

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BOSE CORPORATION,
Petitioner,

v.

INGENIOSPEC, LLC,
Patent Owner.

Case No. IPR2025-01550
Patent No. 12,044,901

DECLARATION OF ANDREW P. DEJACO

Bose Exhibit 1003 Bose v. IngenioSpec
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I, Andrew P. DeJaco, declare:

1. I have been retained by Wolf, Greenfield & Sacks, P.C., counsel for Petitioner Bose Corporation, to assess claims 1-52 (the “challenged claims”) of U.S. Patent No. 12,044,901 (“the ’4901 patent”). I am being compensated for my time at my standard rate of \$350.00 per hour, plus actual expenses. My compensation is not dependent in any way upon the outcome of the *inter partes* review of the ’4901 patent.

I. PERSONAL AND PROFESSIONAL BACKGROUND

2. I received a Bachelor of Science in Electrical Engineering from the University of Dayton in 1986. I received a Master of Science in Electrical Engineering from the University of Michigan in 1989. During my time at the University of Michigan, I completed all the required coursework for a Ph.D. in Digital Signal Processing and Communication.

3. From 1991 to 1997 I worked as an Electrical Engineer for Qualcomm focusing on the research, development, and implementation of digital signal processing algorithms. From 1997 to 2003 I worked as a Vice President of Engineering for Qualcomm, directing the functional group covering voice processing, digital media and digital signal processing needs in a cell phone, in addition to the electro-acoustic systems required in the handset and carkit products that included microphones, speakers, and dual mic noise suppression designs.

4. I am currently self-employed as a business broker and advisor having a franchise with WebsiteClosers LLC. From 2013 to January 2021, I was a co-owner of Judee's Gluten Free Ingredient brand where we doubled Amazon sales each year from 2013-2020 and sold the brand in 2021. From 2003 to June 2012, I taught High School Advanced Placement Calculus/Statistics and Computer Science at St. Charles Preparatory School in Bexley, Ohio.

5. I have over 15 years of experience working in the field of digital signal processing. This includes algorithmic development, product implementation and testing, as well as system wide testing and optimization. I have designed and built speech coders ranging in bit rates from 600 bits per second for military use up to 13000 bits per second for high quality CDMA cellular applications. I have improved coding techniques using Multi-pulse, LPC, RELP, and CELP coding structures and have many patents in the area of variable rate speech coding techniques for CDMA cellular use. These patents include handling severe background noise using speech enhancement techniques, detecting voice activity (VAD) in noisy cellular environments, protecting against channel errors, and optimizing speech quality at the lowest average encoding rate possible. I have participated in speech coding standardization processes and have authored coding standards for CDMA for the IS96-A, IS-733 speech codecs, and the IS-125 speech coding performance specification.

6. My curriculum vitae is provided as Exhibit 1004.

II. MATERIALS REVIEWED AND CONSIDERED

7. In forming my opinions, I have reviewed the following documents, and any other document cited in this declaration:

Exhibit	Description
1001	U.S. Patent No. 12,044,901
1002	Prosecution History of U.S. Patent No. 12,044,901
1005	WIPO Patent Application Publication No. WO 02/39600 A2 (“Griffin”)
1006	U.S. Patent No. 7,925,029 (“Hollemans”)
1008	WIPO Patent Application Publication No. 01/063888 (“Irvin”)
1009	U.S. Patent Application Serial No. 11/580,222 (“the ’222 Application”)
1010	U.S. Patent Publication 2007/0046887 (“Howell-887”)
1011	U.S. Patent Application Serial No. 11/891,411 (“the ’411 Application”)
1013	U.S. Patent Application Serial No. 10/822,218 (“’218-Application”)
1026	U.S. Patent Application Serial No. 11/183,283 (“’283-Application”)
1027	U.S. Patent Application Serial No. 11/183,262 (“’262-Application”)
1028	U.S. Patent Application Serial No. 11/078,857 (“’857-Application”)
1029	U.S. Patent No. 6,289,100 (“Ritter”)
1030	U.S. Patent No. 8,346,324 (“Lowles”)
1031	U.S. Patent No. 4,791,673 (“Schreiber”)
1032	U.S. Provisional Application 60/562,798 (“’798-Provisional”)
1033	U.S. Provisional Application 60/647,826 (“’826-Provisional”)
1034	U.S. Provisional Application 60/846,150 (“’150-Provisional”)
1035	U.S. Patent No. 3,786,391
1036	WIPO Patent Application Publication No. 2005/053289
1037	U.S. Patent Publication No. 2006/0003803
1039	U.S. Patent No. 5,330,226 (“Gentry”)
1040	U.S. Patent No. 6,507,773 (“Parker”)

Exhibit	Description
1041	U.S. Patent No. 5,400,244 (“Watanabe”)
1042	U.S. Patent No. 5,132,523 (“Bassett”)
1043	Application GB2,318,825 (“Wynne”)

8. I have also relied on my education, experience, research, training, and knowledge in the relevant art, and my understanding of any applicable legal principles described in this declaration.

III. MY UNDERSTANDING OF PATENT LAW

9. In developing my opinions, I discussed various relevant legal principles with Petitioner’s attorneys. Though I do not purport to have prior knowledge of such principles, I understood them when they were explained to me and have relied upon such legal principles, as explained to me, in the course of forming the opinions set forth in this declaration. My understanding in this respect is as follows:

10. I understand that “*inter partes* review” (IPR) is a proceeding before the United States Patent & Trademark Office for evaluating the patentability of an issued patent’s claims based on prior-art patents and printed publications.

11. I understand that, in this proceeding, Petitioner has the burden of proving that the challenged claims of the ’4901 patent are unpatentable by a preponderance of the evidence. I understand that “preponderance of the evidence” means that a fact or conclusion is more likely true than not true.

12. I understand that, in IPR proceedings, claim terms in a patent are given their ordinary and customary meaning as understood by a person of ordinary skill in

the art (“POSA”) in the context of the entire patent and the prosecution history pertaining to the patent. If the specification provides a special definition for a claim term that differs from the meaning the term would otherwise possess, the specification’s special definition controls. If a claim element is expressed as a “means” for performing a specified function, I understand that it covers the corresponding structure described in the specification and equivalents of the described structure. I have applied these standards in preparing the opinions in this declaration.

13. I understand that determining whether a particular patent or printed publication constitutes prior art to a challenged patent claim can require determining the effective filing date (also known as the priority date) to which the challenged claim is entitled. I understand that for a patent claim to be entitled to the benefit of the filing date of an earlier application to which the patent claims priority, the earlier application must have described the claimed invention in sufficient detail to convey with reasonable clarity to the POSA that the inventor had possession of the claimed invention as of the earlier application’s filing date. I understand that a disclosure that merely renders the claimed invention obvious is not sufficient written description for the claim to be entitled to the benefit of the filing date of the application containing that disclosure.

14. I understand that for an invention claimed in a patent to be patentable, it must be, among other things, new (novel—*i.e.*, not anticipated) and not obvious from the prior art. My understanding of these two legal standards is set forth below.

A. Anticipation

15. I understand that, for a patent claim to be “anticipated” by the prior art (and therefore not novel), each and every limitation of the claim must be found, expressly or inherently, in a single prior-art reference. I understand that a claim limitation is disclosed for the purpose of anticipation if a POSA would have understood the reference to disclose the limitation based on inferences that a POSA would reasonably be expected to draw from the explicit teachings in the reference when read in light of the POSA’s knowledge and experience.

16. I understand that a claim limitation is inherent in a prior art reference if that limitation is necessarily present when practicing the teachings of the reference, regardless of whether a person of ordinary skill recognized the presence of that limitation in the prior art.

B. Obviousness

17. I understand that a patent claim may be unpatentable if it would have been obvious in view of a single prior-art reference or a combination of prior-art references.

18. I understand that a patent claim is obvious if the differences between the subject matter of the claim and the prior art are such that the subject matter as a whole would have been obvious to a person of ordinary skill in the relevant field at the time the invention was made. Specifically, I understand that the obviousness question involves a consideration of:

- the scope and content of the prior art;
- the differences between the prior art and the claims at issue;
- the knowledge of a person of ordinary skill in the pertinent art; and
- if present, objective factors indicative of non-obviousness, sometimes referred to as “secondary considerations.” To my knowledge, the Patent Owner has not asserted any such secondary considerations with respect to the ’4901 patent.

19. I understand that in order for a claimed invention to be considered obvious, a POSA must have had a reason for combining teachings from multiple prior-art references (or for altering a single prior-art reference, in the case of obviousness in view of a single reference) in the fashion proposed.

20. I further understand that in determining whether a prior-art reference would have been combined with other prior art or with other information within the knowledge of a POSA, the following are examples of approaches and rationales that may be considered:

- combining prior-art elements according to known methods to yield predictable results;
- simple substitution of one known element for another to obtain predictable results;
- use of a known technique to improve similar devices in the same way;
- applying a known technique to a known device ready for improvement to yield predictable results;
- applying a technique or approach that would have been “obvious to try,” *i.e.*, choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.
- known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art;
- some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior-art reference or to combine prior-art reference teachings to arrive at the claimed invention. I understand that this teaching, suggestion or motivation may come from a prior-art reference or from the knowledge or common sense of one of ordinary skill in the art.

21. I understand that for a single reference or a combination of references to render the claimed invention obvious, a POSA must have been able to arrive at the claimed invention by altering or combining the applied references.

IV. THE PERSON OF ORDINARY SKILL IN THE ART (“POSA”)

22. In rendering the opinions set forth in this declaration, I have been asked to consider the claims of the ’4901 patent and the prior art through the eyes of a POSA. I have considered factors such as the educational level and years of experience of those working in the pertinent art, the types of problems encountered in the art, the teachings of the prior art, patents and publications of other persons or companies, and the sophistication of the technology

23. As I discuss in more detail below in Section V, the ’4901 patent generally relates techniques for integrating electrical components (such as those commonly found in conventional cellular phones) into consumer wearable products like eyeglasses or headphones.

24. I have been instructed to assume a person of ordinary skill in the art is not a specific real individual, but rather a hypothetical individual having the qualities reflected by the factors discussed above.

25. I have been asked to provide my opinions as to the state of the art in this field in the time frame of both 2005 and 2008. I understand that the face of the ’4901 patent indicates an earliest claimed priority date of October 11, 2005, but that

Bose disputes whether the '4901 patent is entitled to a priority date earlier than June 19, 2008. The substantive difference between a person of ordinary skill's knowledge in 2005 versus 2008 is largely immaterial for the purposes of this declaration. Regardless, I apply the knowledge a POSA would have had in 2008 when addressing Ground 1, and then apply the knowledge a POSA would have had in 2005 when addressing Ground 2A-2D.

26. In my opinion, a person of ordinary skill in the art in the 2005 and in 2008 timeframe ("POSA") would have had a Bachelor's or graduate degree in electrical engineering, mechanical engineering, signal processing, or a related field, and at least two years of experience with designing personal wireless communication devices. More education could substitute for experience, and vice versa. This hypothetical person would have been capable of understanding and applying the teachings of the '4901 patent and the prior-art references discussed in this declaration.

27. By 2005, I held a Bachelor of Science degree in Electrical Engineering from the University of Dayton and a Master of Science degree in Electrical Engineering from the University of Michigan, and I had over 15 years of experience with developing and implementing wireless communications in personal communication devices such as hand-held cellphones. Therefore, I was a person of more than ordinary skill in the art during the relevant timeframe. However, I worked

with many people who fit the characteristics of the POSA, and I am familiar with their level of skill. When developing the opinions set forth in this declaration, I assumed the perspective of a person having ordinary skill in the art, as set forth above.

V. THE '4901 PATENT

28. The '4901 patent is directed head-worn personal devices like eyewear with electrical components. 6:57-59. Per the patent, previous “attempts to include electrical components within eyeglasses have had limited success” because “[m]any eyeglass frames tend to be very compact and light-weight and thus may not have a lot of space for electrical components.” 5:63-6:6. The patent also identifies “substantial design tradeoffs” in attaching electrical components to eyeglass frames because they “are often fashionable items whose designs are very important.” 6:6-9.

29. The patent purports to identify ways that electrical components can be added to eyeglass frames “without having to substantially compromise aesthetic design principles of the eyewear.” 8:42-49. The patent discloses a “temple arrangement” that houses electrical components, which can be attached to an eyeglass frame, providing electrical capabilities “to the glasses without burdensome impact to the design of other parts of the frames.” 8:50-9:7, 9:27-65, Fig. 1.

30. While the specification focuses on eyeglasses, the claims recite “*a head-worn personal electronic apparatus.*” Rather than reciting the purportedly

novel temple arrangement for housing electronic components, the claims merely require that the “*apparatus*” somehow “*contain[]*” various electrical components that were common in then-existing consumer devices like wireless headsets.

A. Prosecution History of the ’4901 Patent

31. On December 14, 2023, the Examiner issued rejections under §112(a) because many claim limitations were not supported by the specification. EX1002, 221-223. The applicants amended the specification, adding 59 new paragraphs, and argued that the added matter was found in prior applications that had been incorporated by reference. *Id.*, 534-535. A Notice of Allowance followed. *Id.*, 722.

VI. CLAIM INTERPRETATION

32. I am not aware of any claim terms in the ’4901 patent that either party has claimed needed a formal construction. As such, in my analysis, I applied the plain and ordinary meaning for all claim terms.

VII. THE CHALLENGED CLAIMS ARE UNPATENTABLE IN LIGHT OF THE PRIOR ART IDENTIFIED IN THE PETITION

33. I have been asked to provide my opinion concerning whether claims 1-59 of the ’4901 patent are anticipated and/or would have been obvious to a POSA in light of the prior-art references identified in the Petition.

34. For the reasons explained below, it is my opinion that each of claims 1-59 is anticipated and/or would have been obvious to a POSA.

A. Ground 1: Howell-887, Incorporating or in Combination with its Incorporated Applications Anticipates and/or Renders Obvious Claims 1-59

1. The '222 and '411 Applications Do Not Disclose a “Charging Apparatus”

35. As part of my analysis of Ground 1, I have been asked to analyze Application Serial Nos. 11/580,222 (EX1009, the “'222-Application”) and 11/891,411 (EX1011, “the '411-Application”), both of which I understand the '4901 patent claims priority to. *See* EX1001, 1:7-36, 4:18-40.

36. Specifically, I have been asked to analyze whether either the '222 or '411 Applications provide written description support of the claims of the '4901 patent. I have been further instructed to not consider any material the '222 and '411 Applications attempt to incorporate by reference when performing this analysis.

37. Each of the five independent claims of the '4901 patent (claims 1, 18, 35, 38, and 44) include the same final limitation (the “charging apparatus limitation”):

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

38. It is my opinion, as explained below, that neither the '222 or '411 Applications provide written description support for the charging apparatus limitation.

39. I note that the specification of the '4901 patent appears to provide written description support for the charging apparatus limitation at 32:19-45, in which it discloses:

Another feature of the wireless eyeglasses that may be provided is one or more electrical connections on the frame of the wireless eyeglasses so as to facilitate electrical connection with a battery charger. For example, when the power source for the wireless eyeglasses is a rechargeable battery, the ability to charge the battery without removing the battery from the frame (e.g., arm) of the wireless eyeglasses is advantageous. Hence, in one embodiment, the frame of the eyeglasses includes at least one connector or conductive element (e.g., terminal, pin, pad, trace, etc.) so that the electrical coupling between the rechargeable battery and the charger can be achieved. In this regard, the electrical connector or conductive element is provided on the frame of the eyeglasses and electrically connected to the battery. **The placement of the electrical connector or conductive element on the frame serves to allow the wireless eyeglasses to be simply placed within a charger and consequently have the electrical connector or conductive element be in electrical contact with a counterpart or corresponding electrical connector or conductive element of the charger.**

In one embodiment, the charger can be considered a docking station, upon which the wireless eyeglasses are docked so that the battery within the wireless eyeglasses is able to be charged. Hence, the frame of the wireless eyeglasses can likewise include an electrical connector or conductive element that facilitates electrical connection to the docking station when docked.

40. Neither the '222 nor '411 Applications disclose a “*charging apparatus*” that a personal electronic apparatus is “*placed in*” as claimed in the charging apparatus limitation. Nor do they disclose a “charger” that the wireless eyeglasses can be “place[d] within” or a “docking station” that the eyeglasses can be “docked” upon like the specification of the '4901 patent.

41. Instead, the '222-Application only discloses charging the wireless eyeglasses by a “cable” in the following manner:

FIG. 3F is a diagram of a multi-part temple 1300 according to one embodiment of the invention. The multi-part temple 1300 has a forward part 1302 and a rearward part 1304. The rearward part 1304 is removably connected to the forward part 1302 such that the rearward part 1304 is removable. Once removed, the same rearward part or a different rearward part can be later connected to the forward part 1302. Alternatively, a cable can be connected to the forward part 1302 when the rearward part 1304 is removed. **The cable can facilitate data transfer, battery charging, etc., depending on the electrical components in the forward part 1302.**

'222-Application, [0081] (emphasis added); *see also id.*, [0074] (disclosing that “the rearward part can be removed to...charge a battery (e.g., located in forward or rearward part.)”).

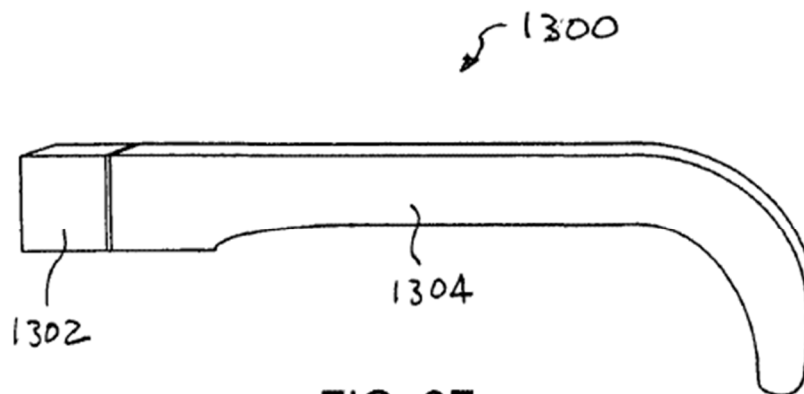


FIG. 3F

42. And the only “charging” disclosed by the '411-Application is found in the following paragraph:

In one embodiment, the pedometer is powered by a battery. The battery can, for example, be rechargeable by way of coupling to a charger through a connector at the glasses or by way of a solar cell. The solar cell can be coupled to or partially embedded in the pair of glasses. In one embodiment, the pair of glasses includes a hatch (e.g., removable cover) that can be opened to replace the battery which is embedded in the pair of glasses.

'411-Application, [0045].

43. In my opinion neither the '222-Application’s disclosure of a “cable” for “battery charging” or the '411-Application’s disclosure of “coupling to a charger

through a connector at the glasses” constitute disclosure of placing the glasses “in” a charging apparatus to charge them as claimed in the charging apparatus limitation. POSAs would understand the difference between charging via an internal connection like a plug, “cable,” or “connector” as disclosed by the ’222-Application and ’411-Application and charging via an external connection like a docking station as claimed by the ’4901 patent. Merely including a conductive connection on the device so that a cable could be connected to charge the rechargeable battery from an externally located charger would not satisfy the device being charged “in a charging apparatus” as disclosed in the 4901 patent. Additionally, a custom charging apparatus that allows the headset to fit within it has some advantages in regards to placement and reliability of the charging station within the users’ environment

44. Thus, it is my opinion that neither the ’222 or ’411 Applications provide written description support for the charging apparatus limitation of the ’4901 patent.

2. Howell-887 and Its Incorporated Applications

45. The published version of the ’222-Application, U.S. Patent Publication 2007/0046887 (“Howell-887,” EX1010) is directed to “[t]echniques for providing eyewear with electrical components” just like the ’4901 patent. Howell-887, Abstract, [0008]; ’4901 Patent, Abstract, 6:57-8.

46. I have been instructed by counsel to treat Howell-887 as prior art to the ’4901 patent.

47. Howell-887 contains disclosure matching, almost identically, much of the text and many figures of the '4901 patent, and *Compare* EX1010, [0043]-[0177], Figs. 1-13C with EX1001, 9:48-31:20, Figs. 1-13C.

48. As such, many of the limitations of the '4901 patent are clearly anticipated by Howell-887 because the exact same disclosure regarding those limitations is provided in Howell-887 as it is in the '4901 specification itself. The remaining portions of the '4901 patent's disclosure relevant to supporting its claims are found in the following applications that Howell-887 incorporates by reference: 11/183,283 ("283-Application") (EX1026); 11/183,262 ("262-Application") (EX1027); 10/822,218 ("218-Application") (EX1013); 11/078,857 ("857-Application") (EX1028); 60/562,798 ("798-Provisional") (EX1032); 60/647,826 ("826-Provisional") (EX1033); 60/846,150 ("150-Provisional") (EX1034) (collectively, the "Incorporated Applications").

49. Because Howell-887 incorporates each of the "Incorporated Applications" by reference, I have been instructed to consider the contents of these references as part of the disclosure of Howell-887 itself. However, I have also been informed that the Patent Owner may dispute that Howell-887 can be considered to include all the contents of the Incorporated References.

50. Thus, I have been requested consider to (1) whether Howell-887 (including the disclosures of the Incorporated References) anticipates and/or renders

obvious the claims of the '4901 patent and (2) whether Howell-887 (not including the disclosure of the Incorporated References) renders the claims of the '4901 patent obvious in combination with the Incorporated References, each of which I have been instructed to consider as a separate prior art reference.

51. It is my opinion that to the extent Howell-887 is considered to include the disclosures of the Incorporated References, it anticipates every claim of the '4901 patent as well as renders every claim obvious.

