG.5

Id., Fig. 5. Thus, Blum-741 discloses this limitation.

6. Module Disposed Within First Temple

211. Claim 1 recites that “the module is disposed within the first temple.” Blum-741 discloses that various electronic components, including batteries, gyroscopes or accelerometers, and processors, are embedded in a temple of its

eyewear frame. Ex.1005 (Blum-741), 5:61-67, 7:52-58, 34:65-67, Fig. 5. As shown in Figure 5, these components are embedded in the first temple:

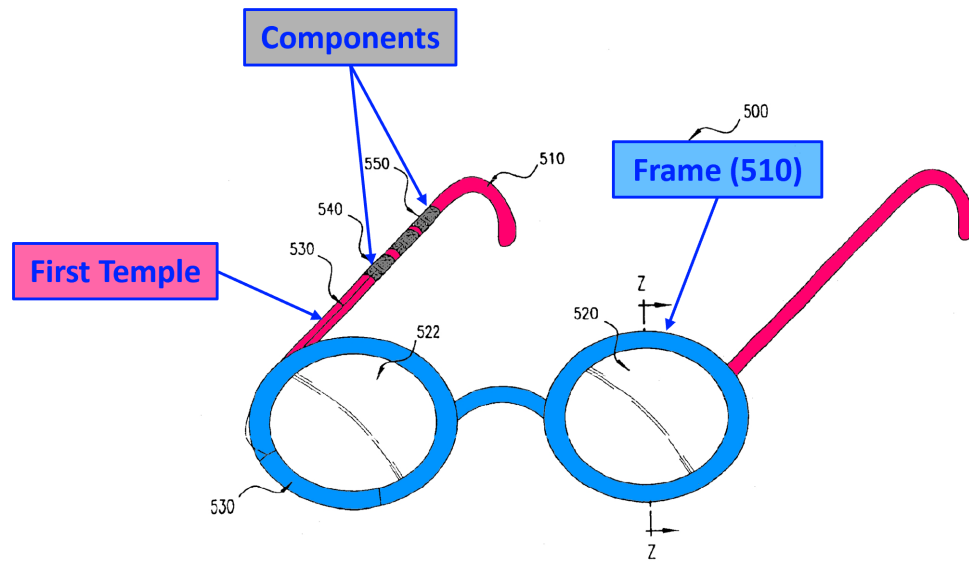


FIG.5

Id., Fig. 5.

212. Furthermore, Hattori-912 discloses that the sealed module is embedded in the eyewear frame (1-a, 1-b). Ex.1006 (Hattori-912), 64; *see* ¶¶177-179, above. Thus, Hattori-912 discloses that the module may be disposed within the eyewear frame and Blum-741 and Hattori-912 together disclose that the sealed module is disposed within the first temple.

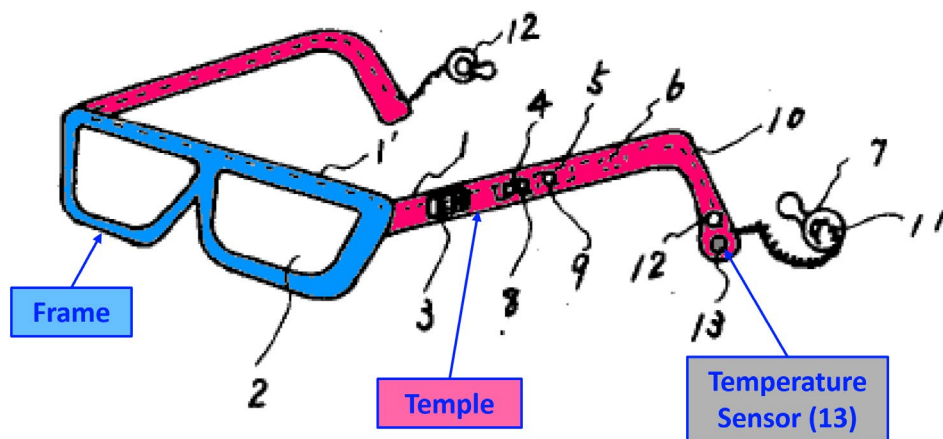
213. Accordingly, Blum-741 and/or Hattori-912 disclose each element of claim 1, and claim 1 would have been obvious to a person of ordinary skill in view of those references.

