

NOTE: This disposition is nonprecedential.

**United States Court of Appeals  
for the Federal Circuit**

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**MASIMO CORPORATION,**  
*Appellant*

v.

**APPLE INC.,**  
*Appellee*

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2022-1631, 2022-1632, 2022-1633, 2022-1634, 2022-1635,  
2022-1636, 2022-1637, 2022-1638

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Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2020-01520, IPR2020-01521, IPR2020-01536, IPR2020-01537, IPR2020-01538, IPR2020-01539, IPR2020-01714, IPR2020-01715.

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Decided: September 12, 2023

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STEPHEN W. LARSON, Knobbe, Martens, Olson & Bear, LLP, Irvine, CA, argued for appellant. Also represented by STEPHEN C. JENSEN, JAROM D. KESLER, JOSEPH R. RE; JEREMIAH HELM, Washington, DC.

LAUREN ANN DEGNAN, Fish & Richardson P.C., Washington, DC, argued for appellee. Also represented by

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Before LOURIE, PROST, and CUNNINGHAM, *Circuit Judges*.

LOURIE, *Circuit Judge*.

Masimo Corp. (“Masimo”) appeals from eight final written decisions of the United States Patent and Trademark Office (“USPTO”) Patent Trial and Appeal Board (“the Board”) holding nearly all claims of U.S. Patents 10,258,265 (“the ’265 patent”), 10,292,628 (“the ’628 patent”), 10,577,553 (“the ’553 patent”), 10,588,554 (“the ’554 patent”), and 10,631,765 (“the ’765 patent”) (collectively, “the challenged patents”) unpatentable as obvious. *Apple Inc. v. Masimo Corp.*, IPR2020-01520, 2022 WL 557896 (P.T.A.B. Feb. 23, 2022) (“’1520 Decision”), J.A. 1–106; *Apple Inc. v. Masimo Corp.*, IRPR2020-01521, 2022 WL 1093210 (P.T.A.B. Apr. 11, 2022) (“’1521 Decision”), J.A. 107–98; *Apple Inc. v. Masimo Corp.*, IPR2020-01536, 2022 WL 562452 (P.T.A.B. Feb. 23, 2022) (“’1536 Decision”), J.A. 199–276; *Apple Inc. v. Masimo Corp.*, IPR2020-01537, 2022 WL 557730 (P.T.A.B. Feb. 23, 2022) (“’1537 Decision”), J.A. 277–358; *Apple Inc. v. Masimo Corp.*, IPR2020-01538, 2022 WL 557732 (P.T.A.B. Feb. 23, 2022) (“’1538 Decision”), J.A. 359–428; *Apple Inc. v. Masimo Corp.*, IRPR2020-01539, 2022 WL 562219 (P.T.A.B. Feb. 23, 2022) (“’1539 Decision”), J.A. 429–514; *Apple Inc. v. Masimo Corp.*, IPR2020-01714, 2022 WL 1094551 (P.T.A.B. Apr. 6, 2022) (“’1714 Decision”), J.A. 515–91; *Apple Inc. v. Masimo Corp.*, IPR2020-01715, 2022 WL 1093219 (P.T.A.B. Apr. 6, 2022) (“’1715 Decision”), J.A. 592–675. For the reasons articulated below, we *reverse-in-part* and *affirm-in-part*.

#### BACKGROUND

The challenged patents, all assigned to Masimo, are directed to an optical sensor for noninvasively measuring blood constituents, including a protruding, convex cover

positioned over multiple light detectors and emitters. Representative claim 1 of the '628 patent is reproduced below.

1. A noninvasive optical physiological sensor comprising:

a plurality of emitters configured to emit light into tissue of a user;

a plurality of detectors configured to detect light that has been attenuated by tissue of the user, wherein the plurality of detectors comprise at least four detectors;

a housing configured to house at least the plurality of detectors; and

a light permeable cover configured to be located between tissue of the user and the plurality of detectors when the noninvasive optical physiological sensor is worn by the user, wherein the cover comprises an outwardly protruding convex surface configured to cause tissue of the user to conform to at least a portion of the outwardly protruding convex surface when the noninvasive optical physiological sensor is worn by the user and during operation of the noninvasive optical physiological sensor, and wherein the plurality of detectors are configured to receive light passed through the outwardly protruding convex surface after attenuation by tissue of the user.

