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On behalf of **Luxottica of America Inc.**

By: Ali S. Razai (Reg. No. 60,771)
Joseph F. Jennings (Reg. No. 40,664)
Jacob L. Peterson (Reg. No. 65,096)
KNOBBE, MARTENS, OLSON & BEAR, LLP
2040 Main Street, 14th Floor
Irvine, CA 92614
Tel.: (949) 760-0404
Fax: (949) 760-9502
Email: luxotticaIPR-355@knobbe.com

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 IPR2024-01069
Patent 10,613,355

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 10,613,355**

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1001	U.S. Patent 10,613,355
1002	Declaration of John Feland
1003	File History of U.S. Patent 10,613,355
1004	U.S. Patent Pub. 2005/0248719 (Howell-719)
1005	Sikonowiz, Walter, DESIGNING AND CREATING PRINTED CIRCUITS (Hayden Book Co., 1981)
1006	U.S. Patent 6,733,130 (Blum-130)
1007	U.S. Patent Pub. 2006/0023158 (Howell-158)
1008	U.S. Patent 3,612,744 (Thomas)
1009	U.S. Patent 5,606,743 (Vogt)
1010	U.S. Patent 4,290,052 (Eichelberger)
1011	U.S. Patent 2,915,598 (Brunton)
1012	Declaration of Sylvia D. Hall-Ellis
1013	Declaration of Rachel J. Watters
1014	U.S. Patent 4,053,789
1015	U.S. Patent Pub. 2006/0238513
1016	JP S58-113913 (Hattori-913)
1017	U.S. Patent 5,373,109
1018	U.S. Patent 6,857,741

Exhibit	Description
1019	Harper, Charles, ed., HANDBOOK OF MATERIALS AND PROCESSES FOR ELECTRONICS (McGraw-Hill, 1970): Chapter 5, Licari, J.J. & Brands, E.R., <i>Coatings for Electronics</i> [Ex. A to Ex. 1013 (Watters Declaration)]
1020	Feland CV
1021	IPC-2221A
1022	U.S. Patent 5,796,183
1023	U.S. Patent Pub. 2003/0076306
1024	U.S. Patent 4,601,206
1025	U.S. Patent 5,916,181
1026	WO 2005/093550
1027	WO 2005/103863
1028	U.S. Patent Pub. 2005/0154330
1029	EP 1575250
1030	McGraw-Hill Concise Encyclopedia of Science & Technology (1994)
1031	Steer, Michael, MICROWAVE AND RF DESIGN: RADIO SYSTEMS, (NC State University)
1032	Patent Owner's May 17, 2024 Infringement Contentions (excerpt)
1033	Federal Court Management Statistics (excerpt), <i>available at</i> https://www.uscourts.gov/sites/default/files/fcms_na_distprofile1231.2023_0.pdf

ANNOTATED INDEPENDENT CLAIMS

Claim 1

- 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.

Claim 13

- 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.

Claim 14

- 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) [sic] 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.

Petitioner Luxottica of America Inc. requests *inter partes* review of claims 1–21 of U.S. Patent 10,613,355, which is purportedly owned by e-Vision Optics, LLC (“Patent Owner”).

I. INTRODUCTION

The challenged claims incorporate decades-old electronics into eyewear. For example, the claims all cover putting electronics into a temple—the part that extends back and rests on one’s ears:



Beyond that simple concept, the claims are just a loose collection of generic components like an “electronics assembly” or a “processor.” The claims recite little to no functional relationship between the physical claim elements. They recite no dimensions, no shapes, and no structural details of the eyewear frame or any electronic components. They recite no details of any structure supposedly overcoming any problem the patent addresses.

The broad, generic claims run far afield from the technology the ’355 patent discloses. The ’355 patent describes glasses with “electro-active lenses”—lenses whose optical power can change by applying electricity. Ex. 1001 7:51–8:3. In theory, a person who wears traditional bifocals or progressive lenses could instead

use the electro-active lenses to change the focal distance of their glasses with the touch of a button. *Id.* 28:46. But none of that appears in the claims. Only one dependent claim recites an electro-active lens, and even then only as one of several options.

Untethered from the specification’s discussion of electro-active lenses, the claims broadly cover combining eyewear with electronics and thereby encompass the prior art. Some claims specify the type of electronics embedded in the temple, but in every such case the electronics are old and basic, such as a power source or an antenna. Other claims generically recite “an electronics assembly” with “electronic components.” All claims read on embedding in the temple a standard integrated circuit or printed circuit board (PCB) with well-known, conventional electronics—something known in the eyewear field long before the 2007 priority date. For example, references Howell-719, Howell-158, and Blum-130 all disclose eyewear with an integrated circuit or PCB embedded in the temple to control a visual display or audio speaker.

The claims also require a conformal coating over at least some of the electronics. But conformal coatings have been a well-known step of manufacturing PCBs since at least the 1980s, as the Sikonowiz reference teaches.

Finally, all claims recite a capacitive touch switch. But none of the claims specify the switch’s location, size, or shape. No claim even restricts what the switch

must control. Capacitive touch switches have been around since at least the 1970s. And prior art disclosing eyewear with a capacitive touch switch was published no later than 2005. For example, Howell-719 discloses a capacitive touch switch on eyeglasses that controls an embedded speaker.

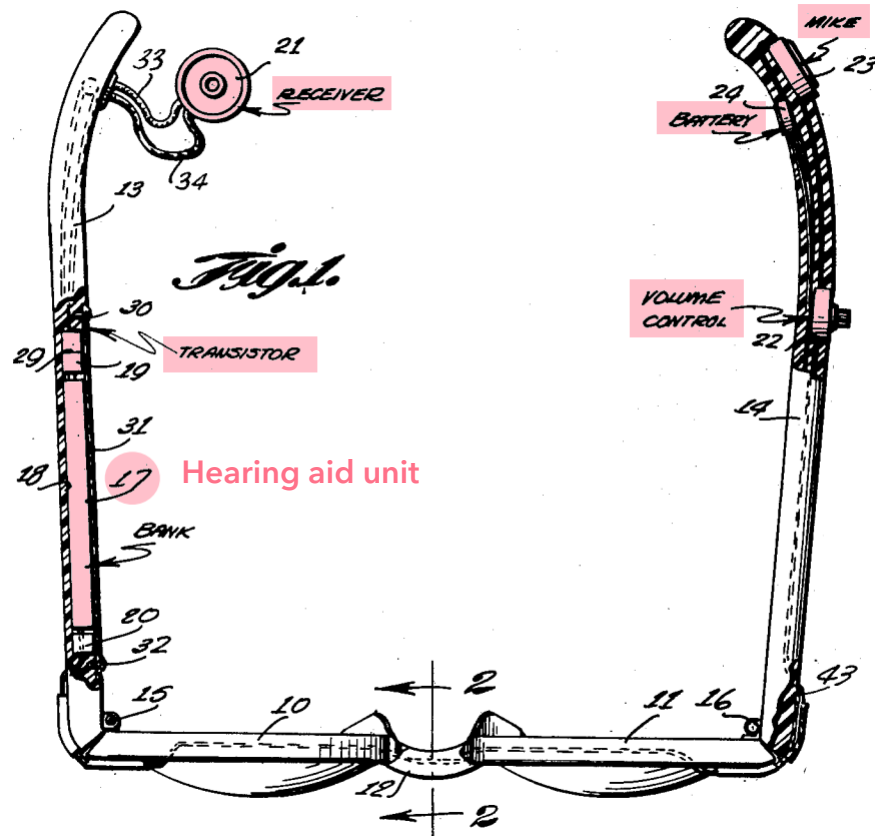
The prior art discloses all the limitations of the '355 patent's claims and renders all the claims obvious. Claims 1–21 are unpatentable, and the Board should therefore cancel those claims.

II. THE PRIOR ART

A. Electronics have been embedded in temples since at least the 1950s.

By the mid-twentieth century, glasses had become so commonplace that they became a marketable springboard for delivering other, non-visual technologies to consumers. For example, in 1954, an inventor named Brunton applied for a patent on combining a hearing aid with glasses, with electronics for the hearing aid embedded in the temples:

Filed Dec. 14, 1954



Ex. 1011 (“Brunton,” U.S. Patent 2,915,598) fig. 1.¹ Unit 17 comprised electronics for the hearing aid, “such as resistors, transistors, and capacitors.” *Id.* 3:51–52. Wires connected the hearing aid unit to other electronic components like the receiver, volume control, and microphone. *Id.* 4:2–9. These wires were embedded within the spectacle frame. *Id.* col.4, figs. 1–7.

¹ Petitioner has added all highlighting and color mark-up appearing in the figures throughout this petition.

B. In the 1980s and '90s, consumer electronics became ubiquitous, along with the printed circuit boards (PCBs) and integrated circuits that drove them.

Invented in the mid-twentieth century, printed circuit boards (PCBs) and integrated circuits would usher in a new era of electronics. Ex. 1002 ¶36. By the 1980s, advances in miniaturization and lower manufacturing costs made PCBs and integrated circuits ubiquitous. *Id.* This in turn allowed for cheaper and more powerful consumer electronics, such as personal computers, video game consoles, and portable music players. *Id.*

1. As Sikonowiz shows, by 1981 it was a well-known practice to protect PCBs with a conformal coating.

DESIGNING AND CREATING PRINTED CIRCUITS published in 1981. Ex. 1005; Ex. 1012 ¶¶32–39. Authored by Walter Sikonowiz, this book provides an in-depth guide to designing and manufacturing PCBs.² Chapter 9 covers final assembly. Ex. 1005 at 122. Chapter 9 devotes an entire section to the step of “Conformal Coating.” *Id.* at 135. “The purpose of a conformal coating is to cover a printed-circuit assembly and protect it from environmental hazards such as moisture, dirt, and chemicals.” *Id.* at 135–36. “Of these, moisture protection is probably of the greatest general significance.” *Id.* at 136.

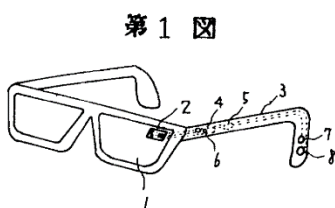
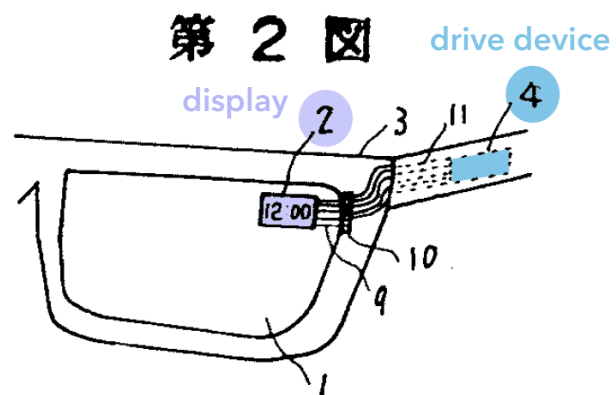
² Following the lead of expert John Feland, Petitioner sometimes uses *printed circuit board* and *PCB* to refer to the board plus mounted components. See Ex. 1002 ¶39 n.1.

2. By the 1980s, it was increasingly common to integrate PCB-mounted integrated circuits into consumer electronics.

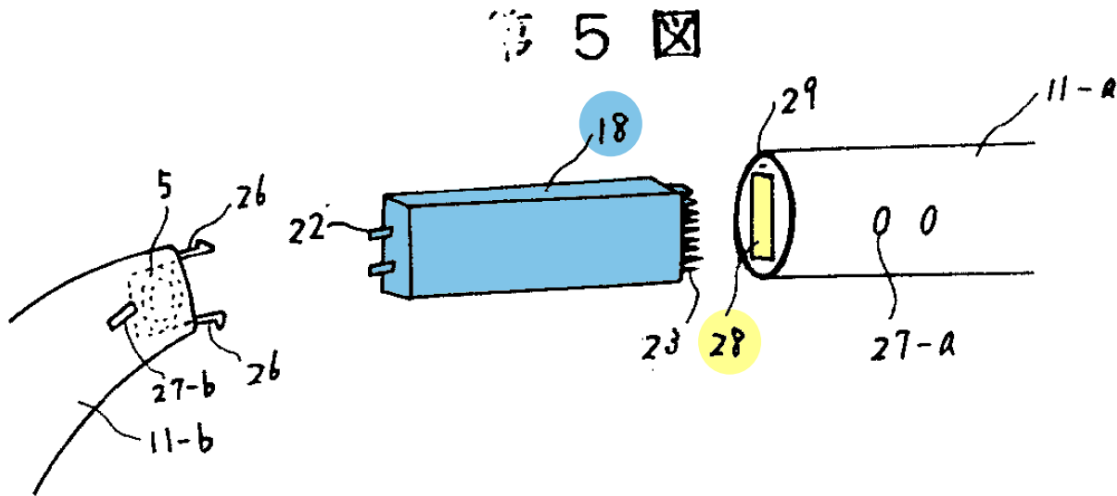
By the 1980s, due to their small size, reliability, and relatively low cost, it was increasingly common to incorporate integrated circuits, especially microprocessors, into consumer electronics. Ex. 1002 ¶37. A type of integrated circuit able to execute program instructions, microprocessors packed significant computational power into a small form factor, which made them popular controllers for consumer electronics. *Id.* Microprocessors and other integrated circuits are mounted on printed circuit boards because PCBs permit automated manufacturing and assembly, which makes production faster and cheaper. *Id.* Thus, by the 1980s, using PCB-mounted integrated circuits for a controller was a well-known, advantageous design for consumer electronics. *Id.*

3. In 1983, Hattori-913 disclosed embedding an integrated circuit in a temple to control a display included in eyeglasses.

Published in 1983, Hattori-913 (JP S58-113913) discloses a pair of glasses with a liquid crystal display:



Ex. 1016 figs. 1, 2. The drive device 4 could be implemented as an integrated circuit 18 embedded within a hollow 28 in the temple:



Id. at 68, fig 5. Hattori-913's device includes a switch to turn power on and off and control the display. *Id.* at 68 (e.g., reference numerals 6, 27a, 27b). The switch can be a touch switch. *Id.*

C. By 2006, glasses had been invented with printed circuit boards, touch switches, and gyroscopes or accelerometers embedded in a temple.

Touch switches responsive to the operator's capacitance date at least as far back as the 1970s. Ex. 1002 ¶44. By the 1990s, they were well known, and by the early 2000s, many consumer electronics featured capacitive touch switches. For example, they were included in home appliances. *Id.* ¶45. Handheld electronic devices such as Apple's iPod also relied on capacitive touch sensing. *Id.* Moreover, by the early 2000s, consumer electronics frequently used a gyroscope or accelerometer to detect motion. *Id.* ¶¶46–48.

Consistent with these developments in electronics manufacturing and design, by 2006, the electronics embedded in eyewear had evolved to include printed circuit boards, microprocessors and other integrated-circuit controllers, capacitive touch switches, and gyroscopes and accelerometers.

