

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

Case No. IPR2024-01069

Patent No. 10,613,355

**DECLARATION OF JAMES H. OLIVER, PHD IN SUPPORT OF PATENT
OWNER'S RESPONSE TO PETITION**

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I. INTRODUCTION

1. My name is Dr. James H. Oliver. I have been retained by counsel for Patent Owner eVision Optics, LLC ("Patent Owner") as an expert in this matter to provide technical opinions with respect to Luxottica of America Inc.'s ("Petitioner") petition seeking *inter partes* review of U.S. Patent No. 10,613,355 ("the '355 patent").

2. All the opinions in this Declaration are based on the documents I reviewed and my knowledge and professional judgment. In forming the opinions expressed in this Declaration, I reviewed the petition and supporting exhibits.

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

II. QUALIFICATIONS

4. In formulating my opinions, I have relied on my knowledge, training, and experience in the relevant field, which I will summarize briefly. A more detailed summary of my background, experience, and publications is set forth in my curriculum vitae (CV), which is submitted as EX-2005.

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

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

7. I have taught at different universities as a professor in Mechanical Engineering, Electrical and Computer Engineering, and Aerospace Engineering.

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Starting in August 1988 until August 1991, I was an Assistant Professor in the Department of Mechanical and Aerospace Engineering at the State University of New York at Buffalo, New York. I have also held various professor positions at Iowa State University, including Assistant Professor in the Department of Mechanical Engineering starting in August 1991, before becoming an Associate Professor in April 1993. I held that position until July 2000, and eventually returned to the same position in September of 2001, before being promoted to the rank of Professor in April 2004. In August 2012, I became a University Professor, an honorary title acknowledging lasting impact on the entire university. In addition to teaching as part of the Department of Mechanical Engineering at Iowa State University, I have received courtesy appointments to the Department of Aerospace Engineering since March 2005; the Department of Electrical and Computer Engineering since June 2005; and the Department of Industrial and Manufacturing Systems Engineering since May 2007—appointments which I still hold. From May 2010 to July 2011, I was a Visiting Professor at Image Institute in the Ecole Nationale Supérieure d'Arts et Métiers, ParisTech in Chalon-sur-Saône, France.

8. Over my career, I have taught numerous other university courses, including “Mechanical Systems Design;” “Virtual Environments, Virtual Worlds and Applications”; Computer Graphics and Geometric Modeling; “Computer-Aided

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Design Applications;" and "Computer-Integrated Manufacturing." For example, I co-developed the content for the introductory design course, ME 270 Introduction to Mechanical Engineering Design. Referred to as our "cornerstone" design course, ME 270 is intended to provide students with context for the in-depth analysis-intensive courses they encounter later in our curriculum. It provides a broad introduction to contemporary mechanical design practice, while incorporating technical modeling and analysis techniques drawn from the basic physics and calculus courses that students have completed to that point in their overall curriculum. Specific course topics include market evaluation, customer requirements, ideation, conceptual design, mathematical modeling and analysis, business case development, detail design, prototype fabrication, prototype testing, resolving analysis predictions with test results, cost analysis, and final product proposal. At the senior undergraduate level, I teach ME 415 Mechanical Systems Design. This course is referred to as our "capstone" design course because it draws from all of the student's experience gained through the core curriculum to provide an integrative, culminating, and in-depth product design experience. Design challenges for this course are typically solicited from regional industry partners. Students often work in close collaboration with industry colleagues on design

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problems with actual market impact. Many of the projects focus on electro-mechanical systems.

9. In addition to teaching at Iowa State University, I have also been involved in the University's research and development efforts. I have served as an Associate Director from April 1993 to July 1997 at the Iowa Center for Emerging Manufacturing Technology (later renamed as the Virtual Reality Applications Center), where I assisted in building a world-renowned research center for applied virtual reality. In fall 2003 I was named director of the Virtual Reality Applications Center and fostered its continued growth until July 2019. Under my leadership the Virtual Reality Applications Center's ongoing contract research has increased from \$9M to \$20M, and faculty involvement has broadened to encompass colleagues from all Iowa State University colleges. From 2005 to 2007, I led fundraising, technical specification, bid process, and vendor management for a \$5M upgrade of our flagship device, the C6—now the world's highest resolution immersive VR facility—and in 2008 led an \$800K upgrade of Lee Liu Auditorium in Howe Hall, making it the world's highest resolution stereoscopic immersive theater.

10. I have also had extensive experience in the software industry, including as Director, Senior Director, and Vice President of Product Development for various companies. From April 1987 to August 1988, I was a Software Research Engineer

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at International TechneGroup, Inc., where I conducted software research and development and provided engineering consulting. From 1997-2001, I took a leave from my university position to work in the software industry. I joined Engineering Animation Inc. to lead their core technology team, focused on CAD-independent, large model visualization to facilitate virtual product prototyping. In 1999, I conceptualized, planned, and led development of e-Vis, the first commercial software product to combine high-performance product visualization with secure Internet-based collaboration capabilities to empower distributed product development and supply chain integration. After several corporate acquisitions, these technologies are now referred to as TeamCenter Visualization, part of the Siemens PLM Software tool suite, and are used by manufacturers around the world.

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

12. I have received financial support for my research programs from several federal sources, including the National Science Foundation, NASA, and the research branches of the Navy, Air Force, and Army. Industry sponsors of my research include John Deere, Rockwell Collins, and Boeing. I have received numerous professional honors and awards, including the Gustus L. Larson Memorial Award from the American Society of Mechanical Engineering, recognizing early career achievement, and the National Science Foundation's prestigious Young Investigator Award. I served six years as Associate Editor of the ASME Transactions, Journal of Computing and Information Science in Engineering. I am a Fellow of the American Society of Mechanical Engineering. I have been a member of the Institute of Electrical and Electronics Engineers since 1983, and the Association for Computing Machinery since 2010. I was also elected Fellow of the American Society of Mechanical Engineers in 2006. I hold four U.S. patents on innovations in mechanical design and manufacturing.

III. UNDERSTANDING OF RELEVANT LEGAL PRINCIPLES

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

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14. I understand the claims, not a patent's disclosure, define the scope of the patented inventions. I further understand a patent may include two types of claims, independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend from an independent claim. A dependent claim can also depend from a dependent claim.

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

16. I understand that a patent claim is invalid if it is anticipated or obvious in view of the prior art, and that a claim can be unpatentable even if all of the requirements of the claim cannot be found in a single prior-art reference. I further understand that invalidity of a claim requires that the claim be anticipated or obvious from the perspective of a person of ordinary skill in the art at the time the invention was made.

17. I have been informed that to qualify as prior art for an obviousness determination, a reference must be analogous to the claimed invention. I have also been informed that a reference is analogous art only if it: (i) is from the same field of endeavor; or (2) is reasonably pertinent to the problem faced by the inventor. I understand that a reference is not reasonably pertinent to the problem unless it

logically commended itself to an inventor's attention in considering his or her problem.

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

19. I have been informed that a claim can be obvious in light of a single prior art reference or multiple prior art references. I understand that to prove that prior art or a combination of prior art renders a patent obvious, it is necessary to:

- 1) Identify the particular references that, alone or in combination, make the patent obvious;
- 2) Specifically identify which elements of the patent claim appear in each of the asserted references; and
- 3) Explain why a person of ordinary skill in the art would have combined the references, and how they would have done so, to create the inventions claimed in the patent. I further understand that exemplary rationales that may support a conclusion of obviousness include:

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

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

IV. THE '355 PATENT

21.Before the claimed invention, it had been found that in some environments, particularly those having high humidity or causing the wearer to sweat, conventional electronic eyewear and frames might suffer from shorting of electronic connections and thus impede or cause the electronic application used with the eyewear to fail. (Ex. 1001, 2:23-28.)

