

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

K/S HIMPP
Petitioner

v.

BRAGI GmbH
Patent Owner

Case IPR2023-01150

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 9,843,853
CHALLENGING CLAIMS 1-21**

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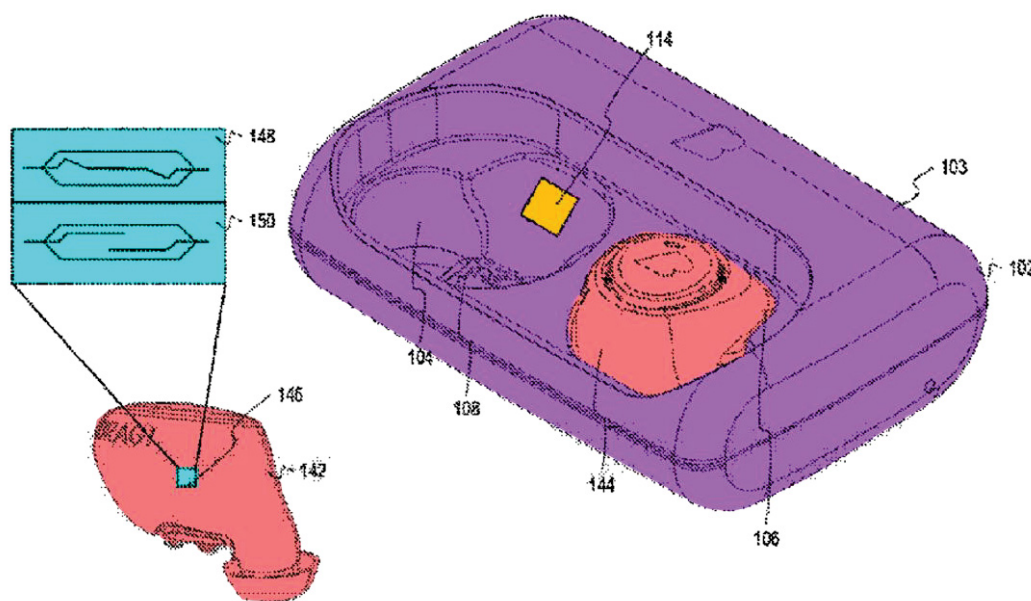
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K/S HIMPP (“Petitioner”) respectfully requests *inter partes* review (“IPR”) of claims 1-21 of USP 9,843,853 (“’853 patent”) (Ex. 1001).

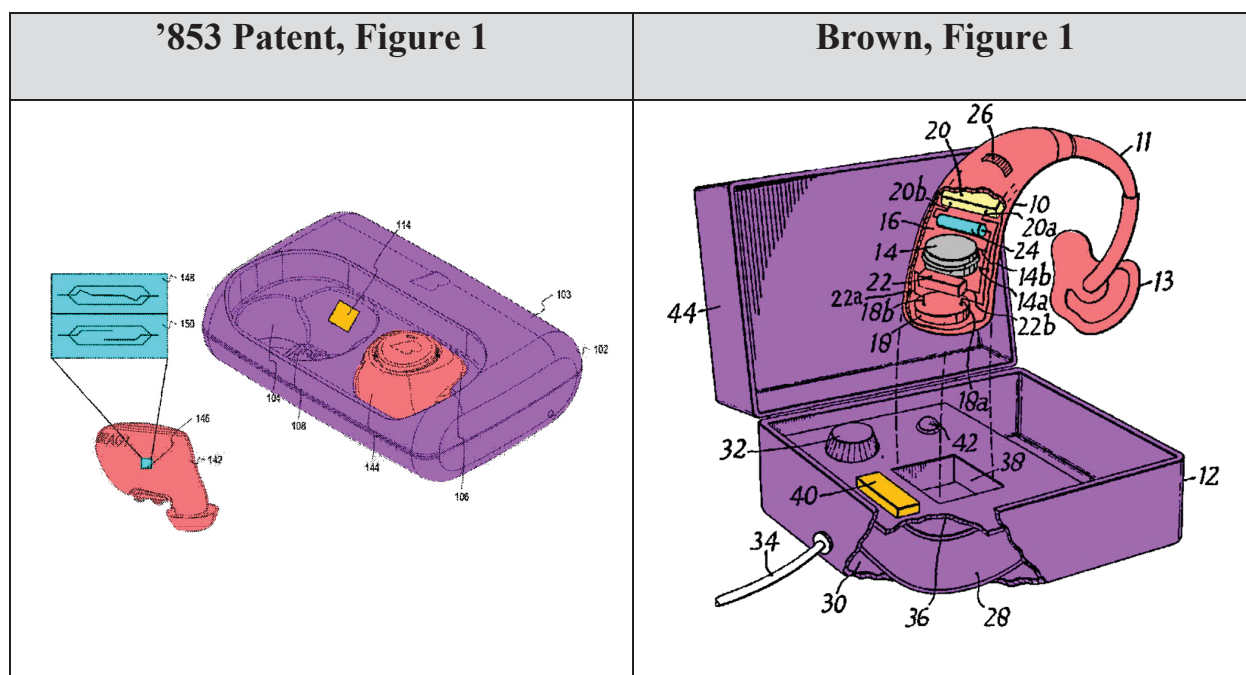
I. INTRODUCTION

The ’853 patent focuses on a decades-old idea: the concept of using a reed switch to automatically turn a wireless earpiece off and on when it has been placed into or removed from its storage case. Ex-1001-USP853, 2:52-57. For example, Figure 1, reproduced below, depicts a representative embodiment of an earpiece 142 with a reed switch 146.

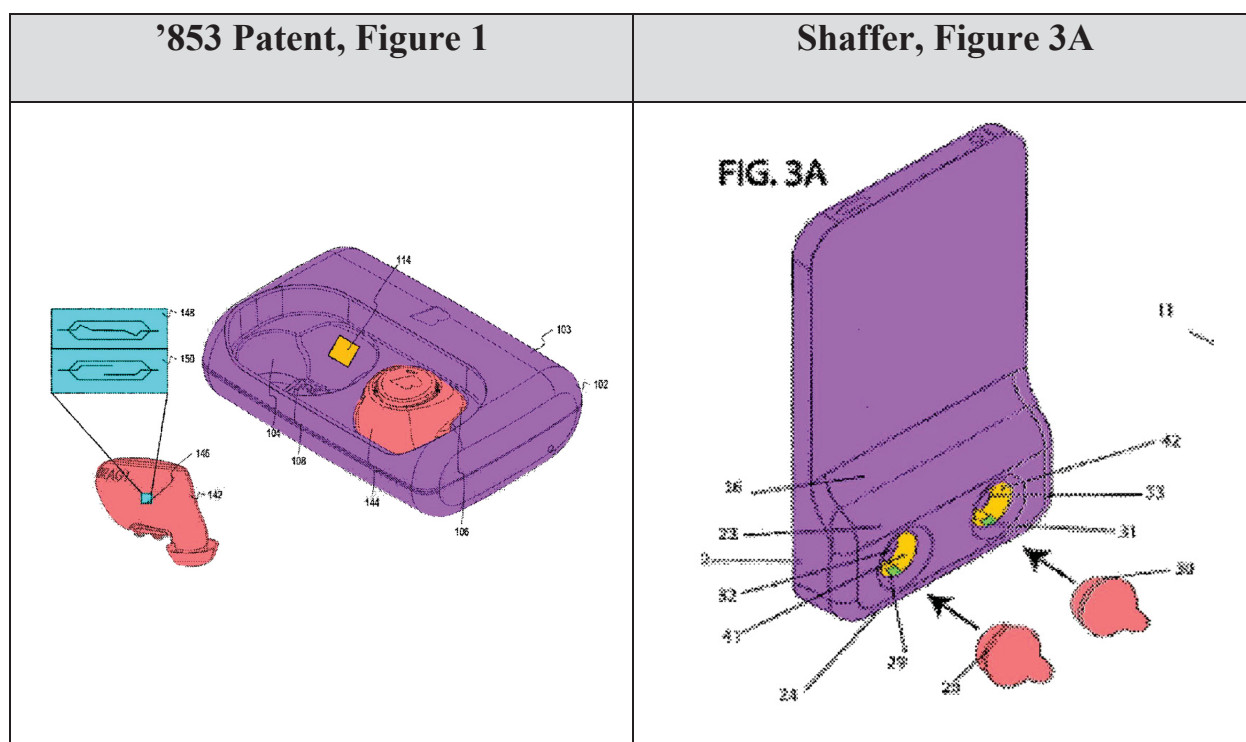


Id., Figure 1. The reed switch 146 is used to power off earpiece 142 when placed into case 102. *Id.*, 4:27-33. However, this concept has been known for over 50 years and is taught by numerous prior art references. For example, a GB patent application published in 1971 discloses the same use for a reed switch, i.e., to automatically turn

the earpiece off when it has been placed into its storage case. Ex-1007-Brown, 1:19-27 (describing “a hearing aid comprising ... a switch controlling the flow of current from the [battery] cell to the amplifier [circuit], the switch being a *reed [r]elay switch* ... *disposed for being rendered open circuit by a magnet* outside the casing”).



In some '853 patent's claims, an earpiece transitions to a low power mode when placed in its case and uses residual power to maintain limited functionality (e.g., battery charging). Ex-1001-USP853, 5:27-30, 10:10-15. This feature was likewise well-known and disclosed in multiple prior art references. For example, a U.S. patent publication disclosed earpieces that transition from a high power “normal” mode to a “low-energy consumption idle mode” when placed into a storage case. Ex-1003-Shaffer, ¶63.



A German patent publication similarly disclosed earpieces that transition to a low power mode that uses only a “residual power supply” when placed into their case. Ex-1004-Hain, ¶¶20, 22. The challenged claims of the ’853 patent are unpatentable over these and other references as set forth below.

II. MANDATORY NOTICES

A. Real Party-in-Interest

Petitioner K/S HIMPP is a real party-in-interest. For purposes of this Petition and for the avoidance of disputes, Petitioner identifies HIMPP members and affiliates Demant A/S; GN Store Nord A/S; IntriCon Corporation; and Rion Co., Ltd. as additional real parties-in-interest.

B. Related Matters

According to USPTO records, the '853 patent is owned by BRAGI GmbH ("Patent Owner"). As of the filing date of this petition, Petitioner is not aware of any related proceedings involving the '853 patent.

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III. CERTIFICATION OF GROUNDS FOR STANDING

Petitioner certifies pursuant to Rule 42.104(a) that the patent for which review is sought is available for IPR and that Petitioner is not barred or estopped from requesting IPR challenging the claims on the grounds identified in this Petition.

IV. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED

Petitioner challenges claims 1-21 of the '853 patent.

A. Prior Art

The '853 patent claims the benefit of a provisional application filed on August 29, 2015. Ex-1001-USP853, Cover.¹ Petitioner relies upon the documents in the Table of Exhibits, including:

¹ Petitioner relies on prior art that predates the claimed provisional date. Accordingly, Petitioner assumes for purposes of this Petition, without taking a position, that the '853 patent is entitled to the benefit of the claimed provisional date, but reserves the right to argue in later proceedings that the claimed subject matter is unsupported by the provisional filing.

1. USP Publication 2015/0245126 (“Shaffer”) (Ex-1003), published August 27, 2015, as § 102(a)(1) and (2) prior art;
2. DE Patent Application 102007039455 (“Hain”) (Ex-1004), published February 26, 2009, as § 102(a)(1) prior art;
3. U.S. Patent 8,265,315 (“Sorensen”) (Ex-1005), issued September 11, 2012, as § 102(a)(1) and (2) prior art;
4. EP Patent Application 1727395 (“Steinbrecher”) (Ex-1006), published August 20, 2008, as § 102(a)(1) prior art; and
5. GB Patent Application 1254017 (“Brown”) (Ex-1007), published November 17, 1971 as § 102(a)(1) prior art.

B. Grounds for Challenge

Certain challenged claims are anticipated under § 102 as follows:

Ground	Claims	Reference
1	10, 14	Brown
2	1-3, 5	Hain
3	10, 21	Steinbrecher

All challenged claims are rendered obvious under § 103 as follows:

Ground	Claims	References
4	1-7, 9	Shaffer and Hain
5	4, 6-8	Shaffer, Hain, and Sorensen
6	10-12, 14, 16-21	Shaffer and Steinbrecher
7	11-13, 15, 17-21	Shaffer, Steinbrecher, and Sorensen

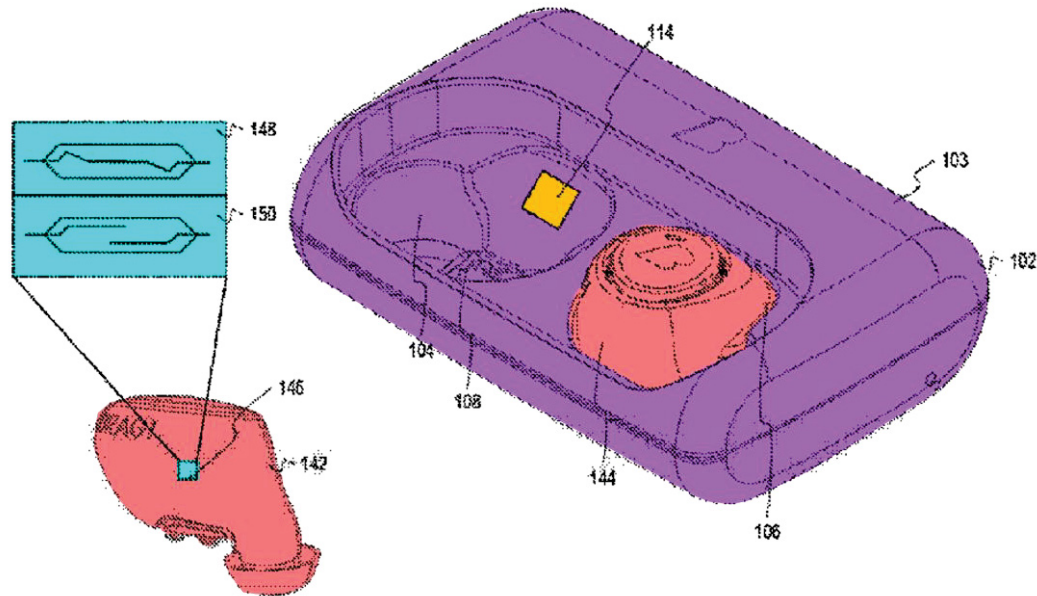
This Petition, supported by the declaration of Dr. Kiaei (“Ex-1002-Kiaei-Decl.”), demonstrates that each challenged claim is unpatentable.

V. BACKGROUND TECHNOLOGY AND ’853 PATENT OVERVIEW

A. The Alleged Invention

The ’853 patent describes techniques for reducing the battery consumption of wireless earpieces when placed in a storage case (which the patent refers to as a “smart case”). Ex-1001-USP853, 1:15-17 (“the present invention relates to wireless earpieces that manage and extend battery life”), 2:35-42 (“The illustrative embodiments provide a system, method, and wireless earpieces for managing and preserving battery life. The wireless earpieces may interact with a smart case to perform various actions. For example, the smart case may be utilized to preserve the battery life of the wireless earpieces by interacting with the wireless earpieces while in a low power mode or state.”). Specifically, referring to Figure 1 below, the patent

explains that a **wireless earpiece** can be equipped with a **reed switch**² that is used to detect a magnetic field of a **magnet** of the **storage case**.



² A reed switch (also referred to as a reed relay or reed contact) is a well-known type of electromechanical switch that is actuated by an applied magnetic field. Ex-1001-USP853, 2:54-55 (“The reed switch is an electrical switch operated by an applied magnetic field”); Ex-1016, 1-2. It was invented in the 1920s and in widespread use by the 1960s. *See, e.g.*, Ex-1014, 2-3; Ex-1015, claim 1. Ex-1002-Kiaei-Decl., ¶¶26-28.

Id., Figure 1; *see also id.*, 2:52-57 (“The reed switch is ... operated by an applied magnetic field ... provided by a magnet of the smart case thereby turning the wireless earpieces on and off.”), 5:31-37. Ex-1002-Kiaei-Decl., ¶29.

The insets 148 and 150 in Figure 1 respectively show that the reed switch 146 is closed when a magnetic field is absent (e.g., when the earpieces are out of the case) and open when a magnetic field is present (e.g., when the earpieces are in the case, close to the magnet). Ex-1001-USP853, 5:31-37 (“The reed switch 146 may operate in a closed mode 148 when no magnetic field is present or in an open mode 150 when a magnetic field is present. ... [T]he reed switch 146 may be in the closed mode 148 when outside the smart case 102 and in the open mode 150 when in the smart case 102.”). Ex-1002-Kiaei-Decl., ¶30.

Thus, by monitoring the state of reed switch 146, the earpieces can be automatically turned off or placed in a low power mode when placed in the storage case. *Id.*, 4:27-33 (“power off or initiate a low power mode (e.g., lower power state or mode) for one or both of the wireless earpieces 142, 144 when one or more of the wireless earpieces 142, 144 are placed within the receptacles 104, 106 [of the storage case]”); *see also id.*, 8:53-9:14, Figure 5. Ex-1002-Kiaei-Decl., ¶31.

The ’853 patent also describes various “smart” capabilities of the storage case, e.g., logic circuitry to facilitate battery charging and other functionality of the

wireless earpieces. Ex-1001-USP853, 2:37-51 (“preserve the battery life of the wireless earpieces by interacting with the wireless earpieces while in a low power mode;” “ensure that the wireless earpieces are charged to a desired level;” “[charge] utilizing contact or wirelessly (e.g., inductive charging);” “communicate with the wireless earpieces through physical interactions (e.g., magnetic contact points, physical switches, etc.) or through wireless connections, standards, or protocols (e.g., near field communications, Bluetooth, Wi-Fi, etc.);” “The wireless earpieces may upload, synchronize, or store biometric and performance data associated with the wireless earpieces and/or associated user to the smart case.”). Ex-1002-Kiaei-Decl., ¶32.

B. Prosecution History

The ’853 patent was filed on August 23, 2016 as U.S. Patent Application No. 15/245,031 and claims the benefit of priority to U.S. Provisional Application No. 62/211,767 filed on August 29, 2015.

On May 2, 2017, the examiner issued a first-office-action notice of allowance, finding all of the claims as written allowable. Ex-1008-FH [PDF173] (5/2/2017 Notice of Allowance at 2). The applicant then filed a Request for Continued Examination (RCE), amending the claims to add Claim 21 and stating that Claim 21 was functionally equivalent to allowed Claim 17. Ex-1008-FH [PDF215] (8/2/2017

RCE Amendment at 7). The examiner again issued a notice of allowance that included Claim 21, stating that “the prior art on record does not teach the power related mode of operation (i.e., high power and low power modes) as required in independent claim 1.” *Id.* [PDF233] (8/16/2017 Notice of Allowance at 3). The examiner further stated that “[s]imilar reasoning applies to independent claims 10 and 21 for connecting and disconnecting from a battery when a magnetic field is detected.” *Id.* Ex-1002-Kiaei-Dec1., ¶34.

Although the examiner cited several new references without comment, including Shaffer, in a form PTO-892, the examiner’s stated reasons for allowance do not mention any of the new references. Ex-1008-FH [PDF175] (5/2/2017 Notice of References Cited at 1). Instead, the examiner’s statements simply mirror an earlier-issued International Written Opinion, which did not cite Shaffer. *Id.* [PDF163] (11/17/2016 International Written Opinion at 4).

C. The Examiner Committed a Material Error

Although Shaffer was cited by the examiner during prosecution, it was not discussed in any meaningful regard on the record, as explained above. The Board has made clear that “[i]f the record of the Office’s previous consideration of the art is not well-developed or *silent*, then a petitioner may show the Office erred by overlooking something persuasive....” *Advanced Bionics, LLC v. MED-EL*

Elektromedizinische Gerate GmbH, IPR2019-01469, 2020 WL 740292, at *4 (Feb. 13, 2020) (emphasis added); *see also Amazon.com, Inc., v. M2M Solutions LLC*, IPR2019-01205, 2020 WL 44835, at *7 (P.T.A.B. Jan. 27, 2020) (“The Board frequently holds that a reference that ‘was neither applied against the claims nor discussed by the Examiner’ does not weigh in favor of exercising the Board’s discretion under § 325(d) to deny a petition.”).

Moreover, as presented herein, Shaffer discloses the precise features that the examiner identified as novel (high-power and low-power modes), which, in combination with the art teaching other known features (e.g., a reed switch), demonstrates that the challenged claims are unpatentable. *See* Sections IX.D-IX.G. By overlooking the specific teachings of Shaffer in allowing the challenged claims, the examiner committed a material error even if it could be argued that Shaffer was considered. 35 U.S.C. §325(d); *Advanced Bionics* at *3.

The Board has previously instituted review under these exact circumstances, and Petitioner respectfully requests that it do so again here. *See, e.g., Mylan Pharm. Inc., v. Merck Sharp & Dohme Corp.*, No. IPR2020-00040, 2020 WL 2478503, at *7 (P.T.A.B. May 12, 2020) (instituting review even though “WO ’498 was presented to the Examiner” because the “Examiner never discussed WO ’498 or made a rejection based on it” and “gave no reasons for allowance” even though the

“disclosure meets the claimed invention” and “[t]he likeliest explanation ... is that the Examiner simply overlooked [its] teachings”); *Roku, Inc. v. Universal Elecs., Inc.*, No. IPR2019-01615, 2020 WL 1903093, at *5 (P.T.A.B. Apr. 17, 2020) (“Examiner erred by overlooking the specific teaching of Chardon” because it taught the precise limitations that the Examiner had concluded were “not disclosed, taught, or suggested in the references applied” in allowing the claims); *see also Advanced Bionics*, 2020 WL 740292, at *3 n.9 (“An example of a material error may include misapprehending or overlooking specific teachings of the relevant prior art where those teachings impact patentability of the challenged claims.”) (emphasis added).

