

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

KOSS CORPORATION,
Patent Owner.

IPR2021-00305
Patent 10,506,325 B1

Before DAVID C. McKONE, GREGG I. ANDERSON,
and NORMAN H. BEAMER, *Administrative Patent Judges*.

McKONE, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Determining Some Challenged Claims Unpatentable

35 U.S.C. § 318(a)

I. INTRODUCTION

A. *Background and Summary*

Apple Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 1–4, 9, 10, and 14–18 of U.S. Patent No. 10,506,325 B1 (Ex. 1001, “the ’325 patent”). Pet. 1. Koss Corp. (“Patent Owner”) filed a Preliminary Response (Paper 9, “Prelim. Resp.”). Pursuant to our authorization, Petitioner filed a Preliminary Reply (Paper 12) and Patent Owner filed a Preliminary Sur-Reply (Paper 13). Pursuant to 35 U.S.C. § 314, we instituted this proceeding. Paper 14 (“Dec.”).

Patent Owner filed a Patent Owner’s Response (Paper 20, “PO Resp.”), Petitioner filed a Reply to the Patent Owner’s Response (Paper 35, “Reply”), and Patent Owner filed a Sur-reply to the Reply (Paper 42, “Sur-reply”). An oral argument was held in this proceeding on March 3, 2022. Paper 46 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Decision is a final written decision under 35 U.S.C. § 318(a) as to the patentability of claims 1–4, 9, 10, and 14–18. Based on the record before us, Petitioner has proved, by a preponderance of the evidence, that claims 1–4, 9, 10, and 14–17 are unpatentable, but has not proved that claim 18 is unpatentable.

B. *Related Matters*

1. *Lawsuits*

Petitioner advises us that it is a defendant in a case filed by Patent Owner asserting the ’325 patent in the United States District Court for the Western District of Texas (“Texas court”) captioned *Koss Corp. v. Apple Inc.*, Case No. 6:20-cv-00665 (W.D. Tex.) (“Texas case”). Pet. 79; *see also* Paper 11, 1. Patent Owner identifies another three lawsuits where Patent

Owner is plaintiff and the '325 patent is asserted against other parties. Paper 11, 1. Patent Owner identifies two other cases involving the '325 patent, including one filed by Petitioner in the United States District Court for the Northern District of California captioned *Apple Inc. v. Koss Corp.*, Case No. 4:20-cv-05504 (N.D. Cal.). Paper 11, 1.

2. *Inter Partes* Review Proceedings

Patent Owner (Paper 11, 1–2; Paper 30, 1) lists the following *inter partes* review proceedings¹ challenging the '325 patent or patents related to the '325 patent:

Bose Corp. v. Koss Corp., IPR2021-00297, filed December 7, 2020, challenging U.S. Patent No. 10,368,155 B2;

Apple Inc. v. Koss Corp., IPR2021-00381, filed January 4, 2021, challenging U.S. Patent No. 10,491,982 B1;

Apple Inc. v. Koss Corp., IPR2021-00546, filed February 22, 2021, challenging U.S. Patent No. 10,206,025 B1;

Apple Inc. v. Koss Corp., IPR2021-00592, filed March 2, 2021, challenging U.S. Patent No. 10,469,934 B1;

Bose Corp. v. Koss Corp., IPR2021-00612, filed March 3, 2021, challenging U.S. Patent No. 10,206,025 B1;

Apple Inc. v. Koss Corp., IPR2021-00626, filed March 17, 2021, challenging U.S. Patent No. 10,206,025 B1;

Bose Corp. v. Koss Corp., IPR2021-00680, filed March 17, 2021, challenging U.S. Patent No. 10,469,934 B1, filed March 17, 2021;

¹ *Apple Inc. v. Koss Corp.*, IPR2021-00255, filed November 25, 2020, and *Apple Inc. v. Koss Corp.*, IPR2021-00600, filed March 7, 2021, both challenging U.S. Patent No. 10,298,451 B1 are also pending.

Apple Inc. v. Koss Corp., IPR2021-00679, filed March 22, 2021, challenging the '325 patent;

Apple Inc. v. Koss Corp., IPR2021-00686, filed March 22, 2021, challenging U.S. Patent No. 10,491,982 B1;

Apple Inc. v. Koss Corp., IPR2021-00693, filed March 23, 2021, challenging U.S. Patent No. 10,469,934 B1;

Apple Inc. v. Koss Corp., IPR2022-00053, filed October 15, 2021, challenging U.S. Patent No. 10,206,025 B1; and

Apple Inc. v. Koss Corp., IPR2022-00188, filed November 15, 2021, challenging U.S. Patent No. 10,469,934 B1.

C. The '325 Patent

The '325 patent describes wireless earphones or headphones. Ex. 1001, 2:3–5. Figure 1D, reproduced below, illustrates an example:

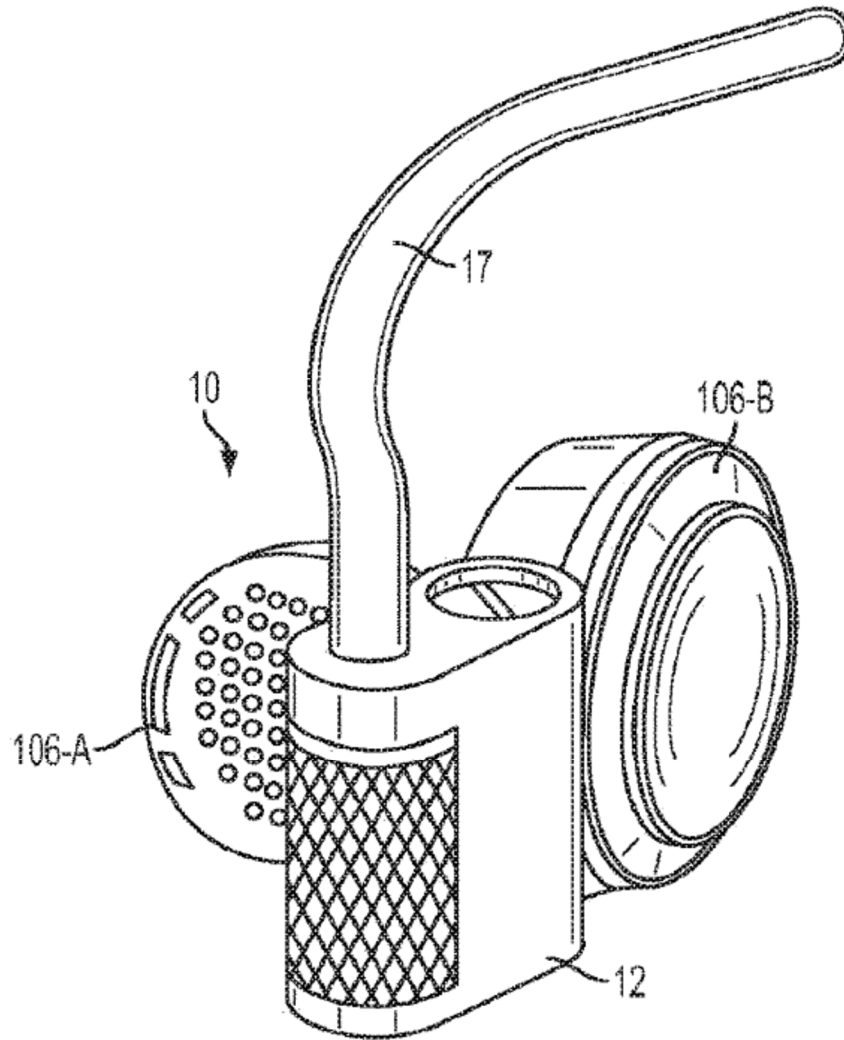


FIG. 1D

Figure 1D is a perspective drawing of a wireless earphone. *Id.* at 2:30–31, 4:7. In this embodiment, earphone 10 includes hanger bar 17 that allows earphone 10 to clip to, or hang on, a listener's ear. *Id.* at 4:4–7. Speaker element 106-A is sized to fit into the cavum concha of the listener. *Id.* at 4:10–12. Hanger bar 17 includes a horizontal section that rests upon the upper external curvature of the listener's ear behind the upper portion of the auricula (or pinna). *Id.* at 4:14–18.

Certain features of an embodiment of a wireless earphone are depicted in Figure 3, reproduced below:

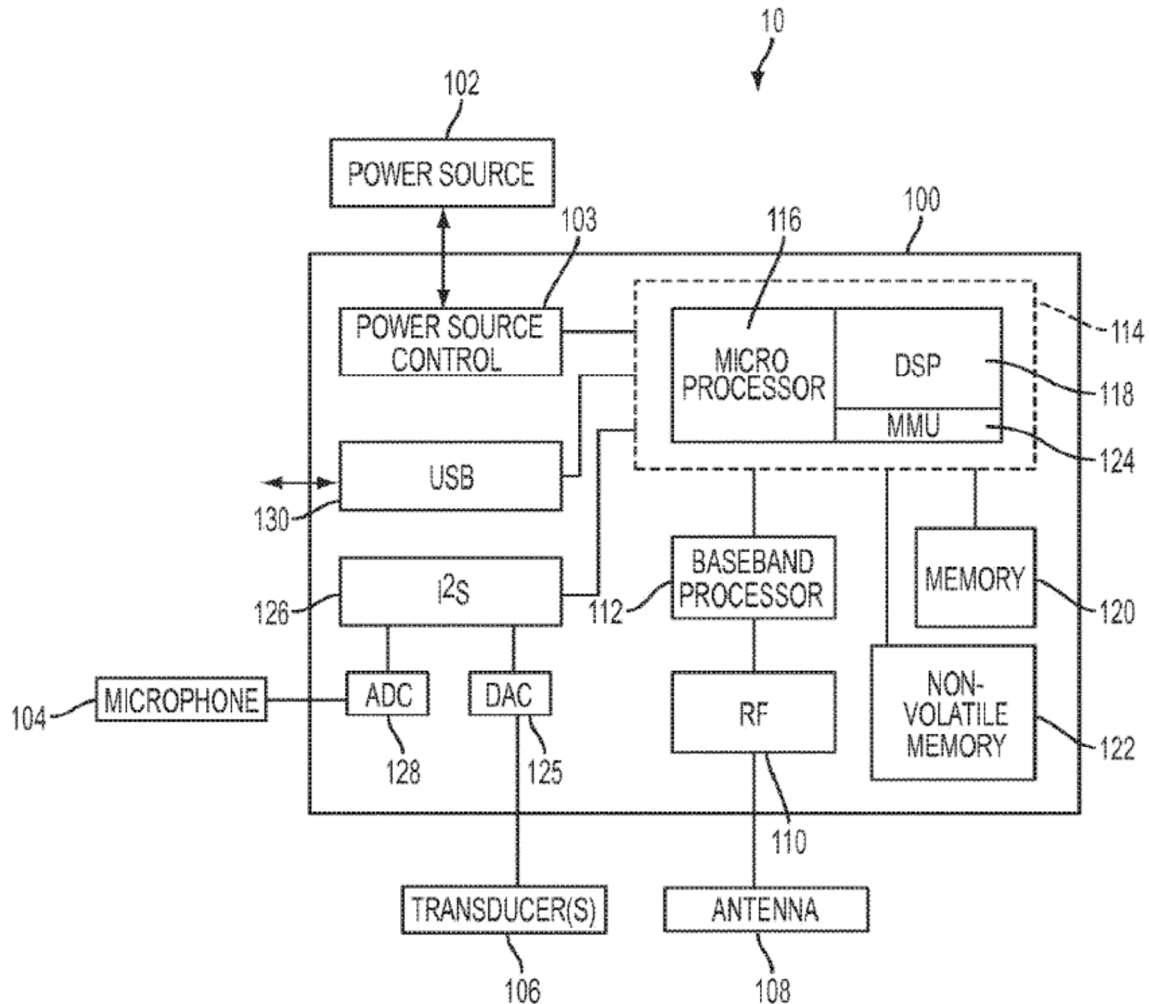


FIG. 3

Figure 3 is a block diagram of a wireless earphone. *Id.* at 2:35–36, 6:30–31.

Earphone 10 includes transceiver circuit 100, power source 102, microphone 104, acoustic transducer 106 (e.g., a speaker), and antenna 108.

Id. at 6:31–37. Transceiver circuit 100, power source 102, and acoustic transducer 106 may be housed within body 12 of earphone 10 (shown in Fig. 1D above).

Id. at 6:37–40. Microphone 104 and antenna 108 are external to body 12.

Id. at 6:40–42. Earphone 10 includes baseband processor 112 in communication with processor unit 114 which, in turn, includes microprocessor 116 and digital signal processor (DSP) 118. *Id.* at

7:30–32. DSP 118 “may . . . perform various sound quality enhancements to the digital audio received by the baseband processor 112, including noise cancellation and sound equalization.” *Id.* at 7:34–38. Processor unit 114 executes firmware that may be stored on memory units 120, 122. *Id.* at 7:43–46. The ’325 patent describes headphone 10 receiving firmware upgrades from a host server when earphone 10 is connected to a client computer device through a USB port and/or docking station. *Id.* at 9:50–56. “The power source 102 may comprise, for example, a rechargeable or non-rechargeable battery (or batteries). . . . In embodiments where the power source 102 comprises a rechargeable battery cell . . . , the battery cell . . . may be charged for use, for example, when the earphone 10 is connected to a docking station or computer.” *Id.* at 6:56–65.