52. It is my further opinion that even if Howell-887 is considered to not include the disclosures of the Incorporated References, POSAs would find it obvious to combine Howell-887 with the teachings of the Incorporated References and the resulting combination would render obvious each of the claims of the '4901 patent.

53. POSAs would be motivated to combine Howell-887 with each of the Incorporated References because Howell-887 explicitly identifies each of the Incorporated References. *See* Howell-887, [0001]-[0004]. Thus, POSAs would naturally look to these references when considering modifications to the eyeglasses disclosed by Howell-887.

54. Further, like Howell-887 (and the '4901 Patent) each of the Incorporated References are similarly directed to eyeglasses with a speaker and other electronic components.

55. For example, the '150-Provisional is directed to “eyewear having an activity monitoring capability” and discloses including electrical components such as a pedometer and a speaker in the eyeglasses. '150-Provisional, [00041], [0054].

56. Likewise, the '218-Application “relates to eyeglasses and, more particularly, to eyeglasses that include wireless communications capabilities” and discloses various electrical components such as a microphone and speaker within the eyeglasses. '218-Application, [0002]; [0020], [0023].

57. In similar fashion, the '262-Application “relates generally to glasses and more particularly to eyeglasses with hearing-enhanced capabilities” and discloses various electrical components such as a microphone and speaker within the eyeglasses. '262-Application, [0004], [0012]-[0013].

58. And the '283-Application “relates to eyeglasses and, more particularly, to eyeglasses for events” and discloses various electrical components such as a radio, microphone, and speaker within the eyeglasses. '283-Application, [0004], [0012], [0050]-[0051].

59. Likewise, the '798-Provisional is directed to “pair of glasses with one or more embedded or partially embedded electrical components” including a microphone and speaker. '798-Provisional, [0001], [0004], [0008].

60. Similarly, the '826-Provisional is directed to “eyewear and, more particularly, to eyewear with detection capability” and includes various electronic

components such as a UV (ultraviolet) radiation detector, radio, microphone, and speaker in the eyeglasses. '826-Provisional, [0006], [0010], [0077], [00279]-[00280].

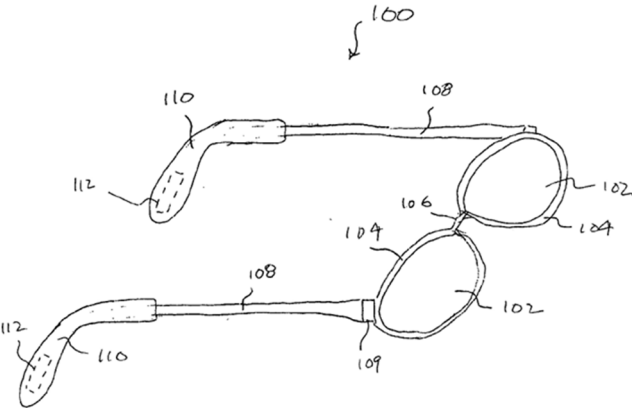
61. Finally, the '857-Application is directed to “components for monitoring radiation” that are “integrated with eyewear” and various electronic components such as a UV radiation detector and speaker are disclosed as being included in the eyewear. '857-Application, [0007], [0078].

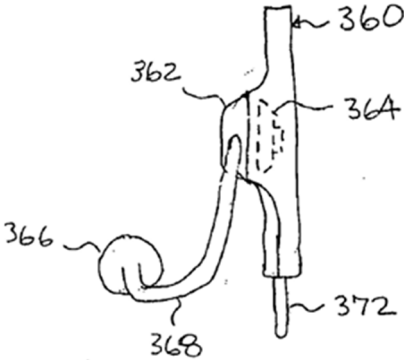
62. Given the similarities between the subject matter of each of the Incorporated References and Howell-887 (i.e. eyeglasses with speakers and other electronic components), POSAs would be motivated to look to the disclosures of the Incorporated References when considering modifying the eyeglasses of Howell-887.

63. Further, POSAs would have a reasonable expectation of success in making such modification given that the electrical components were all well-known in the art, and each of the Incorporated References disclose including such electrical components on eyeglasses similar to those of Howell-887.

64. I have mapped each limitation of the '4901 patent against the disclosures of Howell-887 and the Incorporated References in the chart below. For each citation to Howell-887 and/or the Incorporated References, I include in the third column a corresponding citation to the '4901 specification in which identical or near-identical language is found. This further demonstrates that the disclosures of Howell-

887 and the Incorporated References cover the claims in the same manner as the '4901 specification itself.

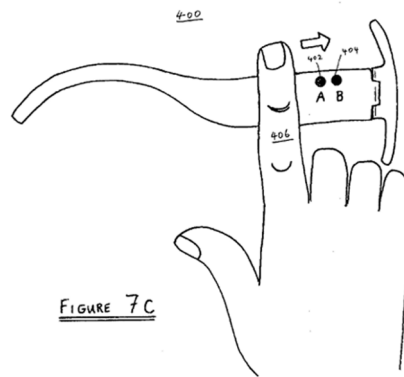
¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
65.	[1PRE] A system, comprising:	<u>Howell-887</u> “The invention can be implemented in numerous ways, including a method, <u>system</u>, device, apparatus, and a computer readable medium.” EX1010, [0014].	7:14-17.
66.	[1A] a head-worn personal electronic apparatus, including at least:	<u>Howell-887</u> “The invention pertains to techniques for providing eyewear with electrical components.” EX1010, [0043].  FIG. 1 EX1010, Fig. 1.	8:40-42; Fig. 1.

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
67.	[1B] a head-worn structure configured to be worn by a user; a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;	<u>Howell-887</u> “An audio sound output by the speaker 364 is coupled to an ear plug 366 by way of the speaker housing 362 and a tube 368. Typically, the tube 368 is a flexible tube, such as a flexible plastic tube. A user of the eyeglasses having the temple arrangement 360 can place the ear plug 366 within her ear to facilitate coupling of the audio sound from the speaker 364 to the ear.” EX1010, [0069].  EX1010, Fig. 3E.	12:41-13:3; Fig. 3E.

68.	[1C] a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user;	<u>Howell-887</u> Howell-887 discloses a “user interface” on the eyeglasses with buttons and/or switches. As discussed below in relation to claim 3, POSAs would have considered the buttons of Howell-887 to be touch-sensitive surfaces in light of the ’4901 specification. “Examples of additional functionality include: global positioning system, antenna, user interface (e.g., buttons, switches, etc), display, microphone, earphone, etc.” EX1010, [0078]. “In a fourth example, in the case of a wireless communication device, the forward part can include a display, while the rearward part can include a battery, an antenna, a wireless module, earphones or earphone connectors, and a user interface. The user interface, for example, can include buttons, which, for example, can facilitate user input with respect to on/off, volume, and accept or decline call.” EX1010, [0079]. <u>’283-Application</u> The ’283-Application also discloses a “switch” on the eyeglasses and further discloses that this “switch” can be activated by a user’s finger being placed over a metallic pad, which changes the capacitance. In another embodiment, the ’283 discloses the switch being activated by a user placing a finger over photodiodes on the frame of the eyeglasses.	38:42-44; 39:64- 40:5; 41:24-40; 43:10-12.
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“[T]he glasses include a switch, which typically is at least partially embedded in the glasses.” EX1026, [0074].

“The switch can be activated depending on electrical forces 158...For example, the capacitance is changed by placing one’s finger over a metallic pad.” EX1026, [0082]; *see also* [0091] (disclosing detection via “two photodiodes, 402 and 404” of a “finger 406 sliding” forward or backward).



EX1026, Fig. 7C.

To the extent that the disclosure of the '283-Application is not considered to be part of Howell-887 via incorporation, POSAs would be motivated to modify the switch of Howell-887 to be either a capacitive or photodiode switch as disclosed in the '283-Application. Doing so would be simple (given that Howell-887 already discloses a user interface with switches) and would provide a convenient user interface where the user does not need to press any buttons.

		Based on the '4901 specification, which discloses identical embodiments, POSAs would understand the capacitive switch and the photodiode switch disclosed in the '283-Application as each being a <i>“touch sensitive surface”</i> that is <i>“configured to sense a touch input associated with the user touch-sensitive surfaces.”</i> <u>'262-Application</u> “[T]he display is a touch-screen display, allowing entries to be entered directly on the display.” EX1027, [0142]. To the extent that the disclosure of the '262-Application is not considered to be part of Howell-887 via incorporation, POSAs would be motivated to modify the user interface of the Howell-887 to include the touch-screen display disclosed by the '262-Application. Doing so would be simple (given that Howell-887 already discloses a user interface and the '262-Application discloses the touch-screen display on similar eyeglasses) and would provide a convenient user interface where the user does not need to press any buttons. Based on the '4901 specification, which discloses an identical embodiment, POSAs would understand the touch-screen display disclosed in the '262-Application as being a <i>“touch sensitive surface”</i> that is <i>“configured to</i>	
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¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
		<i>sense a touch input associated with the user touch-sensitive surfaces.”</i>	
69.	[1D] a rechargeable battery contained within the head-worn structure;	<u>Howell-887</u> Eyeglasses “can include...a rechargeable battery.” EX1010, [0079].	14:38-42.

70.	[1E] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery, and the electronic circuitry being electrically connected to the touch sensitive surface;	<u>Howell-887</u> Howell-887 discloses “electronic circuitry 1348” within the eyeglasses which provide electrical connections for the various components, including the rechargeable battery (<i>see</i> limitation [1D] above), switches, and a circuit board. POSAs would understand that all electrical components within the eyeglasses would need to be connected to this electronic circuitry in order to receive power from the rechargeable battery. For example, POSAs would understand the touch sensitive surface (discussed above in relation to limitation [1C]) would need power to operate and thus would need to be connected to the rechargeable battery and the rest of the electronic circuitry. “In addition, the body 1342 includes at least one conductor 1347 and <u>electrical circuitry 1348 internal to the body 1342</u>. The at least one conductor 1347 can electrically connect the electrical circuitry 1348 with the ear bud 1344, where the at least one conductor 1347 extends through the ear bud arm 1346 to the ear bud 1344....Additionally or alternatively, the electrical circuitry 1348 can, for example, pertain to one or more of a data storage device, <u>battery/power source</u>, a sun sensor, a pedometer, a media player, etc.” EX1010, [0085] (emphasis added). “[A]n electronic component in a temple arrangement, temple adapter or removable temple part interacts with another electronic component in another part (e.g., frame) of the	9:8-20; 15:38-60; 16:6-25; 17:28-45; 27:13-24; 29:66-30:13; Fig. 3J.
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		glasses...For example, a temple of a pair of glasses holds one portion of an electronic circuit. That portion can include generic parts, such as a battery, that are applicable to different applications.” EX1010, [0156]; “In addition, the electrical components can be or pertain to a circuit board or module, which includes a plurality of electrical components.” EX1010, [0047]. “An electrical connection would serve to enable electrical components in the forward part 1322 (or other parts of an eyeglass frame) to electrically connect to electrical components in the rearward part 1324. For example, the electrical connection can provide electrical connections for one or more electrical wires.” EX1010, [0083]; <i>see also</i> [0092]. “More particularly, FIG. 11B illustrates the pair of glasses 1100 illustrated in FIG. 11A where the electrical components 1116 are provided as a module 1122 internal to the extended endpiece 1113. The module 1122 includes a plurality of interconnected electrical components, including the display 1118 and the switches 1120. In addition, the glasses 1100 further include a separate electrical component 1124. As illustrated in FIG. 11B, the separate electrical component 1124 can be provided at the bridge 1106. Still further, a conductive element (e.g., a wire) that electrically connects the module 1122 with the separate electrical component 1124 can be provided internal to the eyeglass frame, namely, internal to the lens holder of 1104.” [0169] (emphasis added).	
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¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
71.	[1F] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and	<u>Howell-887</u> Howell-887 discloses that the electronic circuitry discussed above in relation to limitation [1E] (and which includes the rechargeable battery) includes “<i>wireless communication circuitry</i>” such as “a wireless receiver” and a “wireless module for wireless communications.” EX1010, [0085]. “In addition, the body 1342 includes at least one conductor 1347 and electrical circuitry 1348 internal to the body 1342. The at least one conductor 1347 can electrically connect the electrical circuitry 1348 with the ear bud 1344, where the at least one conductor 1347 extends through the ear bud arm 1346 to the ear bud 1344. Optionally, the body 1342 can further include an antenna 1349 internal to the body 1342. In the case where the electrical circuitry 1348 includes a wireless receiver (e.g., Bluetooth, XM, FM), the antenna 1349 can enhance reception. As an example, the electrical circuitry 1348, can be a wireless module for wireless communications or a receiver for XM or FM signals....[T]he electrical circuitry 1348 can, for example, pertain to one or more of a...battery/power source...” EX1010, [0085].	16:10-25.

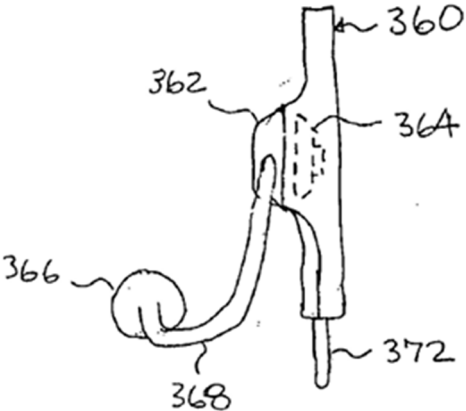
¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
72.	[1G] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and	<u>'218-Application</u> The '218-Application provides the same disclosure of a “charger” that can be a “docking station” as disclosed by the '4901 specification and discussed above. The '218-Application further discloses a “conductive element” such as a “pad” in the frame of the eyeglasses that can be in electrical contact with the charger when the eyeglasses are placed “within” the charger and/or “docked” upon the charger. POSAs would understand that a conductive element “pad” would be <i>“at least partially exposed to enable interconnection therewith.”</i> “Another feature of the wireless eyeglasses that may be provided is one or more electrical connections on the frame of the wireless eyeglasses so as to facilitate electrical connection with a battery charger. For example, when the power source for the wireless eyeglasses is a rechargeable battery, the ability to charge the battery without removing the battery from the frame (e.g., arm) of the wireless eyeglasses is advantageous. Hence, in one embodiment, the frame of the eyeglasses includes at least one connector or conductive element (e.g.,	32:19-45.
73.	[1H] a charging apparatus having at least a charging connector,		

74.	[11] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.	terminal, pin, pad, trace, etc.) so that the electrical coupling between the rechargeable battery and the charger can be achieved. In this regard, the electrical connector or conductive element is provided on the frame of the eyeglasses and electrically connected to the battery. The placement of the electrical connector or conductive element on the frame serves to allow the wireless eyeglasses to be simply placed within a charger and consequently have the electrical connector or conductive element be in electrical contact with a counterpart or corresponding electrical connector or conductive element of the charger.” EX1013, [0055] (emphasis added). “In one embodiment, the charger can be considered a docking station, upon which the wireless eyeglasses are docked so that the battery within the wireless eyeglasses is able to be charged. Hence, the frame of the wireless eyeglasses can likewise include an electrical connector or conductive element that facilitates electrical connection to the docking station when docked.” EX1013, [0056] (emphasis added). To the extent that the disclosure of the ’218-Application is not considered to be part of Howell-887 via incorporation, POSAs would be motivated to modify the eyeglasses of Howell-887 to include the “conductive element” and “charger” of the ’218-Application to allow the eyeglasses to be charged by the “charger” when the eyeglasses are placed in the charger as	
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¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
		disclosed by the '218-Application. Doing so would be simple (given that Howell-887 already discloses a rechargeable battery and the '218 discloses these elements in relation to similar electronic eyeglasses) and would provide a convenient method for charging the Howell-887 eyeglasses without having to remove the rechargeable battery from the frame.	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
75.	[2] A system as recited in claim 1, wherein the sensed touch input by the touch sensitive surface operates to at least alter operation of the head-worn personal electronic apparatus.	<u>'283-Application</u> As explained above in relation to limitation [1C], POSAs would be motivated to modify the switch of Howell-887 to be either a capacitive or photodiode switch (i.e. a “<i>touch sensitive surface</i>”) as disclosed in the '283-Application. The '283-Application further discloses using the switch to alter operation of the eyeglasses such as by turning the speaker on or tuning the frequency of a radio. POSAs would be motivated to include this functionality when modifying the switch of Howell-887. “[T]he switch can be used to turn the speaker on, or to tune the frequency of a radio.” EX1026, [0074]. As further explained above below in relation to claim 3, POSAs would have considered the buttons of Howell-887 to be touch-sensitive surfaces in light of the '4901 specification, and as explained above in relation to limitation [1C], Howell-887 discloses altering the operation of the eyeglasses via its buttons such as with respect to on/off, volume, and accept or decline call. EX1010, [0079].	38:42-45.

76.	[3] A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to support voice calls to the user, and wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.	<u>Howell-887</u> Howell-887 discloses using “buttons” in <i>“accepting or declining a voice call to the user.”</i> “The user interface...can include buttons, which...can facilitate user input with respect to...accept or decline call.” EX1010, [0079]. I note that the specification of the ’4901 patent does not appear to provide any additional disclosure regarding accepting and declining calls beyond disclosure identical to Howell-887 identified above. EX1001, 14:49-58. Thus, in light of the ’4901 specification, POSAs would understand the buttons of Howell-887 to be touch-sensitive surfaces. “The electrical components 1116...include...a plurality of switches 1120 (e.g., buttons).” EX1010, [0168]. Howell-887 further discloses that its switches can be buttons. As discussed above, POSAs would find it obvious to modify the switch of Howell-887 to be either a capacitive or photodiode switch (i.e. a touch-sensitive surface) as disclosed in the ’283-Application. In doing so, POSAs would further find it obvious to map the disclosed functionality of Howell-887’s buttons/switches in accepting/declining voice calls to the capacitive or photodiode switch.	14:49-58; 29:57-59.
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77.	[4] A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.	<u>Howell-887</u> “An audio sound output by the speaker 364 is coupled to an ear plug 366 by way of the speaker housing 362 and a tube 368.” EX1010, [0069].  EX1010, Fig. 3E. “The user interface...can include buttons, which...can facilitate user input with respect to on/off, volume.” EX1010, [0079]. <i>See also</i> EX1010, [0168]. As discussed above in relation to claim 3, POSAs would have considered the buttons of Howell-887 to be touch-sensitive surfaces in light of the '4901 specification. As further discussed above in relation to claim 3, POSAs would find it obvious to map the disclosed functionality of Howell-887's buttons/switches (including “facilitating user input with respect to on/off, volume”) to the capacitive or photodiode switch (i.e. touch-sensitive surfaces).	12:47-52, 14:49-58; 29:57-59, Fig. 3E.
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¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
78.	[5] A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to distinguish at least a direction of the user input with respect to the touch sensitive surface.	As explained above in relation to limitation [1C], POSAs would be motivated to modify the switch of Howell-887 to be either a capacitive or photodiode switch (i.e. a “<i>touch sensitive surface</i>”) as disclosed in the '283-Application and/or to modify Howell-887 to include the touch-screen display disclosed by the '262-Application.	41:24-40.
79.	[6] A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to detect at least a sliding of a finger action with respect to the touch sensitive surface.	POSAs would understand that in each of these embodiments, the headset would be configured to detect forward and/or backward sliding of a finger over the surface, including the direction of the sliding. For example, the '283-Application notes that the photodiode switch can detect both forward and backward sliding motions: “FIG. 7C shows an embodiment 400 again using two photodiodes, 402 and 404, but without a wheel. The two diodes, 402 and 404, are exposed to ambient light unless they are covered. In this embodiment, whether the finger 406 or another object is moving from the first diode 402 to the second diode 404, or from the second diode 404 to the first diode 402 can be determined based on the signals from the diodes. For example, the finger 406 sliding in a forward direction would	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
80.	[7] A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to facilitate determination at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the touch sensitive surface.	trigger a signal from the first diode 402 before the second diode 404. On the other hand, sliding the finger in a backward direction would trigger a signal from the second diode before the first diode. Thus, the outputs from the two diodes can show the direction of movement of the finger. One can then, for example, assign forward movement (from the first 402 to the second 404) as increment, and backward movement (from the second 402 to the first 402) as decrement.” EX1026, [0091].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
81.	[8] A system as recited in claim 1, wherein the head-worn structure comprises: a physical condition sensor at least partially contained within the head-worn structure and configured to acquire data pertaining to a physical condition of the user, the physical condition sensor being provided at least partially contained within the head-worn structure.	<u>Howell-887</u> Howell-887 discloses including a temperature sensor in the eyeglasses, which POSAs would understand to be a “<i>physical condition sensor</i>.” “[O]ne electrical component can be a sensor...to sense the temperature of the wearer.” EX1010, [0120].	20:34-38.

82.	[9] A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises: at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.	<u>Howell-887</u> “In one embodiment, a temple tip, fit-over temple or temple cover according to the invention can further include a connector or cable to facilitate electrical connection with the at least one electrical component that is either attached to a temple or a temple tip or at least partially embedded therein.” EX1010, [0071]. <u>'218-Application</u> “Another feature...is one or more electrical connections on the frame of the wireless eyeglasses so as to facilitate electrical connection with a battery charger.” EX1013, [0055]. <u>'283-Application</u> “The switch in the glasses can...be activated by different type of forces, including...magnetic.” EX1026, [0075]; <i>see also</i> [0081]. As discussed above, in relation limitations [1G]-[1I], to the extent that the disclosure of the '218-Application is not considered to be part of Howell-887 via incorporation, POSAs would be motivated to modify the eyeglasses of Howell-887 to include “conductive element” of the '218-Application. POSAs would be further motivated to include the switch disclosed by the '283-Application that can be activated (thus facilitating an electrical connection) by magnetic forces. Doing so would be simple (given that Howell-887 already discloses a user interface	13:8-13; 32:19-22; 38:51-53; 39:48-63.
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¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
		with switches as discussed above in relation to limitation [1C]) and would provide another option for Howell-887's user interface. I note that the specification of the '4901 patent does not appear to provide any additional disclosure regarding a magnetic element beyond disclosure identical to Howell-887 and the '283-Application identified above. Thus, in light of the '4901 specification, POSAs would understand such disclosure sufficient to anticipate or render obvious this limitation.	