VI. CLAIM CONSTRUCTION

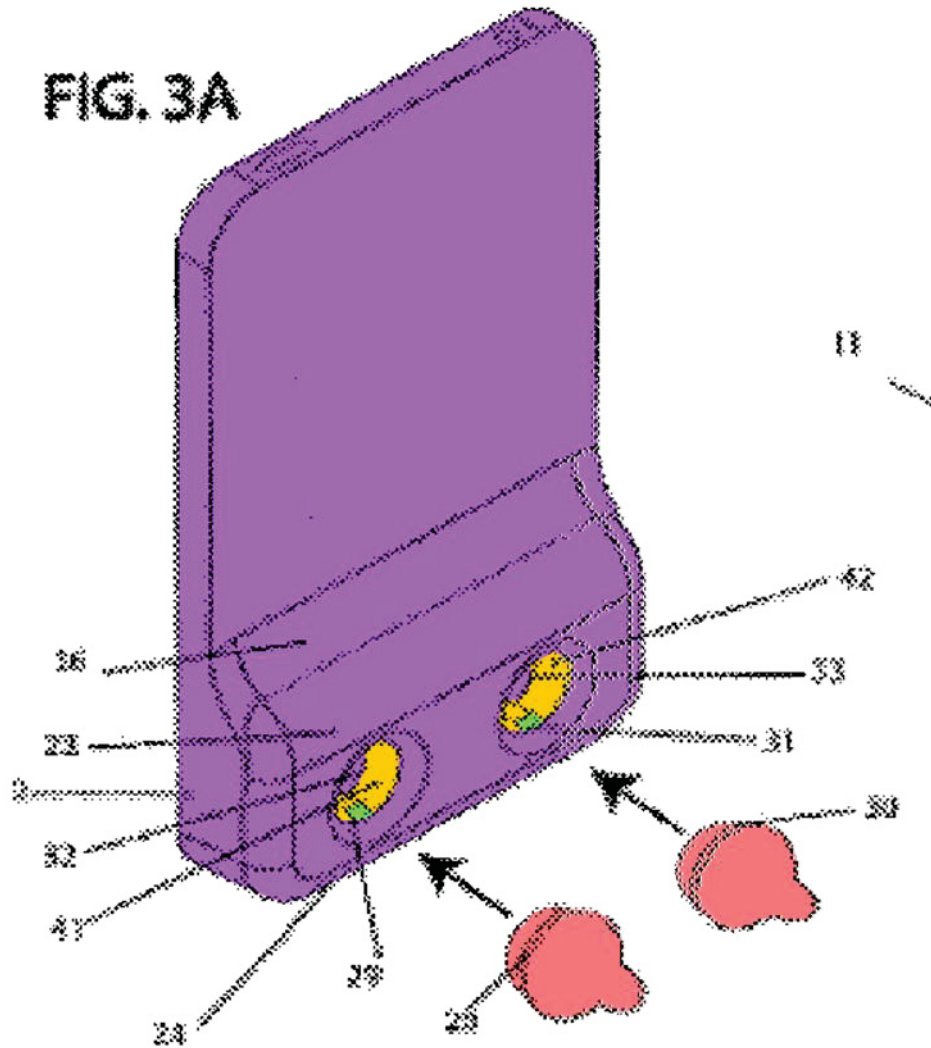
A claim is construed “using the same claim construction standard that would be used to construe the claim in a civil action....” 37 C.F.R. § 42.100(b). Petitioner submits that no terms need to be construed to resolve the issues raised in this Petition because the prior art discloses all limitations under any plausible construction.

VII. OVERVIEW OF THE PRIOR ART

A. Shaffer

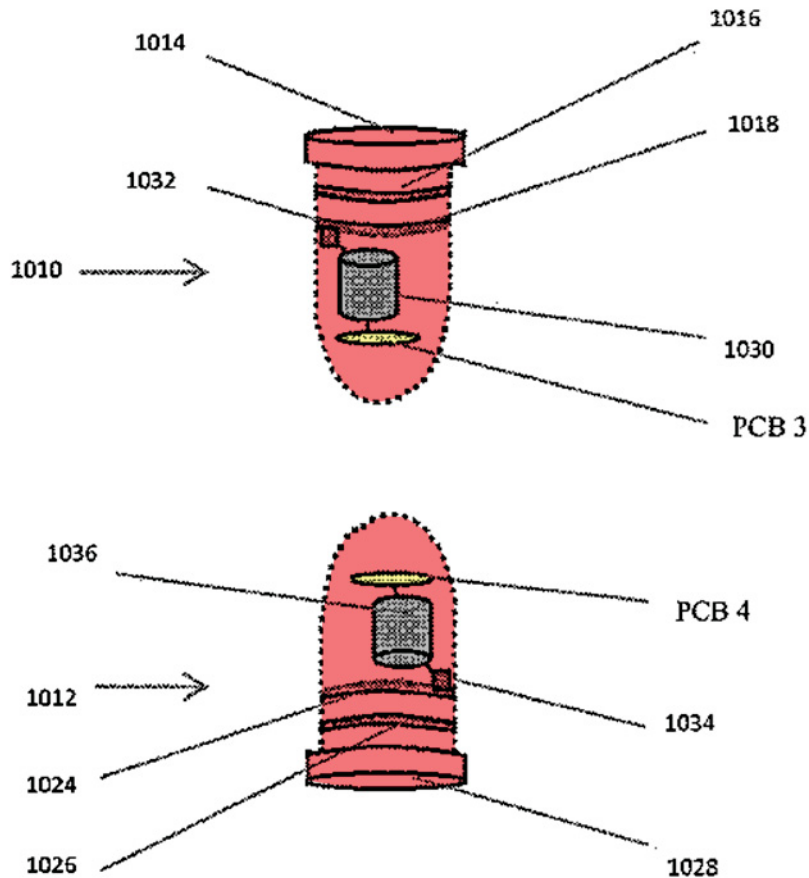
Like the '853 patent, Shaffer describes techniques for reducing the battery consumption of wireless earpieces when placed in a storage case. As shown in Figure 3A, Shaffer discloses a system that includes a pair of wireless earpieces (e.g.,

wireless audio earbuds) and a magnetic storage case (e.g., a mobile device case 11 with a magnetic charging dock).



Ex-1003-Shaffer, Figure 3A; *see also id.*, ¶34 (“FIGS. 1-5 illustrate an embodiment of a mobile device case 11, which embeds a magnetic charging dock for two wireless audio earbuds in the rear of base portion 12.”). Ex-1002-Kiaei-Decl., ¶35.

Referring to Figure 10 below, Shaffer further discloses wireless earbuds 1010 and 1012 that are configured to automatically turn off when placed into the storage case.



Ex-1003-Shaffer, Figure 10; *see also id.*, ¶62 (“the earbuds are equipped with features that enable them to automatically trigger on and off”). Namely, earbuds 1010 and 1012 include magnetic sensors to determine when they are placed in the storage case, such that they can be automatically turned off or placed in a low power mode. *Id.*, ¶63 (“Each earbud may include one or more contact sensors, such as

pressure sensors or magnetic sensors that detect when the earbud is in (or out of) the aperture [of the storage case] and which send a corresponding signal to the earbud PCBs. Firmware embedded within the earbud PCBs could cause a circuit that includes the rechargeable earbud batteries [1030] and [1036] to switch on or off, or return them to a low-energy consumption idle mode.”). Ex-1002-Kiaei-Decl., ¶36.

B. Hain, Brown, and Steinbrecher

As explained in further detail in the Grounds below, Hain, Steinbrecher, and Brown each disclose similar systems to the ’853 patent and to Shaffer for automatically reducing the battery consumption of wireless earpieces when placed in a storage case. Ex-1002-Kiaei-Decl., ¶37.

Hain, Brown, and Steinbrecher each further expressly disclose that the wireless earpieces include a reed switch to determine when the earpieces are placed in the storage case by detecting the presence or absence of a magnetic field. *See, e.g.,* Ex-1004-Hain, ¶¶18 (“[T]he status of *reed contacts 6 and 16* can be queried.... From this, the corresponding hearing aid *detects in a simple manner whether it is in the immediate vicinity of a magnet*”), 22 (“If it is detected that both hearing aids are in a magnetic field at the same time, this is an indication that the hearing aids are located in a storage box equipped with at least one permanent magnet. The hearing aids are then switched to a switch-off mode in which the hearing aids are largely

switched off and only a residual power supply for the sensor device is maintained.”); Ex-1006-Steinbrecher, ¶¶19 (“A microswitch is preferably arranged in the hearing aid, which then controls an input of the charge controller when the hearing aid is placed in a storage case”), 20 (“the microswitch is designed as *a reed contact, which is actuated by a permanent magnet arranged in the storage case*”); Ex-1007-Brown, 1:19-27 (“a hearing aid comprising ... a switch controlling the flow of current from the [battery] cell to the amplifier [circuit], the switch being a *reed [r]elay switch ... disposed for being rendered open circuit by a magnet* outside the casing”). Ex-1002-Kiaei-Decl., ¶38.

VIII. LEVEL OF ORDINARY SKILL IN THE ART

A POSITA at the time of the alleged invention would have had a bachelor’s degree in Electrical Engineering, or equivalent experience, and one to two years of experience in the field of wireless electronic devices and battery systems, particularly wireless earpieces such as wireless headphones and hearing aids. Ex-1002-Kiaei-Decl., ¶25.

IX. SPECIFIC GROUNDS OF UNPATENTABILITY

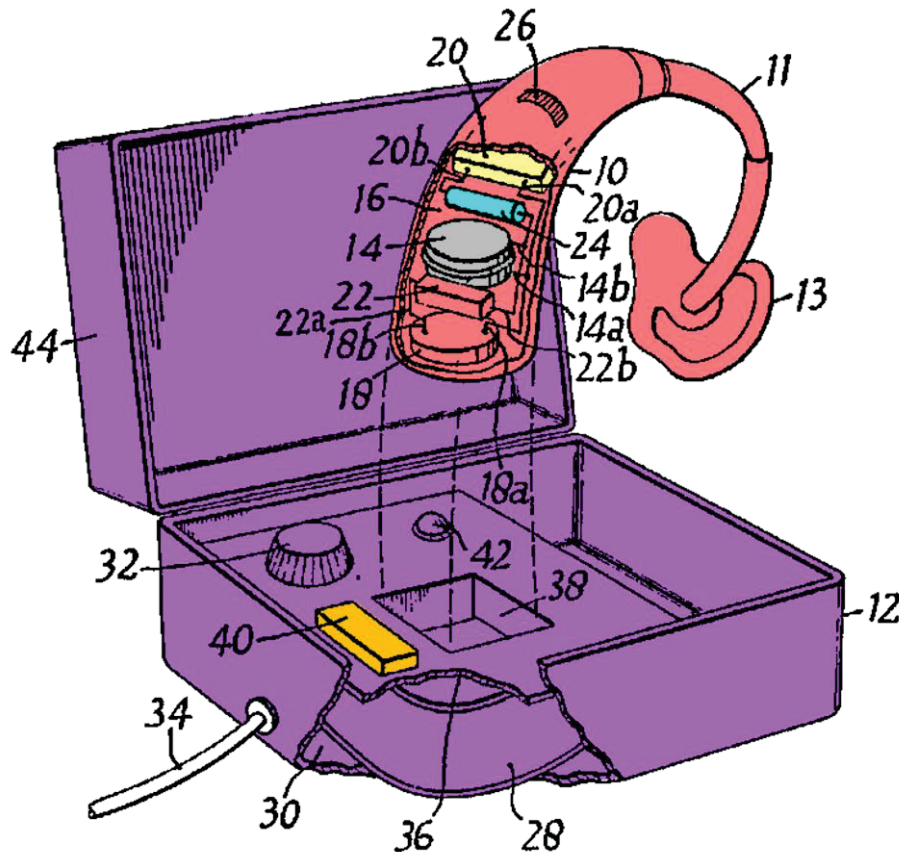
A. Ground 1

Brown anticipates claims 10 and 14. Ex-1002-Kiaei-Decl., ¶39.

1. **Claim 10**

(a) [10Preamble] A wireless earpiece comprising:

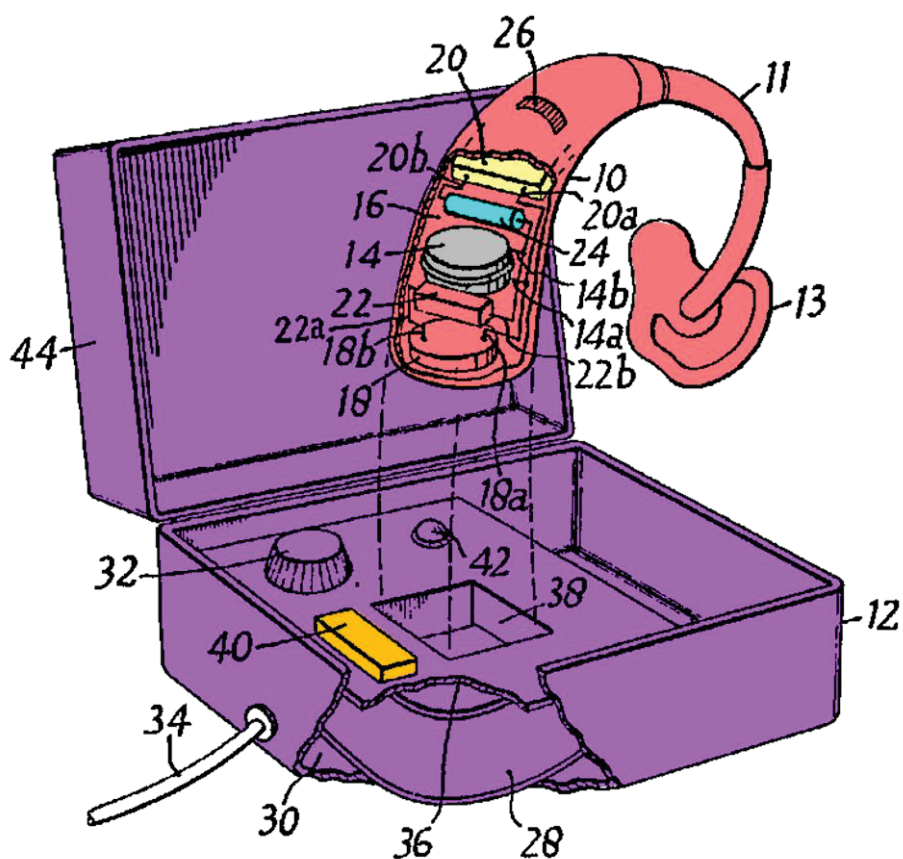
Brown discloses a wireless earpiece (e.g., **hearing aid 10**).



Ex-1007-Brown, Figure 1; *see also id.*, 1:87-91 (“In Fig. 1 there is shown a miniature **hearing aid 10** and a **receptacle or case 10** for storing the **hearing aid 10** when the aid is not in use”). Ex-1002-Kiaei-Decl., ¶40.

(b) [10A] circuitry operating the wireless earpiece;

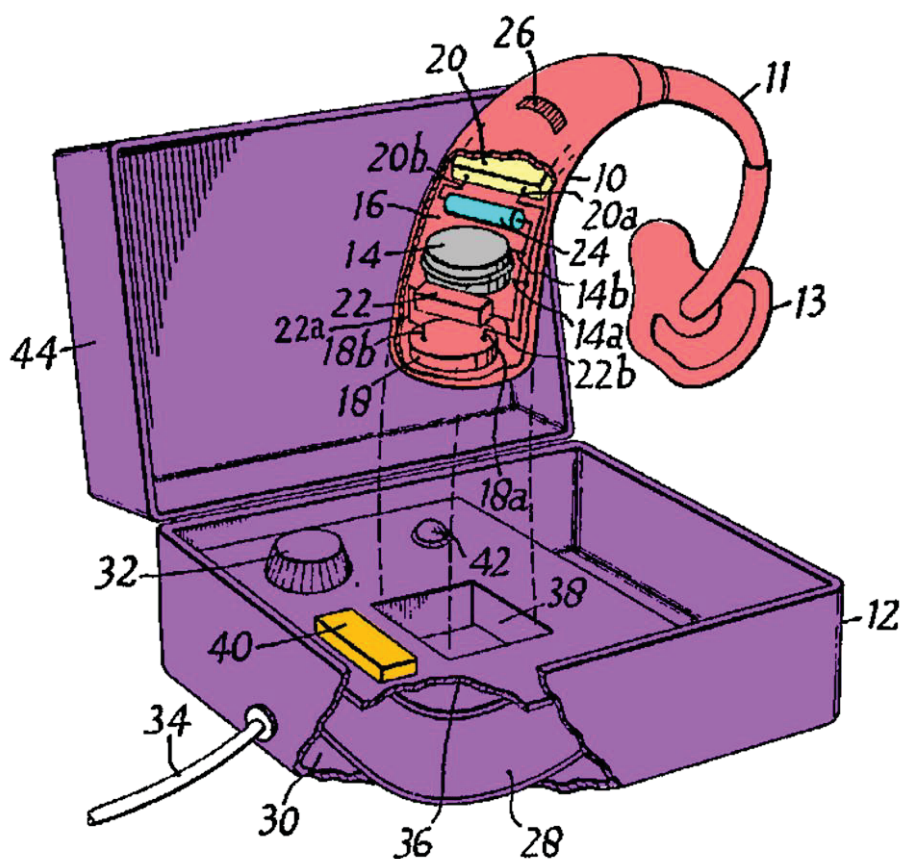
Referring to Figure 1 below, Brown discloses circuitry (e.g., **amplifier 20**) operating the wireless earpiece (e.g., **hearing aid 10**).



Ex-1007-Brown, Figure 1, 2:1-21 (“The **amplifier**, microphone, speaker, and a volume control 26, provided to enable the user of the **hearing aid** to adjust the volume to a convenient level, can be entirely conventional.”). Ex-1002-Kiaei-Decl., ¶41.

(c) [10B] a battery powering the circuitry of the wireless earpiece;
and:

Referring to Figure 1 below, Brown discloses a battery (e.g., accumulator cell 14) powering the circuitry (e.g., amplifier 20) of the wireless earpiece (e.g., hearing aid 10).



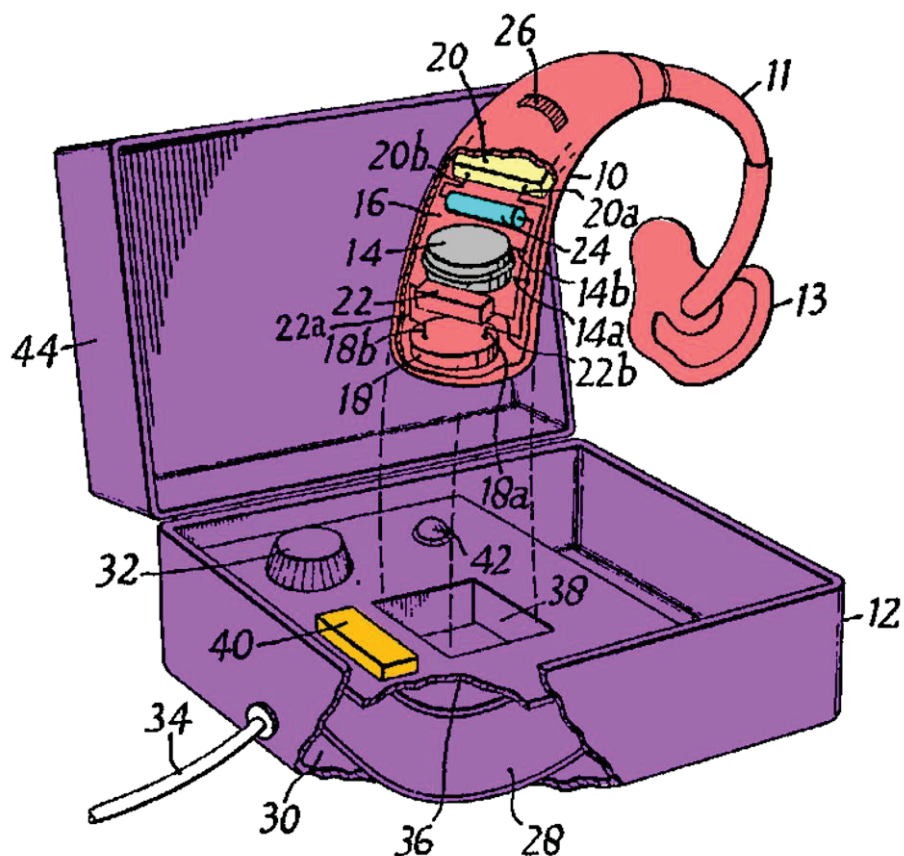
Ex-1007-Brown, Figure 1, 2:1-21, 2:49-52 (“when the hearing aid is removed from the case 12 the switch 24 closes to connect the accumulator 14 to the amplifier 20”).

Ex-1002-Kiaei-Decl., ¶42.

- (d) [10C] a reed switch connecting the battery to the circuitry wherein the reed switch connects the circuitry to the battery when a magnetic field is not detected, and wherein the reed switch disconnects the circuitry from the battery when a magnetic field is detected

Referring to Figure 1 below, Brown discloses a reed switch (e.g., reed relay switch 24) connecting the battery (e.g., accumulator 14) to the circuitry (e.g.,

amplifier 20) when a magnetic field is not detected, and wherein the reed switch 24 disconnects the circuitry 20 from the battery 14 when a magnetic field is detected.



Ex-1007-Brown, Figure 1; *see also id.*, 1:19-43, 2:1-21 (“The hearing aid 10 includes ... a magnetically actuated reed relay switch 24.... The switch 24 includes a permanent magnet (not shown) which, in use, biases the contacts closed to **connect the accumulator 14 to the amplifier 20** [(i.e., when no externally applied magnetic field is detected)]”), 2:42-48 (“When the hearing aid is placed in the well [of the storage case] a magnet 40 effectively neutralizes the magnetic field provided by the magnet in the reed relay switch 24 and the switch contacts open to **disconnect the**

accumulator 14 from the amplifier 20 [(i.e., when the externally applied magnetic field generated by magnet 40 is detected)]”), 2:56-62. Ex-1002-Kiaei-Decl., ¶43.