B. Claim 19

214. Independent claim 19 recites many of the same limitations as claim 1. These limitations are disclosed by the prior art for the reasons I have discussed above in Paragraphs 175-213. Claim 19 also recites that “the module is disposed, at least partially, on a portion of the frame configured to be [sic] behind the ear of a wearer of the eyewear.”

215. A person of ordinary skill would have been motivated to locate Hattori-912’s sealed module within Blum-741’s eyewear frame behind the ear of a wearer because Hattori-912 discloses that electronic components may be embedded in an eyewear frame in that location. Specifically, Hattori-912 discloses that “temperature sensing element 13,” which enables Hattori-912’s system to measure body and air temperature, is located within the eyewear frame and behind the ear of a wearer. Ex.1006 (Hattori-912), 64, Fig. 1. Figure 1 shows this:

Figure 1



Id., Fig. 1. A person of ordinary skill would have recognized from Hattori-912's disclosure that the sealed module could be located behind the wearer's ear just like the temperature sensing element 13. *Id.*, 64.

216. A person of ordinary skill would have been motivated to locate the sealed module there, and would have had a reasonable expectation of success in doing so, because such an arrangement was known in the art. *E.g.*, Ex.1004 (Howell-833), 21:62-22:2, Fig. 10C. A person of ordinary skill would have been motivated to position the module at least partially behind the wearer's ear to reduce the visual impact on the eyewear's design. *Id.*

217. Moreover, such a modification represents nothing more than the simple addition of one known element (one or more components positioned behind the wearer's ear) to another known element (Hattori-912's sealed module) to obtain predictable results (a sealed module as in Hattori-912 positioned at least partially behind the ear of the wearer).

218. The combination represents the use of a known technique (positioning components behind the wearer's ear) to improve a similar device and method (Blum-741's eyewear including Hattori-912's sealed module) in the same way.

219. Additionally, the combination applies a known technique (positioning components behind the wearer's ear) to a known device and method (Blum-741's eyewear including Hattori-912's sealed module) that is ready for improvement and

yields predictable results (a sealed module as in Hattori-912 positioned at least partially behind the ear of the wearer).

220. Finally, the positioning of the module at least partially behind the wearer's ear represents a choice from a finite number of identified, predictable solutions (e.g., in front of or behind the wearer's ear), each of which would have been obvious to try.

221. Accordingly, Blum-741 and Hattori-912 disclose each element of claim 19, and claim 19 would have been obvious to a person of ordinary skill in view of those references.

C. Claim 31

222. Claim 31 depends from claim 19 and further recites that "the module is disposed, at least partially, on a temple portion of the frame." As I have discussed above in Paragraphs 214-221, Hattori-912 discloses that (or a person of ordinary skill would have been motivated in view of Hattori-912 and/or Blum-741 to configure a device such that) the sealed module is positioned at least partially behind the ear of the wearer and on a temple portion of the eyewear frame. Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claim 31, and claim 31 would have been obvious to a person of ordinary skill in view of those references.

D. Claims 2 and 20

223. Claims 2 and 20 depend from claims 1 and 19, respectively, and further recite that “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.”

224. Blum-741 discloses that the device’s controller may be “reprogrammed, in situ, by the refractor without removal from the electro-active eyewear” and discloses that this requires “only an interface link to the refractor which issues the reprogramming commands” to the controller. Ex.1005 (Blum-741), 8:18-38. Thus, Blum-741 discloses an electrical connector that connects at least the processor (e.g., controller) to an external device (e.g., reprogrammer). Blum-741 further discloses that the same connector may provide power to the device’s power source. *Id.*, 8:34-38 (“Part of this link would include external AC power to the electro-active eyewear controller provided by an AC adapter”); *id.*, 30:9-13, 31:24-27.