83.	[10] A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises: a microphone at least partially contained within the head-worn structure, wherein the head-worn personal electronic apparatus is configured to receive a voice input via the microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personable electronic apparatus based on the requested operation.	<u>Howell-887</u> “[T]he temple adapter includes...[a] microphone.” EX1010, [0135]. <u>’798-Provisional</u> “In one embodiment, a pair of glasses has access to voice recognition software.” EX1032, [000100]. “[A] pair of glasses allows personalization by including...a system with a microphone and voice recognition software. The user can indicate his preference vocally.” EX1032, [000106]. <u>’826-Provisional</u> “A user can search by the name of the song, the name of the artists or music genre. Entry for the search term can be through voice recognition applications in the glasses.” EX1033, [00299] <u>’262-Application</u> “In yet another embodiment, entries can be selected based on voice recognition.” EX1027, [0142]. To the extent the disclosures of the ’798-Provisional, ’826-Provisional, and/or ’262-Application are not considered to be part of Howell-887 via incorporation, it would have	22:28-35; 38:5-11; 42:48-54; 43:12-26.
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¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
		been obvious to include the voice-recognition technology disclosed by these references in Howell-887's glasses. POSAs would have been motivated to do so to provide another method for users to make selections via the eyeglasses. Further, POSAs would have had a high expectation of likelihood of success of this modification given that the '798-Provisional, '826-Provisional, and '262-Application each disclose this voice-recognition on similar eyeglasses.	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
84.	[11] A system as recited in claim 1, wherein the head-worn structure comprises: a radiation sensor, operatively connected to the rechargeable battery, at least partially contained within the head-worn structure and configured to sense radiation.	<u>Howell-887</u> Howell-887 discloses radiation monitoring circuitry (i.e. a “<i>radiation sensor</i>”) in the eyeglasses, and as discussed above in relation to limitation [1E], POSAs would understand this radiation monitoring circuitry (like other electrical components) would be connected to the rechargeable battery. EX1010, [0155], [0156], [0161]. “As previously noted, the electrical components associated with a temple arrangement, a temple adapter and/or removable temple part can pertain to radiation monitoring circuitry. In such case, the electrical components within the temple arrangement, temple adapter or removable temple part alone or together with eyeglass electrical components can implement a radiation monitoring system. The radiation being monitored can, for example, pertain to one or more of UV, infrared and gamma radiation.” EX1010, [0161].	27:4-20; 27:51-63.

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
85.	[12] A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises: a sensor at least partially contained within the head-worn structure and configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user.	<u>Howell-887</u> “The “being worn” sensor indicates whether the glasses are being worn by its user...for example, a thermal sensor, a motion detector, a stress sensor or a switch.” EX1010, [0125]-[0126].	21:11-20.

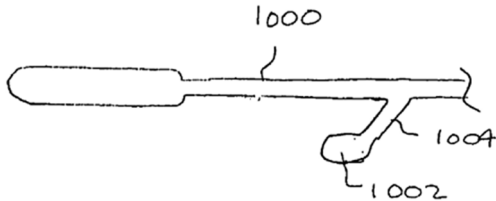
86.	[13] A system as recited in claim 12, wherein the sensor is electrically connected to the electronic circuitry, and wherein the electronic circuitry contained within the head-worn structure of the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.	As discussed above in relation to limitation [1E], POSAs would understand Howell-887's "being worn sensor" (like other electrical components) to be connected to the rechargeable battery. <u>'150-Provisional</u> The '150-Provisional discloses a similar "being-worn switch" that alters the operation of the eyeglasses by determining when to monitor activity and when not to. "[T]he 'being-worn' switch enables the activity monitoring system to automatically determine when to monitor activity and when not to monitor activity. In particular, the activity can be monitored when an eyeglass frame having the activity monitoring system is 'being-worn' and not when the eyeglass frame is not 'being-worn.'" EX1034, [000113]. <u>Howell-887</u> "In yet another embodiment, the electrical components can provide audio player capabilities." EX1010, [0157]. To the extent the disclosure of the '150-Provisional is not considered part of Howell-887, it would have been obvious to include the activity monitoring functionality of the '150-Provisional in Howell-887's glasses and automatically determine whether to monitor activity based on the output of Howell-887's being-worn sensor. POSAs would be motivated to make this	35:9-26.
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		modification in order to provide additional functionality for the eyeglasses (activity monitoring) while also saving battery (by only monitoring activity while the glasses are being worn). POSAs would have a high expectation of success given that Howell-887 already discloses a being-worn sensor and the '150-Provisional's teachings are with regard to extremely similar eyeglasses as disclosed by Howell-887. Alternatively, POSAs would have been motivated based on the '150-Provisional's teaching to have the eyeglasses perform other functionality disclosed in Howell-887 (such as its audio player capabilities) only when the being-worn sensor disclosed in Howell-887 determines that they eyeglasses are being worn. POSAs would be motivated to make this modification in order to saving battery (by only playing audio while the glasses are being worn for example). POSAs would have a high expectation of success given that Howell-887 already discloses a being-worn sensor and the '150-Provisional's teachings are with regard to extremely similar eyeglasses as disclosed by Howell-887. I note that the specification of the '4901 patent does not appear to provide any additional disclosure regarding altering operation of the eyeglasses based on a being-worn sensor beyond disclosure identical to the '150-Provisional identified above. Thus, in light of the '4901 specification, POSAs would understand such	
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¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
		disclosure sufficient to anticipate or render obvious this limitation.	
87.	[14] A system as recited in claim 13, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.	As explained above in relation to claim 2 above, Howell-887 discloses outputting audio via a speaker. As is further discussed in relation to claims 12 and 13 above, Howell-887 discloses a being-worn sensor and in light of the '150-Provisional, it would be obvious to have the eyeglasses perform other functionality disclosed in Howell-887 (such as its audio player capabilities) only when the being-worn sensor disclosed in Howell-887 determines that they eyeglasses are being worn. I note that the specification of the '4901 patent does not appear to provide any additional disclosure regarding altering operation of the eyeglasses based on a being-worn sensor beyond disclosure identical to the disclosure of Howell-887 identified above and the disclosure of the '150-Provisional identified in relation to claim 13 above. Thus, in light of the '4901 specification, POSAs would understand such disclosure sufficient to anticipate or render obvious this limitation.	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
88.	[15] A system as recited in claim 13, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.	<u>Howell-887</u> As discussed above in relation to claims 12-14, Howell-887 discloses a “being-worn sensor.” Howell-887 further discloses a “low-power state” for when sensors (such as the being-worn sensor) are not acquiring data. “For reduced power consumption, the sensors can remain in a low-power state unless data is being acquired by the sensors.” EX1010, [0133]. “In one embodiment, the sensor is a “being worn” sensor.” EX1010, [0126]. I note that the specification of the '4901 patent does not appear to provide any additional disclosure regarding a “low-power state” of the eyeglasses beyond disclosure identical to the disclosure of Howell-887 identified above. Thus, in light of the '4901 specification, POSAs would understand such disclosure sufficient to anticipate or render obvious this limitation.	21:16-20; 22:10-12.

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
89.	[16] A system as recited in claim 1, wherein the system comprises: a Hall effect detector configured to capture data associated with a magnetic characteristic.	<u>'283-Application</u> “The switch can be activated by magnetic forces 156. For example, there can be a magnetic sensor or a Hall effect detector inside a temple proximate to a joint of a pair of glasses.” EX1026, [0081]. To the extent the disclosure of the '283-Application is not considered part of the Howell-887, it would have been obvious to include the Hall effect detector of the '283-Application in Howell-887's glasses. POSAs would have been motivated to make this combination in order to provide an additional type of sensor on Howell-887's eyeglasses. Further, POSAs would have had a high expectation of success given that the '283-Application discloses its Hall effect detector on very similar electronic eyeglasses.	39:48-63.

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
90.	[17] A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises: a bone conducting element at least partially contained within the head-worn structure and configured to operate in accordance with acoustic characteristics, the bone conducting element being operatively connected to the electronic circuitry.	<u>Howell-887</u> “The temple 1000 includes a bone conducting element 1002 that can provide audio sound to a user by coupling vibrations to at least one bone of the user’s face.” EX1010, [0147]; <i>see also</i> [0146] (“electrical signals would be internally or externally supplied to the bone conducting element.”).  FIG. 10A EX1010, Fig. 10A. <i>See also</i> EX1010, [0146]-[0149], Figs. 10B-10C. As discussed above in relation to limitation [1E], POSAs would understand this bone conducting element (like other electrical components) would be connected to the electronic circuitry in order that it could receive electrical signals as disclosed and/or so that it could receive power from the rechargeable battery.	25:22-52; Figs. 10A-10C.

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
91.	[18PRE] A system, comprising:	As the language of these limitations is identical or nearly identical to limitation [1PRE], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1PRE].	
92.	[18A] a head-worn personal electronic apparatus, including at least:	As the language of these limitations is identical or nearly identical to limitation [1A], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1A].	
93.	[18B] a head-worn structure configured to be worn by a user; a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent to an ear of the user when the head-worn structure is being worn by the user;	As the language of these limitations is identical or nearly identical to limitation [1B], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1B].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
94.	[18C] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;	<u>'262-Application</u> “[N]oise cancellation is achieved through a first and a second directional microphones. The first one points at the user’s mouth, and the second one points away...The second microphone can be in the vicinity of the other hinge, whose directionality favors sound arriving in front of or outside of the user. Signals received from the second microphone are subtracted from signals received from the first microphone...” EX1027, [0135]; <i>see also</i> Fig. 1.	33:48-61.
95.	[18D] a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;	Even if the disclosure of the '262-Application is not considered part of Howell-887 via incorporation, it would have been obvious to include its noise cancellation in Howell-887’s eyeglasses including the '262-Application’s first and second microphone. POSAs would have been motivated to do so to improve the quality of phone calls with Howell-887’s eyeglasses. POSAs would have had a high expectation of success given that the '262-Application discloses the noise cancellation functionality on eyeglasses very similar to those of Howell-887.	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
96.	[18E] a rechargeable battery contained within the head-worn structure;	As the language of these limitations is identical or nearly identical to limitation [1D], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1D].	
97.	[18F] a sensor at least partially contained within the head-worn structure and configured to capture data;	As the language of these limitations is identical or nearly identical to claim [12], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [12].	

98.	[18G] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the data captured by the sensor, and	As disclose above in relation to limitation [1E], [1F], and [13] Howell-887 discloses electronic circuitry connected to the various electrical components of the eyeglasses including the rechargeable battery and being-worn sensor (signals of which are used to determine if the user is wearing the eyeglasses). As discussed above in relation to limitations [18C]-[18D], POSAs would have found it obvious to add a first and second microphone to Howell-887's eyeglasses as disclosed in the '262-Application. As further discussed above in relation to [1E], POSAs would have understood the first and second microphone would be connected to the electronic circuitry in order to receive power from the rechargeable battery and to receive and send electrical signals to other components in the eyeglasses (such as a processor or wireless communication module). Further, as explained above in relation to limitations [18C]-[18D], POSAs would have further found it obvious to include the '262-Application's noise cancellation in Howell-887's eyeglasses, and the '262-Application discloses electronic circuitry <i>"process[ing] the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone."</i>	33:42-61.
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¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
	the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data;		
99.	[18H] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and	As the language of these limitations is identical or nearly identical to limitation [1F], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1F].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
100.	[18I] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and	As the language of these limitations is identical or nearly identical to limitation [1G], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1G].	
101.	[18J] a charging apparatus having at least a charging connector,	As the language of these limitations is identical or nearly identical to limitation [1H], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1H].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
102.	[18K] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.	As the language of these limitations is identical or nearly identical to limitation [1I], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1I].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
103.	[19] A system as recited in claim 18, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.	As discussed above in relation to limitation [18C], POSAs would have found it obvious to add a first and second microphone to Howell-887's eyeglasses as disclosed in the '262-Application, and the '262-Application discloses that <i>"the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user."</i> See EX1027, [0135]; Fig. 1	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
104.	[20] A system as recited in claim 19, wherein the head-worn personal electronic apparatus comprises: a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus.	“As the language of these limitations is identical or nearly identical to limitation [1C], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1C] and claim 2.”	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
105.	[21] A system as recited in claim 20, wherein the head-worn electronic personal audio apparatus is configured to support audio output to the user via the speaker, and wherein the at least one operation of the head-worn electronic personal audio apparatus being altered concerns control of the audio output being provided to the user.	As the language of these limitations is identical or nearly identical to claim [4], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [4].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
106.	[22] A system as recited in claim 20, wherein the system comprises: a Hall effect detector configured to capture data associated with a magnetic characteristic.	As the language of these limitations is identical or nearly identical to claim [16], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [16].	
107.	[23] A system as recited in claim 18, wherein the sensor is positioned to be directed towards the user's head when the head-worn structure is being worn.	<u>Howell-887</u> Howell-887 discloses a temperature sensor that is “press[ed] towards” the user’s head (i.e. <i>positioned to be directed towards the user’s head</i>) when the eyeglasses are worn. “In one embodiment, such a temperature sensor is in a temple tip. In measuring the temperature, the user can further press the temple tip towards his head to ensure better connection.” EX1010, [0120]; <i>see also</i> [1028].	20:37-40; 21:26-34.

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
108.	[24] A system as recited in claim 23, wherein the data captured by the sensor is dependent on thermal characteristics of the user's head when the head-worn structure is being worn.	As explained above in relation to claim 23, Howell-887 discloses a temperature sensor. This sensor “ <i>is dependent on thermal characteristics</i> ” as claimed.	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
109.	[25] A system as recited in claim 18, wherein the head-worn personal electronic apparatus is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus based on the requested operation.	As the language of these limitations is identical or nearly identical to claim [10], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [10].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
110.	[26] A system as recited in claim 18, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.	As the language of these limitations is identical or nearly identical to claim [13], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [13].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
111.	[27] A system as recited in claim 26, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.	As the language of these limitations is identical or nearly identical to claim [14], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [14].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
112.	[28] A system as recited in claim 18, wherein the head-worn personal electronic apparatus comprises: a user input device supported by the head-worn structure, the user input device being configured to receive a user input, the user input device is based on at least capacitive effect, wherein the user input being received induces at least a capacitive change to produce at least an electrical response.	As disclosed above in relation to limitation [1C], POSAs would find it obvious to add the capacitive switch disclosed by the '283-Application to Howell-887. POSAs would further understand that this capacitive switch is a <i>“user input device”</i> that is <i>“based on at least capacitive effect, wherein the user input being received induces at least a capacitive change to produce at least an electrical response.”</i> See EX1026, [0082]. Likewise, as the limitations in claims 29-31 are identical or nearly identical to claims 5-7, Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim 5-7.	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
113.	[29] A system as recited in claim 28, wherein the user input device is configured to distinguish at least a direction of the user input with respect to the user input device.		

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
114.	[30] A system as recited in claim 28, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to detect at least a sliding of a finger action with respect to the user input device using at least the electronic circuitry and the user input data.		

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
115.	[31] A system as recited in claim 28, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to distinguish at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the user input device using at least the electronic circuitry and the user input data.		

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
116.	[32] A system as recited in claim 18, wherein the system comprises: a Hall effect detector.	As the language of these limitations is identical or nearly identical to claim [16], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [16].	
117.	[33] A system as recited in claim 18, wherein the head-worn personal electronic apparatus comprises: a bone conducting element at least partially contained within the head-worn structure and configured to operate based on signals associated with sound, the bone conducting element being operatively connected to the electronic circuitry.	As the language of these limitations is identical or nearly identical to claim [17], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [17].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
118.	[34] A system as recited in claim 18, wherein the conductive element is a conductive pad.	As discussed above in relation to limitation [1G], POSAs would be motivated to modify the eyeglasses of Howell-887 to include the “conductive element” of the '218-Application. The '218-Application further discloses that this “conductive element” can be a “pad.” <u>'218-Application</u> “[T]he frame of the eyeglasses includes...[a] conductive element (e.g., ...pad...).” EX1013, [0055].	32:26-38.
119.	[35PRE] A system, comprising: a head-worn personal electronic apparatus, including at least:	As the language of these limitations is identical or nearly identical to limitations [1-PRE] and [1A], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [1-PRE] and [1A].	
120.	[35A] a head-worn structure configured to be worn by a user;	As the language of these limitations is identical or nearly identical to limitation [1B], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1B].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
121.	[35B] a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;	As the language of these limitations is identical or nearly identical to limitation [1B], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1B].	
122.	[35C] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;	As the language of these limitations is identical or nearly identical to limitation [18C], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18C].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
123.	[35D] a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;	As the language of these limitations is identical or nearly identical to limitation [18D], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18D].	
124.	[35E] a rechargeable battery contained within the head-worn structure;	As the language of these limitations is identical or nearly identical to limitation [1D], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1D].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
125.	[35F] a “being worn” sensor at least partially contained within the head-worn structure and configured to detect data indicative of whether the head-worn structure of the head-worn personal electronic apparatus is being worn;	As the language of these limitations is identical or nearly identical to claim 12, Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim 12.	

126.	[35G] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the “being worn” sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the detected data	As the language of these limitations is identical or nearly identical to limitation [18G], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18G].	
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¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
	captured by the “being worn” sensor;		
127.	[35H] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and	As the language of these limitations is identical or nearly identical to limitation [1F], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1F].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
128.	[35I] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and	As the language of these limitations is identical or nearly identical to limitation [1G], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1G].	
129.	[35J] a charging apparatus having at least a charging connector,	As the language of these limitations is identical or nearly identical to limitation [1H], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1H].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
130.	[35K] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.	As the language of these limitations is identical or nearly identical to limitation [1I], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1I].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
131.	[36] A system as recited in claim 35, wherein the detected data by the “being worn” sensor is dependent on a physical characteristic of the user.	As explained above in relation to claim 12, Howell-887 discloses a “being worn” sensor that can be a “thermal sensor” or “stress sensor.” <i>See</i> EX1010, [0125]-[0126]. POSAs would understand that a “thermal sensor” or “stress sensor” are both examples of sensors that are “ <i>dependent on a physical characteristic of a user.</i> ”	
132.	[37] A system as recited in claim 35, wherein the head-worn structure comprises: an accelerometer, operatively connected to the rechargeable battery, at least partially contained within the head-worn structure and configured to sense movement data.	<u>Howell-887</u> As explained above in relation to claim 12, Howell-887 discloses a “being worn” sensor. Howell-887 further discloses that this being worn sensor can be an accelerometer. As explained above in relation to claim 13, POSAs would understand the being-worn sensor to be electrically connected to the rechargeable battery. “In one embodiment, a motion detector is used as a “being worn” sensor....The motion detector can, for example, be achieved by...an accelerometer.” EX1010, [0127].	21:16-25.

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
133.	[38PRE] A system, comprising:	As the language of these limitations is identical or nearly identical to limitation [1PRE], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1PRE].	
134.	[38A] a head-worn personal electronic apparatus, including at least:	As the language of these limitations is identical or nearly identical to limitation [1A], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1A].	
135.	[38B] a head-worn structure configured to be worn by a user;	As the language of these limitations is identical or nearly identical to limitation [1B], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1B].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
136.	[38C] a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent to an ear of the user when the head-worn structure is being worn by the user;	As the language of these limitations is identical or nearly identical to limitation [1B], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1B].	
137.	[38D] a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;	As explained above in relation to claim 37, Howell-887 discloses an accelerometer in the eyeglasses. POSAs would understand that this accelerometer is a “ <i>motion detector</i> ” that is “ <i>configured to provide motion data.</i> ”	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
138.	[38E] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;	As the language of these limitations is identical or nearly identical to limitation [18C], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18C].	
139.	[38F] a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;	As the language of these limitations is identical or nearly identical to limitation [18D], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18D].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
140.	[38G] a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus;	As the language of these limitations is identical or nearly identical to limitation [1C] and claim 2, Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1C] and claim 2.	
141.	[38H] a rechargeable battery contained within the head-worn structure;	As the language of these limitations is identical or nearly identical to limitation [1D], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1D].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
142.	[38I] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;	As the language of these limitations is identical or nearly identical to limitation [1E], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1E].	
143.	[38J] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and	As the language of these limitations is identical or nearly identical to limitation [1F], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1F].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
144.	[38K] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and	As the language of these limitations is identical or nearly identical to limitation [1G], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1G].	
145.	[38L] a charging apparatus having at least a charging connector,	As the language of these limitations is identical or nearly identical to limitation [1H], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1H].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
146.	[38M] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.	As the language of these limitations is identical or nearly identical to limitation [1I], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1I].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
147.	[39PRE]-[39A] A system as recited in claim 38, wherein the head-worn personal electronic apparatus comprises: wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and	As the language of these limitations is identical or nearly identical to limitation [18G], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18G].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
148.	[39B] wherein the head-worn personal electronic apparatus is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus based on the requested operation.	As the language of these limitations is identical or nearly identical to claim 10, Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim 10.	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
149.	[40] A system as recited in claim 39, wherein the head-worn personal electronic apparatus comprises: at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.	As the language of these limitations is identical or nearly identical to claim [9], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [9].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
150.	[41PRE/41A] A system as recited in claim 39, wherein the head-worn personal electronic apparatus comprises: a sensor at least partially contained within the head-worn structure and configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user,	As the language of these limitations is identical or nearly identical to claim [12], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [12].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
151.	[41B] wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.	As the language of these limitations is identical or nearly identical to claim [13], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [13].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
152.	[42] A system as recited in claim 41, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.	As the language of these limitations is identical or nearly identical to claim [14], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [14].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
153.	[43] A system as recited in claim 41, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.	As the language of these limitations is identical or nearly identical to claim [15], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [15].	
154.	[44PRE] A system, comprising:	As the language of these limitations is identical or nearly identical to limitation [1PRE], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1PRE].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
155.	[44A] a head-worn personal electronic apparatus, including at least:	As the language of these limitations is identical or nearly identical to limitation [1A], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1A].	
156.	[44B] a head-worn structure configured to be worn by a user;	As the language of these limitations is identical or nearly identical to limitation [1B], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1B].	
157.	[44C] a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent to an ear of the user when the head-worn structure is being worn by the user;	As the language of these limitations is identical or nearly identical to limitation [1B], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1B].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
158.	[44D] a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;	As the language of these limitations is identical or nearly identical to limitation [38D], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [38D].	
159.	[44E] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;	As the language of these limitations is identical or nearly identical to limitation [18C], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18C].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
160.	[44F] a second microphone at least partially contained within the head-worn structure; a rechargeable battery contained within the head-worn structure;	As the language of these limitations is identical or nearly identical to limitation [18D], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18D].	
161.	[44G] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;	As the language of these limitations is identical or nearly identical to limitation [1E], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1E].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
162.	[44H] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery;	As the language of these limitations is identical or nearly identical to limitation [1F], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1F].	
163.	[44I] a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn;	<u>'857-Application</u> “One implementation for the heart-beat sensor utilizes an infrared emitter and an infrared detector as a component...In operation, the infrared emitter shines infrared radiation towards the user, and the detector captures the infrared signals reflected back by the skin of the user.” EX1028, [0091]. To the extent that the disclosure of the '857-Application is not considered to be part of Howell-887 via incorporation, POSAs would be motivated to include the heart-beat sensor with infrared emitter and detector as disclosed by	36:48-37:2.