2. Claim 14: The wireless earpiece of claim 10, wherein the wireless earpiece alters a power level of the wireless earpiece in response to the reed switch detecting the magnetic field.

As explained above for Element [10C], Brown discloses that the wireless earpiece (e.g., hearing aid 10) alters a power level of the wireless earpieces (e.g., disconnects the battery 14 from the circuitry 20) in response to the reed relay switch 24 detecting the magnetic field. *See* Ex-1007-Brown, 2:42-48 (“When the hearing aid is placed in the well [of the storage case] a magnet 40 effectively neutralizes the magnetic field provided by the magnet in the reed relay switch 24 and the switch contacts open to *disconnect the accumulator 14 from the amplifier 20* [(i.e., power to the earpiece circuitry is cut off in response to reed switch 24 detecting the magnetic field generated by magnet 40)]”); *see also id.*, 1:19-43. 2:56-62. Ex-1002-Kiaei-Decl., ¶44.

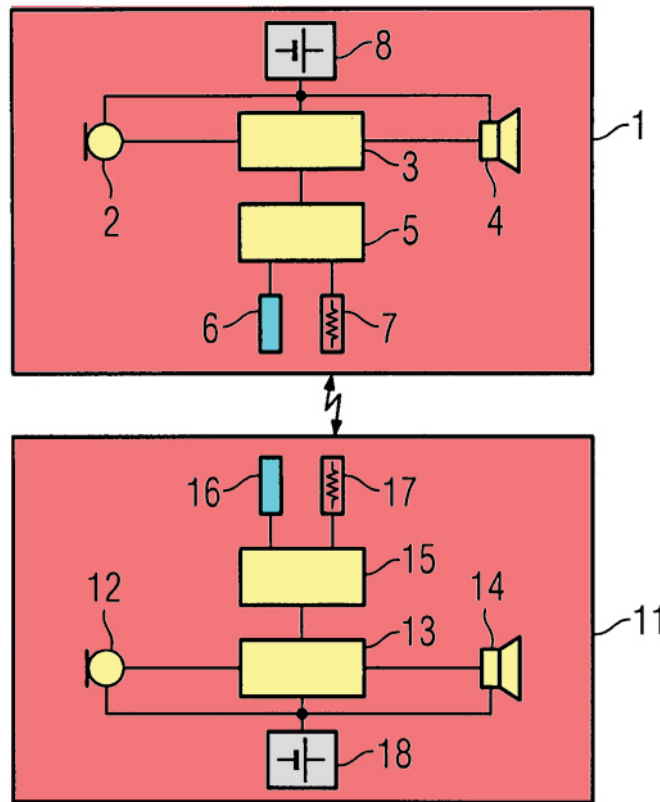
B. Ground 2

Hain anticipates claims 1-3 and 5. Ex-1002-Kiaei-Decl., ¶45.

1. Claim 1

- (a) [1Preamble] A method for managing wireless earpieces comprising:

Hain teaches a method for managing wireless earpieces. As shown in Figure 1, Hain's system includes a pair of wireless earpieces (e.g., **hearing aids 1 and 11**).



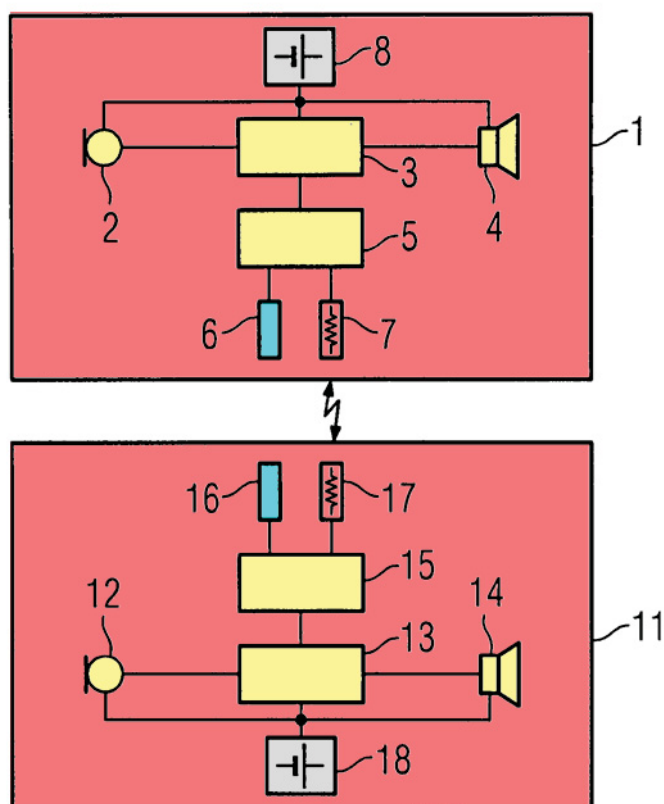
Ex-1004-Hain, Figure 1, ¶¶1 (“a hearing aid system having a **first and a second hearing aid** that can be worn on or in the ear of a user ... wherein the hearing aid system also comprises means for wireless signal transmission between the **hearing aids**”), 13, 18, claims 1 and 7. Ex-1002-Kiaei-Decl., ¶46.

As further explained below for Elements [1A]-[1B], Hain's system carries out a method to manage **hearing aids 1 and 11**, e.g., by detecting whether the **hearing aids** are placed in the magnetic storage case and powering down the hearing aid circuitry when the **hearing aids** are in the case. Ex-1004-Hain, ¶¶11, 18, 19 (“[I]f a magnetic field is detected simultaneously by both **hearing aids 1 and 11**, it can be concluded that both **hearing aids** are located in a storage box equipped with at least one corresponding magnet [and] the two **hearing aids 1 and 11** switch off automatically.”), 21-22, Claims 1, 5-7, and 9. Ex-1002-Kiaei-Decl., ¶46.

- (b) [1A] powering circuitry of the wireless earpieces utilizing a high power mode in response to detecting a magnetic field is not applied to one or more of the wireless earpieces; and

Hain discloses powering circuitry of the wireless earpieces (e.g., **hearing aids 1 and 11**) using a high power mode (e.g., “normal” mode) in response to detecting a magnetic field is not applied to one or more of the wireless earpieces. Ex-1002-Kiaei-Decl., ¶47.

First, Hain's **hearing aids 1 and 11** include circuitry (e.g., **microphones 2 and 12**, **signal processing units 3 and 13**, **receivers 4 and 14**, and **signal transmission and control units 5 and 15**) that, under normal operation, is powered using a high-power mode (e.g., the hearing aids are fully functional and powered by onboard **voltage sources 8 and 18**).

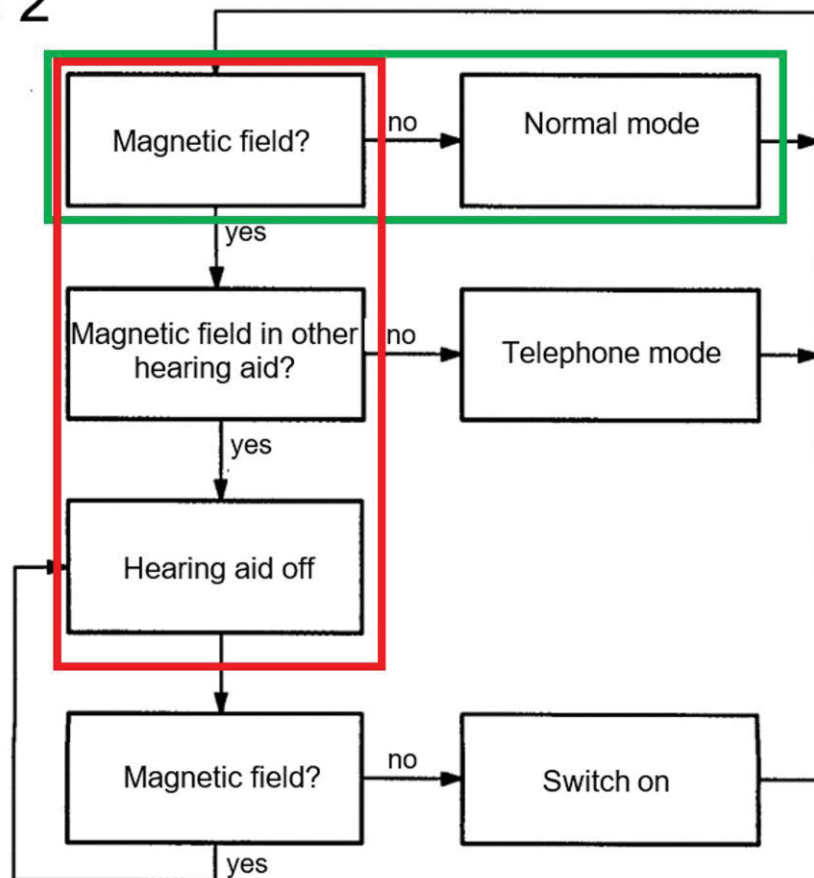


Ex-1004-Hain, Figure 1, ¶¶1 (“an **input converter** for receiving an input signal and converting it into an electrical input signal, a **signal processing unit** for processing and amplifying the electrical input signal and outputting an electrical output signal, and an **output converter** for converting the electrical output signal into an output signal that can be perceived by the user as an acoustic signal, wherein the hearing aid system also comprises **means for wireless signal transmission** between the hearing aids”), 8 (“a **voltage source (battery or accumulator)** for supplying voltage to the electronic components”), 18, 20, Claims 1 and 7. The ’853 patent describes embodiments of the high-power mode as having the same functionality. Ex-1001-

USP853, 8:2-4 (“*self-power (or high power)*” mode when deactivated (e.g., closed) by the magnet 414 of the smart case 402”), 8:41-62 (“If the magnetic field is not present, ... *the wireless earpiece operates normally with the onboard battery powering the circuitry and components of the wireless earpiece.*”). Ex-1002-Kiaei-Decl., ¶¶47-48.

Second, Hain teaches processes (green box below) where the earpiece circuitry is powered using the high-power mode (e.g., normal mode) when a magnetic field is not applied to the earpieces.

FIG 2



Ex-1004-Hain, Figure 2, ¶¶21 (“*For as long as no magnetic field is detected, the hearing aid is in ‘normal operation.’*”), 10, 18. Ex-1002-Kiaei-Decl., ¶¶49-50.

- (c) [1B] altering the power sent to the circuitry of the wireless earpieces to a low power mode in response to detecting a magnetic field is applied to one or more of the wireless earpieces.

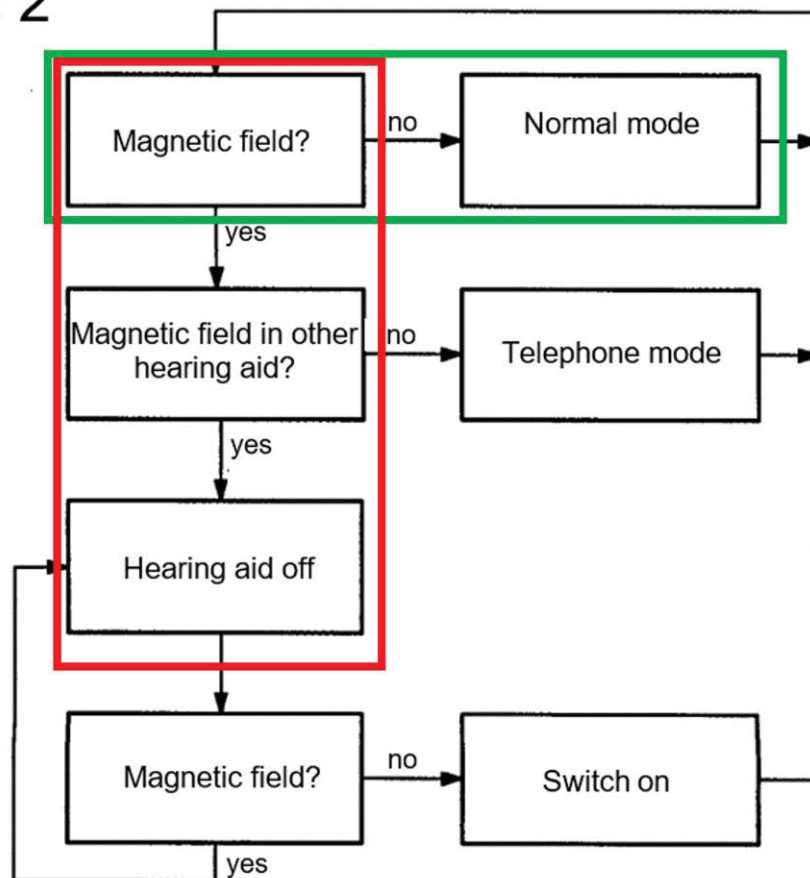
Hain discloses altering the power sent to the circuitry of the wireless earpieces (e.g., **hearing aids 1 and 11**) to a low power mode (e.g., residual power state) in response to detecting a magnetic field is applied to one or more of the wireless earpieces. Ex-1002-Kiaei-Decl., ¶51.

First, Hain teaches that, when the **earpieces** are placed in their storage box, they enter a low-power mode (referred to as receiving “residual” power) with reduced functionality such as monitoring sensors and battery charging. Hain, ¶¶19 (“Advantageously, *a residual power supply is maintained even in the switched-off state*, by which the status of the reed contacts 6 and 16 can continue to be queried. As a result, the **hearing aids 1 and 11** detect when they are being removed from the **storage box**. In this way, the **hearing aids 1 and 11** can also be automatically switched on again. This eliminates the need for manually operated on-and-off switches.”), 20 (“The **hearing aids 1 and 11** are *not only automatically switched off when stored in the storage box; rather, they are also recharged.*”). The ’853 patent describes embodiments of the low-power mode as having the same functionality. Ex-1001-

USP853, 4:27-33 (“a magnet that activates the corresponding reed switch ... to power off or initiate a *low power mode (e.g., lower power state or mode)*”), 5:27-30 (“low power mode allows *charging of the wireless earpieces*”), 10:10-15 (“utilize minimal power to *maintain functionality and alert status* of the wireless earpiece.”). Ex-1002-Kiaei-Decl., ¶51.

Second, Hain teaches processes (red box below) where the earpiece circuitry enters the residual power state (i.e., low power mode) in response to detecting a magnetic field applied to the earpieces.

FIG 2



Ex-1004-Hain, Figure 2; *see also id.*, ¶¶22 (“If it is detected that both hearing aids are in a magnetic field at the same time, ... [t]he hearing aids are then switched to a switch-off mode in which the hearing aids are largely switched off and only a residual power supply for the sensor device is maintained.”), 11, 19. Ex-1002-Kiaei-Decl., ¶¶52-53.

2. Claim 2: The method of claim 1 further comprising: operating the wireless earpieces utilizing an onboard battery in response to detecting the magnetic field is not applied to one or more of the wireless earpieces.

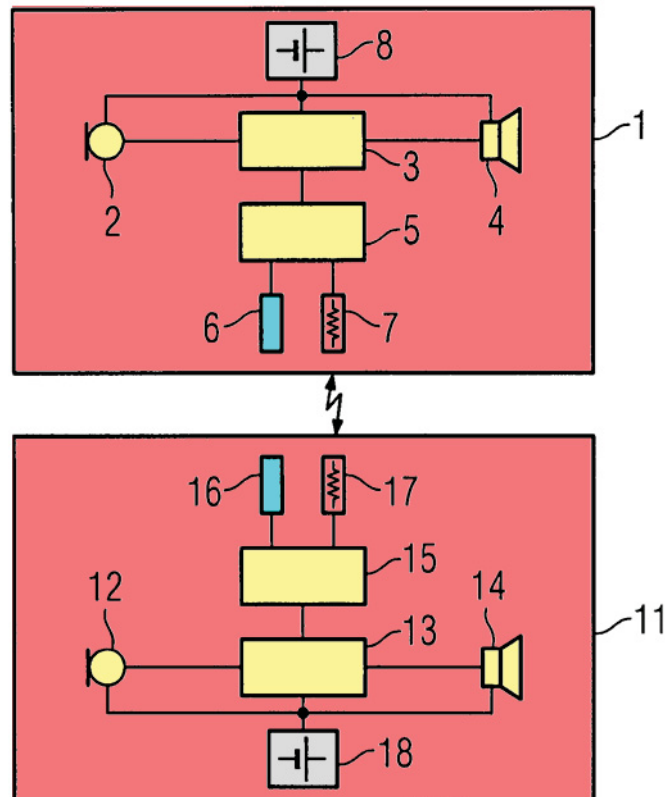
As explained above for Element [1A], Hain discloses operating the earpieces using an onboard battery (e.g., voltage sources 8 and 18) in response to detecting the magnetic field is not applied to one or more of the wireless earpieces. *See* Section IX.B.1(b); *see also* Ex-1004-Hain, Figure 1, ¶¶8, 18, 20, Claims 1 and 7. Ex-1002-Kiaei-Decl., ¶54.

3. Claim 3: The method of claim 1 further comprising: charging an onboard battery of the wireless earpieces in response to detecting a magnetic field is applied to the wireless earpieces.

As explained above for Element [1B], Hain discloses charging an onboard battery (e.g., voltage sources 8 and 18) of the wireless earpieces in response to detecting the magnetic field is applied to the wireless earpieces. *See* Section IX.B.1(c); *see also* Ex-1004-Hain, ¶20, Claim 6. Ex-1002-Kiaei-Decl., ¶55.

4. **Claim 5: The method of claim 1, wherein the magnetic field is detected by a reed switch of the wireless earpieces.**

Hain discloses that the magnetic field is detected by a reed switch (e.g., [reed contacts 6 and 16](#)) of the wireless earpieces.



Ex-1004-Hain, Figure 1, ¶18 (“[T]he status of [reed contacts 6 and 16](#) can be queried.... From this, the corresponding [hearing aid detects in a simple manner whether it is in the immediate vicinity of a magnet](#)”), 19, 21-22. Ex-1002-Kiaei-Decl., ¶¶56-57.

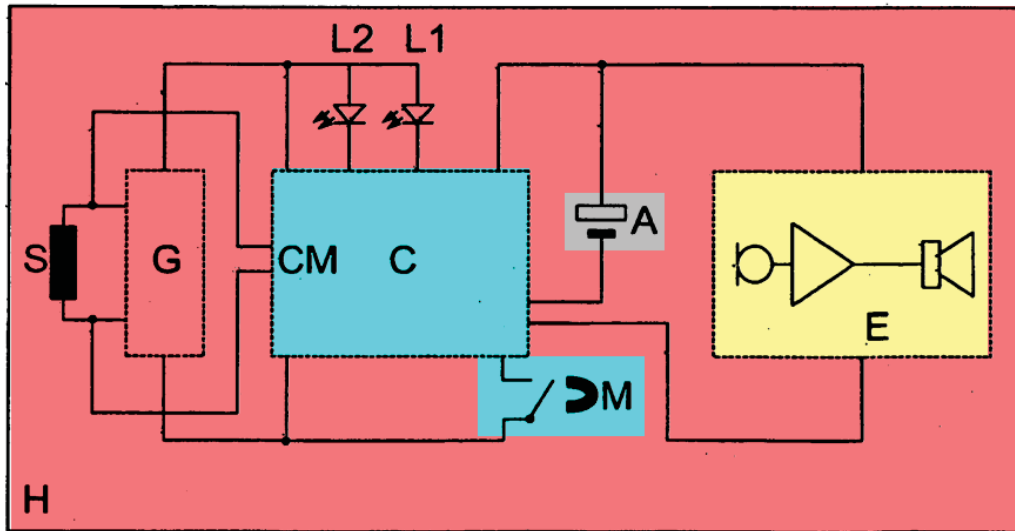
C. Ground 3

Steinbrecher anticipates claims 10 and 21. Ex-1002-Kiaei-Decl., ¶58.

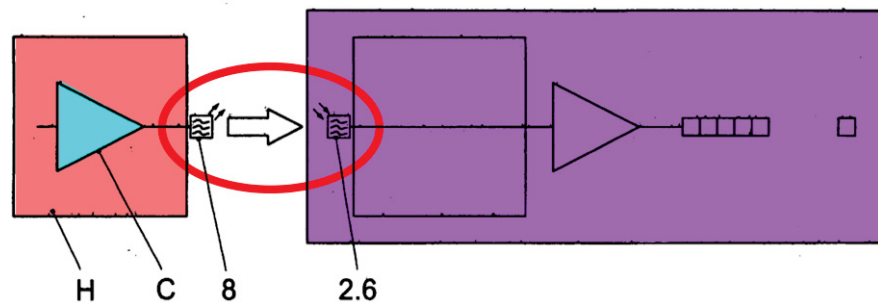
1. **Claim 10**

(a) [10Preamble] A wireless earpiece comprising:

Steinbrecher discloses a wireless earpiece (e.g., **hearing aid H**).



Ex-1006-Steinbrecher, Figure 2, ¶25. Steinbrecher further discloses embodiments in which **hearing aid H** communicates wirelessly with a **charging shell 1**.

