

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LUXOTTICA OF AMERICA INC.,
Petitioner,

v.

E-VISION OPTICS, LLC,
Patent Owner.

IPR2024-01030
Patent 8,708,483 B2

Before RICHARD H. MARSCHALL, JOHN D. HAMANN, and
SEAN P. O'HANLON, *Administrative Patent Judges*.

MARSCHALL, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

Petitioner Luxottica of America Inc. challenges claims 1–37 of U.S. Patent No. 8,708,483 B2 (Ex. 1001, “the ’483 patent”), which is assigned to Patent Owner e-Vision Optics, LLC. We have jurisdiction under 35 U.S.C. § 6, and we issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons set forth below, we determine that Petitioner proves by a preponderance of the evidence that claims 1–20, 22–31, and 33–37 are unpatentable and that Petitioner fails to prove that claims 21 and 32 are unpatentable.

BACKGROUND

A. Summary of Filings

Petitioner filed a Petition requesting *inter partes* review of claims 1–37 of the ’483 patent. *See* Paper 1 (“Pet.”), 1. Patent Owner filed a Preliminary Response to the Petition. Paper 7. With our authorization, Petitioner filed a Preliminary Reply (Paper 8), and Patent Owner filed a Preliminary Sur-reply (Paper 10). Pursuant to 35 U.S.C. § 314, we instituted an *inter partes* review as to all challenged claims and all grounds raised in the Petition. Paper 12.

After institution, Patent Owner filed a Response (Paper 19, “PO Resp.”), Petitioner filed a Reply (Paper 24, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 25, “PO Sur-reply”). The record includes a transcript of an oral hearing held on October 6, 2025. Paper 39. After the oral hearing, we authorized both parties to file post-hearing claim construction briefs and related replies. *See* Paper 35 (“PO Post-hearing”); Paper 36 (“Pet. Post-hearing”); Paper 37 (“PO Post-hearing Reply”); Paper 38 (“Pet. Post-hearing Reply”).

B. Real Parties-in-Interest and Related Matters

Petitioner states that “Luxottica of America Inc. and Luxottica Group S.p.A. are the real parties in interest for Petitioner.” Pet. 84. Petitioner also identifies EssilorLuxottica S.A. as the parent company to these companies. *See id.* Patent Owner identifies itself as the only real party-in-interest. Paper 6, 1.

The parties indicate that the ’483 patent is the subject of the following infringement actions: *e-Vision Optics, LLC et al. v. Luxottica Group S.p.A et al.*, No. 8:23-cv-02013 (C.D. Cal.) and *e-Vision, LLC et al. v. Lenovo Group Ltd. et al.*, No. 8:23-cv-01860 (C.D. Cal.). Pet. 84; Paper 6, 1.

C. The ’483 Patent

The ’483 patent “relates to integrating electronic components into an electro-active frame for driving electro-active focusing lenses.” Ex. 1001, code (57). The ’483 patent states that its device allows for user control of “an electroactive lens in a deliberate, hands free manner” while “minimizing the number of frame part SKUs [stock keeping units], and maintaining the aesthetics of the frame. *Id.* at code (57), 2:23–34. The disclosed device employs “one or more electronic modules” to achieve these goals. *Id.* at 2:35–47.

The electronic modules that the ’483 patent discloses may be placed near front of the temples of the spectacles. Ex. 1001, 2:51–54, Fig. 6. Figures 1A–1C illustrate an electronic module in the electro-active spectacles and are reproduced below.

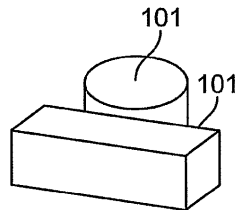
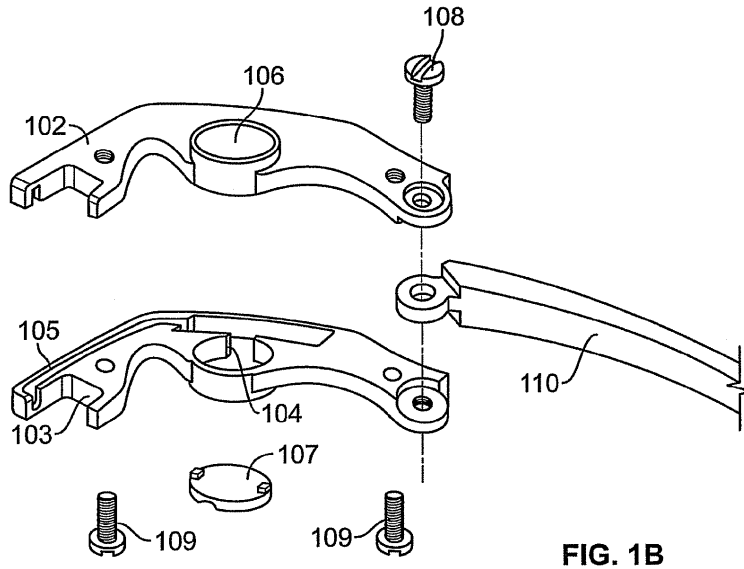
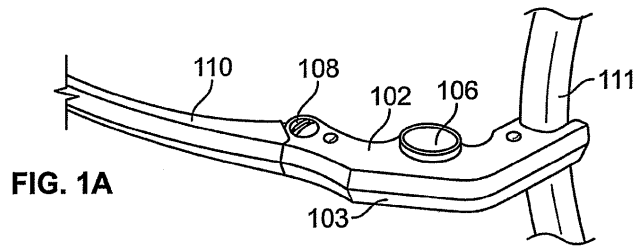


Figure 1A illustrates a universal frame housing including upper and lower lens frame component pieces 102, 103, manual touch switch 106, frame temple 110, and eye-wire 111. Ex. 1001, 3:27–29, 5:64–6:16. Figure 1B shows an exploded view of the universal frame housing of Figure. 1A, which includes receptacle 104 for electronic module 101, and receptacle cover 107. *Id.* at 3:30–31, 5:66–6:8. Figure 1C illustrates electronic module 101, illustrated here “as a cylinder and a block section attached to the side of

the cylinder.” *Id.* at 3:32, 5:54–57. The module preferably houses “electrical components in a substantially water-proof and wear resistant/moisture resistant environment and is preferably hermetically sealed.” *Id.* at 10:47–50.

D. Challenged Claims

Petitioner challenges all 37 claims of the ’483 patent, including independent claims 1 and 19. Claims 1 and 19 are illustrative and recite:

1. Eyewear comprising:

a frame; and

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

19. Eyewear comprising:

a frame; and

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

Ex. 1001, 11:28–37, 12:13–21.

E. Asserted Grounds of Unpatentability

Petitioner challenges claims 1–37 on the following grounds (Pet. 10):

Claims Challenged	35 U.S.C. §¹	Basis
1, 9, 10, 14, 15, 18	102	Howell-596 ²
1, 2, 6–10, 13–16, 18	103	Howell-596
19, 20, 24–28, 31–35, 37	103	Howell-596, Howell-833 ³
4, 5, 7, 17, 22, 23, 25, 36	103	Howell-596, Howell-833, Blum-741 ⁴
3, 21	103	Howell-596, Howell-833, Blum-741, Spitzer ⁵
11, 29	103	Howell-596, Howell-833, Ogren ⁶
12, 30	103	Howell-596, Howell-833, Jannard-868 ⁷
1, 2, 4–10, 13–20, 22–28, 31–37	103	Blum-741, Hattori-912 ⁸

¹ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Because the ’483 patent issued from an application having an effective filing date before March 16, 2013, we apply the pre-AIA version of the statutory basis for unpatentability.

² US Patent Pub. No. 2005/0230596 A1, published October 20, 2005 (Ex. 1003, “Howell-596”).

³ US 7,581,833 B2, issued September 1, 2009 (Ex. 1004, “Howell-833”).

⁴ US 6,857,741 B2, issued February 22, 2005 (Ex. 1005, “Blum-741”).

⁵ US 6,091,546, issued July 18, 2000 (Ex. 1007, “Spitzer”).

⁶ WO 2005/119344 A1, published December 15, 2005 (Ex. 1008, “Ogren”).

⁷ US 5,760,868, issued January 2, 1998 (Ex. 1009, “Jannard-868”).

⁸ Japanese Unexamined Patent Application Publication Number S58-113912, published July 7, 1983 (Ex. 1006, “Hattori-912”) (original at Ex.

3, 21	103	Blum-741, Hattori-912, Spitzer
11, 29	103	Blum-741, Hattori-912, Ogren
12, 30	103	Blum-741, Hattori-912, Jannard-868

In support of these challenges, Petitioner submits the Declaration of Dr. John Feland. *See* Ex. 1002. Patent Owner relies on the Declaration of Dr. James Oliver. *See* Ex. 2019.

ANALYSIS

A. Legal Standards

To prevail in its challenges, Petitioner must prove unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d). In an *inter partes* review, “the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burdens of proof in an *inter partes* review).

Petitioner relies on an anticipation and obviousness in its challenges. Pet. 10. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814

1006, Ex. A; translation at Ex. 1006, Ex. B). We cite to the translation of Hattori-912 at Ex. 1006.

F.2d 628, 631 (Fed. Cir. 1987). A claim is unpatentable as obvious under 35 U.S.C. § 103 if the differences between the claimed invention and the prior art are such that the subject matter, as a whole, would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. 35 U.S.C. § 103; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations, also known as objective indicia of nonobviousness.⁹ *Graham v. John Deere Co.*, 483 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including: “(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.” *Best*

⁹ Patent Owner does not rely on any objective indicia of nonobviousness in this proceeding.

Med. Int'l, Inc. v. Elekta Inc., 46 F.4th 1346, 1353 (Fed. Cir. 2022) (quoting *Daiichi Sankyo Co. v. Apotex, Inc.*, 483 F.3d 1254, 1256 (Fed. Cir. 2007)).

“The patent’s purpose can also be informative.” *Id.*

Petitioner contends that a person having ordinary skill in the art (“POSITA”) at the time of the invention would have had “at least a bachelor’s degree in mechanical or manufacturing engineering; mechatronics; electrical engineering plus coursework in mechanical engineering, manufacturing engineering, or mechatronics; or a similar technical degree, and at least 2 years of experience designing consumer electronics, such as eyewear with electronics.” Pet. 8 (citing Ex. 1002 ¶¶ 23–25). Petitioner contends that “[w]ork experience could substitute for formal education and additional formal education could substitute for work experience.” *Id.*

Patent Owner contends that a “POSITA at the time of the invention of the ’483 patent would have had a bachelor’s degree in mechanical engineering, electrical engineering, or computer engineering, or an equivalent degree and, in addition, approximately two years of work experience in mechanical, electrical, and industrial design, such as with embedded electronic devices.” PO Resp. 8 (citing Ex. 2019 ¶¶ 39, 42). Patent Owner also asserts that “[m]ore advanced degrees or training in a related discipline or both can compensate for shorter work experience.” *Id.*

We find that the proposals from the parties substantially overlap, such that it remains unclear whether any substantive difference exists. Notably, neither party argues that the minor differences in the proposals lead to a different outcome on any issues in this proceeding. Based on our review of the proposals, we apply Patent Owner’s proposal because it is consistent

with the problems and solutions disclosed in the '483 patent and prior art of record. *See, e.g., GPAC*, 57 F.3d at 1579 (approving the determination of the level of ordinary skill in the art by appeal to the references of record). The outcome of the issues addressed in this Decision would not change if we applied Petitioner's proposal.

C. Claim Construction

Pursuant to 37 C.F.R. § 42.100(b), we apply the claim construction standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). Under that standard, we give the words of a claim their plain and ordinary meaning as would have been understood by one skilled in the art at the time of the invention and in the context of the entire patent disclosure. *Id.* at 1312–13. Only terms in controversy need be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Here, Petitioner posits that “no claim terms require construction to resolve the patentability challenges here.” Pet. 9. Patent Owner does not oppose Petitioner's position or proffer any constructions of its own. *See generally* PO Resp. We note, however, that the parties raise at least implicit claim construction issues when addressing the prior art, such as the scope of “hermetically sealed” in claims 13 and 21, which we address in the context of the relevant challenges below.

D. Anticipation by Howell-596 (Ground 1¹⁰)

Petitioner argues that Howell-596 anticipates claims 1, 9, 10, 14, 15, and 18. Pet. 10–20. Patent Owner does not address any of Petitioner’s anticipation arguments or argue that Petitioner fails to show that any of these challenged claims are anticipated by Howell-596. See PO Resp. 1–39; Pet. Reply 2.

1. Overview of Howell-596

Howell-596 discloses an electronic circuit within eyewear that allows a user to monitor its exposure to radiation, such as ultraviolet or infrared radiation or light. Ex. 1004, code (57).

We reproduce Figure 1 of Howell-596 below.

