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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

MASIMO CORPORATION,
Patent Owner.

Case IPR2022-01271
U.S. Patent 10,912,501

PATENT OWNER PRELIMINARY RESPONSE

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37 C.F.R. § 42.11	13, 28
37 C.F.R. § 42.100	9

EXHIBIT LIST

Exhibit No.	Description
2001	Declaration of Jeremiah S. Helm in Support of <i>Pro Hac Vice</i> Motion
2002	Declaration of Professor R. James Duckworth, Ph.D
2003	<i>Curriculum Vitae</i> of Professor R. James Duckworth, Ph.D
2004	RESERVED
2005	R.J. Duckworth et al., “Field Testing of a Wireless Wearable Reflectance Pulse Oximeter,” American Telemedicine Association Annual Conference, 2006
2006	Y. Mendelson, “Wearable Wireless Pulse Oximetry for Physiological Monitoring,” Worcester Polytechnic Institute Precise Personnel Location Workshop, 2008
2007	Y. Mendelson et al., “Multi-channel pulse oximetry for wearable physiological monitoring,” 2013 IEEE International Conference on Body Sensor Networks, pp. 1-6, 2013
2008	<i>Masimo Corp. et al. v. Apple Inc.</i> , June 6-10, 2022 Public Hearing Transcript, ITC Inv. No 337-TA-1276
2009	U.S. Patent No. 5,638,818
2010	U.S. Patent No. 5,916,155
2011	<i>Masimo Corp. et al. v. Apple Inc.</i> , Masimo’s June 27, 2022 Public Initial Post-Hearing Brief, ITC Inv. No 337-TA-1276
2012	<i>Masimo Corp. et al. v. Apple Inc.</i> , Masimo’s August 18, 2022 Motion to Modify Protective Order, ITC Inv. No 337-TA-1276

Exhibit No.	Description
2013	<i>Masimo Corp. et al. v. Apple Inc.</i> , Apple’s August 29, 2022 Opposition to Masimo’s Motion to Modify Protective Order, ITC Inv. No 337-TA-1276
2014	Masimo’s September 20, 2022 Email to Board Requesting Authorization to File Motions for Additional Discovery
2015	Apple’s September 19, 2022 Email to Masimo Opposing Masimo’s Request for Additional Discovery
2016	Public February 22, 2022 Deposition Transcript of Robert Rowe
2017	June 6, 2022 Email from Counsel for Robert Rowe
2018	U.S. Patent No. 10,702,211
2019	U.S. Patent Pub. No. 2017/0325744
2020	January 3, 2013 Masimo Press Release Regarding iSpO2
2021	October, 2013 Marcelo Lamego Email to Apple CEO Tim Cook
2022	U.S. Patent No. 10,524,671
2023	U.S. Patent No. 10,247,670
2024	U.S. Patent No. 11,009,390
2025	U.S. Patent No. 10,219,754
2026	September 15, 2020 Apple Press Release Regarding Apple Watch Series 6
2027	<i>Masimo Corp. et al. v. Apple Inc.</i> , Public Order Regarding Masimo’s Motion for Preliminary Injunction, Case No. 8:20-cv-00048 (C.D. Cal.)
2028	Apple Webpage Titled “Apple Watch Series 6”

Exhibit No.	Description
2029	Apple Watch Series 6 Video
2030	Apple Watch Series 6 “It Already Does That” Commercial
2031	<i>Masimo Corp. et al. v. Apple Inc.</i> , Apple’s May 10, 2022 Trial Subpoena <i>Ad Testificandum</i> to Robert Rowe, ITC Inv. No 337-TA-1276
2032	R. P. Dresher and Y. Mendelson, “A New Reflectance Pulse Oximeter Housing to Reduce Contact Pressure Effects,” Proceedings of the IEEE 32nd Annual Northeast Bioengineering Conference, pp. 49-50, 2006

Pursuant to 35 U.S.C. § 313, 37 C.F.R. § 42.107, and the Notice of Filing Date Accorded to Petition dated July 26, 2022 (*see* Paper 4), Masimo Corporation (“Masimo”) hereby timely submits its Preliminary Response to the Petition for *Inter Partes* Review of U.S. Patent No. 10,912,501 (“’501 Patent”) filed by Apple Inc. (“Apple” or “Petitioner”).

I. INTRODUCTION

Masimo is the technology leader in the field of noninvasive physiological monitoring. In 1989, Masimo was a small startup operating in an inventor’s condo. Today, Masimo is a publicly traded company that employs 6,300 people worldwide and has annual revenues exceeding one billion dollars. Masimo technology is used in clinical care to monitor over 200 million patients a year. This growth followed Masimo’s development of a range of technologies that revolutionized the field of noninvasive physiological monitoring. Other Masimo patents have withstood extensive attacks, including in litigation through trial, *inter partes* reexamination, and appeal.¹

Apple’s Petition arises from a dispute with Masimo in the International Trade Commission. Apple was not, historically, a company that had any involvement in

¹ *See Mallinckrodt, Inc. v. Masimo Corp.*, 147 Fed. Appx. 158, 2005 WL 2139867 at *3 (Fed. Cir. Sept. 7, 2005) (nonprecedential); *Masimo Corp. v. Philips Electronic N, Amer. Corp.*, 2015 WL 2379485 at *1 (D. Del. May 18, 2015).

physiological monitoring devices. But, around 2013, Apple decided to enter the field and sought out Masimo for that technology. Although claiming an interest to integrate Masimo's technology into Apple products, Apple began poaching employees, one after another. The poached employees included Chief Technical Officer Marcelo Lamago, one of the inventors on the '501 Patent challenged in this Petition. Lamago took Masimo's sensor design knowledge with him to Apple. Masimo has accused Apple's devices of using Masimo technology, including key features disclosed and claimed in the '501 Patent.

Masimo asserted the '501 Patent against Apple in an ITC proceeding—Inv. No. 337-TA-1276 (the "ITC Investigation"). At the evidentiary hearing, Apple promised the ALJ it would "present the best possible evidence on the issues," including the validity of the '501 Patent. *See* EX2008, 39:11-17. During the ITC Investigation, including at the hearing and in post-hearing briefing, Masimo identified, presented, and explained extensive objective evidence of nonobviousness of the '501 Patent. Yet, despite Apple's full awareness of Masimo's assertion of extensive evidence of nonobviousness, Apple's Petition is completely silent on that evidence, not even disclosing any of it to the PTAB.

II. BACKGROUND

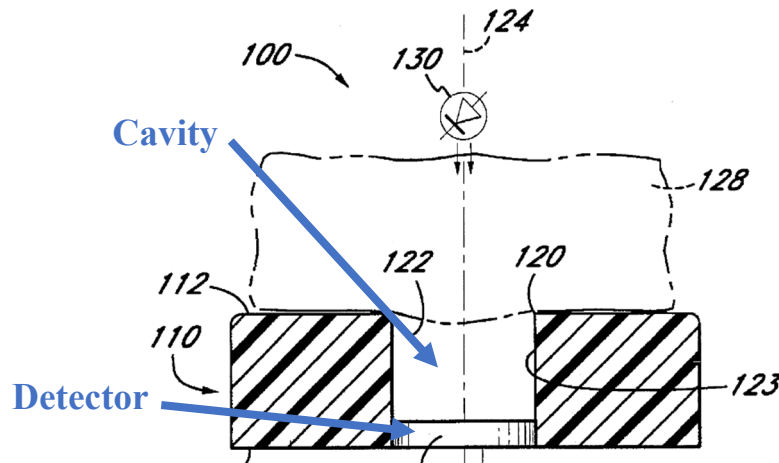
A. Masimo's Pioneering Technology

Masimo developed innovative sensor designs that allow more accurate noninvasive measurement of physiological parameters such as oxygen saturation, hemoglobin, and glucose. EX2008, 98:9-102:1. It is very challenging to extract the signal needed for such measurements. *Id.*, 98:9-100:3. Masimo faced difficulties reducing errors in the detected signal, such as the problem of emitted light reaching a detector without being attenuated by the user's tissue, which cause inaccuracies in resulting measurements. *Id.*, 100:4-102:1. The inventors discovered solutions to these problems and sought to protect their inventions, including those recited in the '501 Patent.

B. '501 Patent Overview

At the time of the invention, those of skill in the art of noninvasive sensors, such as those for pulse oximetry, typically did everything possible to avoid placing any pressure on the tissue. Indeed, the prevailing wisdom before Masimo's inventions in the '501 patent was to avoid pressing against the tissue because pressure was thought to decrease the signal-to-noise ratio, resulting in measurement errors. EX1006, 2:47-57, 3:27-67, 4:59-65, 5:15-21, 5:31-37, 6:1-3, 6:8-13, 6:26-31, 10:49-53, 12:62-13:5. Extensive teaching in the literature directed a POSITA to a flat surface for a pulse oximeter. *Id.*; EX1007, ¶34; EX2002 ¶50. An earlier

Masimo invention went further by using a cavity over a photodetector to allow the tissue to remain undisturbed by any contact from the sensor. For example, Masimo's noninvasive sensors included a cavity in a flat surface that avoided pressing against the tissue, as shown below. EX2008, 98:23-99:4.



See, e.g., EX2009, FIG. 4 (annotated), 7:8-19. Masimo's largest competitor, Nellcor, also used such a cavity. See, e.g., EX2010, FIGS. 4-5. After years of litigation, Apple has never identified any prior art disclosing, teaching, or suggesting adding a convex protrusion over multiple detectors in a pulse oximetry sensor. That is because it defies all conventional thought at the time. Indeed, *Apple's* own and much later 2016 patent filing asserted that a convex pressure-inducing protrusion in a pulse oximeter sensor was inventive, as further explained below.

In the early 2000s, the inventors were researching techniques to noninvasively measure hemoglobin and glucose—signals that are extremely small and very difficult to extract. EX2008, 98:9-17. During their research, the inventors

experimented with creating an artificial, active pulse stronger than the natural human pulse. *Id.*, 98:9-99:16. They used a tiny hammer pressing a protrusion into the finger (or digit) to create the active pulse. *Id.*, 98:9-99:16. As a '501 Patent inventor explained, “one time the active pulse detector hammer had been left in, and when it pushed up against the digit we noticed the signal got stronger, ***which was a surprise to us.***” *Id.*, 98:23-99:1. Thus, the inventors’ discovery that pressing a protrusion into the user’s tissue created a stronger signal was unexpected. *Id.*, 98:18-99:3, 99:12-16; EX1001, FIG. 5, 21:9-43.

Continued experiments revealed that contrary to industry belief, applying pressure in the right amounts with a convex protrusion could actually *strengthen* the signal. EX2008, 99:2-16. The convex protrusion improved signal strength by an order of magnitude and significantly improved the sensor’s signal-to-noise ratio. EX1001, 20:29-33, 21:9-15, 21:26-43. The inventors disclosed the magnitude of the improvement in Figure 5, which shows a tenfold signal-strength increase.

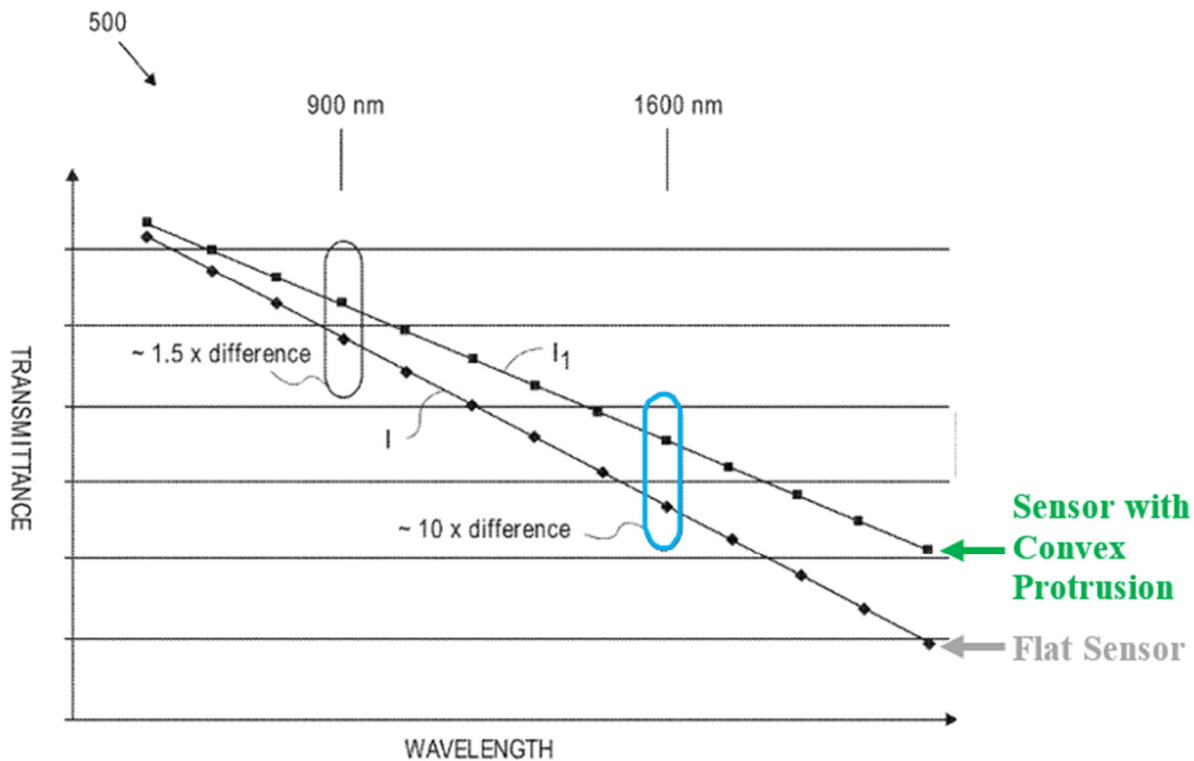


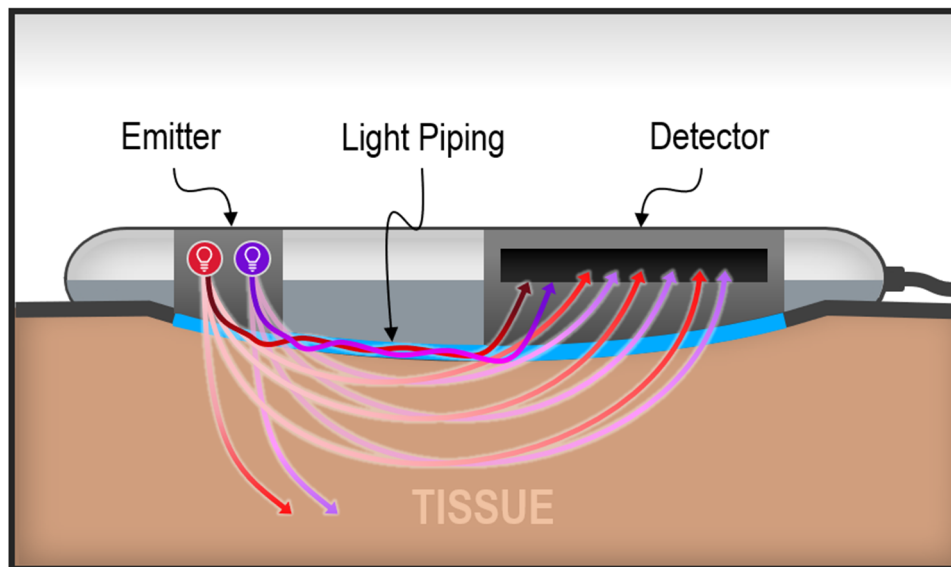
FIG. 5

EX1001, FIG. 5 (annotated). The inventors' discovery that a protrusion comprising a convex surface significantly improved sensor performance would have been an unexpected result to a POSITA, given the understanding at the relevant time that increased or varying pressure caused measurement errors. EX2002 ¶¶51-52.