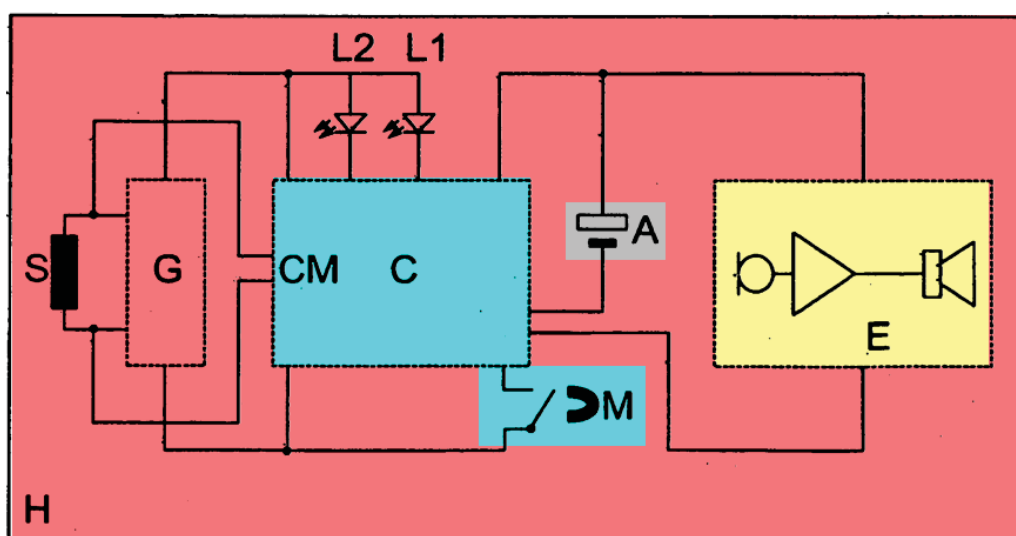


Id., Figure 4; see also *id.* ¶27 (“Fig. 4 shows an embodiment in which the **signals** are ... transmitted from the **hearing aid H** to the **charging shell 1** ... by **electromagnetic waves**, for example by means of Bluetooth transmission. ... **RF**

transmitter 8 is arranged on the hearing aid, [and] the *charging shell 1* is equipped with an RF receiver 9...”). Ex-1002-Kiaei-Decl., ¶¶59-60.

(b) [10A] circuitry operating the wireless earpiece;

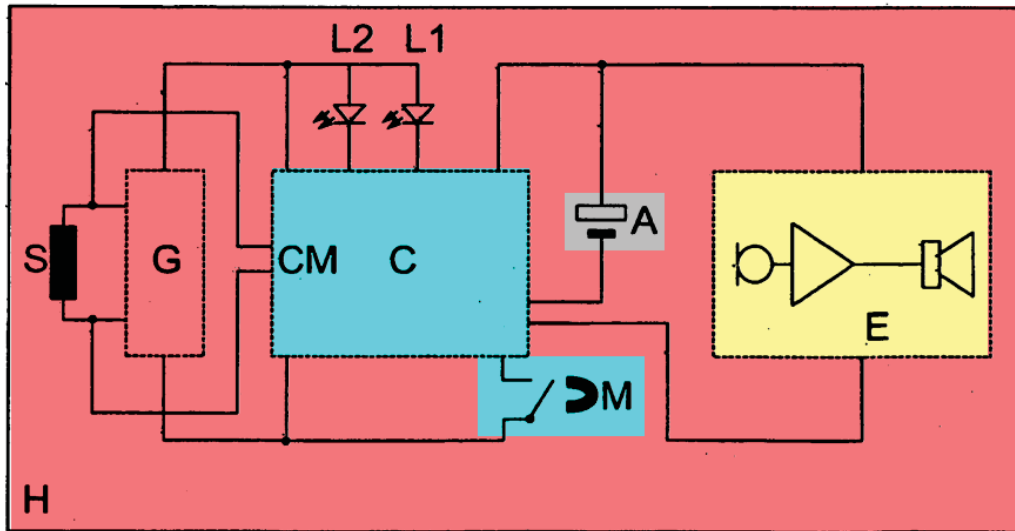
Steinbrecher’s wireless earpiece (e.g., *hearing aid H*) includes circuitry (e.g., *electronics E*) operating the wireless earpiece.



Ex-1006-Steinbrecher, Figure 2, ¶25 (“The *hearing aid H* also contains hearing aid’s *electronics E*, the battery A, the secondary coil S, and the *charge controller C*”). The *electronics E* includes the hearing aid’s microphone (left-most symbol in box E), amplifier (triangular symbol), and speaker (right-most symbol). *See also id.*, ¶¶18-19. Ex-1002-Kiaei-Decl., ¶61.

- (c) [10B] a battery powering the circuitry of the wireless earpiece;
and:

Steinbrecher discloses a battery (e.g., battery A) powering the circuitry (e.g., electronics E) of the wireless earpiece (e.g., hearing aid H).

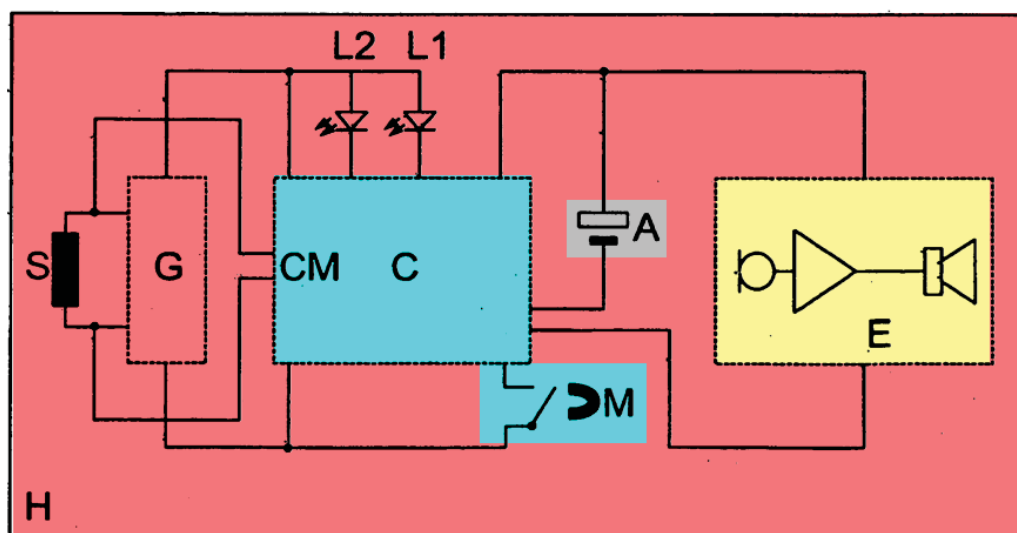


Ex-1006-Steinbrecher, Figure 2, ¶25 (“The hearing aid H also contains ... battery A”). Battery A powers electronics E. See *id.*, ¶¶18-19 (when electronics E are disconnected from battery A, “no current is consumed”), 25 (describing the “electrical connection between the battery and the hearing aid’s electronics”). Ex-1002-Kiaei-Decl., ¶62.

- (d) [10C] a reed switch connecting the battery to the circuitry
wherein the reed switch connects the circuitry to the battery
when a magnetic field is not detected, and wherein the reed
switch disconnects the circuitry from the battery when a
magnetic field is detected

Steinbrecher discloses these limitations. Ex-1002-Kiaei-Decl., ¶¶63-65.

First, Steinbrecher’s wireless earpiece (e.g., **hearing aid H**) includes a switch (e.g., a **microswitch M** coupled to a **charge controller C**) that is preferably implemented as a reed switch.



Ex-1006-Steinbrecher, Figure 2, ¶¶20 (“**microswitch** is designed as a reed contact, which is actuated by a permanent magnet arranged in the storage case”), 25 (“**microswitch** configured as a reed contact is actuated by means of a built-in permanent magnet, which controls an input of the **charging controller**, whereupon the latter disconnects the electrical connection between the battery and the hearing aid’s **electronics**.”). Ex-1002-Kiaei-Decl., ¶63.

Second, Steinbrecher discloses that the reed switch (e.g., a **microswitch M** implemented as a reed contact) connects the battery (e.g., **battery A**) to the circuitry (e.g., **electronics E**). Ex-1006-Steinbrecher, Figure 2, ¶25 (“the **microswitch** configured as a reed contact is actuated by means of a built-in permanent magnet,

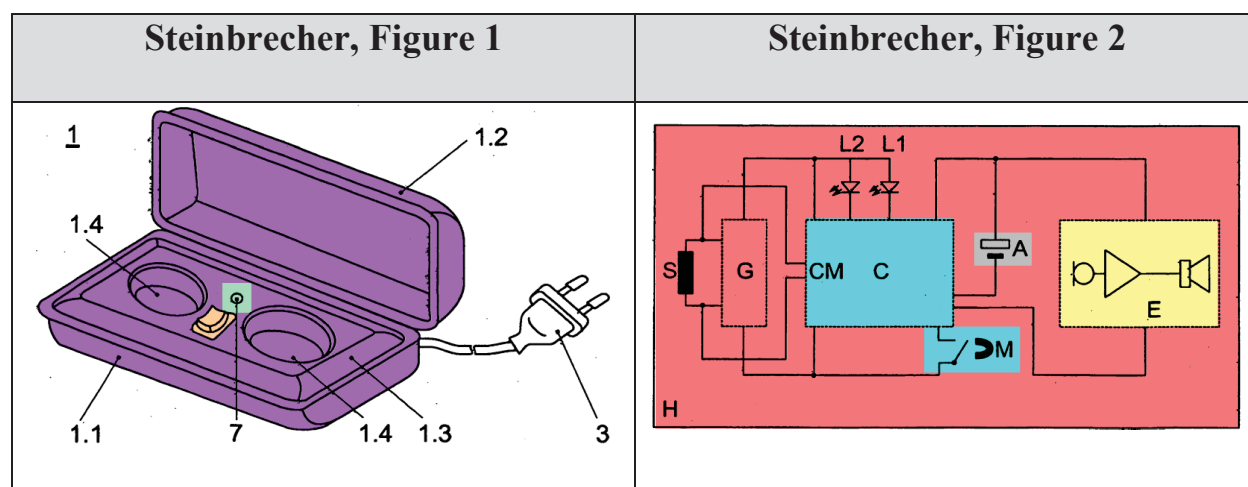
which controls an input of the **charging controller**, whereupon the latter disconnects the *electrical connection between the battery and the hearing aid's electronics*"); *see also* Section IX.C.1(c). Ex-1002-Kiaei-Decl., ¶64.

Third, Steinbrecher discloses that the reed switch (e.g., **microswitch M** implemented as a reed contact) connects the circuitry (e.g., **electronics E**) to the battery (e.g., **battery A**) when a magnetic field is not detected and disconnects the circuitry from the battery when a magnetic field is detected (e.g., the reed switch is actuated by a built-in magnet of the storage case to automatically power on and off the circuitry when the hearing aid is placed in its case). Ex-1006-Steinbrecher, ¶¶18-19, 25 (“*When placed in a storage case, the microswitch configured as a reed contact is actuated by means of a built-in permanent magnet, which controls an input of the **charging controller**, whereupon the latter *disconnects the electrical connection between the battery and the hearing aid's electronics*.*”). Ex-1002-Kiaei-Decl., ¶65.

2. Claim 21

(a) [21Preamble] A system comprising:

Steinbrecher discloses a wireless earpiece system that includes a wireless earpiece (e.g., **hearing aid H**) and a corresponding storage case (e.g., **charging shell 1**).



Ex-1006-Steinbrecher, Figures 1 and 2, ¶¶24 (“The **charging shell 1** shown in Fig. 1 has ... two receiving recesses 1.4 for one **hearing aid H** each are incorporated.”), 25. Ex-1002-Kiaei-Decl., ¶66.

(b) [21A] a first wireless earpiece, comprising:

As explained above for Element [10Preamble], Steinbrecher’s system includes a (first) wireless earpiece. *See also* Element [21Preamble]. Ex-1002-Kiaei-Decl., ¶67.

(c) [21B] circuitry operating the first wireless earpiece;

As explained above for Element [10A], Steinbrecher discloses circuitry operating the first wireless earpiece. Ex-1002-Kiaei-Decl., ¶68.

(d) **[21C] a battery powering the circuitry of the first wireless earpiece; and**

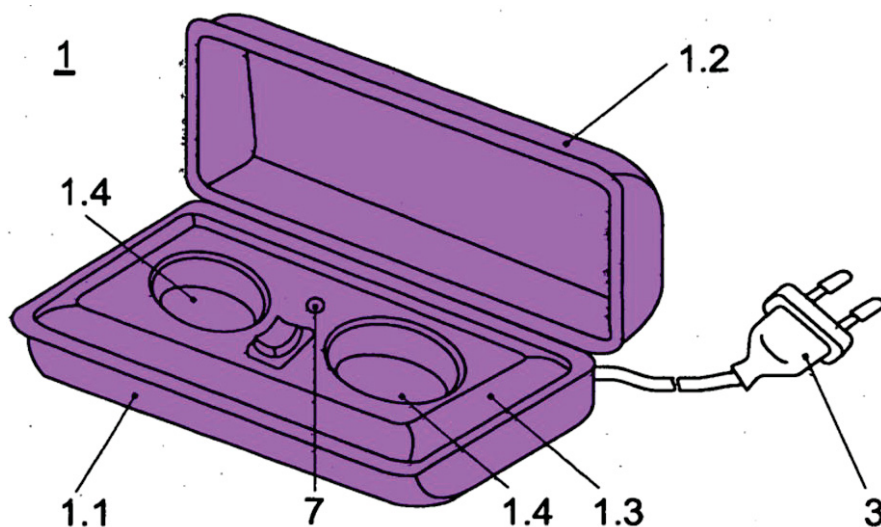
As explained above for Element [10B], Steinbrecher discloses a battery powering the circuitry of the first wireless earpiece. Ex-1002-Kiaei-Decl., ¶69.

- (e) [21D] a switch connecting the battery to the circuitry, wherein the switch connects the circuitry to the battery when a magnetic field is not detected, and wherein the switch disconnects the circuitry from the battery when a magnetic field is detected;

As explained above for Elements [10B]-[10C], Steinbrecher discloses a switch (e.g., microswitch M implemented as a reed contact) as recited in Element [21D]. Ex-1002-Kiaei-Decl., ¶70.

- (f) [21E] a smart case for charging the first wireless earpiece and a second wireless earpiece, the smart case comprising:

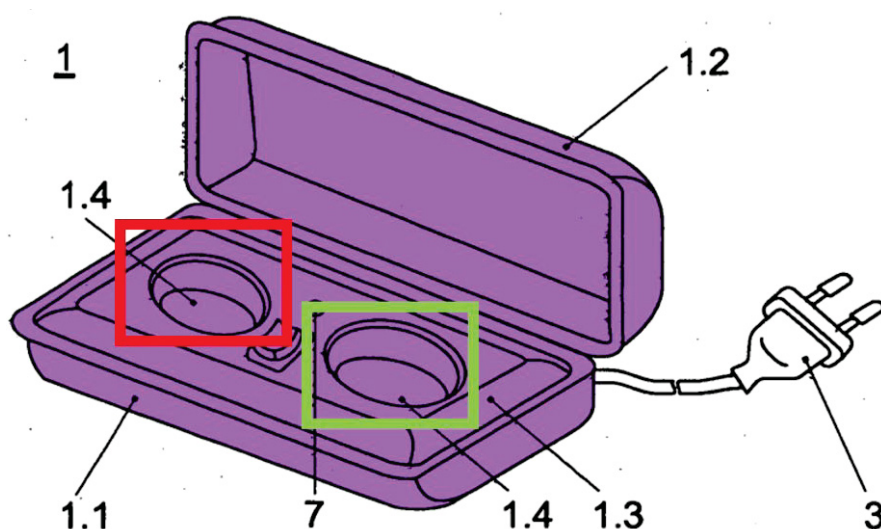
Steinbrecher's system includes a storage case (e.g., **charging shell 1**) which is a smart case, e.g., it includes various intelligent controls such as a signal processing device that receives and displays information associated with battery A.



Ex-1006-Steinbrecher, Figure 1, ¶¶7 (“The **charging shell** comprises a first circuit arrangement, which is used in order to transmit energy and receive and process signals. [I]t contains at least one energy transmission device and one signal

processing device.”), 8 (“the number of charging cycles already completed is monitored;” “current state of charge are processed [and] made available for the user at the **charging shell**”), 24 (“output device 7 display[s] the state of charge”), 25. Ex-1002-Kiaei-Decl., ¶72.

Shaffer further discloses that **charging shell 1** (i.e., smart case) includes a pair of recesses 1.4 for charging the first wireless earpiece (red box) and a second wireless earpiece (green box).



Ex-1006-Steinbrecher, Figure 1, ¶¶24 (“The **charging shell 1** [has] *two receiving recesses 1.4 for one hearing aid H each*”), 25 (“After the **hearing aid H** has been inserted into the **charging shell**, the charge controller C is activated.”). Ex-1002-Kiaei-Decl., ¶71.

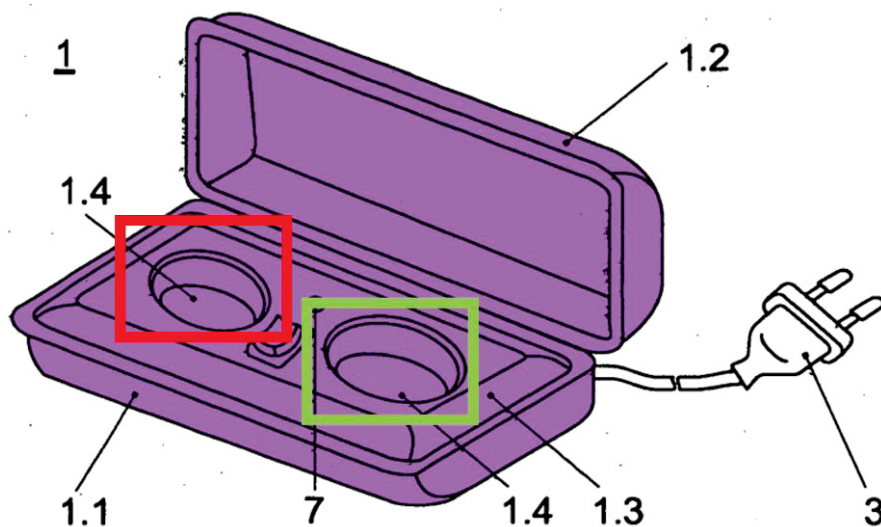
(g) [21F] a smart case housing;

Steinbrecher's smart case (e.g., **charging shell 1**) includes a smart case housing. See, e.g., Ex-1006-Steinbrecher, ¶24 (“**The *charging shell 1* shown in Fig. 1 has a housing bottom part 1.1....**”). Ex-1002-Kiaei-Decl., ¶73.

(h) [21G] a first receptacle for receiving the first wireless earpiece disposed within the smart case housing;

(i) [21H] a second receptacle for receiving the second wireless earpiece disposed within the smart case housing;

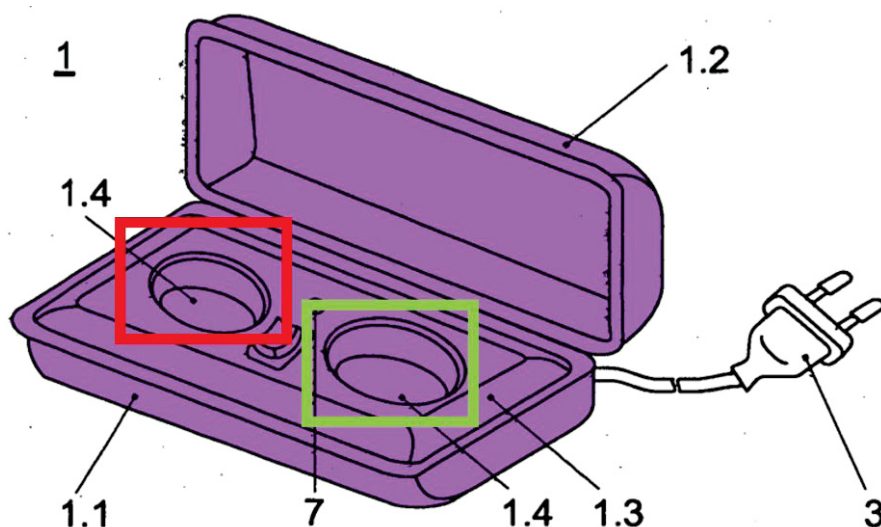
Steinbrecher's smart case (e.g., **charging shell 1**) includes a first receptacle (red box) and a second receptacle (green box) for receiving the left and right earpieces, respectively, where both receptacles are disposed within the smart case housing.



Ex-1006-Steinbrecher, Figure 1, ¶24 (“**two receiving recesses 1.4 for one hearing aid H each**”). Ex-1002-Kiaei-Decl., ¶74.

- (j) [21I] a first interface associated with the first receptacle for electrically connecting the smart case to the first earpiece;
- (k) [21J] a second interface associated with the second receptacle for electrically connecting the smart case to the second earpiece;

Steinbrecher's smart case (e.g., **charging shell 1**) includes first and second interfaces (e.g., energy transmission devices) associated with the first and second receptacles (e.g., recesses 1.4, shown in red and green boxes) for electrically connecting the **smart case** to the **left and right earpieces**, respectively.



Ex-1006-Steinbrecher, Figure 1, ¶¶7 (“[T]he **hearing device** is located in a **charging shell** during the charge process. *The **charging shell** ... contains at least one energy transmission device*”), 9 (“The *energy transmission preferably takes place inductively* from a primary coil arranged in the first circuit arrangement to a secondary coil arranged in the second circuit arrangement”); cf. Ex-1001-USP853,

4:11-26 (describing embodiments of “interfaces” that use “inductive chargers” and/or “[w]ireless charging”), 6:42-44 (“*the interface 411 may include a wireless inductor for charging the wireless earpieces 401* without a physical connection”). Moreover, given that **charging shell 1** accommodates two **earpieces**, as depicted in Figure 1, **it** includes at least two corresponding interfaces (e.g., energy transmission devices). Ex-1002-Kiaei-Decl., ¶75.

- (1) [21K] an intelligent control disposed within the smart case housing and operatively connected to the first interface and the second interface.