225. Furthermore, as I have discussed above in Paragraph 118, Blum-741 also discloses that its eyewear includes electro-active lenses. Blum-741 discloses that the “electro-active lenses 2120 ... are connected by connecting wires 2130 to controller 2140 ... and power source 2150.” Ex.1005 (Blum-741), 32:58-33:6; *id.*, 7:52-58, Figs. 5, 21. Thus, Blum-741 discloses that at least the processor (e.g.,

controller) and power source are connected by an electrical connector (e.g., connecting wires 2130) to an external device (electro-active lenses 2120).

226. Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claims 2 and 20, and those claims would have been obvious to a person of ordinary skill in view of those references.

E. Claims 4 and 22

227. Claims 4 and 22 depend from claims 2 and 20, respectively, and further recite that “the external device includes an electro-active lens mounted to the frame.” As I have discussed above in Paragraph 118, Blum-741 discloses that its eyewear includes electro-active lenses mounted to the frame and connected via an electrical connection to the sealed module and the components inside. Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claims 4 and 22, and those claims would have been obvious to a person of ordinary skill in view of those references.

F. Claims 5 and 23

228. Claims 5 and 23 depend from claims 4 and 22, respectively, and further recite that “the electro-active lenses are configured to change at least one of focus, tint, and a display.” As I have discussed above in Paragraphs 125-129, Blum-741 discloses that its electro-active lenses are configured to change focus, tint, and/or a display. Furthermore, a person of ordinary skill would have understood that Blum-741’s electro-active lenses interact exactly the same way with Hattori-912’s display

as they do with Howell-596's display. Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claims 5 and 23, and those claims would have been obvious to a person of ordinary skill in view of those references.

G. Claims 6 and 24

229. Claims 6 and 24 depend from claims 1 and 19, respectively, and further recite that "the module includes each of drive circuit, a sensor, and a power source." As I have discussed above in Paragraphs 181-209, Blum-741 and Hattori-912 together disclose a module that may include each of a drive circuit, a sensor, and a power source. Accordingly, Blum-741 and Hattori-912 disclose each limitation of claims 6 and 24, and those claims would have been obvious to a person of ordinary skill in view of those references.

H. Claims 7 and 25

230. Claims 7 and 25 depend from claims 1 and 19, respectively, and further recite that "the module includes an antenna and at least one of a transmitter, a receiver or a transceiver." As I have discussed above in Paragraphs 198-199 and 203-208, Blum-741 discloses that its device may include an antenna and a receiver or transceiver to communicate with an external switch device, and a person of ordinary skill would have been motivated to enclose those components in Hattori-912's sealed module. Furthermore, as I have discussed above in Paragraph 200, Hattori-912 discloses a "radio receiving circuit" and an "antenna for radio

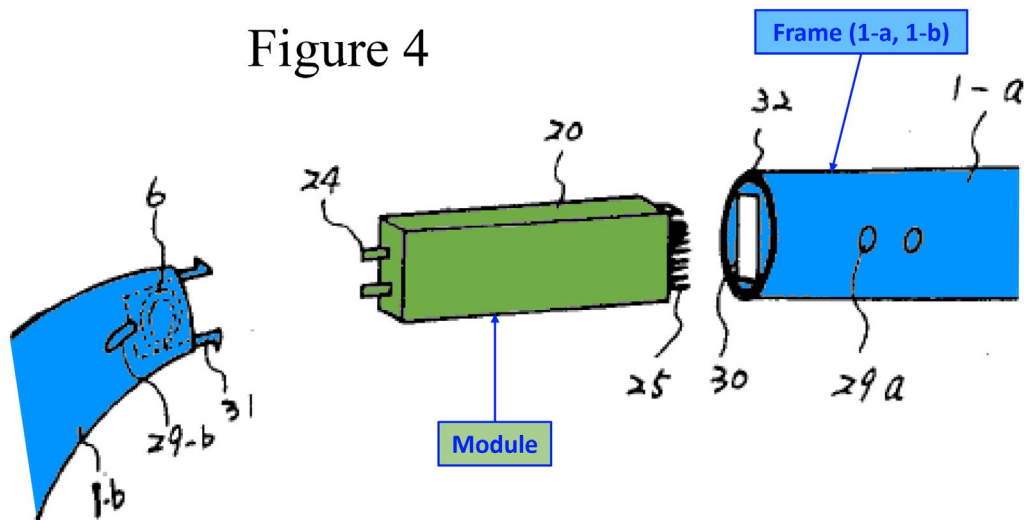
reception.” Ex.1006 (Hattori-912), 64. Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claims 7 and 25, and those claims would have been obvious to a person of ordinary skill in view of those references.