1. **In 2004, Blum-130 disclosed glasses with a microprocessor, a power source, a transmitter, a receiver, an antenna, a gyroscope or accelerometer, and electro-active lenses.**

Issued in 2004, and listing the same first-named inventor as the '355 patent, Blum-130 (Ex. 1006, U.S. Patent 6,733,130) discloses glasses with “electro-active lenses” whose optical power could change electronically.

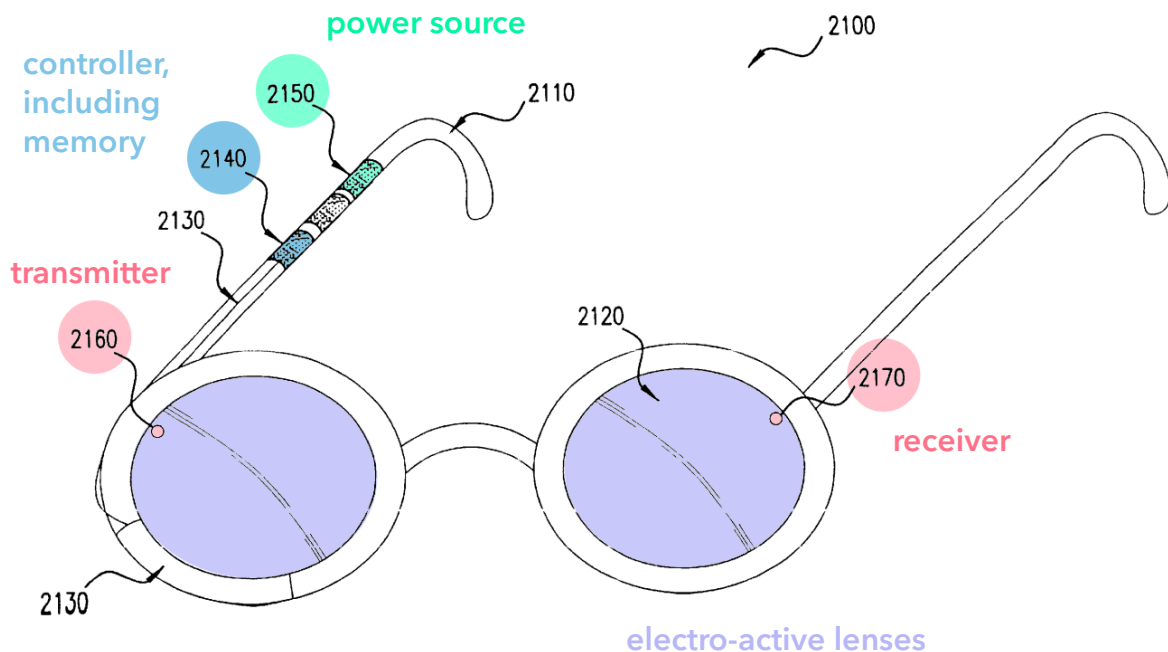


FIG.21

In the embodiment of figure 21, “frames 2110 contain electro-active lenses 2120 that are connected by connecting wires 2130 to controller 2140 (integrated circuit) and power source 2150.” Ex. 1006 30:1–3. Blum-130 discloses a controller that includes a microprocessor, memory, and a port for input and output. *Id.* 3:46–48, 6:22–26. The eyewear includes a transmitter and a receiver for a rangefinder, attached to the lenses (as shown above) or “embedded in frame 2110.” *Id.* 30:3–10. The rangefinder can be used to switch the settings of the lenses. *Id.* 30:29–37. The rangefinder uses radio-frequency waves and thus involves an antenna. *Id.* 30:15–18; *also id.* 29:54–57 (antenna). The rangefinder can be used in combination with a microgyroscope to detect head tilt. *Id.* 30:59–60. Blum-130 also discloses using an accelerometer to detect head motion, and it further discloses combining a gyroscope with a manual switch. *Id.* 30:38–58.

2. In 2005, Howell-719 disclosed glasses with audio components, a printed circuit board, a processor, a memory, a transceiver, and a capacitive touch sensor embedded in a temple.

Published in 2005, Howell-719 (Ex. 1004, U.S. Patent Pub. 2005/0248719) discloses eyewear with a built-in audio player, such as a radio:

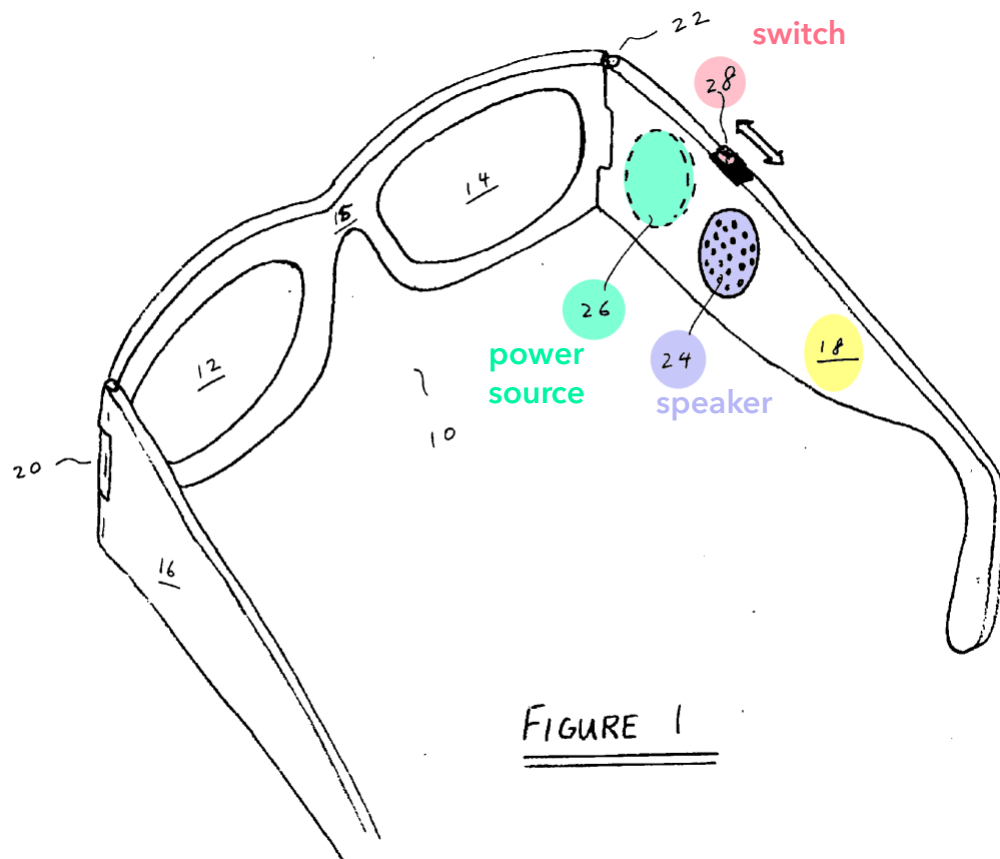


FIGURE 1

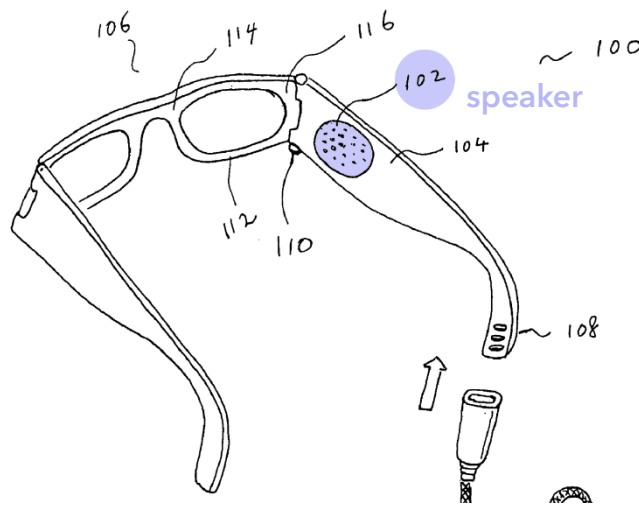
The radio includes a speaker, and the electronics for the radio can reside on a printed circuit board “in one of the temples of the glasses.” *Id.* ¶50. In an embodiment not illustrated above, the glasses include a capacitive touch switch, where “changing the capacitance,” such as “by placing one’s finger over a metallic pad,” turns the switch on and off. *Id.* ¶82.

The glasses also include a power source embedded in the temple, along with a processor, memory, antenna, and transceiver. *E.g., id.* ¶¶28, 50–58, 67, 99.

3. In 2006, Howell-158 disclosed glasses with audio components, a printed circuit board, an antenna, and an accelerometer embedded in a temple.

Published in 2006, Howell-158 (U.S. Patent Pub. 2006/0023158, Ex. 1007)

discloses an eyewear system very similar to that of Howell-719:



Id. fig. 1 (excerpt). The glasses include an embedded printed circuit board to control a speaker, which can be part of, for example, a radio or MP3 player. *Id.* ¶¶51, 65, 69, 95, 130. The glasses include an antenna and transceiver circuits for receiving and transmitting signals wirelessly. *Id.* ¶¶113–16. They can also include an accelerometer to detect motion and sense when the glasses are being worn. *Id.* ¶163.

III. THE '355 PATENT

A. The '355 patent's specification focuses on eyewear with electro-active lenses.

The '355 patent specification focuses on an “electronic module 202” in a temple of a frame 102 to control electro-active lenses, such as lens 104:

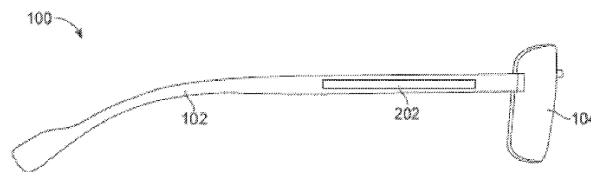


FIG. 2

Ex. 1001 7:51–9:27.

Figure 6 of the '355 patent shows an electro-active lens:

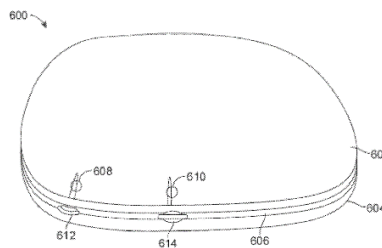


FIG. 6

The lens has a top substrate 602 and a bottom substrate 604. *Id.* 11:1–3. Electrical leads 608 and 610 in between the substrates provide power to the lenses, and conductive materials 612 and 614 are placed on top of the leads. *Id.* 11:9–36.

These conductive materials 612 and 614 make contact with conductors 708 and 710 in a frame:

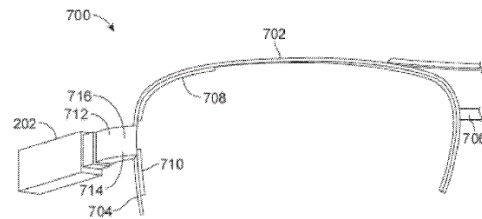


FIG. 7

Id. 11:59–63. Further conducting members 712 and 714 connect the electronic module 202 to the conductors 708 and 710 and thereby link the electronic module to the leads in the electro-active lens.

Since moisture may cause “a temporary electrical short circuit across the rimlock (e.g., between metal components 712 and 714),” the ’355 patent describes applying electrically insulating grease to the mating surfaces of rimlock components 712 and 714:

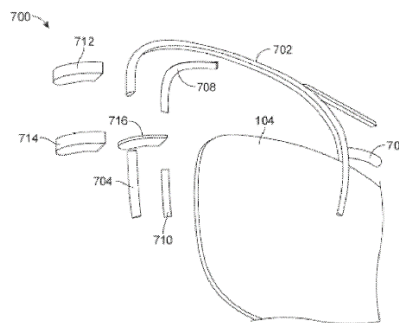


FIG. 8

Id. 13:19–21, 14:11–16.

B. The '355 patent's claims recite commonplace, generic components.

The challenged claims do not require the electro-active lens that is the focus of the specification. Instead, Patent Owner mined the specification to draft claims that merely recite generic, well-known components like “an eyewear frame”; “an electronics assembly”; “electronic components configured to control an electrical functional member”; “a capacitive touch switch”; and “a conformal layer.”

C. During examination, the claims were not sufficiently scrutinized.

Although the PTO examiner issued multiple rejections, the applicant ultimately secured broad claims, sometimes exchanging narrower limitations for broader ones. For example, in November 2015, the applicant amended the claims to require sealing an electronics module “with a material selected from a group consisting of electrically-insulating grease, acrylic, silicone, urethane, and epoxy.” Ex. 1003 E_PA_LUX_004220. But in September 2016, the applicant replaced these specific limitations with a “conformal layer” of unspecified material. *Id.* E_PA_LUX_004381.

In a March 2018 interview, after nearly five years of examination, the examiner pointed out that the primary reference from the then-pending final rejection did not disclose a capacitive touch switch. *See id.* E_PA_LUX_004661. The applicant then requested continued examination and amended the independent claims to recite a “capacitive touch switch.” *Id.* E_PA_LUX_004652–661. In an

August 2018 interview, the examiner confirmed previously presented claims that now had such a switch were allowable and a new independent claim “would be allowable if amended to recite ‘a capacitive touch switch’ and to address potential indefiniteness issues.” *Id.* E_PA_LUX_004991. The applicant made those changes. *Id.*

The examiner allowed the claims a few weeks later. In the reasons for allowance, despite the well-known nature of capacitive touch switches, the examiner relied on applicant’s remarks that the inclusion of a “capacitive touch switch” placed the claims in conditions for allowance. *Id.* E_PA_LUX_005004 (citing *id.* -4661, -4991). After applicant sought various relief after allowance, the final notice of allowance in December 2019 referred back to these same reasons for allowance. *Id.* E_PA_LUX_005571 (citing *id.* -5069 and thereby -4661, -4991).

The examiner did not consider the prior-art combinations, expert declaration, and arguments presented in this petition.

IV. LEVEL OF ORDINARY SKILL

The ’355 patent relates to electronic eyewear. Ex. 1001, Abstract. 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. *Id.*

This petition does not turn on this specific definition of the level of ordinary skill. The claims would have been obvious from the perspective of a POSITA under any reasonable definition. *Id.*

V. CLAIM CONSTRUCTION

In October 2023, Patent Owner sued Petitioner for infringement of the '355 patent in *e-Vision Optics, LLC et al. v. Luxottica Group S.p.A. et al.*, No. 8:23-cv-02013 (C.D. Cal.) (“the Litigation”). Although the parties may propose constructions for certain terms in the Litigation for purposes of determining infringement, no claim terms require construction to resolve the obviousness challenges here. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). Nonetheless, the ordinary meaning of a term is assessed from the perspective of a POSITA, who is “deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–

13 (Fed. Cir. 2005) (en banc). Accordingly, in its arguments below, Petitioner identifies passages from the specification demonstrating that the prior art discloses claim terms in the manner the '355 patent uses them.

VI. STATEMENT OF RELIEF REQUESTED

A. Grounds

Petitioner requests that the Board cancel claims 1–21. Petitioner's seven grounds fall into three groups:

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

In support of the petition, Petitioner submits the expert declaration of John Feland. Ex. 1002.