The inventors found several additional benefits of a protrusion comprising a convex surface over multiple photodetectors, which the '501 Patent discloses. The protrusion thins out the measurement site on the body, resulting in improved transmittance of attenuated light back to the photodetectors and increased signal strength. EX1001, 20:25-33, 21:9-43; EX2002 ¶53. The protrusion also increases

the area for measuring attenuated light with the photodetectors. *Id.*, 7:61-63; EX2002 ¶53.

The inventors found that, while the claimed protrusion increased signal strength, it also had a negative effect—increased light piping. EX2008, 100:14-101:5. The '501 Patent describes light piping as “light that bypasses [the] measurement site” by going from the light source/emitter directly to the detector without being attenuated by tissue, as shown below. EX1001, 22:48-50.



The inventors developed solutions to this problem. For example, they determined how to reduce or avoid light piping through the protrusion by using opaque material, light barriers, and windows. *See, e.g., id.*, 7:65-8:7, 9:33-38, 18:66-19:12, 19:25-26, 22:23-39, 22:50-62, 23:10-12, 26:64-27:3; EX2002 ¶¶54-55. They also determined how to use multiple photodetectors to help cancel noise. *See, e.g.,* EX1001, 9:30-33, 20:25-29; EX2002 ¶55. Exemplary configurations are shown in the '501 Patent.

See, e.g., EX1001, FIGS. 3-4, 7B; EX2002 ¶55. Accordingly, the '501 Patent explains how different pieces of the sensor work together to provide an order-of-magnitude signal strength increase and greater cancellation of light piping.² The claims at issue recite combinations of these elements that work together to obtain these benefits and defied conventional wisdom.

The '501 Patent has three independent claims, Claims 1, 19, and 26. Claim 1 illustrates some of the limitations at issue (bolded), and recites:

A user-worn device configured to non-invasively measure a physiological parameter of a user, the user-worn device comprising:

at least three light emitting diodes (LEDs);

at least three photodiodes arranged on an interior surface of the user-worn device and configured to receive light attenuated by tissue of the user;

a protrusion arranged over the interior surface, the protrusion ***comprising a convex surface*** and a plurality of openings extending through the protrusion and positioned over the three photodiodes, the

² Apple implies the challenged claims are somehow inadequately supported by the specification. Pet., 3. Such argument is improper in an IPR, which considers only arguments “under section 102 or 103.” 35 U.S.C. § 311(b). Regardless, in the ITC Investigation, Masimo demonstrated Apple’s argument lacks merit. EX2011, 176-179.

openings each comprising an *opaque lateral surface*, the plurality of openings configured to allow light to reach the photodiodes, *the opaque lateral surface configured to avoid light piping through the protrusion*; and

one or more processors configured to receive one or more signals from the photodiodes and *calculate a measurement of the physiological parameter of the user*.

EX1001, Claim 1.³

III. CLAIM CONSTRUCTION

Apple identifies no terms for construction. In the ITC Investigation, Apple argued that (1) “over” and “above” in the claims mandated a particular orientation for noninfringement and (2) an opening requires “an absence of material.” EX2011, 42-53. Masimo disagreed, *id.*, and Apple appears to jettison those constructions here. Thus, the Board should give the claim terms their ordinary and customary meaning, consistent with the specification, as a POSITA would understand them. 37 C.F.R. § 42.100(b); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (*en banc*).

³ All emphasis is added unless indicated otherwise.

The preambles of the independent claims—Claims 1, 19, and 26—are limiting because they provide antecedent basis for the “user-worn device,” “user,” “physiological parameter,” “pulse rate,” and/or “oxygen saturation” limitations recited in the bodies of the claims. Apple does not contend otherwise.

IV. LEVEL OF ORDINARY SKILL IN THE ART

Apple’s asserted level of skill requires no coursework, training, or experience with optics, optical physiological monitors, or physiology, and focuses on data processing rather than sensor design. Apple does not contend that the level of skill in the art affects the patentability of the challenged claims. Pet., 4; EX2002 ¶¶31-34. However, Masimo submits that Apple’s asserted level of skill confirms patentability, as explained below.

V. LEGAL STANDARD

“In an IPR, 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). An IPR may not be instituted unless “the information presented in the petition ... shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a).

A patent claim is unpatentable as obvious only if the differences between the claimed subject matter and the prior art are such that the subject matter, *as a whole*,

would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. 35 U.S.C. § 103; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness relies on 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 ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). Furthermore, “the prior art, taken as a whole, must *enable* a skilled artisan to make and use the claimed invention” without undue experimentation. *Raytheon Techs. Corp. v. Gen. Elec. Co.*, 993 F.3d 1374, 1380 (Fed. Cir. 2021).

To prevail on any obviousness ground, it is insufficient to simply identify individual components of the claims in the prior art—one must show why a “skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.” *In re Kotzab*, 217 F.3d 1365, 1371 (Fed. Cir. 2000). To satisfy its burden of proving obviousness, Apple cannot rely on “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Rather, it must set forth “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. at 418-19 (internal citation omitted). An appropriate obviousness

inquiry also must be made without any “hint of hindsight.” *Star Sci., Inc. v. R.J. Reynolds Tobacco Co.*, 655 F.3d 1364, 1375 (Fed. Cir. 2011).

Additionally, a motivation to combine references must be “accompanied by a reasonable expectation of achieving what is claimed in the patent-at-issue.” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016).

VI. NO GROUND ESTABLISHES OBVIOUSNESS

The Petition sets out two main grounds as shown in the table below. Pet., 7.

Ground	References
Ground 1A	Mendelson-799 (EX1006) Aizawa (EX1007) Ohsaki (EX1008)
Ground 2A	Mendelson-799 (EX1006) Aizawa (EX1007) Kotanagi (EX1015, translation EX1016)

Grounds 1B-1D and 2B-2D add additional references to those main grounds. Pet., 7. The Petition does not establish a reasonable likelihood of Apple showing any challenged claim would have been obvious to a POSITA. Apple’s grounds—Grounds 1A-2D—fail for many reasons. The following table summarizes the independent reasons for denying all grounds as to all claims:

Independent Reasons for Denial of All Grounds as to All Claims	Section
Apple failed to address known objective indicia of nonobviousness; the objective indicia support the claims' validity.	§VI.A
Apple's prior IPR positions about the same references materially conflict with Apple's arguments here.	§VI.B
No reference teaches or suggests a protrusion having a convex surface with multiple openings.	§VI.C
A POSITA would not have altered Mendelson-799's oximeter with an opaque convex protrusion.	§VI.D
The Petition's motivations are unpersuasive.	§VI.E

A. Apple's Failure to Inform the PTAB of, Much Less Address, Known Objective Indicia of Nonobviousness Warrants Denying Institution

“Objective indicia of nonobviousness must be considered in every case where present.” *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1048 (Fed. Cir. 2016) (the obviousness inquiry “requires consideration of all four *Graham* factors”). Apple violated this rule by completely ignoring all objective evidence of nonobviousness in its Petition. Apple has known of this evidence and its significance at least since Masimo presented it during the June 6-10, 2022 evidentiary Hearing in the parties' ITC Investigation and discussed it at length in Masimo's June 27 post-Hearing briefing. *See, e.g.*, EX2011, 158-175. Despite Apple's awareness of the relevance of this evidence, and despite having ample time to address it, and despite Apple's duty of candor (37 C.F.R. § 42.11), Apple failed to inform the PTAB of this evidence. In fact, Apple used a different expert for these proceedings, seemingly to shield him from the known objective indicia. Apple's

expert here acknowledges the importance of objective indicia to his analysis. EX1003, ¶204. But neither Apple nor its expert addressed this evidence well known to Apple. *See generally* Pet.; EX1003.

Apple’s failure justifies denying institution. *See, e.g., Stryker Corp. v. KFX Medical, LLC*, IPR2019-00817, Paper 10 at 28-29 (PTAB Sept. 16, 2019) (denying institution; explaining “***We have cautioned petitioners in prior proceedings that petitions may be denied if they do not address known evidence of secondary considerations.***”; citing cases); *Robert Bosch Tool Corp. v. SD3, LLC*, IPR2016-01751, Paper 15 at 23-25 (PTAB Mar. 22, 2017) (same; denying institution for failure to address objective indicia presented during an ITC proceeding); *Gilead Sciences, Inc. v. United States*, IPR2019-01456, Paper 17 at 52-53 (PTAB Feb. 5, 2020) (denying institution; “***Petitioner’s failure*** to persuasively address the [publicly available objective indicia of nonobviousness] in its Petition ***means Petitioner falls short of is burden*** to establish a reasonable likelihood of success in prevailing on its challenge.”).

Apple’s silence here is particularly egregious because Masimo relied on substantial evidence of objective indicia of nonobviousness within Apple’s own records. EX2011, 158-175. Apple nonetheless chose not to inform the PTAB of any of that evidence and has refused to allow Masimo to even present much of it in this response. EX2015.

Indeed, rather than address the known objective indicia, Apple repeatedly attempted to conceal it from the Board. Masimo asked the ITC to modify the Protective Order to allow Masimo to use such evidence in this proceeding. EX2012. Apple opposed, arguing that Masimo should directly obtain the evidence via discovery in this proceeding. EX2013, 10. Masimo then sought the Board's authorization to file a motion for discovery of the same information. EX2014. Apple opposed, this time arguing the opposite—that Masimo should not be permitted such discovery here because of the ITC's Protective Order. EX2015; Paper 10. Apple concealing objective evidence of nonobviousness from the Board is particularly concerning because, in the ITC Investigation concerning the '501 Patent, Apple explained it “wants to provide Your Honor with the best possible evidence of all the issues Your Honor needs to decide in this investigation.” EX2008, 40:7-13. Yet, in its Petition, Apple had no such desire to share the relevant evidence with the Board.

As a result of Apple's three-card monte before the ITC and the Board, Masimo can only identify certain publicly available objective indicia of nonobviousness. As discussed below, however, even that evidence, none of which Apple addressed, confirms the patentability of the challenged claims, and thus each Petition ground fails.

1. The Unexpected Results Achieved by the Claimed Protrusions Demonstrates the Nonobviousness of the Challenged Claims

Mendelson-799 discouraged inducing excessive or varying pressure because such designs were understood to cause measurement errors. *Infra* Section VI.D; *see also* EX2016, 69:8-21. Consistent with this conventional understanding, before the inventions claimed in the '501 Patent, Masimo and others in the field avoided pressure-inducing sensor designs, which were understood to “cause the signal to go away.” EX2008, 99:8-13; *see, e.g.*, EX2009, 7:8-19, FIG. 4; EX1006, 2:37-53, 3:27-67, 4:59-65, 5:15-21, 6:1-3, 6:8-13, 6:16-35, 10:49-53, 12:62-13:5; EX2010, FIG. 5; *see also* EX1007, ¶¶[0013], [0034], FIGS. 1B, 5. For example, Masimo used the “opposite” of a convex protrusion—a “cavity”—for its sensors. EX2008, 98:23-99:4; EX2009, 7:8-19, FIG. 4. Nellcor also disclosed using such a cavity or void. EX2010, FIG. 5.

While Masimo was developing technology for noninvasively measuring hemoglobin and glucose, its engineers found “[j]ust getting to the signal is really challenging.” EX2008, 98:13-16; *supra* Section II.B. The engineers experimented with creating an active pulse (i.e., mechanically inducing a vibration to act as an artificial pulse stronger than the natural human pulse) in their quest to obtain a better signal for measuring these parameters. *Id.*, 98:9-99:16. Surprisingly, these experiments revealed applying pressure did not cause errors, but *strengthened* the signal. As a '501 Patent inventor explained, “one time the active pulse detector

hammer had been left in, and when it pushed up against the digit we noticed the signal got stronger, ***which was a surprise to us.***” *Id.*, 98:23-99:1.

This surprise led the ’501 Patent’s inventors to the claimed protrusion comprising a convex surface. *Id.*, 99:2-16. The inventors discovered, to their surprise, that using such a convex protrusion improved signal strength by an order of magnitude and significantly improved the sensor’s signal-to-noise ratio. EX1001, 20:29-33, 21:9-15, 21:26-43; EX2008, 98:9-99:16. In July 2008, a POSITA would have found a convex protrusion significantly improving the signal-to-noise ratio and increasing signal strength to be a surprising and unexpected result. EX2002 ¶180.

The ’501 Patent has an effective filing date in July 2008. EX1001, 2. It was not until years later that others, including Apple, recognized the benefit of the claimed convex protrusion and its associated structures. In the ITC Investigation, Masimo presented evidence that, as late as 2015, Apple’s skilled sensor engineers did not appreciate how pressure-inducing sensor designs significantly improved signal strength. EX2011, 163.

After Apple’s engineers became aware of the significance of convex protrusions on signal strength, Apple filed multiple patent applications describing and claiming the benefits of such protrusions. For example, Apple filed U.S. Patent No. 10,702,211 (the “’211 patent”) in July 2016, listing Apple engineers as inventors. The patent describes and claims a convex exterior surface with openings

extending from an interior surface to the exterior surface and an opaque light block separating the openings. EX2018, 2:31-39, 4:18-19, 5:25-33, Claim 1.