Earphone 10 may interface with an external device, such as the docking station shown in Figure 4A, reproduced below:

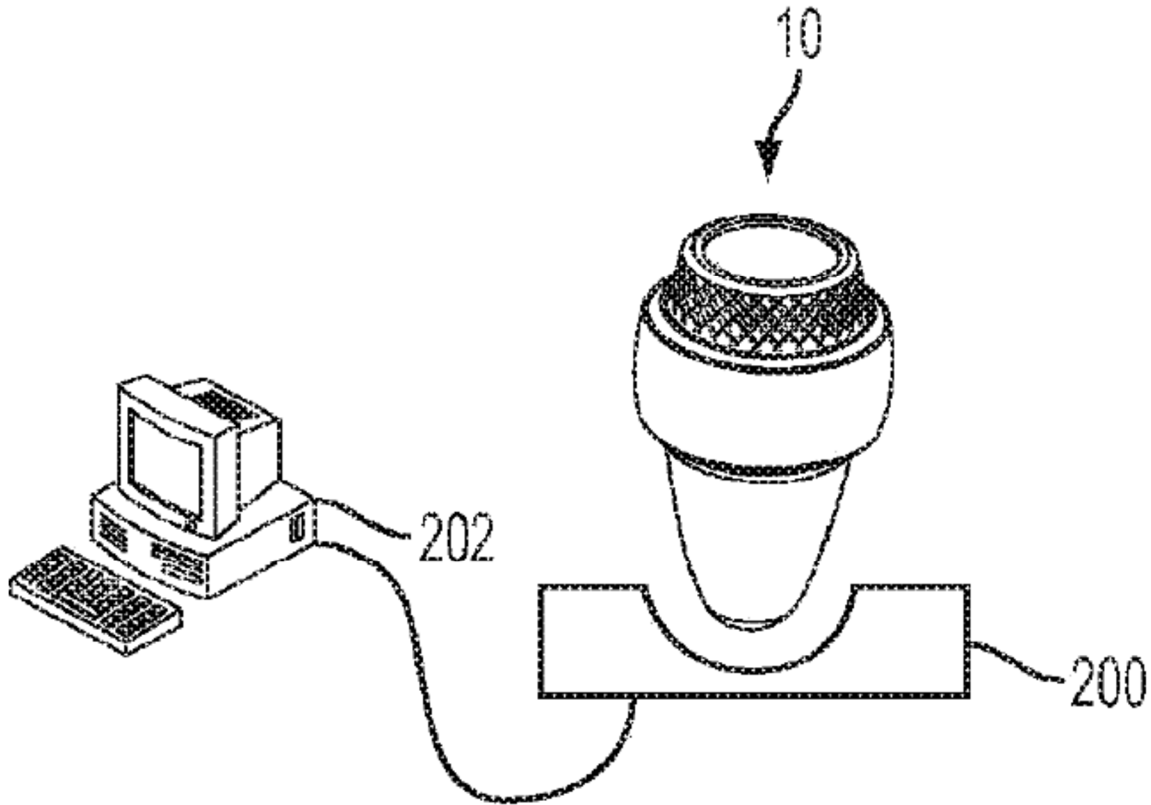


FIG. 4A

Figure 4A is a drawing showing earphone 10 interfacing with docking station 200, which is connected to computer device 202. *Id.* at 7:64–66. Earphone 10 may connect to docking station 102 to charge up power source 102 and to download data or firmware. *Id.* at 8:5–8.

Claims 1, 9, and 18, reproduced below, are illustrative of the claimed subject matter:

1. Headphones comprising:
a pair of first and second wireless earphones to be worn simultaneously by a user, wherein the first and

second earphones are separate such that when the headphones are worn by the user, the first and second earphones are not physically connected, wherein each of the first and second earphones comprises:

a body portion;

an earbud extending from the body portion that is inserted into an ear of the user when worn by the user;

a curved hanger bar connected to the body portion, wherein the curved hanger bar comprises a portion that rests upon an upper external curvature of an ear of the user behind an upper portion of an auricula of the ear of the user;

a wireless communication circuit for receiving and transmitting wireless signals;

a processor circuit connected to the wireless communication circuit;

at least one acoustic transducer for producing audible sound from the earbud;

a microphone for picking up utterances of a user of the headphones;

an antenna connected to the wireless communication circuit; and

a rechargeable power source; and

a docking station for holding at least the first wireless earphone, wherein the docking station comprises a power cable for connecting to an external device to power the docking station, and wherein the docking station is for charging at least the first wireless earphone when the first wireless earphone is placed in the docking station.

9. The headphones of claim 1, the processor circuits of the headphones are configured to receive firmware upgrades transmitted from a remote network server.

18. The headphones of claim 1, wherein the processor circuit of each of the first and second earphones comprises:

- a digital signal processor that provides a sound quality enhancement for the audio content played by the at least one acoustic transducers of the earphone; and
- a baseband processor circuit that is in communication with the wireless communication circuit of the earphone.

D. Evidence

Petitioner relies on the references listed below.

Reference		Date	Exhibit No.
Rosener	US 2008/0076489 A1	pub. Mar. 27, 2008	1004
Huddart	US 7,627,289 B2	pub. Dec. 1, 2009 filed Dec. 23, 2005	1005
Haupt	WO 2006/042749 A2	pub. Apr. 27, 2006	1006 ²
Price	US 2006/0026304 A1	pub. Feb. 2, 2006	1008
Paulson	US 7,551,940 B2	iss. June 23, 2009 filed Jan. 8, 2004	1009
Vanderelli	US 7,027,311 B2	iss. Apr. 11, 2006	1010

Petitioner also relies on the Declaration of Jeremy Cooperstock, Ph.D. (Ex. 1003, “Cooperstock Decl.”), and the Supplemental Declaration of Dr. Cooperstock (Ex. 1023, “Supp. Cooperstock Decl.”).

² We refer to a certified translation of the German language publication of WO 2006/042749.

Patent Owner relies on the Declaration of Joseph C. McAlexander III (Ex. 2035, “McAlexander Decl.”) and the Declaration of Nicholas S. Blair (Ex. 2036, “Blair Decl.”).

E. The Asserted Grounds

We instituted on the following grounds of unpatentability (Dec. 9):

Reference(s)	Basis	Claims Challenged
Rosener, Huddart	§ 103(a) ³	1, 2, 16–18
Rosener, Huddart, Haupt	§ 103(a)	3, 4
Rosener, Huddart, Price	§ 103(a)	9, 10, 14
Rosener, Huddart, Paulson	§ 103(a)	15
Rosener, Huddart, Vanderelli	§ 103(a)	16, 17

II. ANALYSIS

A. Claim Construction

We construe a claim

using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

37 C.F.R. § 42.100(b) (2019); *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

³ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103. Because the ’325 patent claims an effective filing date before March 16, 2013, the effective date of the relevant amendment, the pre-AIA version of § 103 applies.

Petitioner contends that no formal claim constructions are necessary. Pet. 18. Patent Owner does not state a position on claim construction, but does not propose any constructions. *See, generally*, PO Resp.

Based on the complete record, we do not find it necessary to provide express claim constructions for any terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

B. Obviousness of Claims 1, 2, and 16–18 over Rosener and Huddart

Petitioner contends that claims 1, 2, and 16–18 would have been obvious over Rosener and Huddart. Pet. 18–56. For the reasons given below, Petitioner has made a sufficient showing as to claims 1, 2, and 16, but not claim 18. We do not reach claim 17 as to this ground, but do address claim 17’s patentability in Petitioner’s ground asserting Rosener, Huddart, and Vanderelli in Section II.F below.

A claim is unpatentable under 35 U.S.C. § 103 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.” We resolve the question of obviousness on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

1. Level of Skill in the Art

Dr. Cooperstock testifies that a skilled artisan “would have had at least a Bachelor’s Degree in an academic area emphasizing electrical engineering, computer science, or a similar discipline, and at least two years of experience in wireless communications across short distance or local area networks.” Ex. 1003 ¶ 34. In the Institution Decision, we found Dr. Cooperstock’s testimony to be consistent with the technology described in the Specification and the cited prior art and adopted this level of skill for purposes of that Decision. Dec. 24.

Mr. McAlexander testifies that a skilled artisan “would be someone working in the electrical engineering field and specializing in or knowledgeable of speaker components for small wireless devices,” and “would have had a bachelor’s degree in electrical engineering and at least two or more years of work experience in the industry. Ex. 2035 ¶ 19. According to Mr. McAlexander, “[s]uch a person would have studied and have practical experience with circuit design, speaker components, and wireless communication.” *Id.* Patent Owner states that this proposed level of skill “is not far removed from Petitioner’s [person of ordinary skill in the art].” PO Resp. 6.

As Patent Owner acknowledges that the proposed levels of skill are similar, and does not argue that a difference in level of skill would lead to a different result in this proceeding, we continue to adopt Petitioner’s proposed level of skill.

2. Scope and Content of the Prior Art

a) Overview of Rosener

Rosener describes wireless systems with “first and second data sinks having no physical or electrical connection therebetween.” Ex. 1004, Abstract. The data sinks can be, for example, wireless earphones. *Id.* ¶ 2. Each wireless earphone may be in the form of an earbud designed to fit into the concha of the pinna of the user’s ear, and includes a housing containing a speaker, a radio-frequency (RF) transceiver, and a battery. *Id.* ¶ 30.

Each earphone may also include “a clip, earloop, or other suitable securing mechanism to help maintain the earphone . . . on the ear of the user.” *Id.* Although Rosener does not have a figure showing a clip or earloop along with a preferred embodiment of the invention, it does depict, in Figure 4 (reproduced below) an earloop used with a prior art Bluetooth-enabled over-the-ear wireless headset:

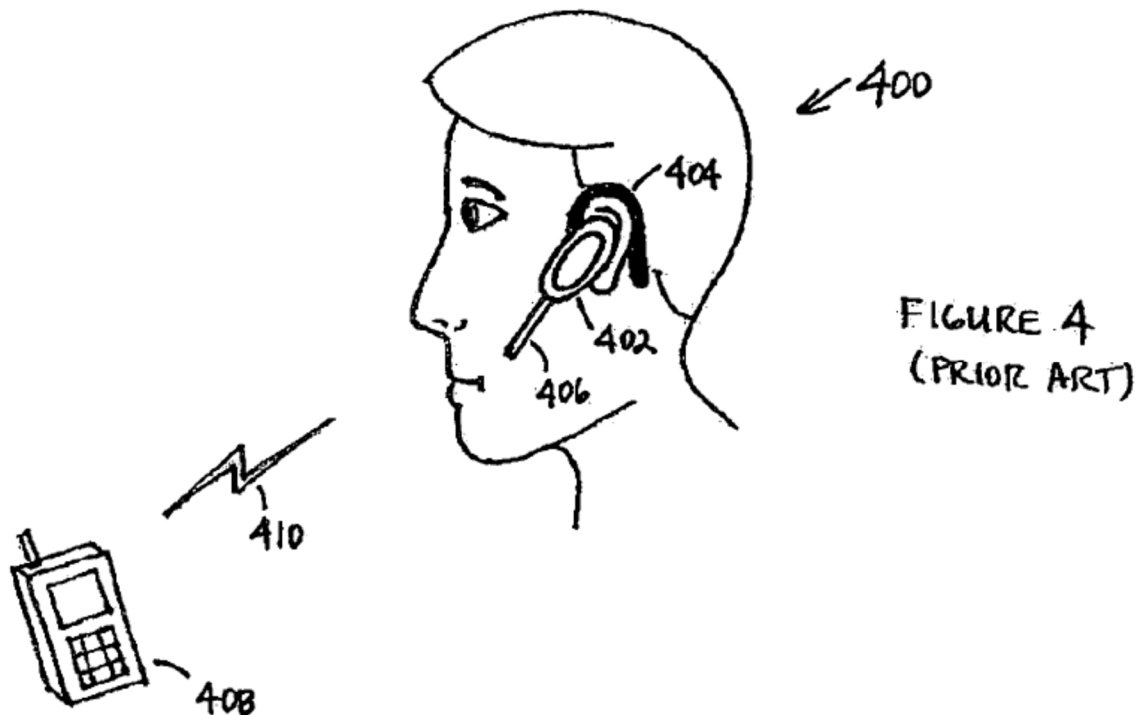


Figure 4 is a drawing of a user wearing a Bluetooth-enabled over-the-ear monaural wireless headset. *Id.* ¶ 17. As shown in Figure 4, headphone 402 includes earloop 404 that is configured to fit around the outer ear of user 400. *Id.* ¶ 8. Figure 5, reproduced below, shows earbuds, but not earloops:

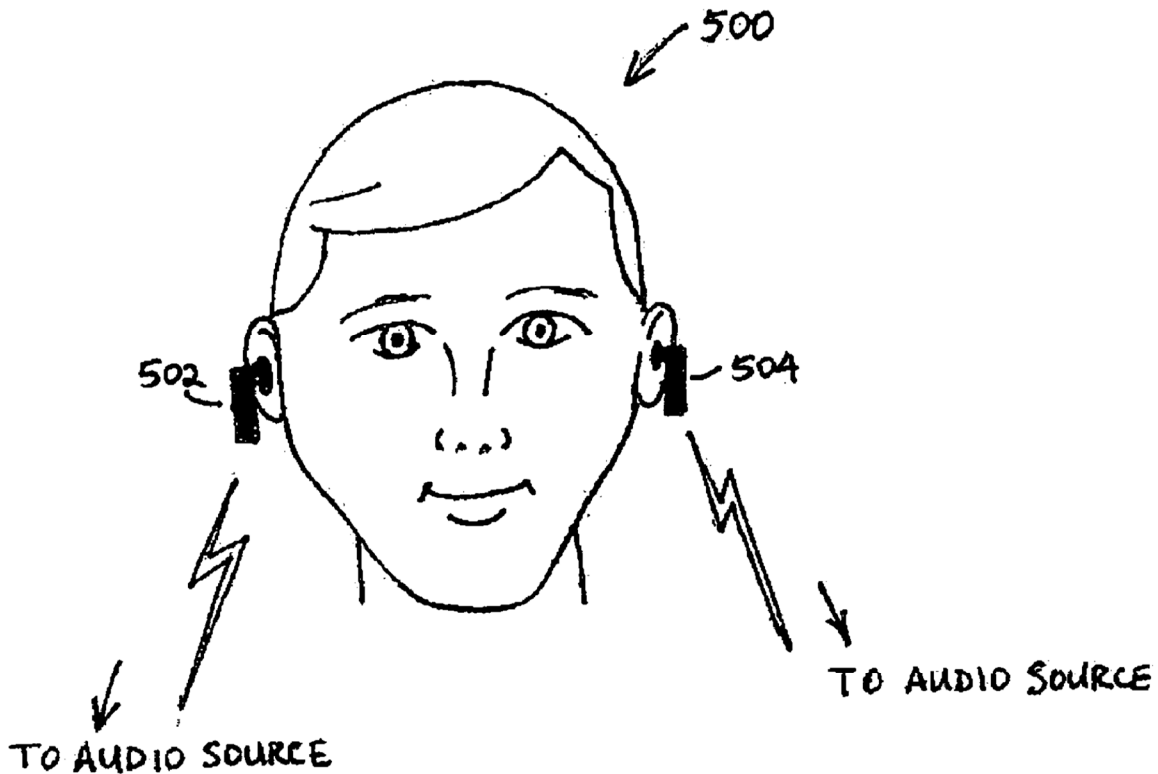


FIGURE 5

Figure 5 is an illustration of the head of a person wearing a headset comprising first and second wireless earphones 502, 504. *Id.* ¶¶ 18, 30.

Figure 9, reproduced below, illustrates some of the components of Rosener's headphones:

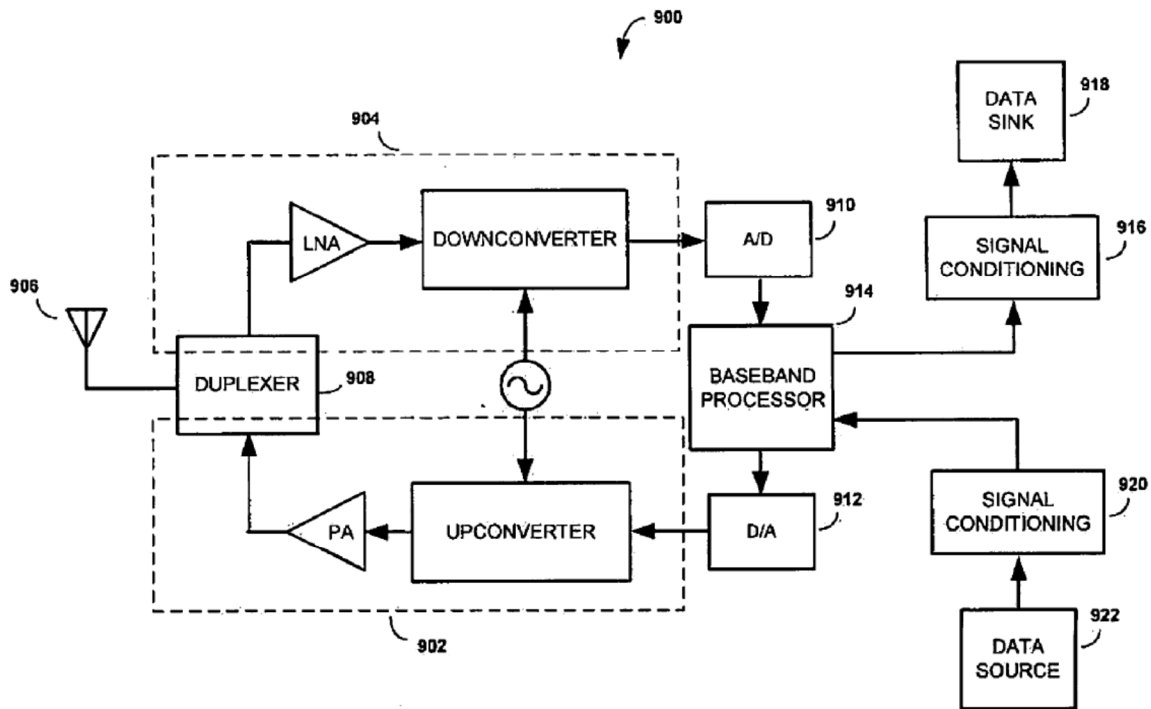


FIGURE 9

Figure 9 is a block diagram of an RF transceiver. *Id.* ¶¶ 24, 49.

RF transceiver 900 includes RF transmitter portion 902, RF receiver portion 904, antenna 906, and duplexer 908. *Id.* ¶ 49. A/D converter 910 receives analog baseband signals from RF transceiver portion 904, digitizes the signals, and sends them to baseband processor 914, which, along with signal conditioning circuit 916, processes the signals into a form suitable to drive data sink (speaker) 918. *Id.* According to Rosener, signal conditioning circuit 916 provides “digital-to-analog conversion, filtering, amplification, and/or other signal processing functions, to ensure that the processed data is in a form suitable to drive the data sink 918.” *Id.* Baseband processor 914 receives data from data source 922 (e.g., a microphone) via signal conditioning circuit 920 and provides the data to RF transmitter portion 902 for transmission via antenna 906. *Id.* ¶ 50.

b) Overview of Huddart

Huddart describes wireless stereo headsets. Ex. 1005, Abstract.

Figure 1, reproduced below, illustrates an example:

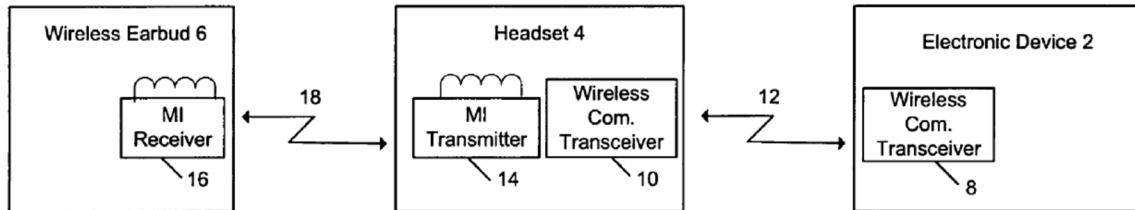


FIG. 1

Figure 1 is a system-view block diagram of a wireless stereo headset system. *Id.* at 1:44–45. Headset 4 is in proximity to electronic device 2 (e.g., a cellular telephone or digital music player), which transmits voice or text data to headset 4. *Id.* at 2:52–3:2. Headset 4 includes a speaker for one ear. “When stereo listening operation is desired by a user, a wireless earbud 6 is used in conjunction with headset 4. Both headset 4 and wireless earbud 6 have wireless communication functionality to form a wireless communication link 18.” *Id.* at 3:7–10. “In one example of the invention, a magnetic induction wireless communication link is established between headset 4 and wireless earbud 6. Magnetic induction provides short range wireless communication at low power and cost while providing good audio signal quality.” *Id.* at 3:19–23. “In further examples of the invention, other methods of wireless communication may be used to establish wireless communication link 18 between headset 4 and wireless earbud 6. For

example, wireless earbud 6 may be Bluetooth enabled to communicate with either headset 4 or electronic device 2.” *Id.* at 3:55–60.

Wireless headset 4 “includes a power source such as a rechargeable battery installed within the housing to provide power to the various components of the receiver.” *Id.* at 5:10–12. Similarly, “[w]ireless earbud 6 also includes a power source such as a rechargeable battery and a controller comprising a processor, memory and software to implement functionality as described herein.” *Id.* at 5:26–29.

Huddart describes several options for charging the rechargeable batteries of wireless headset 4 and wireless earbud 6, including:

a charger/carrier, such as a pocket charger, including a small plastic storage case for storing the headset 4 and wireless earbud 6 for protection and charging. The pocket charger includes a battery and charger circuit for charging both the headset battery and wireless earbud battery when inserted into the pocket charger/carrier.

Id. at 8:25–31;

a charging coil to provide charging current to the wireless earbud battery 84 via receive aerial 52 shown in FIG. 4. The earbud advantageously does not require charging contacts on its small exterior surface when charging is performed with inductive charging. In this example, the single receive aerial 52 functions multiply to receive charging power for battery 84, generate a wake up signal 82, or receive an audio signal carrier.

Id. at 8:35–42; and

a primary charger to which the pocket charger may be removably attached. The primary charger may be a cable or docking facility connecting the pocket charger/carrier to a wall outlet or primary batter[y] such as a car battery, allowing the headset battery, wireless earbud battery, and the storage case battery to be charged using the wall outlet or primary battery.

Id. at 8:51–57.

3. *Differences, if any, Between Claim 1 and the Prior Art; Reasons to Modify or Combine*

In essence, Petitioner contends that Rosener teaches the aspects of claim 1 regarding the components of the “pair of first and second wireless earphones,” including a power source (although not necessarily a rechargeable power source), and that Huddart teaches the “rechargeable power source” and “docking station” aspects. Pet. 26–30. Patent Owner contests whether Rosener teaches “a curved hanger bar connected to the body portion, wherein the curved hanger bar comprises a portion that rests upon an upper external curvature of an ear of the user behind an upper portion of an auricula of the ear of the user,” as recited in claim 1. PO Resp. 11–20. However, Patent Owner does not challenge any of Petitioner’s other allegations for claim 1. We first address the contested “hanger bar” limitation of claim 1 and then address the uncontested limitations.

a) *Contested “hanger bar” limitation of claim 1*

As to “a body portion,” as recited in claim 1, Petitioner cites to the “housing” of Rosener’s earphones 502, 404. Pet. 32 (citing Ex. 1004 ¶ 30). We find that the housing of earphones 502, 504 is “a body portion.” The parties dispute whether Rosener teaches “a curved hanger bar connected to the body portion, wherein the curved hanger bar comprises a portion that rests upon an upper external curvature of an ear of the user behind an upper portion of an auricula of the ear of the user,” as recited in claim 1.

Petitioner (Pet. 34–35) points to Rosener’s description that “[e]ach of the first and second earphone 502, 504 may further include a clip, earloop, or other suitable securing mechanism to help maintain the earphone 502 or 504 on the ear of the user.” Ex. 1004 ¶ 30. According to Petitioner, a

skilled artisan would have understood from this description that each of earphones 502, 504 is connected to an earloop, which is an example of a curved hanger bar. Pet. 35.⁴

Petitioner (Pet. 35–36) argues that this description should be read in the context of Rosener’s description of the prior art Bluetooth-enabled over-the-ear wireless headset depicted in Figure 4 (reproduced above), that “[t]he headset includes a headphone 402 and an earloop 404 that is configured to fit around the outer ear of the user 400.” Ex. 1004 ¶ 8. *See also* Ex. 1003 ¶ 82 (“Though not shown in Figure 5, a [person of ordinary skill in the art] would have understood through this textual description that Rosener’s disclosure contemplates some embodiments in which the housing of each of earphones 502, 504 is connected to, for example, an earloop (‘curved hanger bar’) to improve the manner in which each of the earphones is secured to the user’s ear, as taught in Rosener.”). Petitioner included in the Petition the following annotated version of Figure 5 (reproduced below) illustrating what earloops on Rosener’s earphones might look like:

⁴ In the Institution Decision, we considered competing arguments regarding whether an “earloop” as discussed in Rosener is, in fact, a curved hanger bar or whether, instead, it is more akin to the elastic straps that might hold a face mask in place. Dec. 33–34. We found, on the preliminary record, that Rosener’s earloop is a curved hanger bar. *Id.* Patent Owner does not argue in its Response that the earloop is not a curved hanger bar and we maintain that finding that it is a curved hanger bar on the complete record for the reasons given in the Institution Decision. *See* Paper 15, 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”).