B. Asserted References

The '355 patent claims priority no earlier than May 4, 2007. Ex. 1001. The references Petitioner cites are all prior art under pre-AIA 35 U.S.C. § 102(b):

Ex.	Reference	Date
1004	Howell-719	Published 2005
1005	Sikonowiz	Published 1981; Ex. 1012
1006	Blum-130	Issued 2004
1007	Howell-158	Published Feb. 2006
1008	Thomas	Issued 1971
1009	Vogt	Issued 1997
1010	Eichelberger	Issued 1981

The references are analogous art because they are from the same field as the '355 patent, e.g., eyewear and/or consumer electronics. Ex. 1002 ¶25; Ex. 1001, Abstract; *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1000 (Fed. Cir. 2016). 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. *Id.*

VII. GROUND 1: HOWELL-719 AND SIKONOWIZ RENDER CLAIMS 1 AND 3–13 OBVIOUS

A. Claim 1

1. Preamble and 1[a]: eyewear system comprising an eyewear frame

The preamble and element 1[a] recite: “An eyewear system comprising: an eyewear frame.”³ Howell-719 discloses an eyewear system comprising an eyewear frame:

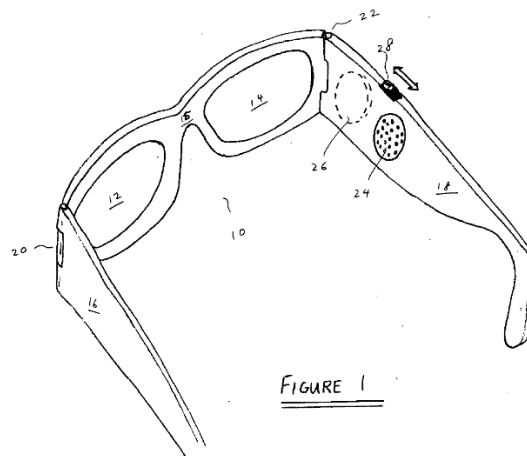


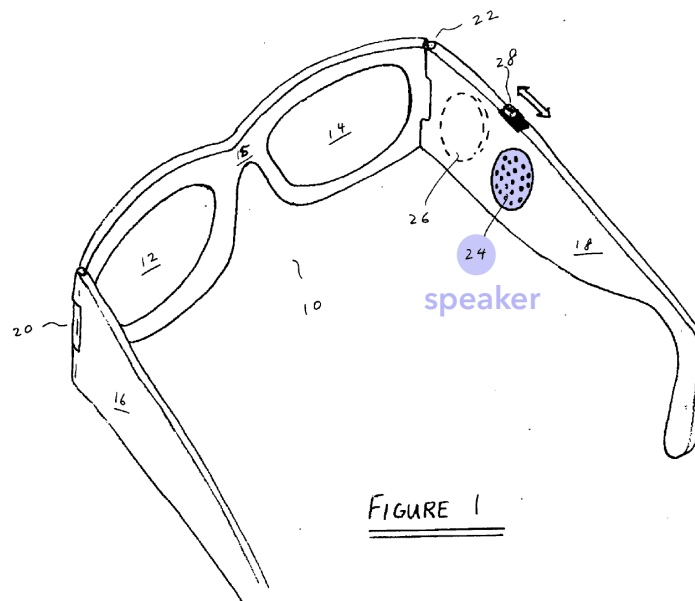
Figure 1 shows “a pair of glasses 10,” and Howell-719 discusses “the frames of the glasses.” Ex. 1004 ¶¶27–29; Ex. 1002 ¶65.

2. 1[b]: electronics assembly

Element 1[b] recites: “an electronics assembly comprising electronic components configured to control an electrical functional member.” Howell-719 discloses this element. Ex. 1002 ¶¶66–67.

³ For a complete numbering of claim elements, see Petitioner’s Annotated Independent Claims after the exhibit list.

Howell-719's eyewear system has built-in audio:



Ex. 1004 ¶¶27, 50, fig. 1.

The audio system can be a radio or audio player that includes a speaker, which is an electrical functional member. *Id.* ¶¶50, 67. The system also includes an electronics assembly comprising electronic components configured to control the speaker. For example: “All the electronics for the radio are at least partially embedded in the glasses.” *Id.* ¶50. The “electronics can be on a printed circuit board, and the board is in one of the temples of the glasses.” *Id.*; *see also id.* ¶¶64, 97. These electronic components can include a data bus, a processor, and a storage device. *Id.* ¶67. The processor works with these other components to control operation of the player. *Id.*

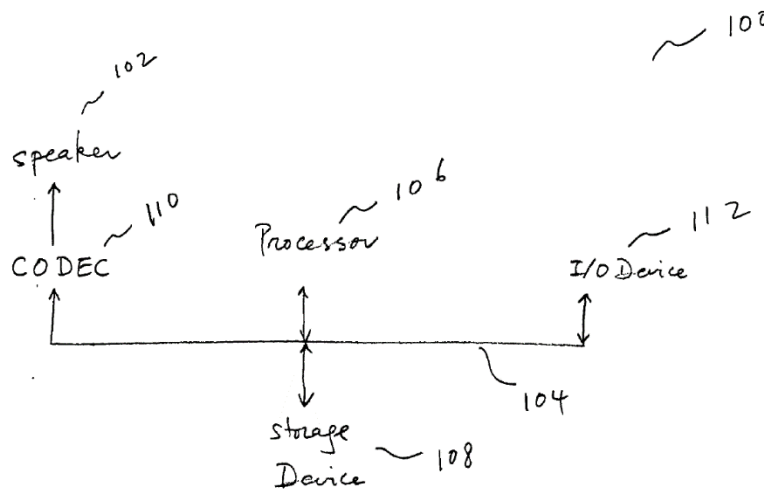
3. 1[c]: capacitive touch switch

Element 1[c] recites: “a capacitive touch switch coupled to at least one electronic component in the electronics assembly.” Howell-719’s glasses include a switch. *E.g.*, Ex. 1004 ¶28. The switch “can be used to turn the speaker on, or to tune the frequency of a radio.” *Id.* ¶74. Howell-719 thus discloses that the switch is operably coupled to the audio electronics that control the speaker. Ex. 1002 ¶70. Moreover, all electronic components, including the switch, “can be coupled to a printed circuit board.” Ex. 1004 ¶97. In this manner as well, the switch is coupled to at least one electronic component in the electronics assembly. Ex. 1002 ¶70.

Howell-719 discloses that its switch can be a *capacitive touch switch*. *Id.* ¶69. “The switch can be activated depending on electrical forces,” including where “the electrical force depends on capacitive effect.” Ex. 1004 ¶82. “By changing the capacitance,” such as “by placing one’s finger over a metallic pad,” one turns the switch on and off. *Id.*

4. 1[d]: at least one electrical connective element

Element 1[d] recites: “at least one electrical connective element electrically connected to the electronic assembly and the electrical functional member.” Figure 3 of Howell-719 illustrates that several electronic components are connected to the speaker:



Ex. 1004 fig. 3. As discussed for element 1[b], Howell-719 discloses putting the electronics for controlling the speaker on a printed circuit board. *Supra* § VII.A.2 (citing, e.g., Ex. 1004 ¶50). Indeed, Howell-719 states that all electronic components “can be coupled to a printed circuit board.” Ex. 1004 ¶97. As a POSITA would know, printed circuit boards have conductive traces on their surfaces electrically connecting electronic components mounted on the board to each other, and they have conductive leads or connectors to electrically connect the mounted electronics to off-board electronic components. Ex. 1002 ¶71; Ex. 1030 at 1498–99.

Howell-719 thus discloses an electrical connective element electrically connected to the electronic assembly and speaker. Ex. 1002 ¶71.

5. 1[e] and 1[f]: conformal layer that is moisture proof and seals electrical connections

Elements 1[e] and 1[f] recite: “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.” Claim 9 recites the “eyewear system of claim 1, wherein the conformal layer is a conformal coating,” so the conformal layer of claim 1 can be a conformal coating. The patent attributes no novelty to its conformal layer. Rather, a conformal coating “may comprise *any suitable material*, such as a brushed, spray or dip applied acrylic, urethane, silicone, or epoxy.” Ex. 1001 27:8–10 (emphasis added). The ’355 patent refers to “any suitable material” because conformal coatings were well known and broadly usable in eyewear. *Cf. Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1366 (Fed. Cir. 1997) (“[A] specification need not disclose what is well known in the art”; at the same time: “It is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement.”).

As discussed for element 1[b], Howell-719 discloses mounting the electronics for controlling the speaker on a printed circuit board. *Supra* § VII.A.2. Published in 1981, Sikonowiz is a book on designing and manufacturing printed circuit boards. Ex. 1005. Sikonowiz teaches that applying a conformal coating to a PCB and mounted electronics is desirable. *Id.* at 135–37. As Sikonowiz explains, the “purpose of a conformal coating is to cover a printed-circuit assembly and protect it from environmental hazards such as moisture, dirt, and chemicals.” *Id.* at 135–36. “Of these, moisture protection is probably of the greatest general significance.” *Id.* at

136. “Ideally, a conformal coating covers not only the circuit board but the components mounted on it as well.” *Id.* “Conformal coatings may be applied by a variety of methods including vacuum deposition, dipping, or spraying.” *Id.* “For printed-circuit applications, the most important coatings are epoxy, parylene, acrylic, polyurethane, and silicone.” *Id.* Epoxies and polyurethane resins in particular provide “excellent resistance to chemicals and humidity.” *Id.* at 137. Sikonowiz thus discloses a conformal layer over the PCB to seal the mounted electronic components, where the conformal layer is moisture proof and seals electrical connections of the electronic components. Ex. 1002 ¶73. For example, the conformal layer seals the PCB’s conductive traces that electrically connect mounted components. *Id.* The conformal layer also seals electrical connections between the PCB itself and mounted components. *Id.*

It would have been obvious to a POSITA to coat Howell-719’s PCB and mounted electronics with a conformal coating, as described in Sikonowiz. A POSITA would have been so motivated to prevent moisture and contaminants from damaging the PCB and its related electronics. *Id.* ¶74. Indeed, compared to PCBs in the 1980s, by the early 2000s, PCBs had generally become smaller and typically utilized more surface mount components. *Id.* As the documentation for an industry standard (IPC-2221A) evidences, a POSITA would have recognized that, “due to the tight spacing of leads and land traces,” “[m]any surface mount technologies

cannot perform adequately without the use of a conformal coating.” Ex. 1021 at 25. This principle known to a POSITA would have provided further motivation to apply a conformal coating as taught in Sikonowiz to Howell-719. Ex. 1002 ¶74. Because conformal coatings were commonplace with PCBs as far back as the 1980s and continuing into the 2000s, a POSITA would have had a reasonable expectation of success in applying Sikonowiz’s teachings to Howell-719. *Id.* For example, applying a conformal coating as Sikonowiz teaches would represent using a known technique (conformal coating) with a known device ready for improvement (uncoated PCB); and the result would have been predictable because decades of experience would have told a POSITA that the coated PCB would accomplish its intended function with the added benefit of keeping moisture and contaminants from interfering with the electronics. *Id.*

6. 1[g]–1[i]: conformal layer disposed in an enclosure and electronic assembly enclosed in a temple

Elements 1[g]–1[i] recite: “wherein the conformal layer is disposed in an enclosure of the eyewear frame; wherein the eyewear frame comprises a temple; and wherein the electronic assembly is enclosed in the temple.”

As discussed above, a POSITA would have been motivated to add a conformal layer to Howell-719’s PCB, and Howell-719 further discloses that its PCB and related electronics are enclosed in a temple: “All of the electronic components can

be self-contained inside the temple of the glasses. The components can be coupled to a printed circuit board.” Ex. 1004 ¶¶97; *see also id.* ¶50.

* * *

In summary, Howell-719 discloses glasses with temples, a PCB embedded in a temple with electronics to control a speaker of a radio or audio player, and a capacitive touch switch to control the speaker and tune the radio. Howell-719 thus expressly discloses all elements of claim 1 except for those relating to the conformal layer (1[e]–1[g]). Sikonowiz discloses applying a conformal coating to a PCB, including to its mounted electronics, and the benefits of doing so. A POSITA would have been motivated to improve Howell-719’s PCB by applying a conformal coating as Sikonowiz teaches. The coating would advantageously moisture proof and seal the electronic components and electrical connections of the PCB, as disclosed in Sikonowiz. Accordingly, claim 1 would have been obvious. Ex. 1002 ¶78.

B. Claim 3

Claim 3 depends from claim 1 and further recites: “wherein the electrical functional member includes at least one of an electro-active lens, ... , an audio output function, a microphone function, ... , a transmitter function, ... , and an active 3D function.” Howell-719’s speaker outputs audio and thus includes an audio output function. Howell-719 also discloses that the embedded electronics can control: a microphone for receiving user audio input (microphone function),

Ex. 1004 ¶102; and a transceiver that wirelessly transmits user inputs (transmitter function), *id.* ¶15. Claim 3 would therefore have been obvious. Ex. 1002 ¶79.

C. Claim 4

Claim 4 depends from claim 1 and further recites “wherein the at least one electrical connective element is a conductive compressible member or a multi-conductor cable.” Multi-conductor cables were known for decades before the ’355 patent. See, for example, Thomas (Ex. 1008, U.S. Patent 3,612,744), directed to a “flexible multiple flat conductor electric cable” and issued in 1971 (Ex. 1008, Abstract), or U.S. Patent 5,373,109, directed to “flat, flexible, multiple conductor electrical cables” and issued in 1994 (Ex. 1017 1:5–6). Indeed, multi-conductor cables were used in eyewear before the ’355 patent. For example, Vogt (Ex. 1009, U.S. Patent 5,606,743), which issued in 1997, discloses eyewear with “[m]ultiple conductors 32, which may comprise a flexible strip circuit,” extending through frame 14, as well as a “single wire or *multi-wire conductor* 28” (Ex. 1009 4:34–39 (emphasis added)):

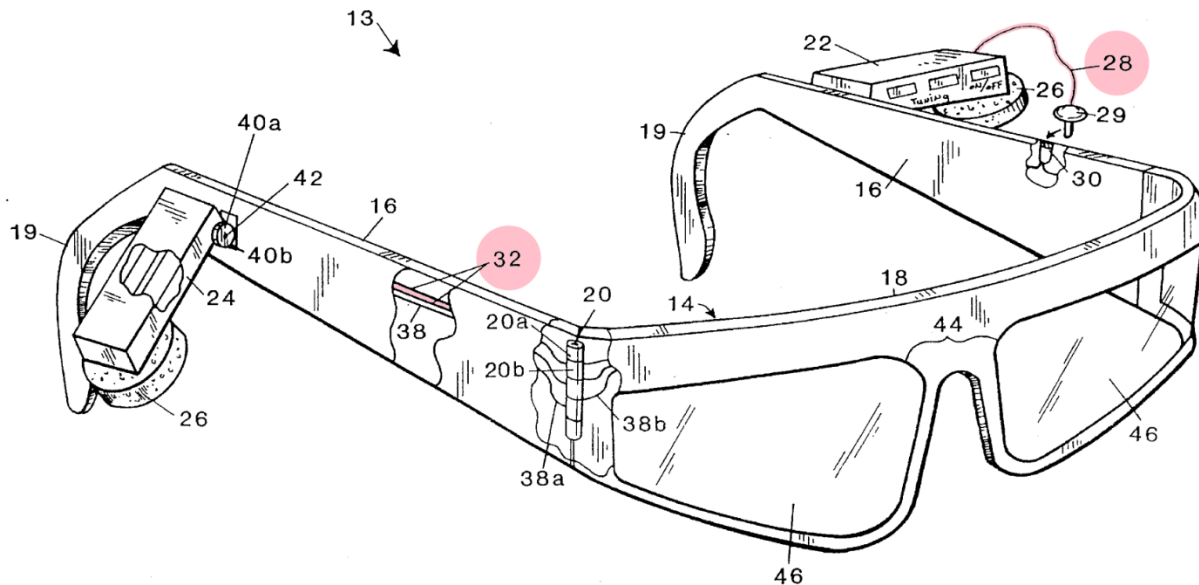


FIG. 2

Ex. 1009 fig. 2.