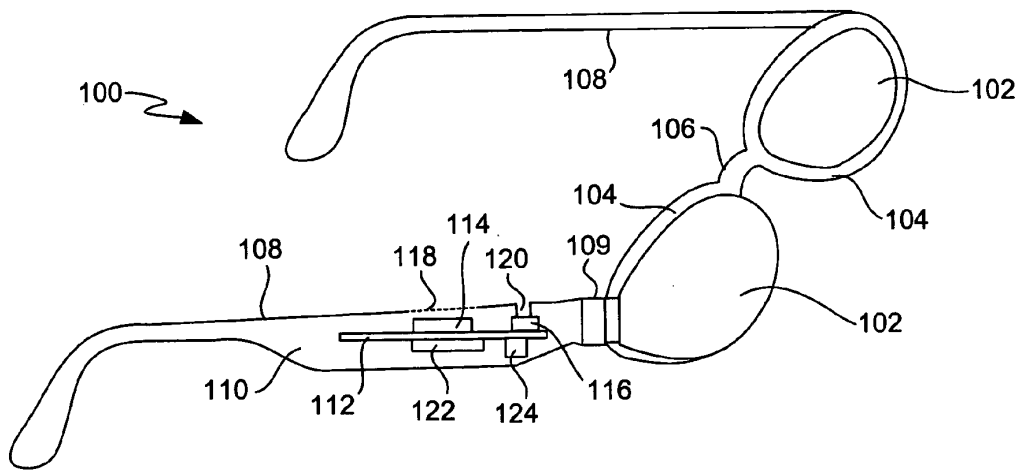


Figure 1 shows “a perspective view of UV monitoring glasses according to one embodiment of the invention.” Ex. 1004 ¶ 15. Figure 1 depicts glasses 100 that include a frame having lens holders 104 and a pair of temples 108.

¹⁰ We follow the approach used by the parties and use ground numbers to refer to the challenges in the order listed in the summary chart above. See Pet. 10 (listing Grounds 1–11).

Id. ¶ 73. Temples 108 include circuit board 112 within internal cavity 110. *Id.* Solar cell 114 and UV detector 116 are provided within cavity 110. *Id.* Circuitry 122 and display device 124 may be coupled to circuit board 112. *Id.*

Howell-596 discloses embodiments that include further details of module housings. In one embodiment, module housing 1700 houses UV detection system 1500 that includes UV sensor 1506, electrical circuitry 1508, display device 1510, and power supply 1504, such as a solar cell. Ex. 1004 ¶¶ 184, 194, Fig. 17A. Module housing 1700 may include vents or holes so that air can circulate through the housing, or, “[a]lternatively, the module housing 1700 does not include vents or holes, so as to be water-resistant or water-proof.” *Id.* ¶ 194. Howell-596 states that module housing 1700 is “placed into an opening, cavity or container of an eyewear housing, such as a temple region of the eyewear housing.” *Id.* ¶ 195. In one embodiment, eyewear housing 1720 has an opening, cavity or container 1721 for receiving the module housing 1700, with module housing 1700 contained by the eyewear housing 1720. *Id.* ¶ 196, Fig. 17B.

2. Petitioner’s Anticipation Arguments and Evidence

Petitioner argues that Howell-596 discloses every limitation of claims 1, 9, 10, 14, 15, and 18, and points to specific portions of Howell-596 and expert testimony to support its arguments. *See* Pet. 10–20 (citing Ex. 1002; Ex. 1003). We have reviewed the evidence and arguments of record and find that Petitioner has shown, by a preponderance of the evidence, that the limitations in claims 1, 9, 10, 14, 15, and 18 are disclosed by Howell-596 for

the reasons set forth in the Petition, which we adopt as our own. *See id.*¹¹ Accordingly, we find that Petitioner has established, by a preponderance of the evidence, that Howell-596 anticipates claims 1, 9, 10, 14, 15, and 18.

E. Obviousness Based on Howell-596 (Ground 2)

Petitioner argues that Howell-596 alone renders claims 1, 2, 6–10, 13–16, and 18 obvious. Pet. 20–29. Petitioner’s challenge here incorporates by reference many aspects of its anticipation challenge to an overlapping set of claims based on Howell-596. *See id.* Patent Owner raises specific arguments against the challenges to claims 13 and 16, but does not separately address Petitioner’s challenge to claims 1, 2, 6–10, 14, 15, and 18. PO Resp. 16–39; Pet. Reply 2. We first address the undisputed claims and then address the disputed challenges to claims 13 and 16.

1. Claims 1, 2, 6–10, 14, 15, and 18

Petitioner argues that claims 1, 2, 6–10, 14, 15, and 18 would have been obvious based on Howell-596. *See* Pet. 20–28. Patent Owner does not address these assertions or argue that Petitioner fails to prove that claims 1,

¹¹ Aside from adopting Petitioner’s arguments and evidence as our own, we do not set forth separate formal findings as to Petitioner’s undisputed assertions. *See In re NuVasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016) (“Although the Board did not make findings as to whether any of the other claim limitations . . . are disclosed in the prior art, it did not have to: NuVasive did not present arguments about those limitations to the Board. . . . The Board . . . was not required to address undisputed matters.”); Paper 14, 10–11 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.” (emphasis removed)).

2, 6–10, 14, 15, and 18 would have been obvious based on Howell-596. *See* PO Resp. 16–39.

We have reviewed the evidence and arguments of record and find that Petitioner has shown, by a preponderance of the evidence, that claims 1, 2, 6–10, 14, 15, and 18 would have been obvious based on Howell-596 for the reasons set forth in the Petition, which we adopt as our own. *See* Pet. 20–28.

2. Claim 13

Claim 1 recites “a sealed moisture resistant module” while claim 13, which depends from claim 1, further recites that “the module is hermetically sealed.” Ex. 1001, 11:30, 11:65–66. The parties dispute the meaning of “hermetically sealed” and whether Howell-596 discloses the limitation. We address each issue in turn.

a. Whether “Hermetically Sealed” Encompasses Waterproof Seals That Are Not Airtight

Petitioner argues that “Howell-596 discloses that the module may be waterproof” and that, “[f]or the same reasons, a POSITA would have understood Howell-596 to disclose that the module is hermetically sealed.” Pet. 28. Petitioner further asserts that “[s]omething that is hermetically sealed is sealed so as to be airtight.” *Id.* (citing Ex. 1002 ¶ 103; Ex. 1010, 269). Petitioner contends that the ’483 patent supports its position that “hermetically sealed” encompasses waterproof seals because it “treats hermetically sealing as conventional and equivalent to waterproofing.” Pet. Reply 14–15 (citing Ex. 1001, 6:47–53, 9:15–18, 10:47–50). In its post-hearing brief, Petitioner argues that, because “the ’483 patent provides no particular definition or guidance, the term should not be given a special construction and should instead be afforded its plain and ordinary meaning in the context of the ’483 patent,” which, in Petitioner’s view, “include[s]

being waterproof” as well as “airtight.” Pet. Post-hearing 1–2. Petitioner acknowledges that “[o]utside the context of the ’483 patent, a hermetic seal is sometimes equated with an airtight seal[,] . . . [b]ut the ’483 patent does not mention ‘air’ or ‘airtight,’ nor does it describe protecting the module against anything other than liquid or water.” *Id.* at 2–3 (citing Ex. 1002 ¶ 103; Ex. 1010, 269); *see also* Pet. Post-hearing Reply 1–2. Petitioner also criticizes Patent Owner’s proposed construction as lacking support in the intrinsic evidence. Pet. Post-hearing 3.

Patent Owner asserts that “the parties agreed that a ‘hermetic seal’ refers to an airtight seal” and that “a POSITA would have understood that an airtight seal provides a higher degree of protection than a waterproof seal; in other words, an airtight seal is often waterproof, but the reverse is not necessarily true.” PO Sur-reply 16 (citing Pet. 28; Ex. 1002 ¶ 103; Ex. 1010, 269); PO Resp. 30 (citing Ex. 2019 ¶ 95). Patent Owner further contends that Petitioner fails to rebut Dr. Oliver’s testimony “that a POSITA would have understood an airtight seal provides a higher degree of protection than a waterproof seal.” PO Sur-reply 16 (citing Ex. 2019 ¶¶ 95–97; Ex. 2022, 2, 4). Patent Owner asserts that the relevant portions of the specification “are consistent with Dr. Oliver’s testimony.” *Id.* at 16–17 (citing Ex. 1001, 6:47–53, 9:15–18, 10:47–50). Patent Owner argues in its post-hearing brief that Petitioner’s argument “that a ‘hermetically sealed’ module need not be impervious to air” contradicts the Petition, the experts, and the intrinsic and extrinsic record. PO Post-hearing 1–2 (citing Pet. 1, 28; Ex. 1002 ¶ 103; Ex. 1010, 269; Ex. 2019 ¶¶ 95–97). Patent Owner also argues that both the specification and other claims “confirms that waterproof

and hermetic seals are distinct.” *See id.* at 2–3; *see also* PO Post-hearing Reply 1–2.

The dispute concerns whether the claimed “hermetically sealed” module requires an “airtight” module, and whether a waterproof module satisfies the “hermetically sealed” requirement. As an initial matter, we note that the parties agree that “airtight” and “waterproof” generally mean two different things because, as Patent Owner puts it, “while an airtight seal is often waterproof, the reverse is not necessarily true” because “water molecules are larger than air molecules.” PO Sur-reply 16 (citing Ex. 2019 ¶¶ 95–97; Ex. 2022, 2, 4); Pet. Post-hearing 1–2 (arguing that the plain and ordinary meaning of “hermetically sealed” “include[s] being waterproof” and “*also encompasses* airtight seals” (emphasis added)). The parties dispute whether “hermetically sealed” encompasses a merely waterproof, but not airtight, module.

For several reasons, we agree with Patent Owner that the claimed “hermetically sealed” module does not encompass waterproof modules that are not airtight. First, as Petitioner admits, as a general matter, “[s]omething that is hermetically sealed is sealed so as to be airtight.” Pet. 28 (citing Ex. 1002 ¶ 103; Ex. 1010, 269); PO Sur-reply 16. Petitioner later tries to argue that the specification puts a different spin on this meaning, but still acknowledges that “[o]utside the context of the ’483 patent, a hermetic seal is sometimes equated with an airtight seal.” *See* Pet. Post-hearing 2–3 (citing Ex. 1002 ¶ 103; Ex. 1010, 269). Based on our review of the record, the “ordinary meaning” of “hermetically sealed” means “airtight,” and, as noted above, “airtight” is not the same thing as “waterproof.”

Second, the claims support Patent Owner’s position by including dependent claims that separately claim a “hermetically sealed” module (claims 13 and 32) and a “waterproof” module (claims 15 and 34), strongly suggesting that the terms have a different scope to avoid rendering some claims redundant. *See* Ex. 1001, 11: 65–66, 12:3–4, 12:52–53, 12:55–56. Petitioner argues in its Post-hearing brief that claims requiring waterproof modules are “a narrower species” of hermetic seal, but fails to explain how hermetic, airtight, and waterproof seals would not fall within the scope of both claims using its approach. Pet. Post-hearing Reply 2. Petitioner’s earlier argument in its Reply also seems to cut against this position by asserting that the specification “treats hermitically sealing as conventional and *equivalent to waterproofing*,” with different dependent claims directed to two allegedly “equivalent” terms making little sense. Pet. Reply 14 (emphasis added). The most natural reading of the claim language suggests that “hermetically sealed” means airtight, and does not encompass modules that are waterproof but not airtight.

Third, while the specification does not define “hermetically sealed” and uses “waterproof” and “hermetically sealed” in similar contexts, it does not suggest that “hermetically sealed” does not require an airtight seal consistent with its ordinary meaning. *See* Pet. Reply 14–15 (citing Ex. 1001, 6:47–53, 9:15–18, 10:47–50). Instead, the specification states that hermetic seals prevent water from contacting electronics, which remains consistent with Patent Owner’s position because airtight hermetic seals are also waterproof. *See* Ex. 1001, 6:47–53, 9:15–18. The specification also states that “[t]he module preferably houses any of the aforementioned electrical components in a substantially water-proof and wear resistant/moisture

resistant environment *and is preferably hermetically sealed.*” *Id.* at 10:47–50 (emphasis added). This passage supports Patent Owner’s position by suggesting that the preferable “hermetically sealed” module goes beyond mere water resistance. *See* PO Sur-reply 16–17.