In Claim 1 of the '211 patent, Apple claimed “a convex surface that forms a portion of an exterior surface.” *Id.*, Claim 1. Apple also claimed “an opening,” “window positioned within the opening,” and “an opaque region positioned between and optically isolating the first transparent region from the second transparent region.” *Id.* Apple claimed that these features were inventive as late as 2016. Yet, these features are analogous to those invented by Masimo nearly ten years earlier. *Compare id.*, Claim 1 with EX1001, Claims 1, 19, 26; EX2002 ¶182. Now, after learning that Masimo discovered these innovations first, Apple performs an about face by arguing the same features recited in the challenged claims would have been obvious to a POSITA years earlier in July 2008. *See, e.g.*, Pet., 18-29.

Moreover, in a 2017 Apple patent filing, Apple explained a convex protrusion actually improves the signal by imparting certain pressure on tissue. EX2019. FIGS. 3A-3B show “protrusion 302” applying “pressure 320.”

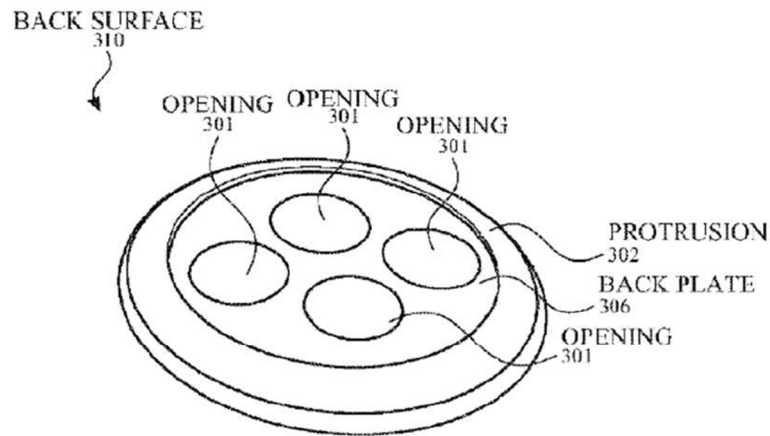


FIG. 3A

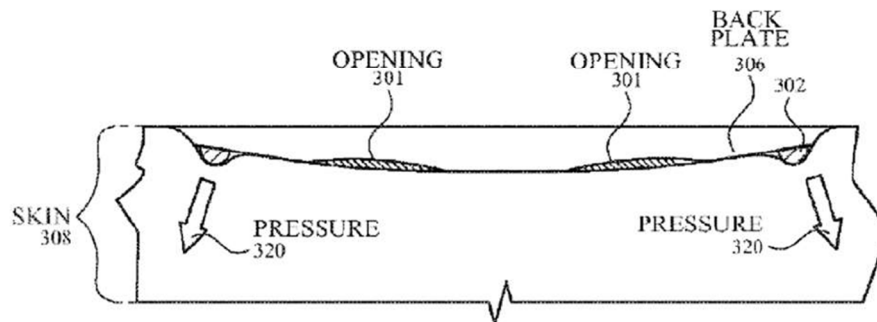


FIG. 3B

Id., FIGS. 3A-3B. The specification explains “Protrusion 302 can be configured to create pressure to skin 308,” and “applying localized pressure to the individual’s skin ... can lead to an increase in pulsatile (AC) signal.” *Id.*, ¶¶[0032]-[0033]. Apple describing and claiming such a protrusion almost 10 years after the ’501 Patent further demonstrates the Petition’s obviousness arguments are based on hindsight, not fact. Apple cannot rewrite history by arguing the challenged claims would have been obvious in 2008 when the evidence shows Apple claimed to the

Patent Office that a convex protrusion *is* innovative and patentable years after Masimo's inventions.

Accordingly, both the state of the art and Apple's own patent filings demonstrate that a POSITA in July 2008 would not have expected the benefits achieved by a protrusion comprising a convex surface. Every independent claim of the '501 Patent requires a physiological measuring device with a protrusion comprising a convex surface. EX1001, Claims 1, 19, 26; EX2002 ¶184. The above evidence of unexpected results thus bears a nexus to, and supports the validity of, every challenged claim. EX2002 ¶184.

2. **Apple's Skepticism Demonstrates Nonobviousness of the Challenged Claims**

a) **Protrusion Comprising a Convex Surface**

Light piping is problematic because it "causes inaccuracies in the measurement" of the physiological parameter. EX2008, 100:14-101:5; EX1001, 7:65-8:7; EX2002 ¶185. In the ITC Investigation, Masimo presented evidence that the engineers working on the first-generation Apple Watch's sensor were skeptical of its convex shape because it caused *more* light piping than a flat sensor. EX2011, 160-161. But Apple refuses to reveal such evidence to the Board or allow Masimo to disclose it. EX2015.

Every independent claim of the '501 Patent requires a user-worn, non-invasive physiological measuring device with a protrusion comprising a convex

surface. EX1001, Claims 1, 19, 26; EX2002 ¶185. Thus, Apple’s skepticism of using a protrusion comprising a convex surface in its Apple Watch bears a nexus to, and supports the validity of, every challenged claim. EX2002 ¶185; *see, e.g., Neptune Generics, LLC v. Eli Lilly & Co.*, 921 F.3d 1372, 1377 (Fed. Cir. 2019) (holding industry skepticism supported finding of nonobviousness).

b) Measuring Oxygen Saturation at the Wrist

In January 2013, Masimo debuted its “iSpO2 Pulse Oximeter for iOS Platform (iPhone, iPad & iPod touch)” at the Consumer Electronics Show in Las Vegas. EX2020; EX2008, 103:7-16. “Within two to three months [Apple] contacted [Masimo],” invited Masimo to a meeting at Apple’s Cupertino headquarters and explained that Apple “want[ed] to work with [Masimo] to integrate [Masimo’s] technology into [Apple’s] products.” EX2008, 104:11-18. The parties met and discussed integrating Masimo technology into Apple’s products. A ’501 Patent inventor attended that meeting. *Id.*, 104:19-20.

Rather than enter into a partnership with Masimo, Apple began raiding Masimo for its employees. Apple first hired Masimo’s Chief Medical Officer, Michael O’Reilly, in July 2013. EX2011, 166. In October 2013, Marcelo Lamago (a named inventor of the ’501 Patent and then, the Chief Technical Officer of a Masimo spin-off company, Cercacor Labs) contacted Apple’s CEO Tim Cook, offering to solve what he characterized as the very deceptive and difficult “patient

equation” for Apple’s patient monitoring based on his 10 years of experience at Masimo and Cercacor. EX2021. Apple hired Lamego, who “started [in] January 2014 at Apple.” EX2008, 187:16.

Apple’s “raiding” of Masimo’s employees did not stop there. In all, Apple ended up recruiting about 30 engineers and stopped communicating with Masimo. EX2011, 167. After providing Apple with Masimo’s technology, Lamego left Apple in the middle of 2014. EX2021; *see, e.g.*, EX2022 (Apple patent regarding optical sensors listing Lamego as inventor); EX2023 (same); EX2024 (same); EX2025 (same).

Later in 2014, Apple hired Dr. Paul Mannheimer, an engineer formerly employed by Nellcor, Masimo’s major competitor in the pulse oximetry space. EX2008, 1009:2-20. Apple tasked Mannheimer with “look[ing] into doing pulse oximetry at the wrist for the Apple Watch.” EX2008, 996:9-997:5.

At the ITC hearing, Masimo presented evidence that various Apple engineers, including Mannheimer, were skeptical that oxygen saturation could be measured at the wrist. EX2011, 169-172. Dr. Stephen Waydo, the director of Apple’s team for health algorithms on the Apple Watch, testified it was “extremely challenging” to develop the blood-oxygen feature of the Apple Watch. EX2008, 919:2-8, 938:21-24. Such skepticism years after the relevant time in 2008 supports the

nonobviousness of the claimed user-worn physiological parameter-measuring devices. *Id.*; EX2002 ¶¶186-187.

3. Apple’s Failures Demonstrate the Nonobviousness of Measuring Oxygen Saturation at the Wrist

Even with the benefit of Masimo’s poached employees and a former lead engineer at Nellcor, it took Apple years to develop a user-worn device with an oxygen saturation measuring feature. In 2015, Apple began selling the original Apple Watch—“Series 0”—which could not measure oxygen saturation. EX2008, 818:10-15. Apple Watch Series 1 through 5 also did not measure oxygen saturation. *See* EX2026, 3-4. Apple did not release a watch with an oxygen saturation feature until it released the accused Apple Watch Series 6 in 2020. *Id.* And the Apple Watch’s oxygen saturation-measuring feature uses the ’501 Patent’s claimed inventions. EX2011, 54-65; EX2002 ¶189. That it took Apple so long to develop the oxygen saturation-measuring feature of its Apple Watches (i.e., Apple’s failures in developing products embodying the ’501 Patent’s claims) bears a nexus to, and supports the validity of, the challenged claims. EX2002 ¶¶188-190.

4. Copying by Apple Demonstrates the Nonobviousness of the Challenged Claims

Lamego, who was named as an inventor on the ’501 Patent, offered to take Masimo’s technology to Apple. EX2021. After receiving his offer, Apple promptly took Lamego up on it. *Supra* Section VI.A.2. A district court found Masimo likely

to succeed in establishing that Lamego disclosed Masimo's trade secrets to Apple. EX2027, 7-10; *see also Masimo Corp. v. True Wearables, Inc.*, No. 2021-2146, 2022 WL 205485 (Fed. Cir. 2022) (affirming preliminary injunction preventing Lamego from disclosing Masimo trade secrets).

Apple ultimately developed the Apple Watch Series 6 and Series 7, which are accused in the ITC Investigation of infringing the '501 Patent. There is a nexus between the accused Apple Watch products and the claimed inventions because the accused products embody the '501 Patent claims. *See, e.g.*, EX2011, 54-65; EX2002 ¶192. In the ITC Investigation, Masimo presented additional evidence of Apple's copying that is not available here because Apple refuses to disclose it to the Board. EX2011, 172-173; EX2015; Paper 10. Regardless, the above evidence supports the validity of the challenged claims. EX2002 ¶193.

5. Commercial Success Demonstrates the Nonobviousness of the Challenged Claims

Masimo also presented evidence in the ITC Investigation that the Apple Watches Series 6 and 7 accused of infringing the '501 Patent have been commercially successful. EX2011, 173-175. The Series 6 and 7 are the only Watches with the accused "blood-oxygen" measurement feature, and enjoyed increased sales compared to generations without this claimed feature. *Id.* This commercial success bears a nexus to the '501 Patent claims because it is significantly attributable to the Watches' accused blood-oxygen feature. Apple marketed, and the

market understood, the Series 6's blood-oxygen feature as the key differentiating feature over the prior generation (Series 5). EX2028; EX2026; EX2029, 1:16-5:05; EX2030, 1:28-2:06. Apple's consistent highlighting of the Watches' accused feature in its marketing materials demonstrates the nexus between their commercial success and the challenged claims. *See, e.g., Apple Inc.*, 839 F.3d at 1055-56 (selecting claimed feature for emphasis in commercial supports provides evidence of nexus). Indeed, the nexus between the success of the Apple Watch Series 6 and Series 7 and '501 Patent claims is presumed because such products embody the claimed features. *See supra* Section VI.A.3.

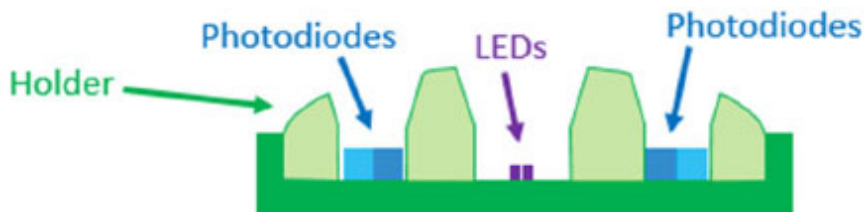
6. **Apple Considering the Claimed Features Inventive Years After the Inventions Claimed in the '501 Patent Demonstrates the Nonobviousness of the Challenged Claims**

In July 2016, Apple filed the '211 patent, listing Mannheimer and other Apple engineers as inventors. EX2018. Apple's '211 patent describes and claims an exterior convex surface with openings and windows that are separated by an opaque region. Apple claimed that these features were inventive as late as 2016. Yet, these features are analogous to those invented by Masimo nearly ten years earlier. *Compare id.*, Claim 1 with EX1001, Claims 1, 19, 26; EX2002 ¶195; *see id.* ¶182. Now, after learning that Masimo discovered these innovations first, Apple performs an about face by arguing the same features recited in the challenged claims would have been obvious to a POSITA years earlier in July 2008. *See, e.g., Pet.*, 18-29.

In sum, the objective evidence of unexpected results associated with the claimed convex protrusion, Apple's skepticism, Apple's lengthy development path and developmental failures, Apple's copying, the commercial success of Apple's accused products, and Apple's later recognition of the inventiveness and importance of Masimo's claimed features demonstrates the devices recited in the challenged claims would not have been obvious to a POSITA many years earlier in July 2008. EX2002 ¶196.