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
	[44J] a radiation detector at least partially contained within the head-worn structure and configured to detect at least a portion of the radiation from the radiation emitter that is reflected back from the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn; and	the '857-Application in Howell-887's eyeglasses. POSAs would be motivated to do so to provide accurate heart-beat information to the user. POSAs would have a high expectation of success given that the '857-Application discloses this heart-beat sensor in glasses very similar to Howell-887 and also because Howell-887 itself discloses a heart-beat sensor. <i>See</i> EX1010, [0169].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
164.	[44K] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and	As the language of these limitations is identical or nearly identical to limitation [1G], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1G].	
165.	[44L] a charging apparatus having at least a charging connector,	As the language of these limitations is identical or nearly identical to limitation [1H], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1H].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
166.	[44M] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.	As the language of these limitations is identical or nearly identical to limitation [1I], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [1I].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
167.	[45PRE/45A] A system as recited in claim 44, wherein the radiation detector is operatively connected to the electronic circuitry, and	As discussed above in relation to [1E], POSAs would have understood the radiation detector (discussed above in limitation [44J]) would be connected to the electronic circuitry in order to receive power from the rechargeable battery and to receive and send electrical signals to other components in the eyeglasses (such as a processor).	
168.	[45B] wherein electronic circuitry within the head-worn structure is configured to facilitate determining whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user.	As the language of these limitations is identical or nearly identical to limitation [18G], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18G].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
169.	[46] A system as recited in claim 45, wherein the head-worn personal electronic apparatus comprises: at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.	As the language of these limitations is identical or nearly identical to claim [9], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [9].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
170.	[47] A system as recited in claim 45, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the determination of whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user based on at least the motion data.	As the language of these limitations is identical or nearly identical to claims [12] and [13], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claims [12] and [13].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
171.	[48] A system as recited in claim 47, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.	As the language of these limitations is identical or nearly identical to claim [14], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [14].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
172.	[49] A system as recited in claim 47, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.	As the language of these limitations is identical or nearly identical to claim [15], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [15].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
173.	[50Pre/50A] A system as recited in claim 45, wherein the second microphone is positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus,	As the language of these limitations is identical or nearly identical to limitation [18D], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18D].	
174.	[50B] wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and	As the language of these limitations is identical or nearly identical to limitation [18G], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18G].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
175.	[50C] wherein the head-worn personal electronic apparatus is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus based on the requested operation.	As the language of these limitations is identical or nearly identical to claim [10], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [10].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
176.	[51] A system as recited in claim 45, wherein the radiation detector is an infrared radiation detector, and wherein the radiation being detected by the radiation detector includes infrared radiation.	As explained above in relation limitations [44I] and [44J], POSAs would be motivated to include the heart-beat sensor with a detector that detects infrared radiation as disclosed by the '857-Application in Howell-887's eyeglasses.	
177.	[52] A system as recited in claim 51, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.	As the language of these limitations is identical or nearly identical to claim [19], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [19].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
178.	[53] A system as recited in claim 52, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the determination of whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user.	As the language of these limitations is identical or nearly identical to claims [12] and [13], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claims [12] and [13].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
179.	[54Pre/54A] A system as recited in claim 53, wherein the second microphone is positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus,	As the language of these limitations is identical or nearly identical to limitation [18D], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18D].	
180.	[54B] wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and	As the language of these limitations is identical or nearly identical to limitation [18G], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to limitation [18G].	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
181.	[54C] wherein the head-worn personal electronic apparatus is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus based on the requested operation.	As the language of these limitations is identical or nearly identical to claim [10], Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim [10].	
182.	[55] A system as recited in claim 54, wherein the motion detector comprises an accelerometer, and wherein the system comprises a Hall effect detector.	As the language of these limitations is identical or nearly identical to claims 16 and 37, Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claims 16 and 37.	

183.	[56] A system as recited in claim 44, wherein the head-worn personal electronic apparatus comprises: a force sensor at least partially contained within the head-worn structure and configured to sense a force input associated with the user, wherein the sensed force input operating to at least alter operation of the head-worn electronic personal audio apparatus.	<u>Howell-887</u> Howell-887 discloses use of buttons to alter the operation of the eyeglasses. POSAs would consider the buttons to be “<i>force sensors</i>” that “<i>sense a force input</i>” (i.e. whether the buttons are being depressed). “The user interface, for example, can include buttons, which, for example, can facilitate user input with respect to on/off, volume, and accept or decline call.” EX1010, [0079]. <i>See also</i> EX1010, [0078]. <u>'283-Application</u> “The switch in the glasses can have different attributes. It can be activated by different type of forces, including mechanical, radiation, magnetic, electrical, and temperature.” EX1026, [0075]; <i>see also</i> [0076]-[0079] (discussing various switches activated by mechanical force from a user). To the extent the disclosure of the '283-Application is not considered to be included in Howell-887, POSAs would find it obvious to include the switches of the '283-Application that are activated by different “forces” in the eyeglasses of Howell-887. POSAs would be motivated to make this addition in order to provide a wider range of user interface options. POSAs would have a high likelihood of success given that the '283-Application discloses these switches on very similar eyeglasses to those of Howell-887 and because Howell-887 already	14:23-25; 14:53-56; 38:51-39:37.
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¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
		discloses switches of its own (as discussed above in relation to limitation [1C]).	
184.	[57] A system as recited in claim 56, wherein the head-worn electronic personal audio apparatus is configured to support audio output to the user via the speaker, and wherein the at least one operation of the head-worn electronic personal audio apparatus being altered concerns control of the audio output being provided to the user.	As the language of these limitations is identical or nearly identical to claim 4, Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim 4.	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
185.	[58] A system as recited in claim 56, wherein the head-worn personal electronic apparatus is configured to support voice calls to the user, and wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.	As the language of these limitations is identical or nearly identical to claim 3, Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim 3.	

¶	Claim/Limitation	Howell-887 and Incorporated References	'4901 Patent
	[59] A system as recited in claim 44, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.	As the language of these limitations is identical or nearly identical to claim 19, Howell-887 (along with its Incorporated References) anticipates and/or renders these limitations obvious for the same reason as discussed above in relation to claim 19.	

B. Ground 2A: Griffin in view of Hollemans Renders Claims 1-8, 10-14, 18-21, 23-31, and 34-36 Obvious.

187. I have been instructed by counsel to treat Griffin (EX1005), Hollemans (EX1006), Irvin (EX1008), Ritter (EX1029), and Lowles (EX1030) (collectively “Ground 2 Prior Art”) as prior art to the ’4901 patent.

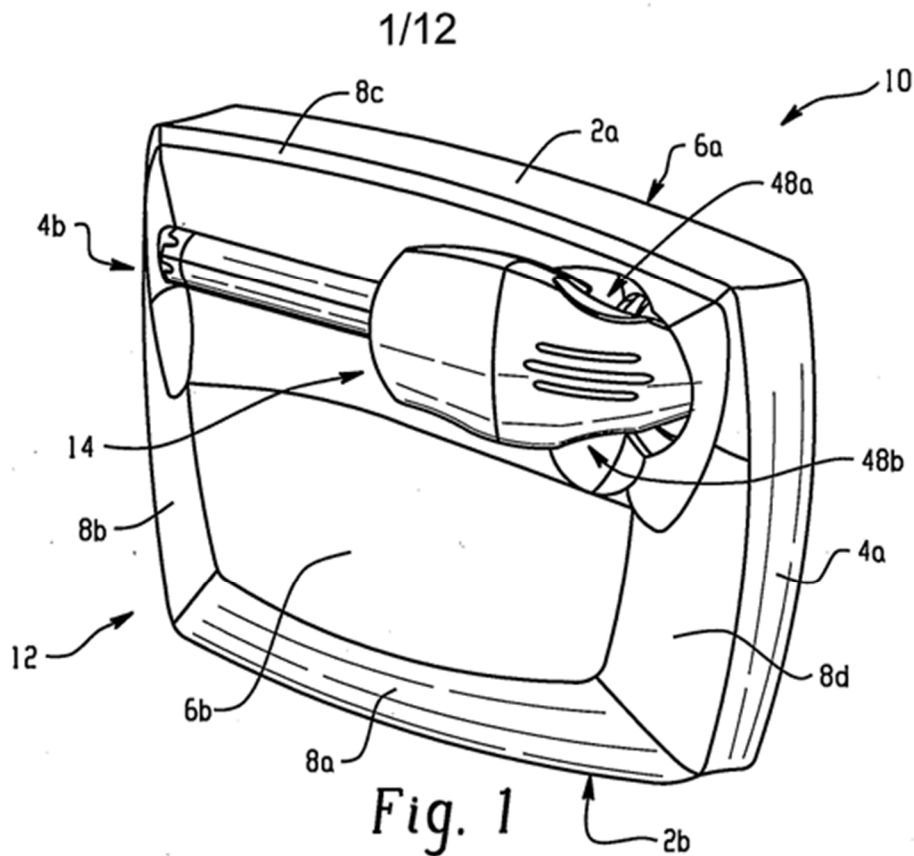
188. As I explained above in Section V, the ’4901 Patent relates generally to “eyewear or other head-worn personal electronic apparatus with electrical

components.” EX1001, 8:40-42. Although the patent focuses primarily on eyeglasses, a person of ordinary skill in the art would have understood that the “head-worn personal electronic apparatus” is more broad and includes headsets, earbuds, and other electronic head-ware.

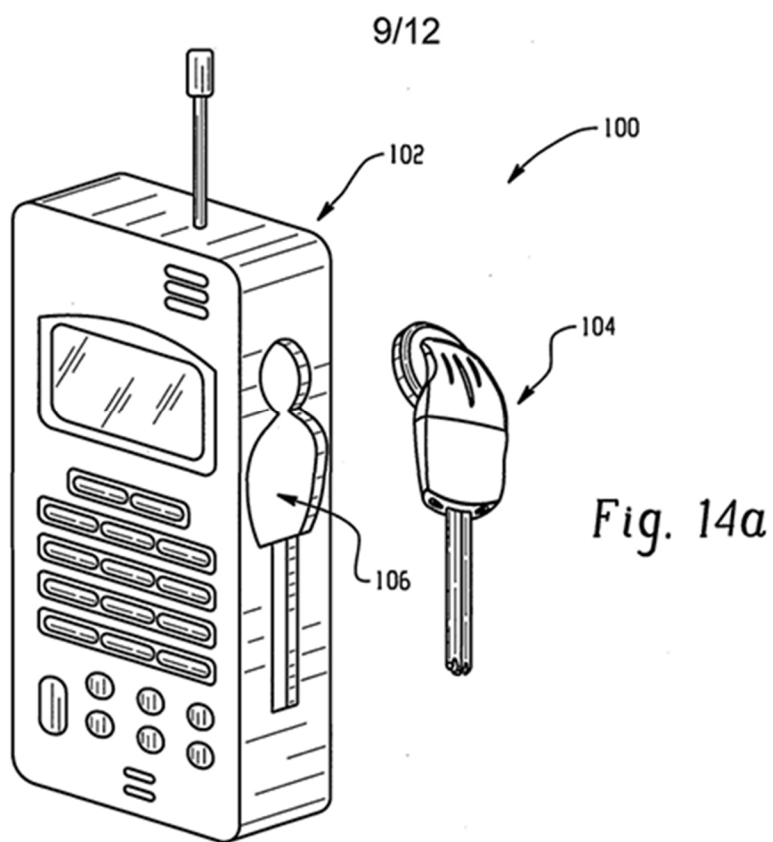
189. In my opinion, each of the Relevant Prior Art references falls within the same field of endeavor (“head-worn personal electronic apparatus”) as the ’4901 Patent. Indeed, all of the Relevant Prior Art except for Ritter relate specifically to headsets, and Ritter is directed to the handset of a telephone, which in many ways is a precursor to the modern-day headset. *See infra* Sections VII.B-VII.E. For these same reasons, the Relevant Prior Art references are also reasonably pertinent to the problem addressed by the ’4901 patent—*i.e.*, how to improve head-worn personal electronic apparatuses.

1. Griffin (EX1005)

190. Griffin discloses a communication device with two components: a first communication module and a second communication module sized to fit inside the first module. Griffin, 4:13-5:5. Figure 1 of Griffin depicts the “first communication module 12 and a second detachable communication module 14 for insertion into the communication device user’s ear.” Griffin, 4:13-15. As shown below, the second communication module takes the form of a headset whereas the first communication module is effectively a docking station for that headset.



191. Griffin teaches that the first communication module can receive long-range “RF signals from a wireless network” and thus function as a cellular phone. Griffin, Abstract, 2:6-7; 15:8-12. Indeed, in an alternate embodiment, Griffin teaches that the first communication module can take the form of a “cellular phone” as depicted in Figure 14a. Griffin, 17:3-13. Griffin further teaches that the first module sends the received RF signals to the second module via a “short-range wireless network or link” and “convert[s] the RF signals into an audible signal.” *Id.*, Abstract, 2:7-11, 15:8-12, 15:25-16:4.



192. Griffin depicts the second communication module as a headset that includes both a “speaker 14a” that is “placed in the ear” of the user as well as a “microphone 14d.” Griffin, 6:14-18.

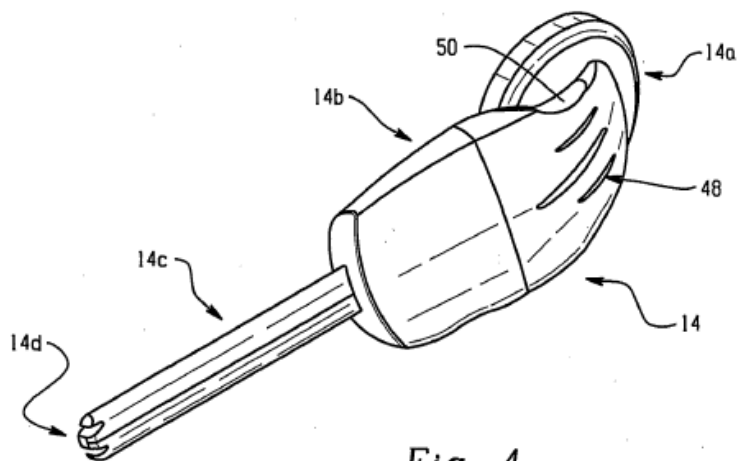


Fig. 4

193. The first communication module is shown in Figure 3. It includes a cavity 16 into which the second module is designed to “be detachably mounted” as shown in Figures 3 and 6. Griffin 5:1-5; *see also* Fig. 2.

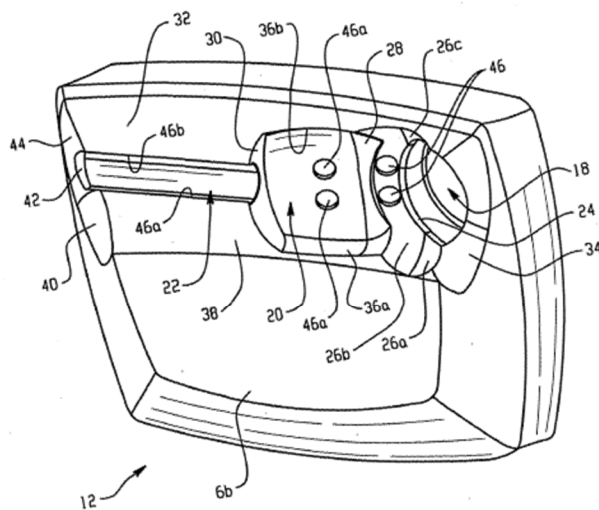


Fig. 3

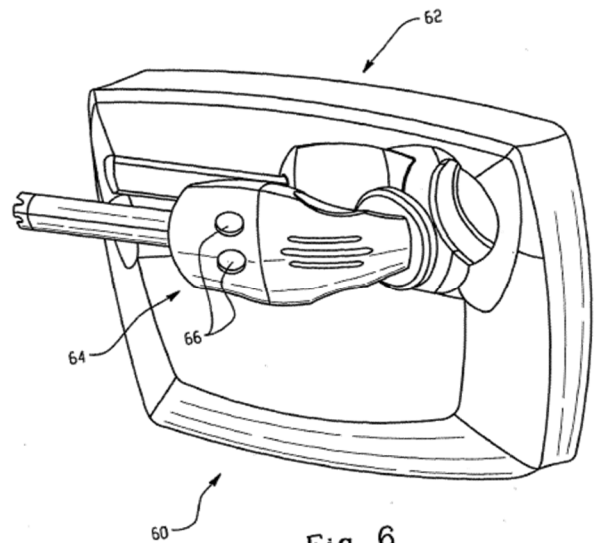


Fig. 6

194. Griffin discloses that the first module can serve as a charging station for the second module (*i.e.*, headset) when the second module is mounted inside the first module. When the headset is put into the first module, the “charging terminals

56” on the headset (*see* Fig. 5 below) “mate with corresponding charging terminals 46 on the first communication module 12 shown in Fig. 3.” Griffin, 8:3-6. The charging terminals allow a “rechargeable power source,” *e.g.*, battery, within the earbud to be recharged. *Id.*, 8:6-12; *see also id.*, claim 2.

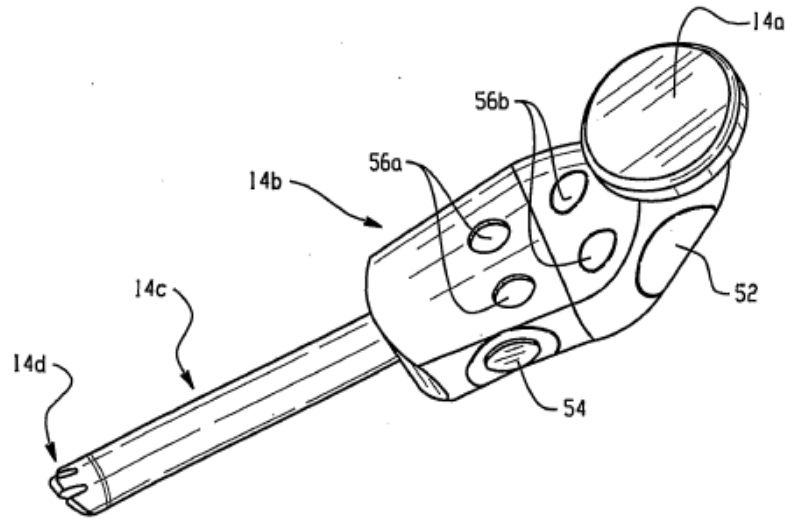


Fig. 5

195. Figure 16 of Griffin depicts the “rechargeable battery 188” within the second module. Griffin, 16:9.

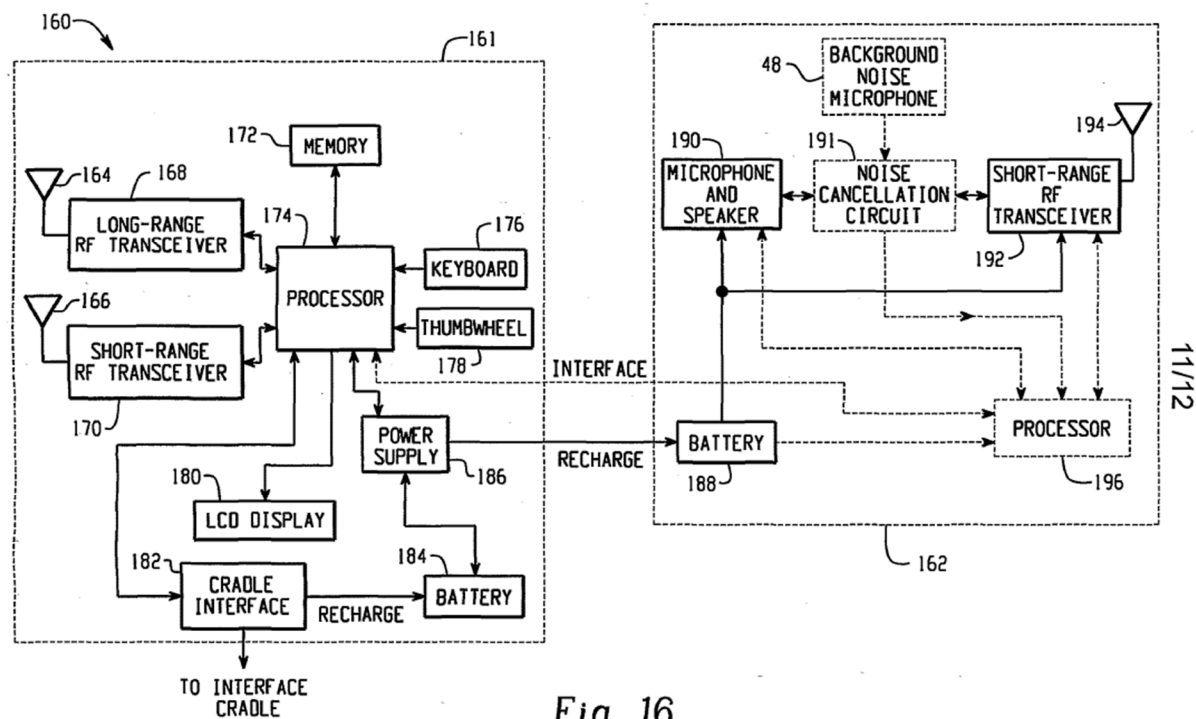


Fig. 16

196. Griffin's second module (i.e., the headset) is "coupled to the first communication module by a wireless link" and is "configured to receive the RF signals from the first communication module over the wireless link and to convert the RF signals into an audible signal." Griffin, 2: 7-11. This allows for "hands-free operation" of the first module such as through voice commands. *Id.*, 14:18-20, 19:6-13; .