As explained above for Element [21E], Steinbrecher’s **charging shell 1** is a smart case that includes intelligent controls (e.g., a signal processing device) disposed within the smart case housing. Ex-1006-Steinbrecher, ¶7. Steinbrecher further discloses that the intelligent control (e.g., signal processing device) is operatively coupled to the first and second interfaces (e.g., energy transmission devices), as data (e.g., charge state information) reaches the signal processing device from the hearing device via a signal path that includes the energy transmission devices. Ex-1006-Steinbrecher, ¶¶8 (“*the number of remaining charging cycles and the current state of charge are processed ... as signals and transmitted from a modulator output via a suitable signal path to a demodulator input of the signal processing device*, so that this information can be made available for the user at the

charging shell.”), 9, 24, 25 (the “signal path” includes the energy transmission device (secondary coil): “The charge controller C has a modulator output CM, which is connected to the secondary coil in order to feed it modulated signals in order to transmit the state of charge and the number of charging cycles completed to the charging shell 1.”). Ex-1002-Kiaei-Decl., ¶¶76-77.

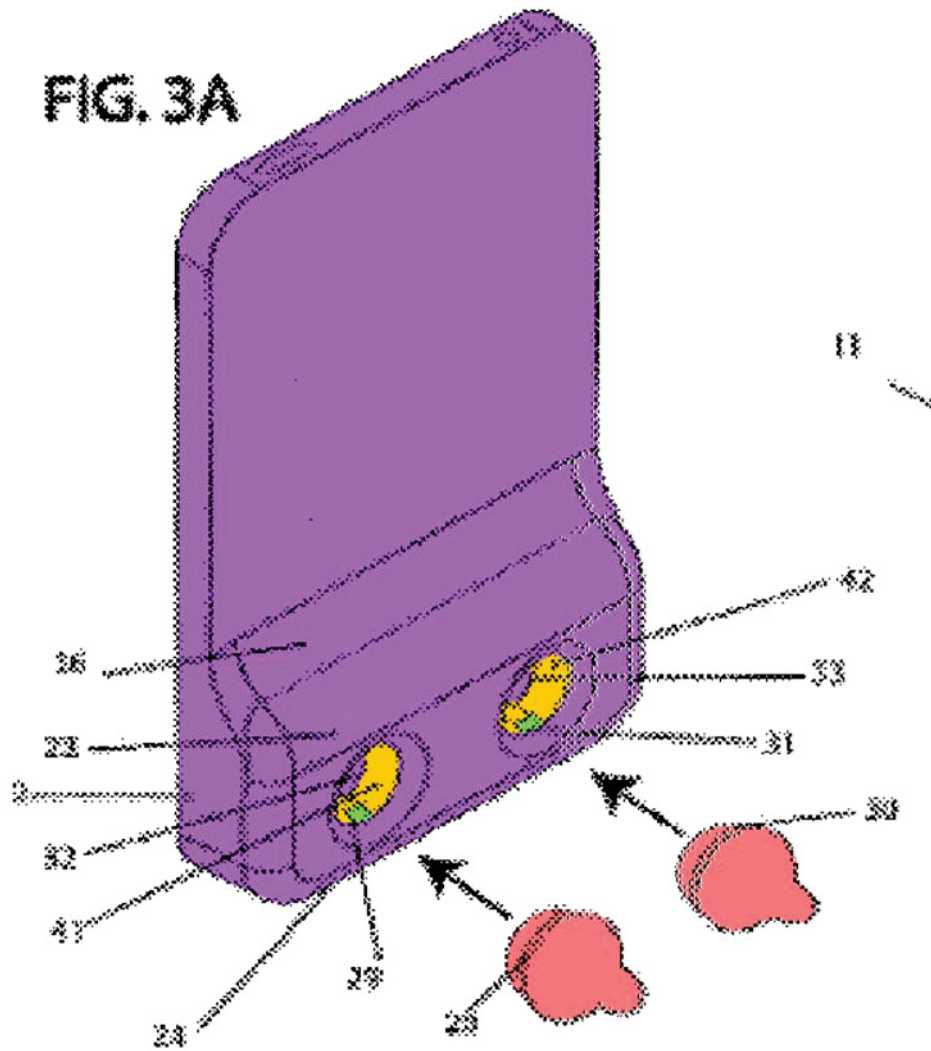
D. Ground 4

Shaffer in view of Hain renders claims 1-7 and 9 obvious. Ex-1002-Kiaei-Decl., ¶78.

1. Claim 1

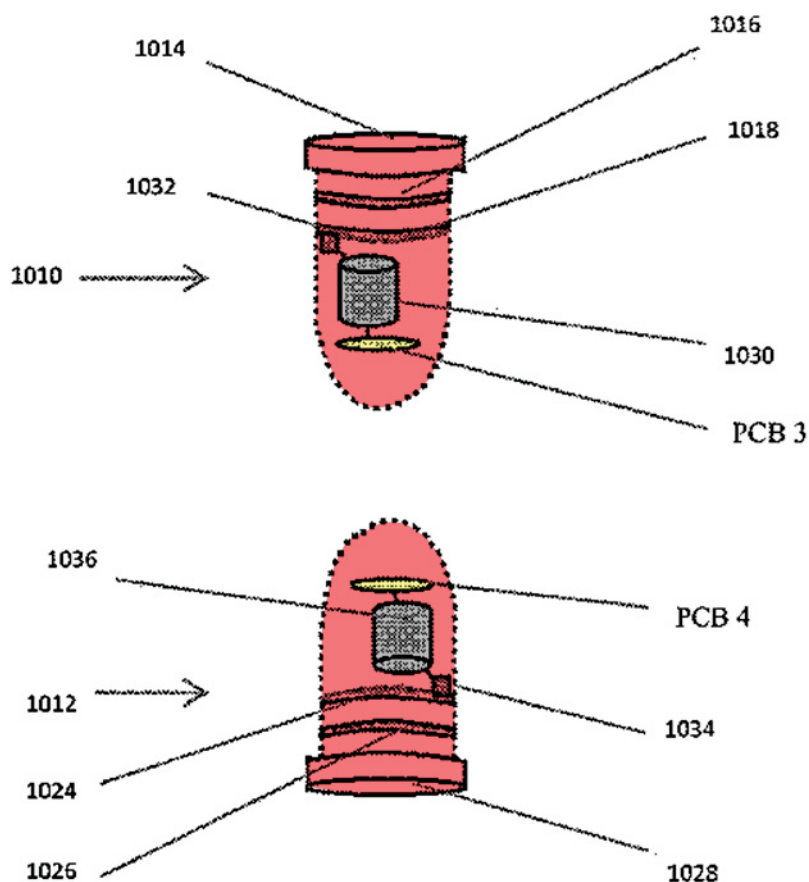
- (a) [1Preamble] A method for managing wireless earpieces comprising:

Shaffer discloses a method for managing wireless earpieces. Shaffer’s system includes a pair of wireless earpieces (e.g., wireless audio earbuds) and a magnetic storage case (e.g., case 11 with a magnetic charging dock).



Ex-1003-Shaffer, Figure 3A, ¶34 (“mobile device case 11, which embeds a magnetic charging dock for two wireless audio earbuds”), ¶32 (“The term ‘earbud’ refers to a device designed to fit within the ear of a human, and which emits audio signals that the earbud receives from a mobile electronic device. Examples of earbuds include in-ear headphones, hearing aids and the like.”). Figure 10 depicts wireless earbuds

1010 and 1012, which are configured to automatically power down when placed into the storage case of Figure 3A, as further explained below for Elements [1A]-[1B].



Ex-1003-Shaffer, Figure 10, ¶¶62-63. Accordingly, Shaffer's system carries out a method to manage earbuds 1010 and 1012, e.g., by detecting whether the earbuds are placed in the magnetic storage case and automatically powering down the earbud circuitry when the earbuds are in the case. *Id.*, ¶¶11, 62-63. Ex-1002-Kiaei-Decl., ¶¶79-80.

- (b) [1A] powering circuitry of the wireless earpieces utilizing a high power mode in response to detecting a magnetic field is not applied to one or more of the wireless earpieces; and

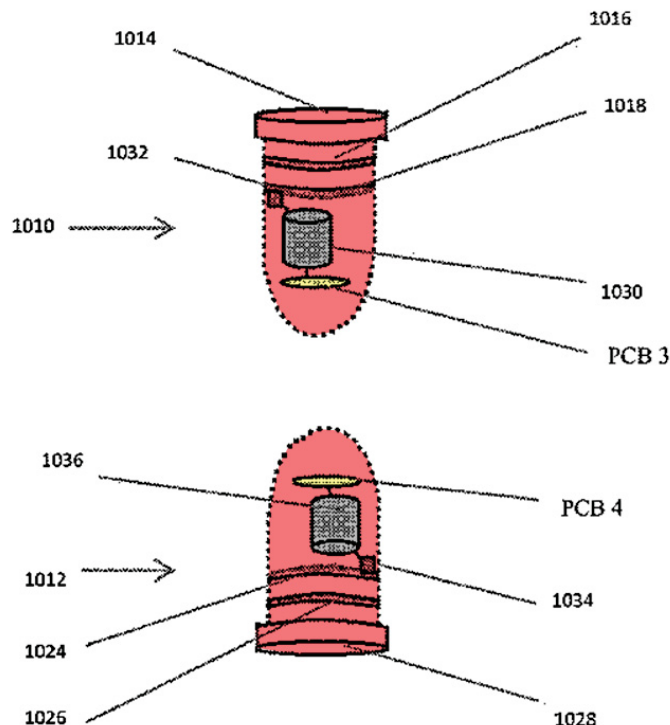
Shaffer in view of Hain discloses these limitations. Ex-1002-Kiaei-Decl.,

¶81.

(i) **Shaffer**

Shaffer discloses powering circuitry of the wireless earpieces (e.g., **earbuds 1010 and 1012**) utilizing a high power mode (e.g., “on” state) in response to a magnetic sensor detecting that the earpieces are out of their storage case. Ex-1002-Kiaei-Decl., ¶83.

First, Shaffer’s **earbuds 1010 and 1012** include circuitry (e.g., **PCB 3 and PCB 4**) that, under normal operation, is powered using a high-power mode (e.g., the earbuds are fully functional and powered by **rechargeable batteries 1030 and 1036**).



Ex-1003-Shaffer, Figure 10, ¶¶62-63 (“[E]arbuds 1010 and 1012 include earbud rechargeable batteries 1030 and 1036.... These components may be connected to printed circuit boards PCB 3 and PCB 4 within the earbuds.”). Ex-1002-Kiaei-Decl., ¶82.

Second, Shaffer discloses that the PCB circuitry is powered on (i.e., using the high-power mode) in response to a magnetic sensor detecting that the earbud is out of its storage case. Ex-1003-Shaffer, ¶¶62-63 (“[Earbuds 1010 and 1012] may contain encoded firmware or other programming instructions to *automatically trigger on when the earbuds are removed from the earbud apertures* [of the storage case]. Each earbud may include ... *magnetic sensors that detect when the earbud*

is in (or out of) the aperture [of the storage case] and which send a corresponding signal to the earbud PCBs.”), 11 (“*activate the earbud when the earbud is removed from an earbud receiving aperture*”). Ex-1002-Kiaei-Decl., ¶83.

(ii) Hain

As explained above for Elements [1A]-[1B] and Claim 5 (Ground 2), Hain discloses a magnetic sensor (e.g., reed contacts 6 and 16) that determines that an earbud is out of its storage case by *detecting that a magnetic field is not applied to the earpieces*. See Sections IX.B.1(b-c), IX.B.4. Ex-1002-Kiaei-Decl., ¶84.

(iii) Motivation to combine

As explained above, Shaffer discloses that the power sent to the circuitry of earbuds 1010 and 1012 is responsive to a magnetic sensor that detects when the earbuds are in or out of their storage case but leaves the implementation of a specific magnetic sensor to a POSITA. See Section IX.D.1(b)(i). Hain discloses an implementation of well-known magnetic sensors (e.g., using reed contacts 6 and 16) that operates by detecting whether a magnetic field is applied to the earpieces. See Section IX.D.1(b)(ii). A POSITA would have been motivated to utilize the specific sensors of Hain to implement Shaffer. Ex-1002-Kiaei-Decl., ¶85.

First, Shaffer discloses that a magnetic sensor is used to detect whether the earpieces are in the storage case, and Hain discloses a well-known implementation of a magnetic sensor (e.g., a reed switch) suitable for this purpose. Ex-1003-Shaffer,

¶63 (“*magnetic sensors that detect when the earbud is in (or out of) the aperture [of the magnetic storage case]*”); Ex-1004-Hain, ¶¶10-11, 18 (“If the reed contacts 6 or 16 are in the immediate vicinity of a magnetic field whose field strength exceeds a certain threshold value, the reed contacts 6 or 16 close.”). Ex-1002-Kiaei-Decl., ¶86.

Second, a POSITA would have turned to Hain for its implementation of a magnetic sensor given that Shaffer and Hain both describe similar systems that seek to reduce the power consumption of wireless earpieces (e.g., hearing aids) when placed in a magnetic storage case. *See, e.g.*, Ex-1003-Shaffer, ¶¶2 (“This patent document relates to a mobile device case that serves as an electrical charger and storage dock for rechargeable wireless audio earbuds”), 32 (“Examples of earbuds include hearing aids”), 46, 62, 63 (“[The earbuds] may ... automatically trigger on when the earbuds are removed from the earbud apertures [of the magnetic storage case], and turn off upon return to the apertures”); Ex-1004-Hain, ¶¶6 (“The problem addressed by the present invention is to provide ... automatic switching off of the [hearing aid] devices in a hearing aid system”), 11 (“This can also be achieved with a sensor device for detecting an external magnetic field.”). In particular, Shaffer and Hain describe using magnetic sensors for an identical purpose of determining whether the earpieces are in their storage case, such that the earpiece circuitry can

be automatically powered on when taken out of the case. *Compare* Section IX.D.1(b-c) (describing Shaffer’s use of magnetic sensors) *with* Section IX.B.1(b-c) (describing Hain’s use of magnetic sensors). Ex-1002-Kiaei-Decl., ¶87.

Third, Hain expressly discloses benefits of implementing the magnetic sensor by using a reed switch to detect whether a magnetic field is applied to the earpieces—“simply implementable and reliable” and requires “[o]nly a single magnetic field sensor ... in each hearing aid.” Ex-1004-Hain, ¶¶6, 23; *see also id.*, ¶10, 18. Ex-1002-Kiaei-Decl., ¶88.

Fourth, a POSITA would have had a reasonable expectation of success in applying Hain’s teachings to Shaffer’s system because Shaffer teaches magnetic sensors and Hain provides further details of known implementations of such sensors, for the same or similar application. Ex-1003-Shaffer, ¶63 (“***magnetic sensors that detect when the earbud is in (or out of) the aperture [of the magnetic storage case]***”); Ex-1004-Hain, ¶10 (“***The sensor devices are designed in a particularly simple manner as reed contacts***”). Moreover, in the modified system, Hain’s **reed contacts 6 and 16** would be used for their intended purpose of detecting the presence or absence of a magnetic field applied to the **earpieces** and thereby reduce power consumption when the **earpieces** are placed in a magnetic storage case. Ex-1002-Kiaei-Decl., ¶89.

- (c) [1B] altering the power sent to the circuitry of the wireless earpieces to a low power mode in response to detecting a magnetic field is applied to one or more of the wireless earpieces.

Shaffer in view of Hain discloses these limitations. Ex-1002-Kiaei-Decl., ¶90.

(i) **Shaffer**

Shaffer discloses altering the power sent to the circuitry of the wireless earpieces (e.g., **earbuds 1010 and 1012**) to a low-power mode (e.g., “low energy consumption idle mode”) in response to a magnetic sensor detecting that the earpieces are in their storage case. Ex-1002-Kiaei-Decl., ¶93.

First, Shaffer teaches that, when **earbuds 1010 and 1012** are placed in their storage case, they enter a low-power mode (referred to as a “low-energy consumption idle mode”) with reduced functionality such as monitoring sensors and battery charging. Ex-1003-Shaffer, ¶¶63 (“Each **earbud** may include ... magnetic sensors that *detect when the earbud is in (or out of) the aperture....* Firmware embedded within the **earbud PCBs** could cause a circuit that includes the rechargeable earbud batteries [1030] and [1036] to switch on or off, or *return them to a low-energy consumption idle mode.*”). Ex-1002-Kiaei-Decl., ¶91.

More generally, as Dr. Kaiei explains, a POSITA would have understood that portable electronic devices at the time of the ’853 patent, like wireless earpieces,

were routinely operated across a wide spectrum of low power modes to achieve a desired balance between functionality and power consumption when not in use. *See, e.g.,* Ex-1013, ¶3 (“To reduce power consumption (and extend battery life), portable wireless devices ... may toggle between an active-power state [e.g., a high-power mode] and a low-power state [e.g., a low-power mode] (also known as a standby mode, sleep mode, suspend mode, or the like). When switched to the low-power state ... power consumption is reduced by reducing and/or eliminating power to all unneeded portions of the platform and devices.”); *see also* Section IX.B.1(c) (describing Hain’s low-power mode that uses a “residual power supply”). Ex-1002-Kiaei-Decl., ¶92.

Accordingly, to the extent PO contends that the claimed low-power mode requires a specific level of residual functionality that is not expressly recited by Shaffer in view of Hain, it would have been obvious to a POSITA to modify the power modes disclosed by Shaffer and Hain as a routine aspect of the design and implementation of the wireless earpiece system. Such variations would have been obvious to try given the limited number of circuits and subsystems in the earpieces that could be powered on or off in a given reduced power mode. A POSITA would have implemented a particular desired level of functionality with a reasonable expectation of success given that the system of Shaffer and Hain already has the

capability to power some, but not all, of the components of the wireless earpieces (as demonstrated by the residual functionality of the low-power “off” or “idle” modes described above), such that selecting a particular combination of components to keep operational would not have resulted in any additional complexity. Ex-1002-Kiaei-Decl., ¶92.

Second, Shaffer discloses that the power sent to the PCB circuitry is reduced in response to a magnetic sensor detecting that earbuds 1010 and 1012 are placed into their storage case. Ex-1003-Shaffer, ¶¶62-63 (“*magnetic sensors that detect when the earbud is in (or out of) the aperture [of the storage case]*” and which send a corresponding signal to the earbud PCBs.... Firmware embedded within the earbud PCBs could cause a circuit that includes the rechargeable earbud batteries [1030] and [1036] to switch on or off, or return them to a low-energy consumption idle mode”), 11. Ex-1002-Kiaei-Decl., ¶93.

(ii) Hain

As explained above for Elements [1A]-[1B] and Claim 5 (Ground 2), Hain discloses a magnetic sensor (e.g., reed contacts 6 and 16) that determines that an earbud is in its storage case by *detecting that a magnetic field is applied to the earpieces*. See Sections IX.B.1(b-c), IX.B.4. A POSITA would have been

motivated to modify Shaffer in view of Hain as described for Element [1A]. Ex-1002-Kiaei-Decl., ¶94.

**2. Claim 2: The method of claim 1 further comprising:
operating the wireless earpieces utilizing an onboard
battery in response to detecting the magnetic field is not
applied to one or more of the wireless earpieces.**

As explained above for Element [1A], Shaffer in view of Hain discloses powering the wireless earpieces using a high-power mode in response to detecting the magnetic field is not applied to one or more of the wireless earpieces. Shaffer further discloses that powering the earpieces using the high-power mode includes *operating the earpieces using an onboard battery*. See Section IX.D.1(b); see also Ex-1003-Shaffer, Figure 10, ¶¶62-63 (“[E]arbuds 1010 and 1012 include *earbud rechargeable batteries 1030 and 1036*... connected to printed circuit boards PCB 3 and PCB 4 within the earbuds.”). Ex-1002-Kiaei-Decl., ¶95.

**3. Claim 3: The method of claim 1 further comprising:
charging an onboard battery of the wireless earpieces in
response to detecting a magnetic field is applied to the
wireless earpieces.**

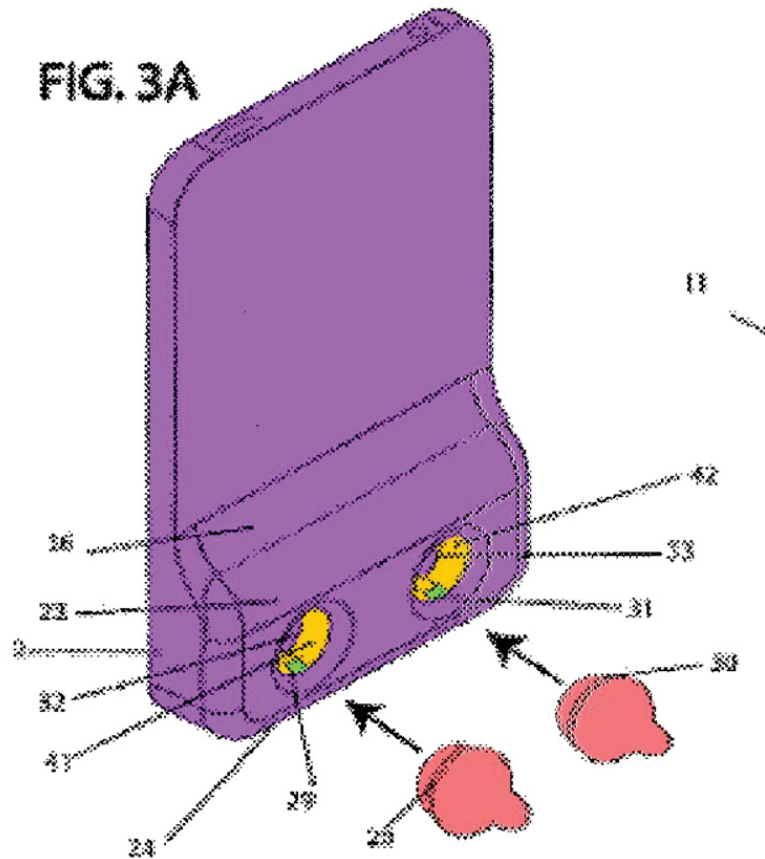
As explained above for Element [1B], Shaffer in view of Hain discloses powering the wireless earpieces using a low-power mode in response to detecting the magnetic field is applied to one or more of the wireless earpieces. Shaffer further discloses that powering the earpieces using the low-power mode includes *charging an onboard battery of the wireless earpieces*. See Section IX.D.1(c)(i); see also Ex-

1003-Shaffer, ¶¶62 (“rechargeable batteries 1030 and 1036”), 40 (“insert a rechargeable earbud into each of the earbud apertures 32 and 33 [of the storage case] to provide electrical charge”), Figure 10. Ex-1002-Kiaei-Decl., ¶96.