B. Apple's Prior IPR Positions About the Same References Materially Conflict With Apple's Arguments Here

The Petition picks and chooses pieces of Mendelson-799, Aizawa, and Ohsaki to arrive at the Frankenstein-like structure shown below. None of the references teach or suggest Apple's amalgamation.⁴



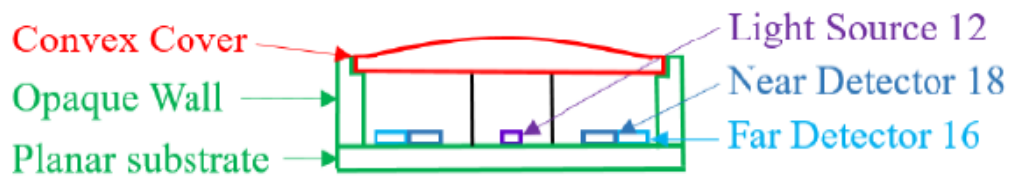
Pet. 28

Apple's prior Petitions expose its hindsight analysis. In its earlier IPRs, Apple argued that a POSITA examining the above references would arrive at an entirely

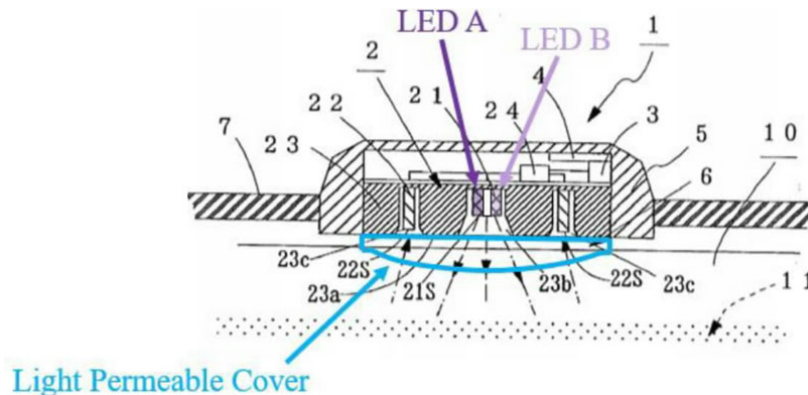
⁴ Apple does the same with Kotanagi instead of Ohsaki. Pet., 84-88. Despite the differences between Ohsaki and Kotanagi, Apple provides no substantively unique analysis. *Id.*

different structure. *See, e.g.*, IPR2021-00209, IPR2021-00208, IPR2021-00195, IPR2021-00193, IPR2020-01737, IPR2020-01733, IPR2020-01716, IPR2020-01715, IPR2020-01714, IPR2020-01713, IPR2020-01539, IPR2020-01538, IPR2020-01537, IPR2020-01536, IPR2020-01521, IPR2020-01520.

Rather than the jagged structure Apple relies on here, in the earlier IPRs Apple repeatedly argued that the combination of Ohsaki with Mendelson-799 or Aizawa would result in a sensor with a continuous, smooth, transparent cover. Apple illustrated these combinations using the figures below.



Apple's Previous Combination of Mendelson-799 and Ohsaki⁵



Apple's Previous Combination of Aizawa and Ohsaki⁶

⁵ *Apple Inc. v. Masimo Corp.*, No. IPR2020-01536, 2022 WL 562452 at *9 (P.T.A.B. Feb. 23, 2022).

⁶ *Apple Inc. v. Masimo Corp.*, No. IPR2020-01537, 2022 WL 557730 at *15 (P.T.A.B. Feb. 23, 2022).

Apple argued that Ohsaki's **cover** would improve Mendelson-799's signal strength because the **cover** improved adhesion between a user's skin and Mendelson-799's sensor. *Apple Inc. v. Masimo Corp.*, No. IPR2020-01536, 2022 WL 562452 at *11 (P.T.A.B. Feb. 23, 2022). Apple also argued Ohsaki's benefits stemmed from **intimate contact** between the **cover** and the skin's surface. 2022 WL 562452 at *8, *11, *14; 2022 WL 557730 at *15, *19; 2022 WL 557896 at *27 (P.T.A.B. Feb. 23, 2022). Apple—and its same expert—repeatedly asserted that Ohsaki would have led a POSITA to add a **cover** to Mendelson-799's sensor or a protrusion to Aizawa's existing flat **cover**. *Id.* The Board agreed. *See, e.g., Apple Inc. v. Masimo Corp.*, No. IPR2020-01536, 2022 WL 562452 at *35 (P.T.A.B. Feb. 23, 2022); *Apple Inc. v. Masimo Corp.*, No. IPR2020-01537, 2022 WL 557730 at *19 (P.T.A.B. Feb. 23, 2022).⁷ Apple never mentions its prior arguments embracing a cover, despite its duty of candor and good faith to the Board. 37 C.F.R. § 42.11.

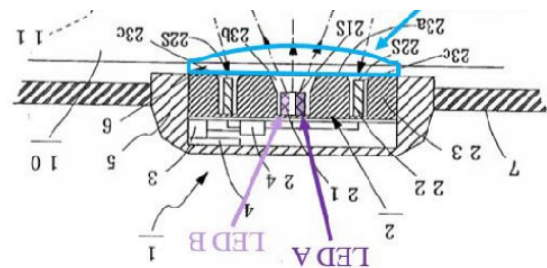
Apple now inconsistently asserts that a POSITA reading Mendelson-799, Aizawa, and Ohsaki would have (1) jettisoned Aizawa's flat cover, (2) eliminated Ohsaki's smooth transparent cover, and (3) instead modified Aizawa's holder into a

⁷ Masimo appealed the Board's prior decisions because Masimo disagreed, *inter alia*, that an artisan would have combined Mendelson-799 and Ohsaki, or Aizawa and Ohsaki, in the first instance, and the Board made errors in connection with finding such motivations. Unlike Apple's materially inconsistent positions, Masimo's prior arguments apply with equal force here.

discontinuous convex structure (below left). The resulting structure has an opaque surface with multiple openings. The multiple openings eliminate more than half of the contact provided by the cover in Apple's previous combinations (*e.g.*, below right). The result dramatically reduces the intimate contact between the sensor and the skin.

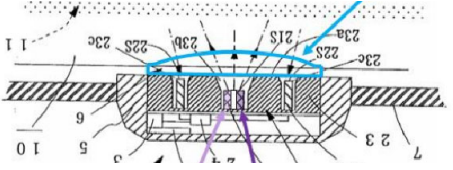
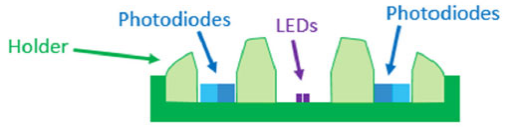


Pet. 33 (annotated)



Apple's Previous Combination of Aizawa and Ohsaki (rotated)

Eliminating the sensor's cover, as Apple does in this Petition, also conflicts with many of Apple's prior representations to the Board. Previously Apple asserted a POSITA would have incorporated a convex cover because of (1) improved light collection, (2) improved adhesion, and (3) improved protection. See, *e.g.*, 2022 WL 562452 at *12, *19; 2022 WL 557896 at *15; 2022 WL 557730 at *19. The Board adopted Apple's prior positions. This Petition advances the very same motivations but jettisons the cover. The table below illustrates some of Apple's conflicting positions:

Apple's Prior Position	Apple's New Position
"More of the partially reflected, transmitted, absorbed, and ultimately back scattered light strikes the detectors than otherwise would have <i>absent the cover.</i>" <i>Apple Inc. v. Masimo Corp.</i>, No. IPR2020-01536, 2022 WL 562452 at *12 (P.T.A.B. Feb. 23, 2022).	"Aizawa's holder provides a tapered <i>opening</i> for each of the detectors that serve to increase the concentration of light collected by the detectors, thereby increasing the signal-to-noise ratio and only uses tapered cavities." Pet., 19.
The "modified cover will allow more light to be gathered and refracted toward the light receiving cavities [23b] of Aizawa ... <i>beyond what is achieved through the tapered cavities</i> [23b]." <i>Apple Inc. v. Masimo Corp.</i>, No. IPR2020-01520, 2022 WL 557896 at *15 (P.T.A.B. Feb. 23, 2022).	"Aizawa's ... <i>tapered cavities</i> ... provide an opening ... that serve[s] to increase, for instance, the concentration of light collected by the detectors, thereby increasing the signal to noise ratio." Pet., 16.
 A POSITA "would have been motivated by such teachings [Ohsaki's paragraphs 25 and 27] to apply a <i>cover</i> with a convex surface to Aizawa to improve that <i>similar device in the same way</i> and to yield predictable results, i.e., to resist movement of the sensor on the user's wrist and to suppress variation." <i>Apple Inc. v. Masimo Corp.</i>, No. IPR2020-01537, 2022 WL 557730 at *19 (P.T.A.B. Feb. 23, 2022).	 A POSITA would have modified Aizawa's <i>holder</i>, which "would have amounted to nothing more than the use of a known technique to improve <i>similar devices in the same way.</i>" Pet., 28.
Ohsaki's <i>cover</i> would "<i>protect the elements within the sensor housing</i>" of Aizawa or Mendelson-799. <i>See, e.g., id.</i> at *27; <i>see also Apple Inc. v. Masimo Corp.</i>, No. IPR2020-01536, 2022 WL 562452 at *19 (P.T.A.B. Feb. 23, 2022).	Aizawa's <i>housing</i> without a cover would "<i>protect the elements within the sensor housing.</i>" A POSITA would have ignored Ohsaki's cover in favor of large openings over the detectors. Pet., 26.

Apple fails to acknowledge, much less explain, its prior positions, which demonstrate that Apple’s obviousness arguments are based on hindsight and use the particular claims at issue as a guide.

C. No Reference Teaches or Suggests a Protrusion Having a Convex Surface With Multiple Openings

No reference teaches or suggests the claimed limitation of a “protrusion comprising a convex surface and a plurality of openings extending through the protrusion and positioned over the three photodiodes.” EX1001 Claim 1; *see also* Claims 19, 26. Each independent claim includes a convex protrusion with multiple openings or windows:

- Claim 1 requires a “protrusion comprising a convex surface and a plurality of openings extending through the protrusion and positioned over the three photodiodes”;
- Claim 19 requires a “protrusion ... comprising a convex surface, the protrusion including a separate window associated with each of the three photodiodes”; and
- Claim 26 requires a “protrusion comprising a convex surface” with “a plurality of openings extending through the protrusion and aligned with the three photodiodes.”

Each independent claim also requires that the openings have “an opaque lateral surface ... configured to avoid light piping through the protrusion” (Claim 1), “an

opaque material lining a lateral surface of the windows ... configured to reduce an amount of light reaching the photodiodes without being attenuated by the tissue” (Claim 19), or an “opening defined by an opaque surface extending through the protrusion and configured to reduce light piping” (Claim 26).

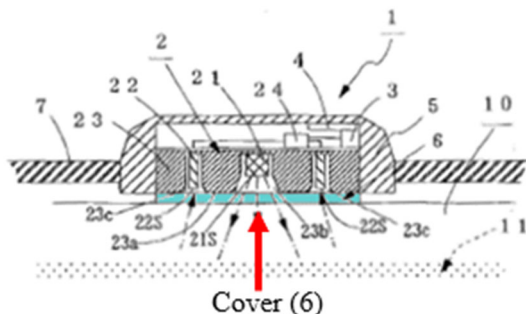
The Petition treats the challenged claims as mere catalogs of separate parts, in disregard of the part-to-part relationships that give the claims their meaning. For both main grounds, Apple’s analysis begins by describing the limitations of the challenged claims allegedly found in the asserted references. Pet., 8-18, 84-88. That is, Apple improperly “break[s] [each] invention into its component parts, then find[s] a prior art reference corresponding to each component.” *Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.*, 411 F.3d 1332, 1337 (Fed. Cir. 2005). The Federal Circuit, however, has cautioned against this hindsight-driven approach of “using the invention as a roadmap to find its prior art components.” *Id.* And here Apple has not even found every limitation in the prior art. EX2002 ¶¶75-76.

The next step of Apple’s flawed analysis creates a “Mendelson-799-Aizawa” structure, which Apple then further modifies into a “Mendelson-799-Aizawa-Ohsaki” (or “Mendelson-799-Aizawa-Kotanagi”) structure using the challenged claims as its guide. Pet., 18-29, 88. Apple thus starts with the claims and works backwards to cobble together each claim feature into a “combination device,” *id.*,

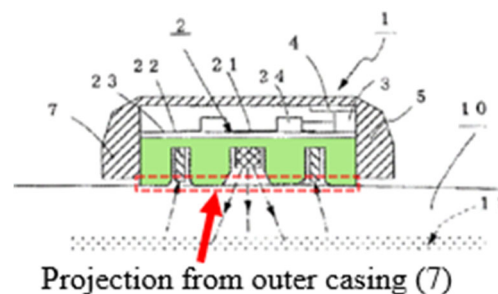
but “[t]his type of piecemeal analysis is precisely the kind of hindsight that the Board must not engage in.” *In re NTP, Inc.*, 654 F.3d 1279, 1299 (Fed. Cir. 2011).

1. Aizawa Does Not Teach a Protrusion Comprising a Convex Surface With Openings That Extend Through the Protrusion

Aizawa teaches two different sensor configurations, neither of which disclose the claimed protrusion. Aizawa’s main embodiment includes a holder with a flat cover extending across its surface. EX1007, ¶¶[0023]-[0032], FIGS. 1A-1B (below left, in blue). Aizawa teaches the flat cover improves adhesion at the palm-side of the wrist “and thereby further improve[s] the detection efficiency of the pulse waves.” *Id.*, ¶[0013]. Aizawa also includes an alternate embodiment without a cover that contacts the skin with a flat surface. *Id.*, ¶[0034], FIG. 5 (below right, in green).



EX1007 FIG. 1B (annotated)

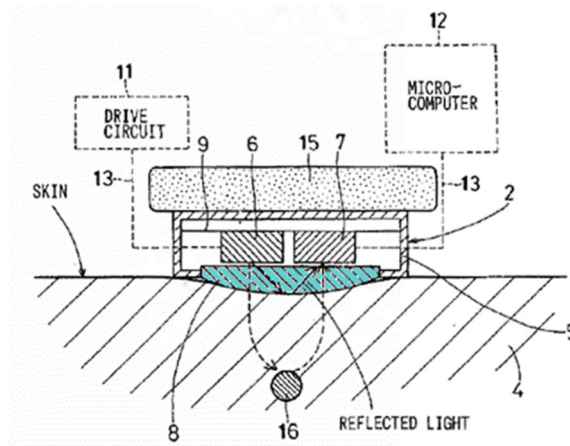


EX1007 FIG. 5 (annotated)

Aizawa does not teach or suggest modifying its holder into anything other than the illustrated flat surface. EX2002 ¶¶57-60, 77-79.

2. **Ohsaki Does Not Teach a Protrusion Comprising a Convex Surface With Openings That Extend Through the Protrusion**

Ohsaki's sensor includes a continuous convex glass "board" that does not disclose the claimed protrusion comprising a "plurality of openings extending through the protrusion and positioned over the three photodiodes." EX1008, ¶[0017], FIG. 2 (below, "board" in blue). Ohsaki illustrates "the convex surface" of the board "in intimate contact with the surface of the user's skin." *Id.*, ¶[0025].