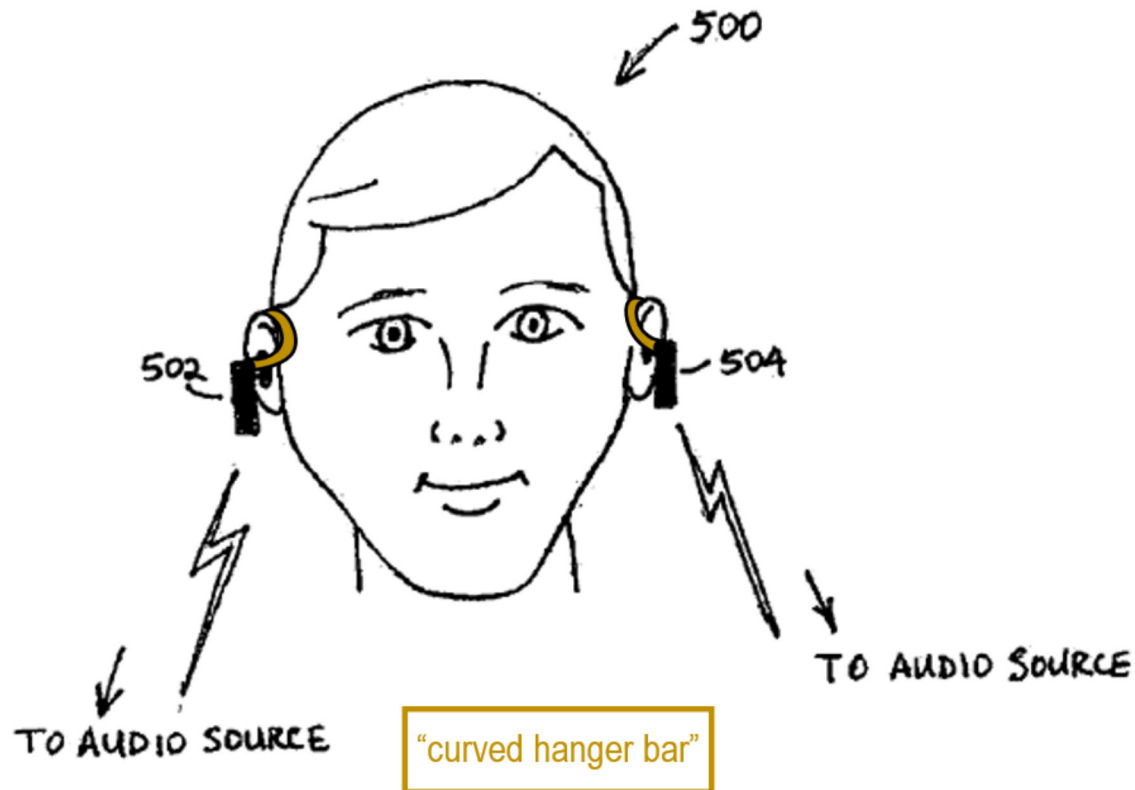


FIGURE 5

The figure above is a version of Rosener's Figure 5, annotated by Petitioner to add gold curved hanger bars to earphones 502, 504. Pet. 36. According to Petitioner, Rosener "thus teaches a system in which each of the elongated portions of the housings of earphones 502, 504 are connected to an earloop providing the same type of securing mechanism as shown for earloop 402," and "discloses this configuration given its teaching that each of earphones 502, 504 can include earloops and acknowledgement that use of earloops was conventional." *Id.* at 37 (citing Ex. 1004 ¶¶ 8, 30; Ex. 1003 ¶ 85).

Patent Owner characterizes Petitioner's position as asserting that "the earloop of Rosener's Figure 4 could be added to the wireless earphones of Rosener's Figure 5," that Petitioner's position relies on its modified version

of Figure 5, and that what Petitioner is arguing is that a skilled artisan would have combined two different embodiments of Rosener, one with the earbud and downwardly extending member of Figure 5 and another with the earloop of Figure 4. PO Resp. 14–15. Characterizing Petitioner’s arguments in this way, Patent Owner then argues that a skilled artisan “would not have been motivated to add earloops to the earbud-downwardly extending member combination shown in Figure 5.” *Id.* at 5.

Relying on the testimony of Mr. Blair, Patent Owner argues that, if one were to add the earloop of Figure 4 to the earbud and downwardly extending member of Figure 5, the earloop would effectively pry the earbuds out of the listener’s ears. PO Resp. 16–18. According to Mr. Blair, the downwardly extending member of the earbud of Figure 5 exerts a downward force that holds the earbud in the ear, while the earloop of Figure 4 exerts a force upward and backward, counteracting the downward force and displacing the earbud from the ear. Ex. 2036 ¶¶ 14–17.⁵

Petitioner replies that Mr. Blair’s testimony is conclusory and uncorroborated. Reply 10. Petitioner then argues that Patent Owner mischaracterizes what is shown in its annotated Figure 5 and contends that Mr. Blair’s analysis of the various forces exerted on the earbuds is faulty. *Id.* at 10–15. In support, Petitioner offers testimony from Dr. Cooperstock, although that testimony is also conclusory and does not identify the basis for the testimony. Ex. 1023 ¶¶ 11–23.

⁵ Mr. McAlexander provides testimony that largely copies the arguments in Patent Owner’s Response. Ex. 2035 ¶¶ 37–43. His testimony, however, does not appear to be based upon his own knowledge or expertise and, instead, is based upon his reading of Mr. Blair’s testimony. We accord this testimony by Mr. McAlexander little weight.

We need not evaluate which of the experts' views on the various forces on a Figure 4/5 combination would have been correct. Patent Owner improperly limits Petitioner's arguments (and Rosener's disclosure) to a combination of separate embodiments shown alternately in Figures 4 and 5. We agree with Petitioner (Pet. 34–35; Reply 18) and find that Rosener expressly describes earbuds with curved hanger bars. Specifically, Rosener states that “[e]ach of the first and second earphones 502, 504 may be in the form of an earbud designed to fit into the concha of the pinna of the user's ear,” and that “[e]ach of the first and second earphone 502, 504 may further include a clip, earloop, or other suitable securing mechanism to help maintain the earphone 502 or 504 on the ear of the user.” Ex. 1004 ¶ 30. We read Petitioner's annotated Figure 5 (shown above) as an illustration of how these expressly described features might look together, as Rosener does not have a figure depicting that embodiment. Petitioner relies on Figure 4 to show that “earloops” in fact correspond to “curved hanger bars,” not to show precise structure that would be bodily incorporated into the embodiment depicted in Figure 5. We do not read Petitioner's annotated Figure 5 as a proposed physical combination of different embodiments within Rosener. Patent Owner's characterization of Petitioner's combination is not the correct lens through which we analyze obviousness. *See In re Keller*, 642 F.2d 413, 425 (Fed. Cir. 1981) (“To justify combining reference teachings in support of a rejection it is not necessary that a device shown in one reference can be physically inserted into the device shown in the other.”).

Patent Owner argues that “Rosener . . . never states which listed earphone forms (e.g., earbud, canalphone, or over-the-ear) could also include an earloop.” PO Resp. 19–20. In the Sur-reply, Patent Owner argues that Rosener “describes three separate earphone form factors (i.e.,

earbud, canalphone and over-the-ear circum-aural), but only links one of them—over-the-ear circum-aural—with an earloop. Rosener describes that the first two types—earbuds and canalphones—fit ‘into’ or ‘within’ the user’s ear.” Sur-reply 9–10.

We disagree. Rosener states that earphones 502, 504 could be earbuds and further states that they could include a clip or earloop to help maintain them on the ear of the user. Ex. 1004 ¶ 30. Although other options would be within the scope of this disclosure (e.g., an over-the-ear earphone with an earloop), we see no description in Rosener that would limit Rosener’s clip or earloop to only some earphone form factors, and specifically find that Rosener’s description of an earloop helping maintain the earphone “on the ear of the user,” Ex. 1004 ¶ 30, is not an attempt to exclude earbuds. In sum, we find that Rosener expressly teaches “a curved hanger bar connected to the body portion, wherein the curved hanger bar comprises a portion that rests upon an upper external curvature of an ear of the user behind an upper portion of an auricula of the ear of the user,” as recited in claim 1.

b) Uncontested limitations of claim 1

Regarding “a pair of first and second wireless earphones to be worn simultaneously by a user, wherein the first and second earphones are separate such that when the headphones are worn by the user, the first and second earphones are not physically connected,” as recited in claim 1, Petitioner (Pet. 30–32) cites to Rosener’s earphones 502, 504, which “may be in the form of an eardbud designed to fit into the concha of the pinna of the user’s ear” and are “physically and electrically-separated” with “no physical or electrical connection” between them. Ex. 1004 ¶¶ 11, 30, Fig. 5. Based

on this evidence, we find that Rosener's earphones 502, 504 teach this limitation.

As to an “earbud extending from the body portion that is inserted into an ear of the user when worn by the user,” Petitioner points to earphones 502, 504, shown in Figure 5 as extending from a portion inserted into a user's ear. Pet. 33–34. As Petitioner notes (Pet. 33), Rosener describes earphones 502, 504 as “in the form of an earbud designed to fit into the concha of the pinna of the user's ear.” Ex. 1004 ¶ 30. We find that Rosener teaches this limitation as well.

Petitioner contends that Rosener's RF transmitter portion 902, RF receiver portion 904, duplexer 908, A/D converter 910, and D/A converter 912, together constitute “a wireless communication circuit for receiving and transmitting wireless signals.” Pet. 37–39 (citing Ex. 1004 ¶¶ 11, 30–36, 49, Figs. 5, 9). We agree. For example, Rosener teaches “[w]ireless systems having a plurality of physically and electrically-separated data sinks An exemplary wireless system includes first and second data sinks having no physical or electrical connection therebetween.” Ex. 1004 ¶ 11.

Petitioner further contends that Rosener's baseband processor 914, signal conditioning circuits 916, 920, and other described circuitry constitute “a processor circuit connected to the wireless communication circuit,” as recited in claim 1. *Id.* at 39–41 (citing Ex. 1004 ¶¶ 39–43, 49, 50, Fig. 9). We agree. As noted above, baseband processor 914 receives digitized baseband signals and signal conditioning circuit 916 provides digital-to-analog conversion, filtering, amplification, and other processing. Ex. 1004 ¶ 49.

Petitioner identifies Rosener's “data sink 918” as an “acoustic transducer,” as recited in claim 1; Rosener's “data source 922” as “a

microphone for picking up utterances of a user of the headphones”; and Rosener’s “antenna 906” as “an antenna connected to the wireless communication circuit.” *Id.* at 41–44 (citing Ex. 1004 ¶¶ 2, 30 (“The speaker may comprise, for example, a magnetic element attached to a voice-coil-actuated diaphragm, an electrostatically charged diaphragm, a balanced armature driver, or a combination of one or more of these transducer elements.”), 50 (“For the RF transmitter portion 902, a D/A converter 912 is adapted to receive data signals from a data source 922 and operable to convert the data signals into analog signals, which are upconverted to RF by the RF transmitter in preparation of being radiated over the appropriate wireless link by the antenna 906.”), 56 (“a microphone to allow . . . data to be sent back to an external electronic device”), Fig. 9). We find that Rosener teaches each of these limitations.

As to “a rechargeable power source,” as recited in claim 1, Petitioner argues that Rosener describes a battery, but concedes that “Rosener does not explicitly describe the batteries being rechargeable.” Pet. 44–45 (citing Ex. 1004 ¶ 30). Petitioner contends that Huddart teaches a rechargeable battery. *Id.* at 45 (citing Ex. 1005, 5:26–30). According to Petitioner, “[t]o the extent that Rosener is deemed to not disclose rechargeable batteries, [a person of ordinary skill in the art] would have found it obvious to incorporate a rechargeable battery (e.g., earbud battery) as taught in Huddart into each of Rosener’s earphones 502, 504 for providing power to earphone components.” *Id.* Citing Dr. Cooperstock’s testimony, Petitioner argues that a skilled artisan “would have understood . . . that Rosener’s earphones could have incorporated rechargeable batteries since this configuration was conventional around the time of its disclosure, as demonstrated by Huddart.” *Id.* at 27 (citing Ex. 1003 ¶ 48). Petitioner contends that rechargeable

batteries would have improved Rosener's earphones "by eliminating or reducing the need to periodically replace the batteries, thereby removing or reducing the cost of doing so and also improving user convenience."

Id. (citing Ex. 1003 ¶ 49). Dr. Cooperstock further testifies that Rosener's earphones would have benefited from rechargeable batteries in the same manner as Huddart's earbuds, e.g., in that the user could avoid frequent battery replacements. Ex. 1003 ¶ 50. We credit Dr. Cooperstock's testimony and find that a skilled artisan would have had reasons to (e.g., cost, convenience, avoid the need to replace batteries) to incorporate Huddart's teaching of rechargeable batteries into Rosener's earphones, and would have had a reasonable expectation of success in doing so.