4. Claim 4: The method of claim 1, wherein the magnetic field is applied by a magnet of a smart case configured to receive the wireless earpieces.

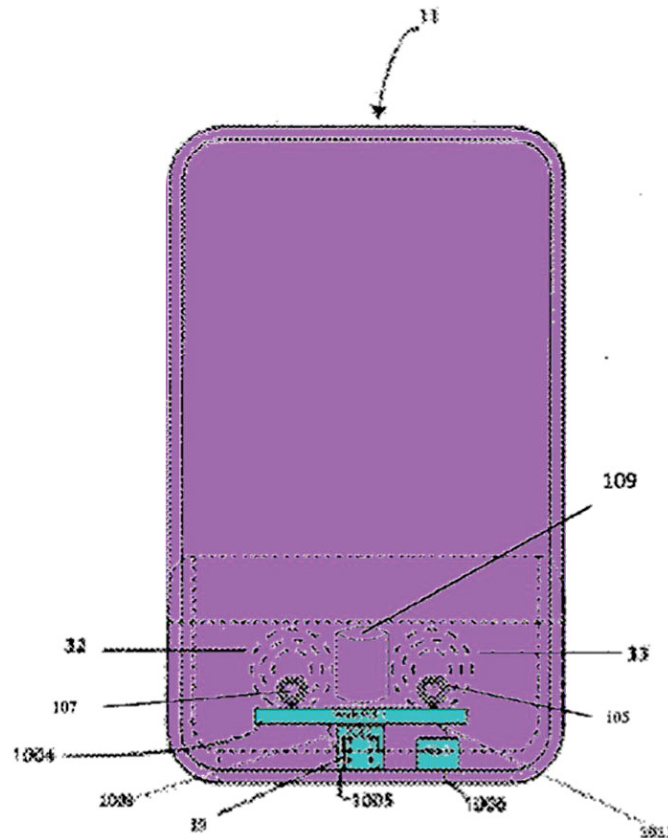
Shaffer discloses that the magnetic field is applied by a magnet of a smart case (e.g., storage case) configured to receive the wireless earpieces (e.g., earbuds 1010 and 1012). Ex-1002-Kiaei-Decl., ¶97.

First, as explained above for Elements [1A]-[1B], Shaffer’s storage case includes magnets (e.g., magnetic strips 41 and 42) that apply a magnetic field to the earbuds when they are placed in the storage case.



Ex-1003-Shaffer, Figure 3A, ¶¶42 (storage case includes “aperture magnetic contact strips 41 and 42”), 43, 46, 58, 62 (earbuds 1010 and 1012 interact with the magnetic fields applied by the magnets of the storage case). Ex-1002-Kiaei-Decl., ¶98.

Second, Shaffer’s storage case is a “smart” case that houses one or more intelligent controls (e.g., printed circuit boards 1004, 1005, and 1006).

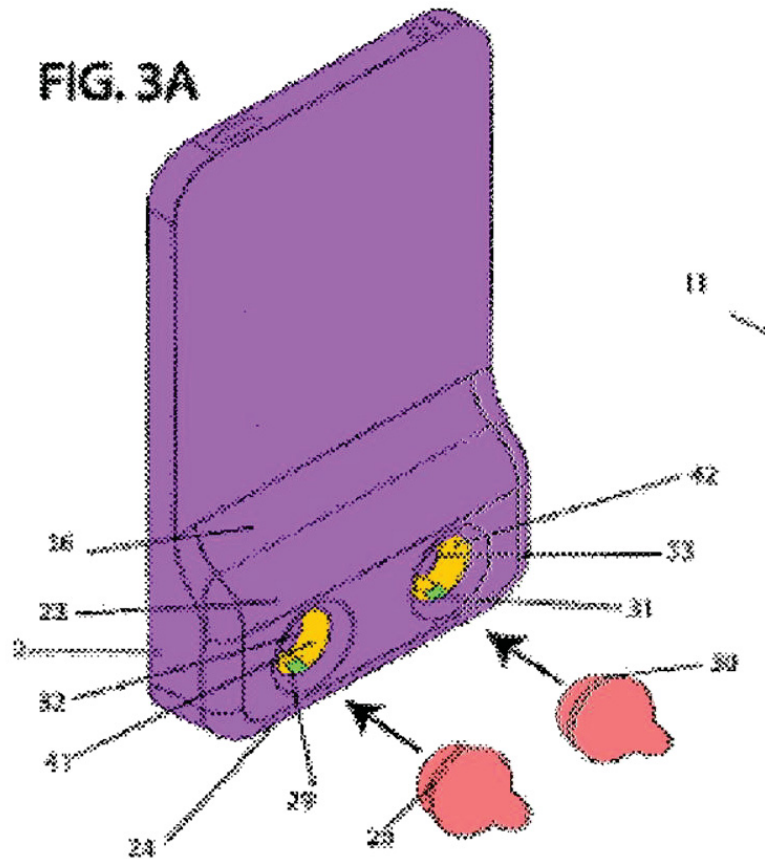


Ex-1003-Shaffer, Figure 4, ¶48 (“**main PCB1 1004, PCB2 1005, and PCB3 1006.**”).

These **intelligent PCB controls** perform management functions to control the operation and functionality of the **storage case**, including authentication, battery charging, and data connectivity functions. *Id.* (“**PCB1 1004** ... may contain such items as *a controller, firmware, an authentication chip, and a battery charging circuit.* **PCB2 1005** may contain a case connector, such as a *30-pin connector, Lightning connector* or other connector. **PCB3 1006** may contain the *USB connector.*”). Moreover, the **intelligent PCB controls** can automatically distribute battery charge among the onboard batteries of the **storage case**, the **wireless earbuds**,

and a mobile device connected to the storage case. Ex-1003-Shaffer, ¶57 (“Main PCB1 1004 may ... balance the charge directed to rechargeable batteries 39 and 27 and case rechargeable battery 109, and the charge exchanged between all three rechargeable batteries and a mobile device connected to case 11.”). The ’853 patent discloses embodiments of a smart case as having similar capabilities. *See, e.g.*, Ex-1001-USP853, 6:45-56 (“The logic engine 406 is the logic that controls the operation and functionality of the smart case 402. The logic engine 406 may include circuitry, chips, and other digital logic. The logic engine 406 may also include programs, scripts, and instructions that may be implemented to operate the logic engine 406. The logic engine 406 may represent hardware, software, firmware, or any combination thereof”), 2:41-42 (“the smart cases may ensure that the wireless earpieces are charged to a desired level”). Ex-1002-Kiaei-Decl., ¶99.

Third, as shown in Figure 3A, Shaffer’s smart case is configured to receive the earbuds, e.g., via one or more “earbud receiving apertures.”



Ex-1003-Shaffer, Figure 3A, ¶¶40 (“The **case** also may include any number of *earbud receiving apertures 32 and 33.*”), 41-43, 62 (“the earbuds remain securely retained within earbud apertures”). Ex-1002-Kiaei-Decl., ¶100.

5. Claim 5: The method of claim 1, wherein the magnetic field is detected by a reed switch of the wireless earpieces.

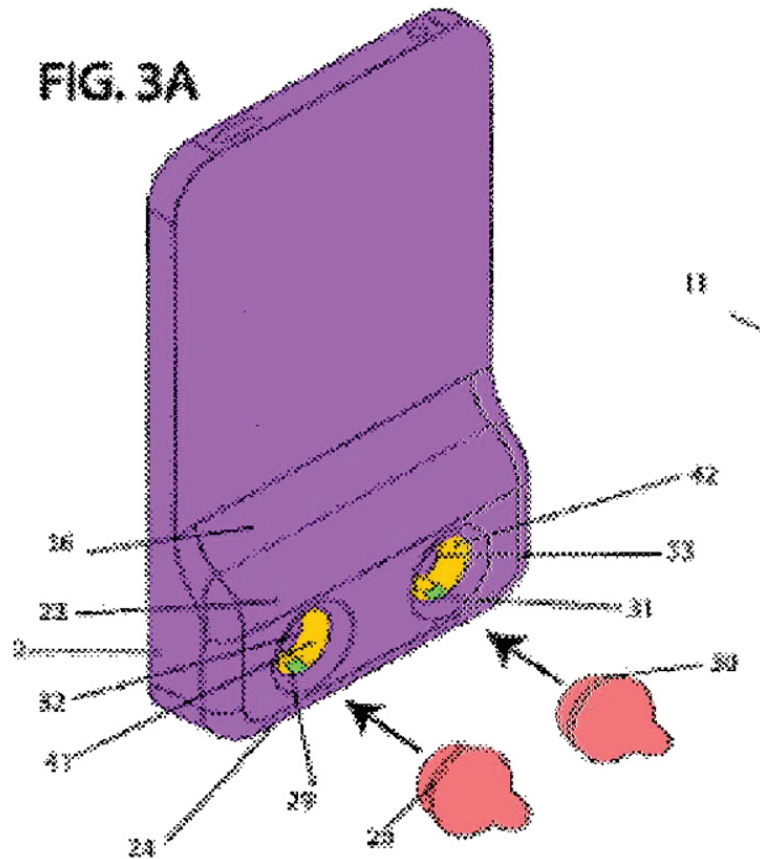
As explained for Elements [1A]-[1B] and Claim 5 (Ground 2), Hain discloses that the magnetic field is detected by a reed switch (e.g., **reed contacts 6 and 16**) of the **wireless earpieces**. See Sections IX.B.1(b-c), IX.B.4. Moreover, a POSITA

would have been motivated to modify Shaffer in view of Hain as described for Elements [1A]-[1B] (Ground 4). Ex-1002-Kiaei-Decl., ¶101.

6. **Claim 6: The method of claim 1, further comprising:
coupling the wireless earpieces to interfaces of a smart case,
wherein the smart case applies a magnetic field to one or
more of the wireless earpieces.**

Shaffer discloses coupling the wireless earpieces (e.g., earbuds 1010 and 1012) to interfaces of a smart case (e.g., storage case), wherein the smart case applies a magnetic field to one or more of the wireless earpieces. Ex-1002-Kiaei-Decl., ¶102.

First, as shown in Figure 3A, Shaffer discloses coupling earbuds 1010 and 1012 to interfaces (e.g., electrical contacts 29 and 31) of storage case 11.



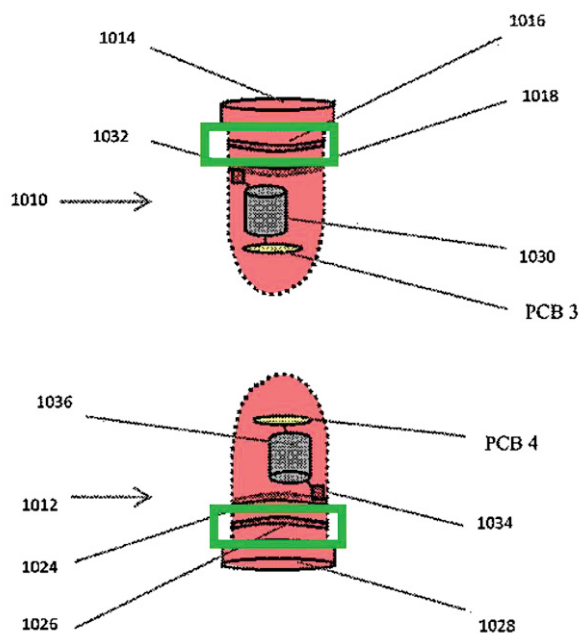
Ex-1003-Shaffer, Figure 3A, ¶¶39-40 (“insert a rechargeable **earbud** into each of the earbud apertures 32 and 33 to provide electrical charge via the earbud **electrical contacts 29 and 31**”), 42, 47, 56-58. Shaffer discloses alternative interfaces for coupling to **earbuds 1010 and 1012**, e.g., using inductive chargers or magnetic strips. *Id.*, ¶¶53 (“earbuds 34 and 35 may receive power from earbud apertures 32 and 33 via an **induction charging unit**”), 54-56, 42 (“the aperture **magnetic contact strips 41 and 42 may also serve as electrical contacts**”). Ex-1002-Kiaei-Decl., ¶103.

Second, as explained for Claim 4, Shaffer's *storage case* (which includes *electrical contacts 29 and 31*) is a "smart case" that applies a magnetic field to one or more of the wireless earpieces. Ex-1002-Kiaei-Decl., ¶104.

7. **Claim 7: The method of claim 1, wherein the magnetic field is detected by a reed switch integrated in magnetic contacts that interface with a smart case for securing the wireless earpieces.**

As explained for Elements [1A]-[1B] and Claim 5, Shaffer in view of Hain discloses that the magnetic field is detected by a reed switch (e.g., Shaffer's *earbuds 1010 and 1012* using Hain's *reed contacts 6 and 16*). Shaffer in view of Hain further discloses that the *reed switch* is integrated in magnetic contacts (e.g., Shaffer's *magnetic rings 1016 and 1026*) that interface with a *smart case* (see Claims 4 and 6) for securing the *wireless earpieces*. Ex-1002-Kiaei-Decl., ¶¶105-106.

Namely, Shaffer discloses *earbuds 1010 and 1012* include *magnetic rings 1016 and 1026* that interface with the *storage case* for securing the *earbuds*.



Ex-1003-Shaffer, Figure 10, ¶¶62 (“The earbuds are outfitted with magnetic rings 1016 and 1026 that allow a connection [(i.e., interface)] with magnetized earbud aperture rings [of the storage case] to ensure the earbuds remain securely retained within earbud apertures”), 63, 42. Ex-1002-Kiaei-Decl., ¶106.

Thus, modifying Shaffer’s earbuds to use Hain’s reed contacts results in the reed contacts being integrated with magnetic rings that interface with the storage case for securing the earbuds. A POSITA would have been motivated to modify Shaffer in view of Hain’s teachings in this manner as described for Elements [1A]-[1B]. Ex-1002-Kiaei-Decl., ¶106.

8. Claim 9: The method of claim 1, wherein the low power mode is a power saver mode.

Shaffer discloses that the low-power mode (e.g., “low-energy consumption idle mode”) is a power saver mode. As described in the ’853 patent, the power saver mode corresponds to a mode in which minimal power is used to support residual functionality of the earpieces (e.g., charging and other residual functions). Ex-1001-USP853, 10:10-24 (“During the power saver mode the wireless earpiece may utilize minimal power to maintain functionality and alert status of the wireless earpiece. For example, the wireless earpiece may be configured to communicate with one or more other external devices, such as the smart case, another pair of wireless earpieces, mobile devices, personal computers, routers, or so forth. Location data of the user may be shared with other external, devices and corresponding applications. In the power saver mode the wireless earpiece minimizes power utilization while still exerting full control over the power utilization, charging, and synchronization of the wireless earpieces.”). Ex-1002-Kiaei-Decl., ¶107.

As explained above for Element [1B], Shaffer discloses minimizing the power consumption of the wireless earpieces while retaining residual functionality, such as recharging the battery and detecting when the earpieces are removed from the storage case. *See* Section IX.D.1(c). Furthermore, to the extent PO contends that there are any differences between the residual functionality in Shaffer’s low-power

mode and the claimed “power saver mode,” it would have been obvious to implement the low-power mode as a “power saver mode” for the same reasons explained in Section IX.D.1(c). Ex-1002-Kiaei-Decl., ¶108.

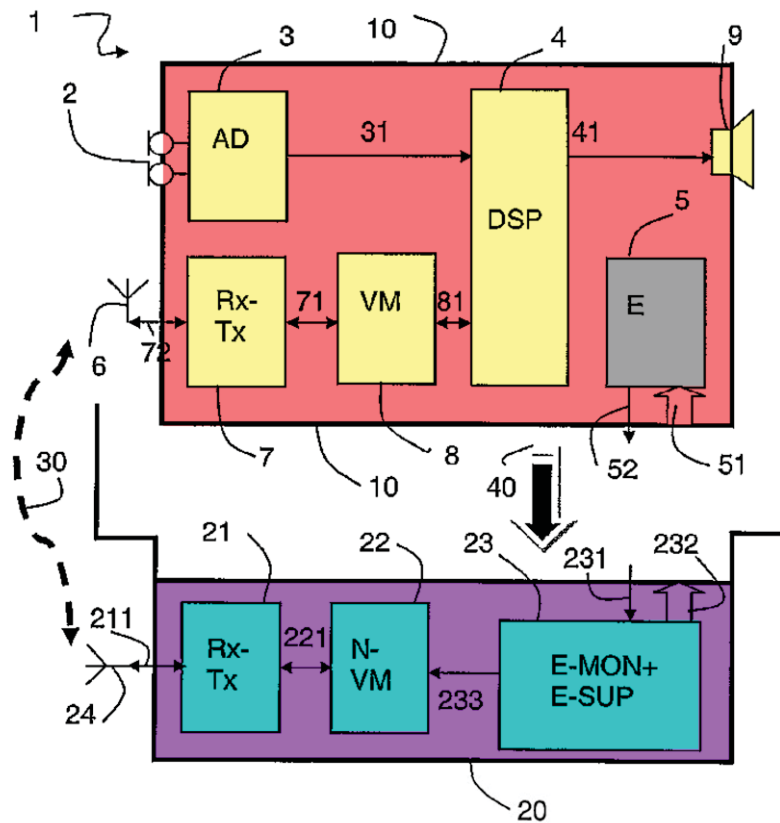
E. Ground 5

Shaffer in view of Hain and Sorensen renders claims 4 and 6-8 obvious. Ex-1002-Kiaei-Decl., ¶109.

1. Claims 4, 6, and 7

Each of claims 4, 6, and 7 recites a “smart case.” As explained above, Shaffer’s storage case is a “smart case” that houses intelligent controls to perform a variety of management functions that control the case’s operation and functionality (e.g., authentication, battery charging, and data connectivity functions). See Section IX.D.4. Ex-1002-Kiaei-Decl., ¶¶110-111.

However, to the extent PO contends that Shaffer’s storage case is not a “smart case” as claimed, Sorensen discloses a smart case (e.g., charging station 20) that performs additional functions in connection with storing and charging wireless earpieces (e.g., hearing instrument 10). For example, Sorensen discloses that charging station 20 houses a variety of intelligent controls, including a signal processor 21, a memory 22, and a monitoring and charging unit 23, which collectively establish data communications between charging station 20 and hearing instrument 10 and recharge the hearing instrument’s battery 5.



Ex-1005-Sorensen, Figure 1, 6:26-47 (“a hearing aid system 1 comprising a **hearing instrument 10** and a **charging station 20** for recharging a rechargeable battery of the hearing instrument”), 7:26-54. Ex-1002-Kiaei-Decl., ¶112.

The **intelligent controls 21, 22, and 23** perform a number of management capabilities on behalf of the hearing instrument system, including:

- transferring configuration data from **memory 22** to **hearing instrument 10** (Ex-1005-Sorensen, 7:37-43);
- transferring usage and operational data from **hearing instrument 10** to **charging station 20** (*id.*, 7:43-46);

- monitoring the status of hearing instrument battery 5 (*id.*, 7:54-60);
- executing data transfers intelligently based on the battery status (e.g., executing the transfers when hearing instrument battery 5 is charged above a threshold) (*id.*, 6:51-62, 8:10-15);
- connecting to a network (e.g., the Internet) to facilitate data transfer between hearing instrument 10 and remote servers (*id.*, 3:22-33); and
- updating software or firmware of hearing instrument 10 (*id.*, 3:36-42).

Ex-1002-Kiaei-Decl., ¶112.

A POSITA would have been motivated to modify Shaffer's storage case to use the functionality of Sorensen's intelligent controls 21, 22, and 23. For example, Sorensen discloses that this functionality reduces the hardware requirements of the hearing instrument and thereby "allow[s] a smaller and cheaper and more energy efficient hearing instrument to be made." Ex-1005-Sorensen, 2:33-35. Sorensen's functionality also "allow the user, dispenser, or manufacturer to analyze the data from the hearing instrument and/or to upload basic data of the hearing instruments and/or software updates (e.g., firmware updates) to the hearing instrument." *Id.*, 2:5-8. Ex-1002-Kiaei-Decl., ¶113.

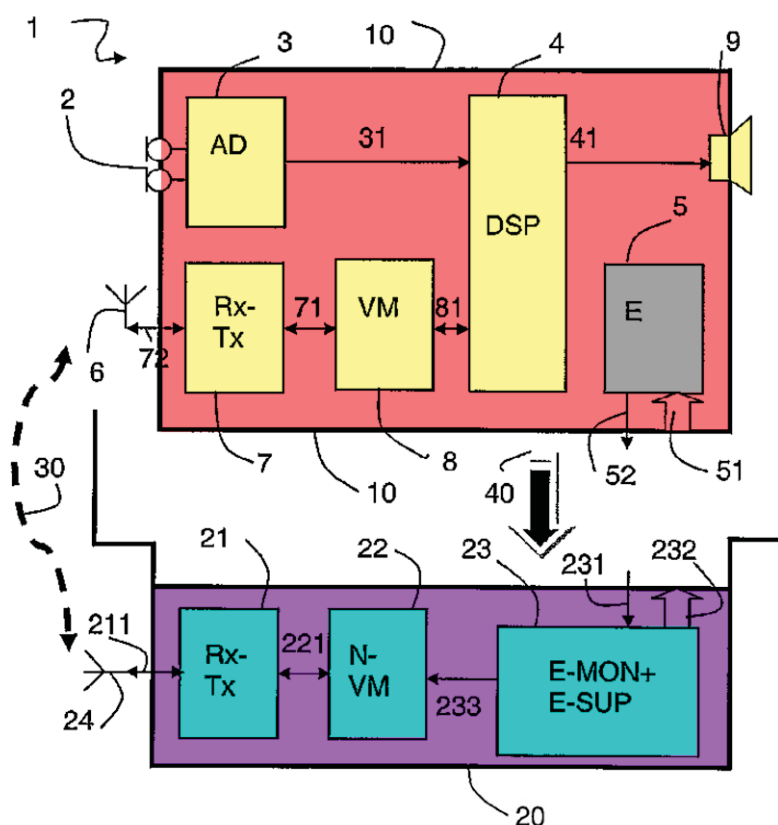
A POSITA would have modified Shaffer's storage case to use the functionality of Sorensen's intelligent controls 21, 22, and 23 with a reasonable

expectation of success. As explained above for claims 4, 6, and 7, Shaffer's storage case already includes PCB circuitry 1004, 1005, and 1006 that perform a variety of management functions, and Sorensen simply discloses further details and capabilities of that circuitry. Moreover, in the modified system, the functionality of Sorensen's intelligent controls 21, 22, and 23 would be used for its intended purpose of exchanging data with and recharging wireless earpieces when placed in a storage case. Ex-1002-Kiaei-Decl., ¶114.