EX1008 FIG. 2 (color added)

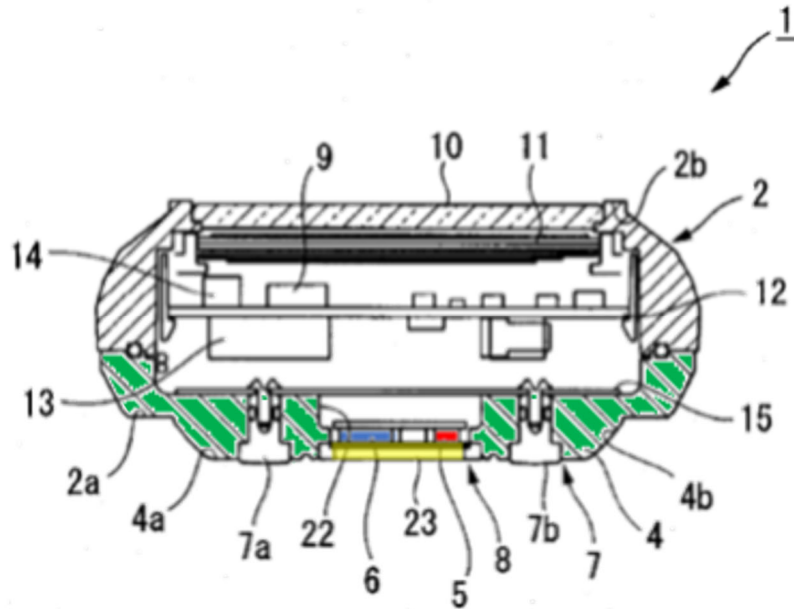
There are *no openings* in Ohsaki's board. *Id.*, ¶[0017], FIG. 2. There are also *no opaque surfaces* over Ohsaki's detector that would block light from passing through Ohsaki's board. *Id.*; EX2002 ¶¶67-68, 80-82.

3. **Kotanagi Does Not Teach a Protrusion Comprising a Convex Surface Over Multiple Photodiodes With Openings That Extend Through the Protrusion**

Kotanagi includes a "protruding part" (4) extending from the bottom of a wristwatch. EX1016, ¶[0054]. Unlike the claims at issue, Kotanagi's "protruding

part” (4, in green below left) is not above Kotanagi’s detector (6, blue below). *Id.*,

¶¶[0054]-[0055], FIGS. 5, 7.



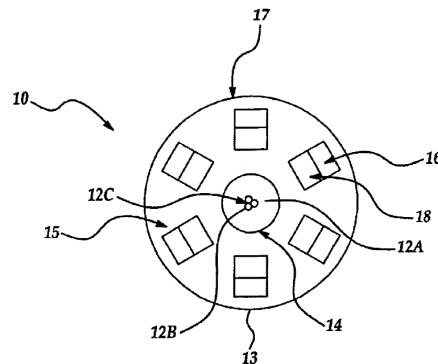
EX1016 FIG. 7 (color added)

Kotanagi’s detector is under a flat glass cover (23, in yellow above) with no openings. *Id.*, ¶[0055]. Kotanagi positions its detector “as close to the living body surface ... as possible.” *Id.*, ¶[0055]; see also *id.*, ¶¶[0056] (“the LED 5 and the PD 6 are as close to the living body surface ... as possible”), [0070] (LED and PD are pushed “so that they are as close to the living body surface ... as possible” which “makes it possible to detect the pulse rate with high precision”). Kotanagi does not teach a protrusion *over the detector*, does not teach or suggest openings *over each detector*, and does not teach or suggest an opaque surface *over each detector*.

EX2002 ¶¶61, 83-84.

4. **Mendelson-799 Does Not Teach a Protrusion Comprising a Convex Surface With Openings That Extend Through the Protrusion**

Mendelson-799's sensor does not include a protrusion, does not include a convex cover, and does not include openings for each detector. Instead, Mendelson-799 positions all of its detectors (16, 18) in the same open area between the sensor housing (17, on the outside) and the light shield (14, on the inside). EX1006, 9:22-40, FIG. 7; EX2002 ¶¶66, 85-86.



EX1006 FIG. 7

Because the cited art does not teach or suggest a “protrusion comprising a convex surface and a plurality of openings extending through the protrusion and positioned over the three photodiodes, the openings each comprising an opaque lateral surface” (EX1001, Claim 1; *see also id.*, Claims 19, 26; EX2002 ¶87), the Petition’s obviousness grounds are facially deficient. *See, e.g., PAR Pharms., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1194 (Fed. Cir. 2014) (The Board should “consider motivation to combine and reasonable expectation of success only ‘if all the elements of an invention are found in a combination of prior art references.’”).

D. A POSITA Would Not Have Altered Mendelson-799’s Oximeter to Add an Opaque Convex Protrusion Because Mendelson-799 Teaches Away and Repeatedly Warns Against Increasing Pressure

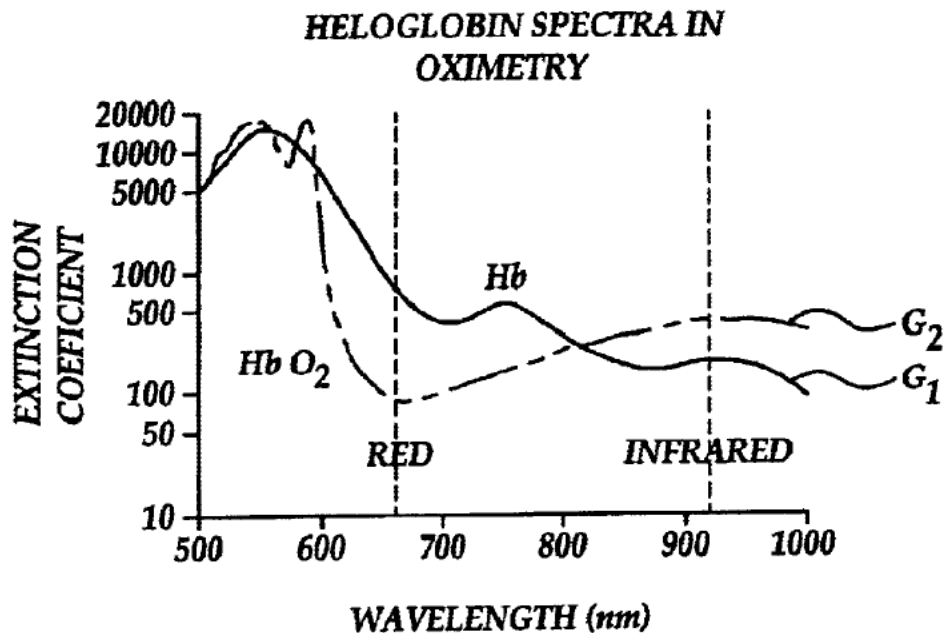
The Petition argues that a POSITA would have been motivated to add a “convex profile” to Mendelson-799’s pulse oximetry sensor to increase “the contact pressure at the center part of the lower surface,” Pet., 85, 26-27. But Mendelson-799 repeatedly warns against, and ultimately teaches away from, applying pressure with a convex surface by cautioning throughout its disclosure that pressure causes large errors in reflectance sensors’ measurements of blood-based parameters. *See, e.g.*, EX1006, 3:27-67 (explaining “mechanical pressure exerted by the sensor on the skin” was known to be a “major source” of measurement errors), 2:47-57 (“Similarly, variations in contact pressure between the sensor and the skin can cause larger errors in reflection pulse oximetry ... since some of the blood near the superficial layers of the skin may be normally displaced away from the sensor housing towards deeper subcutaneous structures. Consequently, the highly reflective bloodless tissue compartment near the surface of the skin can cause large errors....”), 4:59-65 (referencing measurement “errors caused by pressure differences and site-to-site variations”), 5:15-21 (referencing measurement errors “due to sensor placement and varying contact pressures”), 6:1-3 (“perturbations caused by contact pressure remain one of the major sources of errors in reflectance pulse oximetry”), 6:8-13 (variations in pressure “by the sensor on the skin ... can lead to large errors”),

6:16-35 (explaining why excessive and varying pressure causes errors in reflectance pulse oximetry measurements), 10:49-53 (explaining that “extensive human and animal studies” confirmed that oxygen saturation measurements are adversely affected “by sensor placement and by the amount of pressure applied by the sensor on the skin”), 12:62-13:5 (pressure can prevent accurate pulse oximetry measurements); EX2002 ¶¶88-89.

Mendelson-799 teaches that pressure-related errors are particularly “large” for reflectance-type sensors because the signals for reflectance-type sensors “are generally very small” to begin with. EX1006, 2:53-57. Mendelson-799 thus teaches a POSITA that the “perturbations caused by contact pressure remain one of the major sources of errors in reflectance pulse oximetry.” *Id.*, 5:66-6:3; *see also id.*, 10:49-57 (the “amount of pressure applied by the sensor on the skin ... could result in significant errors”). Mendelson-799 also explains that “the effects of contact pressure exerted by the probe on the skin” are compounded for reflectance-type pulse oximeters because the “light paths in reflectance oximetry are not well defined ... and thus may differ between the red and infrared wavelengths.” *Id.*, 3:32-38; EX2002 ¶89.

Mendelson-799 teaches that the pressure-induced errors relate, *inter alia*, to the multi-wavelength monitoring required for certain physiological parameters, such as oxygen saturation. As Mendelson-799 explains, accurately measuring oxygen

saturation requires obtaining consistent, high-quality red and infrared wavelength signals. *See, e.g.*, EX1006, 1:33-60, 6:16-22 8:65-9:7; EX2002 ¶¶42-43, ¶90. Mendelson-799's Figure 1 (below) illustrates the complicated relationship between extinction coefficient, wavelength, and oxygenated and deoxygenated hemoglobin that would have been used by a POSITA as part of the oxygen saturation determination. *See* EX1006, 9:3-7 (pulse oximetry sensor "relies on proportional changes in the AC and DC components" at each wavelength); EX2002 ¶¶42-43, ¶90.

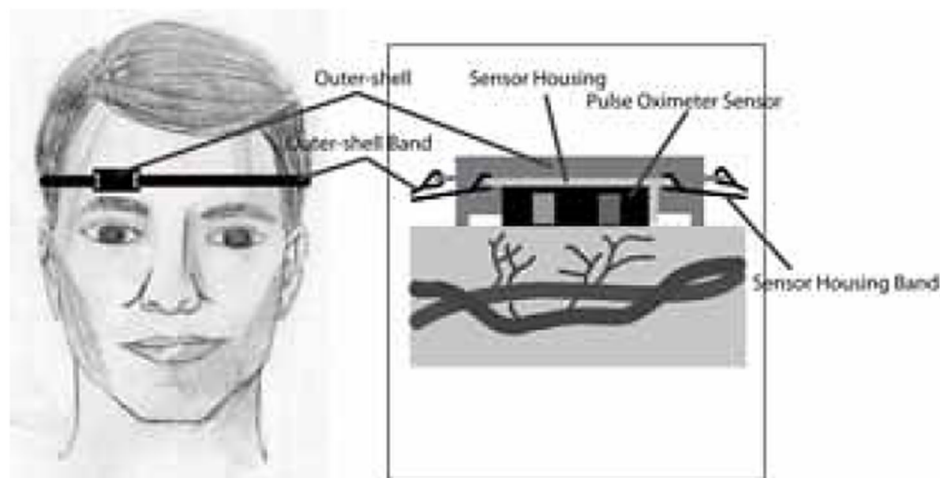


EX1006 FIG. 1

Mendelson-799 explains that pressure can change the complicated relationship between the different signals measured at different wavelengths, resulting in deviations in the calculated ratio and errors. EX1006, 6:16-35; *see also id.*, 9:8-21, EX2002 ¶¶42-43. Mendelson-799, therefore, demonstrates the understanding of

those of skill in the art at the relevant time that excessive or varying pressure caused errors in reflectance measurements of blood-based parameters. EX2002 ¶90.

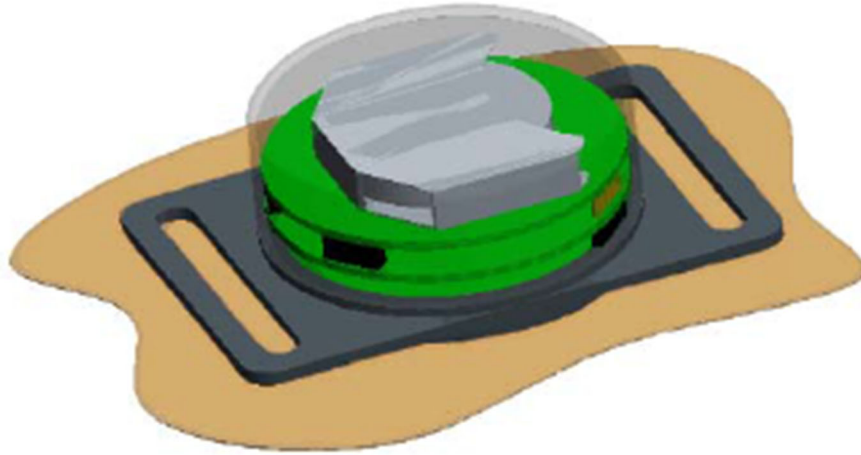
Other contemporaneous art reiterates the understanding of the pressure problem by those of skill in the art at the relevant time. For example, Mendelson made prototype sensors and published about them 2006, made commercial sensors and presented about them in 2007-2008, and published articles about his commercial sensors in 2013. EX2032; EX1014; EX2005; EX2006; EX2007; EX2002 ¶¶42-49, 91. In 2006, Mendelson explained that applying excessive or varying contact pressure between the sensor and skin was “known to interfere with local blood flow, consequently leading to diminished or loss of the photoplethysmographic (PPG) signal” and thus, “affect[s] the measurement accuracy.” EX2032, 49-50. His prototype sensors were flat.



Id.; EX2002 ¶45. Around the same time in 2005-2006, Professor Mendelson developed another prototype reflectance pulse oximetry sensor, which he published

about and presented at an industry conference in 2006. EX1014; EX2005; EX2002

¶46. As shown below, that prototype reflectance sensor was flat.



EX1014, 913. In 2007-2008, Mendelson designed and manufactured commercial forehead-mounted pulse oximeters. EX2006; EX2002 ¶47. That reflectance sensor design included the slightly concave curvature shown below to match the tissue surface, not press into it. This makes sense because Mendelson repeatedly taught that pressure would introduce significant errors by displacing the superficial (capillary) blood that is being measured, as was well understood in the industry.



EX2006. In August 2008, Professor Mendelson gave a presentation regarding the above sensor design at an industry conference. EX2006; EX2002 ¶47. In 2013,

Mendelson published an article explaining “[e]xcessive contact pressure between a reflectance pulse oximeter sensor and the skin is known to interfere with local blood flow, consequently leading to diminished or loss of the PPG signals.” EX2007, 3; EX2002 ¶48. Accordingly, Mendelson’s work over many years consistently taught that before, during, and after the relevant 2008 timeframe, a POSITA understood that pressure at the measurement site caused errors in reflectance measurements of blood-based parameters. EX2002 ¶49.