Petitioner also cites Huddart for "a docking station for holding at least the first wireless earphone," as recited in claim 1. Pet. 46. Specifically, Petitioner contends that Huddart's charger/carrier and primary charger are examples of a docking station. *Id.* (citing Ex. 1005, 8:25–34). Petitioner contends that Huddart's primary charger can be a cable or docking station facility that allows the charger/carrier to connect to a wall outlet or primary battery, and, thus, teaches "a power cable for connecting to an external device to power the docking station," as recited in claim 1. *Id.* at 46–47 (citing Ex. 1005, 8:51–57). Petitioner argues that Huddart's charger/carrier and primary charger are "for charging at least the first wireless earphone when the first wireless earphone is placed in the docking station," as recited in claim 1. *Id.* at 47 (citing Ex. 1005, 5:9–12, 5:26–30, 8:25–50). Huddart's charger/carrier is described as "a convenient mechanism by which the earbud 6, having a relatively smaller capacity battery due to its limited size, may be recharged in the absence of a primary charger." Ex. 1005, 8:31–34.

Relying on Dr. Cooperstock's testimony, Petitioner argues that Huddart's docking station would have "improve[d] battery capacity when a primary charger is unavailable or to avoid the inconvenience of having to frequently plug the charger into a wall outlet, for instance when traveling." *Id.* at 28 (citing Ex. 1003 ¶ 51). Petitioner also argues that Huddart's charger/carrier would have provided a storage case to prevent Rosener's earphones from being misplaced. *Id.* at 28–29 (citing Ex. 1003 ¶52).

We credit Dr. Cooperstock's testimony and find that Petitioner's proffered reasons to combine Rosener and Huddart have rational underpinning; that a skilled artisan would have combined Huddart's teachings of a docking station with Rosener's earbuds (with rechargeable batteries that would be recharged via the docking station); and that a skilled artisan would have had a reasonable expectation of success in combining these teachings.

Thus, Rosner and Huddart teach each limitation of claim 1.

4. Differences, if any, Between Claims 2 and 16 and the Prior Art; Reasons to Modify or Combine

Petitioner contends that claims 2 and 16 would have been obvious over Rosener and Huddart. Patent Owner does not contest the additional allegations for claims 2 and 16.

Claim 2 depends from claim 1 and adds:

the wireless communication circuits are for receiving,
wirelessly, streaming audio content;
the at least one acoustic transducers are for playing the
streaming audio content; and

each of the first and second earphones comprises a buffer for caching the streaming audio content prior to being played by the at least one acoustic transducer.

Petitioner identifies Rosener's RF transmitter portion 902, RF receiver portion 904, duplexer 908, A/D converter 910, and D/A converter 912, collectively, as "wireless communication circuits . . . for receiving, wirelessly, streaming audio content." Pet. 47–49 (citing Ex. 1004 ¶¶ 30, 34, 36, 39–42, 49). Petitioner further identifies Rosener's speaker as "at least one acoustic transducer." *Id.* at 49 (citing Ex. 1004 ¶¶ 30 ("The speaker may comprise, for example, a magnetic element attached to a voice-coil-actuated diaphragm, an electrostatically charged diaphragm, a balanced armature driver, or a combination of one or more of these transducer elements."), 38). As to "a buffer for caching the streaming audio content prior to being played by the at least one acoustic transducer," Petitioner cites to Rosener's description of "data buffers in each of the first and second RF receivers 604, 608." *Id.* at 49–50 (citing Ex. 1004 ¶ 39). Based on the evidence presented in the Petition, we find that Rosener teaches each additional limitation of claim 2.

Claim 16 depends from claim 1 and adds "wherein the rechargeable power source comprises wirelessly chargeable circuit components." We agree with Petitioner (Pet. 50–51) and find that Huddart teaches this limitation through its description of inductive charging and that a skilled artisan would have had reasons to combine Huddart's teaching of inductive charging with the teachings of Rosener, with a reasonable expectation of success. Ex. 1005, 8:35–50; Ex. 1003 ¶ 103.

5. *Claim 17*

Claim 17 recites “wherein the rechargeable power source comprises a passive, wireless rechargeable power source.” Petitioner argues that “the claim language is not clear as to how a *passive* wireless rechargeable power source differs from other wireless rechargeable power sources.” Pet. 51. Petitioner argues that claim 17 would have been obvious over Rosener, Huddart, and Vanderelli if claim 17 is construed in light of the Specification. Pet. 51. We address these allegations in Section II.F below. In the alternative, Petitioner argues that, if we adopt a broader construction of claim 17 that is “divorced from the ’325 patent specification,” we should find it taught by Rosener and Huddart. *Id.* at 51–52. Because we find that the combination of Rosener, Huddart, and Vanderelli teaches the additional limitation of claim 17, as explained below, we do not reach whether Rosener and Huddart teach this limitation under a broader construction. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding that a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

6. *Differences, if any, Between Claim 18 and the Prior Art; Reasons to Modify or Combine*

As to claim 18, for “wherein the processor circuit of each of the first and second earphones comprises: . . . a baseband processor circuit that is in

communication with the wireless communication circuit of the earphone,” Petitioner cites to a description of Rosener’s baseband processor 914 and associated circuitry. *Id.* at 55–56 (citing Ex. 1004 ¶¶ 30, 49, Fig. 9). We agree that baseband processor 914 is a baseband processor circuit, and Figure 9 depicts baseband processor 914 in communication with RF transmitter portion 902, RF receiver portion 904, duplexer 908, A/D converter 910, and D/A converter 912, the alleged “wireless communication circuit of the earphone.” Patent Owner does not contest Petitioner’s allegations for this limitation of claim 18.

The parties dispute whether Rosener and Huddart teach “wherein the processor circuit of each of the first and second earphones comprises: a digital signal processor that provides a sound quality enhancement for the audio content played by the at least one acoustic transducers of the earphone,” as recited in claim 18.

Petitioner cites to description of Rosener’s signal conditioning circuit 916 and identifies that component as corresponding to the claimed digital signal processor (DSP). *Id.* at 53–55 (citing Ex. 1004 ¶¶ 30, 34, 36, 38, 49, Fig. 9). In particular, Petitioner points to Rosener’s description that signal conditioning circuit 916 provides “digital-to-analog conversion, filtering, amplification, and/or other signal processing functions, to ensure that the processed data is in form suitable to drive the data sink 918.” *Id.* at 54 (quoting Ex. 1004 ¶ 49). Dr. Cooperstock testifies that signal conditioning circuit 916 “would have conditioned the signal to, for example, reduce or eliminate the effects of noise on the signal through filtering, which enhances sound quality.” Ex. 1003 ¶ 111.

Patent Owner argues that Rosener’s signal conditioning circuit 916 is a digital-to-analog converter (DAC), rather than a DSP, as its purpose is to

drive the headphone's speaker (data sink 918). PO Resp. 22–24 (citing Ex. 1004 ¶¶ 30–49; Ex. 2035 ¶ 50). Patent Owner, relying on Mr. McAlexander's testimony, contends that a DSP "is a circuit that performs mathematical functions on digital signals (like digital audio signals when used with speakers and earphones)." *Id.* at 24 (citing Ex. 2035 ¶ 53). Patent Owner further argues that a DSP is a processor and, as such, "typically includes the building blocks of a processor, such as an Arithmetic Logic Unit, shift registers, and memory space." *Id.* (citing Ex. 2035 ¶ 54).

Petitioner does not appear to contest Patent Owner's arguments that a DSP must be a processor, with components like arithmetic logic units, shift registers, and memory space, that performs mathematical functions on digital signals. Reply 19–22.⁶ Indeed, Petitioner provides no proposed construction in either the Petition or the Reply, and contends instead that DSP "should be interpreted based on . . . its plain meaning." Reply 21. Rather, Petitioner argues that signal conditioning circuit 916 is more than a DAC, and performs filtering, amplification, and other signal processing

⁶ Petitioner does argue that Patent Owner is incorrect to suggest that a DSP must be embodied as a single chip or integrated circuit. Reply 21–22. We do not read Patent Owner's arguments to limit a DSP to a single chip. PO Resp. 25 (arguing that "[a] DSP is often embodiment as a single chip (i.e., integrated circuit)"). In any case, we see no persuasive evidence that would limit a DSP to a single chip or integrated circuit.

functions. *Id.* at 19–20 (citing Ex. 1004 ¶ 49).⁷ Petitioner equates the filtering, amplification, and other signal processing performed by signal conditioning circuit 916 to the “noise cancelation and sound equalization” listed by the ’325 patent as examples of “various sound quality enhancements” performed by DSP 114. Reply 22–23; Ex. 1001, 7:34–37.

Patent Owner responds that

[m]erely because Rosener’s signal conditioning circuit can perform amplification and filtering does not mean that the amplification and filtering are of *digital* signals. Thus, the amplification and filtering by Rosener’s “signal conditioning circuit” do not even necessarily involve processing of digital signals. Also, neither Rosener nor Cooperstock explained why it would have been obvious that the amplification and filtering performed by Rosener’s signal conditioning circuit would have been digital.

Sur-reply 12–13. Patent Owner’s concern is well-founded. Dr. Cooperstock admits that filtering and amplification are techniques for processing analog as well as digital signals. Ex. 2040, 9:10–10:8. Rosener describes signal conditioning circuit 916 as receiving data (presumably in digital format) from baseband processor 914, performing processing including digital-to-

⁷ Petitioner also argues, for the first time in the Reply, that “‘digital-to-analog conversion’ is an example of a ‘signal processing function.’” Reply 20–21. If Petitioner is attempting to argue that a DAC is a DSP, Petitioner did not make such an argument in the Petition and we do not entertain it here. *See* Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019) (“TPG”), 73–74 (“While replies and sur-replies can help crystalize issues for decision, a reply or sur-reply that raises a new issue or belatedly presents evidence may not be considered.”), *available at* <https://www.uspto.gov/TrialPracticeGuideConsolidated>. Nevertheless, Petitioner does not articulate that argument clearly or support it with persuasive evidence. Thus, the argument would not be persuasive even if considered.

analog conversion, filtering, and amplification, and producing an output suitable to drive data sink 918. Ex. 1004 ¶ 49. The most logical reading of this description is that signal conditioning circuit 916 receives a digital signal, converts it to an analog signal, and filters and amplifies that signal to condition it to appropriately drive a speaker. In other words, consistent with Mr. McAlexander's testimony, the filtering and amplification are part of the digital-to-analog conversion process that converts and conditions a signal to drive a speaker. Ex. 2035 ¶¶ 49–52. Petitioner does not expressly argue in the Petition or the Reply that the filtering and amplification are performed on digital signals, or provide persuasive evidence that would support such an argument. Pet. 53–55; Reply 19–23; Ex. 1003 ¶¶ 110–111; Ex. 1023 ¶¶ 35–41.

For the first time at the oral argument, Petitioner argues that Rosener's data sink 918 might receive a digital signal instead of an analog signal and, thus, the filtering and amplification performed in signal conditioning circuit 916 could be performed on digital signals. Tr. 22:17–23:13. Petitioner argues that this is taught in paragraph 36 of Rosener. *Id.* Petitioner further argues that Mr. McAlexander admitted on cross-examination that signal conditioning circuit 916 performs filtering in the digital domain. *Id.* at 54:12–57:1 (citing Ex. 1024, 162). Petitioner did not raise these arguments in its Petition or Reply and, therefore, we do not consider them. *See* TPG 85–86; *Dell Inc. v. Accelaron, LLC*, 818 F.3d 1293, 1301 (Fed. Cir. 2016).