**2. Claim 8: A method of claim 1 further comprising:
synchronizing data between the wireless earpieces and a
smart case in response to detecting the magnetic field.**

Shaffer in view of Hain and Sorensen discloses synchronizing data between the wireless earpieces and a smart case in response to detecting the magnetic field. Ex-1002-Kiaei-Decl., ¶115.

First, as explained above for Claims 4, 6, and 7 (*see* Section IX.E.1), Sorensen discloses synchronizing data between (e.g., transferring data to and from) wireless earpieces (e.g., hearing instrument 10) and a smart case (e.g., charging station 20 comprising intelligent controls 21, 22, and 23).



Ex-1005-Sorensen, Figure 1, 6:26-47. Sorensen discloses transferring configuration data from memory 22 to hearing instrument 10 (*id.*, 7:37-43) and transferring usage and operational data from hearing instrument 10 to charging station 20 (*id.*, 7:43-46). Ex-1002-Kiaei-Decl., ¶116.

Second, Sorensen discloses that the data synchronization occurs in response to determining that the wireless earpieces (hearing instrument 10) are placed into the smart case. Ex-1005-Sorensen, 4:43-62 (“*The system is arranged to provide that communication [e.g., data synchronization as described above] between charging station and hearing instrument can be established via connection 30, when the*

hearing instrument is placed in the charging station”). Ex-1002-Kiaei-Decl., ¶117.

A POSITA would have been motivated to modify the teachings of Shaffer in view of Sorensen as described above for Claims 4, 6, and 7, e.g., by modifying Shaffer’s *storage case* to use the data synchronization functionality of Sorensen’s *intelligent controls 21, 22, and 23*. See Section IX.E.1. Moreover, as explained above, Shaffer in view of Hain discloses determining that the earpieces are in the storage case by detecting a magnetic field is applied to the earpieces. See Section IX.D.1(b-c). Thus, modifying the system of Shaffer and Hain to use the data synchronization functionality of Sorensen results in a system in which data is synchronized between the *earpieces* and *smart case* in response to detecting the magnetic field. Ex-1002-Kiaei-Decl., ¶118.

F. Ground 6

Shaffer in view of Steinbrecher renders claims 10-12, 14, and 16-21 obvious. Ex-1002-Kiaei-Decl., ¶119.

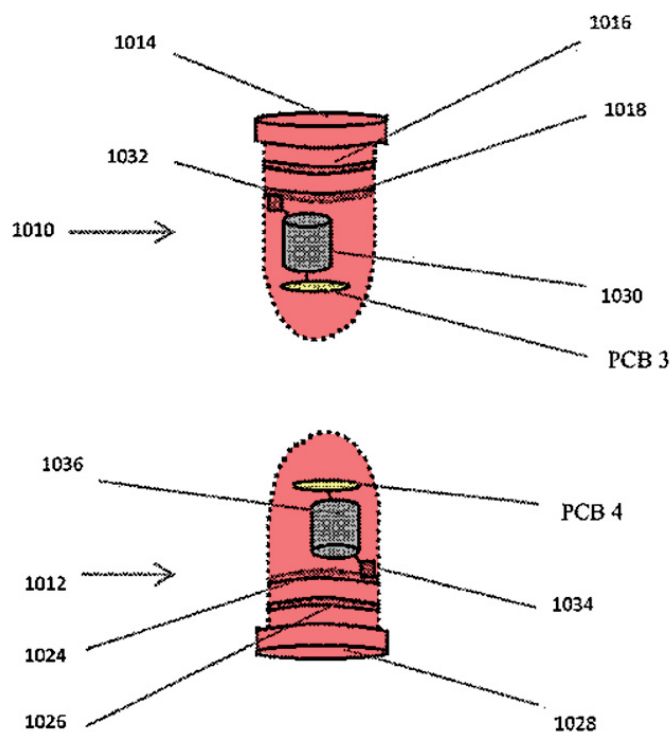
1. Claim 10

(a) [10Preamble] A wireless earpiece comprising:

As explained above for Element [1Preamble], Shaffer discloses a wireless earpiece (e.g., *wireless earbuds 1010 and 1012*). Ex-1002-Kiaei-Decl., ¶120.

(b) [10A] circuitry operating the wireless earpiece;

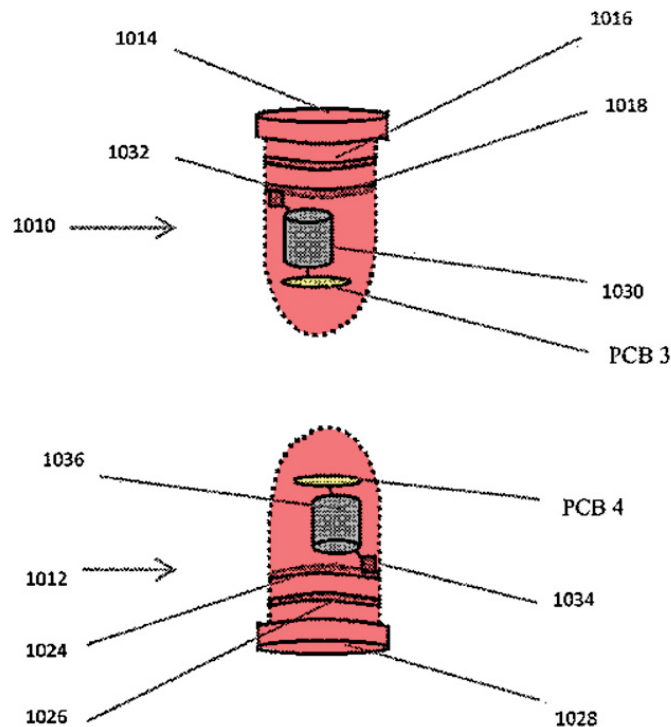
As explained above for Elements [1A]-[1B], Shaffer discloses circuitry (e.g., **PCB 3 and PCB 4**) operating the wireless earpiece (e.g., **earbuds 1010 and 1012**).



Ex-1003-Shaffer, Figure 10, ¶¶62-63. The **PCB circuitry** includes firmware or software that automatically turns the **earbuds** on and off when placed into a storage case. *Id.*, ¶63 (“Firmware embedded within the **earbud PCBs** could cause a circuit that includes the rechargeable earbud batteries [1030] and [1036] to switch on or off, or return them to a low-energy consumption idle mode.”). Ex-1002-Kiaei-Decl., ¶121.

- (c) [10B] a battery powering the circuitry of the wireless earpiece;
and:

As explained above for Elements [1A]-[1B], Shaffer discloses a battery (e.g., batteries 1030 and 1036) powering the circuitry (e.g., PCB 3 and PCB 4) of the wireless earpiece (e.g., earbuds 1010 and 1012).



Ex-1003-Shaffer, Figure 10, ¶¶62-63 (“[E]arbuds 1010 and 1012 include earbud rechargeable batteries 1030 and 1036... connected to printed circuit boards PCB 3 and PCB 4”). Ex-1002-Kiaei-Decl., ¶122.

- (d) [10C] a reed switch connecting the battery to the circuitry wherein the reed switch connects the circuitry to the battery when a magnetic field is not detected, and wherein the reed switch disconnects the circuitry from the battery when a magnetic field is detected

Shaffer in view of Steinbrecher discloses these limitations. Ex-1002-Kiaei-Decl., ¶123.

(i) Shaffer

As explained above for Elements [1A]-[1B], Shaffer discloses connecting the battery (e.g., batteries 1030 and 1036) to the circuitry (e.g., PCB circuitry 3 and 4), wherein the circuitry is connected to the battery (e.g., powered) when a magnetic sensor detects that the earpieces are out of their storage case (*see* Section IX.D.1(b)), and wherein the circuitry is disconnected from the battery (e.g., power is switched off) when the magnetic sensor detects that the earpieces are in their storage case (*see* Section IX.D.1(c)). Ex-1002-Kiaei-Decl., ¶124.

(ii) Steinbrecher

First, Steinbrecher discloses an implementation of a magnetic sensor that uses a reed switch (e.g., microswitch M implemented as a reed contact) to connect the battery to the circuitry, noting that this implementation is “particularly preferred.” Ex-1006-Steinbrecher, ¶¶20 (“In a particularly preferred embodiment, *the microswitch is designed as a reed contact*, which is actuated by a permanent magnet arranged in the storage case, which controls an input of the *charging controller*,”

whereupon the latter *disconnects the electrical connection between the battery and the hearing aid's electronics*.”), 25. Ex-1002-Kiaei-Decl., ¶125.

Second, as explained above for Element [10C] (Ground 3), Steinbrecher discloses that the magnetic sensor with the reed switch connects (or disconnects) the circuitry from the battery by detecting that a magnetic field is not (or is) applied to the earpieces. *See* Section IX.C.1(d); *see also* Ex-1006-Steinbrecher, ¶¶18-19, 20, 25. Ex-1002-Kiaei-Decl., ¶126.

(iii) Motivation to combine

As explained above, Shaffer discloses that the power sent to the circuitry of earbuds 1010 and 1012 is responsive to a magnetic sensor that detects when the earbuds are in or out of their storage case but leaves the implementation of a specific magnetic sensor to a POSITA. *See* Section IX.F.1(d)(i). Steinbrecher discloses an implementation of well-known magnetic sensors (e.g., using a reed contact) that operates by detecting whether a magnetic field is applied to the earpieces. *See* Section IX.F.1(d)(ii). A POSITA would have been motivated to utilize the specific sensors of Steinbrecher to implement Shaffer. Ex-1002-Kiaei-Decl., ¶127.

First, Shaffer discloses that a magnetic sensor is used to detect when the earpieces are removed from the magnetic storage case, and Steinbrecher discloses a well-known implementation of a magnetic sensor (e.g., using a reed switch actuated

by a permanent magnet) suitable for this purpose. Ex-1003-Shaffer, ¶63 (“*magnetic sensors that detect when the earbud is in (or out of) the aperture [of the magnetic storage case]*”); Ex-1006-Steinbrecher, ¶¶20 (“In a particularly preferred embodiment, *the microswitch is designed as a reed contact, which is actuated by a permanent magnet arranged in the storage case*”), 25. Ex-1002-Kiaei-Decl., ¶128.

Second, a POSITA would have turned to Steinbrecher for its implementation of a magnetic sensor because Shaffer and Steinbrecher both describe similar systems that seek to reduce the power consumption of wireless earpieces (e.g., hearing aids) when placed in a magnetic storage case. *See, e.g.*, Ex-1003-Shaffer, ¶¶2 (“This patent document relates to a mobile device case that serves as an electrical charger and storage dock for rechargeable wireless audio earbuds”), 32 (“Examples of earbuds include hearing aids”), 46, 62, 63 (“[The earbuds] may ... automatically trigger on when the earbuds are removed from the earbud apertures [of the magnetic storage case], and turn off upon return to the apertures”); Ex-1006-Steinbrecher, ¶¶1 (“The invention relates to a procedure and a device for the contactless loading of an accumulator battery in a hearing aid which, during the charge process, is located in a charging shell”), 18 (“In a preferred embodiment, the hearing aid’s electronics are switched off ... as soon as the hearing aid is located in the charging shell. This ensures that energy is not consumed unnecessarily....”). In particular, Shaffer and

Steinbrecher describe using magnetic sensors for an identical purpose of determining whether the earpieces are in their storage case, such that the earpiece circuitry can be automatically powered on when taken out of the case. *Compare* Section IX.D.1(b-c) (describing Shaffer’s use of magnetic sensors) *with* Section IX.C.1(d) (describing Steinbrecher’s use of magnetic sensors). Ex-1002-Kiaei-Decl., ¶129.

Third, Steinbrecher expressly discloses benefits of implementing the magnetic sensor by using a charge controller connected to a reed switch. For example, Steinbrecher’s implementation ensures that “no current is consumed and no feedback whistling occurs.” Ex-1006-Steinbrecher, ¶19; *see also id.*, ¶¶18, 20 (using a reed contact is a “particularly preferred” implementation). Ex-1002-Kiaei-Decl., ¶130.

Fourth, a POSITA would have had a reasonable expectation of success in applying Steinbrecher’s teachings to Shaffer’s system because Shaffer teaches magnetic sensors and Steinbrecher provides further details of known implementations of such sensors, for the same or similar application. Ex-1003-Shaffer, ¶63 (“***magnetic sensors that detect when the earbud is in (or out of) the aperture [of the magnetic storage case]***”); Ex-1006-Steinbrecher, ¶¶20, 25 (“***When placed in a storage case, the microswitch configured as a reed contact is actuated by means of a built-in permanent magnet.***”). Moreover, in the modified system,

Steinbrecher's reed contact-based sensor would be used for its intended purpose of detecting the presence or absence of a magnetic field applied to the **earpieces** so as to disconnect the battery from the earpiece circuitry when the **earpieces** are placed in a magnetic storage case. Ex-1002-Kiaei-Decl., ¶131.

2. **Claim 11: The wireless earpiece of claim 10, wherein the magnetic field is applied by a smart case configured to receive the wireless earpiece, and wherein the smart case powers the wireless earpiece when received in the smart case.**

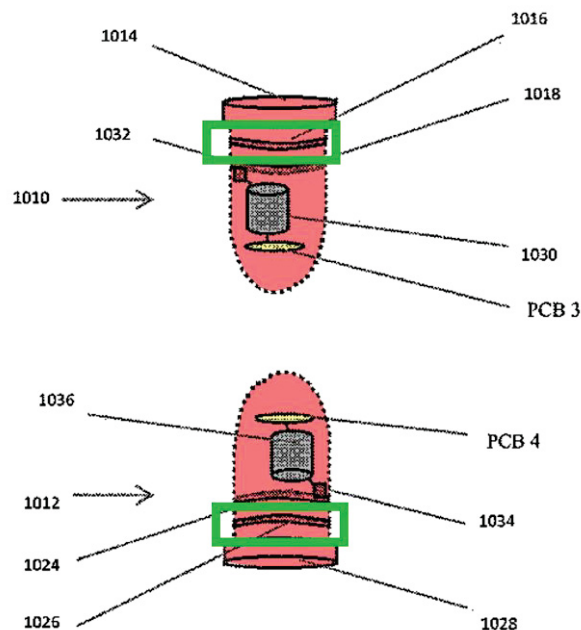
As explained above for Claim 4, Shaffer discloses that the magnetic field is applied by a magnet of a smart case (e.g., **storage case**) configured to receive the wireless earpieces (e.g., **earbuds 1010 and 1012**). Shaffer further discloses that *the smart case powers the wireless earpieces when received in the smart case*. See, e.g., Ex-1003-Shaffer, ¶¶6 (“*transfer an electrical charge from a power source to an **earbud** when the earbud is positioned within the aperture [of the **storage case**]*”), 53, Claim 1. Ex-1002-Kiaei-Decl., ¶132.

3. **Claim 12: The wireless earpiece of claim 10, further comprising: magnetic contacts in connection with the circuitry and the battery that interface with a smart case to charge the battery.**

As discussed above for Claim 7, Shaffer discloses magnetic contacts (e.g., **magnetic rings 1016 and 1026**) that interface with a smart case (e.g., **storage case**; see Claims 4 and 11). Shaffer further discloses that (a) the **magnetic contacts** are in

connection with the circuitry (e.g., **PCBs 3 and 4**) and the battery (e.g., batteries 1030 and 1034) and (b) the **magnetic contacts** interface with the **smart case** to charge the battery. Ex-1002-Kiaei-Decl., ¶133.

First, Shaffer discloses that the **magnetic rings 1016 and 1026** are located within **earbuds 1010 and 1012**, such that they are in connection with the **PCB circuitry** and batteries 1030 and 1034.



Ex-1003-Shaffer, Figure 10, ¶¶62 (“The **earbuds** are outfitted with **magnetic rings 1016 and 1026**”), *id.* (“**earbuds 1010 and 1012** include earbud rechargeable batteries 1030 and 1036”), 63 (“These components may be connected to printed circuit boards **PCB 3 and PCB 4** within the **earbuds**”). Ex-1002-Kiaei-Decl., ¶133.

Second, Shaffer discloses that the magnetic rings 1016 and 1026 interface with the smart storage case to charge batteries 1030 and 1034. Ex-1003-Shaffer at ¶42 (“the aperture magnetic contact strips 41 and 42 [of the smart storage case] may also serve as electrical contacts, *delivering charge directly to [batteries 1030 and 1036 via] the earbud magnetic contact strips [(e.g., magnetic rings 1016 and 1026)]*”). Ex-1002-Kiaei-Decl., ¶134.

4. Claim 14: The wireless earpiece of claim 10, wherein the wireless earpiece alters a power level of the wireless earpiece in response to the reed switch detecting the magnetic field.

As discussed in Element [10C], Shaffer in view of Steinbrecher discloses that the wireless earpiece (e.g., Shaffer’s earbuds 1010 and 1012) alters the power level of the earpiece (e.g., places the hearing aid circuitry in a low-energy consumption idle mode) in response to the reed switch (e.g., Steinbrecher’s reed contact) detecting the magnetic field. *See* Section IX.F.1(d); *see also* Section IX.D.1(c). A POSITA would have been motivated to modify Shaffer in view of Steinbrecher as explained for Element [10C] (*see* Section IX.F.1(d)(iii)). Ex-1002-Kiaei-Decl., ¶135.

5. **Claim 16: The wireless earpiece of claim 10, wherein the circuitry includes logic that alters a power state of the wireless earpiece in response to detecting the magnetic field and a startup process in response to not detecting the magnetic field after having detected the magnetic field.**

Shaffer in view of Steinbrecher discloses these limitations. Ex-1002-Kiaei-Decl., ¶136.

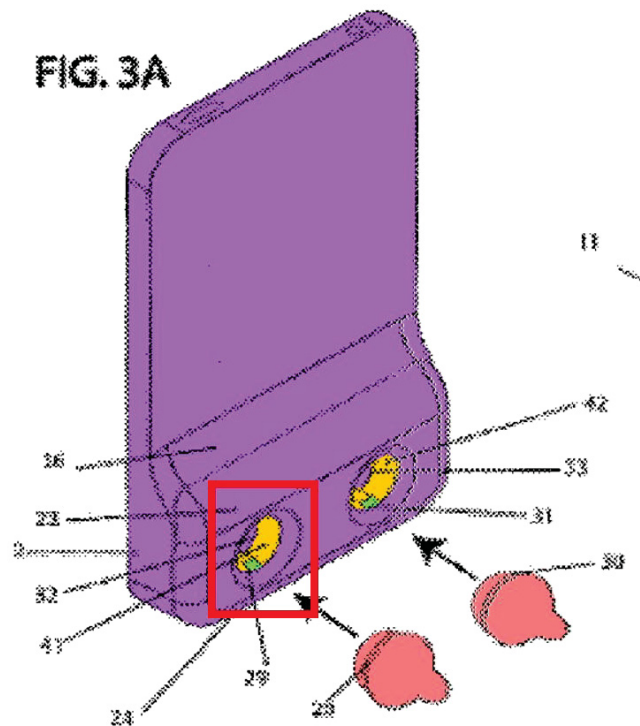
First, as discussed in Element [10C], Shaffer in view of Steinbrecher discloses that the circuitry (e.g., PCB 3 and PCB 4) includes logic (e.g., embedded firmware) that alters a power state of the wireless earpieces (e.g., by placing the earpiece circuitry in a low-energy consumption idle mode) in response to detecting the magnetic field. *See* Section IX.F.1(d); *see also* Ex-1003-Shaffer at ¶63, Section IX.D.1(b-c) (discussing the power states of the wireless earpieces). Ex-1002-Kiaei-Decl., ¶136.

Second, Shaffer in view of Steinbrecher discloses a startup process (e.g., powering on the earpieces) in response to not detecting the magnetic field after having detected the magnetic field—that is, upon removing the earpieces from the magnetic storage case such that they no longer detect the magnetic field applied by the storage case. *See* Section IX.F.1(d); *see also* Ex-1003-Shaffer at ¶63 (“*automatically trigger on when the earbuds are removed from the earbud apertures [of the storage case]*”), Section IX.D.1(b-c). Ex-1002-Kiaei-Decl., ¶137.

6. **Claim 17**

- (a) [17Preamble] A system comprising the wireless earpiece of claim 10, wherein the wireless earpiece is a left earpiece and a smart case for charging the left earpiece, the smart case comprising:

As explained above for Elements [1Preamble], [10Preamble], and claims 4 and 11, Shaffer discloses a system that includes a left earpiece (e.g., a pair of earbuds 1010 and 1012, one of which is a left earpiece) and a smart case for charging the left earpiece. For example, the storage case includes two apertures, such that the left aperture (shown in the red box) is used for charging the left earpiece.