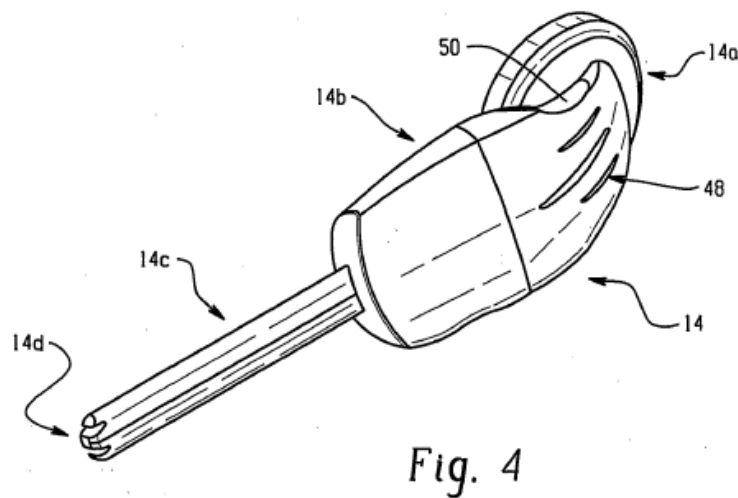
197. Griffin teaches that its headset can provide noise cancellation functionality to reduce "undesired noise signals from a multitude of sources" other than the user's speech. Griffin, 7:6-8. Specifically Griffin notes that the headset:

includes a noise cancellation circuit with a background noise microphone 48 as shown in Fig. 4. The background noise microphone

48 preferably detects background noise signals which are then subtracted from the corrupted speech received by the microphone 14d in the noise cancellation circuit. In this manner, a higher quality speech signal is provided.

Id., 7:8-13.

198. Figure 4 depicts microphone 14d being positioned closer to the user's mouth during use than background noise microphone 48. And Griffin teaches that “[o]ptimally, the length of the boom portion 14c should be maximized such that the microphone 14d is located in the proximity of the communication device user's mouth when the module 14 is in use.” Griffin, 7:1-3.



2. Hollemans (EX1006)

199. Hollemans discloses an earbud-type headphone with a touch-sensitive surface. Specifically, Hollemans discloses a “remote controller (120)” that is arranged to fit substantially in a human ear concha (*i.e.*, an earbud) and contains

“touch-sensitive area 122.” Hollemans, Abstract, 1:44-49, 1:63-2:4, *see also id.*, claim 10 (claiming an “earbud comprising...a sensor that is configured to detect a touch of the earbud”).

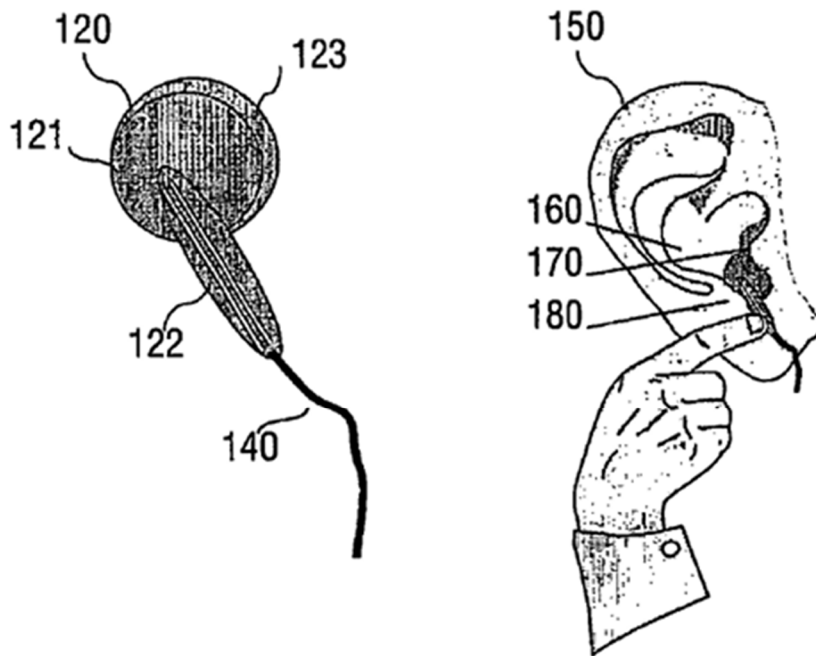


FIG. 2

200. Hollemans discloses that the earbud (*i.e.*, remote controller 120) can be used to control “remotely controllable device 110,” which can be for example a “mobile phone,” “MP3 player[]” or a “personal digital assistant.” *Id.*, 1:12-19; 3:4-22. Specifically, the earbud detects “temporal patterns” and/or “gesture[s]” by a user on the touch-sensitive surface (*i.e.* touch-sensitive area 122) in order to “command[] the device 110 to perform one or more of its functions or capabilities.” *Id.*, 2:5-18;

3:23-24; 6:14-35. “An example is a single short tap for pause/play, double short tap for next track, triple short tap for next artist/album and a long tap for adjusting the volume.” *Id.*, 2:15-18. Other examples include detecting gestures “for controlling a mouse pointer, navigating a menu, entering a tapping pattern, [or] scrolling content on display.” *Id.*, 6:23-26.

201. Hollemans touts its touch-sensitive design over prior-art designs that relied on a “tiny button,” which “require[] considerable time and attention from the user, which may lead to dangerous situations when the user takes part in traffic.” *Id.*, 1:12-40.

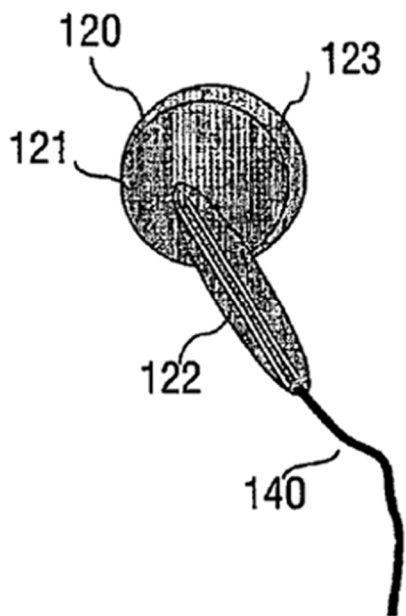
202. Hollemans also teaches the use of a second (or “further”) “touch-sensitive surface 123” that “is touched substantially by the ear when the controller is substantially worn in or by a human ear.” *Id.*, 2:19-27; 3:36-38. Hollemans’ device only sends a control signal to the remote device (*e.g.*, a mobile phone) if the second/further touch-sensitive surface is touched, which “prevent[s] the accidental remote control of the device when the remote controller is not wor[n], thus preventing unwanted activation of the device and unnecessary battery exhaustion.” *Id.*, 2:19-27.

3. The Griffin-Hollemans Combination

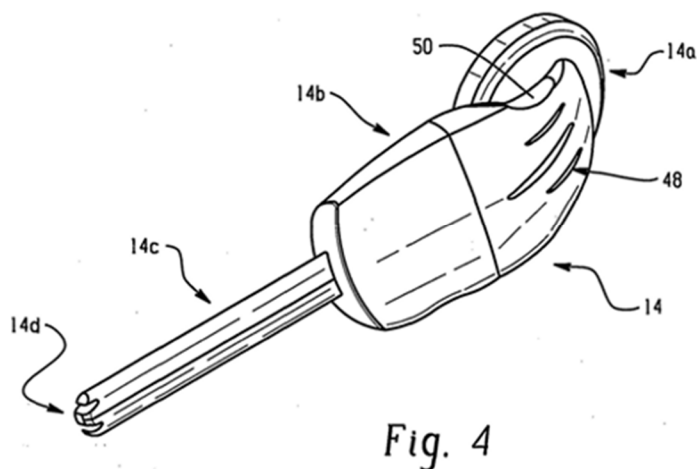
203. In view of Hollemans, a person of ordinary skill in the art would have had reason to modify Griffin’s second module (*i.e.*, headset) such that it incorporate

Hollemans's touch-sensitive surface and its corresponding ability to adjust device functionality based on a user's interaction with that touch-sensitive surface.

204. As explained above, Griffin discloses a headset that is inserted in a user's ear and that can be used to control a wirelessly connected first module, such as a mobile phone. Hollemans similarly discloses an earbud that is inserted in a user's ear and that can be used to control wirelessly connected audio devices such as a phone.



Hollemans, Fig. 2



Griffin, Fig. 4

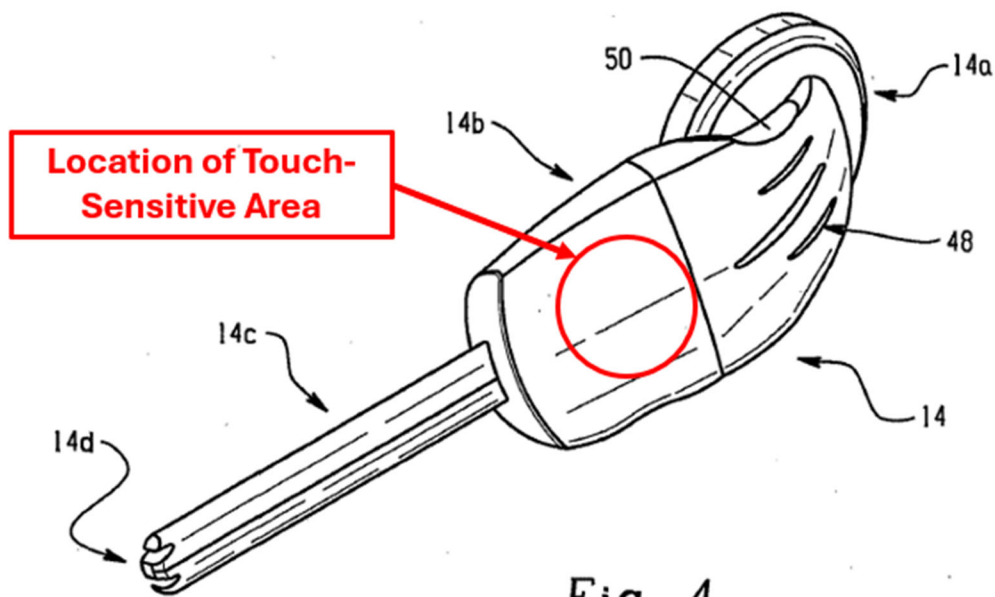
205. Given the similarity between the two devices' structure and function, a POSA would be motivated to look to Hollemans when considering how to improve the headset of Griffin. Specifically, a POSA would be motivated to include Hollemans' touch-sensitive surface to provide a convenient way to control the

functionality of Hollemans' headset and/or the devices with which it is wirelessly connected.

206. A POSA would understand, based on the teachings of Hollemans, that adding its touch-sensitive surface to Griffin would increase user safety in scenarios such as driving. Hollemans, 1:12-40. Griffin teaches the use of several "switches" on the headset (second module) to control functionality such as for muting the microphone and powering the headset on and off. Griffin, 7:14-8:2. However, as Hollemans notes, multiple "tiny buttons" on earbuds/headsets can be "hard to distinguish" and it can take "considerable time and attention from the user" to operate such buttons. Hollemans, 1:28-62; 2:9-12. This can "lead to dangerous situations when the user takes part in traffic" and has to blindly locate the correct physical button on the headset. *Id.*, 1:38-40. A POSA would thus have viewed the use of Hollemans' touch-sensitive surface to be one known technique for making Griffin's headset safer to use in situations, like driving, where the user's attention should be focused on other things (the road), not the headset's physical buttons.

207. POSAs would have had a reasonable expectation of success in the proposed combination, as Hollemans' technique is designed to work with "mobile phones" (Hollemans, 1:11-19; 3:15-17), the same type of external device to which Griffin's headset is wirelessly connected (*e.g.*, Griffin, 7:25-8:2, 13:19-22, 17:10-14, 19:7-9, claim 13).

208. The combination would have required only routine skill, well within POSAs' capabilities. Given the larger physical size of the headset shown below in Griffin Fig. 4, there is plenty of room just below the 2nd microphone on the back of the headset to incorporate such a touch-sensitive surface, which would thus be a routine addition to Griffin. The resulting Griffin-Hollemans combination would maintain Griffin's headset and second module for charging that headset, but the headset would have been modified to include at least one touch-sensitive surface that a user could touch, *e.g.*, tap, to control the headset's functionality or the functionality of the device to which the headset is connected, *e.g.*, hang up or answer a call that the connected mobile phone receives.



209. The Griffin-Hollemans combination renders obvious claims 1-8, 10-14, 18-21, 23-31, and 34-36 for the reasons I discuss below.

4. Claim 1

a. [1PRE] “A system, comprising:”

210. Griffin’s first module, depicted as 12 in Fig. 2 below, and second module 14 (i.e. the headset) depicted as 14 in Fig. 2 below, both used in the Griffin-Hollemans combination, collectively constitute a “system.” Griffin, Abstract, Figs. 1-10, 17.

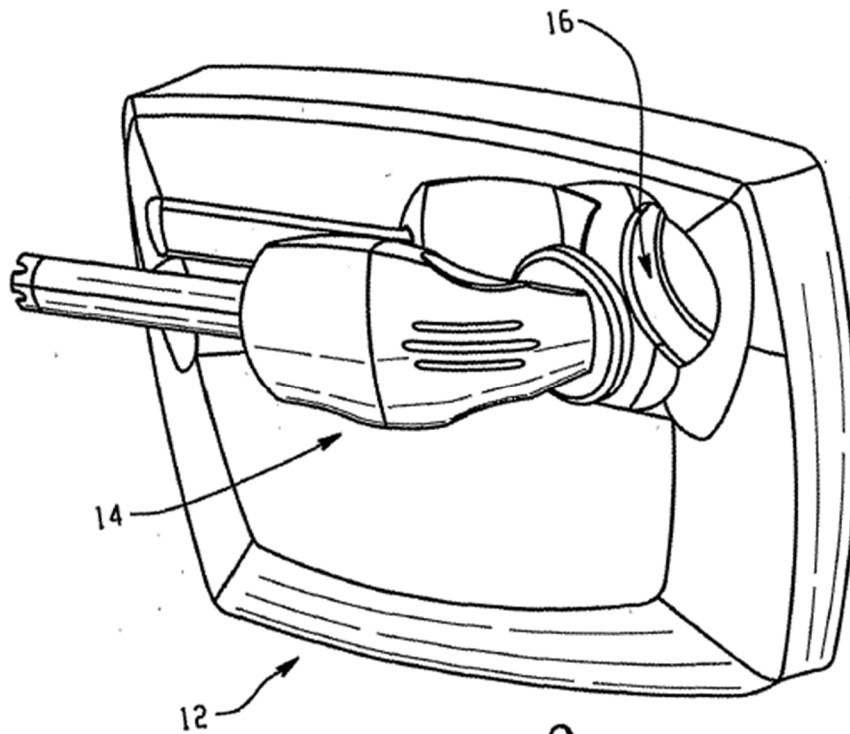


Fig. 2

211. For example, Griffin describes the first and second modules collectively as a “system 200.” Griffin, 17:3-13.

b. [1A]: “a head-worn personal electronic apparatus, including at least:”

212. Griffin’s headset is a “*head-worn personal electronic apparatus*” as it is worn in the ear and houses electrical circuits. For example, Griffin notes that the headset (second module) “is physically dimensioned so that it may be fitted into or onto an ear of a communication device user.” Griffin, Abstract. Additionally claim 1 of Griffin claims “a second communication module physically proportioned to be...fitted into or onto an ear of a communication device user.” Likewise, Figures 17 and 18 of illustrate a user wearing the headset (labelled as 214 in both figures.)

Fig. 17

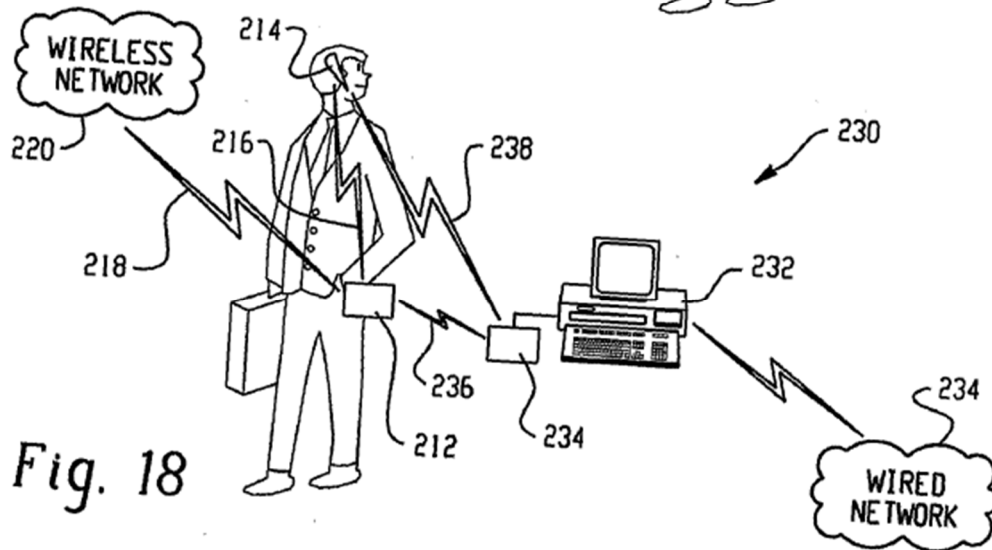
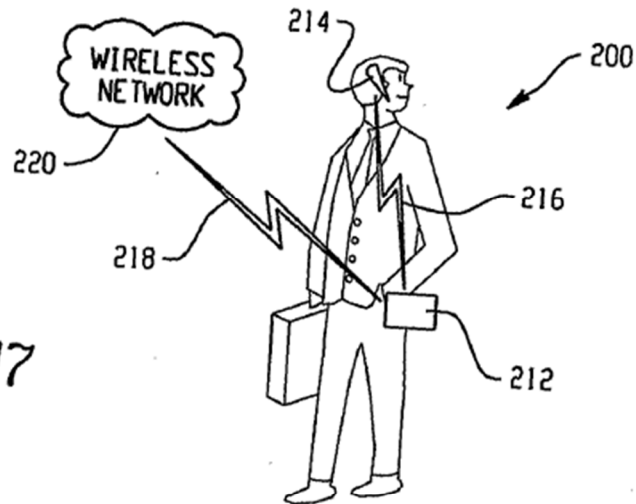
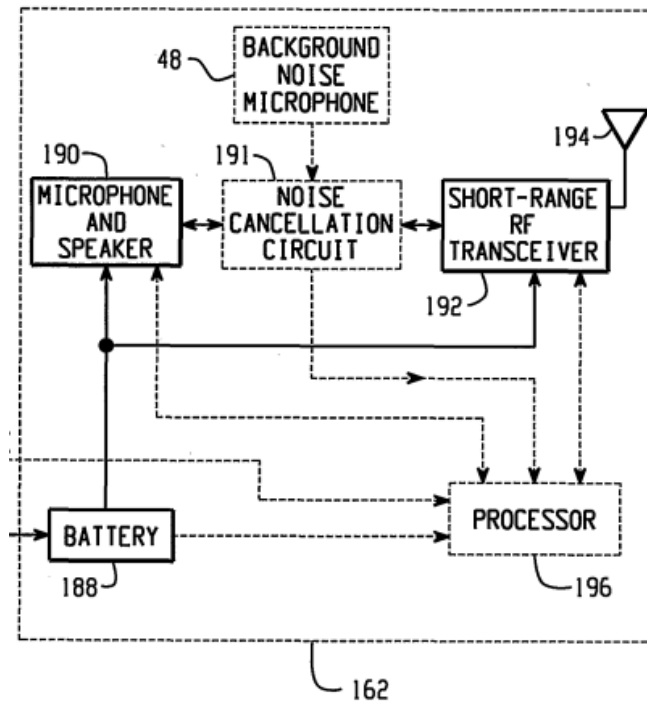


Fig. 18

213. As seen in the excerpted version of Figure 16, Griffin's headset (element 162) houses various electronics (and is thus a head-worn personal **electronic** apparatus) such as a microphone and speaker, a noise cancellation circuit, a processor, and a short-range RF transceiver:



See also *id.*, 15:3-4.