Moreover, Petitioner's arguments would not be persuasive even if considered. Paragraph 36 of Rosener describes Rosner's Figure 6, reproduced below:

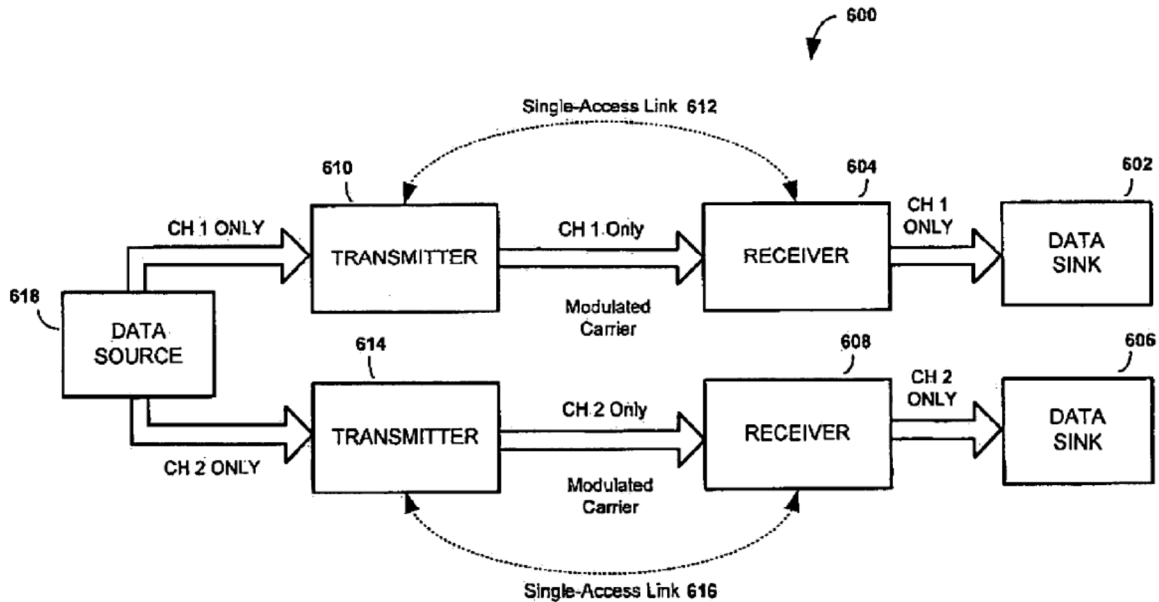


FIGURE 6

Figure 6 is a block diagram of a wireless system used to wirelessly transmit data signals to two or more data sinks. Ex. 1004 ¶19. First and second data streams are modulated onto RF carriers by first and second RF transmitters 601, 614 and transmitted wirelessly to first and second RF receivers 604, 608. *Id.* ¶ 36. RF receivers 604, 608 down-convert the modulated RF carriers and electrically couple the demodulated data streams to first and second data sinks 602, 606. *Id.* According to Rosener, the baseband portions of first and second RF receivers 604, 608 may also contain a DAC and/or other or additional processing circuitry to facilitate the electrical coupling of first and second RF receivers 604, 608 to first and second data sinks 602, 606. *Id.* “Alternatively, such components may be included as part of the data sinks 602, 606 themselves.” *Id.*

Petitioner appears to argue that, here, Rosener describes a data sink with a DAC and, by implication, signal conditioning circuit 916 of Figure 9 would operate (filter, amplify) only on digital signals if connected to that

sort of data sink. We are not persuaded. Rosener does not explain how the components of Figure 9 would be used or modified if data sink 918 included a DAC. As noted above, the best reading of Rosener is that signal conditioning circuit 916 converts a digital signal to an analog signal and filters/amplifies that analog signal to put it into condition to drive a speaker. Presumably, if the DAC functionality is moved to data sink 918, the other signal conditioning functionality, such as filtering and amplification, would be moved as well, rendering signal conditioning circuit 916, as depicted, unnecessary (or incorporated into data sink 918). Petitioner offers no persuasive evidence that signal conditioning circuit 916 would perform sound quality enhancing digital signal processing in this scenario.

Mr. McAlexander's cross-examination testimony is not inconsistent with our reading of Rosener. Mr. McAlexander testifies that a signal conditioning circuit would have resistor-capacitor filters both before and after a DAC as part of signal conditioning, not digital signal processing. Ex. 1024, 162:2–164:12. Petitioner does not show persuasively that this would be digital signal processing to provide a sound quality enhancement for the audio content played by the speaker.

In sum, Petitioner has not shown, by a preponderance of the evidence, that the combination of Rosener and Huddart teaches “wherein the processor circuit of each of the first and second earphones comprises: a digital signal processor that provides a sound quality enhancement for the audio content played by the at least one acoustic transducers of the earphone,” as recited in claim 18.

Patent Owner raises a second dispute as to this claim limitation. Although it is not necessary to reach this dispute to assess the patentability of claim 18, Patent Owner refers to its claim 18 arguments when responding

to Petitioner’s challenge to claims 9 and 10 (discussed in detail below).
PO Resp. 34–35. Thus, we discuss Patent Owner’s second argument for claim 18.

As noted above for claim 1, Petitioner contends that, “[t]o the extent that Rosener is deemed to not disclose rechargeable batteries, [a person of ordinary skill in the art] would have found it obvious to incorporate a rechargeable battery (e.g., earbud battery) as taught in Huddart into each of Rosener’s earphones 502, 504 for providing power to earphone components.” Pet. 45. Patent Owner does not contest these allegations for claim 1 and, for the reasons given above, we find that a skilled artisan would have combined the teachings of Rosener and Huddart for the limitation of claim 1, “a rechargeable power source.”

Nevertheless, Patent Owner contests this limitation as it pertains to claim 18. Specifically, Patent Owner argues that Huddart does not describe a rechargeable battery that would be capable of powering Rosener’s earbud if the earbud were to include a DSP and a baseband processor. PO Resp. 27–32. Patent Owner contends that Huddart describes a “relatively *smaller capacity battery due to its limited size.*” *Id.* at 28 (quoting Ex. 1005, 8:32–33). Patent Owner argues that Huddart’s battery is recharged using a small plastic storage case and that “[i]f a larger-capacity battery was needed to power the additional components of the earbud, such as a DSP and baseband processor per claim 18, Huddart’s pocket charger would not be suitable for charging the battery of the wireless earbud.” *Id.* Patent Owner does not cite to evidence for this contention.

To support its contention that Huddart’s battery is “low-power,” Petitioner argues that Huddart describes its headset and wireless earbud as communicating using magnetic induction, which Huddart characterizes as

providing short range wireless communication at low power. *Id.* at 29 (citing Ex. 1005, 3:8–14, 3:21–23, 3:43–46). In contrast, Patent Owner argues, a DSP and a baseband processor are high-level integrated circuits that “consume and require a greater amount of battery power than a magnetic inductance receiver.” *Id.* at 29–30 (citing Ex. 2035 ¶ 62). According to Patent Owner, “[g]iven the significant power requirements of a DSP and baseband processor, a [person of ordinary skill in the art] would not be motivated to use Huddart’s low-power battery, which is designed to merely power a low-power magnetic inductance receiver and the related components of Huddart’s earbud.” *Id.* at 30. Patent Owner argues that “Huddart’s low-power battery [would] be unreliable, undesirable, and/or incompatible for use to power the claimed DSP and baseband processor due to its small capacity.” *Id.*

As noted above, communication via magnetic induction is only one example contemplated by Huddart, and Bluetooth communication is another described option. Ex. 1005, 3:19–60. Patent Owner dismisses this alternative, arguing that “Huddart fails to disclose whether a Bluetooth enabled earbud would be compatible with the low power battery discussed solely in connection with the magnetic induction communication system or whether a larger, higher power battery would be needed.” PO Resp. 31. However, we see nothing in Huddart to suggest that the battery it describes would be insufficient to power its alternative embodiment.

Patent Owner also argues that the additional power needed for a DSP and baseband processor would increase the drain on Huddart’s battery, causing it to generate heat that would be undesirable in an earbud worn on the face. PO Resp. 30–31 (citing Ex. 2035 ¶ 63). Patent Owner further

argues that a battery with a larger capacity than that of Huddart would have been too heavy to be used in a wireless earphone. *Id.* (citing Ex. 2035 ¶ 63).

Petitioner argues that Patent Owner misinterprets Petitioner's mapping of Rosener and Huddart to the claims. Reply 23–24. Specifically, Petitioner argues that Rosener teaches a rechargeable power source and that it “relie[s] on Huddart for its disclosure of an earbud battery being rechargeable and proposed modifying Rosener's battery to be similarly rechargeable.” *Id.* at 23. In the Petition, Petitioner argues that

While Rosener does not explicitly describe the batteries being rechargeable, a [person of ordinary skill in the art] would have understood that earphones 502, 504 could have been configured with rechargeable batteries since the use of such batteries in wireless devices was well-known before the Critical Date as shown, for example, Huddart's disclosure of its “wireless earbud” including a “power source such as a rechargeable battery.”

Pet. 44–45. Petitioner continues, “[t]o the extent that Rosener is deemed to not disclose rechargeable batteries, [a person of ordinary skill in the art] would have found it obvious to incorporate a rechargeable battery (e.g., earbud battery) as taught in Huddart into each of Rosener's earphones 502, 504 for providing power to earphone components.” *Id.* at 45; *see also id.* at 27 (“A [person of ordinary skill in the art] would have understood, however, that Rosener's earphones could have incorporated rechargeable batteries since this configuration was conventional around the time of its disclosure, as demonstrated by Huddart.”). Petitioner further argues that Patent Owner does not contest that Rosener's battery, when modified to be rechargeable, would have been sufficient to power a digital signal processor. *Id.* at 23.

We agree with Petitioner. Petitioner did not contend in the Petition that a skilled artisan would have swapped Huddart's battery for Rosener's.

Indeed, that is not how we typically evaluate obviousness. *See In re Mouttet*, 686 F.3d 1322, 1332–33 (Fed. Cir. 2012) (“It is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements. . . . Rather, the test for obviousness is what the combined teachings of the references would have suggested to those having ordinary skill in the art.”). Instead, Petitioner argues that a skilled artisan would have made Rosener’s battery rechargeable, as that would have eliminated the need to replace batteries and would have been more convenient to users, and that Huddart showed that it was well-known that earbuds could be equipped with rechargeable batteries. Pet. 27. We credit Dr. Cooperstock’s testimony in support of these arguments. Ex. 1003 ¶¶ 48–50. Setting aside the issue whether signal conditioning circuit 916 is a DSP (above, we find that it is not), Patent Owner does not contest that Rosener’s battery is at least sufficient to power the circuitry specifically described in Rosener, including signal conditioning circuit 916 and baseband processor 914. Tr. 46:17–21. We find that a skilled artisan would have had reasons, with rational underpinning, to use a rechargeable battery with Rosener’s earphones (Huddart shows that this was conventional), and that the skilled artisan would have selected a rechargeable battery sufficient to power Rosener’s circuitry.

7. Objective Indicia of Nonobviousness

Patent Owner argues that the commercial success of the invention of the challenged claims evidences nonobviousness. PO Resp. 37–42.

“[E]vidence of secondary considerations may often be the most probative and cogent evidence in the record.” *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983). For example,

Commercial success is relevant because the law presumes an idea would successfully have been brought to market sooner, in response to market forces, had the idea been obvious to persons skilled in the art. Thus, the law deems evidence of (1) commercial success, and (2) some causal relation or “nexus” between an invention and commercial success of a product embodying that invention, probative of whether an invention was non-obvious.

Merck & Co. v. Teva Pharms. USA, Inc., 395 F.3d 1364, 1376 (Fed. Cir. 2005). “[T]o be accorded substantial weight in the obviousness analysis, the evidence of secondary considerations must have a ‘nexus’ to the claims, *i.e.*, there must be ‘a legally and factually sufficient connection’ between the evidence and the patented invention.” *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019) (quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988)).

“[A] patentee is entitled to a rebuttable presumption of nexus between the asserted evidence of secondary considerations and a patent claim if the patentee shows that the asserted evidence is tied to a specific product and that the product ‘*is the invention disclosed and claimed.*’” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Demaco*, 851 F.2d at 1392). “That is, presuming nexus is appropriate ‘when the patentee shows that the asserted objective evidence is tied to a specific product and that product embodies the claimed features, and is coextensive with them.’” *Id.* (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018) (additional internal quotation marks omitted)).

“Conversely, ‘[w]hen the thing that is commercially successful is not

coextensive with the patented invention—for example, if the patented invention is only a component of a commercially successful machine or process,’ the patentee is not entitled to a presumption of nexus.” *Id.* (quoting *Demaco*, 851 F.2d at 1392) (alteration by Federal Circuit). “‘The patentee bears the burden of showing that a nexus exists.’”⁸ *Id.* (quoting *WMS Gaming Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999)).

If we do not presume nexus, “[t]o establish a proper nexus between a claimed invention and the commercial success of a product, a patent owner must offer ‘proof that the sales were a direct result of the unique characteristics of the claimed invention—as opposed to other economic and commercial factors unrelated to the quality of the patented subject matter.’” *SightSound Techs., LLC v. Apple Inc.*, 809 F.3d 1307, 1319 (Fed. Cir. 2015) (quoting *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996)); accord *Fox Factory*, 944 F.3d at 1373–74 (“A finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations. To the contrary, the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the ‘direct result of the unique characteristics of the claimed invention.’” (quoting *Huang*, 100 F.3d at 140)).

⁸ The parties agree that Patent Owner bears the burden of persuasion on nexus. Reply 31–32; Tr. 51:3–22. In a related hearing conducted on the same day between the same parties, Patent Owner expressly agreed that it bears the burden of persuasion on the issue of nexus. IPR2021-00255, Paper 53 (Mar. 3, 2022, Oral Argument Transcript) at 43:8–23. Patent Owner stated that we can rely on that agreement in this proceeding. Tr. 51:3–22.

Patent Owner argues that the commercial success of the Powerbeats Pro, a product by Petitioner's subsidiary Beats by Dr. Dre, is objective evidence of the nonobviousness of the challenged claims.⁹ PO Resp. 37–42. The parties dispute whether Patent Owner has shown a nexus between the commercial success of the Powerbeats Pro and the claimed invention.