I. Claims 8 and 26

231. Claims 8 and 26 depend from claims 1 and 19, respectively, and further recite that “the module includes a sensor” and “the sensor comprises a manual switch.” Blum-741 discloses that its system may include a sensor that controls the input of power to various components of Blum-741’s system (for example, a controller). Ex.1005 (Blum-741), 35:39-37:2. In one embodiment, this sensor comprises “a combination of microgyroscope with a manual switch.” *Id.*, 36:20-30. Blum-741 discloses that the manual switch may be used to manually control the output of the microgyroscope as desired by the user. *Id.* Thus, Blum-741 discloses that its system may include a sensor that comprises a manual switch. A person of ordinary skill would have been motivated to enclose those components in Hattori-912’s sealed module for the same reasons I have discussed above in Paragraphs 203-208. Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claims 8 and 26, and those claims would have been obvious to a person of ordinary skill in view of those references.

J. Claims 9 and 27

232. Claims 9 and 27 depend from claims 1 and 19, respectively, and further recite that “the module is removably attached to the frame.” Hattori-912 discloses that components of the sealed module are “removably embedded in temple 1” of its eyewear frame. Ex.1006 (Hattori-912), 64. Furthermore, Hattori-912 shows the sealed module in a removed position with respect to the eyewear frame in Figure 4:



Id., Fig. 4. Thus, Hattori-912 discloses that the sealed module is removably attached to the frame.

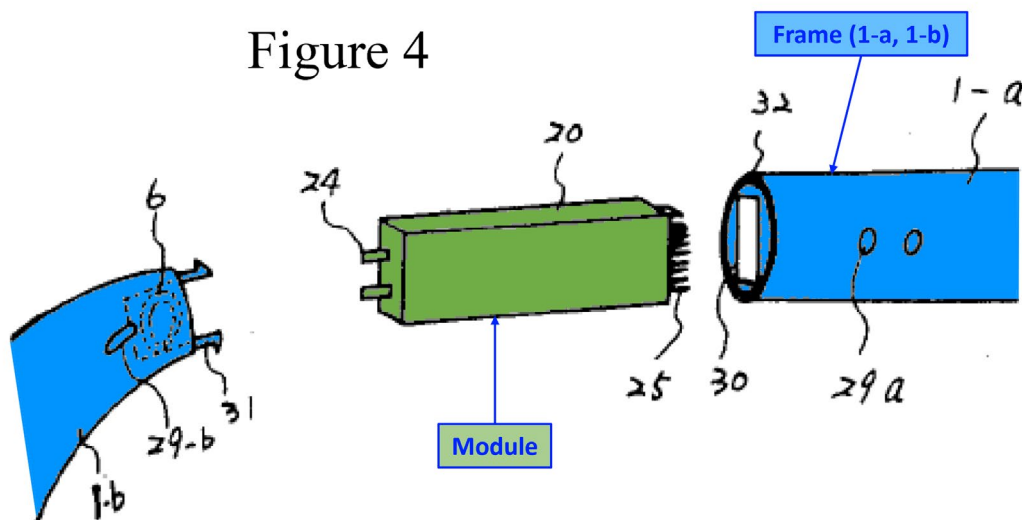
233. Even if Hattori-912 did not disclose this limitation, it suggests it for the reasons discussed above. A person of ordinary skill would have been motivated to configure Hattori-912 in this manner because it would have allowed for easy access to the sealed module to perform maintenance and repairs, reprogramming, and/or to swap out a depleted battery for a fully charged one, for example. Furthermore, a

person of ordinary skill would have reasonably expected success because Hattori-912 already provides the structure required to make the sealed module removable (e.g., biting part 31, which removably connects the portions of the frame that surround the sealed module). *Id.*, 64.

234. Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claims 9 and 27, and those claims would have been obvious to a person of ordinary skill in view of those references.

K. Claims 10 and 28

235. Claims 10 and 28 depend from claims 1 and 19, respectively, and further recite that “the module is affixed directly to the frame.” Hattori-912 discloses that the sealed module is contained in frames 1-a and 1-b, and shows this configuration in Figure 4:



Ex.1006, 64, Fig. 4. Because Hattori-912 discloses that the sealed module is contained directly within the frame, it discloses that the module is affixed directly to the frame. *Id.* Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claims 10 and 28, and those claims would have been obvious to a person of ordinary skill in view of those references.

L. Claims 13-15 and 32-34

236. Claims 13 and 32 depend from claims 1 and 19, respectively, and further recite that “the module is hermetically sealed.” Claims 14 and 33 also depend from claims 1 and 19, respectively, and further recite that “the module is substantially water-proof.” Claims 15 and 34 likewise depend from claims 1 and 19, respectively, and further recite that “the module is water-proof.”

237. Hattori-912 discloses that the module is sealed with “[w]aterproof ring 32,” which is located between the frame portions enclosing the sealed module. Ex.1006 (Hattori-912), 64. Additionally, Hattori-912 discloses that the module may be coated with “protective film 41,” which a person of ordinary skill would have understood to form a water-proof coating on the module. *Id.*, 65. For example, Sikonowiz teaches that “[t]he purpose of a conformal coating [such as Hattori-912’s] is to cover a printed-circuit assembly and protect it from environmental hazards such as moisture[.]” Ex.1011 (Sikonowiz) at 135-136. Thus, Hattori-912 discloses that the module is water-proof (and thus also substantially water-proof).

238. For the same reasons, a person of ordinary skill would have understood Hattori-912 to disclose that the module may be hermetically sealed. Something that is hermetically sealed is sealed so as to be air-tight. *See, e.g.*, Ex.1010 (McGraw-Hill Engineering Dictionary), 269 (defining “hermetic seal” as “[a]n airtight seal”). And something that is sealed with a water-proof ring or coating is also air-tight. Thus, Hattori-912 discloses, or at least suggests, that the module may be hermetically sealed.

239. Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claims 13-15 and 32-34, and those claims would have been obvious to a person of ordinary skill in view of those references.

M. Claims 16 and 35

240. Claims 16 and 35 depend from claims 1 and 19, respectively, and further recite that “the module is substantially wear resistant.” Hattori-912 discloses this limitation because it discloses that the module is embedded in frames 1-a and 1-b. Ex.1006 (Hattori-912), 64. A person of ordinary skill would have understood that eyewear frames are generally made from durable materials that are wear-resistant. For example, Pickel (Ex. 1018) discusses several well-known materials for eyewear frames that are resistant to wear, such as Optyl, carbon fiber graphite, nylon, polycarbonate, and many others. Thus, if the sealed module is embedded within the eyewear frame, the module is protected from wear by the frame and is

thus substantially wear-resistant. Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claims 16 and 35, and those claims would have been obvious to a person of ordinary skill in view of those references.

N. Claims 17 and 36

241. Claims 17 and 36 depend from claims 1 and 19, respectively, and further recite that “the module includes a power source” and “the power source comprises an inductively rechargeable battery.” As I have discussed above in Paragraphs 137-143, Blum-741 discloses that its eyewear includes an inductively rechargeable battery to be used as a power source. A person of ordinary skill would have been motivated to enclose Blum-741’s inductively rechargeable battery in Hattori-912’s sealed module, and would have reasonably expected success doing so, for the same reasons I have discussed above. *See* ¶¶137-143, 203-208, above. Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claims 17 and 36, and those claims would have been obvious to a person of ordinary skill in view of those references.