Based on the foregoing, we decline to adopt Petitioner’s position that the “hermetically sealed” module of claim 13 encompasses waterproof modules that are not airtight.

b. Whether Howell-596 Discloses a “Hermetically Sealed” Module

Petitioner contends that “Howell-596 contrasts its waterproof arrangement without vents or holes with one that ‘include[s] one or more vents or holes *so that air can circulate through the module housing 1700.*’” *Id.* (citing Ex. 1003 ¶ 194). According to Petitioner, a “POSITA would have understood that in Howell-596’s configuration that does not include vents or holes, air could not circulate through the module (and thus it would be airtight)” and that “Howell-596 discloses, or at least suggests, that the module is hermetically sealed.” *Id.* at 28–29 (citing Ex. 1002 ¶ 103). Petitioner asserts that Howell-596 discloses a hermetically sealed module under either parties’ construction because it describes its module as waterproof and airtight due to the lack of vents or holes. Pet. Post-hearing 3–4 (citing Ex. 1002 ¶ 103; Ex. 1003 ¶ 194). Petitioner also argues that Howell-596’s optional opening 1706 would not be present in its embodiment that lacks any holes, and that it need not rely on inherency for this limitation because Howell-596 expressly discloses the limitation to a POSITA. Pet. Post-hearing Reply 2–3 (citing Ex. 1002 ¶ 103).

Patent Owner argues that “in Howell-596’s configuration that does not include vents or holes, the resulting module is water-resistant or

waterproof, not hermetically sealed as Petitioner contends.” PO Resp. 29–30 (citing Ex. 1003 ¶ 194; Ex. 2019 ¶ 94). Patent Owner contends that Howell-596’s module contains opening 1706 even in the embodiment suggesting that it lacks vents or holes, and that opening prevents it from being airtight. PO Post-hearing 4 (citing Ex. 1003 ¶ 194, Fig. 17A). Patent Owner also contends that a module lacking vents or holes may not be airtight. *Id.* at 4–5 (citing Ex. 1002 ¶ 103; Ex. 2019 ¶ 95); *see also* PO Post-hearing Reply 2–3 (same).

We first note that we disagree with Patent Owner’s suggestion that the entire dispute turns on whether hermetically sealing and waterproofing are equivalent. *See* PO Sur-reply 16. The Petition goes beyond mere reliance on Howell-596’s use of the term “waterproof” and contends that “Howell-596 contrasts its waterproof arrangement without vents or holes with one that ‘include[s] one or more vents or holes so that air can circulate through the module housing 1700.’” Pet. 28 (citing Ex. 1003 ¶ 194). By describing a module without vents or holes, Howell-596 supports Petitioner’s position that a “POSITA would have understood that in Howell-596’s configuration that does not include vents or holes, air could not circulate through the module (and thus it would be air-tight)” and that “Howell-596 discloses, or at least suggests, that the module is hermetically sealed.” *Id.* at 28–29 (citing Ex. 1002 ¶ 103; Ex. 1003 ¶ 194).

Patent Owner argues that Howell-596’s embodiment lacking vents or holes would still allow air in, but does not adequately explain how this would occur, and we find Petitioner’s interpretation of Howell-596 more persuasive. *See* PO Resp. 29–30 (citing Ex. 2019 ¶ 94); PO Post-hearing 4–5; PO Post-hearing Reply 2–3. Patent Owner also contends that because

Howell-596 describes its module that lacks vents and holes as waterproof, that it “does not provide an airtight or hermetic seal,” but, as noted above, if Howell-596’s module without vents or holes is airtight, it could also be described as waterproof. *See* PO Post-hearing 4. Accordingly, while we agree with Patent Owner that Howell-596 does not explicitly state that its module is airtight, that does not rebut Petitioner’s position that a POSITA “would have understood” that the embodiment without vents or holes would be airtight. *See* Pet. 28–29; Ex. 1002 ¶ 103. In addition, the lack of detail about the manner in which to make a module airtight in Howell-596 mirrors the approach taken by the ’483 patent specification, which does not provide any details about its hermetically sealed module and treats such a seal as a known option in the art. *See* Pet. Reply 15–16. Patent Owner also suggests that Howell-596 retains opening 1706 in its embodiment that lacks vents or holes because Howell-596 does not expressly suggest eliminating that opening, but we view that as a convoluted interpretation of Howell-596. *See* PO Post-hearing 4 (citing Ex. 1003 ¶ 194, Fig. 17A). Howell-596 clearly contrasts its embodiments having vents or holes, including opening 1706, with an alternative embodiment that lacks any such vents or holes. *See* Ex. 1003 ¶ 194.

Based on the foregoing, we find that Petitioner establishes by a preponderance of the evidence that Howell-596 teaches or suggests the hermetically sealed module required by claim 13. Accordingly, we determine that claim 13 would have been obvious based on Howell-596.¹²

¹² Although we need not reach Petitioner’s additional argument that a hermetic seal would have been obvious to add and advantageous, we find the argument persuasive and supported by the specification’s treatment of

3. Claim 16

Claim 16 depends from claim 1 and further recites a module that “is substantially wear resistant.” Ex. 1001, 12:5–6. Petitioner argues that a “POSITA would have understood ‘wear resistant’ to mean resistant to deterioration from damage caused by relative motion between the module and another surface.” Pet. 29 (citing Ex. 1002 ¶ 104). Petitioner also contends that “Howell-596 discloses this limitation because it discloses that ‘[t]he module housing 1700 protects the module.’” *Id.* (citing Ex. 1003 ¶ 195). According to Petitioner, a “POSITA would have understood this disclosure to mean that the module housing (e.g., the outer portion of the module) protects the inner portions of the module from damage and is thus wear resistant.” *Id.* (citing Ex. 1002 ¶ 104). According to Petitioner, module housing 1700 would also “protect the inner components from damage caused by motion relative to another surface, such as eyewear housing 1720.” Pet. Reply 17 (citing Ex. 1003 ¶ 195, Fig. 17B).

Patent Owner does not disagree with Petitioner’s proposed interpretation of the claim, but argues that “equating the protective function of a housing with being wear resistant contradicts Petitioner’s own definition

hermetic seals as already known in the art. *See* Pet. 29 (citing Ex. 1002 ¶ 103); Ex. 1002 ¶ 103 (opining that a POSITA “would have known to hermetically seal the module for a variety of reasons, for example, to keep the components clean, dust-free, etc.”); Pet. Reply 15–16; PO Resp. 30 (citing Ex. 2019 ¶ 95) (arguing that airtight seals cost more and would undermine the motivation “to replace the watertight seal with an airtight one”); PO Sur-reply 17 (arguing without elaboration that a hermetic seal would have been unnecessary “within Howell-596’s specific application”); PO Post-hearing 5 (arguing that the obviousness argument comes too late for the “first time” in Petitioner’s Reply, but not acknowledging that Patent Owner argued against the argument in its Response to the Petition).

of wear resistant” and that “mere disclosure of a protective housing does not imply that the housing is wear resistant.” PO Resp. 31–32 (citing Ex. 2019 ¶ 102). According to Patent Owner, a housing may protect a module from various forms of damage that are not “cause by relative motion between a module and another surface” and therefore Howell-596 fails to disclose a wear resistant module. *Id.* at 32 (citing Ex. 2019 ¶ 102). In its Sur-reply, Patent Owner argues that “because Howell-596’s module ‘is fixed within the eyewear frame,’ a POSITA would not have expected the housing to have any ‘relative motion... with another surface’ and, therefore, would not understand a need for wear resistant housing.” PO Sur-reply 19 (citing Ex. 1002 ¶ 102). Patent Owner asserts that Dr. Feland’s contrary opinion rests on speculation. *See id.*

We begin our analysis with the claim language and apply Petitioner’s interpretation of “wear resistant,” which means “resistant to deterioration from damage caused by relative motion between the module and another surface.” Pet. 29 (citing Ex. 1002 ¶ 104). Although we apply this meaning, we note that the claim does not specify what type of or how much wear the module must resist, and Petitioner’s proposed meaning does not specify any specific type or frequency of relative motion between the module and another surface. *See id.*

With that claim interpretation in mind, we find that Petitioner establishes that Howell-596 discloses a “substantially wear resistant” module as required by claim 16 because, as Petitioner notes, it expressly notes that its “module housing 1700 protects the module.” Ex. 1003 ¶ 195. As to the possibility of relative motion between module 1700 and another surface, Petitioner persuasively points to Howell-596’s Figure 17B, which

shows another surface directly adjacent to and surrounding module housing 1700. *See* Pet. Reply 16–17 (citing Ex. 1003 ¶ 195, Fig. 17B). Figure 17B shows eyewear housing 1720 surrounds module housing 1700 within it such that the surfaces of module housing 1700 and eyewear housing 1720 are next to one another, if not touching. *See* Ex. 1003, Fig. 17B. We credit Petitioner’s arguments and evidence on this point because such a “housing-within-a-housing” arrangement could lead to relative motion between the housings, and Howell-596’s statement that module housing 1700 “protect[s]” the module supports Petitioner’s position that such protection would include preventing damage from any relative motion with the surrounding eyewear housing 1720. *See* Ex. 1003 ¶ 195, Fig. 17B.

We have reviewed Patent Owner’s arguments as to claim 16, but find them unpersuasive in comparison to Petitioner’s arguments and evidence. *See* PO Resp. 31–32; PO Sur-reply 19. Patent Owner argues that the protection afforded by Howell-596’s module housing does not include protection from any relative motion, but Patent Owner does not persuasively argue that no such motion will occur. *See id.* For example, Patent Owner argues that the fixed nature of the module within the frame suggests that no motion will occur, but Patent Owner does not address Petitioner’s reliance on Howell-596’s Figure 17B and the fact that module housing 1700 fits snugly within eyewear housing 1720 such that wear due to relative motion appears likely if not certain. *See* PO Sur-reply 19. Patent Owner’s arguments also fail to acknowledge that apparatus claim 16 merely requires a substantially wear resistant module, and a module that resists wear may satisfy the limitation even if not actively resisting wear from adjacent structures at all times.

Based on the foregoing, we find that Petitioner establishes by a preponderance of the evidence that Howell-596 teaches or suggests the “substantially wear resistant” module required by claim 16. Accordingly, we determine that claim 16 would have been obvious based on Howell-596.

F. Obviousness Based on Howell-596 and Howell-833 (Ground 3)

Petitioner argues that the combination of Howell-596 and Howell-833 renders claims 19, 20, 24–28, 31–35, and 37 obvious. Pet. 30–34. Petitioner’s challenge here incorporates by reference many aspects of its anticipation challenge based on Howell-596. *See id.* at 31–34.

Patent Owner raises specific arguments against the challenge to independent claim 19, and argues that Petitioner’s challenge to claims 20, 24–28, 31–35, and 37, which all depend from claim 19, fail for the same reasons. PO Resp. 33–39. We provided an overview of Howell-596 above. We first provide an overview of Howell-833 and then address the disputed challenge to claim 19.

1. Overview of Howell-833

Howell-833 discloses techniques for integrating electronic components into eyewear frames. Ex. 1004, code (57). Howell-833 states that electronic components “can be partially or completely internal to eyewear” and can be provided “without having to substantially compromise aesthetic design principles of the eyewear.” *Id.*

We reproduce Figure 1 of Howell-596 below.

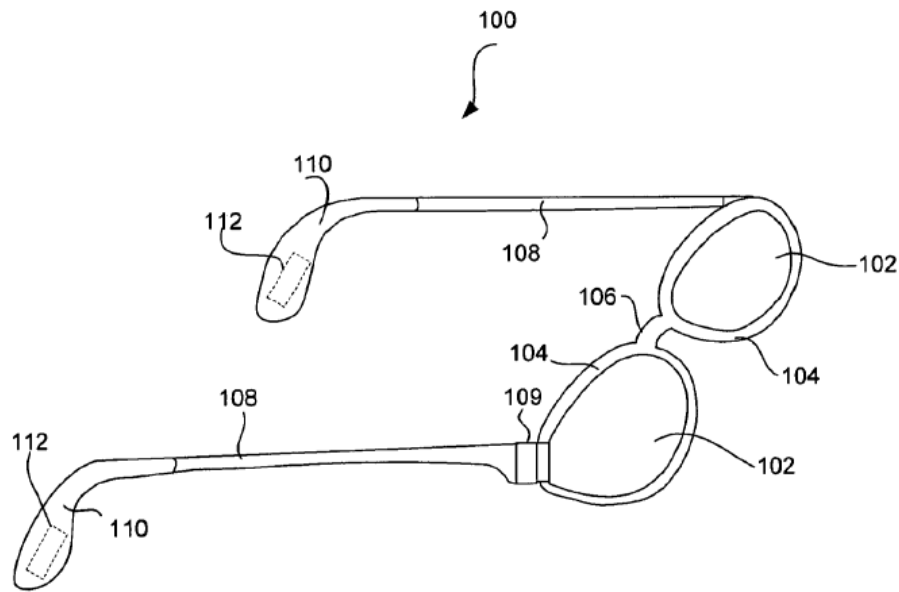


FIG. 1

Figure 1 shows a perspective view of glasses 100 having a frame that includes bridge 106 and temples or arms 108. Ex. 1004, 4:16–17, 5:66–6:5. Figure 1 also depicts lens holders 104 coupled to temples 108 at hinge 109. *Id.* at 5:5–7. One end of temples 108 includes temple arrangement 110 that includes one or more electrical components 112. *Id.* at 6:9–12. Howell-833 states that glasses 100 may not have any other electrical components within the frame other than those in temple arrangements 110, or glasses 100 may “include one or more other electrical components embedded or attached to the frame of the glasses 100 and the components are electrically coupled to the one or more electrical components 112 in one or both of the temple arrangements 110.” *Id.* at 6:26–34.