Based on that understanding, as demonstrated by Mendelson-799, a POSITA would have understood that adding a convex protrusion to a reflectance sensor like Mendelson-799’s pulse oximeter would add excessive and varying pressure to the measurement site. That pressure was understood to displace blood away from the sensor, which was taught to *cause* large errors in multi-wavelength blood-based parameter measurements, as explained above. EX2002 ¶91. Indeed, Masimo’s own inventors accepted this understanding before conducting the research leading to the discovery of the convex protrusions claimed in the ’501 Patent. EX2008, 98:9-99:16. Accordingly, the leading art, repeatedly and consistently taught away from Apple’s proposed combinations.

Repeated “cautions” that a particular path “should not be used”—like Mendelson-799’s repeated warnings against excessive or varying pressure in reflectance measurements of blood-based parameters—amount to a teaching away.

Chemours Co. FC, LLC v. Daikin Indus., Ltd., 4 F.4th 1370, 1376-77 (Fed. Cir. 2021). Indeed, Mendelson-799 teaches away from Apple’s proposed combinations because a POSITA “would be discouraged” or “led in a direction divergent from” combining a pressure-inducing convex protrusion with Mendelson-799’s sensor. *Ricoh Co., Ltd. v. Quanta Computer Inc.*, 550 F.3d 1325, 1332 (Fed. Cir. 2008); EX2002 ¶91. And the “inference of nonobviousness is especially strong” because the prior art’s “teachings undermine the very reason being proffered as to why a [POSITA] would have combined” a convex protrusion with Mendelson-799. *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009); Pet., 26-27, 85 (proposing combining Ohsaki or Kotanagi with Mendelson-799 to increase pressure over measurement site); EX2002 ¶91.

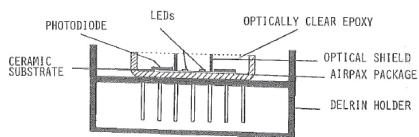
Relatedly, Mendelson-799’s repeated warnings against increased pressure undermine the alleged motivation to introduce a pressure-inducing convex protrusion, which is required for an obviousness finding. *See Chemours*, 4 F.4th at 1376-77 (there must be “competent proof” for why a POSITA would have changed a “key feature” in the cited art, regardless of whether or not the feature is in the challenged claims). A POSITA would not have modified Mendelson-799’s structure with a convex surface that increased pressure because that modification goes against Mendelson-799’s repeated warnings that pressure introduces errors. *Id.*; EX2002 ¶91.

The Petition never addresses Mendelson-799's teaching away or warnings about increasing pressure. Instead, the Petition relies on Ohsaki or Kotanagi, in combination with Aizawa, and argues that a POSITA would have been motivated to *increase* pressure at Mendelson-799's measurement site to improve adhesion. Pet., 26-27; *see also id.*, 85-87. But Ohsaki's, Kotanagi's, and Aizawa's sensors are all pulse rate monitors—not pulse oximeters. EX1007, ¶[0023]; EX1008, FIG. 2, ¶[0017] (“a light emitting element” (6)); EX1016, FIG. 5, ¶[0055] (“the LED” (5)); EX2002 ¶92. These pulse rate monitors use a single wavelength of light—not multiple wavelengths like a pulse oximeter—and count the number of pulse waves at that single wavelength. *See* EX1007, ¶[0028]; EX1008, ¶[0022]; EX1016, ¶[0065]; EX2002 ¶92. Because the pulse rate monitors disclosed in Aizawa, Ohsaki, and Kotanagi do not measure or use a ratio of multiple wavelengths, they are not susceptible to the same uncontrolled pressure errors as the reflectance-type pulse oximeters discussed in Mendelson-799. *See, e.g.*, EX1006, 3:32-38. A POSITA would have understood this difference and would not have blindly applied a pressure-increasing feature from a pulse rate monitor to Mendelson-799's pulse oximeter. EX2002 ¶92.

Apple ignores the teaching away and repeated cautions against pressure expressed in Mendelson-799, and argues “a POSITA would have found it obvious to modify a flat protrusion ... to include a convex surface ... so as to improve

adhesion between the user’s wrist and the sensor’s surface.” Pet., 26; *see also id.*, 86-87 (“a convex surface ... further improving adhesion between a subject’s wrist and a surface of the sensor while improving user comfort”). But many other approaches improved adhesion *without* causing detrimental pressure at the measurement site. EX2002 ¶93.

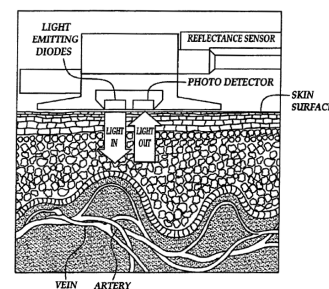
For example, Mendelson-799’s pulse oximeter could be attached to the user’s skin with “double-sided tape” (EX1013, 2) or secured with a band and used in such high motion activities as monitoring “soldiers during training exercises” or “emergency first-responders operating in harsh and hazardous environments” (EX1014, 4). Indeed, the Petition’s cited references—including Mendelson-799—illustrate pulse oximeters contacting the skin with a flat surface. *See e.g.*, EX1006, FIG. 3 (below right); EX1013, FIG. 2B (below left); EX2002 ¶93.



EX1013 FIG. 2B

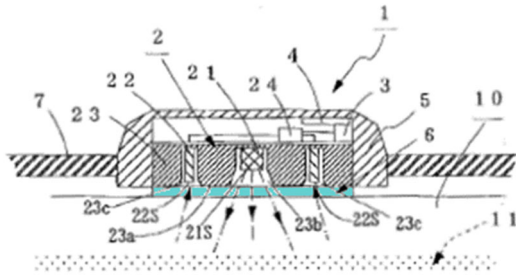


EX1014 FIG. 1

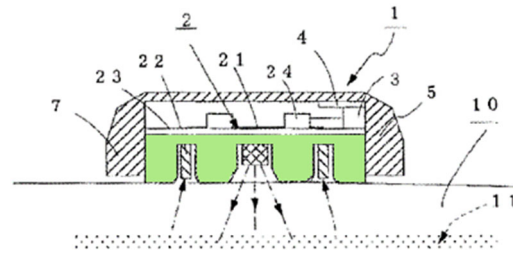


EX1006 FIG. 3

Aizawa also reports improved adhesion using a *flat* cover (below left, in blue) or a *flat* holder surface (below right, in green). EX1007 ¶¶ [0013], [0034], FIGS. 1B, 5.



EX1007 FIG. 1B (color added)



EX1006 FIG. 5 (color added)

Aizawa explains that its flat cover “makes it possible to improve adhesion between the sensor and the wrist.” EX1007, ¶[0013]. Alternatively, “adhesion can be improved” with the holder’s flat surface “projected from the outer casing.” *Id.*, ¶[0034], FIG. 5. An artisan need not choose between detrimental pressure and improved adhesion. Instead, a POSITA could improve adhesion and avoid pressure using a flat surface as taught by both Aizawa and Mendelson. EX1007, ¶¶[0013], [0034], FIGS. 1B, 5; EX1013, 2; EX1014, 4; EX2002 ¶94.

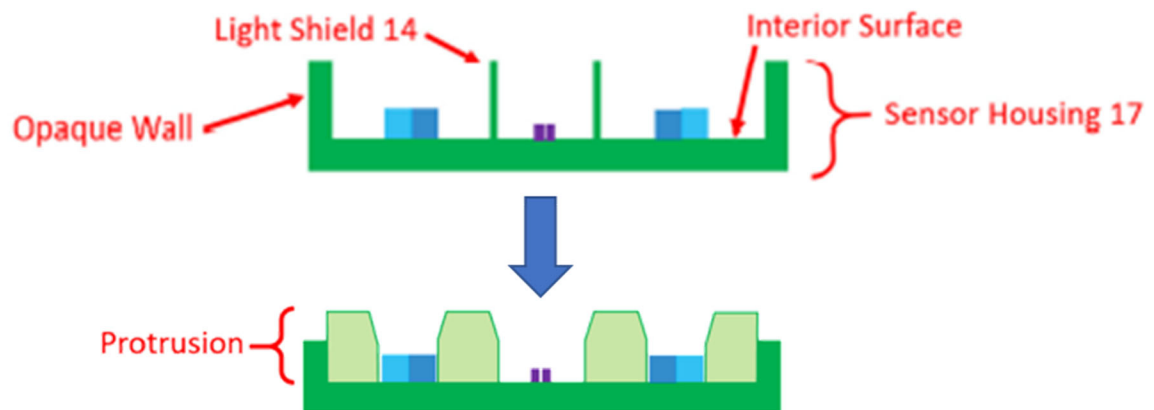
Apple cannot selectively “pick and choose” from Mendelson-799 while ignoring its warnings and teaching away from the proposed combinations. Indeed, “[i]t is **impermissible** within the framework of section 103 **to pick and choose** from any one reference ... to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” *In re Wesslau*, 353 F.2d 238, 241 (CCPA 1965); *see also Novo Nordisk A/S v. Caraco Pharm. Labs., Ltd.*, 719 F.3d 1346, 1365 (Fed. Cir. 2013) (“[o]ne cannot ... pick and choose among isolated disclosures in the prior art to deprecate the claimed invention”) (internal citation omitted). Apple selects Mendelson-799’s disclosure

of a sensor but ignores Mendelson-799's repeated warnings against pressure. Apple fails to reconcile Mendelson-799's warnings with Kotanagi's and Ohsaki's teaching that a protrusion would increase contact pressure at the measurement site. *See* Pet., 26-27, 82; EX1016, ¶¶[0035] ("the contact pressure of the center part of the lower surface is increased"), [0080] (same); EX1008, FIGS. 1-2. The Petition never reconciles these teachings, which fundamentally undermine its obviousness combinations. EX2002 ¶95; *see generally id.*, ¶¶73-95.

E. The Petition's Motivations are Unpersuasive

1. Apple Fails to Explain Why a POSITA Would Add the Teachings of Two Different References to Improve Adhesion

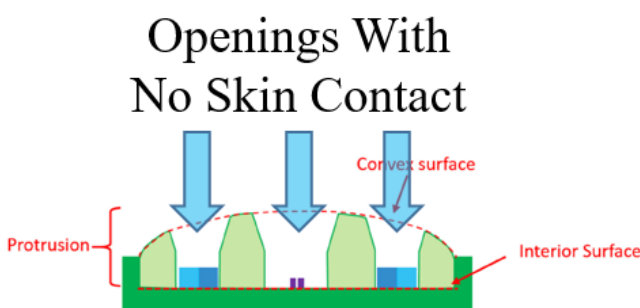
As the starting point for every ground, Apple argues a POSITA would have added Aizawa's flat opaque holder to Mendelson-799's sensor to improve adhesion. Pet., 19-23, 86.



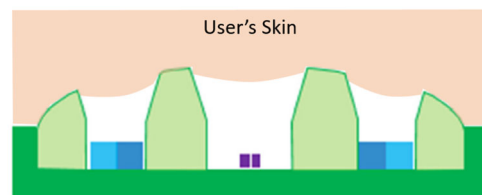
*Apple's Illustration of Mendelson-799 (Pet. 13, top)
and Mendelson-799 Combined with Aizawa (Pet. 22, bottom)*

The Petition then asserts a POSITA would have modified Aizawa's holder to have a convex surface based on either Ohsaki or Kotanagi as a way to “*further improv[e] adhesion.*” Pet., 24, 86-87. In support of this argument, Apple states that Ohsaki teaches a convex surface improves on a flat surface by preventing adverse effects from “the movement of the user's wrist.” *Id.*, 25 (citing EX1008, ¶[0025]).

Apple argues Ohsaki provides “contact between the *convex surface* and the user's skin” that “is said to prevent slippage, which increases the strength of the signals obtainable by Ohsaki's sensor.” Pet., 24. But the Petition eliminates the very structure Ohsaki suggests provides these alleged benefits—the continuous convex surface of the transparent glass cover. EX1008, ¶[0025], FIG. 2; EX2002 ¶¶96-97. Apple rejects Ohsaki's continuous transparent glass cover and instead introduces an opaque structure with multiple openings that eliminate most of the contact with the user's skin (below).



Pet. 33 (annotated)



Pet. 27 (modified to add user's skin)

Despite concocting a structure with reduced skin contact, Apple nevertheless asserts its structure would “prevent slippage” and “increase the strength of the

signals,” just like Ohsaki’s cover. Pet., 24. But Apple identified no teaching or suggestion in the prior art establishing that a perforated structure with reduced skin contact would provide the intimate contact of Ohsaki’s continuous convex surface. A skilled artisan would have understood that reduced intimate contact would undermine Ohsaki’s alleged benefits. EX2002 ¶¶96-98.

Apple never resolves the contradiction between (i) its original assertion that Aizawa’s flat holder provides improved adhesion, thus motivating its inclusion with Mendelson-799’s sensor, and (ii) its later assertion that a POSITA would have found Aizawa’s flat holder **deficient** for improving adhesion and thus necessitating its transformation into a “convex” shape. *Compare* Pet., 21-22 with *id.*, 25. Nothing explains why a POSITA seeking to improve adhesion would **first** adopt Aizawa’s purportedly deficient approach and **then** incorporate Ohsaki’s alleged improved approach. Only hindsight supports this frolic and detour through Aizawa. And nothing explains why a POSITA would have used a pressure-inducing protrusion for adhesion instead of one of the other known approaches, such as tape or a band. This flaw in the Petition’s analysis shows that Apple’s combinations are based on hindsight.⁸

⁸ The Petition raises a similar argument for Kotanagi, asserting that Kotanagi’s “protruding part 4” causes “the living body surface B [to] deform[] smoothly..., which further enhances adherence.” Pet., 85. The Kotanagi grounds have the same problem as the Ohsaki grounds: the proposed change no longer causes “the living

2. Aizawa Would Not Have Motivated a POSITA to Guard Against Saturation, Increase Light “Concentration” or Improve the Signal-To-Noise Ratio

Every Petition ground argues that a POSITA would have added Aizawa’s holder to Mendelson-799’s sensor to “guard against saturation,” “increase the signal-to-noise ratio,” and “increase the concentration of light collected by the detectors.” Pet., 19. But Aizawa never mentions saturation, increasing the signal-to-noise ratio, or increased light concentration. EX2002 ¶¶99. Apple instead relies on a conclusory and unsupported paragraph from its expert that is word-for-word identical to the Petition and sets forth no analysis whatsoever. Pet., 19 (*citing* EX1007, ¶¶[0023]-[0024]; EX1003, ¶45). Apple’s expert’s declaration even duplicates the Petition’s erroneous citation (to Mendelson-799 (EX1006) instead of Aizawa). *Compare* Pet., 19 (*citing* “APPLE-1006, [0024], [0012]” *with* EX1003, ¶46 (*citing* “APPLE-1006, [0024], [0012]”). Such conclusory and unsupported testimony cannot establish obviousness. *See DSS Tech. Mgmt., Inc. v. Apple Inc.*, 885 F.3d 1367, 1377 (Fed. Cir. 2018) (“conclusory statements and unspecific expert testimony’ are insufficient to support the Board’s findings”).

body surface B [to] deform[] smoothly,” and thus compromises the feature that allegedly “enhances adherence.” Pet., 85-87; EX1016, ¶¶[0035], [0080]; EX2002 ¶¶96-98.