Moreover, U.S. Patent 6,857,741, which is directed to eyewear with electro-active lenses and which issued in 2005, uses “multi-conductor wire 3720” (Ex. 1018 50:27):

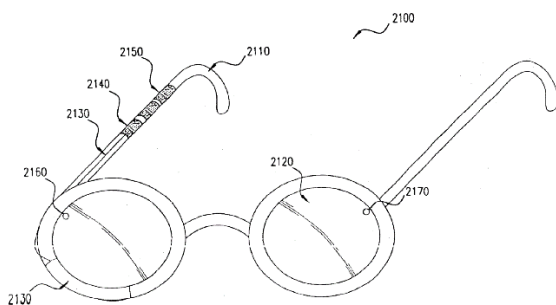


FIG. 21

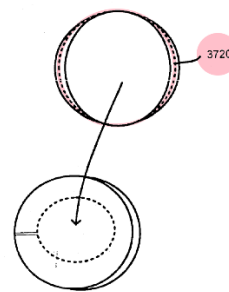


Figure 37e

By the mid-2000s, a POSITA would be very familiar with multi-conductor cables as part of the POSITA’s basic background knowledge and readily identify them as a commonplace and advantageous design option for connecting electronic

components. Ex. 1002 ¶82. Such cables include flat, flexible varieties that would be a natural and beneficial design choice for connecting components within an eyewear temple, which is a structure expected to rotate, with very limited internal space to accommodate components. *Id.* A POSITA would be motivated to use a flexible cable because the flexibility facilitates: assembling components within the temple, adjusting for differences in manufacturing tolerances, reworking failed components, and distributing the electronics assembly and electrical functional member recited in claim 1 to the most appropriate locations of the eyewear. *Id.*; Ex. 1008 3:14–24 (describing thin cables that can be “sharply folded upon themselves,” allowing for easier assembly and greater alignment tolerances). Since Howell-719 discloses embedding electronic components in the temple, a POSITA would have identified a flat, flexible multi-conductor cable as an advantageous option among a limited number of well-known suitable choices for connecting electronic components in the temple. Ex. 1002 ¶82. Claim 4 would have been obvious.

D. Claim 5

Claim 5 depends from claim 1 and further recites “wherein the electronic assembly comprises a micro-processor.” As discussed for element 1[b], Howell-719 discloses an electronic assembly including a processor. *Supra* § VII.A.2. Howell-719 states the processor “can be a micro-processor.” Ex. 1004 ¶67. Howell-719’s eyewear is designed to be worn and has limited internal space. Ex. 1002 ¶83.

Lightweight and compact, Howell-719's disclosed microprocessor would be an advantageous design choice. *Id.* Claim 5 would have been obvious.

E. Claim 6

Claim 6 depends from claim 1 and further recites “wherein the enclosure comprises at least one of an outer casing of the electronic assembly or a cavity of the eyewear frame.” As discussed for elements 1[g]–1[i], Howell-719 discloses a PCB embedded in the temple. *Supra* § VII.A.6. Howell-719 states “a temple of the eyeglass frame can have an opening, cavity or container to hold or encompass the different embodiments of components.” Ex. 1004 ¶108. Claim 6 would have been obvious. Ex. 1002 ¶84.

F. Claim 7

Claim 7 depends from claim 1 and further recites “wherein the conformal layer comprises at least one of an encasing layer or an encapsulating layer.” Sikowiz discloses liquid conformal coatings such as epoxy, acrylic, polyurethane, and silicone that “cure into hard, protective films.” Ex. 1005 at 136. The cured protective film forms a layer that encompasses electronic components. The epoxy resin film “is so impervious” that “it cannot be chemically stripped”; rather, to access the encased components, “it must be burned away.” *Id.* To access electronic components encased in silicone film “requires that the film be cut away.” *Id.* at 137.

Sikonowiz thus discloses conformal coatings that encase the coated electronics in a hard, protective film. Claim 7 would have been obvious. Ex. 1002 ¶85.

G. Claim 8

Claim 8 depends from claim 1 and further recites “wherein the conformal layer protects the electronic components from external environmental damage.” Sikonowiz explains that the conformal coating protects the printed-circuit assembly from “environmental hazards such as moisture, dirt, and chemicals.” Ex. 1005 at 135–36. Claim 8 would have been obvious. Ex. 1002 ¶86.

H. Claim 9

Claim 9 depends from claim 1 and further recites “wherein the conformal layer is a conformal coating.” The analysis for claim 1 relied on Sikonowiz’s conformal-coating disclosure and thereby addresses claim 9. *Supra* §VII.A.5. Claim 9 would have been obvious. Ex. 1002 ¶87.

I. Claim 10

Claim 10 depends from claim 9 and further recites “wherein a thickness of the conformal coating is less than 1 mm.” Sikonowiz explains that the conformal coatings “are rarely thicker than 0.005 in.” and “can be as thin as 250 angstroms.” Ex. 1005 at 136. A coating 0.005 inches thick is less than 0.2 millimeters thick. Claim 10 would have been obvious. Ex. 1002 ¶88.

J. Claim 11

Claim 11 depends from claim 9 and further recites “wherein the conformal coating comprises at least one of an acrylic, urethane, silicone, or epoxy.” Sikonowiz discloses that “the most important coatings are epoxy, parylene, acrylic, polyurethane, and silicone.” Ex. 1005 at 136; Ex. 1002 ¶89. Claim 11 would have been obvious. Ex. 1002 ¶89.

K. Claim 12

Claim 12 depends from claim 11 and further recites “wherein the conformal coating is brush applied, spray applied, or dip applied.” Sikonowiz discloses: “Conformal coatings may be applied by a variety of methods including vacuum deposition, dipping, or spraying.” Ex. 1005 at 136. Epoxy, acrylic, polyurethane, and silicone coatings “are dipped or sprayed.” *Id.* Claim 12 would have been obvious. Ex. 1002 ¶90.

L. Claim 13

1. Preamble

Claim 13’s preamble recites: “A method of manufacturing an eyewear system.” Howell-719 discloses an eyewear system and its construction. *See, e.g.*, Ex. 1004 fig. 1, ¶¶27–107; *supra* § VII.A.1.

2. 13[a]–13[b]: disposing electronic components on a capacitive touch switch and connecting the components to form an electronic assembly

Elements 13[a]–13[b] recite: “disposing a plurality of electronic components on a capacitive touch switch; connecting the plurality of electronic components via electrical connections to form an electronic assembly.” Howell-719 discloses mounting all its electronic components on a printed circuit board. Ex. 1004 ¶97; *supra* §§ VII.A.2, VII.A.3. Howell-719’s electronic components include its capacitive touch switch, as well as electronic components such as a data bus, processor, and storage device.

Within the meaning of the ’355 patent, these other electronic components are disposed on the capacitive touch switch. The ’355 patent describes an embodiment in which a printed circuit board (PCB) is coupled to “electrical connectors that may have been reflow soldered to the capacitive touch switch.” Ex. 1001 27:40–42. “In this manner, an electronic assembly may be created, wherein each additional electronic component may connect to another electronic component or components.” *Id.* 27:42–45. “*Each of these additional electronic components may be considered to be disposed on the capacitive touch switch.*” *Id.* 27:45–47 (emphasis added). By mounting the capacitive touch switch and all its other electronic components on a PCB, Howell-719 disposes a plurality of electronic components on the capacitive touch switch and electrically connects those components to form an electronic

assembly. Ex. 1002 ¶94; *see also supra* §VII.A.4 (discussing PCB electrical connections; citing Ex. 1030 at 1498–99).

Indeed, in the parallel district-court litigation, Patent Owner appears to construe “disposing” components “on” the switch to encompass any coupling of components to the switch, no matter how indirect. Patent Owner alleges a capacitive touchpad in Petitioner’s glasses is the capacitive touch switch. Ex. 1032 at Ex.A-05:47–48. Patent Owner appears to contend components that are not physically touching the touchpad are allegedly nonetheless “disposed thereon.” *Id.*

3. 13[c]: depositing a conformal layer

Element 13[c] recites: “depositing a conformal layer over at least a portion of the electronic assembly and at least a portion of the capacitive touch switch.” For the same reasons discussed for claim 1, *supra* §VII.A.5, Sikonowiz motivates depositing a conformal coating over Howell-719’s PCB, including the electronic components on the board, and a POSITA would have had a reasonable expectation of succeeding in doing so. Ex. 1002 ¶95.

4. 13[d] coupling the assembly and switch with the conformal layer to an enclosure

Element 13[d] recites: “coupling the electronic assembly and the capacitive touch switch with the conformal layer to an enclosure of an eyewear frame.” As discussed above for claim 1 and below for claim 14 (Grounds 4 and 5), Howell-719 discloses that all electronics, including the capacitive touch switch, can be embedded

in a cavity within a temple. *Supra* § VII.A.6; *infra* § X.A.2. Within the meaning of the '355 patent, such electronics are coupled to the enclosure that the cavity and temple form. Ex. 1002 ¶96. As the '355 patent states: “[T]he enclosure may comprise . . . the cavity of a temple of electronic eyewear. The step of coupling the capacitive touch switch to the enclosure may comprise any suitable method, including pressure fitting the two components.” Ex. 1001 28:7–12.

**VIII. GROUND 2: HOWELL-719, SIKONOWIZ, THOMAS, AND VOGT
RENDER CLAIM 4 OBVIOUS**

Claim 4 recites the system of claim 1 “wherein the at least one electrical connective element is a conductive compressible member or a multi-conductor cable.” In Ground 1, Petitioner submits that, in light of a POSITA’s background knowledge of flat, flexible multi-conductor cables, claim 4 would have been obvious over Howell-719 and Sikonowiz alone. Multiple references, including Thomas and Vogt, evidence a POSITA’s knowledge that flat, flexible multi-conductor cables were an advantageous design option for connecting electronic components in a temple. *Supra* § VII.C.

In Ground 2, Petitioner submits that the limitation the claim 4 adds would have alternatively been obvious in view of Howell-719 and Sikonowiz plus Thomas and Vogt. Thomas discloses a “flexible multiple flat conductor electric cable.” Ex. 1008 Abstract. The cable comprises multiple “individual strip conductors 18 which extend parallel to one another, at spaced intervals along the length of the cable

10.” *Id.* 5:65–66. The cable’s thickness can be as small as 0.013 inches, and its construction permits various embodiments to “be sharply folded upon themselves with fold curvature radii of less than the cable thickness.” *Id.* 3:14–17.

Vogt discloses using a cable like Thomas’s in eyewear. Vogt discloses eyewear with “[m]ultiple conductors 32, which may comprise a flexible strip circuit,” extending through frame 14, as well as a “single wire or *multi-wire conductor 28*” (Ex. 1009 4:34–39 (emphasis added)):

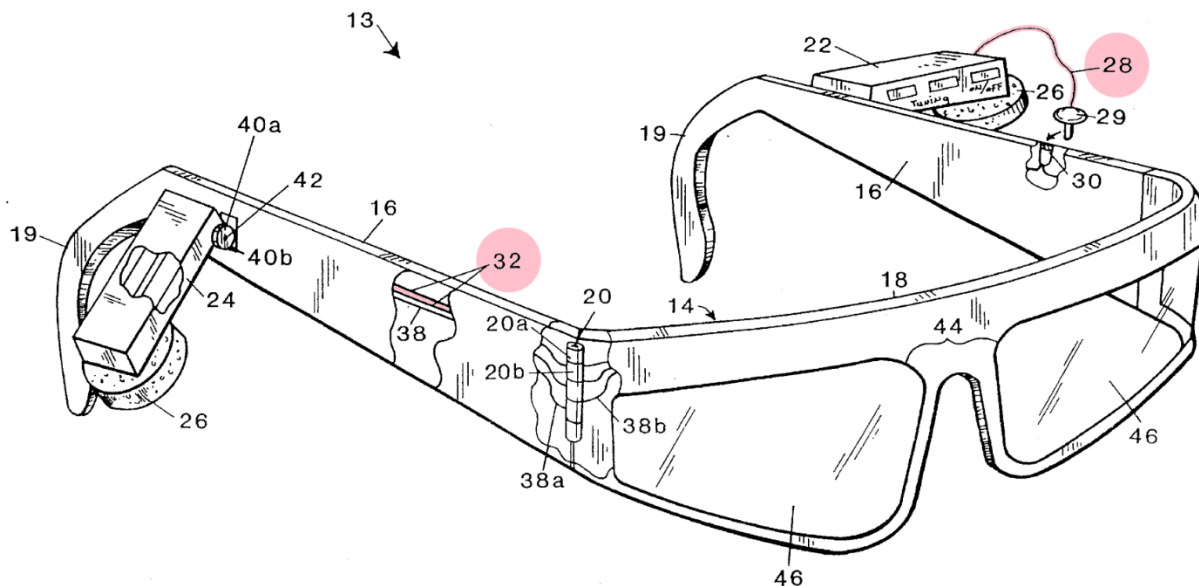


FIG. 2

Ex. 1009 fig. 2.

For the reasons discussed in Ground 1, the flat, flexible multi-conductor cables described in Thomas and Vogt would be an advantageous choice for connecting components within the limited space of an eyewear temple designed to

rotate. *Supra* § VII.C; Ex. 1002 ¶100; *also id.* ¶82. Since Howell-719 discloses embedding electronic components in the temple, using Thomas’s cable in Howell-719’s glasses as illustrated in Vogt would have merely involved identifying an advantageous option among a limited number of well-known suitable choices for connecting the components in the temple with predictable results. Ex. 1002 ¶100. Additionally, combining Howell-719 with the teaching of both Thomas and Vogt (e.g., Thomas as illustrated in Vogt) would have merely involved applying a known technique to a similar device in the same way with predictable results. *Id.* A POSITA would have had a reasonable expectation of success because the cable would be used precisely for its well-known purpose and Vogt itself illustrates use of such a cable in eyewear. *Id.*

Claim 4 therefore would have been obvious in view of Howell-719 and Sikonowiz plus Thomas and Vogt. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416–17 (2007).