Howell-833 describes a number of different electrical components. *See* Ex. 1004, 16:11–18:38. The potential components include sensors, such as temperature sensors, speed sensors, a pressure detector, “or a detector for radiation, such as an ultraviolet (UV) detector.” *Id.* at 16:59–17:2. Howell-

833 also describes various “being worn” sensors that indicate “whether the glasses are being worn by the user,” including “a thermal sensor, a motion detector, a stress sensor or a switch.” *Id.* at 17:39–43.

2. Claim 19

Independent claim 19 includes many of the same limitations as claim 1. *See* Ex. 1001, 11:28–37, 12:13–21. For the common limitations, Petitioner incorporates its arguments and evidence that Howell-596 anticipates claim 1. *See* Pet. 31 (citing Ex. 1002 ¶ 106). For the limitation in claim 19 requiring a module “disposed, at least partially, on a portion of the frame configured to be [sic, “be”] behind the ear of a wearer of the eyewear,” Petitioner argues that “Howell-833 discloses several different locations on an eyewear frame where electronics could be placed, including “behind the user’s ear.” *Id.* (citing Ex. 1002 ¶ 107; Ex. 1004, 21:41–22:2, Figs. 1, 10A–10C). Patent Owner does not argue that Petitioner’s combination fails to disclose any of the limitations of claim 19, and instead focuses its argument on Petitioner’s motivation to combine analysis. *See* PO Resp. 33–37. Accordingly, we focus on the motivation to combine issue.

Petitioner asserts that a “POSITA would have been motivated to place Howell-596’s sealed module on the temple at least partially behind the wearer’s ear in view of Howell-833 for several reasons.” Pet. 31. Petitioner’s reasons include (1) Howell-833 touts benefits of the location such as a reduction in “impact to the design of the eyeglasses” and a POSITA would also see the location as improving “the balance of the eyewear”; (2) “attaching components to or embedding components within an eyewear frame behind the ear of a wearer was well-known, leading a POSITA to reasonably expect success in the modification”; (3) the

combination represents nothing more than the simple addition of one known element or technique to another known element or technique to obtain predictable results; and (4) “that placement represents a choice from a finite number of identified, predictable solutions (e.g., in front of or behind the wearer’s ear), each of which would have been obvious to try.” *Id.* at 31–33 (citing Ex. 1002 ¶¶ 108–113). Petitioner also asserts that Howell-596 discloses a sensor behind the ear of a user and Howell-833 teaches a UV sensor in the same position, undermining Patent Owner’s argument that such a location would not work for a UV sensor. Pet. Reply 18–20 (citing Ex. 1003 ¶ 205, Fig. 21; Ex. 1004, 9:59, 16:66–17:2, 18:9–11, Figs. 1, 4). Petitioner also asserts that the ’483 patent acknowledges that placing electronics at the end of the temple was already known, supporting Petitioner’s obvious to try argument. *See id.* at 21–22 (citing Ex. 1001, 2:18–23; Ex. 1002 ¶ 113; Ex. 2019 ¶ 21; Ex. 2024, 14:6–18, 21:8–22:5).

Patent Owner notes that Petitioner relies on Howell-596’s UV detection system to satisfy the “sealed module limitation of claim 19,” and asserts that locating that module “behind the ear of the wearer would render the resulting system unfit for its intended purpose, i.e., detecting the level of UV radiation.” PO Resp. 34 (citing Ex. 2019 ¶¶ 108–110). Patent Owner also argues that (1) “a POSITA would not have been motivated to place only a portion of the UV detection system of Howell-596 behind a user’s ear”; (2) Petitioner’s reasoning fails to “address the undesirable effect of the proposed combination” or that the combination “would render the resulting system unfit for its intended purpose of UV detection”; and (3) the combination “would not lead a POSITA to ‘reasonably expect success,’ . . . because the proposed modification would likely inhibit UV sensing or

contradict the express teaching of Howell-596.” *Id.* at 35–37 (citing Ex. 2019 ¶¶ 111–115); *see also* PO Sur-reply 21 (citing Ex. 1003, code (57)) (raising similar arguments). Patent Owner also argues that “being worn” sensors in the references do not show that a UV radiation exposure sensor would work for its intended behind the ear of a user. PO Sur-reply 21–22 (citing Ex. 1003 ¶ 205, Fig. 21). As to Petitioner’s obvious to try argument, Patent Owner asserts that it would not be obvious to try a location that would render Howell-596’s UV detection system “unworkable.” *Id.* at 23–24.

We begin our analysis by noting the important points of agreement between the parties. First, Petitioner does not dispute Patent Owner’s argument that Petitioner relies on Howell-596’s module housing 1700, which contains a UV detection system, to satisfy the “sealed module limitation of claim 19.” PO Resp. 34 (citing Ex. 2019 ¶¶ 108–110); Pet. 15 (citing Ex. 1002 ¶ 61; Ex. 1003 ¶¶ 194–195), 31; Ex. 1003 ¶ 194 (“[M]odule housing 1700 can operate as a housing for the UV detection system 1500.”); Pet. Reply 17–22. This comports with Petitioner’s reliance on Howell-596’s module housing 1700 to meet the “sealed moisture resistant module” limitation in claim 1, and Petitioner’s incorporation of that argument into its analysis of the same limitation in claim 19. *See* Pet. 15, 31. Second, Petitioner does not dispute Patent Owner’s assertion that Howell-596’s UV detection system 1500 requires exposure to light in order to operate properly. *See* PO Resp. 34 (citing Ex. 2019 ¶¶ 108–110); Pet. Reply 17–22. Third, Petitioner does not dispute that its proposed combination requires locating Howell-596’s module housing 1700 at least partially behind a user’s ear. *See* Pet. 15, 31.

Based on these undisputed points and the parties' arguments, we agree with Patent Owner that Petitioner fails to establish that a POSITA would have been motivated to locate Howell-596's module housing 1700, which contains its UV detection system 1500, behind a user's ear. Petitioner never squarely addresses the fact that placing Howell-596's UV detection system behind a user's ear would negatively impact its performance. Pet. 31–33; Pet. Reply 17–22. As a result, even if we accept Petitioner's arguments and evidence as to the various advantages when placing electronics behind a user's ear, it fails to establish a motivation to combine that requires placing Howell-596's module housing 1700, and therefore its UV detection system, behind a user's ear. Petitioner never acknowledges the readily apparent disadvantages of placing a UV detection system behind the ear, where it may not work at all. *See* Pet. 31–33. Nor does Petitioner argue that, in its combination, adjustments would be made to ensure accurate operation of Howell-596's UV detection system. *See id.*

Similarly, Petitioner notes that both Howell-596 and Howell-833 disclose UV sensors behind the ear of a user, but those teachings do not establish that placing Howell-596's module behind the ear would ensure proper operation of its UV detection system housed within that module. *See* Pet. Reply 17–22. Instead, even though Howell-596 discloses a sensor behind the ear of a user, it maintains the UV detection system in a module toward the front of the temple, away from the ear. *See id.* at 18–19; PO Sur-reply 21–22; Ex. 1003 ¶ 205 (describing UV detection system 2102), Fig. 21 (showing UV detection system 2102 toward the front of the temple). Moreover, Petitioner's reliance on the sensor placed behind the ear of the user in Howell-596 lacks weight because that sensor merely indicates that

the device “is being worn by a user,” which serves a very different purpose than Howell-596’s UV detection system, which seeks to monitor a user’s exposure to UV radiation, a central purpose of Howell-596’s eyewear. *See* Ex. 1003 ¶ 205, code (57). Howell-833 also employs a UV sensor behind the ear, but Petitioner does not establish that it operates any differently than the “being worn” sensor in Howell-596, and therefore does not establish that Howell-596’s UV detection system would still work for its intended purposes in Petitioner’s proposed combination. *See* Pet. Reply 19–20.

Finally, although the parties address the breadth of the limitation that only requires a module “disposed, *at least partially*, on a portion of the frame . . . behind the ear of a wearer of the eyewear,” that does not impact our analysis here. *See* Ex. 1001, 12:19–21; Pet. 31; PO Resp. 35–36; Pet. Reply 20–21; PO Sur-reply 22–23. Petitioner states that “neither claim 19 nor the Petition’s combination requires that ‘only a portion,’ and not the entirety, of the module be disposed behind the ear” and that “this limitation is satisfied regardless of whether the module is entirely or only partially disposed behind the ear.” Pet. Reply 20–21. Petitioner does not argue that its combination places Howell-596’s module “partially” on a portion of the frame behind the ear and partially away from the ear to allow adequate access to the UV detection system, which may allow that system to operate as intended without being blocked. *See id.*; *see also* PO Sur-reply 22–23 (“Petitioner also seems to argue that the entirety of the alleged electronic module would be disposed behind the wearer’s ear. If that is true, then there is no question the UV detection system would be incapable of functioning as intended since it would be blocked by the wearer’s ear (and/or hair) and incapable of detecting UV radiation.” (citations omitted)).

Based on the foregoing, we are not persuaded a POSITA would have been motivated to combine Howell-596 and Howell-833 in the manner Petitioner proposes to meet all of the limitations of claim 19. Although a POSITA may have been motivated to place a UV sensor behind the ear for various reasons, or that it would have been obvious to try such a location, those arguments and evidence fail to establish that Howell-596's UV detection system, which requires the ability to measure and monitor total UV radiation exposure, would work for its intended purpose if located behind the ear in Howell-596's module. Accordingly, Petitioner fails to prove by a preponderance of the evidence that the combination of Howell-596 and Howell-833 renders claim 19 obvious. For the same reasons, Petitioner fails to prove that claims 20, 24–28, 31–35, and 37, which all depend from claim 19, would have been obvious based on Howell-596 and Howell-833 for the same reasons.

*G. Obviousness Based on Howell-596, Howell-833, and Blum-741
(Ground 4)*

Petitioner argues that claims 4, 5, 7, 17, 22, 23, 25, and 36 would have been obvious based on Howell-596, Howell-833, and Blum-741. *See* Pet. 34–43. Claims 4, 5, 7, and 17 ultimately depend from claim 1, while claims 22, 23, 25, and 26 ultimately depend from claim 19. *See* Ex. 1001, 11:45–12:41. Petitioner's challenges to these claims rely upon previous challenges in Grounds 2 and 3. *See* Pet. 34.

Patent Owner does not address Petitioner's arguments with respect to claims 4, 5, 7, and 17. *See* PO Resp. 16–39; Pet. Reply 2. Patent Owner does not specifically address the challenge to claims 22, 23, 25, and 36, but implicitly argues against the challenge to claims 22, 23, 25, and 36 based on

their dependency from claim 19 and the fact that this Ground 4 incorporates Petitioner's analysis from Ground 3, which we found unpersuasive. *See* Pet. 34; PO Sur-reply 25 (arguing that due to its arguments as to claim 19, Petitioner fails to meet its burden as to dependent claims 20–37).

We have reviewed the evidence and arguments of record and find that Petitioner has shown, by a preponderance of the evidence, that the limitations in claims 4, 5, 7, and 17 are disclosed by the combination of Howell-596, Howell-833, and Blum-741 and that a POSITA would have been motivated to combine the references, for the reasons set forth in the Petition, which we adopt as our own. *See* Pet. 34–43. Accordingly, we find that Petitioner has established, by a preponderance of the evidence, that claims 4, 5, 7, and 17 would have been obvious over the combination of Howell-596, Howell-833, and Blum-741. In addition, because Petitioner's challenge to dependent claims 22, 23, 25, and 36 rely upon previous challenge to claim 19 in Ground 3, which we found unpersuasive, we determine that Petitioner fails to prove that claims 22, 23, 25, and 36 would have been obvious over the combination of Howell-596, Howell-833, and Blum-741 for the same reasons.