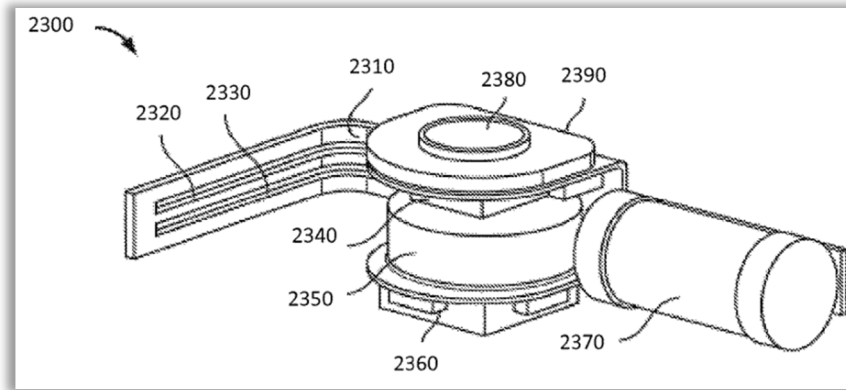
22.In addition to high humidity environments, electronic eyewear are generally exposed to moisture and liquids, which can come from various sources, such as, “the natural environment (e.g., rain, snow),” “the human body in the form of oils and perspiration,” and “consumer products such as liquid lens cleaners and cosmetics.” If these materials get into and between the electronic components of the eyewear, they can cause damage, e.g., electrical short circuits. (*Id.*, 13:4-11.)

23.As a result, before the claimed invention, there was a need for electronic eyewear and frames to be even more robust in all environments including those whereby there is an abundance of moisture present, one whereby there are fewer electrical contact points exposed to the environment, and/or one that involved fewer moving and/or open and shut electrical connections. (*Id.*, 2:29-35.)

24. The '355 patent discloses and claims novel embodiments of moisture-resistant electronic eyewear, which include an optical functional member, a capacitive touch switch, and a moisture-proof "barrier layer" to seal electrical components and connections. (*Id.*, Title, Abstract, cls. 1, 14, 23:36-46.) The electrical components and connections are "sealed such that they are water resistant or water proof." (*Id.*, 5:20-21.)

25. The barrier layer may be incorporated in the frames in different ways and at different points of the manufacturing process. (*See id.*, 23:30-24:57.) For example, the barrier layer may comprise: a polymer substance that may be applied between two components (*Id.*, 23:46-52); a material with a thin enough viscosity that it can be applied or injected into areas between the components (*id.*, 23:64-24:19); or a soft and/or flexible material such that it does not damage the other components (*id.*, 24:20-32).

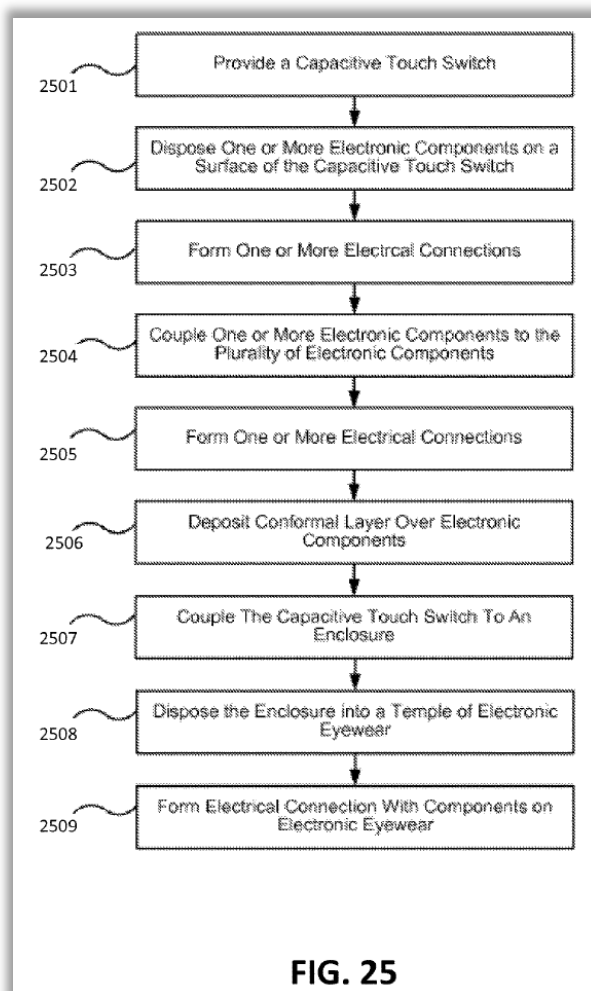
26. Figure 22, below, shows one embodiment of the '355 patent's invention in which a sealing diaphragm (2390) has been integrated with a manual switch (2380) that is attached to the top of the electronic module (2300) and then sealed with an epoxy, silicone, or similar water-resistant material to prevent water from contacting the electronic components:



(*Id.*, FIG. 23, 24:58-25:9.)

27.The '355 patent also discloses and claims novel methods of forming, assembling, or manufacturing moisture-resistant eyewear with electrical connections. (*Id.*, cl. 13, FIG. 25, 27:16-28:25.)

28.Figure 25, below, shows a flow chart with exemplary steps for implementing the '355 patent's method:



V. LEVEL OF ORDINARY SKILL IN THE ART

29.A person of ordinary skill in the art (“POSITA”) at the time of the invention of the ’355 patent would have had a bachelor’s degree in mechanical engineering, electrical engineering, or computer engineering, or an equivalent degree and, in addition, approximately two years of work experience with embedded electronic devices. More advanced degrees or training in a related discipline or both can compensate for shorter work experience.

30.I understand that Petitioner has defined a POSITA as:

Based on the relevant factors, *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995), a hypothetical person of ordinary skill in the art ("POSITA") would have had at least a bachelor's degree in mechanical or manufacturing engineering; mechatronics; electrical engineering plus coursework in mechanical engineering, manufacturing engineering, or mechatronics; or a similar technical degree. Ex. 1002 ¶32. A POSITA would have also had at least 2 years of experience designing consumer electronics, such as eyewear with electronics. *Id.* Work experience could substitute for formal education and additional formal education could substitute for work experience.

Petition at 15-16.

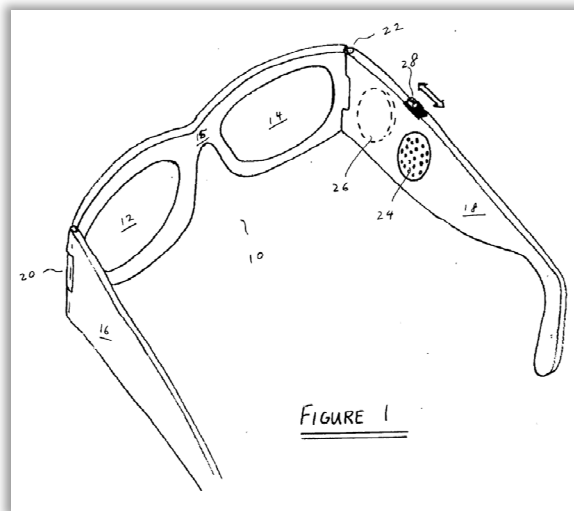
31.I understand that the Board has applied the above definition in the Institution Decision. My opinions as expressed in this Declaration would be the same when viewed under either party's definition of the level of ordinary skill in the art. The minor variations between them are immaterial.

32.Based on either standard, I was at least a person of ordinary skill in the art at the time of the invention of the '355 patent.