Patent Owner argues that “[i]n light of the extreme coextensiveness between the Powerbeats Pro and claims 1–18 of the ’325 Patent, the Board should presume a nexus between the commercial success of the Powerbeats Pro and claims 1–18.” PO Resp. 41. In support of this argument that the Powerbeats Pro product is coextensive with the claimed invention, Patent Owner cites to its infringement contentions served in the Texas case, and argues that “claims 1–18 of the ’325 Patent read on the Powerbeats Pro.” *Id.* at 38 (citing Ex. 1014, 1079–113), 40 (same); Sur-reply 19 (“The [Patent Owner Response] cited an exhibit, APPLE-1014, 1079–1113, that includes a detailed claim chart showing that the PowerBeats Pros possess all the elements of the Challenged Claims.”). Patent Owner does not provide a detailed comparison of the Powerbeats Pro with the challenged claims in its Response. PO Resp. 37–42. At most, Patent Owner points out certain features of the Powerbeats Pro, such as being “completely wireless” and having a “a signature earhook design.” *Id.* at 37–38, 40. However, Patent Owner’s attempt to incorporate its infringement contentions by reference into the Response is contrary to our rules, and those infringement

⁹ Patent Owner’s evidence of commercial success shows success at the level of a category that would include the Powerbeats Pro, but does not break out the Powerbeats Pro individually. PO Resp. 38, 41–42 (citing Exs. 2037, 2038). Nevertheless, Petitioner does not contest that the Powerbeats Pro product has been commercially successful.

contentions will be disregarded. *See* 37 C.F.R. § 42.6(a)(3) (“Arguments must not be incorporated by reference from one document into another document.”). Accordingly, Patent Owner has not shown that the Powerbeats Pro practices the invention of the challenged claims and, for that reason, has not shown that the Powerbeats Pro is coextensive with the challenged claims.

Additionally, Petitioner points to features of the Powerbeats Pro, not recited in the challenged claims, that it alleges are responsible for the commercial success of that product. Reply 32–34. “Although we do not require the patentee to prove perfect correspondence to meet the coextensiveness requirement, what we do require is that the patentee demonstrate that the product is essentially the claimed invention.” *Fox Factory*, 944 F.3d at 1374. On one hand, “if the unclaimed features amount to nothing more than additional insignificant features, presuming nexus may nevertheless be appropriate.” *Id.* On the other, a claim is not coextensive with a product that includes a “critical” unclaimed feature that materially impacts the product’s functionality. *Id.* at 1375.

In particular, Petitioner argues that the Powerbeats Pro includes a speech-detecting accelerometer in each earbud, two beam-forming microphones per side to help filter out sounds such as wind and ambient noise, a proprietary chip package that provides a faster and more stable wireless connection, and wireless audio sharing functionality and location tracking using a phone to determine if the headphones are lost or missing. Reply 32–33 (citing Ex. 1028; Ex. 2039, 3–4). Petitioner argues that these unclaimed features materially impact the Powerbeats Pro’s functionality and points to product reviews to show that the proprietary chip package improves quality and latency. *Id.* at 33 (citing Exs. 1029, 1030).

Patent Owner responds that much of what Petitioner argues are unclaimed features are, in fact, claimed. Sur-reply 19–20. Specifically, Patent Owner argues that claim 1’s recitation of a “microphone” corresponds to the two beam-forming microphones in Powerbeats Pro; the “processor circuit” of claim 1 corresponds to the proprietary chip package of Powerbeats Pro; and that claim 18’s recitation of a “digital signal processor that provides a sound quality enhancement” corresponds to the speech-detecting accelerometer and two-beam forming microphones of Powerbeats Pro. *Id.* Patent Owner, however, offers no evidence to support these arguments.¹⁰ *Id.* Patent Owner’s attorney argument is not persuasive to meet its burden to show that the challenged claims are coextensive with Powerbeats Pro. In any case, we agree with Petitioner that these particular features of Powerbeats Pro do not appear to be coextensive with the recitations in claims 1 and 18. *Cf. Fox Factory*, 944 F.3d at 1376 (“On a broader note, if we were to agree . . . that the coextensiveness requirement is met so long as the patent claim broadly covers the product that is the subject of the secondary considerations evidence, irrespective of the nature of any

¹⁰ We recognize that, ordinarily, “[t]he sur-reply may not be accompanied by new evidence other than deposition transcripts of the cross-examination of any reply witness.” TPG 73. In this instance, it is Patent Owner’s burden to prove that the challenged claims are coextensive with the Powerbeats Pro in order to show nexus via coextensiveness. *See Fox Factory*, 944 F.3d at 1373. Thus, Patent Owner should have marshaled evidence of coextensiveness, including evidence as to unclaimed features, with its Response. Paper 15 (Scheduling Order) 8 (Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”); TPG 73–74 (“Sur-replies should only respond to arguments made in reply briefs, comment on reply declaration testimony, or point to cross-examination testimony.”). In any case, Patent Owner did not request an opportunity to submit additional evidence with its Sur-reply.

unclaimed features—then the coextensiveness requirement would rest entirely on minor variations in claim drafting.”). Moreover, Patent Owner does not contest that other features, such as wireless audio sharing functionality and location tracking using a phone, are features of Powerbeats Pro but not claimed in the challenged claims.

Patent Owner also argues that, even if the features of Powerbeats Pro are not claimed in the challenged claims, those features “are not for improving the ‘heart,’ or purpose, of the ’325 Patent.” Sur-Reply 20–21. In a similar argument, Patent Owner contends that “even if any of the Powerbeats Pro’s features identified in the Reply could be considered unclaimed, there is no evidence that they are critical or significant to performing the function of the ’325 Patent’s earphones better.” *Id.* at 21. Specifically, Patent Owner argues, “Petitioner . . . did not introduce any evidence to show that the speech-detecting accelerometer, beam-forming microphones, ambient noise filtering, wireless audio sharing and/or location tracking are critical to securing a pair of independently wireless earphones to the user.” *Id.* at 21–22. This misstates the law. *Fox Factory* did not hold that unclaimed features must be critical to or for improving the heart of the challenged claims. Rather, we look to whether the unclaimed features “materially impact[] the product’s functionality.” *Fox Factory*, 944 F.3d at 1375. Thus, when *Fox Factory* states that “if the unclaimed features amount to nothing more than additional insignificant features, presuming nexus may nevertheless be appropriate,” *id.* at 1374, it means insignificant to the product, not insignificant to the challenged claims. Patent Owner does not argue, and has not presented evidence, that the unclaimed features of Powerbeats Pro are insignificant to, or do not materially impact, the Powerbeats Pro product and its success.

For these reasons, even if we consider Patent Owner’s improperly incorporated claim charts, we still conclude that Patent Owner has not met its burden to prove that the challenged claims and Powerbeats Pro are coextensive. Thus, Patent Owner has not shown a nexus between the commercial success of Powerbeats Pro and the invention of the challenged claims by virtue of coextensiveness.

As noted above, Patent Owner may still show nexus by showing that the commercial success of the Powerbeats Pro is the direct result of the unique characteristics of the claimed invention. *See Fox Factory*, 944 F.3d at 1373–74; *Huang*, 100 F.3d at 140. To that end, Patent Owner argues in the Response that “[a]t a minimum, a nexus between the Powerbeats Pro [and] the Challenged Claims exists because the commercial success is the direct result of the unique characteristics of the claimed invention.” PO Resp. 41. Patent Owner does not cite to evidence to support this statement, and does not identify, in the Response which “unique characteristics” it relies on. *Id.*

In its arguments regarding coextensiveness, Patent Owner identified the “completely wireless” nature and “signature earhook design” of the Powerbeats Pro. *Id.* at 37–38, 40. In the Sur-reply, Patent Owner attempts to tie these two features to “unique characteristics” of the challenged claims. Sur-reply 23 (“The [Patent Owner Response] explained how Petitioner’s press releases touted the ‘completely wireless’ nature of the headphones as well as the ‘signature earhook design’ of the PowerBeats Pros.”) (citing PO Resp. 37–38; Ex. 2039, 1). Patent Owner has not shown persuasive evidence to support an argument that the commercial success of the Powerbeats Pro was the direct result of these features. The press release of Exhibit 2039 characterizes the Powerbeats Pro as

completely wireless earphones that deliver powerful sound for the world's most passionate music lovers and motivated athletes. The result of a deep integration between Beats and Apple engineering, Powerbeats Pro features industry-leading battery life, advanced functionality, reliable connectivity, exceptional fit via the signature earhook design and beautiful fidelity.

Ex. 2039, 2. This press release purportedly published on April 3, 2019, (Ex. 2039, 2), while Patent Owner relies on commercial success that took place after this date, in "Q3 2019" (PO Resp. 41). Patent Owner does not explain persuasively why a press release published before the period of alleged commercial success is evidence of the reasons for that success.

In sum, we conclude that Patent Owner has not shown a nexus between the challenged claims and the alleged commercial success of the Powerbeats Pro. Accordingly, Patent Owner's objective indicia of nonobviousness is particularly weak and unpersuasive.

8. Conclusion of Obviousness

As explained above, the combination of Rosener and Huddart teaches each limitation of claims 1, 2, and 16, but not claim 18. Petitioner has introduced persuasive evidence that a skilled artisan would have had reasons to combine the teachings of Rosener and Huddart with a reasonable expectation of success. We have considered Patent Owner's arguments and evidence of objective indicia of nonobviousness, but do not find it persuasive, for the reasons explained above. In sum, upon consideration of all the evidence, we conclude that Petitioner has proved by a preponderance of the evidence that claims 1, 2, and 16 would have been obvious over Rosener and Huddart. Petitioner has not proved, by a preponderance of the evidence, that claim 18 would have been obvious over Rosener and Huddart.

C. Obviousness of Claims 3 and 4 over Rosener, Huddart, and Haupt

Petitioner contends that claims 3 and 4 would have been obvious over Rosener, Huddart, and Haupt. Pet. 57–64. Patent Owner does not challenge Petitioner’s additional allegations for claims 3 and 4.

Haupt describes techniques for downloading digital data (e.g., MP3 music files) from the Internet using a computer (e.g., a PDA or notebook computer wirelessly connected to a network) and distributing those digital data to wireless headphones. Ex. 1006, 1.

Claim 3 depends from claim 1 and adds “wherein the processor circuit for the first earphone is for, upon activation of a user control of the headphones, initiating transmission of a request to a remote network server that is remote from the headphones.” Claim 4 depends from claim 3 and adds “wherein the processor circuit of the first earphone is further for receiving a response to the request.”

As we find above, Rosner teaches a processor circuit, for example broadband processor 914, signal conditioning circuits 916, 920, and other processing circuitry. Ex. 1003 ¶ 114. Petitioner contends that Haupt teaches activation of a user control of headphones and corresponding transmission of a request to a remote network server, after which the server sends, and the headphones receive, a response (e.g., downloaded audio content). Pet. 61–64. In particular, Petitioner cites to Haupt’s description of interacting with control buttons on wireless headphones to connect with a server and retrieve audio files over a network. *Id.* (citing Ex. 1006, 2–5, 10–14, 21). Petitioner, relying on Dr. Cooperstock’s testimony, contends that a skilled artisan would have combined Haupt’s teachings with those of Rosener and Huddart to “improve[] performance when streaming data streams with high throughput requirements due to the increased data transmission rates,”

“impart[] new and useful functionality to [Rosener’s] earphones 502, 504 as audio playback devices,” and “provid[e] Internet access to the headphones.” *Id.* at 58–61 (citing Ex. 1003 ¶¶ 57–61). We credit Dr. Cooperstock’s uncontroverted testimony on this point.

Based on the evidence presented in the Petition, we find that the combination of Rosener, Huddart, and Haupt teaches each limitation of claims 3 and 4. Petitioner has introduced persuasive evidence that a skilled artisan would have had reasons to combine the teachings of Rosener, Huddart, and Haupt with a reasonable expectation of success. We have considered Patent Owner’s arguments and evidence of objective indicia of nonobviousness, but do not find it persuasive, for the reasons explained above. In sum, upon consideration of all the evidence, we conclude that Petitioner has proved by a preponderance of the evidence that claims 3 and 4 would have been obvious over Rosener, Huddart, and Haupt.

D. Obviousness of Claims 9, 10, and 14 over Rosener, Huddart, and Price

Petitioner contends that claims 9, 10, and 14 would have been obvious over Rosener, Huddart, and Price. Pet. 65–71. Patent Owner disputes whether claims 9 and 10 would have been obvious, but does not contest Petitioner’s allegations for claim 14. We find that the combination of Rosener, Huddart, and Price teaches each limitation of claims 9, 10, and 14.

Price “relates generally to collecting data from, sending data to, and/or updating software or digital data in electronic devices.” Ex. 1008 ¶ 3. In one example, updated software code (including firmware) is retrieved by a computer from a data store on a network and delivered (wirelessly) to an electronic device. *Id.* ¶¶ 29, 38–39, Fig. 1. Exemplary electronic devices

include personal computers, digital cameras, TiVo-like devices, and personal digital assistants (such as Palm and Pocket PC devices). *Id.* ¶¶ 25, 33.

Claim 9 depends from claim 1 and adds “the processor circuits of the headphones are configured to receive firmware upgrades transmitted from a remote network server.” Claim 10 depends from claim 9 and adds “wherein the headphone[s] are configured to receive the firmware upgrades wirelessly.”

As to claims 9 and 10, Petitioner contends that Price teaches a coordinating computer obtaining software update code representing firmware upgrades from a server and transmitting those firmware upgrades to devices wirelessly. Pet. 69–71 (citing Ex. 1008 ¶¶ 26, 30, 33, 37, 38). According to Petitioner, a skilled artisan would have modified Rosener’s transceiver 900 to implement processing related to the receipt of software update code for firmware upgrades, per the teachings of Price. *Id.* at 70 (citing Ex. 1003 ¶ 124). Petitioner argues that this feature of Price would have “provided the benefits of improving reliability, functionality, or compatibility” to Rosener’s earphones. *Id.* at 70 (citing Ex. 1008 ¶¶ 5, 11; Ex. 1003 ¶¶ 124, 125).