IX. GROUND 3: HOWELL-719, SIKONOWIZ, AND EICHELBERGER RENDER CLAIM 13 OBVIOUS

Claim 13 requires disposing electronic components on the capacitive touch switch. In Ground 1, Petitioner identified Howell-719’s capacitive touch switch, as well as Howell-719’s disclosure of coupling all electronic components to a printed circuit board. As the ’355 patent’s specification confirms, this coupling falls within

the broad meaning of components *disposed on* the capacitive touch switch. *Supra* § VII.L.2.

In Ground 3, Petitioner alternatively relies on combining Howell-719 with Eichelberger, which discloses in detail a capacitive touch switch that would be an obvious implementation of the capacitive touch switch that Howell-719 discusses generally.

A. Preamble

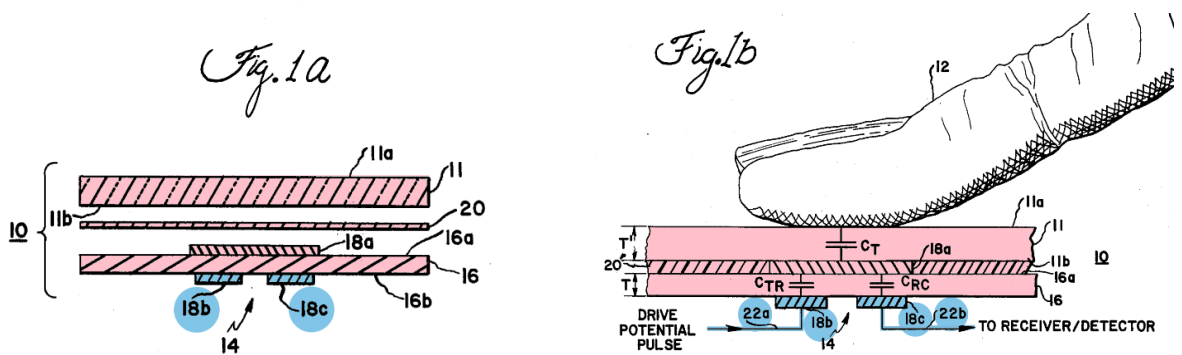
Claim 13’s preamble recites: “A method of manufacturing an eyewear system.” Howell-719 discloses an eyewear system and its construction. *See, e.g.*, Ex. 1004 fig. 1, ¶¶27–107; *supra* §§ VII.A.1, VII.L.1.

B. 13[a]: disposing electronic components on a capacitive touch switch

Element 13[a] recites: “disposing a plurality of electronic components on a capacitive touch switch.” According to the ’355 patent, capacitive touch switches include “any sensor that may utilize an electrical field to detect, for instance, the presence of a human finger or other conducting object to activate a switch.” Ex. 1001 26:18–21. The electronic components can be simple “electrical connectors” disposed directly on a surface of the switch, such as through soldering. *Id.* 27:22–28. As discussed in Ground 1, when such directly soldered connectors are coupled to other electrical connectors that are in turn coupled to printed circuit boards, the additional connectors and PCBs are *also* considered disposed “on” the switch even if they are

not attached directly to the switch. *Supra* § VII.L.2. By coupling a PCB to an electrical connector that is in turn coupled to another connector soldered to the switch, “an electronic assembly may be created, wherein each additional electronic component may connect to another electronic component or components.” Ex. 1001 27:42–45. “Each of these additional electronic components may be considered to be disposed on the capacitive touch switch.” *Id.* 27:45–47.

Eichelberger discloses a capacitive touch switch that includes a double-sided printed circuit board 16 on which electrodes 18b and 18c are fabricated. Ex. 1010 3:20–23, 3:43–47, 3:54–57.



Id. figs. 1a, 1b. Eichelberger thus discloses disposing a plurality of electronic components on a capacitive touch switch. Ex. 1002 ¶ 107; *see also* Ex. 1001 27:22–28 (electrical connectors soldered to switch are electronic components “disposed on” the switch’s surface).

Additionally, Eichelberger’s electrodes are coupled to additional circuitry and electronic components (including the components the switch controls). *E.g.*,

Ex. 1010 4:3–4, 4:26–34. Under the '355 patent, these additional electronic components are “considered to be disposed on the capacitive touch switch.”

Ex. 1001 27:45–47.

Eichelberger would have motivated a POSITA to use a capacitive touch switch with a plurality of electronic components disposed thereon. Howell-719 already discloses using a capacitive touch switch and also discloses mounting electronic components, such as a data bus, processor, and storage device, on a printed circuit board. *Supra* § VII.A.2. A POSITA would have been motivated to use the capacitive touch switch from Eichelberger in Howell-719 because using a switch with a double-sided printed circuit board and the ability to mount electronics directly thereon would facilitate efficient use of space. Ex. 1002 ¶109; *see also* Ex. 1010 3:53–57 (teaching this as a “further advantage” of the double-sided PCB). Such efficiency is vital in designing eyewear with embedded electronics because the space for the electronics is limited. Ex. 1002 ¶109.

Incorporating Eichelberger’s capacitive touch switch into Howell-719’s glasses involves nothing more than identifying a long-known example of the genus of switches (capacitive touch switches) Howell-719 expressly discloses and using that specific example according to its fundamental purpose of detecting capacitance levels to trigger a switch in functionality. *Id.* ¶110. Because using Eichelberger’s capacitive touch switch in exactly the way Howell-719 contemplates using a

capacitive touch switch would lead to the predictable result of using capacitance to control or tune the audio electronics in Howell-719’s glasses, a POSITA would have a reasonable expectation of success. *Id.* ¶111.

Limitation 13[a] would have been obvious.

C. 13[b]: connecting the components to form an electronic assembly

Element 13[b] recites: “connecting the plurality of electronic components via electrical connections to form an electronic assembly.” Eichelberger discloses that the electrodes 18b and 18c are “interconnected by conductive leads fabricated as a portion of the PC board, as is well known to the art.” Ex. 1010 3:50–53. Additionally, conductive leads or traces on the PCB would likewise connect Howell-719’s electronic components (e.g., data bus, processor, and storage device) to form an electronic assembly. Ex. 1002 ¶113; *see also supra* § VII.A.4 (discussing PCB electrical connections; citing Ex. 1030 at 1498–99).

D. 13[c]: depositing a conformal layer

Element 13[c] recites: “depositing a conformal layer over at least a portion of the electronic assembly and at least a portion of the capacitive touch switch.” For the same reasons discussed in Ground 1, *supra* §§ VII.A.5, VII.L.3, Sikonowiz motivates depositing a conformal coating over a PCB like that in the combination of Howell-719 and Eichelberger, including the electronic components mounted on the board, and a POSITA would have had a reasonable expectation of succeeding in

doing so. Ex. 1002 ¶114. The conformal coating would cover the electronic assembly and at least the PCB portion of Eichelberger’s capacitive touch switch, protecting them from, e.g., moisture and other contaminants. *Id.*

E. 13[d] coupling the assembly and switch with the conformal layer to an enclosure

Element 13[d] recites: “coupling the electronic assembly and the capacitive touch switch with the conformal layer to an enclosure of an eyewear frame.” See the discussion in Ground 1. *Supra* § VII.L.4.

X. GROUNDS 4 AND 5: HOWELL-719, SIKONOWIZ, AND HOWELL-158 OR BLUM-130 RENDER CLAIMS 14–21 OBVIOUS

For brevity, 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.

A. Claim 14

1. Preamble and 14[a]: eyewear comprising a frame with a temple

Howell-719 discloses “[e]yewear comprising: an eyewear frame comprising a temple.” *See, e.g.*, Ex. 1004 fig. 1; *supra* §§ VII.A.1, VII.A.6.

2. 14[b]: electronic components in a temple cavity

Element 14[b] recites: “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, iii) [sic] 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.”

Howell-719 discloses: “All of the electronic components can be self-contained inside the temple of the glasses.” Ex. 1004 ¶¶97. And “a temple of the eyeglass frame” has a “cavity” to “hold or encompass the different embodiments of components.” *Id.* ¶108.

Howell-719 discloses at least the following electronic components:

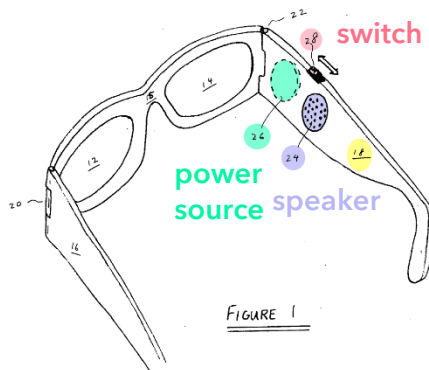
- (i) a “processor 106, which can be a microprocessor or controller,” *id.* ¶67;
- (ii) a memory, such as “a flash memory device” or “a RAM [random access memory],” *id.* ¶67, claim 13;
- (iii) “a power source,” such as a battery (in figure 1, reference numeral 26, embedded in the temple), *id.* ¶¶28, 36, fig. 1, claim 15;
- (iv) a radio, *e.g.*, *id.* ¶¶40, 50–62, claim 12; and
- (v) a variety of receivers and transmitters, *e.g.*, *id.* ¶¶50–62 (radio receiver), *see id.* ¶55 (WiFi or WiMax receiver), *id.* ¶99 (wireless transceiver).

By disclosing a radio and such receivers and transmitters, Howell-719 discloses an antenna. Ex. 1002 ¶120 (citing Ex. 1031).

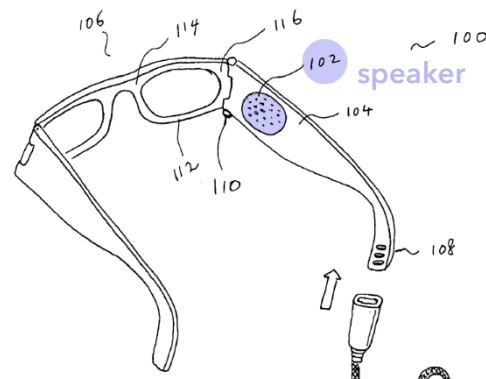
Howell-719 thus discloses all the electronic components recited in element 14[b] apart from “an accelerometer or a gyroscope.” *Id.* ¶121. In Ground 4, Howell-

158 supplies an accelerometer, while in Ground 5, Blum-130 supplies both an accelerometer and a gyroscope. (And to the extent needed, Howell-158 and Blum-130 also disclose other electronic components recited in element 14[b].)

Ground 4. Howell-158 discloses glasses very similar to those of Howell-719.



Howell-719 fig. 1



Howell-158 fig. 1 (excerpt)

Like those of Howell-719, Howell-158's glasses include a speaker and, in a temple cavity, a processor, memory, power source such as a battery, antenna, receiver, and transmitter. *E.g.*, Ex. 1007 ¶¶ 49, 95, 99, 113, 159, 185, claim 26.

Furthermore, the glasses advantageously include an accelerometer to detect whether a user is wearing the glasses. *Id.* ¶ 163. Due to the close similarity between Howell-719 and Howell-158, it would have been obvious to a POSITA to incorporate Howell-158's accelerometer into Howell-719's glasses. Ex. 1002 ¶ 124. Howell-719's glasses would benefit from the ability to detect when a user is wearing the glasses. Howell-719 describes an embodiment using a magnetic or Hall effect sensor to detect when the temple "is in its extended position" such that the glasses

are “ready to be worn.” Ex. 1004 ¶81. Detecting this state can activate the switch to turn on the audio. *Id.*

By the mid-2000s, accelerometers were widely used in consumer electronics to detect motion and tilt. *Supra* § II.C; Ex. 1002 ¶¶46–48, 125. Incorporating Howell-158’s accelerometer-based “being worn” detector thus represents using a simple substitution of one known alternative (accelerometer-based “being worn” detector) for another, similar component (magnetic-based “ready to be worn” detector) with predictable results. Ex. 1002 ¶125. Howell-158’s disclosure of the accelerometer-based detector in glasses highly similar to those of Howell-719 demonstrates a POSITA would have a reasonable expectation of success. *Id.*

In Ground 4, element 14[b] would therefore have been obvious.

Ground 5. Blum-130 likewise discloses glasses similar in many respects to those of Howell-719.

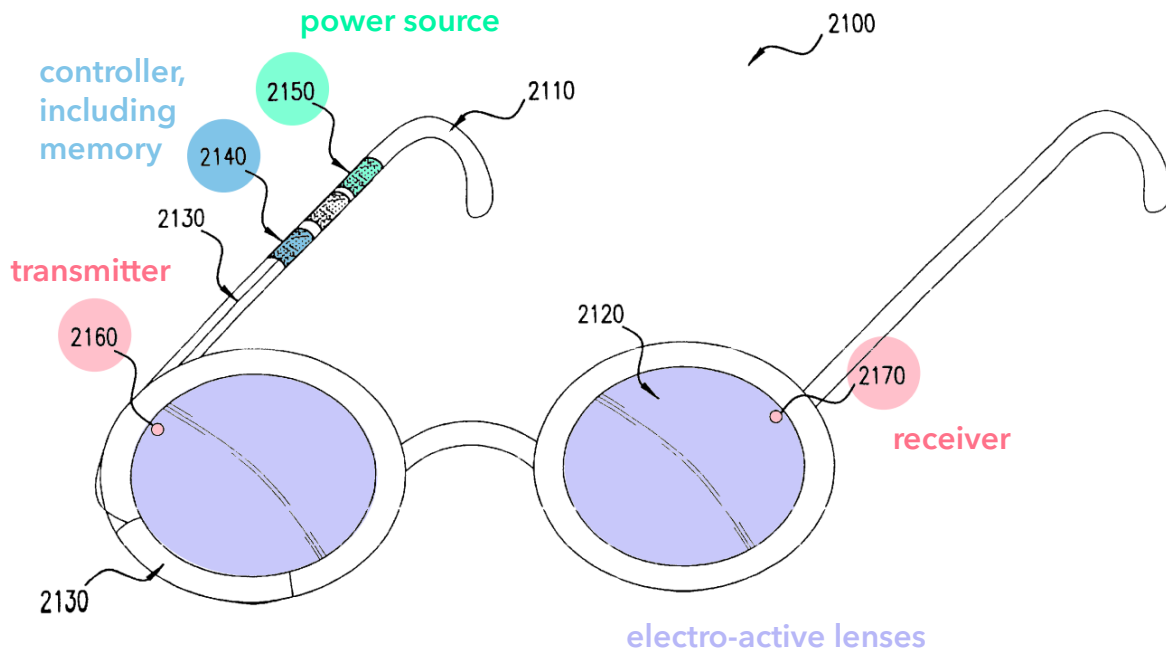


FIG.21

Ex. 1006 fig. 21. Like in Howell-719, Blum-130’s glasses include, embedded in a temple, a processor, memory, power source, antenna, rangefinder receiver, and rangefinder transmitter. *E.g., id.* 3:46–48 (“controller” can be processor), 30:2–3 (“controller 2140” and “power source 2150”), 30:3–10 (rangefinder receiver 2170 and transmitter 2160 can be “embedded in frame 2110”), 29:55–57 (receiver as antenna).