VI. OVERVIEW OF THE PRIOR ART

A. Howell-719

33.Howell-719 discloses eyeglasses for events. (Ex. 1004 ¶ 4.) Figure 1, below, shows a pair of glasses with a speaker in one of the temples.



34.Howell-719 discloses that the speaker is a part of a radio, and “[a]ll the electronics for the radio are at least partially embedded in the glasses.” (*Id.* ¶ 50.) “[T]he electronics can be on a printed circuit board, and the board is in one of the temples of the glasses.” (*Id.*) Howell-719 does not disclose or suggest a conformal layer.

B. Sikonowiz

35.Sikonowiz is a textbook titled “Designing and Creating Printed Circuits.” Petitioner includes only chapter nine, which is titled “Final Assembly.” (Ex. 1005,

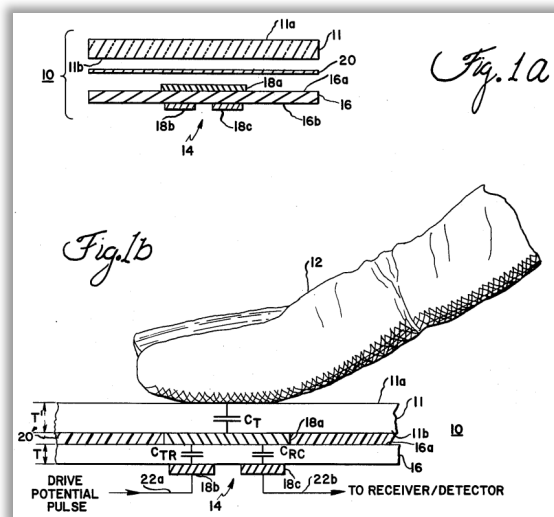
122.) Petitioner's expert, Dr. Feland, explains that "Sikonowiz focuses on designing and manufacturing PCBs." (Ex. 1002, ¶ 39.)

36. Chapter nine of Sikonowiz discusses conformal coatings but does not suggest or teach any application to eyewear or even consumer electronics. (*See generally* Ex. 1005.)

C. Eichelberger

37. Eichelberger is a patent directed only to a capacitive touch entry apparatus with a high degree of personal safety. (Ex. 1010, Title; 1:6-9.)

38. Figures 1A and 1B, below, illustrate a capacitive touch entry panel comprising a substrate or panel of a transparent insulative material, with a surface that is contactable by a body part (e.g., finger), and at least one capacitive touch sensor on an insulative material layer 16.

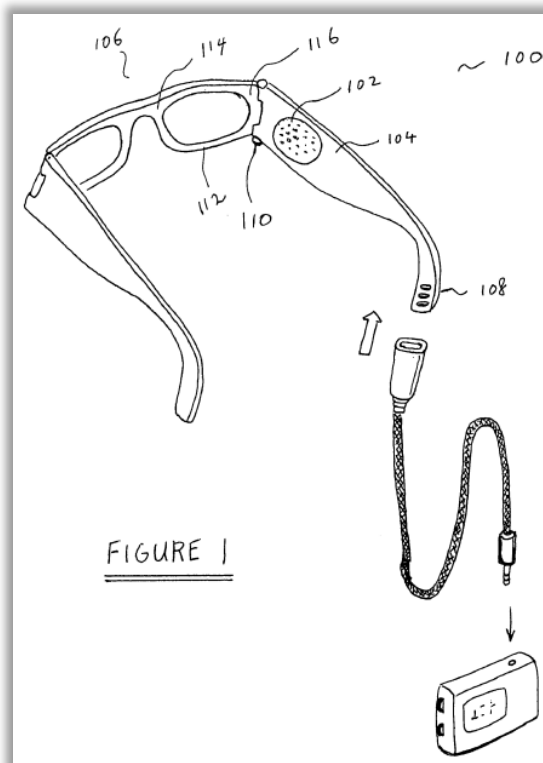


39. Eichelberger does not disclose or suggest any connection to eyewear.

D. Howell-158

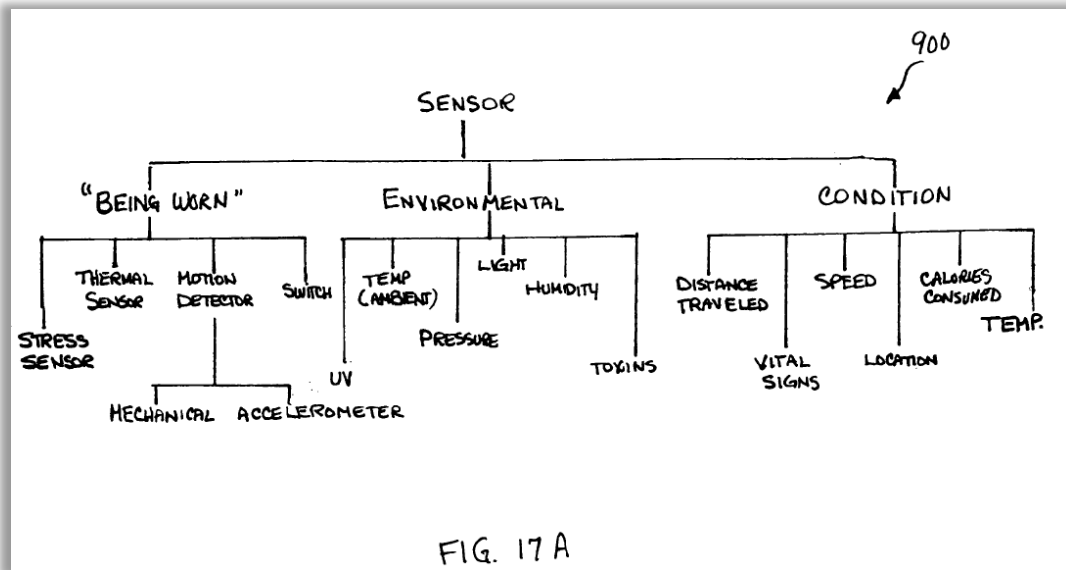
40.Howell-158 relates to glasses with embedded electrical components. (Ex. 1007, ¶ [0004].) The glasses include a speaker electrically coupled to a connector, with both components at least partially embedded in the glasses, as well as a processor and a storage medium. (*Id.*, ¶¶ [0010]-[0012].)

41.Figure 1, below, shows a speaker in one of the temples of the glasses. (*Id.*, ¶ [0020].)



42.Howell-158 also discloses that the glasses include a sensor, which can be a “being worn” sensor, an environmental sensor, or a condition sensor. (*Id.*, ¶ [0018];

see also *id.*, ¶¶ [0038], [0161], [0167]-[0168].) Figure 17A, below, depicts the various sensors.



(*Id.*, FIG 17A.)

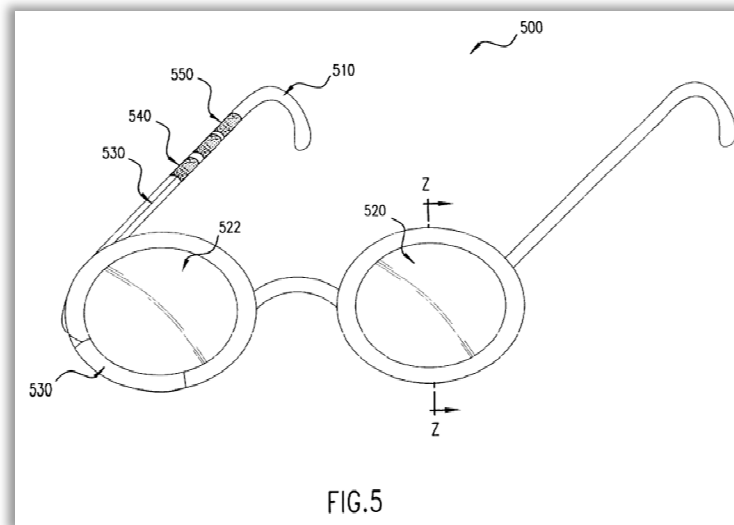
43.Howell-158 discloses that the “being worn” sensor can be “a thermal sensor, a motion detector, a stress sensor *or* a switch.” (*Id.*, ¶¶ [0162]-[0166].)