- c. **[1B]: a head-worn structure configured to be worn by a user; a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user”**

214. As noted above, Griffin’s headset is a “head-worn structure configured to be worn by a user.”

215. Griffin’s headset includes “*a speaker at least partially contained within the head-worn structure.*” Griffin discloses that “[t]he second communication module 14 is preferably a voice communication device that includes a speaker 14a...” which is depicted in Figure 5. Griffin, 6:15-17.

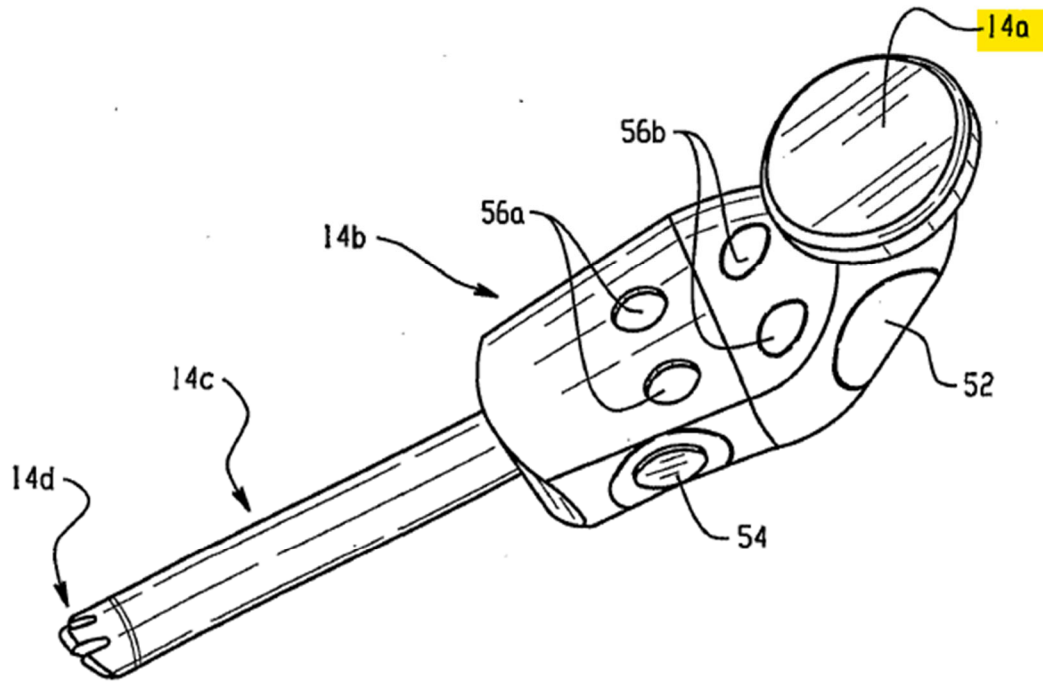


Fig. 5

216. Griffin further discloses an “alternate design” of the headset that also includes a speaker such as “speaker 120a” (depicted in Figure 15b). *Id.*, 14:6-7.

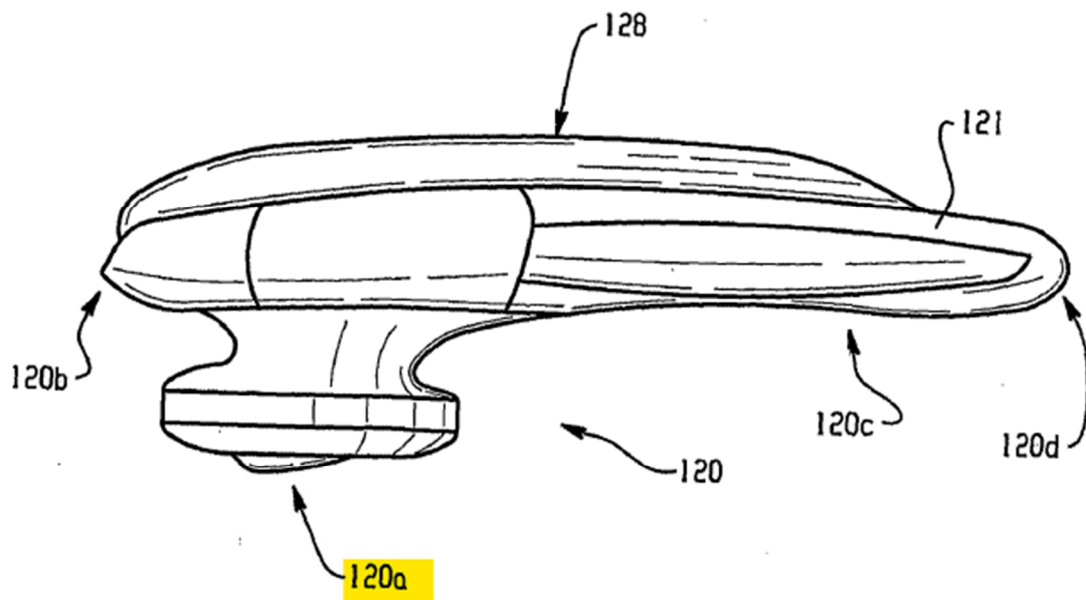
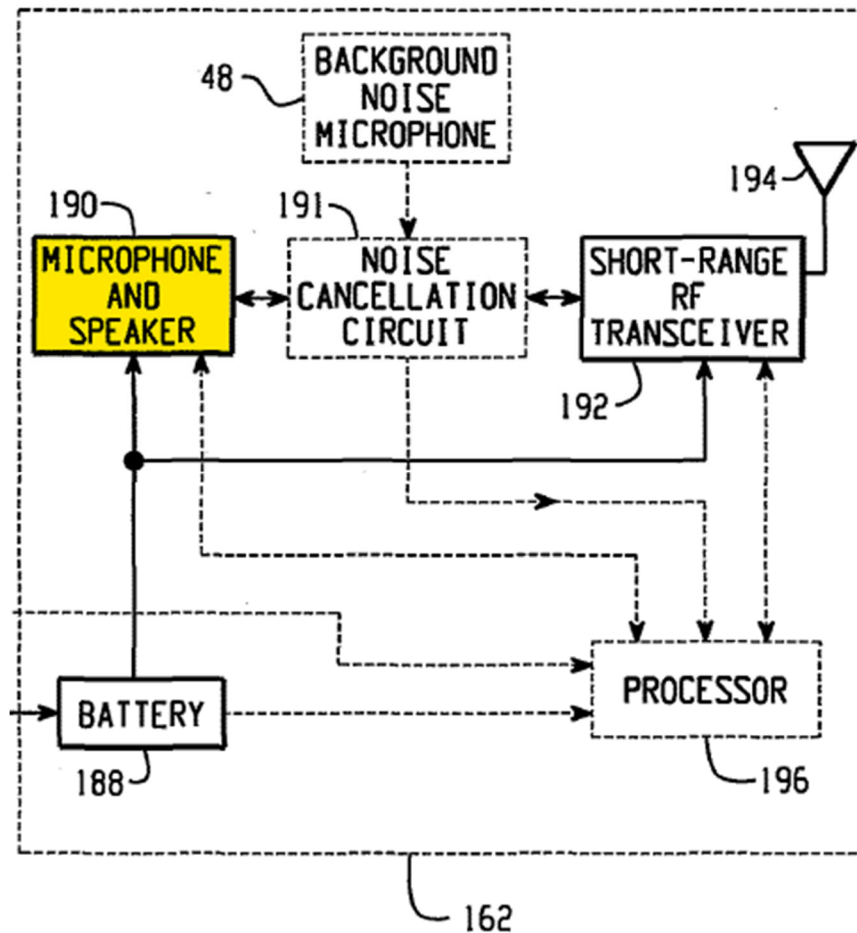


Fig. 15b

217. The excerpted portion of Figure 16 of Griffin further illustrates the speaker on the headset as part of “microphone and speaker 190.” Griffin, 16:7-9



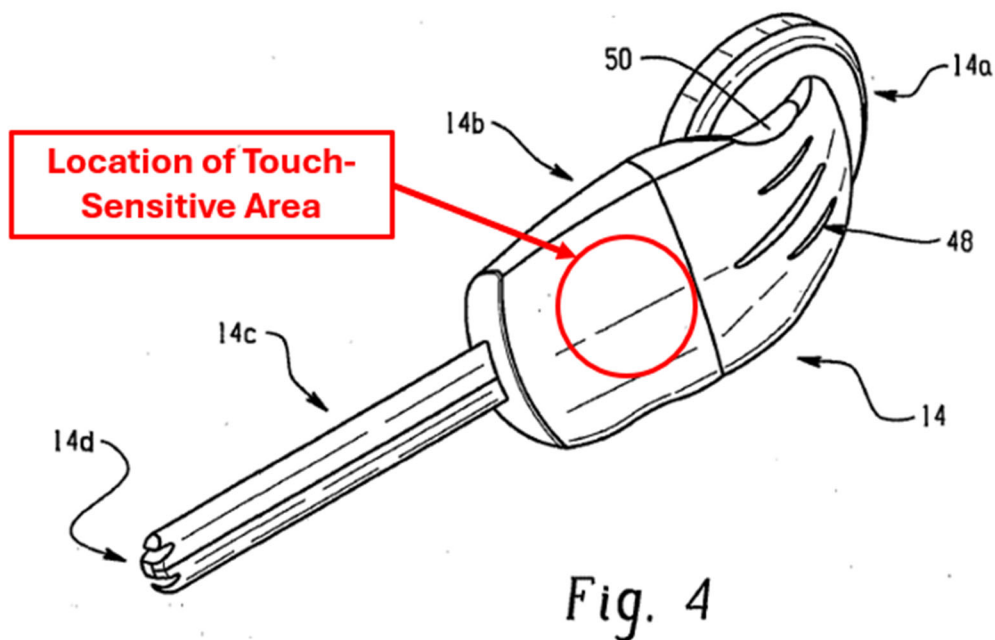
218. Griffin discloses that its speaker is configured to be “worn proximate to the ear of the user when the head-worn structure is being worn by the user” noting that the “speaker 14a is placed in the ear of a...user.” *Id.*, 6:17-18; see also 14:20-21 (“The speaker 120a is placed in a user’s ear...”); claim 16 (“a second communication module comprising an outer housing, a speaker attached to the outer housing and physically dimensioned to be fitted into an ear of a communication device user.”).

- d. [1C]: “a touch sensitive surface at least partially contained within the head-worn structure and

configured to sense a touch input associated with the user”

219. As I discussed above in Section VII.B.3, in the Griffin-Hollemans combination, Griffin’s headset includes Hollemans’ touch-sensitive area to allow users to control the headset and/or a connected device like the first communication module.

220. In the Griffin-Hollemans combination one obvious location for Hollemans’ touch-sensitive area would be a surface on “main body 14b” of Griffin’s headset. Griffin, 6:16.



221. The touch-sensitive surface of the combination would be “*configured to sense a touch input associated with the user,*” and a user would tap or otherwise touch the touch-sensitive surface to control the operation of the headset and/or

connected device, *e.g.*, volume. Hollemans, 2:17-18 (“a long tap for adjusting volume”); claim 15.

222. Other temporal patterns and/or gestures could be used to control other functions of the headset as disclosed by Hollemans. Hollemans describes the following examples of temporal patterns and/or gestures that are detected by its touch-sensitive surface:

“single short tap for pause/play, double short tap for next track, triple short tap for next artist/album and a long tap for adjusting the volume”
Griffin, 2:15-19

“A basic temporal pattern that can be detected is a short tap, which consists of the touch-sensitive area 122 being initially untouched and subsequently being touched for a short while, and subsequently being untouched again. The short while typically lasts between 40 and 300 milliseconds. Another basic temporal pattern is the long tap, which typically lasts between 400 milliseconds to several seconds. Yet another basic temporal pattern is a repeated long or short tap or another sequence of long and short taps. All of these temporal patterns may each be mapped to functions or capabilities of the device 110.” *Id.*, 4:46-56.

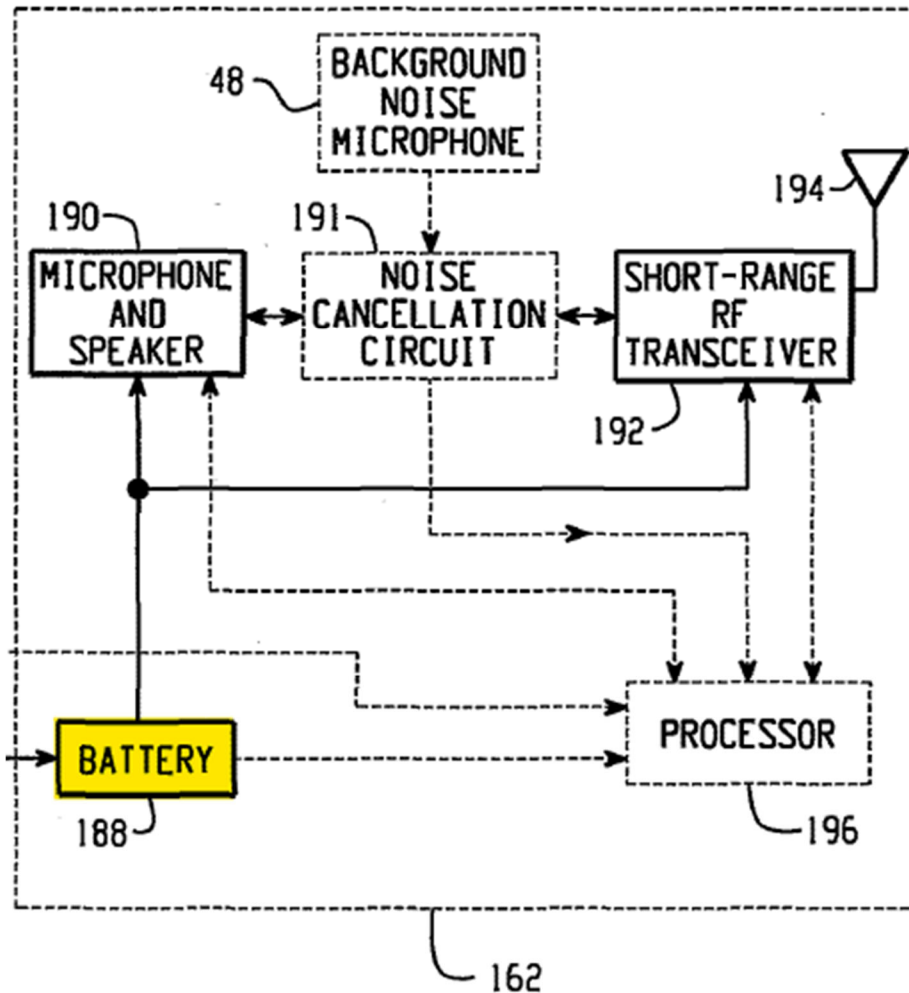
“[T]he touch-sensitive area is used for picking up a gesture made on the area with *e.g.* a stylus or a finger....The gesture detected may be used for controlling a setting of the system. Examples of a setting are a selection of a next or a previous track, a volume, a position of a stereo image, *e.g.* a panning position, a balance position. The gesture detected may also be used for controlling a mouse pointer, navigating a menu,

entering a tapping pattern, scrolling content on display. The gesture detected may be a character, like a letter from an alphabet. The character detected may be used for jumping in a list to an entry with a first letter corresponding to the character detected. The list may contain items like contacts, artists, song titles, etc. The gesture detected may be a user defined gesture for activating a user defined function. The gesture detected may be used for user identification by matching with initials or an autograph. The gesture may extend into two dimensions, e.g. a planar gesture....” *Id.*, 6:14-35; *see also generally*, 5:55-6:60.

223. Each of these temporal patterns and gestures (or other similar ones) could be utilized in the Griffin-Hollemans combination’s headset to provide the user with a wide range of control over the functionality of the headset and/or connected device.

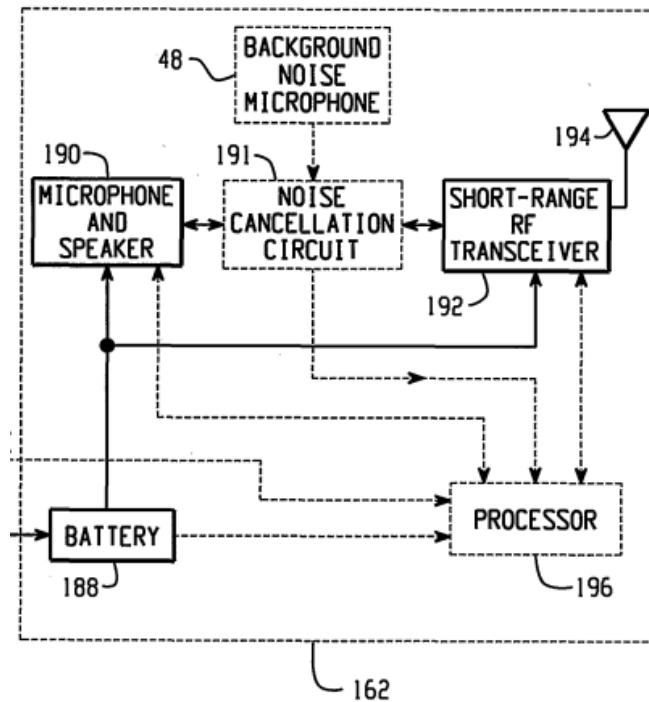
e. [1D]: “a rechargeable battery contained within the head-worn structure”

224. Griffin’s headset includes a “*rechargeable battery*.” For example, Griffin discloses that its headset (second communication module 14) “preferably includes a rechargeable power source.” Griffin, 9:3-5. And the excerpted portion of Figure 16 below illustrates the “rechargeable battery 188” included in the headset (element 162). *Id.*, 16:7-17.



- f. [1E]: “electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery, and the electronic circuitry being electrically connected to the touch sensitive surface”

225. As discussed above in relation to limitation [1A], Griffin’s headset houses various electronic circuits, *i.e.*, “*electronic circuitry*” including a microphone and speaker, a noise cancellation circuit, a processor, and a short-range RF transceiver as depicted in the excerpted portion of Figure 16 below. Griffin, 15:3-4.

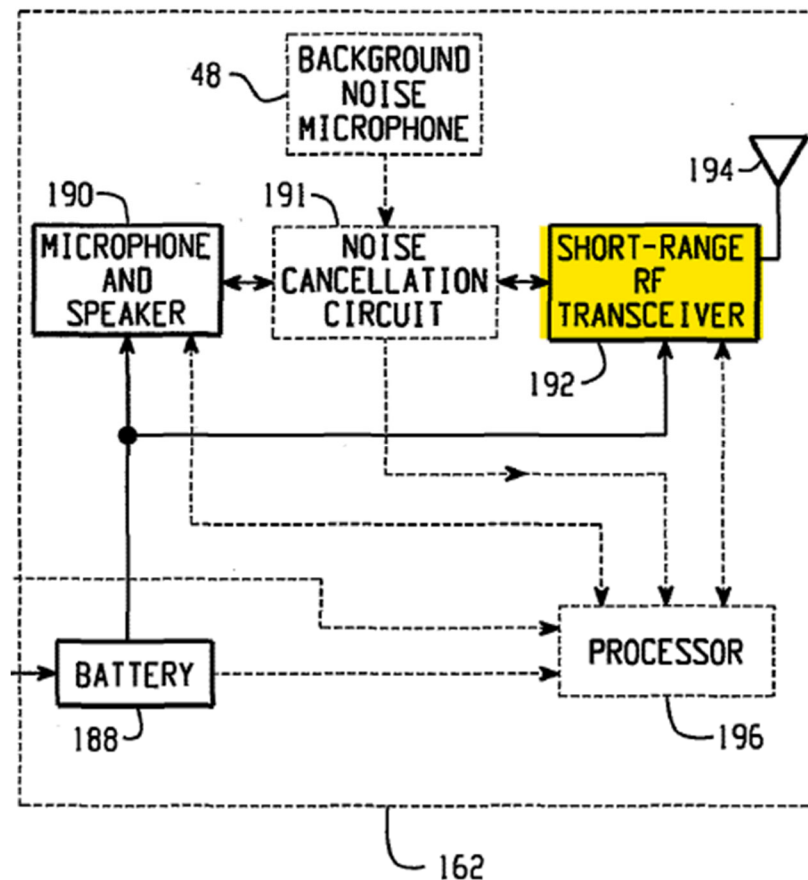


226. As depicted above, and as a person of ordinary skill in the art would have expected in a modern consumer electronic, Griffin’s rechargeable battery 188 is “*electrically connected*” to Griffin’s various electronic circuitry such as its processor, microphone/speaker, noise-cancellation circuit, and transceiver so as to provide those circuits with power to operate. Griffin, 16:7-17. Claim 2 of Griffin is explicit on this point as it recites “a rechargeable power source **coupled to** the RF transceiver, microphone and speaker.”

227. POSAs would understand the electronic circuitry of Griffin would likewise be “*electrically connected*” to Hollemans’ touch-sensitive surface in the Griffin-Hollemans combination so as to provide the touch-sensitive surface with power.

- g. [1F]: “wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery”

228. Griffin’s headset includes “a short-range wireless transceiver 192” used to communication with the first module. Griffin, 15:25-16:9. This short-range transceiver of the headset is electrically connected to rechargeable battery 188 of the headset as depicted in the excerpted portion of Figure 16 below.



Griffin, Fig. 16.

229. Additionally, claim 1 of Griffin claims “a second communication module...comprising an RF transceiver configured to transmit and receive RF signals to and from the first communication device.” And claim 2 of Griffin (which depends from claim 1) claims “a rechargeable power source coupled to the RF transceiver”.