H. Obviousness Based on Howell-596, Howell-833, Blum-741, and Spitzer (Ground 5)

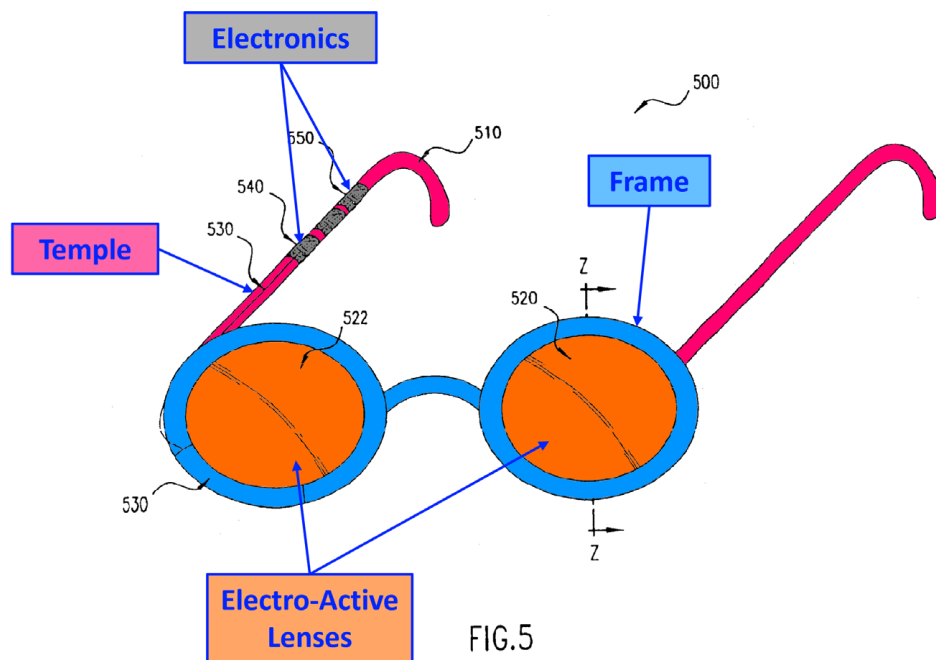
Petitioner argues that Howell-596, Howell-833, Blum-741, and Spitzer renders dependent claims 3 and 21 obvious. Pet. 43–46. Petitioner's challenge here incorporates by reference its challenge to claims 1 and 2 in Ground 2, which we found persuasive, and its challenge to claims 19 and 20 in Ground 3, which we found unpersuasive. *See* Pet. 44. In addition to relying on its previous arguments where applicable, Patent Owner raises

specific arguments against the challenge to claims 3 and 21. PO Resp. 16–24, 38.

We provided an overview of Howell-596 and Howell-833 above. We first provide an overview of Blum-741 and Spitzer and then address the disputed challenge to claims 3 and 21.

1. Overview of Blum-741 and Spitzer

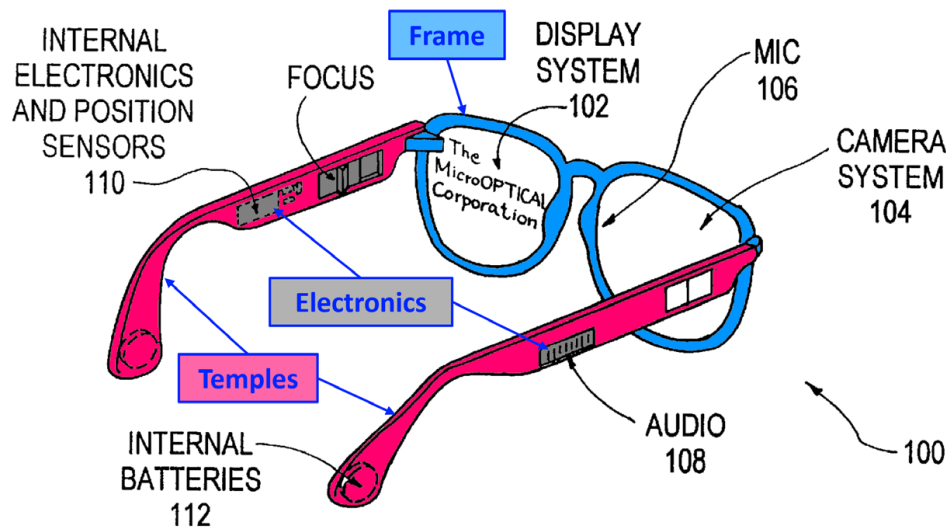
Blum-741 discloses eyewear having an electro-active lens system, including a controller and power source connected to the lenses. *See* Ex. 1005, 7:52–57, code (57). We reproduce Petitioner’s annotated version of Blum-741’s Figure 5 below.



Annotated Figure 5 shows a perspective view of eyewear 500 and includes labels for “Electronics” in a “Temple,” a “Frame,” and “Electro-Active Lenses” within the Frame. *See* Pet. 1; Ex. 1005, 7:52–53. Figure 5 depicts electro-active lenses 520, 522 “that are electrically coupled by connecting

wires 530 to electro-active eyewear controller 540 and power source 550.”
Ex. 1005, 7:53–57.

Spitzer discloses an electronic eyewear system with a display system, a camera system, and various sensors mounted on an eyeglass frame. Ex. 1007, code (57). We reproduce Petitioner’s annotated version of Spitzer’s Figure 1 below.



Annotated Figure 1 shows an isometric view of an eyeglass interface system that includes labels for a “Frame” and “Electronics” in each of two “Temples.” Pet. 4; Ex. 1007, 3:26–27. Spitzer describes electronic components located on various parts of an eyewear frame that may be connected via “flexible stranded insulated wire, flexible coaxial cable, or flexible circuitry based on Kapton or other polymeric material.” Ex. 1007, 7:44–60. Spitzer further states that such flexible circuitry may connect to an external device not mounted on the eyewear frame, such as one “placed in a pocket or worn on a belt.” *Id.* at 9:49–10:4.

2. Claim 3

Claim 2 depends from claim 1 and further requires “an electrical connector configured to connect” any two of a list of electrical components “with an external device,” while claim 3 depends from claim 2 and further recites that “the module is electrically connected to the external device by a flex circuit.” Ex. 1001, 11:38–44. Petitioner argues that “Spitzer discloses that components located on various parts of an eyewear frame, or external to the frame, may connected via “flexible circuitry based on Kapton or other polymeric material (e.g., a flex circuit).” Pet. 44 (citing Ex. 1002 ¶ 146; Ex. 1007, 7:44–60, 9:49–10:4). Patent Owner does not argue that Petitioner’s proposed combination fails to disclose any limitations of claim 3, but instead argues that a POSITA would not have been motivated to combine Howell-596 with the teachings of Blum-741 and Spitzer for several reasons. PO Resp. 17–24. Accordingly, we focus on the motivation to combine dispute.

Petitioner contends that a “POSITA would have been motivated to connect the sealed modules discussed in Grounds 2 and 3 to an external device mounted on the eyewear, such as Blum-741’s electro-active lenses (discussed in Ground 4), using a flex circuit in view of Spitzer.” Pet. 44 (citing Ex. 1002 ¶¶ 147–152). For example, Petitioner asserts that (1) “Spitzer discloses the benefits of flex circuits, including that they allow that ‘the position of [components] may be adjusted without strain to the leads’”; (2) “flex circuits were well-known in the art, leading a POSITA to reasonably expect success in the combination”; and (3) the modification represents nothing more than the simple addition of one known element or technique for another known element or technique to obtain predictable

results.” *Id.* at 45–46 (citing Ex. 1002 ¶¶ 148–152; Ex. 1007, 7:56–60, 9:60–61). Petitioner also argues that the fact that flex circuit may be more costly or complex does not undermine its obviousness challenge. Pet. Reply 3–4 (citing Ex. 1002 ¶¶ 148–152). Petitioner also argues that (1) Howell-596’s use of circuit boards does not teach against use of a flex circuit, and “Spitzer teaches the use of both printed circuits and flex circuits within a single implementation”; (2) Patent Owner “provides no evidence to establish that a flex circuit would have increased costs”; (3) Howell-596 discloses distributing electrical components in different parts of the frame that may benefit from flex circuits; and (4) the “references fall within the same field of electronic eyewear and address problems pertinent to the claimed invention.” *Id.* at 4–8 (citing Ex. 1002 ¶¶ 43–51, 54–55).

Patent Owner contends that “a POSITA would not have been motivated to incorporate Spitzer’s flex circuit into the combination of Howell-596 and Blum-741 because the flex circuit in Spitzer is either unnecessary and wasteful or inapplicable in Petitioner’s proposed combination.” PO Resp. 18 (citing Ex. 2019 ¶ 63). Patent Owner asserts that Spitzer’s embodiments employing a flex circuit to connect a transducer to a sliding mechanism or on a strap behind a user’s head have no applicability to the combination given that Howell-596 fixes components in place on a circuit board. *Id.* at 18–21 (citing Ex. 2019 ¶¶ 65–72). Patent Owner also argues that a POSITA would have recognized that Howell-596 and Blum-741 “are in different fields (i.e., radiation detection versus optics) and aim to solve different problems (i.e., UV detection versus vision correction with electro-active lenses),” resulting in a lack of motivation to combine the references. *Id.* at 22 (citing Ex. 2019 ¶¶ 74–75). As to

Petitioner's stated reasons for the combination, Patent Owner argues that they fail to take into account the "dissimilar environments" and "unrelated goals" of the references, and that Spitzer's benefits would not apply to the combination. *See id.* at 23–24 (citing Ex. 2019 ¶¶ 76–77). Patent Owner also argues that (1) Petitioner "oversimplifies Patent Owner's argument" as to expense of the flex circuit, and argues that case law merely holds that "expensive solutions should not necessarily be excluded"; (2) the flex circuit would offer no improvement or solution of any problem and would therefore be wasteful; and (3) Petitioner did not rely on the sensor in Howell-596's Figure 21 in its combination or distributing components around the eyewear. PO Sur-reply 4–9.

Based on our review of the arguments and evidence, we find Petitioner's motivation to combine arguments persuasive for several reasons. Notably, critical aspects of Petitioner's assertions are virtually unchallenged by Patent Owner, including (1) Spitzer expressly discloses the benefits of using flex circuits, including the reduction in strain on the leads; (2) "flex circuits were well-known in the art, leading a POSITA to reasonably expect success in the combination"; and (3) "such a modification represents nothing more than the simple addition of one known element (flex circuits as in Spitzer) to another known element (eyewear with electronic components as in Howell-596, Howell-833, and/or Blum-741) to obtain predictable results (electronic eyewear that connects components using flex circuits)." *See* Pet. 44–45 (citing Ex. 1002 ¶¶ 147–152). Spitzer supports these arguments and related expert testimony. *See* Ex. 1007, 7:56–60 (stating that when using flex circuits "the position of [components] may be adjusted without strain to the leads"); Ex. 1002 ¶¶ 148 (noting express benefits of flex circuits), 149

(noting that three references in the electronic eyewear prior art show how well-known flex circuits were in the art), 150 (stating that employing such circuits would have the simple addition of a known element to achieve predictable results).

We find Patent Owner’s arguments against the combination insufficient to undermine Petitioner’s showing here. First, as noted above, Patent Owner does not dispute the benefits and motivations at the core of Petitioner’s arguments. Flex circuits were well-known, with known advantages, and straightforward to implement with an expectation of success.

Second, Patent Owner’s argument that a POSITA would not be motivated to incorporate either of Spitzer’s two embodiments employing a flex circuit misses the mark. *See* PO Resp. 18–21 (citing Ex. 2019 ¶¶ 63–72). Petitioner does not base its motivation to combine argument on incorporating either of these embodiments and need not bodily incorporate entire embodiments from Spitzer in order to support its proposed combination. *See* Pet. 44–45; *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.”); *see also In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (“It is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements.”). In addition, Patent Owner does not argue or establish that the advantages of flex circuits only apply to Spitzer’s embodiments.

Third, Patent Owner asserts that a POSITA would not employ flex circuits because such an “unnecessary and wasteful or inapplicable” approach would lead to no benefits at all in Howell-596 given Howell-596’s decision to fix electronics in place on a circuit board. *See* PO Resp. 18–20; PO Sur-reply 5 (“[A] flex circuit would be *no improvement* and *no solution* due to the lack of movable or distributed components in Petitioner’s proposed combination.” (emphasis in original)). We are not persuaded that a known method of connecting electronic components in a more robust manner (by reducing strain on leads) would have no positive impact at all on Howell-596’s connections. Instead, we agree with Petitioner that the advantages of flex circuits touted in Spitzer itself would have *some* benefit in Howell-596 that would motivate their use. *See* Pet. 44–45; Pet. Reply 3–5.

We also find that Patent Owner’s argument against the use of flex circuits in Howell-596 lacks support because Howell-596 employs wires to connect electrical components that would benefit from flex circuits, and Spitzer itself teaches the use of printed circuits and flex circuits together. *See* Pet. Reply 4–6; Ex. 1003 ¶¶ 184, 205; Ex. 1007, 8:41–65.¹³ These

¹³ Relatedly, Patent Owner argues that Petitioner did not rely on Howell-596’s embodiment employing a sensor separated from its module in Figure 21 in the Petition. PO Resp. 6. But Petitioner was not required to identify every instance of the module in Howell-596 to establish that Howell-596 discloses the limitation. Even if the citations to Howell-596 are new, we view Petitioner’s arguments in its Reply as merely responsive to Patent Owner’s arguments in its Response rather than impermissible new argument. *See* PO Resp. 18–23; Pet. Reply 4–6. Although Petitioner’s reliance on Howell-596 in the manner lends further support to its arguments, we would arrive at the same conclusion on this issue even if Petitioner could not rely on Howell-596’s Figure 21.

disclosures support Petitioner’s proposed use of flex circuits when connecting Howell-596’s module to Blum-741’s electro-active lenses. *See* Pet. 44. Patent Owner does not meaningfully respond to Petitioner’s argument that Spitzer itself uses a flex circuit on printed circuits similar to Howell-596’s printed circuits. *See* PO Sur-reply 3–9. At best, Patent Owner points to potential disadvantages when adding a flex circuit to Howell-596 (arguably “wasteful” due to limited benefits), which does not meaningfully undermine Petitioner’s showing here. *See Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (“[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”).