In arguments similar to those presented for claim 18, discussed above, Patent Owner contends that “a [person of ordinary skill in the art] would not have attempted to use a low-power, pocket-charger-rechargeable battery as in Huddart, with wireless earphones that have the additional power consumption associated with receiving firmware upgrades, including wirelessly with respect to claim 10.” PO Resp. 32–33 (citing Ex. 2035 ¶ 65). Here, Patent Owner mischaracterizes Petitioner’s obviousness allegations as bodily incorporating Huddart’s rechargeable battery into Rosener’s earphone. *See also id.* at 34–35 (“As with dependent claim 18,

. . . the Petition and Cooperstock rely on Huddart’s low-power earbud battery as a motivation to power the firmware-receiving earphones of claims 9 and 10. . . . Put another way, to the extent that a [person of ordinary skill in the art] might be motivated to power Rosener’s earphone with Huddart’s low-power, pocket-charger-rechargeable battery, neither Petitioner nor Cooperstock revisited whether the [person of ordinary skill in the art] would be motivated to use a rechargeable battery, like Huddart’s low-power, pocket-charger-rechargeable battery, in a wireless headphone that additionally receives firmware upgrades (including wirelessly).”); Reply 28 n.3 (“[Patent Owner] misinterprets the Petition as incorporating Huddart’s battery into Rosener”). This argument is unpersuasive, as Patent Owner’s attempt to recast Petitioner’s argument as a physical substitution of elements fails to take into account the teachings of Rosener and Huddart. *See Mouttet*, 686 F.3d at 1332–33.

Patent Owner further argues that “updating a device’s firmware requires that the device be sufficiently powered throughout the firmware upgrade process,” and that “[o]ften, if the device loses power during the firmware upgrade process, the device can become inoperable (a so-called ‘brick’).” PO Resp. 33. Patent Owner then argues that the ’325 patent’s solution is to implement the transceiver circuit on a single integrated circuit (IT), which it refers to as system-on-chip (SoC or SOC), implying that a SoC design is required by the patent’s claims. *Id.* at 35–36 (citing Ex. 1001, 6:45–49; Ex. 2035 ¶¶ 70–71); *see also* Sur-reply 17–18 (“[T]he [Patent Owner Response’s] description of the SOC described in the ’325 Patent demonstrates how the ’325 Patent enables a wireless earphone with a rechargeable battery to receive firmware upgrades.”). According to Patent Owner, without a teaching of “an earphone with a SoC for reduced power

consumption,” a person of ordinary skill in the art “would realize that for claims 9 and 10, the battery would need to power non-SOC wireless earphones throughout the firmware update process; and if the battery ran out of power, the wireless earphones likely would become ‘bricked.’” PO Resp. 35–36. Patent Owner concludes:

If a [person of ordinary skill in the art] were truly motivated to use small, low-power rechargeable batteries in Rosener, the [person of ordinary skill in the art] would want to keep power requirements low by implementing lower power receiver technologies (like magnetic inductance or Bluetooth), and not additionally burdening the low power rechargeable battery with having to power the wireless device throughout a firmware update.

Id. at 36–37 (citing Ex. 2035 ¶ 72).

Petitioner faults Patent Owner for not presenting evidence showing that firmware upgrades involve significant power consumption. Reply 27. In any case, Petitioner argues, a skilled artisan would have known how to implement a Rosner-Huddart-Price combination in a way that does not require high power consumption, such as incrementally upgrading firmware. *Id.* at 29–30 (citing Ex. 1023 ¶¶ 50–51). In its Sur-reply, Patent Owner changes its argument, contending instead that it is the reliability of the

battery, rather than its power, that poses the risk of a device “becoming a brick.” Sur-reply 17.¹¹

Patent Owner’s arguments are unpersuasive. First, as Petitioner argues (Reply 28), Patent Owner points to no persuasive evidence that the claims of the ’325 patent require a SoC design for a transceiver. Mr. McAlexander’s testimony, which merely copies the Patent Owner Response without identifying any basis for the testimony, is of little value. Ex. 2035 ¶¶ 70–72. Moreover, the ’325 patent makes clear that a SoC design is only an example. Ex. 1001, 1001, 6:45–49 (“In various embodiments, the transceiver circuit 100 may be implemented as a single integrated circuit (IC), such as a system-on-chip (SoC), which is conducive to miniaturizing the components of the earphone 10, which is advantageous if the earphone 10 is to be relatively small in size.”).

Second, Patent Owner’s argument that the power source must be high-power or reliable assumes that the battery would be used for the entire firmware upgrade process, including both receiving the firmware update and installing it. PO Resp. 33. Claim 9 only recites a processor circuit “configured to receive firmware upgrades,” and says nothing about installing firmware. Patent Owner provides no persuasive argument or evidence suggesting that a high-power or more reliable battery would be necessary to

¹¹ Patent Owner repeatedly argued in its Response that it was the “low-power” nature of Huddart’s battery that made it unsuitable for firmware upgrades. PO Resp. 32–37. Patent Owner’s mention of an “unreliable power source” was in the context of Huddart’s battery being low power. *Id.* at 37; *see also id.* at 30 (arguing that Huddart’s “low-power battery” would be “unreliable” “due to its small capacity”). We decline to consider Patent Owner’s new argument that Huddart’s battery would have been unreliable. However, even if we did, it would not be persuasive, as we explain.

receive firmware, or that a power failure while receiving firmware (as opposed to a power failure during installation of the firmware) would result in “bricking” a device. Moreover, as Petitioner argues, a skilled artisan could have implemented the combination such that the firmware installation takes place while the earphone is connected to a charger, such as described in Huddart (primary charger and pocket charger). Reply 30–31 (citing Ex. 1023 ¶¶ 52–53; Ex. 1005, 8:28–34). Thus, even if firmware installation were required by claims 9 and 10, Patent Owner’s argument still would be unpersuasive.

As explained for claims 1 and 18 (Sections II.B.3.b) and II.B.6 above), we find that a skilled artisan would have had persuasive reasons to incorporate Huddart’s teaching of rechargeable batteries into Rosener’s earphones, would have selected a rechargeable battery sufficient to power Rosener’s circuitry (including transceiver 900, which would receive firmware upgrades), and would have had a reasonable expectation of success in doing so.

Claim 14 depends from claim 10, but otherwise adds limitations that are substantially the same as those added by claim 2. Petitioner incorporates by reference its arguments and evidence for claim 2. Pet. 71. As explained in Section II.B.4 above, we find that Rosener teaches each additional limitation of claim 2. For the same reasons, Rosener teaches each additional limitation of claim 14.

In conclusion, the combination of Rosener, Huddart, and Price teaches each limitation of claims 9, 10, and 14. Petitioner has introduced persuasive evidence that a skilled artisan would have had reasons to combine the teachings of Rosener, Huddart, and Price with a reasonable expectation of success. We have considered Patent Owner’s arguments and evidence of

objective indicia of nonobviousness, but do not find it persuasive, for the reasons explained above. In sum, upon consideration of all the evidence, we conclude that Petitioner has proved by a preponderance of the evidence that claims 9, 10, and 14 would have been obvious over Rosener, Huddart, and Price.

E. Obviousness of Claim 15 over Rosener, Huddart, and Paulson

Petitioner contends that claim 15 would have been obvious over Rosener, Huddart, and Paulson. Pet. 71–75. Patent Owner does not contest Petitioner’s additional allegations for claim 15.

Paulson describes a voice communication device, such as an earphone assembly with an ear tip that inserts in the ear canal and a microphone attached at the end of a boom. Ex. 1009, 5:1–8, Figs. 1A, 1B, 2. In one example, Paulson describes a push-button switch that can be pushed to enable and mute the microphone. *Id.* at 6:18–49.

Claim 15 depends from claim 1 and adds
wherein the processor circuit of the first earphone is configured to:

process audible utterances by the user picked by the
microphone in response to activation of the
microphone by the user; and
transmit a communication based on the audible
utterances via the Bluetooth wireless
communication links.

Petitioner argues that Paulson’s unmute feature corresponds to enabling a microphone and processor circuit to “process audible utterances by the user picked by the microphone in response to activation of the microphone by the user,” as recited in claim 15. Pet. 73–74 (citing Ex. 1009, 6:18–49). Petitioner cites Rosener for the ability to “transmit a

communication based on the audible utterances via the Bluetooth wireless communication links,” as recited in claim 15. *Id.* at 74–75 (citing Ex. 1004 ¶¶ 11, 35, 49, 56). According to Petitioner and Dr. Cooperstock (Pet. 73; Ex. 1003 ¶ 71), a skilled artisan would have combined Paulson’s and Rosener’s features in light of Paulson’s statements that its “feature is important for users in a noisy environment, to allow them to reduce the noise heard by the distant party.” Ex. 1009, 6:33–35. We credit Dr. Cooperstock’s uncontested testimony on this point.

In light of Petitioner’s evidence, we find that the combination of Rosener, Huddart, and Paulson teaches each limitation of claim 15. Petitioner has introduced persuasive evidence, including Dr. Cooperstock’s testimony, that a skilled artisan would have had reasons to combine the teachings of Rosener, Huddart, and Price with a reasonable expectation of success. We have considered Patent Owner’s arguments and evidence of objective indicia of nonobviousness, but do not find them persuasive for the reasons explained above. In sum, upon consideration of all the evidence, we conclude that Petitioner has proved by a preponderance of the evidence that claim 15 would have been obvious over Rosener, Huddart, and Paulson.

F. Obviousness of Claims 16 and 17 over Rosener, Huddart, and Vanderelli

Petitioner contends that claims 16 and 17 would have been obvious over Rosener, Huddart, and Vanderelli. Pet. 75–78. Patent Owner does not contest Petitioner’s additional allegations for this ground.

Vandereilli describes a wireless power supply that rectifies RF energy and stores it in a group of capacitors. Ex. 1010, Abstract, 2:1–51, 4:9–17, Fig. 1.

For claim 16, Petitioner cites Vanderelli for additional examples, beyond those shown in Huddart, of “wirelessly chargeable circuit components.” Pet. 77. As explained above, we conclude that claim 16 would have been obvious over Rosener and Huddart. Thus, we do not reach whether claim 16 also would have been obvious over Rosener, Huddart, and Vanderelli. *See SAS*, 138 S. Ct. at 1359); *Bos. Sci. Scimed*, 809 F. App’x at 990.

As to claim 17, Petitioner contends that a “passive, wireless rechargeable power source” is a rechargeable power source that “may comprise capacitors passively charged with RF radiation.” Pet. 51 (quoting Ex. 1001, 7:3–5; citing Ex. 1003 ¶ 104), 78 (quoting Ex. 1001, 7:3–5; citing Ex. 1003 ¶ 134). Petitioner contends that a skilled artisan would have incorporated Vanderelli’s technique of rectifying RF energy and storing it in capacitors because it would have provided the “advantages of obtaining energy from a range of RF frequencies.” *Id.* at 78 (citing Ex. 1003 ¶ 134). We credit Petitioner’s evidence, including Dr. Cooperstock’s uncontested testimony.

In light of Petitioner’s evidence, we find that the combination of Rosener, Huddart, and Vanderelli teaches each limitation of claim 17. Petitioner has introduced persuasive evidence, including Dr. Cooperstock’s testimony, that a skilled artisan would have had reasons to combine the teachings of Rosener, Huddart, and Vanderelli with a reasonable expectation of success. We have considered Patent Owner’s arguments and evidence of objective indicia of nonobviousness, but do not find it persuasive, for the reasons explained above. In sum, upon consideration of all the evidence, we conclude that Petitioner has proved by a preponderance of the evidence that claim 17 would have been obvious over Rosener, Huddart, and Vanderelli.

III. CONCLUSION¹²

Petitioner has shown by a preponderance of the evidence that claims 1–4, 9, 10, and 14–17 would have been obvious. Petitioner has not shown by a preponderance of the evidence that claim 18 would have been obvious.

In summary:¹³

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 2, 16–18	103(a)	Rosener, Huddart	1, 2, 16	18
3, 4	103(a)	Rosener, Huddart, Haupt	3, 4	
9, 10, 14	103(a)	Rosener, Huddart, Price	9, 10, 14	
15	103(a)	Rosener, Huddart, Paulson	15	
16, 17	103(a)	Rosener, Huddart, Vanderelli	17	
Overall Outcome			1–4, 9, 10, 14–17	18

¹² Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

¹³ For the reasons explained above, we do not reach whether claim 17 would have been obvious over Rosener and Huddart, or whether claim 16 would have been obvious over Rosener, Huddart, and Vanderelli.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED, based on a preponderance of the evidence, that claims 1–4, 9, 10, and 14–17 have been shown to be unpatentable;

FURTHER ORDERED, based on a preponderance of the evidence, that claim 18 has not been shown to be unpatentable; and

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

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