O. Claims 18 and 37

242. Claims 18 and 37 depend from claims 1 and 19, respectively, and further recite that “the module includes electronic components configured to enable an electronic display.” Hattori-912 discloses that the eyewear may include “display device 3 [which] may be placed on eyeglasses frame 1’ or lens 2 such that it will be

possible to view the display details while wearing the eyeglasses.” Ex.1006 (Hattori-912), 64; *id.*, 63, 65. As I have discussed above in Paragraphs 192-196, Hattori-912 further discloses electronic components, such as drive circuitry, configured to enable use of the electronic display device 3 by the user, and discloses or suggests that those electronic components may be contained in the sealed module. A person of ordinary skill would have been motivated to include Hattori-912’s electronic display with Blum-741’s eyewear for the reasons I have discussed above. *See* ¶¶192-196, above. Accordingly, Blum-741 and/or Hattori-912 disclose each limitation of claims 18 and 37, and those claims would have been obvious to a person of ordinary skill in view of those references.

XIII. BLUM-741, HATTORI-912, AND SPITZER RENDER CLAIMS 3 AND 21 OBVIOUS

243. Claims 3 and 21 depend, directly or indirectly, from claims I have discussed above in Paragraphs 175-226; I have also discussed above in Paragraphs 145-153 how Spitzer discloses the additional limitations of claims 3 and 21 and why a person of ordinary skill would have been motivated to combine Spitzer with other references and would have had a reasonable expectation of success in doing so. My analysis above applies equally to the combination of Blum-741, Hattori-912, and Spitzer. Accordingly, Blum-741, Hattori-912, and Spitzer together disclose each element of claims 3 and 21, and render those claims obvious as a whole.

XIV. BLUM-741, HATTORI-912, AND OGREN RENDER CLAIMS 11 AND 29 OBVIOUS

244. Claims 11 and 29 depend, directly or indirectly, from claims I have discussed above in Paragraphs 175-221; I have also discussed above in Paragraphs 154-163 how Ogren discloses the additional limitations of claims 11 and 29 and why a person of ordinary skill would have been motivated to combine Ogren with other references and would have had a reasonable expectation of success in doing so. My analysis above applies equally to the combination of Blum-741, Hattori-912, and Ogren. Accordingly, Blum-741, Hattori-912, and Ogren together disclose each element of claims 11 and 29, and render those claims obvious as a whole.

XV. BLUM-741, HATTORI-912, AND JANNARD-868 RENDER CLAIMS 12 AND 30 OBVIOUS

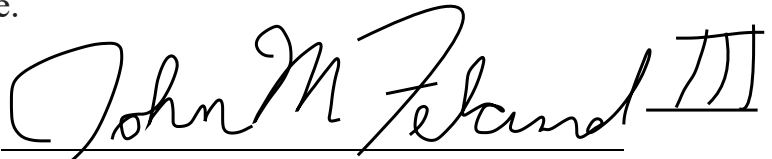
245. Claims 12 and 30 depend, directly or indirectly, from claims I have discussed above in Paragraphs 175-221; I have also discussed above in Paragraphs 164-173 how Jannard-868 discloses the additional limitations of claims 12 and 30 and why a person of ordinary skill would have been motivated to combine Jannard-868 with other references and would have had a reasonable expectation of success in doing so. My analysis above applies equally to the combination of Blum-741, Hattori-912, and Jannard-868. Accordingly, Blum-741, Hattori-912, and Jannard-868 together disclose each element of claims 12 and 30, and render those claims obvious as a whole.

XVI. CONCLUSION

For the foregoing reasons, it is my opinion that the claims of the '483 patent are anticipated by and/or would have been obvious in view of the prior art discussed above and the knowledge of one of ordinary skill in the art at the time of the alleged invention.

I reserve the right to supplement my opinions in the future to respond to any arguments or positions that the patent owner may raise, taking account of new information as it becomes available to me.

I 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.

Dated: 14 Jun 2024 By:  III
John Feland, Ph.D.