Furthermore, “a tiny micro-gyroscope or micro-accelerometer in the temple” controls a switch, allowing the user to use a head movement to change the

functionality of the glasses. *Id.* 30:39–45. In “another exemplary embodiment, a combination of a rangefinder and a microgyroscope” controls the switch. *Id.* 30:59–60.

Howell-719 describes that the user may operate switches to control audio while wearing the glasses. Ex. 1004 ¶93. Since the user might not be able to see the switches, Howell-719 describes using different tactile cues (rough versus smooth surface or different heights) to allow the user to distinguish between switches. Ex. 1002 ¶130. Incorporating Blum-130’s accelerometer- or gyroscope-based switch controls into Howell-719 represents using 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 hands-free control. *Id.* Blum-130’s disclosure of the accelerometer/gyroscope-based switch in glasses highly similar to those of Howell-719 demonstrates a POSITA would have a reasonable expectation of success. *Id.*

In Ground 5 as well, element 14[b] would have been obvious.

3. 14[c]: conformal coating

Element 14[c] recites: “a conformal coating, deposited over at least a portion of the plurality of electronic components, to protect the plurality of electronic

components.” As discussed for claim 1, Howell-719 explains that electronic components for controlling the speaker can reside on a printed circuit board, and Sikonowiz discloses a conformal coating deposited to protect components mounted on a printed circuit board. *Supra* §§ VII.A.2, VII.A.5.

4. 14[d]: capacitive touch switch

Finally, element 14[d] recites: “a capacitive touch switch operably coupled to an electronic component in the plurality of electronic components.” As discussed in claim 1, Howell-719 discloses a capacitive touch switch operably coupled to the speaker to control the speaker and thus discloses element 14[d]; additionally, Howell-719 renders obvious a capacitive touch switch operably coupled to the processor controlling the speaker and to the power source for the speaker. § VII.A.3.

On both Ground 4 and Ground 5, claim 14 would have been obvious.

B. Claim 15

Claim 15 depends from claim 14 and further recites: “wherein the conformal coating exposes an electrical contact of the electronics assembly.” To function, a printed circuit board typically connects to off-board components. Ex. 1002 ¶135. This connection is often accomplished via a connector strip on the edge of the board. *Id.* Since conformal coating materials are often insulators, a POSITA would therefore understand that edge connector strips should be left uncoated to permit electrical contact with off-board components. *Id.* Indeed, HANDBOOK OF MATERIALS

AND PROCESSES FOR ELECTRONICS, published in 1970 (Ex. 1013), documents this principle, which would have been immediately apparent to a POSITA: “In the assembly and processing of electronic components, resists or maskants may be needed to ‘stop off’ certain areas from conformal coating or solder. For example, in the conformal coating of printed-circuit boards, the edge connector strip should be left uncoated to allow electric contact with an edge connector.” Ex. 1019 at 5-11 (chapter 5, p. 11). Claim 15 would have been obvious.

C. Claims 16 and 17

Claim 16 depends from claim 14 and further recites: “wherein the conformal coating has a thickness of less than 1 mm.” Claim 17 also depends from claim 14 and further recites: “wherein the conformal coating has a thickness of less than 0.5 mm.” As explained for claim 10, Sikonowiz discloses conformal coatings are rarely thicker than 0.2 millimeters. Ex. 1005 at 136; *supra* § VII.I. Claims 16 and 17 would have been obvious. Ex. 1002 ¶136.

D. Claim 18

Claim 18 depends from claim 14 and further recites: “wherein the electronic component is disposed on a surface of the capacitive touch switch.” Howell-719 discloses putting all electronic components on a printed circuit board within a temple. Ex. 1004 ¶97. The printed circuit board itself, or an electrical connector between the switch and printed circuit board, can serve as the “electronic

component” recited in the claim. Ex. 1002 ¶137. As the ’355 patent explains: “[E]lectronic components may be disposed on a surface of the capacitive touch switch. For instance, electrical connectors may be disposed on the surface (e.g. using reflow soldering).” Ex. 1001 27:23–26. Within the meaning of the ’355 patent, Howell-719’s printed circuit board, or the electrical connector between the board and switch, would be disposed on a surface of the connected capacitive touch switch. Claim 18 would have been obvious. Ex. 1002 ¶137.

E. Claim 19

Claim 19 depends from claim 14 and further recites: “wherein the conformal coating protects a portion of the capacitive touch switch.” Howell-719 discloses: “All of the electronic components can be self-contained inside the temple of the glasses. The components can be coupled to a printed circuit board.” Ex. 1004 ¶97. And Sikonowiz states: “Ideally, a conformal coating covers not only the circuit board but the components mounted on it as well.” Ex. 1005 at 136. It would have therefore been obvious to mount the capacitive touch switch on a PCB and apply a conformal coating to both the board and a portion of the switch. Ex. 1002 ¶138. Claim 19 would have been obvious. *Id.*

F. Claim 20

Claim 20 depends from claim 14 and further recites: “wherein the capacitive touch switch is fit to the cavity in the temple.” Again, Howell-719 discloses: “All of

the electronic components can be self-contained inside the temple of the glasses.”

Ex. 1004 ¶97. That includes the capacitive touch switch that Howell-719 discloses.

Ex. 1002 ¶139. Howell-719 thus discloses a capacitive touch switch fit to the temple cavity. *Id.* Claim 20 would have been obvious. *Id.*

G. Claim 21

Claim 21 depends from claim 14 and further recites: “wherein the capacitive touch switch is electrically connected to an electronic component disposed on the eyewear frame.” Claim 21 is obvious from multiple standpoints.

First, Howell-719 discloses the capacitive touch switch as an option for a switch that controls the speaker or tunes the frequency of the radio. Howell-719 describes embodiments where the speaker is partially embedded in the frame. *E.g.*, Ex. 1004 ¶49, claim 1. It would therefore be obvious for the capacitive touch switch to be electrically connected to a speaker disposed on the eyewear frame. Ex. 1002 ¶141.

Alternatively, Howell-719 discloses LEDs “arranged as an array on the outside surface of one of the temples.” Ex. 1004 ¶95. These LEDs light up in sync with audio from the speaker. *Id.* Since the capacitive touch switch controls the speaker, it would have been obvious that the switch would be electrically connected to the LEDs to activate the audio and LEDs in sync. Ex. 1002 ¶142.

Claim 21 would have been obvious.

**XI. GROUND 6: BLUM-130, HOWELL-719, AND SIKONOWIZ RENDER
CLAIMS 1–21 OBVIOUS**

A. Claim 1

1. Preamble and 1[a]: eyewear system comprising an eyewear frame

The preamble and element 1[a] recite: “An eyewear system comprising: an eyewear frame.” Blum-130 discloses an eyewear system comprising an eyewear frame:

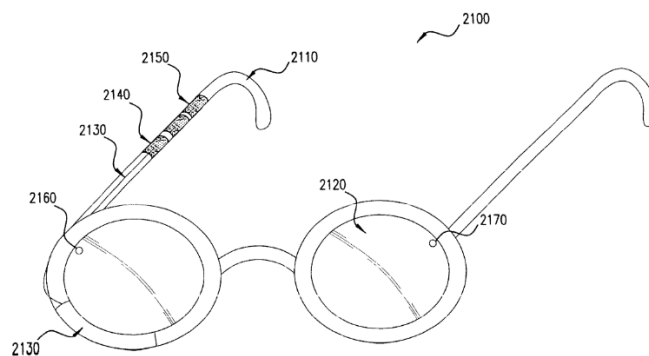


FIG.21

Figure 21 shows “electro-active eyewear 2100” with “frames 2110.” Ex. 1006 29:66–30:1.

2. 1[b]: electronics assembly

Element 1[b] recites: “an electronics assembly comprising electronic components configured to control an electrical functional member.” Blum-130 discloses this element:

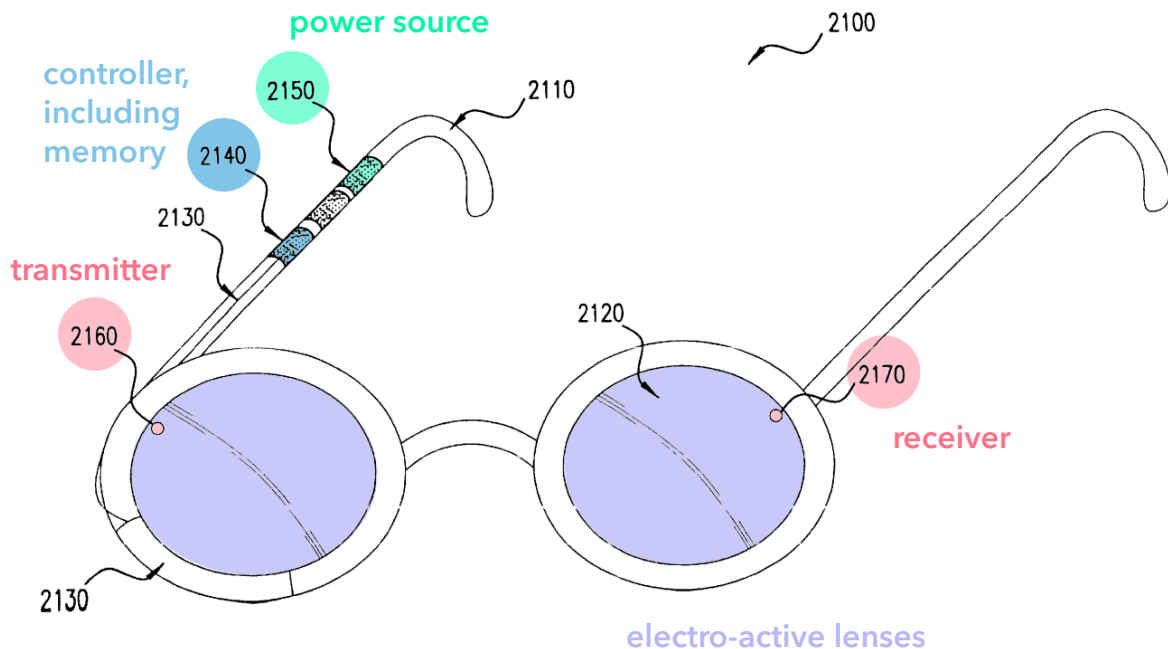


FIG.21

In the embodiment of figure 21, “frames 2110 contain electro-active lenses 2120 that are connected by connecting wires 2130 to controller 2140 (integrated circuit) and power source 2150.” Ex. 1006 30:1–3. Blum-130 discloses a controller that includes a microprocessor, memory, and a port for input and output. *Id.* 3:46–48, 6:22–26. Blum-130 thus discloses an assembly of electronic components configured to control an electro-active lens, which is an electrical functional member. Ex. 1002 ¶146.

3. 1[c]: capacitive touch switch

Element 1[c] recites: “a capacitive touch switch coupled to at least one electronic component in the electronics assembly.” Blum-130 discloses several

options for a switch to control the electro-active lenses, including combining sensors and a manual switch to allow for a mixture of automated and manual inputs to control the electro-active lenses. Ex. 1006 cols.28–30. As discussed in Ground 1, Howell-719 discloses a capacitive touch switch satisfying element 1[c]. *Supra* § VII.A.3.

A POSITA would have been motivated to use such a capacitive touch switch with Blum-130's glasses. Ex. 1002 ¶148. A person needing Blum-130's electro-active lenses would be expected to require frequent switching operations to change the lenses' focal distance as the person looked at objects at different distances. *Id.* Manual switches relying on mechanical movement to close a circuit are susceptible to wear, fatigue, and loosening, which, over the course of repeated switching operations, can lead to eventual failure. *Id.* Capacitive touch switches do not rely on mechanical movement, eliminating this source of failure. *Id.* Moreover, using a capacitive touch switch permits the glasses to have a switch without a protruding button that would disrupt the typical smooth, slim profile of glasses. *Id.* It also avoids Blum-130's inconvenient alternative of needing to carry a second device that remotely controls the lenses. *Id.* (citing Ex. 1006 29:49–51). A capacitive touch switch would therefore have been an ideal choice for a switch in eyewear in the early 2000s, when glasses were often marketed as fashion accessories. *Id.*

Incorporating Howell-719's capacitive touch switch into Blum-130 would constitute a simple substitution or addition of a specific known type of switch

(Howell-719’s capacitive touch switch) for or to a genus of switches disclosed in Blum-130 (manual switch). *Id.* ¶ 149. Capacitive touch switches had been known for decades and, by the 2000s, were commonplace in consumer electronics. *Id.* ¶¶ 43–45, 149. A POSITA would therefore have a reasonable expectation of success incorporating Howell-719’s capacitive touch switch into Blum-130’s glasses. *Id.* ¶ 149. The ’355 patent’s brief, generic reference to capacitive touch switches, without identifying components or any specific type of capacitive touch switch needed for the claimed invention, confirms this reasonable expectation of success. Element 1[c] would have been obvious. *Id.*

4. 1[d]: at least one electrical connective element

Element 1[d] recites: “at least one electrical connective element electrically connected to the electronic assembly and the electrical functional member.” Blum-130 explains: “connecting wires 2130” connect the integrated-circuit controller 2140 to the electro-active lenses 2120. Ex. 1006 30:1–3.

5. 1[e] and 1[f]: conformal layer that is moisture proof and seals electrical connections

Elements 1[e] and 1[f] recite: “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.” As discussed for Ground 1, the conformal layer can be a conformal coating. *Supra* § VII.A.5. Howell-719 discloses mounting electronic components on a printed circuit board, and

Sikonowiz explains the well-known PCB assembly step of applying a conformal coating satisfying elements 1[e] and 1[f], including to prevent moisture from damaging the PCB and mounted electronics. *Supra* § VII.A.5; Ex. 1004 ¶¶97.

A POSITA would have been motivated to mount Blum-130's electronic components on a printed circuit board as Howell-719 teaches, including Blum-130's controller, which is itself an integrated-circuit electronics assembly including a microprocessor, memory, and input/output port, Ex. 1006 3:46–49, 6:22–47, 29:5–6, 30:3. Ex. 1002 ¶¶151–52. Mounting components on a PCB makes manufacturing and assembly cheaper and faster. *Id.* And a POSITA would have been motivated to cover the PCB and mounted electronics with a conformal coating satisfying elements 1[e] and 1[f] as Sikonowiz teaches to protect the electronics from moisture and other contaminants. *Id.* Combining these aspects of Blum-130, Howell-719, and Sikonowiz would have constituted nothing more than arranging well-known elements in a time-tested manner, with each element performing the same function it had been known to perform for decades and resulting in exactly what a POSITA would expect from that arrangement. *Id.* Indeed, a POSITA would have had a reasonable expectation of success because, by the mid-2000s, it had been commonplace for decades to mount integrated circuits to printed circuit boards and to apply conformal coatings to printed circuit boards to protect them and their

mounted components from moisture and contaminants. *Id.*; *supra* §§ II.B.1, II.B.2.

Elements 1[e] and 1[f] would have been obvious.