Finally, Patent Owner argues that Howell-596 and Blum-741 “are in different fields (i.e., radiation detection versus optics) and aim to solve different problems (i.e., UV detection versus vision correction with electro-active lenses),” but does not argue that either falls into the category of non-analogous art. PO Resp. 22 (citing Ex. 2019 ¶¶ 74–75) (comparing the references to each other rather than to the ’483 patent as required in a non-analogous art argument); PO Sur-reply 8–9. We disagree with Patent Owner’s argument, whether framed as part of a motivation to combine analysis or non-analogous art argument. The ’483 patent and all of the references are in the same field of electronic eyewear and address similar problems when incorporating electronics into eyeglasses. *See* Pet. 11–14, 34–35, 43–44; Pet. Reply 7–8 (citing Ex. 1002 ¶¶ 43–51, 54–55; Ex. 1024, 25:18–27:13); Ex. 1001, 1:56–2:7. The fact that Howell-596’s electronic eyewear focuses on a UV detection system in the temple while Blum-741 focuses on electro-active lenses does not place them in entirely different

fields or fatally undermine Petitioner’s stated basis for its proposed combination.¹⁴

Based on the forgoing, we find that Petitioner proves by a preponderance of the evidence that a POSITA would have been motivated to combine Howell-596, Howell-833, Blum-741, and Spitzer. In addition, Patent Owner does not argue that Petitioner fails to establish that its proposed combination discloses the limitations of claim 3. *See* PO Resp. 16–24. We have reviewed the evidence and arguments of record and find that Petitioner has shown, by a preponderance of the evidence, that the combination of Howell-596, Howell-833, Blum-741, and Spitzer discloses the limitations in claim 3 for the reasons set forth in the Petition, which we adopt as our own. *See* Pet. 44. Accordingly, we determine that Petitioner proves by a preponderance of the evidence that claim 3 would have been obvious over Howell-596, Howell-833, Blum-741, and Spitzer.

3. *Claim 21*

Claim 21 depends from claim 20, which in turn depends from claim 19, with claim 21’s limitations mirroring those of claim 3. *See* Ex. 1001, 12:27–28. Petitioner argues that claim 21 would have been obvious over Howell-596, Howell-833, Blum-741, and Spitzer for the same reasons as claim 3. *See* Pet. 44–46. As part of its analysis, Petitioner incorporates by reference Ground 3 addressing claims 19 and 20, which we found unpersuasive. Because Petitioner’s challenge to claim 21 relies upon those

¹⁴ Because we find Petitioner’s showing persuasive for the reasons stated, we need not reach its additional “space saving” rationale for using Spitzer’s flex circuit in the proposed combination and Patent Owner’s belated counter-arguments appearing for the first time in its Sur-reply. *See* Pet. 45; PO Sur-reply 4.

unpersuasive challenges, we determine that Petitioner has not proven by a preponderance of the evidence that claim 21 would have been obvious over Howell-596, Howell-833, Blum-741, and Spitzer for the same reasons discussed above in the context of Ground 3.

I. Obviousness Based on Howell-596, Howell-833, and Ogren (Ground 6) and Howell-596, Howell-833, and Jannard-868 (Ground 7)

Petitioner argues that claims 11 and 29 would have been obvious based on Howell-596, Howell-833, and Ogren. Pet. 46–49. Claim 11 depends from claim 1 and claim 29 depends from claim 19. Ex. 1001, 11:61–62, 12:45–46. Both claims recite a module “included in a rimless frame.” *See id.* Petitioner also argues that claims 12 and 30 would have been obvious based on Howell-596, Howell-833, and Jannard-868. Pet. 49–52. Claim 12 depends from claim 1 and claim 30 depends from claim 19. Ex. 1001, 11:63–64, 12:47–48. Both claims recite a module “included in a hinge-less frame.” *See id.*

For the challenge to claims 11 and 12, Petitioner incorporates its analysis for Ground 2 addressing independent claim 1. *See* Pet. 47, 50. Petitioner argues that Ogren discloses the rimless frames required by claim 11 and that Jannard-868 discloses the hinge-less frames required by claim 12. *See id.* at 47, 50–51. Petitioner further asserts that a POSITA would have been motivated to include a sealed module as taught by Howell-596 in Ogren’s rimless frame and in Jannard-868’s hinge-less frame for a number of reasons. *See id.* at 48–49, 51–52. Patent Owner does not address Petitioner’s challenges to claims 11 and 12. *See* PO Resp. 16–39.

We have reviewed the evidence and arguments of record and find that Petitioner has shown, by a preponderance of the evidence, that the

combination of Howell-596, Howell-833, and Ogren discloses the limitations in claim 11 and that a POSITA would have been motivated to combine the references, for the reasons set forth in the Petition, which we adopt as our own. *See* Pet. 47–49. We also find that Petitioner has shown, by a preponderance of the evidence, that the combination of Howell-596, Howell-833, and Jannard-868 discloses the limitations in claim 12 and that a POSITA would have been motivated to combine the references, for the reasons set forth in the Petition, which we adopt as our own. *See id.* at 50–52. Accordingly, we find that Petitioner has established, by a preponderance of the evidence, that claim 11 would have been obvious over the combination of Howell-596, Howell-833, and Ogren and claim 12 would have been obvious over the combination of Howell-596, Howell-833, and Jannard-868.

For the challenges to claims 29 and 30, Petitioner incorporates its analysis for Ground 3 addressing independent claim 19, which we found unpersuasive. *See* Pet. 47, 50. Because Petitioner’s challenges to claims 29 and 30 relies upon that unpersuasive challenge to claim 19, we determine that Petitioner has not proven by a preponderance of the evidence that claim 29 or claim 30 would have been obvious, for the same reasons discussed above in the context of Ground 3.

J. Obviousness Based on Blum-741 and Hattori-912 (Ground 8)

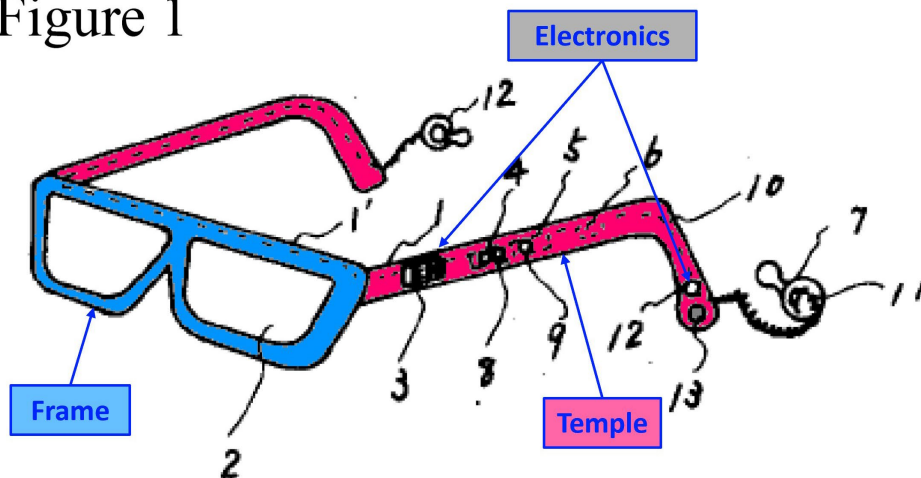
Petitioner argues that the combination of Blum-741 and Hattori-912 renders claims 1, 2, 4–10, 13–20, 22–28, and 31–37 obvious. Pet. 53–78. Patent Owner argues that there was no motivation to combine Blum-741 with Hattori-912, and even if there were, the combination fails to disclose or suggest the limitation “a sealed moisture resistant module attached to the

frame” in independent claims 1 and 19. *See* PO Resp. 24–28, 30–33, 37–39. Patent Owner makes these arguments in the context of claims 1 and 19, but also makes additional arguments specific to certain dependent claims. *See id.* We provided an overview of Blum-741 above. In our analysis below, we first provide an overview of Hattori-912 before addressing the parties arguments that apply to the independent claims as well as the disputed dependent claims.

1. Overview of Hattori-912

Hattori-912 discloses eyewear that includes a display driven by an electronics module located in the eyewear frame. Ex. 1006, 63. The electronics includes sensors, a power supply, and processing circuitry, embedded in the eyewear frame. *Id.* at 63–65. We reproduce Petitioner’s annotated version of Hattori-912’s Figure 1 below.

Figure 1



Annotated Figure 1 shows eyewear that includes labels for “Electronics” in a “Temple” and a “Frame.” *See* Pet. 3; Ex. 1006, 65. Figure 1 depicts electronics such as display device 3, switch 8, and frequency adjustment knob 9 on the Temple. Ex. 1006, 64. Hattori-912 also describes embodiments that integrate semiconductor integrated circuit 20 into the

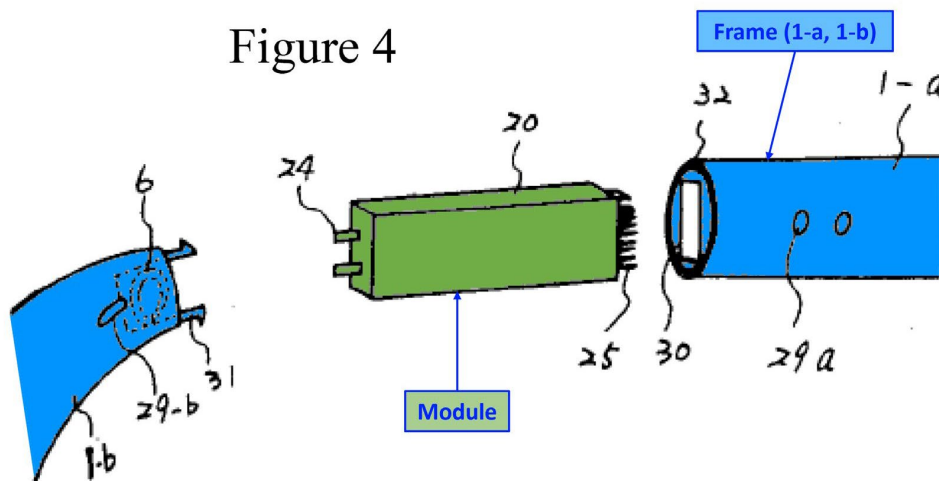
frame, including within hollow part 30, and sealed by waterproof ring 32. *See id.* Alternatively, Hattori-912 discloses use of a “thin film integrated circuit” that uses a metal frame as a substrate and protective film 41 covering the circuit. *Id.* at 65.

2. Claims 1 and 19

a. Disclosure of a Sealed Moisture Resistant Module

Independent claims 1 and 19 require “a sealed moisture resistant module.” Ex. 1001, 11:30, 12:14. The parties treat this common limitation and their arguments as applicable to both claims, and we take the same approach here.

For this challenge, Petitioner argues that “Hattori-912 discloses an eyewear frame having a ‘hollow part 30’ in which electronic components are embedded.” Pet. 55 (citing Ex. 1006, 64). We reproduce Petitioner’s annotated version of Hattori-912’s Figure 4 below.



The annotated version of Figure 4 shows a green rectangular structure in the middle of the figure labelled “Module” pointing to Hattori-912’s integrated circuit 20, frame 1-a on the right of the figure in blue, with frame 1-a including hollow part 30 and waterproof ring 32. Pet. 55 (citing Ex. 1002

¶ 177, Ex. 1006, Fig. 4); Ex. 1006, 64. Petitioner asserts that this structure “discloses a sealed moisture resistant module (contents sealed in the hollow part 30 by waterproof ring 32)” within Hattori-912’s frame 1-a. *Id.* (citing Ex. 1002 ¶ 177; Ex. 1006, Fig. 4). Alternatively, Petitioner contends that “Hattori-912 discloses that the eyewear components may be ‘covered by protective film 41’” and that a “POSITA would have understood this to disclose that components of Hattori-912’s eyewear that are coated with protective film 41 form a sealed moisture resistant module.” *Id.* at 55–56 (citing Ex. 1002 ¶ 178; Ex. 1006, 65); *see also id.* at 65–66 (incorporating same analysis for claim 19). Petitioner asserts that Patent Owner’s expert agreed that such “conformal layers” are common ways to protect electronics from “vapor and water.” Pet. Reply 12 (citing Ex. 1024, 33:8–22). Petitioner also asserts that its arguments find support in Patent Owner’s infringement contentions in related litigation. *See id.* at 8–11 (citing Ex. 1023, 6–15).