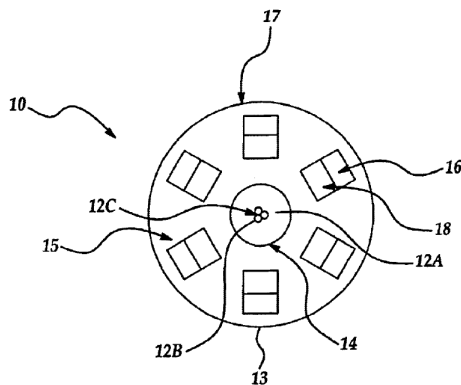
The Petition nonetheless asserts without credible support that the tapered openings of Aizawa’s holder “serve to increase the concentration of light collected by the detectors, thereby increasing the signal-to-noise ratio.” Pet., 19. But Aizawa does not indicate that its *tapered openings* increase the “*concentration* of light” collected, a function that typically requires a lens and not openings in a surface like those of Aizawa’s holder. See Pet., 19 (citing EX1007, ¶¶[0012], [0024]); EX2002 ¶100. Adding Aizawa’s holder to Mendelson-799’s sensor would block light from the measurement site and reduce the signal relative to Mendelson-799’s existing structure (see figure below). EX2002 ¶¶60, 100-101. The tapered openings in Aizawa’s holder merely restore part of the field of view otherwise blocked by the holder. EX1007, ¶[0024]; EX2002 ¶¶60, 100-101.



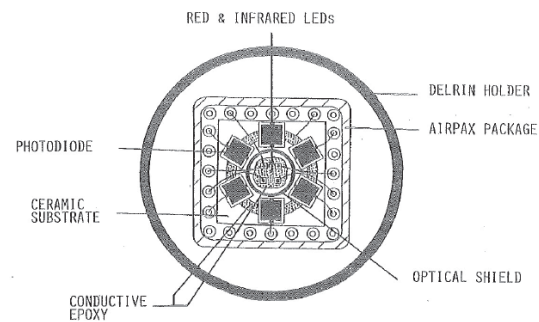
Apple’s fabricated illustration of Mendelson-799 (left, Petition at 13)
Apple’s “Mendelson-799-Aizawa” structure (right Petition at 22)
(light reflected from measurement site added in yellow)

While Aizawa has no teaching regarding signal-to-noise, Mendelson-799 teaches its design, with detectors positioned in a large open area, *already* maximizes signal-to-noise ratio. EX2002 ¶102. Thus, there would have been no reason for a POSITA to modify Mendelson-799’s sensor with Aizawa’s holder to maximize signal-to-noise ratio. Specifically, Mendelson-799 states its Figure 7 design (below

left) “*maximiz[es]* the fraction of backscattered light passing through the arterially perfused vascular tissue in the detected light.” EX1006, 9:22-40; EX2002 ¶¶102-103. Thus, Mendelson-799 teaches its design maximizes the signal (the fraction of backscattered light passing through tissue) to noise (in the overall detected light). EX1006, 9:22-40; EX2002 ¶¶102-103. The other cited Mendelson references use similar designs. See EX1013, FIG. 2A (below right).



EX1006 FIG. 7



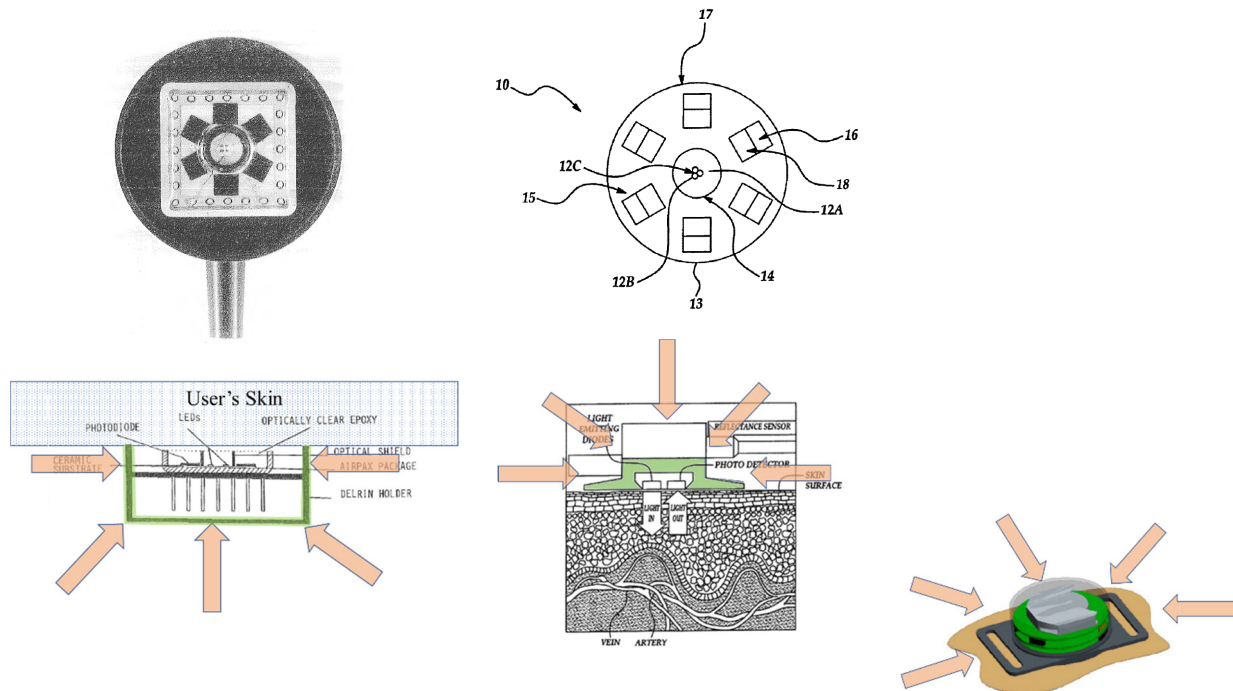
EX1013 FIG. 2A

Moreover, Apple argued that a POSITA would add Aizawa’s holder to both maximize light and block noise. But neither the Petition nor its verbatim declaration language establishes that Aizawa’s holder could both selectively block noise but increase the concentration of light. EX2002 ¶¶99-103.

3. Aizawa Would Not Have Motivated a POSITA to Modify Mendelson-799’s Sensor to Reduce Ambient Light

The Petition next alleges that a POSITA would have added Aizawa’s holder to Mendelson-799’s sensor to reduce ambient light. But, as the Petition admits, a POSITA would have understood that Mendelson-799’s existing housing *already*

shields from ambient light. Pet., 19. Under Apple’s theory, as illustrated below, the housing in Mendelson’s sensor (green below) presses against the skin and blocks ambient light (illustrated with orange arrows). EX2002 ¶¶104.



EX1013 FIGS. 2B-2C

EX1006 FIGS. 3, 7

EX1014 FIG. 1

(colorized to show exterior housing, ambient light indicated with arrows)

Apple never identifies any ambient-light problem with Mendelson-799’s sensor. EX2002 ¶¶104-105.

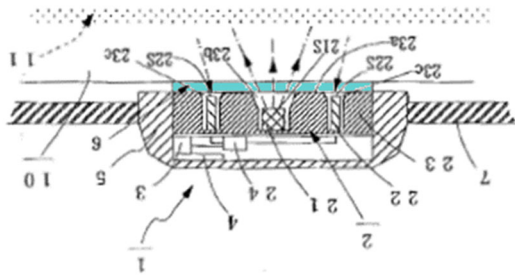
Apple nevertheless turns to Aizawa’s holder to “shield[] the [Mendelson-799] detectors from unwanted ambient light coming from outside the housing.” Pet., 19. Aizawa has no such teaching and does not even mention ambient light. Indeed, Apple’s cited portions of Aizawa (¶¶[0012], [0024], FIG. 1B) do not teach or suggest that the holder’s function is blocking ambient light. EX2002 ¶¶104-106. Apple’s

expert declaration is again effectively identical to the Petition and provides no additional analysis. *Compare* Pet., 19 with EX1003, ¶46.

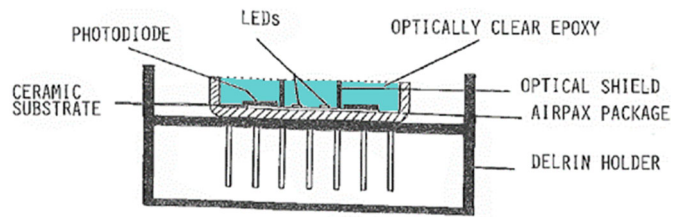
4. Apple’s “Added Protection” Motivation is Nonsensical

The Petition argues that a POSITA would have added Aizawa’s *holder* to Mendelson-799’s sensor to provide “added protection.” Pet., 22. But Aizawa does not teach its holder provides protection. Instead, Aizawa’s main embodiment (below left) includes a *cover* for the optical components. EX1007, ¶[0023], FIG. 1B. Apple previously argued, and the Board previously found, that a *cover* protected the underlying LED or detector. *See supra* Section VI.B.⁹ If anything, a POSITA desiring to add protection to Mendelson-799’s sensor would have added Aizawa’s *cover* (below left, blue). EX2002 ¶¶107-108. Indeed, Mendelson-1988—a related reference by the same inventor as Mendelson-799—encapsulates its optical components with a clear epoxy (below right, blue).

⁹ Apple argued that “a cover with a protruding convex surface...would ‘protect the elements within the sensor housing’ of Aizawa.” 2022 WL 557730 at *24. The Board found a convex cover would “*protect* the sensor’s internal components *in a manner similar to Aizawa’s flat acrylic plate*.” *Id.*; see also 2022 WL 562452 at *19 (“We are persuaded that adding a convex cover, such as that taught by Ohsaki, would protect the sensor's internal components.”).



EX1007 FIG. 1B
(rotated, cover in blue)



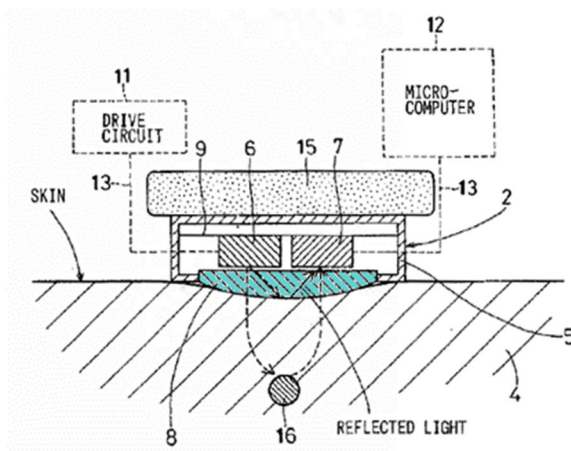
EX1013 FIG. 2
(epoxy encapsulation in blue)

Unlike Aizawa's cover or Mendelson's encapsulation, Aizawa's holder leaves open cavities. *Compare Pet., 27 with EX1007, FIG. 1B and EX1013, FIG. 2.* The open cavities are directly over the very components (LEDs and detectors) that are allegedly protected. When the sensor is used, the openings press against the skin. Accordingly, far from protecting the LEDs or detectors, the openings funnel dirt, sweat, and other contaminants from the measurement site directly to the optical components. EX2002 ¶¶107-108. The Petition provides no explanation for how an open cavity provides protection "from the elements" or "external forces," or why a POSITA seeking improved protection would use open cavities instead of Aizawa's cover or Mendelson's encapsulant.

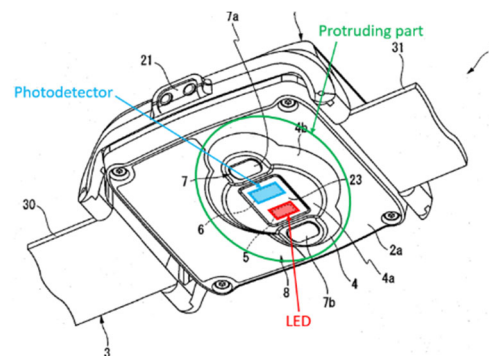
5. A POSITA Would Not Have Added a Protrusion to Aizawa's Holder to Improve User Comfort

Apple asserts that a "desire for improved user comfort" would have motivated a POSITA to add "a smooth, curved protrusion as per Ohsaki" to Aizawa's holder, which Apple alleges has "sharp edges." Pet., 28-29. The Petition similarly argues that a desire for improved comfort would motivate a POSITA to add Kotanagi's

convex shape to Aizawa's holder. Pet., 28 (citing EX1016), 85. Ohsaki's sensor has a smooth curved protrusion (below left) and Kotanagi's sensor has a continuous protruding surface (below right). Kotanagi specifically explains that it provides comfort because "the living body surface deforms smoothly." EX1016, ¶[0035]; EX2002 ¶109.