6. 1[g]–1[i]: conformal layer disposed in an enclosure and electronic assembly enclosed in a temple

Elements 1[g]–1[i] recite: “wherein the conformal layer is disposed in an enclosure of the eyewear frame; wherein the eyewear frame comprises a temple; and wherein the electronic assembly is enclosed in the temple.”

Like Howell-719 teaches for its electronic components, Blum-130 discloses that the integrated-circuit controller and its electronic assembly can be housed inside the frame, such as in a temple as illustrated in figure 21. Ex. 1006 12:44–46, 30:6–10 (“embedded in frame”), fig. 21. Therefore, for the same reasons as discussed for Ground 1, the conformal coating resulting from combining Blum-130, Howell-719, and Sikonowiz would satisfy elements 1[g]–1[i] and render them obvious. *See supra* § VII.A.6; Ex. 1002 ¶154.

* * *

In summary, Blum-130 discloses glasses with temples, an integrated circuit embedded in a temple with electronics to control electro-active lenses, and a combination of a manual switch and sensors to activate different settings for the lenses. Ex. 1002 ¶155. Blum-130 thus expressly discloses all elements of claim 1 except for those relating to the capacitive touch switch (1[c]) and the conformal layer (1[e]–1[g]). *Id.* Howell-719 discloses a capacitive touch switch, which would be

obvious to incorporate as a simple substitution of known alternatives with the same function, while reducing failure from wear and tear and avoiding both a button that disrupts the temple's profile and the inconvenience of using a separate device to switch modes. Howell-719 also discloses putting the electronic components on a PCB, and Sikonowiz discloses applying a conformal coating to a PCB. It would have been obvious to improve Blum-130's system by putting the integrated circuit on a PCB as Howell-719 teaches and applying a moisture-proof conformal coating as Sikonowiz teaches. *Id.* The coating would seal the electronic components and electrical connections of the PCB to protect them from moisture and contaminants. *Id.* Based on the disclosures of Blum-130 and Howell-719 of embedding their respective integrated circuit and PCB and other electronics in a temple, the coated PCB would be embedded in the temple. *Id.* Incorporating these teachings of Howell-719 and Sikonowiz satisfies the remaining elements of claim 1 and represents applying a known technique to a known device ready for improvement with known beneficial results. *Id.* Claim 1 would have therefore been obvious.

B. Claims 2 and 3

Claim 2 depends from claim 1 and further recites: "wherein the electrical functional member comprises a lens." Claim 3 also depends from claim 1 and further recites: "wherein the electrical functional member includes at least one of an electro-active lens, [other options] ... , and an active 3D function." The electrical functional

member discussed for claim 1 was an electro-active lens. *Supra* § XI.A.2. Claims 2 and 3 would have been obvious.

C. Claim 4

Claim 4 depends from claim 1 and further recites “wherein the at least one electrical connective element is a conductive compressible member or a multi-conductor cable.” Blum-130 discloses that the electro-active lenses are connected to the controller “via a network of conductive wires.” Ex. 1006 4:19–21; *also id.* 30:1–3. In addition, Blum-130 discloses embedding the integrated-circuit controller in the temple. *E.g., id.* 12:44–46, fig. 21. Accordingly, for the reasons discussed for Ground 1, *supra* § VII.C, a POSITA would have identified a flat, flexible multi-conductor cable as an advantageous option among a limited number of well-known suitable choices for connecting the components in the temple. Claim 4 would have been obvious. Ex. 1002 ¶157.

D. Claim 5

Claim 5 depends from claim 1 and further recites “wherein the electronic assembly comprises a micro-processor.” As discussed for element 1[b], Blum-130 discloses an electronic assembly including a microprocessor. *Supra* § XI.A.2; Ex. 1006 3:46–49. Claim 5 would have been obvious.

E. Claim 6

Claim 6 depends from claim 1 and further recites “wherein the enclosure comprises at least one of an outer casing of the electronic assembly or a cavity of the eyewear frame.” See the discussion of claim 6 in Ground 1 and elements 1[g]–1[i] in Ground 6. *Supra* §§ VII.E, XI.A.6. Claim 6 would have been obvious. Ex. 1002 ¶159.

F. Claims 7–12

Claims 7–12 depend from claim 1 and further recite limitations relating to the conformal layer. See the discussion in Ground 1, which applies here. *Supra* §§ VII.F–VII.K; Ex. 1002 ¶160. These claims would have been obvious.

G. Claim 13

1. Preamble

Claim 13’s preamble recites: “A method of manufacturing an eyewear system.” Blum-130 discloses an eyewear system and its construction. *See, e.g.*, Ex. 1006 fig. 21; *see also supra* § XI.A.1.

2. 13[a]–13[b]: disposing electronic components on a capacitive touch switch and connecting the components to form an electronic assembly

Elements 13[a]–13[b] recite: “disposing a plurality of electronic components on a capacitive touch switch; connecting the plurality of electronic components via electrical connections to form an electronic assembly.” For the reasons discussed for

claim 1, it would have been obvious to incorporate Howell-719's capacitive touch switch into Blum-130 and to mount Blum-130's integrated-circuit electronic components on a printed circuit board, where they would be electrically connected to form an electronic assembly. *Supra* §§ XI.A.3, XI.A.5. Moreover, for the same reasons discussed for claim 13 in Ground 1, it would have been obvious to mount Howell-719's capacitive touch switch to the same printed circuit board. *Supra* § VII.L.2. Within the meaning of the '355 patent, Blum-130's electronic components would thus be disposed on the capacitive touch switch. *See supra* § VII.L.2. Elements 13[a]–13[b] would have been obvious. Ex. 1002 ¶162.

3. 13[c]: depositing a conformal layer

Element 13[c] recites: “depositing a conformal layer over at least a portion of the electronic assembly and at least a portion of the capacitive touch switch.” For the same reasons discussed for claim 1, *supra* § XI.A.5, Sikonowiz motivates depositing a conformal coating over the PCB discussed for elements 13[a]–13[b], including the electronic components mounted on the board, and a POSITA would have had a reasonable expectation of succeeding in doing so. Ex. 1002 ¶163.

4. 13[d] coupling the assembly and switch with the conformal layer to an enclosure

Element 13[d] recites: “coupling the electronic assembly and the capacitive touch switch with the conformal layer to an enclosure of an eyewear frame.” As discussed above for claim 1, the electronics, including the capacitive touch switch,

discussed for elements 13[a]–13[c] would be embedded within a temple. *Supra* § XI.A.6. Within the meaning of the '355 patent, such electronics are coupled to the enclosure that the cavity and temple form. *See supra* § VII.L.4; Ex. 1002 ¶ 164.

H. Claim 14

1. Preamble and 14[a]: eyewear comprising a frame with a temple

The preamble and element 14[a] recite: “Eyewear comprising: an eyewear frame comprising a temple.” Blum-130 discloses these elements. *See, e.g.*, Ex. 1006 fig. 21; *see also supra* §§ XI.A.1, XI.A.6.

2. 14[b]: electronic components in a temple cavity

Element 14[b] recites: “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) [sic] 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.” Blum-130’s figure 21 shows several of these components:

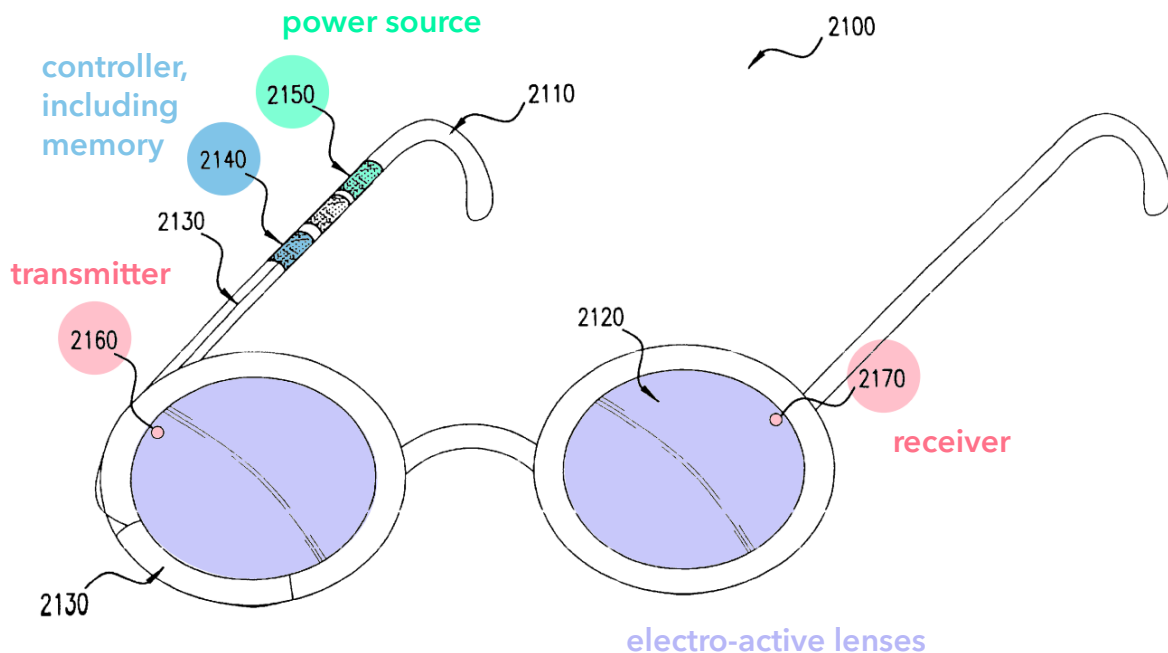


FIG.21

Blum-130 discloses at least the following electronic components embedded in a temple:

- (i) a controller, e.g., “controller 2140,” Ex. 1006 30:2–3, fig. 21;
- (ii) a memory, e.g., *id.* 3:46–49, 6:22–47, 14:34;
- (iii) a power source, e.g., “power source 2150,” *id.* 30:2–3, fig. 21;
- (iv) receivers and transmitters, including rangefinder receiver 2170 and transmitter 2160 “embedded in frame 2110,” e.g., *id.* 30:3–10; and
- (v) “a tiny micro-gyroscope or micro-accelerometer in the temple,” *id.* 30:39–45; *see also id.* 30:59–60.

Blum-130 discloses the rangefinder can utilize “radio-frequency waves,” *id.* 30:15–17, which requires an antenna. Ex. 1002 ¶167. Alternatively, Blum-130 discloses “a tiny receiver antenna mounted conformably on the spectacle frames.” Ex. 1006 29:55–57. In either case, a POSITA would be motivated to embed the antenna inside the temple to protect it from damage and to simplify manufacturing. Ex. 1002 ¶167. As Howell-719 teaches, embedding components in a temple cavity “[a]dvantageously” creates “minimal impact on the design of the end product” and avoids both “tedious wiring” and “other changes or complications to the eyeglass frames.” Ex. 1004 ¶108; *also id.* ¶97.

3. 14[c]: conformal coating

Element 14[c] recites: “a conformal coating, deposited over at least a portion of the plurality of electronic components, to protect the plurality of electronic components.” See §§ XI.A.2, XI.A.5, *supra*; Ex. 1002 ¶168.

4. 14[d]: capacitive touch switch

Element 14[d] recites: “a capacitive touch switch operably coupled to an electronic component in the plurality of electronic components.” See § XI.A.3, *supra*; Ex. 1002 ¶169.

I. Claims 15–20

Claims 15–20 depend from claim 14 and further recite limitations related to the conformal coating or capacitive touch switch. The discussion of these claims in

Grounds 4 and 5 applies equally to the combination of Blum-130, Howell-719, and Sikonowiz: exposing an electrical contact as recited in claim 15 would have been obvious based on a POSITA's background knowledge; Sikonowiz discloses conformal coatings satisfying the thickness limitations of claims 16 and 17; Howell-719 discloses the capacitive-touch-switch limitations of claims 18 and 20; and Sikonowiz's disclosure of conformal coatings covering mounted components combines with Howell-719's disclosure of mounting a capacitive touch switch to a PCB to render claim 19 obvious. *Supra* §§ X.B–X.F; Ex. 1002 ¶170.

J. Claim 21

Claim 21 depends from claim 14 and further recites: “wherein the capacitive touch switch is electrically connected to an electronic component disposed on the eyewear frame.” Blum-130 discloses “thin film solar cell arrays can be attached to the surface of the frames.” Ex. 1006 28:27–28. These solar cell arrays are a power source. *Id.* 28:31–33. Because the capacitive touch switch requires a power source, it would have been obvious to electrically connect the switch to the solar cell arrays. Ex. 1002 ¶171. Additionally, since the capacitive touch switch controls the electroactive lenses, the switch is electrically connected to the lenses. *Id.* Claim 21 would have been obvious.

**XII. GROUND 7: BLUM-130, EICHELBERGER, AND SIKONOWIZ
RENDER CLAIMS 13, 14, AND 18 OBVIOUS**

In Ground 7, Petitioner alternatively relies on Eichelberger for a capacitive touch switch.

A. Claim 13

1. Preamble

Claim 13’s preamble recites: “A method of manufacturing an eyewear system.” See Ground 6, Claim 13. *Supra* § XI.G.1.

2. 13[a]: disposing electronic components on a capacitive touch switch

Element 13[a] recites: “disposing a plurality of electronic components on a capacitive touch switch.” As discussed in Ground 3, Eichelberger discloses a capacitive touch switch with multiple electronic components disposed thereon. *Supra* § IX.B. For the same reasons discussed in Ground 3 relating to combining Eichelberger with Howell-719, a POSITA would have been motivated to use Eichelberger’s capacitive touch switch with Blum-130’s glasses and would have had a reasonable expectation of success. *Id.* For example, the efficient use of space that Eichelberger’s double-sided PCB affords and the common use of capacitive touch switches in consumer electronics would have motivated a POSITA to combine Blum-130 with Eichelberger. *See id.*; Ex. 1002 ¶176. Incorporating Eichelberger’s capacitive touch switch would also constitute a simple substitution or addition of a

specific known type of switch (capacitive touch switch) for or to a genus of switches disclosed in Blum-130 (manual switch). Capacitive touch switches had been known for decades. Ex. 1002 ¶177. Given the prevalence of capacitive touch switches in consumer electronics, including in glasses as disclosed in Howell-719, a POSITA would have a reasonable expectation of success. *Id.* Blum-130 and Eichelberger therefore render element 13[a] obvious.

3. 13[b]: connecting the components to form an electronic assembly

Element 13[b] recites: “connecting the plurality of electronic components via electrical connections to form an electronic assembly.” Eichelberger discloses that the electrodes 18b and 18c are “interconnected by conductive leads fabricated as a portion of the PC board, as is well known to the art.” Ex. 1010 3:50–53. And conductive leads or traces on the PCB would likewise connect Blum-130’s electronic components to form an electronic assembly. Ex. 1002 ¶179; *see also supra* § VII.A.4 (discussing PCB electrical connections; citing Ex. 1030 at 1498–99).

4. 13[c]: depositing a conformal layer

Element 13[c] recites: “depositing a conformal layer over at least a portion of the electronic assembly and at least a portion of the capacitive touch switch.” For the same reasons discussed in Ground 6, *supra* § XI.G.3, Sikonowiz motivates depositing a conformal coating over the PCB discussed for elements 13[a]–13[b],

including the electronic components mounted on the board, and a POSITA would have had a reasonable expectation of succeeding in doing so. Ex. 1002 ¶180.