- h. [1G]: “at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and”**

230. Griffin’s headset includes charging terminals 56 as shown in figure 5 below.

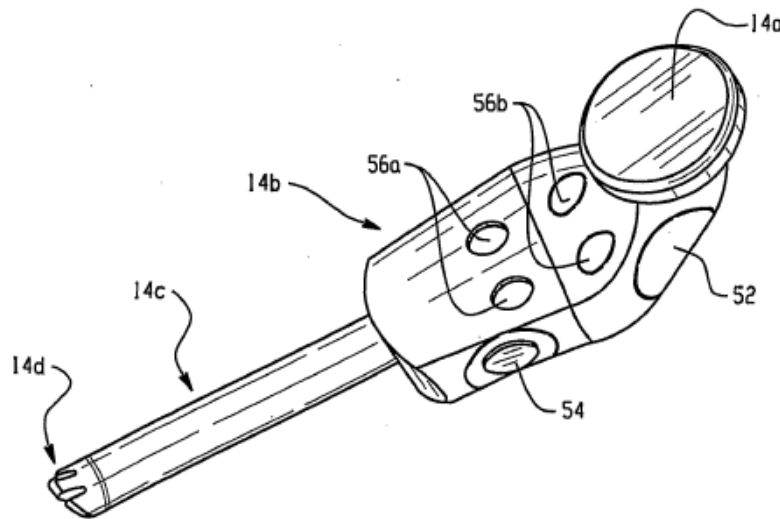
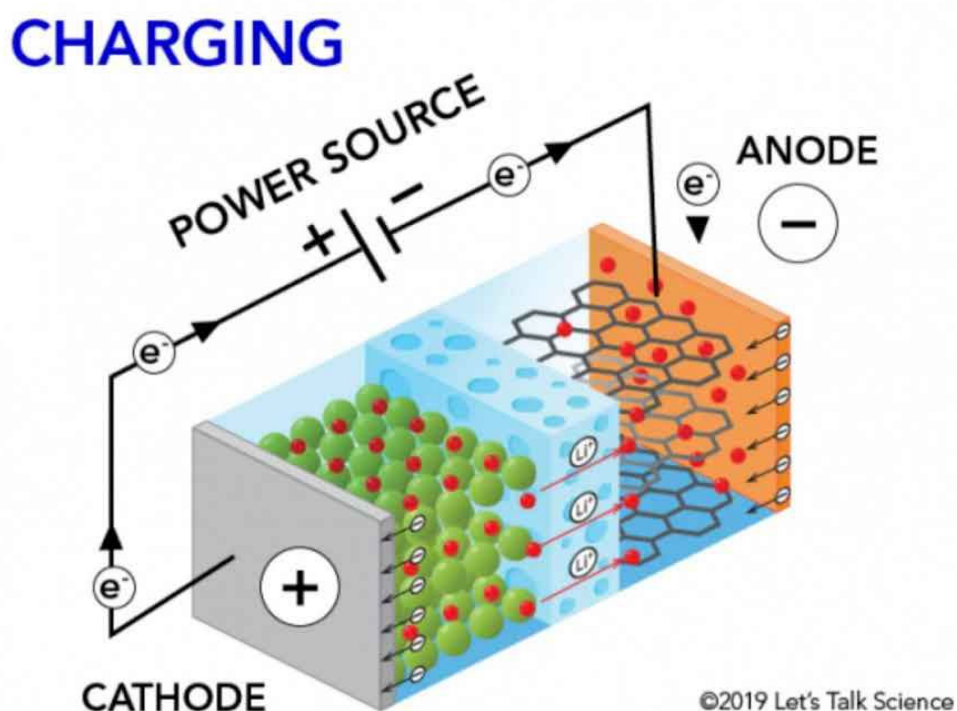


Fig. 5

231. POSAs would have known that in order to carry an electrical current, the charging terminals would be made of conductive materials because the flow of

electrons required from a power source to recharge a battery requires a fully conductive circuit in which these electrons flow into and out of these charging terminals as shown in the diagram below.



Taken from: <https://letstalkscience.ca/educational-resources/stem-explained/how-does-a-lithium-ion-battery-work>

232. “The charging terminals 56 on the second communication module 14 [i.e., headset] preferably mate with corresponding charging terminals 46 on the first communication module 12 shown in Fig. 3 [below].” Griffin, 8:3-5. This mating, i.e., “interconnection,” is enabled by the fact that the charging terminals on the headset are “at least partially exposed.”

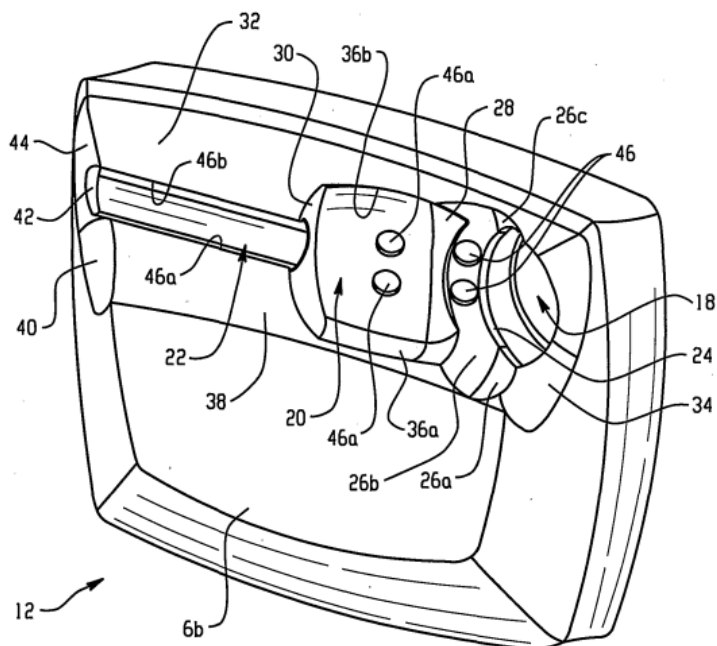
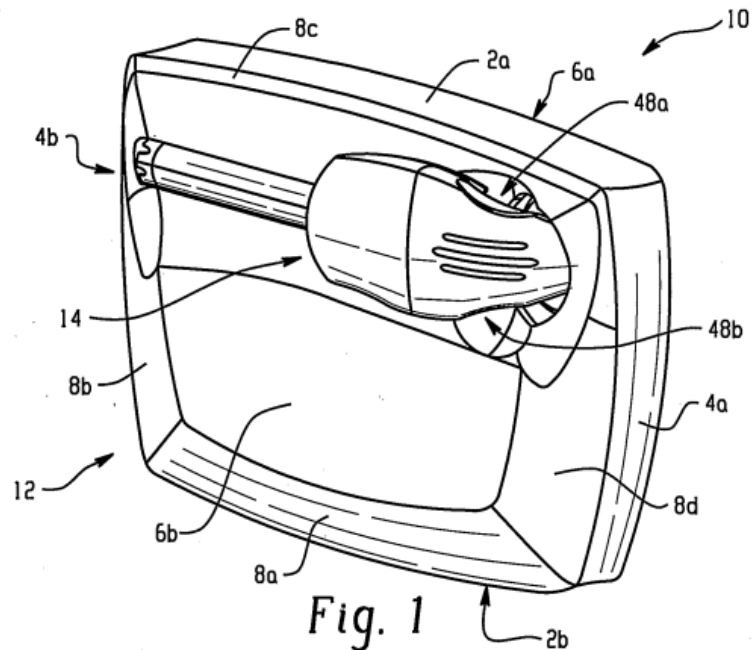


Fig. 3

233. Griffin’s rechargeable battery “is recharged by the first communication module 12 through the charging terminals 46 and 56 while the [headset] is in its fully mounted position as shown in Fig. 1 [below].” Griffin, 8:6-9; *see also id.*, 9:3-5. In order to conduct electricity to the battery (i.e. via recharging), the charging terminals are “*electrically connected*” to the battery. Claim 2 of Griffin explicitly discloses this as it recites “a first set of terminals coupled to the rechargeable power source on the second communication module.”



234. As depicted in Figure 16 below, the rechargeable battery (element 188 below) in Griffin's headset (element 162) is recharged by a power source (element 186) in the first module (element 160) when the headset is mounted in the first module such that they "*are in electrical contact*" via their respective charging contacts. As Griffin explains, "the rechargeable battery 188 of the second module 162 may be recharged by the battery 184 of the first communication module 161 through power supply recharging circuitry 186 when the two modules are in electrical contact." Griffin, 16:15-17.

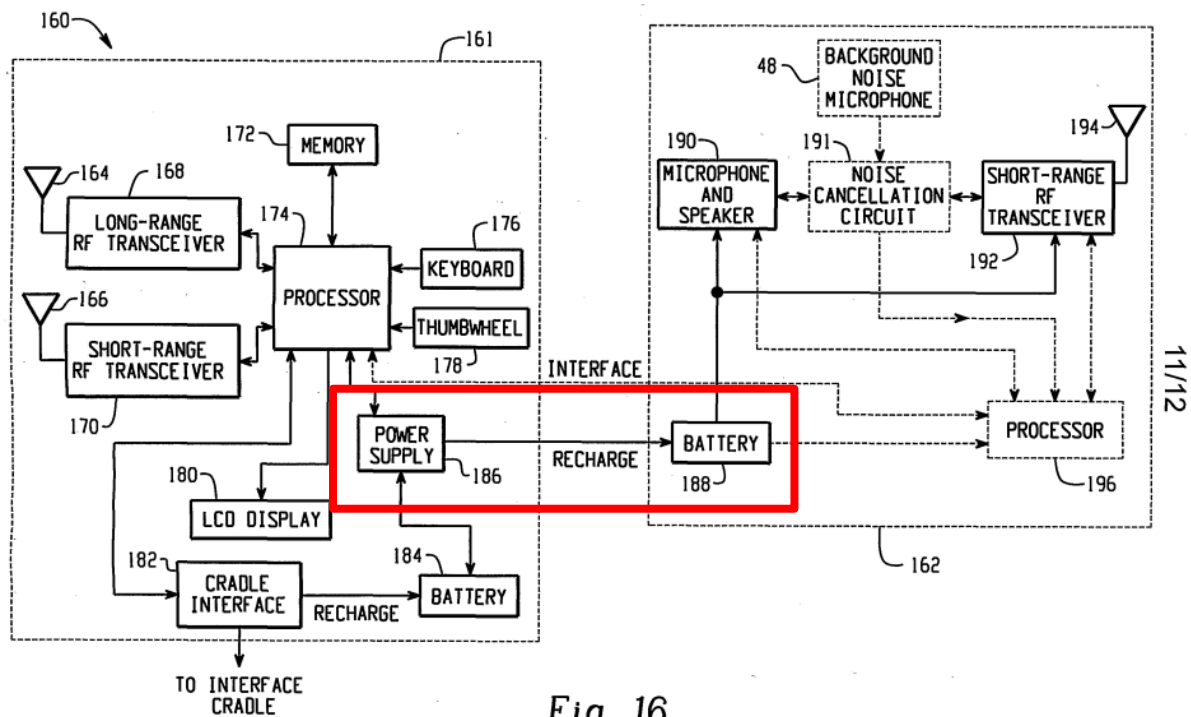


Fig. 16

See also *id.*, claim 2; Fig. 1 (depicting the mating of the two modules); 13:8-11.

i. [1H]: “a charging apparatus having at least a charging connector,”

235. As discussed above in relation to limitation [1G] and as seen in Figs. 3 and 5 below, Griffin’s first module charges the rechargeable battery in Griffin’s headset via charging terminals 46 that “mate” with charging terminals 56 on the second module when the second module is placed in the first module. Griffin, 8:3-5. POSAs would thus understand Griffin’s first module to be a “*charging apparatus*” and its charging terminals to each be a “*charging connector*” as claimed by the ’4901 patent.

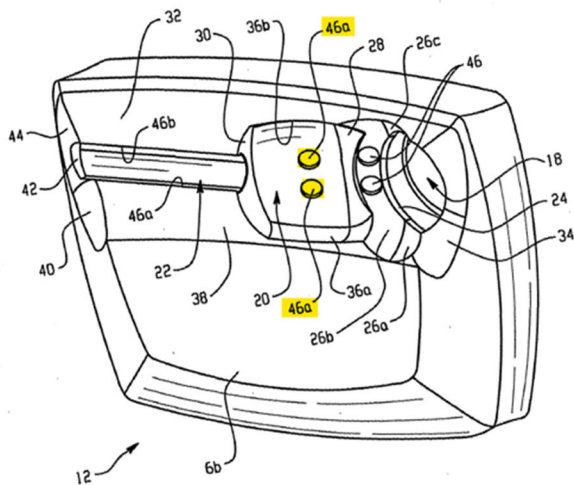


Fig. 3

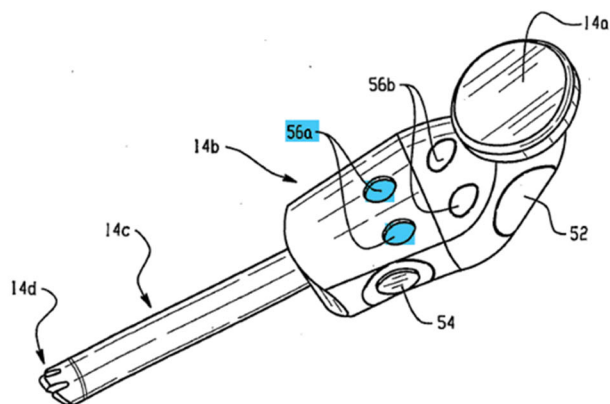


Fig. 5

Fig. 3

- j. [1I]: “wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.”

236. As discussed above in relation to limitations [1G] and [1H], when Griffin’s second module (i.e. the headset) is placed in Griffin’s first module, the first module charges the rechargeable battery in Griffin’s headset via charging terminals 46 on the first module. Specifically, terminals 46 (i.e. the *charging connector*) of the first module “mate with corresponding charging terminals 56” (i.e. the *conductive element*) of the headset as depicted in Figures 3 and 5 below. Griffin, 8:3-5.

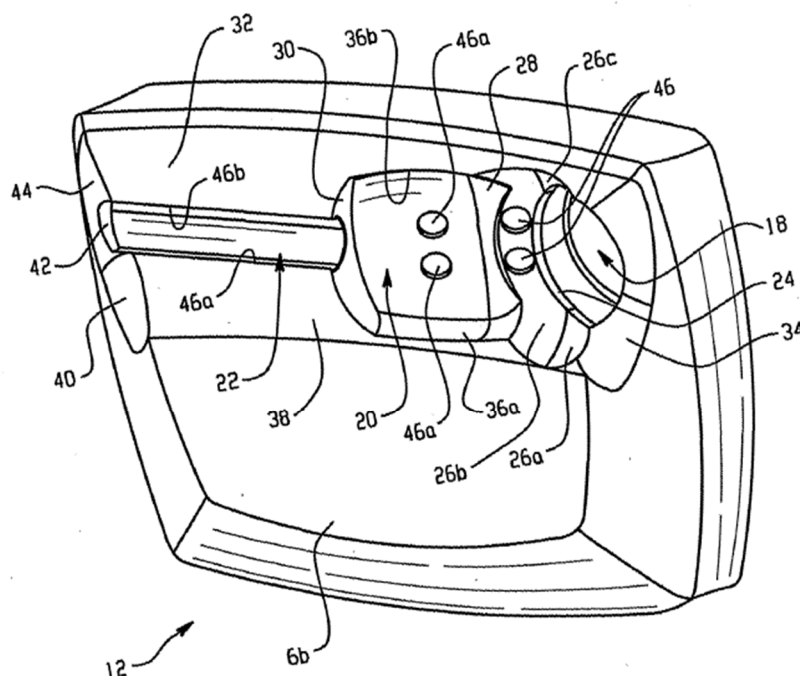


Fig. 3

237. Thus, “*electrical connection results at least from the at least one conductive element connecting with the charging connector*” and “*the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.*”

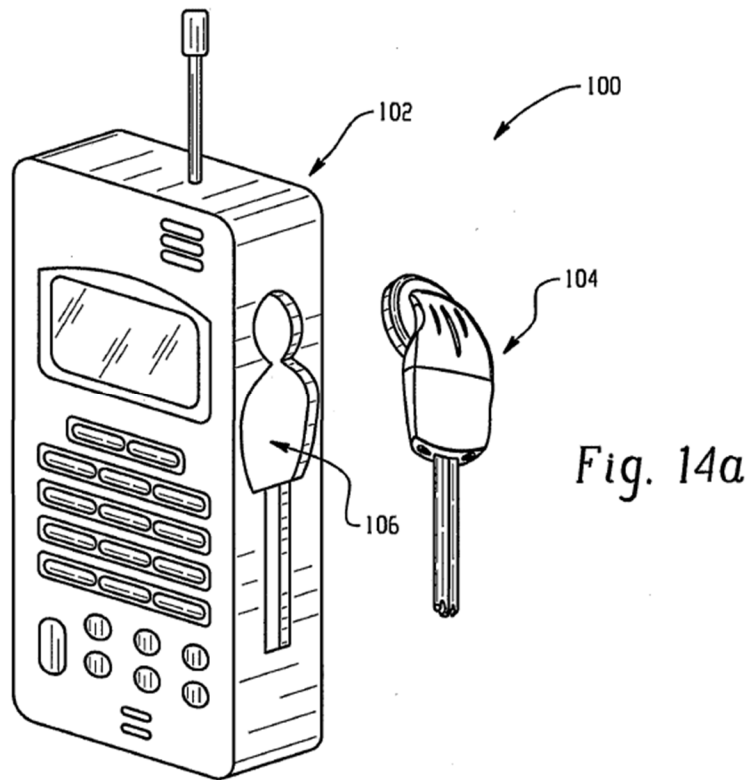
5. **Claim 2: “A system as recited in claim 1, wherein the sensed touch input by the touch sensitive surface operates to at least alter operation of the head-worn personal electronic apparatus.”**

238. As discussed above in relation to limitation [1C], in the Griffin-Hollemans combination, Griffin’s headset includes Hollemans’ touch-sensitive area that detects temporal patterns and/or gestures on the touch sensitive surface performed by the user to control an operation of the headset, *e.g.*, volume of a

telephone call. Hollemans, 2:15-19 (“a long tap for adjusting volume”); claim 15; *see also id.*, 4:46-56; 5:55-6:64.

6. **Claim 3: “A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to support voice calls to the user, and wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.”**

239. Griffin discloses that its first module includes an RF component for “long-range wireless network” communication such as wireless network communication. Griffin, 15:3-16:4. Griffin further discloses that its first module can be “a cellular telephone” and that the second communication module (i.e. the headset) “may provide a hands-free means for a user to answer and participate in a voice call received at the cellular telephone” (i.e. the first module). *Id.*, 19:6-13; *see also, id.*, 13:20-23 (first module can be a phone); 17:10-11 (same); claim 13 (same). This is illustrated in Figure 14a below where the first module (element 102) is depicted as a cellular phone.



240. Thus, Griffin’s headset “*is configured to support voice calls.*”

241. In the Griffin-Hollemans combination, a user can answer or decline a call by touching the touch-sensitive area added to Griffin’s headset. This is supported by Hollemans, which explicitly teaches that its earbud can control “a mobile phone” and that touching its touch-sensitive surface “could be mapped on answering [a] call” and/or “mapped to hanging up.” Hollemans, 3:9-22; 6:54-60; *see also id.*, claims 24-27.

7. **Claim 4: “A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the at least one operation of the head-worn personal electronic**

apparatus being altered concerns control of the audio output being provided to the user.”

242. As discussed above in relation to claim 3, the Griffin-Hollemans headset supports voice calling which results in “*audio output to the user via the speaker*” of the headset.

243. Additionally, as discussed above, in relation to limitation [1C] and claim 3, users can adjust the Griffin-Hollemans headset’s volume or hang up a phone call, using Hollemans’ touch-sensitive surface. Hollemans, 2:17-18; 6:54-60. Thus, the user can alter “*at least one operation...[that] concerns control of the audio output.*”

8. Claim 5: “A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to distinguish at least a direction of the user input with respect to the touch sensitive surface.”

244. Hollemans’ touch-sensitive surface “is used for picking up a gesture made on the [surface] with e.g., ...a finger.” Hollemans, 6:14-15. The gestures that the touch-sensitive surface can detect include a “planar gesture,” and the gesture can be used to “control[] a setting” such as the “volume,” to “scroll[] content on a display,” or to write a “character, like a letter from an alphabet.” Hollemans, 6:20-35. “The character detected may be used for jumping in a list to an entry with a first letter corresponding to the character detected.” *Id.*

245. A person of ordinary skill in the art would have understood that scrolling through content using a touch-sensitive surface is typically performed by sliding one's finger up or down the surface to cause content that is be accessed to scroll up or down. Likewise, a person of ordinary skill in the art would readily understand that for a device to recognize a letter that is being traced on a touch-sensitive surface, the device would need to be able to distinguish the various directions in which the user's finger is moving so as to correlate those movements/directions with a database of known letters or symbols. Likewise, Griffin teaches that its first module can include a "stored number list" with telephone numbers in it. Griffin, 19:9-13.

246. In view of these teachings, POSAs would have had reason to implement the Griffin-Hollemans combination such that a user could slide a finger on the touch-sensitive surface to perform various functions, such as raising/lowering volume of the audio output or scrolling content (*e.g.*, a list of phone numbers) shown on the wirelessly connected phone or PDA display (*i.e.* the first module).