44.Howell-158 does not disclose or suggest capacitive touch switches or conformal layers to protect electronics. (*See generally id.*)

E. Blum-130

45.Blum-130 relates to a system, apparatus, and method for correcting vision using an electro-active lens. (Ex. 1006, 1:36–39.)

46. Figure 5, below, shows electro-active eyewear, which include electro-active lenses electrically coupled by connecting wires to an electro-active eyewear controller and power source. (*Id.*, 6:16-21.)



47. Blum-130 discloses that the controller contains at least one processor and a memory component. (*Id.*, 6:22-25.) Blum-130 also discloses a microgyroscope and a manual switch, which is used to override the microgyroscope. (*Id.*, 30:49-58.)

48. Blum-130 also relates to “selection, dispensing, activating, and programming of electro-active eyewear.” (*Id.*, 3:16-18.) For example, the electro-active eyewear controller can be originally programmed by the eyecare specialist or technician when first dispensed, and as the patient's needs change, the same controller can be reprogrammed to provide a different correction, even without removal from the electro-active eyewear. (*Id.*, 6:48-58.)

49. Blum-130 does not disclose or suggest a capacitive touch switch or conformal layers.

VII. INDEPENDENT CLAIMS 1, 13, AND 14 ARE PATENTABLE

50. Petitioner contends that claims 1-21 of the '355 patent are obvious in view of various combination of references set forth below:

Ground	References	Basis	Challenged Claims
1	Howell-719 and Sikonowiz	§ 103	1, 3-13
2	Howell-719, Sikonowiz, Thomas, and Vogt	§ 103	4
3	Howell-719, Sikonowiz, and Eichelberger	§ 103	13
4	Howell-719, Sikonowiz, and Howell-158	§ 103	14-21
5	Howell-719, Sikonowiz, and Blum-130	§ 103	14-21
6	Blum-130 in view of Sikonowiz and Howell-719	§ 103	1-21
7	Blum-130 in view of Sikonowiz and Eichelberger	§ 103	13, 14, 18

51. Claims 1, 13, and 14 are independent, whereas claims 2-12 depend on claim 1 and claims 15-21 depend on claim 14.

52. In my opinion, the asserted grounds do not render claims 1, 14, and 13 of the '355 patent obvious.

53. I present below the independent claims, as they are represented in the petition. For example, claim 1 as 1[pre] through 1[i].

54. Claim 1 recites:

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- 1[pre] 1. An eyewear system comprising:
- 1[a] an eyewear frame;
- 1[b] an electronics assembly comprising electronic components configured to control an electrical functional member;
- 1[c] a capacitive touch switch coupled to at least one electronic component in the electronics assembly;
- 1[d] at least one electrical connective element electrically connected to the electronic assembly and the electrical functional member; and
- 1[e] a conformal layer over the electronic assembly to seal the electronic components;
- 1[f] wherein the conformal layer is moisture proof and seals electrical connections of the electronic component;
- 1[g] wherein the conformal layer is disposed in an enclosure of the eyewear frame;
- 1[h] wherein the eyewear frame comprises a temple; and
- 1[i] wherein the electronic assembly is enclosed in the temple.

55.Claim 13 recites:

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- 13[pre]** 13. A method of manufacturing an eyewear system comprising:
- 13[a]** disposing a plurality of electronic components on a capacitive touch switch;
- 13[b]** connecting the plurality of electronic components via electrical connections to form an electronic assembly;
- 13[c]** depositing a conformal layer over at least a portion of the electronic assembly and at least a portion of the capacitive touch switch; and
- 13[d]** coupling the electronic assembly and the capacitive touch switch with the conformal layer to an enclosure of an eyewear frame.

56.Claim 14 recites:

- 14[pre]** 14. Eyewear comprising:
- 14[a]** an eyewear frame comprising a temple;
- 14[b]** a plurality of electronic components disposed within a cavity formed in the temple, the plurality of electronic components comprising (i) at least one of a processor or a controller, (ii) a memory, (iii) a power source, (iv) an antenna, (v) at least one of a transmitter or a receiver, and (vi) at least one of an accelerometer or a gyroscope;
- 14[c]** a conformal coating, deposited over at least a portion of the plurality of electronic components, to protect the plurality of electronic components; and
- 14[d]** a capacitive touch switch operably coupled to an electronic component in the plurality of electronic components.

A. Independent Claim 14 is Patentable Over the Cited Prior Art.

57. Petitioner relies on four grounds to challenge the validity of independent claim 14: Grounds 4 (Howell-719, Sikonowiz, and Howell-158), 5 (Howell-719, Sikonowiz, and Blum-130), 6 (Blum-130, Sikonowiz, and Howell-719), and 7 (Blum-130, Sikonowiz, and Eichelberger).

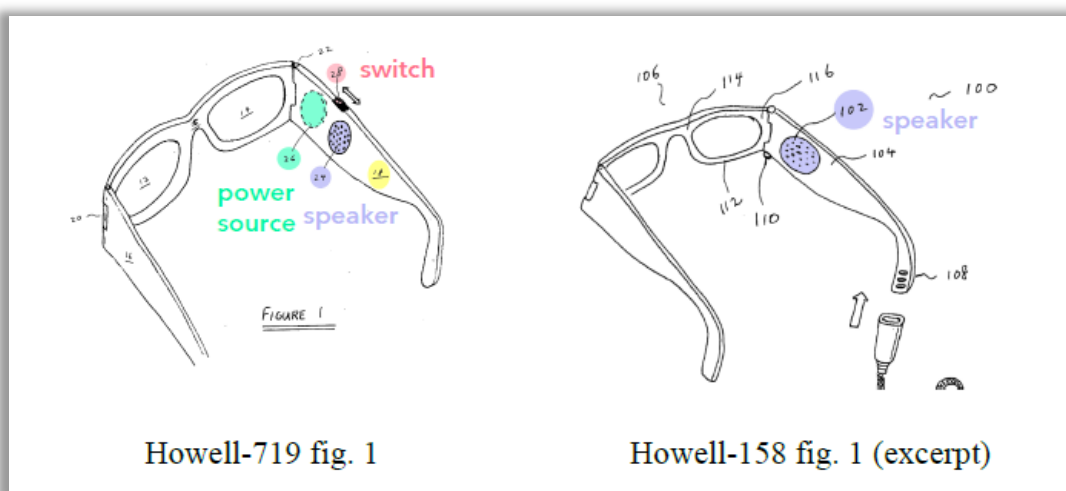
58. Claim 14 requires, in relevant part, “a plurality of electronic components . . . comprising . . . at least one of an accelerometer or a gyroscope ...; and a capacitive touch switch operably coupled to an electronic component in the plurality of electronic components.” (Ex. 1001, 30:15–28.)

59. In my opinion, Petitioner's prior art combinations in Grounds 4, 5, 6, and 7 fail to disclose a capacitive touch switch.

1. Grounds 4 and 5: Petitioner's Modification Eliminates the Capacitive Touch Switch

60. Petitioner and Dr. Feland both address Grounds 4 and 5 in parallel and employs the same analysis. (*See* Petition at 42 (“Petitioner addresses Grounds 4 and 5 in parallel. The grounds differ only with respect to which reference—Howell-158 or Blum-130—supplies an accelerometer or gyroscope for element 14[b]. Otherwise, the analysis for claims 14–21 is the same for Grounds 4 and 5.”); Ex. 1002, ¶ 116.)