5. 13[d] coupling the assembly and switch with the conformal layer to an enclosure

Element 13[d] recites: “coupling the electronic assembly and the capacitive touch switch with the conformal layer to an enclosure of an eyewear frame.” See the discussion in Ground 6. *Supra* § XI.G.4; Ex. 1002 ¶181.

B. Claim 14

For Ground 7, the analysis of claim 14 is identical to that of claim 14 for Ground 6, except with Eichelberger’s capacitive touch switch taking the place of Howell-719’s. *Supra* § XI.H. For the reasons discussed for claim 13 in Ground 7, it would have been obvious to incorporate Eichelberger’s capacitive touch switch into Blum-130’s glasses. *Supra* § XII.A.2; Ex. 1002 ¶182.

C. Claim 18

Claim 18 depends from claim 14 and further recites: “wherein the electronic component is disposed on a surface of the capacitive touch switch.” For the reasons discussed for claim 13, Blum-130 and Eichelberger render obvious coupling an electronic component to Eichelberger’s capacitive touch switch and disposing that component on one side of Eichelberger’s printed circuit board. *Supra* § XII.A.2; Ex. 1002 ¶183.

XIII. SECONDARY CONSIDERATIONS

Secondary considerations should be considered but do not control the obviousness conclusion. *Newell Cos. v. Kenney Mfg. Co.*, 864 F.2d 757, 768 (Fed. Cir. 1988). Where, as here, a strong *prima facie* obviousness showing exists, even relevant secondary considerations supported by substantial evidence may not dislodge the obviousness conclusion. *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007). Petitioner is aware of no evidence supporting a claim for secondary considerations.

XIV. DISCRETIONARY DENIAL UNDER §314(A) IS UNWARRANTED

Considering the factors under *Apple v. Fintiv*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential), the Board should decline to exercise its discretion under §314(a).

A. Factor 1: Potential Stay

Petitioner will move to stay the Litigation pending resolution of this IPR. In the Litigation, discovery is in the very early stages, with the parties serving initial sets of discovery requests on June 4, 2024. Claim construction, depositions, expert reports, and summary-judgment motions have not begun. The Central District of California recognizes a “liberal policy” favoring stays pending PTO proceedings. *RJ Tech. LLC v. Apple Inc.*, No. 8:22-cv-01874, 2023 WL 8188475, at *1 (C.D. Cal. Oct. 4, 2023). Courts in that district stay litigation pending IPR where, as here, “there

is more work ahead of the parties and the Court than behind”; the stay “will simplify the issues in question and the trial of the case”; and there is no undue prejudice. *Polaris PowerLED Techs., LLC v. LG Elecs., Inc.*, No. SACV-20-00125, 2020 WL 6064964, at *2–3 (C.D. Cal. Aug. 26, 2020). Courts routinely grant pre-institution stays. *E.g.*, *RJ Tech.*, 2023 WL 8188475, at *3; *DataQuill Ltd. v. TCL Commc’n Tech. Holdings Ltd.*, No. 2:19-cv-03394, 2020 WL 3884436, at *1–3 (C.D. Cal. Apr. 24, 2020). Accordingly, this factor favors institution.

B. Factor 2: Trial Timing

The Litigation’s trial is currently scheduled for July 21, 2025. A final written decision in this proceeding would be expected within five months of that date—in December 2025. Furthermore, the Litigation is in its early stages, and, as statistics discussed below suggest, the court may well postpone trial, due to a stay or otherwise. The Director’s June 2022 memorandum counsels against relying on scheduled trial dates. Memo⁴ 8.

In 2023, over 17,000 new cases were filed in the Central District, resulting in 622 new cases per authorized judgeship, *not accounting for vacancies*. Ex. 1033. In 2023, the median time to trial for civil cases in the Central District was 29.7 months from filing. *Id.* Applying that median time to the Litigation, which was filed at the

⁴ https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

end of October 2023, would put trial in April 2026—four months *after* the expected final written decision in this case. Accordingly, this factor favors institution or is at worst neutral. *Fusion Orthopedics, LLC v. Extremity Med., LLC*, IPR2023-00894, Paper 15 at 30 (PTAB Nov. 17, 2023); *Samsung Elecs. Co. v. DoDots Licensing Sols. LLC*, IPR2023-00621, Paper 9 at 11 (PTAB Oct. 11, 2023).

C. Factor 3: Investment in Litigation

On June 13, 2024, the Court granted Petitioner’s motion to dismiss claims from Patent Owner’s amended complaint. The parties have invested very little in the Litigation. Fact discovery remains in its infancy. *Supra* § XIV.A. The parties have not proposed claim constructions or submitted claim construction briefs. No expert reports have been served. Accordingly, the “remaining investment” outweighs any investments made and this factor weighs against discretionary denial. *Samsung Elecs. Am. Inc. v. Snik LLC*, IPR2020-01428, Paper 10 at 11 (PTAB Mar. 9, 2021); *Huawei Techs. Co. v. WSOU Invs., LLC*, IPR2021-00226, Paper 10 at 13–14 (PTAB June 10, 2021).

D. Factor 4: Overlap

Petitioner hereby stipulates that, if the Board institutes review, Petitioner will not pursue in the Litigation invalidity of the ’355 patent based on any ground Petitioner raised or reasonably could have raised in this petition. This stipulation resolves *Fintiv* factor 4 strongly in favor of institution. *Sotera Wireless, Inc. v.*

Masimo Corp., IPR2020-01019, Paper 12 at 18–19 (Dec. 1, 2020) (precedential as to § II.A). The Director’s June 2022 memorandum states that, when a petitioner so stipulates, “the PTAB will not discretionarily deny institution” due to parallel litigation. Memo, *supra* n.4, at 7.

E. Factor 5: Parties

The parties are the same, but due to the likelihood of a stay, the Litigation is unlikely to go to trial before a final written decision. This factor is neutral. *Google LLC v. Jawbone Innovations, LLC*, IPR2022-00630, Paper 10 at 14 (PTAB Sept. 13, 2022) (note: Paper 10 is captioned with Samsung as petitioner).

F. Factor 6: Other Circumstances

The PTO did not discuss the prior art cited here. Nor has the prior art been considered by any court or any jury. The claims start with the decades-old concept of electronics embedded in eyewear and try to dress it up with terms like “capacitive touch switch” and “conformal coating.” But capacitive touch switches and conformal coatings are also decades old. Indeed, the ’355 patent refers only briefly and generically to capacitive touch switches and conformal coatings because no explanation was necessary for a POSITA: they were well-known, fundamental options for a broad range of electronics, including consumer electronics. The examiner allowed the claims based on their recitation of a “capacitive touch switch” without acknowledging the decades-old nature of that technology and its prior-art

use in eyewear. If unrebutted, Petitioner’s evidence plainly leads to the conclusion that all claims are unpatentable. It is highly likely Petitioner will prevail on at least one claim, and the petition’s merits are therefore compelling. *CommScope Techs. LLC. v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 at 3–4 (February 27, 2023) (precedential). Therefore, even if *Fintiv* factors 1–5 favored denial, factor 6 would require institution. *Id.*

Accordingly, the *Fintiv* analysis favors institution.

XV. DISCRETIONARY DENIAL UNDER § 325(D) IS UNWARRANTED

The PTO has never evaluated the ’355 patent against the asserted combinations of prior art.

Advanced Bionics Prong 1; Becton, Dickinson Factors (a), (b), and (d). The applicant disclosed Howell-719, Howell-158, and Blum-130, but the PTO examiner never relied on those references or discussed them. “As clarified in the Notice of Proposed Rule Making,” the Board has explained, “mere prior citation of prior art in an IDS will not automatically satisfy the first prong of the analytical framework set forth in *Advanced Bionics*.” *JUUL Labs, Inc. v. NJOY, LLC*, IPR2024-00160, Paper 10 at 11–12 (PTAB May 24, 2024) (citing 89 FR 28693, 28702 (Apr. 19, 2024)).

Importantly, Sikonowiz was never before the examiner, and the examiner cited no conformal coating in any reference analyzed in a rejection. Rather, the

examiner relied on a flexible plastic ribbon but ultimately agreed this was not a conformal layer and was not moisture proof. Ex. 1003 E_PA_LUX_005004 (citing *id.* -4661). In contrast, Sikonowiz indisputably discloses a moisture-proof conformal coating, including the few materials like epoxy and silicone that the '355 patent identifies as suitable for a conformal coating. At a minimum, Sikonowiz thus represents new, noncumulative prior art. *Oticon Medical AB v. Cochlear Limited*, IPR2019-00975, Paper 15 at 20 (Oct. 16, 2019) (precedential as to §§ II.B, II.C). All grounds in this petition rely on Sikonowiz's teaching of a conformal coating, and thus none of the asserted grounds has ever been before the PTO.

Additionally, Eichelberger was never before the examiner, and the examiner allowed the claims based on their recitation of a capacitive touch switch. Eichelberger thus represents new, noncumulative prior art as well.

The first prong of *Advanced Bionics* is therefore unmet, and the Board "need not address the second part." *JUUL*, Paper 10 at 13; *Quasar Sci. LLC v. Colt Int'l Clothing, Inc.*, IPR2023-00611, Paper 10 at 12 (PTAB Oct. 10, 2023) (even where some petition references were listed in IDS, the asserted art was "not 'the same prior art'" presented in original examination where petition relied on additional references the Office had not considered).

Advanced Bionics Prong 2; Becton, Dickinson Factors (c), (e), and (f). The applicant listed Howell-719 and Howell-158 in a 23-page combined IDS with over

400 references. Ex. 1003 E_PA_LUX_004108–134. Three years later, the applicant listed Blum-130 in a 10-page IDS with over 200 references. *Id.* E_PA_LUX_004669–80. The examiner did not consider Sikonowiz or Eichelberger and never discussed Howell-719, Howell-158, or Blum-130. *Becton, Dickinson* factor (c) thus weighs heavily against denial.

The examiner allowed the claims based on the recitation of a capacitive touch switch. *Id.* E_PA_LUX_005004 (citing *id.* -4661, -4991). But Howell-719 and Eichelberger clearly disclose that claim element. Accordingly, as shown in Grounds 1–7, the examiner erred in concluding the claims were patentable. *Quasar*, Paper 10 at 14 (when examiner did not address prior art apart from initialing IDS, “petitioner may show material error by showing that the Office failed to reject the claims over the asserted art”).

In providing reasons for allowance, the examiner also cited applicant’s April 27, 2018 remarks, in which applicant argued the cited art did not disclose a conformal layer as recited in the claims. Ex. 1003 E_PA_LUX_005004 & -4661. The examiner thus failed to appreciate the teachings of Howell-719, Howell-158, and Blum-130 relating to placing their electronics on printed circuit boards, coupled with the well-known technique (taught in Sikonowiz) of applying a conformal coating to PCBs. The examiner also failed to appreciate the decades-old nature of the purportedly novel limitations of capacitive touch switches and conformal

coatings as documented in Eichelberger and Sikonowiz, both from 1981. Neither reference was before the examiner. Likewise, the examiner did not have the benefit of Mr. Feland’s expert testimony.

In short, the grounds presented here are not cumulative of the grounds substantively addressed during examination. The Board should not deny institution under § 325(d). *Oticon*, Paper 15 at 20; *Quasar*, Paper 10 at 14.

XVI. MANDATORY NOTICES, GROUNDS FOR STANDING, AND FEE PAYMENT

A. Real Parties-In-Interest (37 C.F.R. § 42.8(b)(1))

Luxottica of America Inc. and Luxottica Group S.p.A are the real parties in interest for Petitioner. The parent company of each party identified above is EssilorLuxottica S.A.

B. Related Matters (37 C.F.R. § 42.8(b)(2))

The parties are currently engaged in district-court litigation in *e-Vision Optics, LLC et al. v. Luxottica Group S.p.A et al.*, No. 8:23-cv-02013 (C.D. Cal.). The ’355 patent is asserted in the Litigation.

C. Lead and Backup Counsel (37 C.F.R. § 42.8(b)(3))

Petitioner provides the following designation of counsel, all of whom are included in Customer No. 20,995 identified in Petitioner’s Power of Attorney.

Lead Counsel	Back-up Counsel
Ali S. Razai (Reg. No. 60,771) 2AZR@knobbe.com	Joseph F. Jennings (Reg. No. 40,664) 2JFJ@knobbe.com
Knobbe, Martens, Olson, & Bear, LLP <u>Postal and Hand-Delivery Address:</u> 2040 Main St., 14 th Floor Irvine, CA 92614 Telephone: 949-760-0404 Facsimile: 949-760-9502	Knobbe, Martens, Olson, & Bear, LLP <u>Postal and Hand-Delivery Address:</u> same as lead counsel Jacob L. Peterson (Reg. No. 65,096) 2JUP@knobbe.com Knobbe, Martens, Olson, & Bear, LLP <u>Postal and Hand-Delivery Address:</u> 925 4th Ave. Ste. 2500 Seattle, WA 98104 Telephone: (206) 405-2000 Facsimile: (206) 405-2001

D. Service Information (37 C.F.R. §42.8(b)(4))

Please direct all correspondence to lead counsel and back-up counsel at the addresses shown above. Petitioner also consents to electronic service by email to luxotticalPR-355@knobbe.com.

E. Standing

The '355 patent is available for IPR, and no bar or estoppel applies. PO filed the Litigation in October 2023 and served the complaint subsequently.

The Office may charge any fees due to Deposit Account 11-1410.

XVII. CONCLUSION

Petitioner respectfully requests that the Board institute IPR and cancel all claims of the '355 patent.

Dated: June 20, 2024

By: /Ali S. Razai/

Ali S. Razai (Reg. No. 60,771)

KNOBBE MARTENS OLSON & BEAR, LLP

Attorney for Petitioner Luxottica of America Inc.

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that this PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,613,355 contains 13,902 words according to the word-processing program used to prepare this paper. The foregoing word count complies with the 14,000-word type-volume limit specified by 37 C.F.R. § 42.24(a)(1).

Dated: June 20, 2024

By: /Ali S. Razai /
Ali S. Razai (Reg. No. 60,771)
KNOBBE MARTENS OLSON & BEAR, LLP

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on the date below copies of this PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,613,355, PETITIONER’S POWER OF ATTORNEY, and EXHIBITS 1–1033 are being served by FedEx on the Patent Owner at the correspondence address of record for the subject patent as follows:

Smith Baluch LLP
376 Boylston St. Suite 401
Boston, MA 02116

A courtesy copy is being sent by email on this day to Patent Owner’s counsel of record in the Litigation as follows:

Christopher C. Campbell
ccampbell@kslaw.com
King & Spalding LLP
1700 Pennsylvania Avenue, NW, Suite 200
Washington, DC 20006-4707

Dated: June 21, 2024

By: /Ali S. Razai/
Ali S. Razai (Reg. No. 60,771)
KNOBBE MARTENS OLSON & BEAR, LLP