See Ex-1003-Shaffer, Figure 3A, Figure 10, ¶¶6 (“a case for a mobile electronic device includes a housing and one or more earbud receiving apertures [(i.e.,

receptacles)J”), 34, 40 (“*insert a rechargeable earbud* into each of the earbud apertures 32 and 33 [of the *storage case*] to *provide electrical charge*”). Ex-1002-Kiaei-Decl., ¶138.

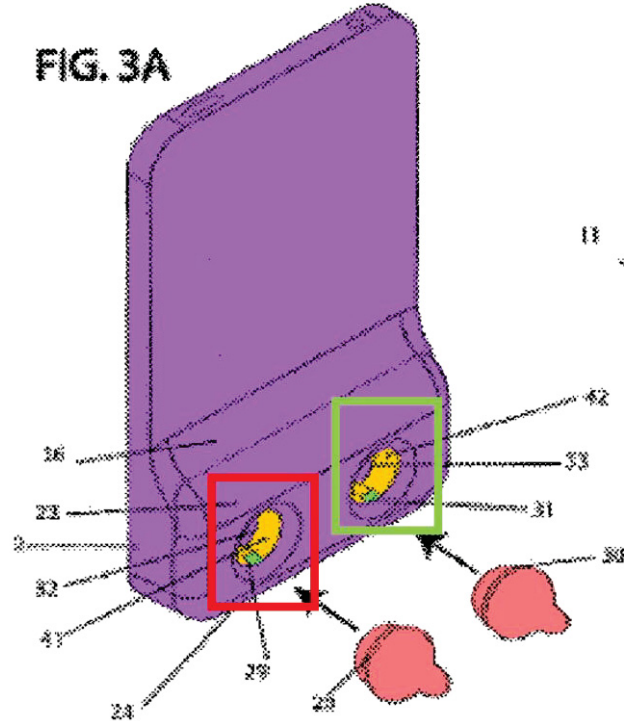
(b) [17A] a smart case housing;

Shaffer’s smart case (*storage case 11*) includes a smart case housing. Ex-1003-Shaffer, ¶¶6 (“*a case for a mobile electronic device includes a housing*”), 36, 41, 60, 61, Claims 1 and 12. Ex-1002-Kiaei-Decl., ¶139.

(c) [17B] a first receptacle for receiving the left earpiece disposed within the smart case housing;

(d) [17C] a second receptacle for receiving a right earpiece disposed within the smart case housing;

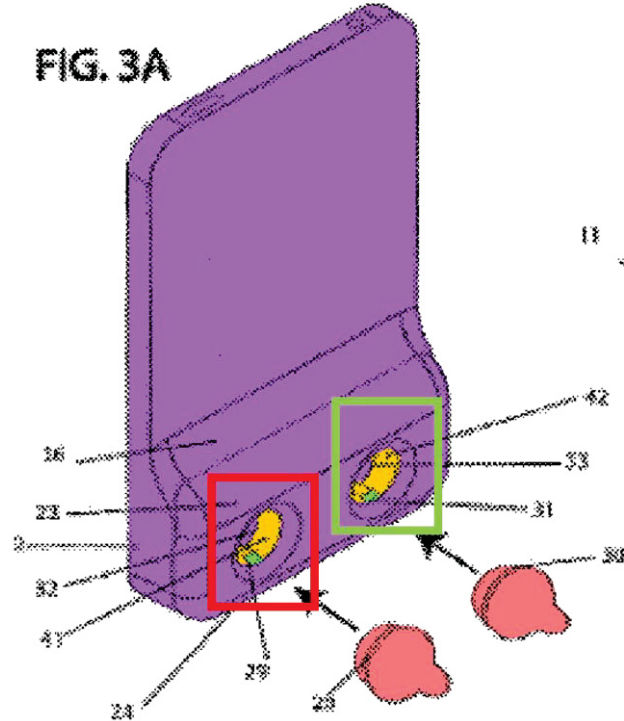
Shaffer’s smart case (e.g., *storage case 11*) includes a first receptacle (aperture 32, red box) and a second receptacle (aperture 33, green box) for receiving the left and right earpieces, respectively. Both receptacles are disposed within the smart case housing.



Ex-1003-Shaffer, Figure 3A, Figure 10, ¶6 (“*a case for a mobile electronic device includes a housing and one or more earbud receiving apertures [(i.e., receptacles)]*”), 36, 40, 41, 60, 61, Claims 1 and 12. Ex-1002-Kiaei-Decl., ¶140.

- (e) [17D] a first interface associated with the first receptacle for electrically connecting the smart case to the left earpiece;
- (f) [17E] a second interface associated with the second receptacle for electrically connecting the smart case to the right earpiece;

Shaffer’s smart case (e.g., **storage case 11**) includes first and second interfaces (e.g., **electrical contacts 29 and 31**) associated with the first and second receptacles (e.g., apertures 32 and 33) for electrically connecting the **smart case** to the **left and right earpieces**, respectively.

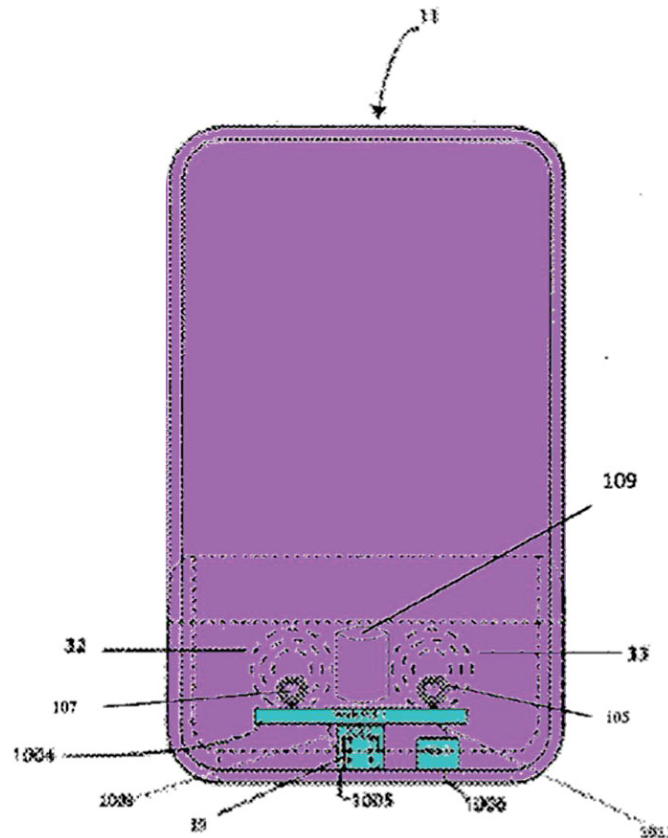


Ex-1003-Shaffer, Figure 3A, Figure 10, ¶¶6, 36, 40 (“a rechargeable **earbud** into each of the earbud apertures 32 and 33 [red and green boxes] to provide electrical charge via the **earbud electrical contacts 29 and 31**”), 41, 60, 61, Claims 1 and 12.

Ex-1002-Kiaei-Decl., ¶141.

- (g) [17F] an intelligent control disposed within the smart case housing and operatively connected to the first interface and the second interface.

As explained above for Claim 4 and Element [17Preamble], Shaffer’s **storage case** is a “smart” case that includes one or more intelligent controls (e.g., **PCBs 1004, 1005, and 1006**) disposed within the smart case housing.



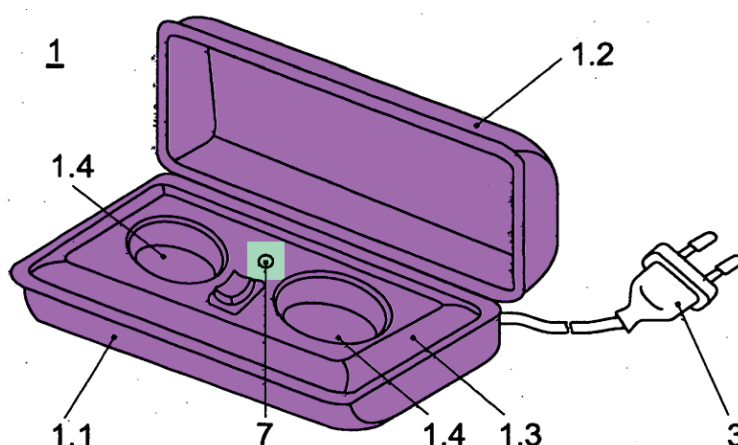
Ex-1003-Shaffer, Figure 4, ¶48 (“**PCB1 1004** ... may contain such items as *a controller, firmware, an authentication chip, and a battery charging circuit*. **PCB2 1005** may contain a case connector, such as a *30-pin connector, Lightning connector* or other connector. **PCB3 1006** may contain the *USB connector*.”). Ex-1002-Kiaei-Decl., ¶142.

Shaffer further discloses that the **intelligent PCB controls** are operatively connected to the first and second interfaces (e.g., **electrical contacts**; see Elements [17D]-[17E]). See, e.g., Ex-1004-Shaffer, ¶48 (“**Main PCB1** ... may transfer

electrical charge to and from the rechargeable ear bud batteries 39 and 27 via earbud electrical contacts 48 and 49”). Ex-1002-Kiaei-Decl., ¶143.

7. 18. The system of claim 17 wherein the smart case further comprises a display.

Steinbrecher discloses that the smart case (e.g., charging shell 1) comprises a display (e.g., output device 7).



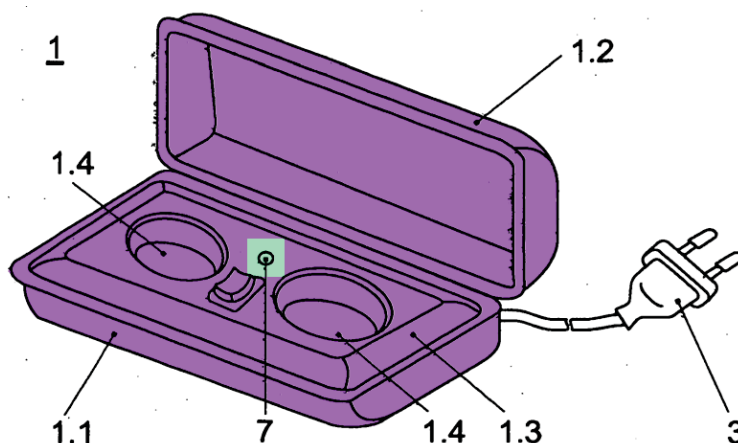
Ex-1006-Steinbrecher, Figure 1, ¶¶24 (“An output device 7 is used in order to display the state of charge or information about the remaining life expectancy of a battery A in a hearing aid H that may have been inserted”), 8, 14 (“In particular, the output device can be an LED, an LED matrix, or another optical display, because this form of output is particularly eye-catching”), 15, 26, Figures 3 and 4. Ex-1002-Kiaei-Decl., ¶144.

A POSITA would have been motivated to modify Shaffer in view of Steinbrecher as described for Element [10C]. Furthermore, a POSITA would have

been motivated to modify Shaffer's **storage case** to use Steinbrecher's display (e.g., **output device 7**) as this would have provided the **storage case** with the ability to “display the state of charge or information about the remaining life expectancy of a battery” in a manner that is “particularly eye-catching.” Ex-1006-Steinbrecher, ¶¶14, 24. A POSITA would have modified Shaffer in view of Steinbrecher with a reasonable expectation of success given that Shaffer's **storage case** is already used to charge wireless earpieces. Steinbrecher's **display** would therefore be used for its intended purpose of displaying information related to charging wireless earpieces to a user. Ex-1002-Kiaei-Decl., ¶145.

8. **19. The system of claim 18 wherein the display is moveably connected to the smart case to transition from a first position to a second position.**

As explained for Claim 18, Figure 1 of Steinbrecher depicts a display (**output device 7**) built into the bottom part 1.1 of a smart case (**charging shell 1**).



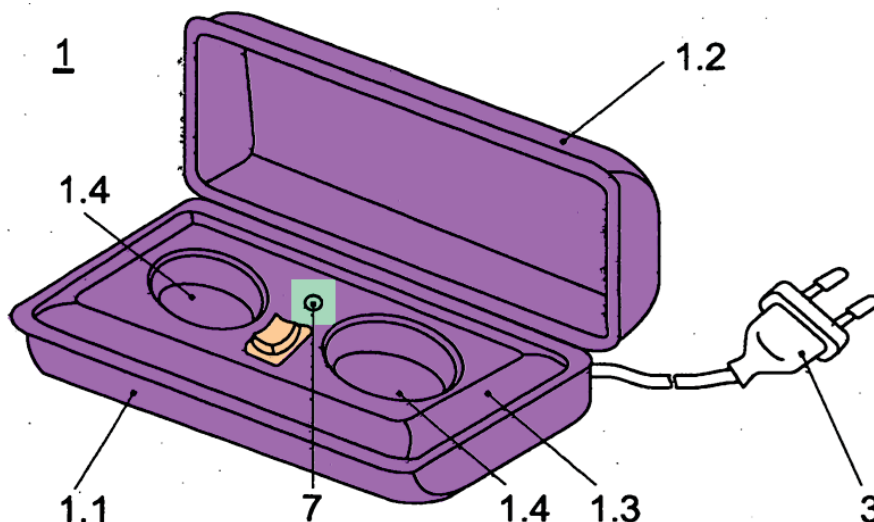
Ex-1006-Steinbrecher, Figure 1. However, an obvious alternative arrangement would have been to incorporate the display into the lid 1.2 of **charging shell 1**, which would have been readily accomplished either by modifying the placement of **output device 7** or adding another display element. In this arrangement, the additional display would be movably connected (e.g., via a hinge of lid 1.2) to **charging shell 1** to transition from a first position (open) to a second position (shut). Ex-1002-Kiaei-Decl., ¶146.

A POSITA would have been motivated to modify Shaffer's storage case to include a display mounted on a movable lid, as disclosed by Steinbrecher. Adding a lid to Shaffer's storage case would have provided the obvious benefit of protecting the earpieces when the earpieces are placed in the case and protecting the receptacles when the earpieces are not in the case (i.e., the ordinary function of a lid). Moreover, there are a limited number of exterior surfaces the storage case to place the display, such that placing the display on the lid would have been among a finite number of known alternatives. This placement would have yielded the predicted result of allowing a user to view the display when the lid is shut. Moreover, a POSITA would have added the lid and display to Shaffer's storage case with a reasonable expectation of success given that Steinbrecher already discloses storage case with a lid 1.2 and display (**output device 7**), and in the modified teachings of Shaffer they

would be used in the same manner and for the same purpose in Shaffer's storage case. Ex-1002-Kiaei-Decl., ¶147.

9. 20. The system of claim 19 wherein the smart case further comprises at least one manual input for receiving user input to provide additional functionality.

Steinbrecher discloses that the smart case (e.g., **charging shell 1**) comprises a manual input (e.g., a **button or switch**) for receiving user input to provide additional functionality.



Ex-1006-Steinbrecher, Figure 1. For example, the **button or switch** shown in Figure 1 would have been understood to function as an on/off switch, a button to toggle among different types of information displayed via **output device 7**, or similar well-known functions. *See, e.g., id.*, ¶24 (“An output device 7 is used in order to display the state of charge *or* information about the remaining life expectancy of a battery A in a hearing aid H that may have been inserted.”). Ex-1002-Kiaei-Decl., ¶148.

A POSITA would have been motivated to modify Shaffer in view of Steinbrecher as described for Element [10C] and Claim 18. Furthermore, modifying Shaffer's storage case to use Steinbrecher's manual input (e.g., button or switch) would add desirable functionality—manual user controls—to the storage case, and this functionality would be used for the same intended purpose for which it is used in Steinbrecher's charging shell 1. Ex-1002-Kiaei-Decl., ¶149.

10. Claim 21

- (a) [21Preamble] A system comprising:
- (b) [21A] a first wireless earpiece, comprising:
- (c) [21B] circuitry operating the first wireless earpiece;
- (d) [21C] a battery powering the circuitry of the first wireless earpiece; and
- (e) [21D] a switch connecting the battery to the circuitry, wherein the switch connects the circuitry to the battery when a magnetic field is not detected, and wherein the switch disconnects the circuitry from the battery when a magnetic field is detected;
- (f) [21E] a smart case for charging the first wireless earpiece and a second wireless earpiece, the smart case comprising:
- (g) [21F] a smart case housing;
- (h) [21G] a first receptacle for receiving the first wireless earpiece disposed within the smart case housing;
- (i) [21H] a second receptacle for receiving the second wireless earpiece disposed within the smart case housing;
- (j) [21I] a first interface associated with the first receptacle for electrically connecting the smart case to the first earpiece;
- (k) [21J] a second interface associated with the second receptacle for electrically connecting the smart case to the second earpiece;
- (l) [21K] an intelligent control disposed within the smart case housing and operatively connected to the first interface and the second interface.

According to the applicant, the scope of Claim 21 is substantially the same as, or broader than, Claim 17. Ex-1008-FH [PDF215] (8/2/2017 RCE Amendment at

7). Accordingly, Shaffer in view of Steinbrecher discloses the limitations of Claim 21 for at least the same reasons that it discloses the corresponding limitations of Claim 17 and Claim 10, from which Claim 17 depends. Elements [10Preamble]-[10C], [17Preamble]-[17F]. Ex-1002-Kiaei-Decl., ¶150.

G. Ground 7

Shaffer in view of Steinbrecher and Sorensen renders claims 11-13, 15, and 17-21 obvious. Ex-1002-Kiaei-Decl., ¶151.

1. Claims 11, 12, and 17-21

Each of claims 11, 12, and 17-21 recites a “smart case.” Accordingly, Shaffer in view of Steinbrecher and Sorensen discloses these limitations for the same reasons provided for claims 4, 6, and 7. *See* Section IX.E.1. Ex-1002-Kiaei-Decl., ¶152.

2. Claim 13: The wireless earpiece of claim 12, wherein the wireless earpiece synchronizes data with the smart case.

Shaffer in view of Steinbrecher and Sorensen discloses these limitations for the same reasons provided for claim 8. *See* Section IX.E.2. Ex-1002-Kiaei-Decl., ¶153.

3. Claim 15: The wireless earpiece of claim 10, wherein the wireless earpiece updates software of the wireless earpiece in response to detecting the magnetic field.

As explained for Element [10C], Shaffer in view of Steinbrecher discloses detecting a magnetic field applied to a wireless earpiece. *See* Section IX.F.1(d).

Shaffer in view of Steinbrecher and Sorensen further discloses *updating software of the wireless earpiece* in response to detecting the magnetic field. Ex-1002-Kiaei-Decl., ¶154.

First, Sorensen discloses updating software of the wireless earpiece (**hearing instrument 10**) when the earpiece is placed in the storage case (**charging station**). Ex-1005-Sorensen, 2:3-8, 3:22-42 (“the system is adapted to provide that a connection to a server is established ... to check for updates for the hearing instrument basic data and/or software, when the **hearing instrument** is mounted in the **charging station**”). Ex-1002-Kiaei-Decl., ¶154.

Second, as explained above, Shaffer in view of Steinbrecher discloses determining that the earpieces are in the storage case by detecting a magnetic field is applied to the earpieces. *See* Section IX.F.1(d). Thus, modifying the teachings of Shaffer and Steinbrecher to use the software update capabilities of Sorensen results in a system in which the earpiece software is updated in response to detecting the magnetic field. A POSITA would have been motivated to modify Shaffer in view of Steinbrecher and Sorensen as described in Sections IX.F.1(d)(iii) and IX.G.1. Ex-1002-Kiaei-Decl., ¶155.

X. CONCLUSION

Petitioner respectfully requests institution of IPR to cancel claims 1-21.

Respectfully submitted,

/Haixia Lin/

Haixia Lin

Registration No. 61,318

Table of Exhibits for U.S. Patent 9,843,853 Petition for *Inter Partes* Review

Exhibit	Description
1001	U.S. Patent No. 9,843,853 (“’853 patent”)
1002	Declaration of Sayfe Kiaei, Ph.D.
1003	U.S. Patent Application Publication No. 2015/0245126 (“Shaffer”)
1004	Certified English translation of DE Patent Application No. 102007039455 (“Hain”)
1005	U.S. Patent No. 8,265,315 (“Sorensen”)
1006	Certified English translation of EP Patent Application No. 1727395 (“Steinbrecher”)
1007	GB Patent Application No. 1254017 (“Brown”)
1008	File History for U.S. Patent No. 9,843,853 (“’853 FH”)
1009	DE Patent Application No. 102007039455 (original German version of Hain)
1010	Affidavit of James Doing (Certificate of Translation for Hain)
1011	EP Patent Application No. 1727395 (original German version of Steinbrecher)
1012	Affidavit of James Doing (Certificate of Translation for Steinbrecher)
1013	U.S. Patent Application Publication No. 2013/0007484
1014	Colburn, “The Resilience of the Reed Relay,” IEEE Spectrum (August 28, 2015) [https://spectrum.ieee.org/the-resilience-of-the-reed-relay]
1015	U.S. Patent No. 2,264,746
1016	Hamlin Application Note AN104: Reed Switch and Reed Sensor Activation (2008) [https://www.sparkfun.com/datasheets/Components/Buttons/AN104.pdf]

CERTIFICATE OF SERVICE

I hereby certify that on July 13, 2023, I caused a true and correct copy of the foregoing materials:

- Petition for *Inter Partes* Review of U.S. Patent No. 9,843,853
- Table of Exhibits
- Exhibits 1001-1016
- Word Count Certificate of Compliance
- Fee Authorization
- Power of Attorney

to be served via electronic mail at the addresses listed below. These email addresses include addresses for the attorney of record for the '853 patent as listed on USPTO Patent Center and who have agreed to electronic service:

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Respectfully Submitted

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Registration No. 74,075

WORD COUNT CERTIFICATE OF COMPLIANCE

I hereby certify that the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 9,843,853 contains 13,745 words as measured by the word processing software used to prepare the document, in compliance with 37 C.F.R. § 42.24(d).

Respectfully submitted,

Dated: July 13, 2023

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