61. Petitioner also relies on the following annotated figures to show that Howell-719 and Howell-158 disclose similar glasses to further support the combined analysis.



(Petition at 44.)

62. I will similarly address Grounds 4 and 5 together. In my opinion, both grounds fail to disclose a capacitive touch switch because Petitioner's proposed modifications and motivation to combine eliminates the capacitive touch switch.

63. For example, in Ground 5, Petitioner relies on Howell-719 to disclose a switch that the user operates to control audio while wearing the glasses and Blum-130 to disclose glasses including an accelerometer or gyroscope that allows the user to control a switch, thereby allowing the user to use a head movement to change the functionality of the glasses. (Petition at 46–47.) Petitioner then argues that it would have been obvious to an ordinarily skilled artisan to incorporate Blum130's

accelerometer- or gyroscope-based switch controls into Howell-719 as “a simple substitution of one known alternative (accelerometer/gyroscope-based motion detector allowing for head movement to activate switch) for a component (physical switches) *serving the same purpose* (allowing the user to activate switch to control functionality while the user is wearing the glasses and cannot see the switches) with the added benefit of handsfree control.” (*Id.* at 47 (emphasis added)).

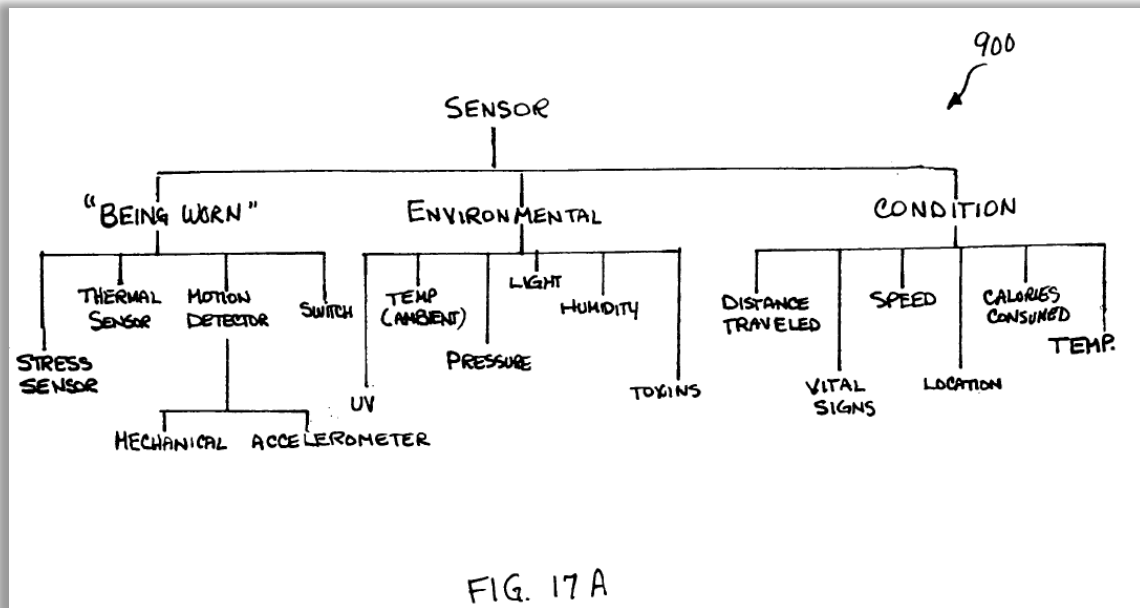
64.As a result, Petitioner's modification replaces Howell-719's physical switch with Blum-130's accelerometer or gyroscope-based motion detector, which entirely eliminates the required capacitive touch switch. Therefore, in my opinion, Petitioner's asserted combination of references in Ground 5 fails to satisfy the claimed capacitive touch switch.

65. Petitioner's rationale for the motivation to combine further demonstrates that Petitioner's proposed medication and combination of references do not close a capacitive touch in addition to an accelerometer or a gyroscope. Specifically, Petitioner alleges that a capacitive touch switch serves the same purpose as an accelerometer or a gyroscope, which confirms that the modified eyewear does not include a capacitive touch switch as well as an accelerometer or a gyroscope as required by claim 14.

66. Based on my review, Petitioner does not offer any other motivation to combine Howell-719 and Blum-130 as suggested in Ground 5. (*See generally* Petition.)

67. In Ground 4, Petitioner relies on Howell-719 to disclose a switch and Howell-158 to supply an accelerometer “to detect whether a user is wearing the glasses.” (Petition at 43-44) Like in Ground 5, Petitioner’s modification replaces Howell-719’s switch (“ready to be worn” sensor that activates the switch to turn on the audio) with Howell-158’s accelerometer (“being worn” detector) “using a simple substitution” of one known alternative for another to serve the same purpose. (*Id.* at 44.)

68. Because the accelerometer-based motion detector allows for head movement to activate switch to control functionality, there is no need for a capacitive touch switch. Howell-158 confirms this and specifically states that “[t]he ‘being worn’ operation can be performed using, for example, a thermal sensor, a motion detector, a stress sensor or a switch,” as illustrated by Figure 17A reproduced below. (Ex. 1007 ¶ 162.)



(*Id.*, FIG 17A.)

69. In my opinion, Howell-158 does not disclose or suggest a motion detector, such as an accelerometer, as well as a switch, as required by claim 14. To the extent, Petitioner contends such a combination would be a redundancy measure known or obvious to a POSITA, Howell-158 expressly discloses fault-tolerance only, which is pairs of the same sensor and not a combination of different sensors. (*Id.*, ¶ [0169] (“The sensors can be provided in a redundant or fault-tolerant manner. For example, sensors can come in pairs in the glasses. When one malfunctions, the other one will take over its operation.”))

70. In my opinion, Petitioner's Ground 5 fails to satisfy the capacitive touch switch limitation (14[d]).

2. Ground 6: No Motivation to Combine Blum-130 and Howell-719

71. In my opinion, claim 14 is patentable over the cited prior art combination in Ground 6 (i.e., Blum-130, Sikonowiz, and Howell-719) because Petitioner's motivation for combining Blum-130's teachings with those of Howell-719 is flawed.

72. In my opinion, a POSITA would not have been motivated to use a capacitive touch switch. Both Blum-130 and the '355 patent disclose electro-active eyewear, whereas Howell-719 is directed to eyewear with a speaker. (*See, e.g.*, EX-1006, Abstract; EX-1001, 2:18-22, 2:50-62.)

73. In my opinion, a POSITA would not have found Howell-719's disclosures suitable for Blum-130's electro-active eyewear. Moreover, as Petitioner recognizes, Blum-130 discloses different types of switches and their associated benefits in electro-active eyewear, including the manual switch, which Petitioner argues a POSITA would have been motivated to replace with Howell-719's capacitive touch switch. (*See, e.g.*, EX-1006, 30:55-58 ("The manual switch...used for overriding the microgyroscope for certain visual functions at or above the 180, such as working on a computer.")) In fact, Blum-130 discloses specific alternative to the manual switch, i.e., an eye-tracker, for the same purpose Petitioner proposes for the capacitive touch switch. (*Id.*, 30:65-31:1.)

74.Blum-130 discloses that “the switch is analog not digital, and provides *continuous variance of the focal length of the lens by adjusting a knob or lever much like a volume control on a radio.*” (EX-1006, 28:55-58 (emphasis added).)

To enable continuous variance functionality in a capacitive touch switch, a POSITA would have needed to include multiple capacitive touch switches, or at least a very complex touch switch with slider capabilities, which would have been cost-prohibitive. (EX-2006.)