Patent Owner argues that “Petitioner never identifies which component in Hattori-912 allegedly satisfies the claim requirement of a sealed moisture-resistant module attached to the frame” and that Petitioner fails to establish that Hattori-912 discloses the limitation no matter how we interpret the Petition. PO Resp. 24–26. Patent Owner asserts that “[t]o the extent that Petitioner may argue that the purported sealed moisture-resistant module includes waterproof ring 32 plus frame parts 1-a and 1-b, that argument fails as well, because the resulting module would be the entire eyeglass frame, instead of a module ‘attached to the frame’ as required by claim 1.” *Id.* at 26 (citing Ex. 2019 ¶ 84). As to Petitioner’s alternative argument, Patent Owner argues that the “mere disclosure of a protective film

is far from disclosing a sealed moisture resistant module” because the film may only cover the top of an integrated circuit or may not be moisture resistant. *Id.* at 26–27 (citing Ex. 2019 ¶ 86); *see also* PO Sur-reply 10–13 (raising similar arguments). As to the protective film issue, Patent Owner contends that its expert merely testified that conformal layers can protect from water and vapor, but that “Hattori-912 does not disclose a conformal layer.” *Id.* at 13–14.

We first address Patent Owner’s argument that Petitioner fails to articulate the basis for its challenge in the Petition. As summarized above, and with reference to Hattori-912’s Figure 4 in the Petition, Petitioner asserts that the “contents of the hollow part 30,” i.e., integrated circuit 20, are attached to the frame in a manner that satisfies the requirement of a “module attached to the frame” in claim 1. *See* Pet. 55 (citing Ex. 1006, 64, Fig. 4). Petitioner’s “Module” label pointing to integrated circuit 20 reinforces the that integrated circuit 20 corresponds to the claimed module. *See id.* Petitioner also asserts that once integrated circuit 20 is “sealed in the hollow part 30 by waterproof ring 32” within frame 1-a, it meets the “sealed moisture resistant module” limitation. *Id.* (citing Ex. 1002 ¶ 177; Ex. 1006, Fig. 4). These assertions track the relevant claim language in a straightforward manner. Contrary to Patent Owner’s alleged confusion over Petitioner’s assertions, the Petition never suggests that integrated circuit 20 alone (prior to insertion and sealing within hollow part 30) meets the “sealed moisture resistant module” limitation, nor does the Petition state that all of these parts, plus frame pieces 1-a and 1-b, form the claimed “module.” *See id.*; PO Resp. 24–26; PO Sur-reply 10–11. Accordingly, we do not read the

Petition as failing to adequately articulate Petitioner's basis for the challenge to claims 1 and 19.

We are also persuaded by Petitioner's argument that once Hattori-912's integrated circuit 20 is sealed within hollow part 30 by waterproof ring 32, it forms a "sealed moisture resistant module." *See* Pet. 55; Ex. 1006, 64. Petitioner's allegation implicitly assumes that the module, integrated circuit 20, may be both "sealed" and "moisture resistant" by virtue of waterproof ring 32 just outside hollow part 30. *See* Pet. 55. Patent Owner does not dispute that waterproof ring 32 creates a "moisture resistant" seal. *See* PO Resp. 24–28. Nor does Patent Owner argue that the seal and moisture resistance must be created by a structure integrated with the module rather than a waterproof ring structurally distinct from the module itself as in Hattori-912. *See* Pet. 55. In other words, Patent Owner does not argue that because waterproof ring 32 and integrated circuit 20 are distinct structures attached to frame 1-a, that the claim cannot cover such an arrangement because integrated circuit 20 viewed in isolation lacks a seal and moisture resistance. *See* PO Resp. 24–28. In the absence of such an argument from Patent Owner, and based on our reading of the claim language, we see no reason to import such a requirement to the claim limitation. Instead, we find Petitioner's showing, based on waterproof ring 32 creating a moisture resistant seal for integrated circuit 20 within hollow part 30, as sufficient to establish that Hattori-912 discloses a sealed moisture resistant module.¹⁵

¹⁵ We find Petitioner's showing persuasive without the need to reach whether Patent Owner's arguments made in the related litigation further support Petitioner's positions. *See* Pet. Reply 8–11 (citing Ex. 1023, 6–15).

As to Petitioner’s alternative argument based on Hattori-912’s protective film 41, we are persuaded by Petitioner’s argument that a “POSITA would have understood this to disclose that components of Hattori-912’s eyewear that are coated with protective film 41 form a sealed moisture resistant module.” Pet. 55–56 (citing Ex. 1002 ¶ 178; Ex. 1006, 65). Patent Owner argues that protective film 41 may merely be wear resistant rather than moisture resistant, but we find that interpretation less persuasive than Petitioner’s expert testimony. *See id.*; Ex. 1002 ¶ 178 (“A person of ordinary skill would have understood this to disclose that components of Hattori-912’s eyewear that are coated with protective film 41 form a sealed moisture resistant module.”); PO Resp. 26–27 (citing Ex. 2019 ¶ 86). Hattori-912 itself supports Petitioner’s interpretation by describing the need for a moisture resistant seal (waterproof ring 32) in the immediately preceding embodiment, suggesting that the embodiment employing protective film 41 also supplies some degree of moisture resistance. *See* Ex. 1006, 64–65, Fig. 4. Patent Owner also argues that protective film 41 may not surround the electronics, rendering it incapable of creating a “sealed module,” but Hattori-912 itself shows protective film 41 completely surrounding the electronics. *See* Ex. 1006, Fig. 6, 65; PO Resp. 26–27 (citing Ex. 2019 ¶ 86). We are persuaded that such a protective film surrounding the electronics creates a “sealed moisture resistant module” as required by claim 1.

Based on the foregoing, for two independent reasons, we find that Petitioner establishes that Hattori-912 discloses a “sealed moisture resistant module” as required by claims 1 and 19. Patent Owner does not dispute that the combination of Blum-741 and Hattori-912 discloses the remaining

limitations of claims 1 and 19. *See* PO Resp. 37. We have reviewed the evidence and arguments of record and find that Petitioner has shown, by a preponderance of the evidence, that the combination of Blum-741 and Hattori-912 discloses all of the limitations of claims 1 and 19. *See* Pet. 54–66.

b. Motivation to Combine

In its analysis of claim 1, Petitioner provides various reasons to combine Blum-741 and Hattori-912 in the context of specific claim limitations. *See* Pet. 55–64. For example, for the “sealed moisture resistant module” limitation, Petitioner argues that a “POSITA would have been motivated to incorporate Hattori-912’s sealed module into Blum-741’s eyewear,” as Hattori-912 teaches for several reasons, including to protect the electronic components within the module. *Id.* at 56 (citing Ex. 1002 ¶ 179), 62–64 (citing Ex. 1002 ¶¶ 203–208). Petitioner further asserts that a “POSITA would have been motivated to include Hattori-912’s electronic display, and thus the drive circuit that controls it, in Blum-741’s eyewear for several reasons,” including the express benefits Hattori-912 describes. *Id.* at 59–60. Petitioner asserts the prior art references need not be analogous to each other, they need only be analogous to the claimed invention, and that “both references are in the field of electronic eyewear and address problems pertinent to the claimed invention.” Pet. Reply 13 (citing Pet. 34–35, 53–54; Ex. 1001, 1:56-67; Ex. 1002 ¶¶ 47–53; Ex. 1024, 25:18–27:13). For claim 19, Petitioner relies on its arguments for claim 1 and raises additional arguments supporting the motivation to combine that address the limitations unique to claim 19. Pet. 65–68 (citing Ex. 1002 ¶¶ 214–221).

Patent Owner raises arguments against the motivation to combine Blum-741 and Hattori-912 in the context of dependent claim 3, with some of those arguments applicable to claim 1 and some only relevant to the limitations of claim 3 and the use of Spitzer in Ground 9. *See* PO Resp. 27–28. Later portions of its Response addressing other claims, including claim 19, also argue against the motivation to combine Blum-741 and Hattori-912 and refer back to the arguments as to claim 3. *See id.* at 30 (claim 13), 33 (claim 16), 37 (claim 19). With respect to the combination of Blum-741 and Hattori-912 generally, Patent Owner argues that “a POSITA reviewing Blum-741 and Hattori-912 would have recognized that they are in different fields (i.e., optics versus electronics) and aim to solve different problems (i.e., vision correction with electro-active lenses versus adding electronics to eyewear).” PO Resp. 27–28 (citing Ex. 1005, 1:15–19; Ex. 1006, 63; Ex. 2019 ¶¶ 87–88). Patent Owner further asserts that Petitioner’s rationale “fails to consider or acknowledge that those teachings are implemented in dissimilar environments with unrelated goals.” *Id.* at 28 (citing Pet. 62–63). In its Sur-reply, Patent Owner does not address these issues and focuses its motivation to combine arguments on issues related to claim 3 and the addition of Spitzer to the combination. *See* PO Sur-reply 14–16.

Based on our review of the parties’ arguments and evidence, we find that Petitioner establishes that a POSITA would have been motivated to combine Blum-741 and Hattori-912 for the reasons provided by Petitioner. *See* Pet. 56–64, 66–68. For example, Petitioner argues, with direct support from Hattori-912 itself, that a “POSITA would have been motivated to include Hattori-912’s electronic display, and thus the drive circuit that

controls it, in Blum-741’s eyewear” because Hattori-912 describes its display of time, date, and image information as commercially desirable. *Id.* at 59–60 (citing Ex. 1002 ¶¶ 1006, 63). Petitioner also persuasively argues that a “POSITA would have been motivated to enclose the various electronic components disclosed by Blum-741 and/or Hattori-912” within Hattori-912’s sealed module to protect the components from moisture and dirt that could interfere with their operation, and “including as many components as possible in the sealed module would allow the system to be easily removable and swappable.” *Id.* at 62–63 (citing Ex. 1002 ¶¶ 203–204; Ex. 1005, 37:49–65; Ex. 1011, 135–136). Petitioner also asserts, with support from its expert, that sealed modules were well known and easily added with predictable results. *Id.* at 63–64 (citing Ex. 1002 ¶¶ 203–204; Exs. 1003, 1006, 1011). Petitioner relies on these same arguments for claim 19 and adds additional arguments that support the motivation to locate the module behind a user’s ear. See *id.* at 66–68 (citing Ex. 1002 ¶¶ 215–221). Patent Owner does not directly address or rebut any of the specific reasons Petitioner provides for its motivation to combine arguments. See PO Resp. 27–28.

The only arguments Patent Owner raises against the combination stem from Patent Owner’s assertion that “a POSITA reviewing Blum-741 and Hattori-912 would have recognized that they are in different fields (i.e., optics versus electronics) and aim to solve different problems (i.e., vision correction with electro-active lenses versus adding electronics to eyewear).” PO Resp. 27–28 (citing Ex. 1005, 1:15–19; Ex. 1006, 63; Ex. 2019 ¶¶ 87–88). Patent Owner does not couch this argument in terms of a non-analogous art argument, and Petitioner correctly points out that it lacks the

proper comparison between the art of the references and the claimed invention. *See* Pet. Reply 13. To the extent the argument applies to Petitioner's motivation analysis, we find it unpersuasive because both references are in the same field of electronic eyewear. *See id.* In addition, the '483 patent refers to electronics and audio functionality as part of its field, and Petitioner persuasively argues that the references and the '483 patent address similar types of problems. *See id.* (citing Pet. 34–35, 53–54; Ex. 1001, 1:56-67; Ex. 1002 ¶¶ 47–53; Ex. 1024, 25:18–27:13). Patent Owner leaves these arguments unrebutted by not responding to them in its Sur-reply. *See* PO Sur-reply 14–16, 24.

Based on the foregoing, we find that Petitioner establishes that a POSITA would have been motivated to combine Blum-741 and Hattori-912 in the manner Petitioner proposes and for the reasons provided by Petitioner. As noted above, we also find that Petitioner establishes that this combination discloses or suggests all of the limitations of claims 1 and 19. Accordingly, we determine that Petitioner proves by a preponderance of evidence that claims 1 and 19 would have been obvious based on Blum-741 and Hattori-912.

3. *Claims 2, 4–10, 14, 15, 17, 18, 20, 22–28, 31, 33, 34, 36, and 37*

Petitioner challenges claims 2, 4–10, 14, 15, 17, 18, 20, 22–28, 31, 33, 34, 36, and 37 as obvious based on Blum-741 and Hattori-912. *See* Pet. 65–78. For Petitioner's challenge to these claims, Patent Owner either expressly relies on its arguments as to claim 1, or does not address the claims at all in its Response. *See* PO Resp. 37–39 (arguing that Petitioner's challenge to independent claim 19 and all claims that depend from claim 19 fail based on the same arguments made with respect to claim 1). As

discussed above, we found Patent Owner’s arguments as to claims 1 and 19 less persuasive than Petitioner’s arguments and evidence and determined that Petitioner proves that claims 1 and 19 would have been obvious based on Blum-741 and Hattori-912. Accordingly, for the same reasons, we find Patent Owner’s arguments unpersuasive here.