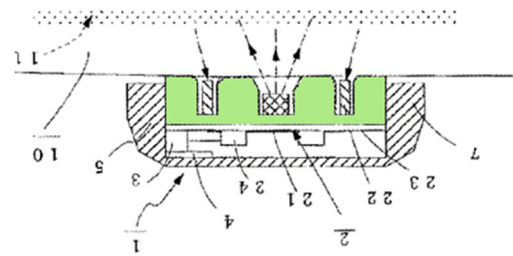


EX1008 FIG. 2
(color added, cover in blue)



Pet. 85
(Apple annotating EX1016 FIG. 5)

Apple's combinations inexplicably **eliminate** Ohsaki's smooth curved protrusion and Kotanagi's continuous protruding surface and replace them with a surface that is more uneven than Aizawa's existing flat surface (below right, in green):



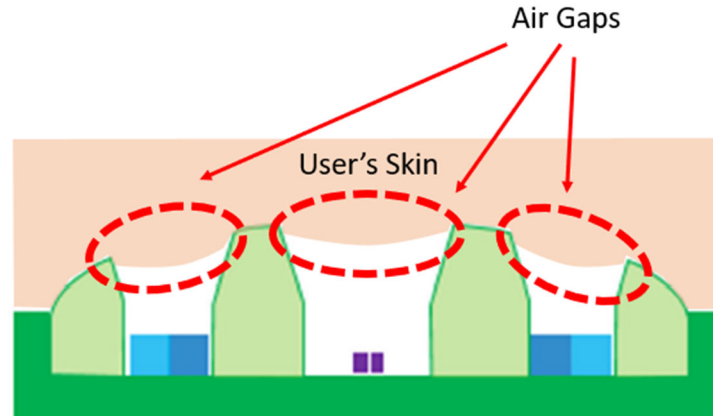
EX1007 FIG. 5 (rotated)

6. Adding Aizawa's Holder to Mendelson-799's Sensor Would Have Hindered Mendelson-799's Function

-57-

optimized arrangement. EX2002 ¶114. Further, as discussed above, the Petition’s proposed modifications would increase pressure. EX2002 ¶115. Mendelson-799 repeatedly warns against adding pressure, explaining pressure would have been expected to degrade performance. *See* Section VI.D; *see also* Section VI.A.1-2.

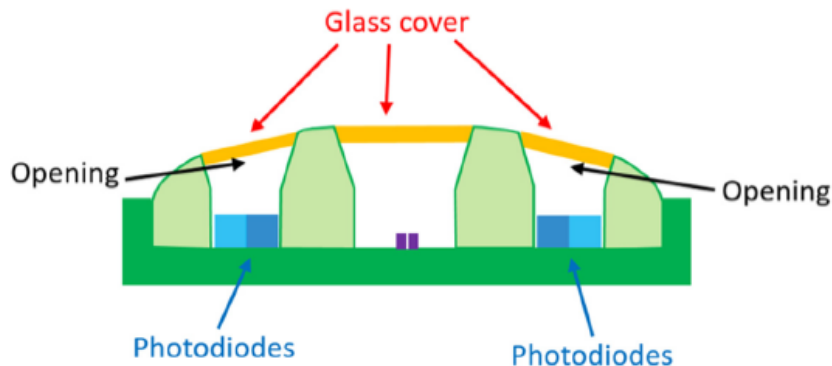
Mendelson-799 further warns against air gaps. EX1006, 2:58-61 (discussing “the potential for specular reflection caused by the superficial layers of the skin, when an *air gap* exists between the sensor and the skin”). As shown below, the Petition’s proposed structure introduces air gaps above the detectors. The Petition never reconciles Mendelson-799’s teaching against air gaps with the Petition’s introduction of air gaps. EX2002 ¶¶116-117.



Pet. 27 (modified to add user’s skin, air gaps annotated)

F. Apple Misinterprets the Art in Reconstructing Claim Features in Grounds 1B and 2B

For Grounds 1B and 2B, the Petition adds Scharf (EX1011) to Apple’s combinations.¹⁰ Apple argues that “a POSITA would have been motivated to add a glass cover (as per Scharf) to each of the openings in Mendelson-799-Aizawa-Ohsaki.” Pet., 52-53, 88-89.¹¹ But no reference teaches or suggests individual glass covers inserted into individual cavities in an opaque surface, much less the Petition’s convoluted structure shown below:



Apple’s Ground 1B and 2B Combinations (Pet. 53, 88-89)

Apple concocts the above structure by arguing a POSITA would place individual glass covers over each opening in Aizawa’s holder. Apple argues this is

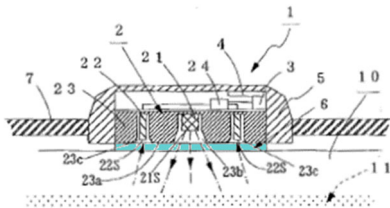
¹⁰ Grounds 1B and 2B incorporate the same reasoning as Grounds 1A and 2A, and are also flawed for the same reasons discussed above.

¹¹ Apple asserts that an opening and “glass across that opening ... together form a window.” Pet., 56. Masimo disagrees that claim 19’s “window” limitation necessarily requires a glass cover. See Pet., 55-58. Masimo nevertheless responds to the Petition’s arguments.

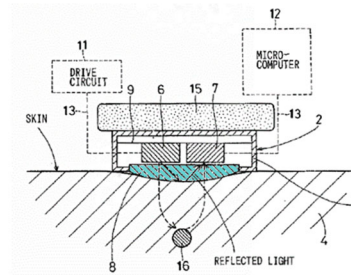
consistent with Aizawa because Aizawa’s sensor “includes cavities ... but does not expressly mention whether such cavities should be covered.” Pet., 52. Not true.

Aizawa (below left), like Ohsaki and Kotanagi, includes a single cover (blue).

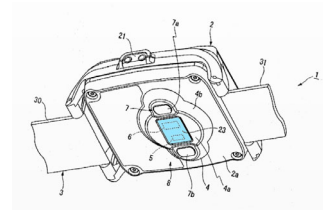
Aizawa’s cover extends over all of its cavities.



EX1007 FIG. 1B
(color added)
(Aizawa)



EX1008 FIG. 2
(color added)
(Ohsaki)

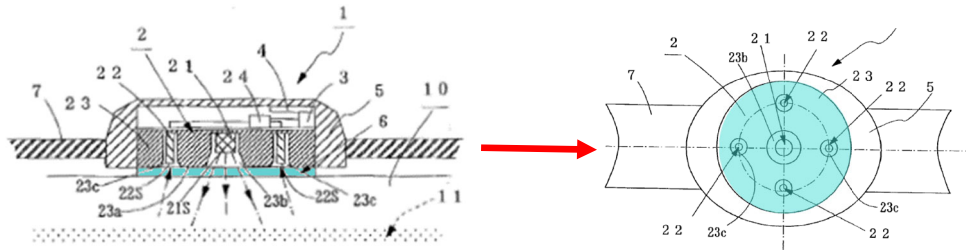


EX1016 FIG. 5
(color added)
(Kotanagi)

Ignoring those disclosures, the Petition proposes sticking individual glass pieces into Aizawa’s individual cavities “as per Scharf.” Pet., 52-53. But Scharf teaches a single flat cover similar to Aizawa’s cover that extends over all of the optical components.



EX1011 FIG. 6 (left, partial view) and FIG. 3 (right) (Scharf)



EX1007 FIG. 1B (left) and FIG. 1A (right) (color added) (Aizawa)

Apple's hindsight reconstruction of Masimo's claims consists of a series of highly improbable and circuitous steps. First, Apple argues a POSITA motivated by a desire for added protection would have added Aizawa's holder alone to Mendelson-799's sensor. But Aizawa includes a holder embodiment with a cover. Apple fails to explain why a POSITA desiring added *protection* would have added Aizawa's holder *without a cover*.

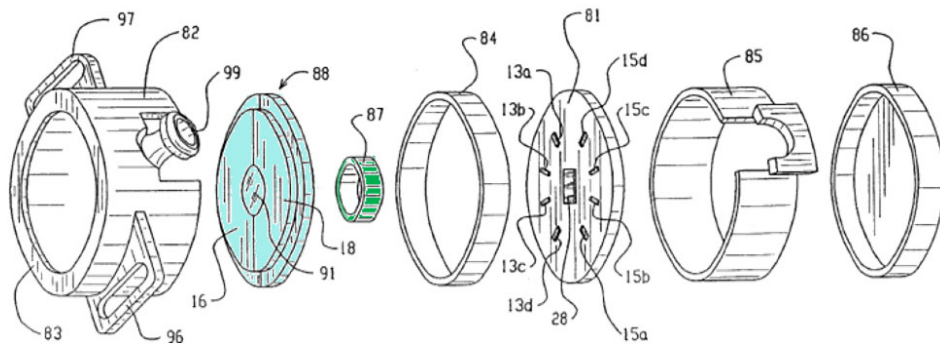
Second, Apple argues a POSITA reading Ohsaki or Kotanagi would change the shape of Aizawa's holder, resulting in a pock-marked structure found nowhere in the references. Pet., 26-28, 86-88. Again, Apple fails to explain why a POSITA would make such a change, rather than simply add Ohsaki or Kotanagi's covers. Either one of those covers (or Aizawa's holder with a cover) would have provided far more protection than the open cavities in Aizawa's holder.

Third, Apple argues a POSITA would have added Apple's disjointed glass covers to Aizawa's openings to "isolate these [optical] components from contamination from the environment or the tissue." Pet., 53. As discussed, however, Aizawa already has an embodiment with a cover to protect its optical components. Apple never explains why a POSITA would not select that embodiment, and rather select the embodiment *without* a cover only to add disjointed glass covers to provide protection. *Id.*, 19-22. As discussed, Aizawa, Ohsaki, and Kotanagi each disclose a single continuous cover over all the optical components. Nothing explains why a POSITA seeking to provide protection would add disjointed glass covers within each individual cavity in Aizawa's holder, rather than add the cover of Aizawa, Ohsaki or Kotanagi in the first place.

The Petition's approach also materially conflicts with Apple's prior arguments that a POSITA considering Ohsaki in combination with Aizawa or Mendelson-799 would have added a cover over all of the detectors for protection. *Apple Inc. v. Masimo Corp.*, No. IPR2020-01537, 2022 WL 557730 at *19 (P.T.A.B. Feb. 23, 2022); *Apple Inc. v. Masimo Corp.*, No. IPR2020-01536, 2022 WL 562452 at *19 (P.T.A.B. Feb. 23, 2022); *see also* Sections VI.B, VI.E.4.

Indeed, no cited reference teaches or suggests the Petition's proposed covers over individual cavities. The Petition incorrectly asserts that Scharf discloses "adding a glass cover over the openings/cavities." Pet., 53. But Scharf does not

place optical components (LEDs 13a-d, 15a-d, detector 28)¹² in individual cavities, let alone add an individual glass cover to each cavity. EX1011, 8:49-50; EX2002 ¶70.



EX1011 FIG. 6 (color added)

Rather than place the LEDs into individual cavities, Scharf uses a light shield (87, green above) to separate the detector from all the surrounding LEDs, which are all in the same open area. EX1011, 8:55-56; *see also* EX1006, FIG. 7; EX2002 ¶70.

The Petition suggests that Scharf’s face/cover includes pieces of glass (16, 18 and 91 above). Pet., 51 (citing EX1011, 8:60-66, 9:13-15). But Scharf’s purported “pieces” are actually part of a larger whole and make a single, smooth, flat cover. EX1011, 8:60-65 (pieces “are glued ... with an appropriate optically clear adhesive” into a single continuous flat cover); EX2002 ¶69. Scharf does not disclose individual glass covers placed into individual cavities. EX2002 ¶70. As illustrated below,

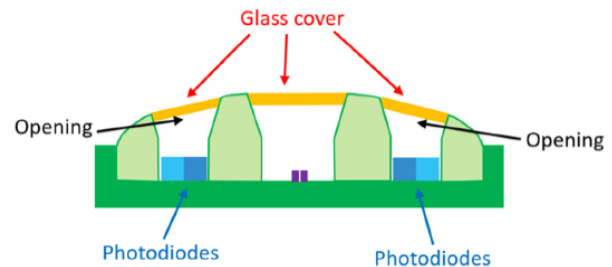
¹² Scharf’s photodiode 26 is part of a light-to-frequency converter (LFC) 28. EX1011, 5:19-22.

Scharf’s glass cover fits into its housing, forming a single flat surface (below left).

EX1011, FIGS. 3, 6. This is nothing like the Petition’s combinations (below right), which place individual glass covers over individual cavities.



*EX1011 FIG. 6 (left, partial view) and
FIG. 3 (right)*



Pet. 53, 88-89

Finally, the Petition is wrong that Apple’s proposed “glass cover would perform the same function taught by Scharf.” Pet., 54-55. Scharf’s cover consists of a single flat surface over all optical components. Indeed, Scharf is far more similar to Aizawa’s flat cover than Apple’s hindsight reconstruction. The Petition identifies no disclosed “function taught by Scharf” (Pet., 54-55) relevant to Apple’s proposed modification. Nor does the Petition identify any benefit to the proposed individual covers over individual cavities (*e.g.*, “index matching”) not already accomplished by the single cover of Aizawa, Ohsaki, or Kotanagi—each of which Apple ignored in the first instance. Pet., 54-55. No cited art discloses the features illustrated in the combinations or the relevant claims, and thus Grounds 1B and 2B must fail.

VII. RESERVATION OF RIGHTS

Should the Board decide to institute an *inter partes* review, Masimo reserves all rights to make additional arguments in and present claim constructions and evidence with its Patent Owner Response. Masimo's silence on any particular claim or limitation at this time is not a concession that the Petition's discussion of that claim or limitation is properly based. Patent Owner also reserves the right to dispute the level of ordinary skill in the art if the Board decides to institute *inter partes* review. Accordingly, Masimo reserves the right to submit additional or alternative arguments of patentability, and nothing in this Preliminary Response acts or should be construed to act as an admission, acquiescence, or estoppel on the merits of the Petition.

VIII. CONCLUSION

For the reasons discussed above, the Petition is deficient and Masimo respectfully requests that the Board deny institution.

IPR2022-01271

Apple Inc. v. Masimo Corp.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: October 26, 2022

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), Counsel for Patent Owner Masimo Corporation hereby certifies that this document complies with the type-volume limitation of 37 C.F.R. § 42.24(b). According to Microsoft Office Word 2010's word count, this document contains approximately 11,913 words, including any statement of material facts to be admitted or denied in support, and excluding the table of contents, table of authorities, mandatory notices under § 42.8, exhibit list, certificate of service or word count, or appendix of exhibits or claim listing.

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: October 26, 2022

/Jacob L. Peterson/

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CERTIFICATE OF SERVICE

I hereby certify that, pursuant to 37 C.F.R. § 42.6(e) and with the agreement of counsel for Petitioner, a true and correct copy of **PATENT OWNER PRELIMINARY RESPONSE AND EXHIBITS 2002-2003, 2005-2032** is being served electronically on October 26, 2022, to the e-mail addresses shown below:

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