75.Therefore, in my opinion, a POSITA would not have been motivated to replace any of Blum-130's switch options with a capacitive touch switch. Accordingly, Petitioner's cited prior art combination in Ground 6 does not render obvious the claimed capacitive touch switch.

i. Ground 7: Petitioner's Reliance on Eichelberger is Misplaced

76.In my opinion, claim 14 is patentable over the cited prior art combination in Ground 7 (Blum-130, Sikonowiz, and Eichelberger) because Eichelberger is non-analogous art. And even if Eichelberger were analogous art, in my opinion, there still would have been no motivation to combine its teachings with Blum-130.

77.Petitioner and Dr. Feland have not shown that Eichelberger is analogous art. Both the petition and Dr. Feland's declaration, merely assert, in two conclusory statements, that all cited prior art is analogous: “The *references* are analogous art

because they are from the same field as the '355 patent, e.g., eyewear and/or consumer electronics...They are also pertinent to a problem the inventor was focused on, e.g., adding electronics to eyewear or sealing eyewear electronics to resist moisture.” (Petition at 18 (emphasis added).)

78.Petitioner and Dr. Feland fail to analyze any of the references, including Eichelberger, specifically. Thus, it is unclear whether Petitioner and Dr. Feland contend that Eichelberger is “from the same field as the '355 patent, e.g., eyewear and/or consumer electronics” or “pertinent to a problem the inventor was focused on, e.g., adding electronics to eyewear or sealing eyewear electronics to resist moisture.” (*Id.*)

79.In my opinion, Eichelberger does not satisfy either prong of the test for analogous art, i.e., it is neither (1) from the field of eyewear and/or consumer electronics nor (2) pertinent to adding electronics to eyewear or sealing eyewear electronics to resist moisture.

80.The '355 patent's field is “various types of eyewear including electronic functional members, including, for example, electronic focusing eyeglasses, electroactive eyeglasses, electronic eyewear providing 3D capabilities, etc.” (Ex. 1001, 18-22.) Eichelberger's field, on the other hand, is “capacitive touch entry structures and more particularly [] a structure allowing capacitive touch entry of data

while providing a high degree of safety to user personnel.” (Ex. 1010, 1:6-9.) Eichelberger is further directed to capacitive touch structures for appliances. (*Id.*, 7:32-40) The reference does not relate to or even mention eyewear.

81. In my opinion, Eichelberger is also not reasonably pertinent to the problem the '355 patent seeks to address (i.e., moisture-proof eyewear). Instead, Eichelberger is focused on addressing the need for a capacitive touch structure with “capacitive touch entry sensors so positioned as to provide a high degree of user safety and sensor reliability, with low manufacturing costs.” (*Id.*, 1:56-60.)

82. Eichelberger attempts to solve problems with conventional touch entry systems, “utiliz[ing] a matrix of electrodes [overlaid] by an insulating film, such as a plastic membrane,” which provide “insufficient insulative thickness.” (*Id.*, 1:10-34.) Eichelberger also addresses other deficiencies associated with conventional touch entry systems, such as “a plastic appearance; a high probability of damage during cleaning (which may allow touch pad potentials to be received by user personnel); and low possibility of integration with display apparatus.” (*Id.*) Eichelberger does not relate to or address moisture-resistant eyewear or methods of making same.

83. In my opinion, even if Eichelberger were analogous art, there still would have been no motivation to combine its teachings with those of Blum-130. For

example, as discussed above with respect to Howell-719, Blum-130 provides a good alternative, i.e., eye-tracker. Because Blum-130's switch must "provide[] continuous variance of the focal length of the lens by adjusting a knob or lever much like a volume control on a radio" (Ex. 1006, 28:55-58), in my opinion, a POSITA would not have been motivated to use a capacitive touch switch.

B. Independent Claims 1 and 13 are Patentable Over the Cited Prior Art.

84.Claim 1 recites an eyewear system comprising, in relevant part, "a conformal layer over the electronic assembly to seal the electronic components; wherein the conformal layer is moisture proof and seals electrical connections of the electronic component; wherein the conformal layer is disposed in an enclosure of the eyewear frame." (Ex. 1001, 29:9–14.)

85.Claim 13 recites a "method of manufacturing an eyewear system comprising," in relevant part, "depositing a conformal layer over at least a portion of the electronic assembly and at least a portion of the capacitive touch switch." (*Id.*, 30:9–14.)

86.In my opinion, none of Petitioner's asserted grounds disclose the conformal layer limitations of claims 1 and 13 because Sikonowiz is non-analogous art.

1. Grounds 1, 3, 6, and 7: Sikonowiz is Non-Analogous Art

87. Petitioner and Dr. Feland rely on Sikonowiz in all grounds for the conformal layer limitations of the independent claims. (*See* Petition at 26 & 58; *see also id.* at 57 (stating that “Howell-719 discloses a capacitive touch switch,” for Ground 6)).)

88. With respect to claim 1 under Ground 1, Petitioner admits that Howell-719 fails to disclose claim limitations 1[e]-1[g] relating to a conformal layer. (*See* Petition at 26.)

89. In Ground 6, Petitioner admits that Blum-130 fails to disclose the elements of claim 1 “relating to the capacitive touch switch (1[c]) and the conformal layer (1[e]–1[g]).” (Petition at 57.)

90. Petitioner also relies on Sikonowiz for the conformal layer limitations of independent claim 13 in Grounds 1, 3, and 7. (*See, e.g., id.* at 34 (“Sikonowiz motivates depositing a conformal coating over Howell-719’s PCB.”); *id.* at 41 (“For the same reasons discussed in Ground 1, *supra* §§VII.A.5, VII.L.3, Sikonowiz motivates depositing a conformal coating over a PCB.”); *id.* at 67 (“For the same reasons discussed in Ground 6, *supra* §XI.G.3, Sikonowiz motivates depositing a conformal coating over the PCB.”))

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91. Without Sikonowiz, none of Petitioner's prior art combinations in Grounds 1, 3, 6, and 7 discloses or suggests the conformal layer limitations of claims 1 and 13 (i.e., limitations 1[e]-1[g] and 13[c]).

92. In my opinion, Sikonowiz is not analogous art. As discussed above with respect to Eichelberger, Petitioner and Dr. Feland fail to analyze whether any of the cited prior art is analogous, and instead merely assert that "[t]he *references* are analogous art because they are from the same field as the '355 patent, e.g., eyewear and/or consumer electronics... They are also pertinent to a problem the inventor was focused on, e.g., adding electronics to eyewear or sealing eyewear electronics to resist moisture." (Petition at 18 (emphasis added).) Therefore, it is unclear whether Petitioner and Dr. Feland contend that Sikonowiz is "from the same field as the '355 patent, e.g., eyewear and/or consumer electronics" or "pertinent to a problem the inventor was focused on, e.g., adding electronics to eyewear or sealing eyewear electronics to resist moisture." (*Id.*)

93. In my opinion, Sikonowiz is not from the same field as the '355 patent. Sikonowiz is "focuse[d] on designing and manufacturing PCBs." (Ex. 1002, ¶ 39; *see also* Petition at 5 ("[T]his book provides an in-depth guide to designing and manufacturing PCBs.")). Sikonowiz does not mention eyewear or consumer electronics.

94. On the other hand, the '355 patent is directed to “various types of eyewear including electronic functional members, including, for example, electronic focusing eyeglasses, electroactive eyeglasses, electronic eyewear providing 3D capabilities, etc.” (Ex. 1001, 1:18-22; *see also id.*, Abstract (“Eyewear including an optical functional member, control electronics, and a sealed electrical connective element connecting the electronics to the optical functional member.”)) Unlike Sikonowiz, the '355 patent does not relate to designing and manufacturing PCBs.