We have reviewed the evidence and arguments of record and find that Petitioner has shown, by a preponderance of the evidence, that claims 2, 4–10, 14, 15, 17, 18, 20, 22–28, 31, 33, 34, 36, and 37 would have been obvious based on Blum-741 and Hattori-912 for the reasons set forth in the Petition, which we adopt as our own. *See* Pet. 65–78.

4. Claims 13 and 32

We addressed claim 13 above in the context of Ground 2 based on Howell-596. As noted above, claim 13 recites a “hermetically sealed” module. Ex. 1001, 11:65–66. Claim 32 depends from claim 19 and includes the same “hermetically sealed” limitation. *See id.* at 12:51–52. In this challenge, Petitioner relies on Hattori-912’s waterproof ring 32 and a “water-proof coating” in the form of protective film 41, both of which we discussed above in the context of claim 1’s sealed moisture resistant module limitation. *See* Pet. 75 (citing Ex. 1006, 65). Petitioner argues that, “[f]or the same reasons” that Hattori-912 discloses a waterproof module, “a POSITA would have understood Hattori-912 to disclose that the module may be hermetically sealed.” Pet. 75 (citing Ex. 1002 ¶ 238). Petitioner also asserts that “[s]omething that is hermetically sealed is sealed so as to be air-tight” and that “something that is sealed with a water-proof ring or coating is also air-tight.” *Id.* at 75–76; *see also* Pet. Reply 17 (relying on Ground 2 arguments).

In addition to the arguments it raises with respect to claim 1, from which claim 13 depends, Patent Owner argues that “a hermetically sealed module must be both airproof and waterproof and therefore has a higher level of protection than a module that is merely waterproof.” PO Resp. 30–31 (citing Ex. 2019 ¶ 97). According to Patent Owner, “the mere disclosure of waterproof module does not teach or suggest that the module is also hermetically sealed.” *Id.* In its Sur-reply, Patent Owner notes that Petitioner cannot merely cross reference its arguments for Ground 2 when the challenges involve different references, and neither Hattori-912’s waterproof ring nor its circuit coated with a protective film “suggests that the frames or circuit would necessarily be hermetically sealed.” PO Sur-reply 18–19.

We agree with Patent Owner that the challenges here present different issues than Ground 2 because the challenges rely on different references and structures. *Compare* Pet. 28–29, *with* 75–76. Moreover, we disagreed with Petitioner’s position that the ’483 equates “hermetically sealed” with “waterproof” for the reasons discussed above. Because we already determined that “hermetically sealed” means “airtight,” and, “airtight” is not the same thing as “waterproof,” Petitioner’s conclusory statement that “something that is sealed with a water-proof ring or coating is also air-tight” lacks support. Pet. 75–76. Unlike its challenge based on Howell-596, here Petitioner does not cite to any other evidence in Hattori-912 that would support its argument that it discloses an airtight module. *See id.* at 28–29, 75–76.

Based on the foregoing, we determine that Petitioner has not proved by a preponderance of evidence that Hattori-912 discloses the “hermetically

sealed” limitation of claims 13 or 32 or that either of claims 13 or 32 would have been obvious based on Blum-741 and Hattori-912.

5. Claims 16 and 35

As noted above in our analysis of Ground 2, claim 16 depends from claim 1 and further recites a module that “is substantially wear resistant.” Ex. 1001, 12:5–6. Claim 35 depends from claim 19 and contains the same limitation. *See id.* at 12:57–58.

In this challenge, Petitioner alleges that “Hattori-912 discloses this limitation because it discloses that the module is embedded in frames 1-a and 1-b.” Pet. 76 (citing Ex. 1006, 64). According to Petitioner, a “POSITA would have understood that eyewear frames are generally made from durable materials that are wear resistant” and that a sealed module embedded within the frame “is protected from wear by the frame and is thus substantially wear resistant.” *Id.* (citing Ex. 1002 ¶ 240); *see also* Pet. Reply 17 (relying on Ground 2 arguments).

In its Response, Patent Owner relies on its arguments for claim 1, but does not address Petitioner’s specific arguments directed to claims 16 or 35, or argue that Hattori-912 fails to disclose a substantially wear resistant module. *See* PO Resp. 33, 38–39. In its Sur-reply, Patent Owner argues that Petitioner fails to address claim 1 in its claim 16 analysis and improperly cross references Ground 2, but does not raise or address any specific arguments as to Ground 8 for claim 16. PO Sur-reply 19–20, 25. As a result, Patent Owner never directly addresses or attempts to refute Petitioner’s showing as to claims 16 and 35.

We have already addressed claim 1 and found Petitioner’s arguments persuasive for the reasons provided above. Petitioner was not required to

reiterate those arguments in the context of its briefing on claim 16 merely because Patent Owner argues that claim 16 depends from claim 1 and would not have been obvious for the same reasons. *See* PO Sur-reply 19–20.

We have reviewed the evidence and arguments of record and find that Petitioner has shown, by a preponderance of the evidence, that Hattori-912 discloses a substantially wear resistant module as required by claims 16 and 35, for the reasons provided by Petitioner, which Patent Owner does not dispute. *See* Pet. 76; Ex. 1002 ¶ 240. Accordingly, we determine that Petitioner proves by a preponderance of evidence that claims 16 and 35 would have been obvious based on Blum-741 and Hattori-912.

K. Obviousness Based on Blum-741, Hattori-912, and Spitzer (Ground 9)

Petitioner argues that Blum-741, Hattori-912, and Spitzer renders dependent claims 3 and 21 obvious. Pet. 78. We provide Petitioner’s entire analysis for Ground 9 below.

As discussed above, Spitzer discloses the additional limitations of claims 3 and 21. *Supra* §X [Ground 5]. A POSITA would have been motivated to combine Spitzer with Blum-741 and Hattori-912, and would have had a reasonable expectation of success in doing so, for the same reasons discussed above. *Id.* Accordingly, Blum-741, Hattori-912, and Spitzer disclose each limitation of claims 3 and 21, and those claims would have been obvious to a POSITA in view of those references. Ex.1002 ¶243.

Id. Petitioner’s challenge here relies on its analysis in Ground 5, which in turn builds on Petitioner’s challenge to claims 1 and 2 in Ground 2 and its challenge to claims 19 and 20 in Ground 3. We found Petitioner’s challenge to claims 1 and 2 in Ground 2 persuasive, and its challenge to claim 3 in Ground 5 persuasive. We did not find Petitioner’s challenge to claim 21 in

Ground 5 persuasive because it relied upon an unpersuasive challenge to claims 19 and 20 in Ground 3.

In addition to relying on its previous arguments where applicable, Patent Owner raises specific arguments against the challenge to claims 3 and 21. PO Resp. 24–28, 38. Patent Owner contends that “Petitioner merely refers back to its defective rationales for a different combination, i.e., Spitzer with Howell-596 and Blum-741 [in Ground 5], without explaining how the same (defective) rationales might be applicable in a different combination” applicable to Ground 9 involving Blum-741, Hattori-912, and Spitzer. *Id.* at 28 (citing Pet. 78; Ex. 2019 ¶ 89); *see also* PO Sur-reply 14 (“This “borrowing” of rationale for a different primary reference and different combination of references is insufficient to meet Petitioner’s burden.”).

Petitioner replies that Patent Owner’s arguments improperly treat a POSITA as an automaton and that “Hattori-912 would have provided motivation for a POSITA to construct ‘a sealed moisture resistant module attached to the frame,’ while Spitzer would have motivated the incorporation of a flex circuit.” Pet. Reply 14 (citing Pet. 55–56, 78, 44–46). Petitioner further asserts that “[t]his configuration would have been well within the skill of a POSITA to implement,” and that Patent Owner “does not dispute this point.” *Id.* (citing Ex. 1002 ¶ 243).

We agree with Patent Owner that Petitioner fails to establish an adequate motivation to combine Blum-741, Hattori-912, and Spitzer. Petitioner’s analysis merely refers back to its motivation-to-combine analysis related to a different ground based on different art. *See* Pet. 78. That prior analysis, which addresses why a POSITA would have been motivated to add Spitzer’s flex circuit to Howell-596’s module in the context

of Ground 5, does not explain why a POSITA would have been motivated to add Spitzer's flex circuit to Hattori-912 in the present challenge. *See id.* at 44–46. Such a showing lacks an adequate foundation to conclude that a POSITA would have been motivated to combine the references, and it was not incumbent upon Patent Owner to point to reasons why the analysis for Ground 5 would not apply to the current challenge. *See In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1378–79 (Fed. Cir. 2016) (determining that the Board erred by shifting burden to a patent owner to explain why an obviousness argument based on a first set of prior art references would not be applicable to a second set of prior art references).

Petitioner contends that “the same reasons” apply to both challenges, but does not attempt to explain why by, for example, explaining how Howell-596 and Hattori-912 share substantively the same structures and the combination would be made in the same way with the same results. *See id.* at 78. The parties hotly disputed the combinability of Howell-596's module with Spitzer's flex circuit in the context of Ground 5, including disputing the applicability of the flex circuit to Howell-596's structure. *See* PO Resp. 17–24. We cannot determine, without more explanation from Petitioner, that the combination of Hattori-912's module and Spitzer's flex circuit involves identical issues that must come out the same way without the need for further explanation and analysis from Petitioner. Petitioner did not defend this approach in its Reply, and instead merely states that Hattori-912 motivates a POSITA to construct the claimed module while Spitzer motivates “the incorporation of a flex circuit,” but those arguments merely refer to what the references already disclose and do not explain why a POSITA would combine the references. *See* Pet. Reply 14.

Based on the foregoing, we find that Petitioner fails to establish a motivation to combine Blum-741, Hattori-912, and Spitzer. Accordingly, we determine that Petitioner fails to prove by a preponderance of evidence that either of claims 3 or 21 would have been obvious based on Blum-741, Hattori-912, and Spitzer.

*L. Obviousness Based on Blum-741, Hattori-912, and Ogren
(Ground 10) and Blum-741, Hattori-912, and Jannard-868
(Ground 11)*

Petitioner argues that claims 11 and 29 would have been obvious based on Blum-741, Hattori-912, and Ogren and that claims 12 and 30 would have been obvious based on Blum-741, Hattori-912, and Jannard-868. Pet. 78–79. Patent Owner does not address Petitioner’s challenge to these claims or raise any arguments, other than those applicable to claims 1 and 19 that we address above, that the claims would not have been obvious for the reasons Petitioner provides. *See* PO Resp. 16–39.

We have reviewed the evidence and arguments of record and find that Petitioner has shown, by a preponderance of the evidence, that claims 11 and 29 would have been obvious based on Blum-741, Hattori-912, and Ogren for the reasons set forth in the Petition, which we adopt as our own. *See* Pet. 78–79. We have also reviewed the evidence and arguments of record and find that Petitioner has shown, by a preponderance of the evidence, that claims 12 and 30 would have been obvious based on Blum-741, Hattori-912, and Jannard-868 for the reasons set forth in the Petition, which we adopt as our own. *See* Pet. 79.

CONCLUSION¹⁶

Based on the foregoing, we determine that Petitioner proves by a preponderance of the evidence that claims 1–37 of the '483 patent are unpatentable.

The following chart summarizes our patentability determinations:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 9, 10, 14, 15, 18	102	Howell-596	1, 9, 10, 14, 15, 18	
1, 2, 6–10, 13–16, 18	103	Howell-596	1, 2, 6–10, 13–16, 18	
19, 20, 24–28, 31–35, 37	103	Howell-596, Howell-833		19, 20, 24–28, 31–35, 37
4, 5, 7, 17, 22, 23, 25, 36	103	Howell-596, Howell-833, Blum-741	4, 5, 7, 17	22, 23, 25, 36
3, 21	103	Howell-596, Howell-833, Blum-741, Spitzer	3	21
11, 29	103	Howell-596, Howell-833, Ogren	11	29
12, 30	103	Howell-596, Howell-833, Jannard-868	12	30

¹⁶ Should Patent Owner wish to pursue amendment of the Challenged Claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding, 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 2, 4–10, 13–20, 22–28, 31–37	103	Blum-741, Hattori- 912	1, 2, 4–10, 14–20, 22–28, 31, 33–37	13, 32
3, 21	103	Blum-741, Hattori- 912, Spitzer		3, 21
11, 29	103	Blum-741, Hattori- 912, Ogren	11, 29	
12, 30	103	Blum-741, Hattori- 912, Jannard-868	12, 30	
Overall Outcome			1–20, 22–31, 33–37	21, 32

ORDER

Accordingly, it is:

ORDERED that Petitioner has proven by a preponderance of the evidence that claims 1–20, 22–31, and 33–37 of the '483 patent are unpatentable;

FURTHER ORDERED that Petitioner fails to prove that claims 21 and 32 of the '483 patent are unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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