'628 patent, col. 44 ll. 36–56.

Apple Inc. (“Apple”) petitioned for review of the five challenged patents, asserting three primary references,

Aizawa,<sup>1</sup> Mendelson-1988,<sup>2</sup> and/or Mendelson-799,<sup>3</sup> in combination with at least one of three secondary references, Inokawa,<sup>4</sup> Ohsaki,<sup>5</sup> and/or Mendelson-2006.<sup>6</sup> Aizawa discloses a wrist, palm-side sensor for detecting a pulse with a single, central emitter and a “plate-like member” to “improve adhesion” (e.g., contact between the sensor and a user’s skin). Aizawa, Figs. 1(a), 1(b), 2, ¶ 13. Mendelson-1988 discloses a flat, forehead oxygen sensor with multiple detectors around a central emitter. Mendelson-1988, Fig. 2. Mendelson-799 discloses a similar arrangement but with three centrally clustered emitters. Mendelson-799, Fig. 7. Mendelson-2006 focuses on the transmission of data from an optical sensor. Mendelson-2006, Abstract. Inokawa discloses a wrist sensor with a convex cover, emitters on the periphery, and a single detector in the center. Inokawa, ¶¶ 58–59, Fig. 2. Ohsaki

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<sup>1</sup> U.S. Patent Application Publication 2002/0188210 A1 (filed May 23, 2002, published Dec. 12, 2002), J.A. 3242–48 (“Aizawa”).

<sup>2</sup> Yitzhak Mendelson et al., *Design and Evaluation of a New Reflectance Pulse Oximeter Sensor*, 22 ASS’N FOR THE ADVANCEMENT OF MED. INSTRUMENTATION 167 (1988), J.A. 3358–64 (“Mendelson-1988”).

<sup>3</sup> U.S. Patent 6,801,799 B2 (filed Feb. 6, 2003, issued Oct. 5, 2004), J.A. 155578–93 (“Mendelson-799”).

<sup>4</sup> Japanese Patent Application Published 2006-296564 A (filed Apr. 18, 2005, published Nov. 2, 2006), J.A. 3249–95 (“Inokawa”).

<sup>5</sup> U.S. Patent Application Publication 2001/0056243 A1 (filed May 11, 2001, published Dec. 27, 2001), J.A. 3352–57 (“Ohsaki”).

<sup>6</sup> YITZHAK MENDELSON ET AL., A WEARABLE REFLECTANCE PULSE OXIMETER FOR REMOTE PHYSIOLOGICAL MONITORING (Proceedings of the 28th IEEE EMBS Annual International Conference, Aug. 30–Sep. 3, 2006), J.A. 23200–03 (“Mendelson-2006”).

discloses a sensor with a convex cover worn on the “back side” (*i.e.*, watch side) of a user’s wrist and that reduces slippage. Ohsaki, Abstract; *see also id.* at Fig. 1, ¶ 23.

In the eight *inter partes* review (“IPR”) proceedings, Apple asserted a variety of motivations to combine the asserted references, including: (1) improved light collection, (2) improved adhesion, (3) improved detection efficiency, and (4) improved protection of the sensor elements. The improved light collection theory was based, in part, on what the Board and parties referred to as the “greatest curvature theory,” meaning that light concentration would increase where the curvature of a lens’s surface is the greatest—in Apple’s proposed combinations, allegedly at the peripheral detectors, not directly at the center.

Masimo challenged each of the proffered motivations to combine, including arguing that (1) a convex lens would condense light toward the center, away from the peripheral detectors in Apple’s combinations; (2) Apple’s arguments contradicted admissions made by its expert witness; and (3) Ohsaki only teaches improved adhesion with a watch-side sensor, and the same benefits would not be achieved with Aizawa’s palm-side sensor, which achieves adhesion through its flat plate. Masimo further argued that the greatest curvature theory was belatedly raised in Apple’s Reply Brief. In addition, Masimo challenged Apple’s asserted reasonable expectations of success and the references’ alleged disclosure of every claim element, including the specific protrusion heights required by claims 11, 17, and 28 of the ’554 patent and claims 12, 18, and 29 of the ’765 patent.

The Board ultimately found that each challenged claim would have been obvious over the combination of references, except for independent claim 13 of the ’554 patent.

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