95. In my opinion, Sikonowiz is also not reasonably pertinent to the particular problem with which the inventors were involved. The '355 patent is directed to the problem of moisture in eyewear in certain environments, such as those having high humidity or causing the wearer to sweat, which led conventional electronic eyewear and frames to suffer from shorting of electronic connections, thereby impeding or causing electronic applications used with the eyewear to fail. ('355 patent, 52:23-28.)

96. In addition to moisture, electronic eyewear are exposed to liquids, which can come from “the natural environment (e.g., rain, snow),” “the human body in the form of oils and perspiration,” and “consumer products such as liquid lens cleaners and cosmetics.” (*Id.*, 13:4-11.) The '355 patent is therefore intended “to address pressing needs of making electronic eyewear more moisture resistant and *more*

robust,” does so by disclosing moisture-resistant eyewear that uses a moisture-proof layer to seal the electrical components and connections. (*E.g., Id.*, cls. 1, 13, 5:23-26, 23:36-46 (emphasis added).) For example, the sealing is substantially water-resistant or water-proof. (*E.g., id.*, 5:20-21, 20:58-59; *see also id.*, 17:16-18 (explaining that the electronic components are sealed “to inhibit undesirable effects of liquid and moisture”).) The ’355 patent did not solve the problem simply by applying a conformal layer to a PCB. For example, the ’355 patent discloses conformal layer as well as enclosing the components in the temple. Additionally, as Petitioner and Dr. Feland admit, miniaturization of components has been ongoing for years and PCB manufacturers continue to work in this area. (*See, e.g., EX-2007.*) Petitioner and Dr. Feland’s oversimplification greatly minimizes the intricacies of designing and creating moisture-resistant and moisture-proof electronic eyewear. (*Id.*)

97. Sikonowiz, on the other hand, discloses that conformal coatings protect a PCB from “environmental hazards such as moisture, dirt, and chemicals.” (Ex. 1005, 136.) Sikonowiz does not address or mention water-proofing or inhibiting the undesirable effects of liquids.

2. Grounds 1 and 3: No Motivation to Combine Sikonowiz and Howell-719

98. In my opinion, there is no motivation to combine Sikonowiz's teachings with those of Howell-719, and Petitioner fails to articulate any sufficient rationale for doing so.

99. As previously discussed, Petitioner relies on Howell-719 for all elements of independent claims 1 and 13, except for the conformal layer limitations. To satisfy the conformal layer limitations, Petitioner argues that because Sikonowiz discloses a conformal layer over a PCB, "[i]t would have been obvious to a POSITA to coat Howell-719's PCB and mounted electronics with a conformal coating, as described in Sikonowiz." (Petition at 24-25.)

100. Howell-719 discloses eyewear with a radio, including a speaker, wherein all the electronics for the radio, not just those for controlling the speaker, are at least partially embedded in the glasses and are on a printed circuit board. (Ex. 1004, FIG. 1, ¶50.)

101. In my opinion, a POSITA would understand Howell-719's disclosures to mean that the speaker components, such as the voice coil, magnet, and wiring are on the PCB. As such, applying a conformal layer on the PCB with those components would have adversely impacted the speaker's functionality.

102. For example, conformal coatings can dampen vibrations of the speaker diaphragm, negatively affecting sound quality and clarity. (Ex. 1019, 5-2-5-3.) Applying a conformal coating to a speaker is also problematic for other reasons, such as flexibility, since speakers often have moving parts and a rigid conformal coating might restrict their movement, leading to reduced performance or damage.

103. Other critical considerations include application complexity or removal difficulty of the conformal coating. (EX-2006, 361-62.) For example, for any repair work, polyurethane coating would need to be stripped chemically or burned away with a soldering iron, whereas epoxy coating “must be burned away with a soldering iron” since it is so impervious and “cannot be chemically stripped for repair work.” (See Ex. 1005, 136-37; EX-2006, 361-62.) As for the application complexity of the conformal coating, polyurethanes, for example, are particularly sensitive to moisture and can cause blistering under humid conditions, which can eventually lead to circuit failure. (EX-2006, 362.) Thus, polyurethane formulations require careful application and close control of coating and curing environments.

104. In my opinion, neither the petition nor Dr. Feland's declaration addresses any of these drawbacks of Petitioner's proposed combination.

105. In my opinion, Sikonowiz also does not disclose or suggest applying a conformal coating to a capacitive touch switch. (See *id.*, 136 (“[A] conformal coating

covers not only the circuit board but the components mounted on it as well.”)) Nor does Petitioner explain why a POSITA would be motivated to deposit a conformal layer over a capacitive touch switch.

106. In my opinion, applying a conformal layer to a capacitive touch switch would deprecate the performance of the switch given that it is based on a capacitance change when touched. For example, a POSITA would recognize that “high dielectric constant can produce stray unwanted capacitance effects between surface tracks that run close and parallel to one another – this can alter the tuned characteristics of the circuit” (EX-2007 at 5.)

107. Therefore, in my opinion, a POSITA would not have been motivated to a deposit a conformal layer on a capacitive touch switch, as Petitioner suggests.

108. Based on my review, none of Petitioner's cited prior art discloses that conformal layers were “broadly usable in eyewear.” (Petition at 23.) Petitioner has not identified any disclosures to that effect.

109. In my opinion, Sikonowiz does not teach or disclose applying conformal coatings to electronic components in eyewear or consumer electronics. (See Ex. 1005.)

110. Because there was no motivation to combine Sikonowiz's teachings with those of Howell-719, Petitioner has not shown that independent claims 1 and 13 are obvious under Grounds 1, 3, 4 and 5.

3. Grounds 6 and 7: No Motivation to Combine Sikonowiz and Blum-130

111. In my opinion, there was no motivation to combine Sikonowiz's teachings with those of Blum-130 and therefore, Petitioner and Dr. Feland have not shown that claims 1 and 13 are obvious under Grounds 6 and 7

112. In Grounds 6 and 7, Petitioner argues that a "POSITA would have been motivated to mount Blum-130's electronic components on a printed circuit board as Howell-719 teaches" and "cover the PCB and mounted electronics with a conformal coating." (Petition at 56) I disagree.

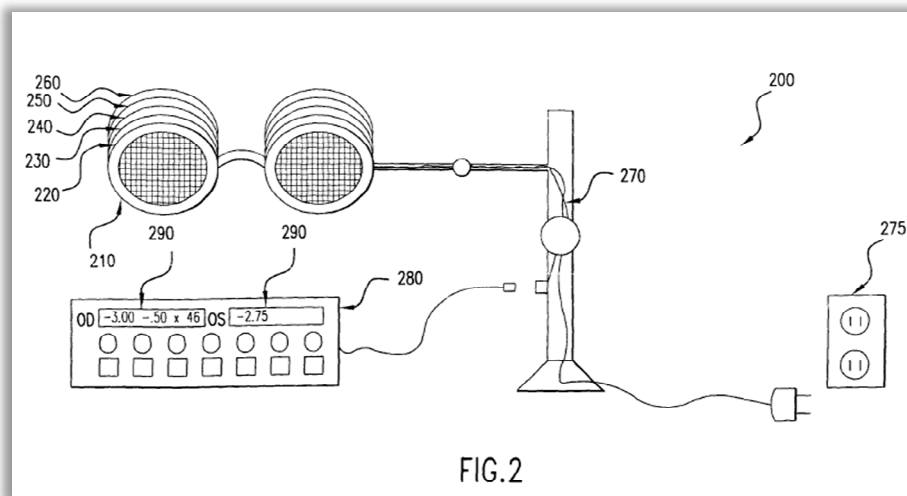
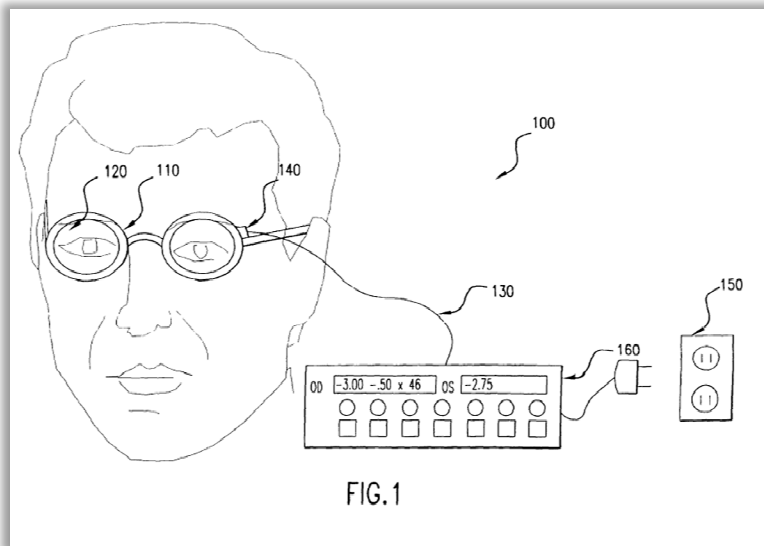
113. For example, Blum-130 emphasizes the need to reprogram the controller chip, *in situ*, to update a prescription for electro-active lenses:

In another inventive embodiment, the electro-active eye wear controller may be originally programmed by the eyecare specialist or technician when first dispensed, and later the same controller, or a component thereof, can be reprogrammed to provide a different correction, as the patient's needs change. This electro-active eyewear controller may be extracted from the eyewear, placed in the refractor's controller/programmer (shown in FIGS. 1 and 2) and

reprogrammed during the examination, or reprogrammed, in situ, by
the refractor without removal from the electro-active eyewear.

(Ex. 1006, 6:48-58.)

114. I reproduce below, Figures 1 and 2, which are referenced in the above
disclosure from Blum-130, which show reprogramming of the controller while
extracted and in situ.



115. In my opinion, if a POSITA were to mount the controller on a PCB and apply a conformal coating as Petitioner and Dr. Feland suggest, doing so would prevent an electrical connection to the controller necessary to reprogram it.

116. A POSITA would understand that any reprogramming would require maintenance and therefore repair work. As discussed in Sikonowiz, conformal coatings need to be chemically stripped away or burned away before any repair work can occur. (*See, e.g.*, Ex. 1005, 136 (“[E]poxy resin is so impervious, it cannot be chemically stripped for repair work. Instead, it must be burned away with a soldering iron.”); *id.*, 137 (“When circuits must be repaired, polyurethane conformal coatings may be stripped chemically or burned away with a soldering iron... Removal of a silicone coating for repair work is difficult, however, and requires that the film be cut away.”))

117. In my opinion, for seamless in situ reprogramming, a POSITA would not have applied a conformal layer to the electronics taught by Blum-130's eyewear.

4. Claim 13 is Patentable Because the Cited Prior Art Fail to Disclose a Method of Manufacturing Eyewear

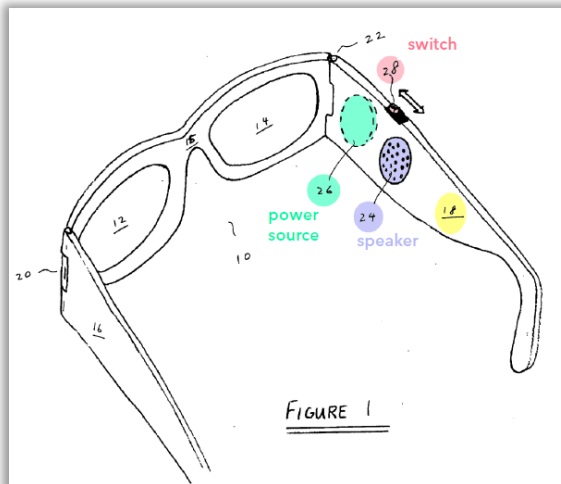
118. In my opinion, Petitioner and Dr. Feland fail to show that each and every limitation of claim 13 is obvious under Grounds 1, 3, 6, and 7.

119. Claim 13 requires “[a] method of manufacturing an eyewear system.”

120. Petitioner and Dr. Feland do not address this requirement in Grounds 1, 3, 6, and 7 and do not show where in Howell-719 or Blum-130 a *method* such as manufacturing steps is taught or suggested. Therefore, in my opinion, claim 13 is patentable because none of the cited art discloses a “method for manufacturing eyewear.”

121. In Grounds 1 and 3, Petitioner and Dr. Feland contend that “Howell-719 discloses an eyewear system and its construction.” (Petition at 32.) But the cited materials (i.e., Figure 1, paragraphs [0027] – [0107], and section VII.A.1 of the petition) do not even mention a method.

122. In my opinion, the claimed steps, for example, “depositing a conformal layer over at least a portion of the electronic assembly and at least a portion of the capacitive touch switch,” would not be apparent to a POSITA, solely based on the disclosed eyewear or simply looking at Figure 1 or paragraphs [0027] – [0107].



(Petitioner at 10 (Ex. 1004, FIG. 1 with Petitioner's annotations).)

123. Because Howell-719 does not even disclose a conformal layer, this step would not have been apparent or obvious from the identified structures. (*See also id.* at 34 (relying on Sikonowiz for this limitation).)

124. The word “method” appears in only *two* unrelated and irrelevant passages in the body of Howell-719, excluding the titles of other references. (*See id.*, ¶¶ [0018], [0111]).)

125. Similarly, in Grounds 6 and 7, Petitioner claims that “Blum-130 discloses an eyewear system and its construction.” (Petition at 60 (citing Ex. 1006 FIG. 21 and §XI.A.1); *id.* at 66 (“See Ground 6, Claim 13. *Supra* §XI.G.1.”); *see also id.* at 52 (Section XI.A.1 states that “Figure 21 shows ‘electro-active eyewear 2100’ with ‘frames 2110’” and cites Ex. 1006, 29:66–30:1).) Again, this is not true. Figure 21 and the referenced portion of Blum-130 specifically deal with an eyewear system and not a method. (*See* Ex. 1006, 29:66–30:1 (“FIG. 21 is a perspective view of another inventive embodiment of electro-active eyewear 2100. In this illustrative example, frames 2110 contain electro-active lenses.”))

VIII. THE CHALLENGED DEPENDENT CLAIMS ARE PATENTABLE

126. In my opinion, because the asserted prior art does not render obvious independent claims 1 and 14, as discussed above, Petitioner's challenges to the '355

patent's dependent claims fail for the same reasons under all grounds (**Grounds 1-7**). Specifically, Petitioners cannot show that claims 2-12, which depend on claim 1, and claims 15-21, which depend on claim 14, are obvious. *See VII.*

IX. CONCLUSION

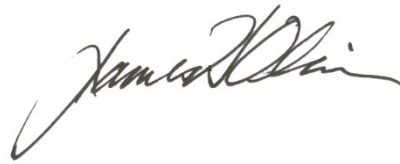
127. For at least the foregoing reasons, it is my opinion that Petitioner's grounds do not render obvious the claims of the '355 patent.

Declaration of James H. Oliver, Ph.D in
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

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

Respectfully submitted,

A handwritten signature in black ink, appearing to read "James H. Oliver", written in a cursive style.

James H. Oliver, Ph.D.