247. Additionally, in order to detect gestures corresponding to letters or other characters as taught by Hollemans, POSAs would configure the combination's headset to recognize changes in the direction of a user's finger. Hollemans, 6:26-27. When, for example, a user makes a gesture on the touch-sensitive surface that corresponds to the letter "I," "the touch input received at the touch-sensitive input

includes a movement with a direction,” i.e., down or up to create the “I.” Based on the direction of movement of the user’s finger on the touchpad, the letter “I” is detected, and an “operation” of Griffin’s headset is “dependent on the determined direction” because the determination of the “I” gesture results in a jump in a list (e.g., of song titles or names in a phone number list) to the letter I. POSAs would understand that implementing directional gestures on a touch-sensitive surface to control headset functionality—such as scrolling or navigating a list—is a natural and predictable application of the technologies disclosed in these references.

248. Implemented in this manner, the combination’s headset is configured to “*distinguish at least a direction of the user input with respect to the touch sensitive surface.*”

9. Claim 6: “A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to detect at least a sliding of a finger action with respect to the touch sensitive surface.”

249. As discussed above in relation to claim 5, the combination’s headset would be configured to recognize a user sliding their finger on the touch-sensitive surface of the headset to raise/lower volume, scroll content shown on the display of the connected device, and/or draw letters or other characters via a gesture. Thus, in this implementation, the headset is configured to “*detect at least a sliding of a finger action with respect to the touch sensitive surface.*”

10. **Claim 7: “A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to facilitate determination at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the touch sensitive surface.”**

250. As discussed above in relation to claim 5, the combination’s headset would be configured to recognize a user sliding their finger on the touch-sensitive surface of the headset to raise/lower volume, scroll content shown on the display of the connected device, and/or draw letters or other characters via a gesture. As the headset would need to determine the direction of the sliding (in order to tell whether the user was raising or lowering the volume for example), in this implementation, the headset is configured to *“facilitate determination at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the touch sensitive surface.”*

11. **Claim 8: “A system as recited in claim 1, wherein the head-worn structure comprises: a physical condition sensor at least partially contained within the head-worn structure and configured to acquire data pertaining to a physical condition of the user, the physical condition sensor being provided at least partially contained within the head-worn structure.”**

251. In addition to its first touch-sensitive surface used to control a connected device, Hollemans also teaches the use of a second (or “further”) “touch-sensitive surface 123” that “is touched substantially by the ear when the controller is substantially worn in or by a human ear.” Hollemans, 2:19-27; 3:36-38. This second touch-sensitive surface can be a “temperature sensor.” *Id.*, 3:38-43.

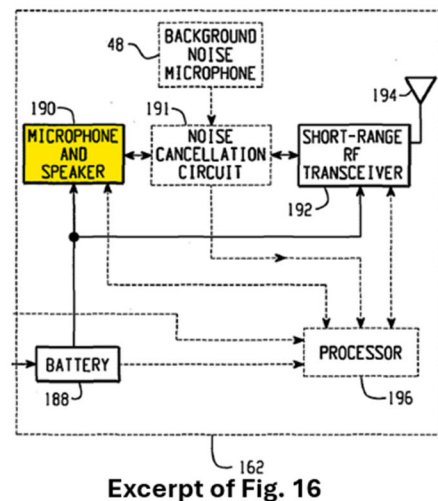
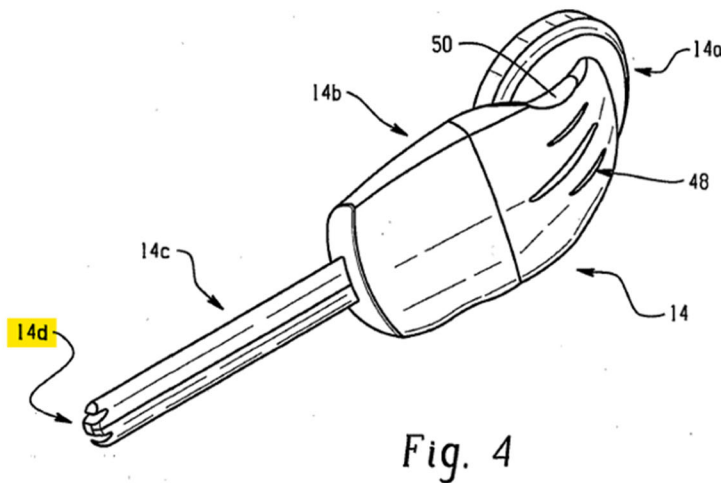
252. Hollemans' device only sends a control signal to the remote device (e.g., a mobile phone) if the second/further touch-sensitive surface is touched, which "prevent[s] the accidental remote control of the device when the remote controller is not wor[n], thus preventing unwanted activation of the device and unnecessary battery exhaustion." *Id.*, 2:19-27. That is, the earbud's ability to change or adjust functions of a connected device only exists when the earbud is being worn as detected by the second touch-sensitive surface.

253. Adding Hollemans' second touch-sensitive surface in the form of a temperature sensor to Griffin's headset would have preserved the battery of the connected device (e.g., phone or PDA device) that the headset controls by preventing the headset from mistakenly sending a control signal to the remote device when the headset was not being worn as detected by temperature sensor. Being able to detect when the headset is in use would save battery life in both the headset and the connected device. If the headset is known to be disconnected, the connected phone doesn't need to maintain a voice or audio link to the headset and thus the phone will save power. Likewise, if the headset is not in use, it can shut down all its functionality and just wake up intermittently to check the status of this "in use" detector in the headset. This intermittent polling of the "in use" detector would save considerable power consumption in the headset.

254. This obvious implementation of Griffin-Hollemans would include Hollemans' temperature sensor, *i.e.*, “*a physical condition sensor*” within the headset, rendering claim 8 obvious.

12. **Claim 10: “A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises: a microphone at least partially contained within the head-worn structure, wherein the head-worn personal electronic apparatus is configured to receive a voice input via the microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personable electronic apparatus based on the requested operation.”**

255. Griffin's discloses a “*microphone at least partially contained within*” the headset as depicted in Figure 4 (element 14d) and Figure 16 (element 190). Griffin, 6:15-16; *see also id.*, 14:7 (“microphone 120d”), 16:8 (“microphone and a speaker 190”), Figs. 5, 15.



256. Griffin's headset is also "adapted for voice control" to "provide a hands-free means for a user to answer and participate in a voice call received at the cellular telephone." Griffin, 19:6-13. Using voice control, a user may, for example, "initiate a telephone call [or] add a telephone number to a stored number list...by simply speaking into the microphone of the second communication module 214 [*i.e.*, the headset]." *Id.*

257. Thus, Griffin's headset, as used in the Griffin-Hollemans combination "is configured to receive a voice input via the microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personable electronic apparatus based on the requested operation," rendering claim 10 obvious.

13. Claim 11: "A system as recited in claim 1, wherein the head-worn structure comprises: a radiation sensor, operatively connected to the rechargeable battery, at least partially contained within the head-worn structure and configured to sense radiation."

258. As discussed above in relation to claim 8, POSAs would have been motivated to include Hollemans' second touch-sensitive surface to detect whether the headset is being worn, as doing so would conserve battery power for the connected device.

259. Hollemans teaches that several different sensors can be used to enable the touch-sensitive areas to detect whether it is being touched including a

“temperature sensor” (discussed above in relation to claim 8) as well as a sensor that “measure[s] and detect[s] changes in either a passive or an active electromagnetic field” (i.e. an electromagnetic field sensor). Hollemans, 3:36-48. Additionally, Hollemans also discloses including an “IR movement sensor” in its earbud. *Id.*, 6:15-18.

260. In light of these teachings, it would have been obvious for a POSA to use Hollemans’ electromagnetic field sensor or IR movement sensor in place of the temperature sensor discussed above in relation to claim 8 in order to determine if the headset is being worn.

261. Alternatively, it would have been obvious for a POSA to include Hollemans’ electromagnetic field sensor or IR movement sensor in addition to the temperature sensor in order to improve the accuracy of the determination whether a headset is being worn.

262. As POSAs would have understood, electromagnetic field sensors detect electromagnetic radiation and IR (*i.e.*, “infrared”) movement sensors detect infrared radiation. Thus, each constitutes “*a radiation sensor*” as claimed.

14. **Claim 12: “A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises: a sensor at least partially contained within the head-worn structure and configured to sense data indicative of whether**

the head-worn personal electronic apparatus is being worn by the user.”

263. As discussed above in relation to claims 8 and 11, Hollemans would have motivated POSAs to include a second-touch sensitive surface to determine when the Griffin-Hollemans headset is being worn. That surface can comprise several different types of “*sensor[s]*” including a temperature sensor, pressure sensor, capacitive sensor, electromagnetic field sensor or IR movement sensor. Hollemans, 3:36-49, 6:14-18. Each of those sensors is “*configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user.*”

15. Claim 13: “A system as recited in claim 12, wherein the sensor is electrically connected to the electronic circuitry, and wherein the electronic circuitry contained within the head-worn structure of the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.”

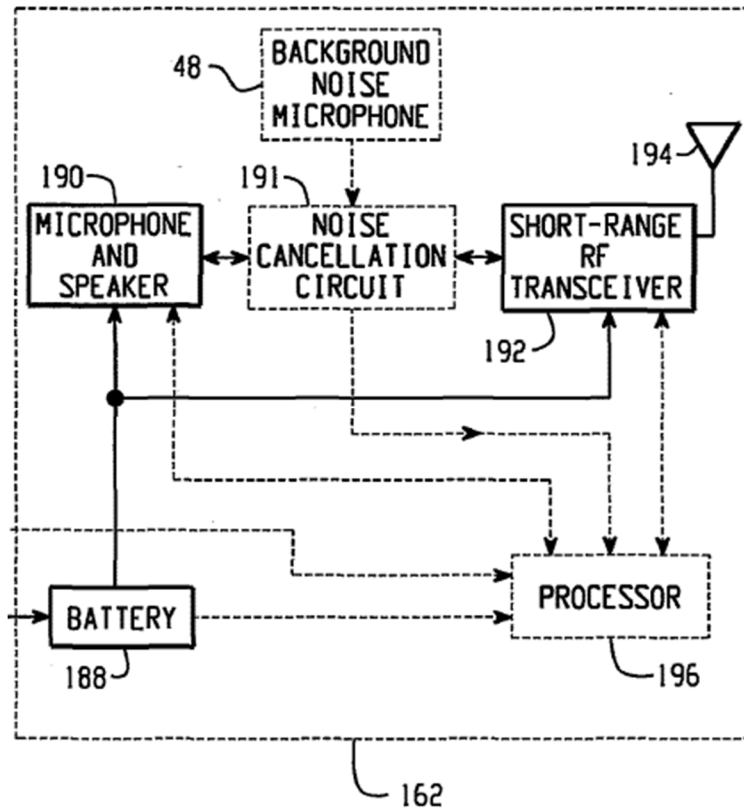
264. As discussed above, in relation to claims 8, 11, and 12, Hollemans teaches that its second touch-sensitive surface can disable the headset’s ability to control a remote device (*e.g.*, phone) when the headset is not being used. Additionally, Hollemans discloses that the second touch-sensitive surface is also used to send a “further control signal to the device if the further touch-sensitive area is touched” and that “[t]his makes it, for example, possible for the device to pause

playing music as soon as the earpiece is taken out and to resume playing music upon re-insertion.” Hollemans, 2:28-32.

265. A POSA would understand this as disclosing that the touch-sensitive surface would send a control signal when the second touch-sensitive surface is first touched (instructing the device to “resume playing music upon re-insertion”) or first ceases being touched (instructing the device to “pause playing music as soon as the earpiece is taken out”).

266. As discussed *supra* claim 12, the Griffin-Hollemans headset includes a sensor for detecting whether it is being worn. As Hollemans teaches, data from that sensor would be used to “*alter operation*” of the headset, *e.g.*, cause the headset to send a signal to a connected device like a phone or PDA to pause or resume audio.

267. POSAs would have understood that Griffin’s processor 196 controls the headset’s functionality and that for the sensor’s data to be used by the processor for the above-discussed functionality, then the sensor is “*electrically connected*” to the headset’s various electronic circuits, including Griffin’s processor 196, and/or that that would have been an obvious implementation of Griffin-Hollemans. Griffin, 16:5-9. For example, the excerpt of Figure 16 below illustrates how Griffin’s processor 196 is electrically connected to the other components of the headset.



16. **Claim 14:** “A system as recited in claim 13, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.”

268. As discussed above in relation to limitation [1B], the headset of Griffin-Hollemans combination is “*is configured to support audio output to the user via the speaker.*” As discussed above in relation to claim 13, when the second touch-sensitive surface detects that the headset is being taken off, the headset sends a control signal to the device to pause audio, and when the second touch-sensitive surface detects that the headset is being put back on, the headset sends a control

signal to the device to resume audio. Thus, “*the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.*”

17. Claim 18

a. [18PRE]: “A system, comprising:”

269. As explained above in relation to limitation [1PRE], the Griffin-Hollemans combination is “[*a*] system.”

b. [18A]: “a head-worn personal electronic apparatus, including at least:”

270. As explained above in relation to limitation [1A], the Griffin-Hollemans combination includes a headset, which is “*a head-worn personal electronic apparatus.*”

c. [18B]: “a head-worn structure configured to be worn by a user; a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent to an ear of the user when the head-worn structure is being worn by the user;”

271. As explained above in relation to limitation [1B], the headset in the Griffin-Hollemans combination is “*a head-worn structure configured to be worn by a user*” and contains “*a speaker...configured to be at or adjacent to an ear of the user when the head-worn structure is being worn by the user.*”

d. [18C]: “a first microphone at least partially contained within the head-worn structure, the first microphone

being positioned to pick up at least audio input from at least the user”

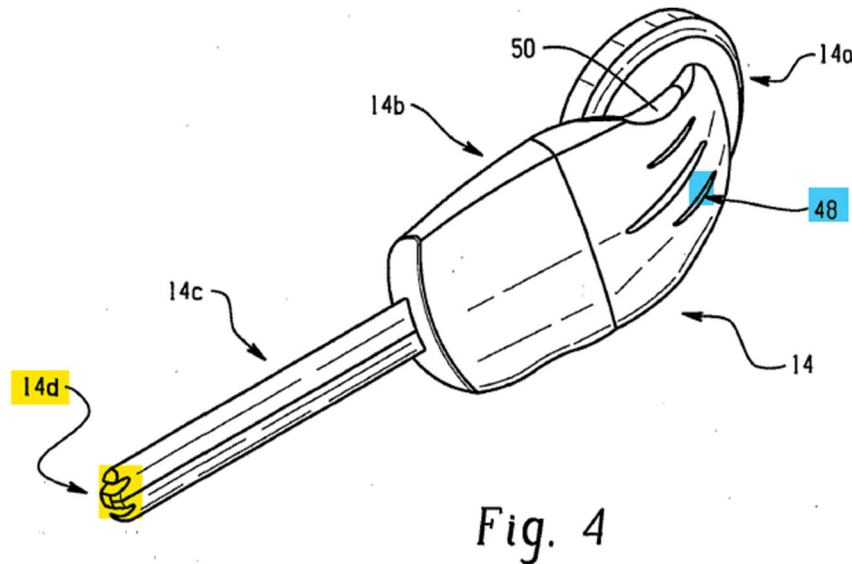
272. As discussed above in relation to claim 10, Griffin’s headset includes a first microphone. *See* Griffin, 6:15-17, 14:6-7, 16:7-9, Figs. 4-5, 15-16. Griffin discloses that the “length of boom portion 14c should be maximized such that microphone 14d is located in proximity of the communication device user’s mouth” when the headset is being used and that it will “receive...a user’s speech.” *Id.*, 7:1-8; *see also id.*, 14:20-23 (“microphone 120d extend[s] toward the user’s mouth”). Thus, Griffin’s first microphone is located near a user’s mouth and “*positioned to pick up at least audio input from at least the user.*”

- e. **[18D]: “a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;”**

273. Griffin teaches that in addition to receiving a user’s speech, the first microphone (discussed above in relation to limitation [18C]) also receives “undesired noise signals from a multitude of sources, such as other speakers in the vicinity or car engine noise.” Griffin, 7:6-8. Griffin further teaches that “[i]n order to reduce this background noise, the second communication module [i.e. the headset] preferably includes a noise cancellation circuit with a background noise microphone

48 as shown in Fig. 4.” Griffin, 7:8-10. This background noise microphone is “*a second microphone.*”

274. As seen in Fig. 4, “background noise microphone 48” is positioned closer to the user’s ear, and further from the user’s mouth, than microphone 14d:



275. “The background noise microphone 48 preferably detects background noise signals which are then subtracted from the corrupted speech received by the microphone 14d [*i.e.*, the “*first microphone*”] in the noise cancellation circuit. In this manner, a higher quality speech signal is provided.” Griffin, 7:10-14. The background noise microphone therefore is “*positioned to pick up at least environmental audio input associated with an environment around the [headset].*”

f. [18E]: “a rechargeable battery contained within the head-worn structure;”

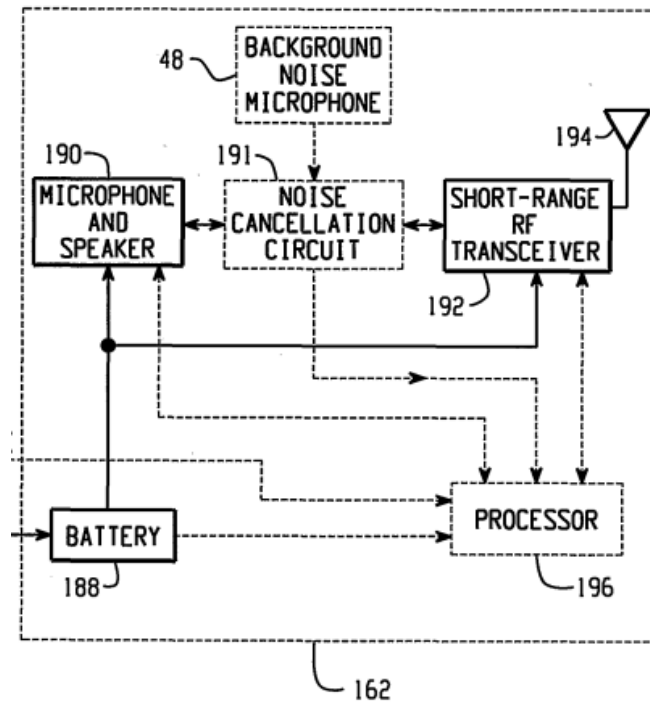
276. As explained above in relation to limitation [1D], the headset in the Griffin-Holleman combination contains a “*rechargeable battery.*”

- g. [18F]: a sensor at least partially contained within the head-worn structure and configured to capture data;**

277. As explained above in relation to claims 8 and 11-12, the headset in the Griffin-Hollemans combination contains one or more “*sensor[s]*,” including a temperature sensor, pressure sensor, capacitive sensor, electromagnetic field sensor and/or IR movement sensor, each “*configured to capture data.*”

- h. [18G] “electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the data captured by the sensor, and the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data;”**

278. As discussed above in relation to limitation [1E] and depicted below in an excerpt of Figure 16, the Griffin headset includes “*electronic circuitry*” such as its microphone(s), noise-cancellation circuit, and processor that is *electrically connected*” to the rechargeable battery 188.



279. Likewise, a POSA would understand that in the Griffin-Hollemans combination, the battery would also be “*electrically connected*” to Hollemans’ sensors for detecting whether the headset is being worn discussed above in relation to claims 8 and 11-13 in order to provide those sensors with power. The headset in Griffin-Hollemans therefore contains “*electronic circuitry [that is] electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the sensor.*”

280. As discussed above in relation to limitation [18D], Griffin’s headset includes a background noise microphone and Griffin’s “noise cancellation circuit” subtracts that noise from the audio signal that Griffin’s first microphone captures (which contains both background noise and the user’s speech). Griffin, 7:8-14.

Griffin's "noise cancellation circuit" is part of Griffin's "*electronic circuitry*," and the circuit is "*configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone.*"

281. Finally, in the Griffin-Hollemans combination, Griffin's processor 196 (which is part of Griffin's "*electronic circuitry*") would be "*configured to process at least the data captured by the sensor,*" i.e., the second touch-sensitive sensor discussed in claims 8 and 11-13, and the processor would use that data to determine if the headset "*is being worn by a user.*" Griffin, 16:5-9, Fig. 16. A POSA would understand this conventional use of a processor in a consumer electronic.

- i. **[18H]: "wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and"**

282. As explained above in relation to limitation [1F], the headset in the Griffin-Hollemans combination contains "*wireless communication circuitry.*"

- j. **[18I]: "at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one**

conductive element being electrically connected to at least the rechargeable battery; and,”

283. As explained above in relation to limitation [1G], the headset in the Griffin-Hollemans combination contains a “*partially exposed*” “*conductive element*” that is “*electrically connected*” to “*the rechargeable battery.*”

k. [18J]: “a charging apparatus having at least a charging connector,”

284. As explained above in relation to limitation [1H], the first module in the Griffin-Hollemans combination is a “*charging apparatus having at least a charging connector.*”

l. [18K]: “wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.”

285. As explained above in relation to limitation [1I], when the headset of the Griffin-Hollemans combination is placed on the first module in the Griffin-Hollemans combination, “*electrical connection results*” from the *conductive element*” of the headset “*connecting with the charging connector*” of the first module and “*the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged.*”

18. **Claim 19:** “A system as recited in claim 18, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.”

286. As discussed above in relation to limitations [18C] and [18D], Griffin's headset positions its “background noise microphone 48,” *i.e.*, “*second microphone*” away from the user's head and its microphone 14d, *i.e.*, “*first microphone*” toward the front of the user's face, *i.e.*, his/her mouth. This is depicted in Fig. 4, where “background noise microphone 48” (highlighted in blue) is positioned closer to the user's ear, and further from the user's mouth, than microphone 14d (highlighted in yellow):

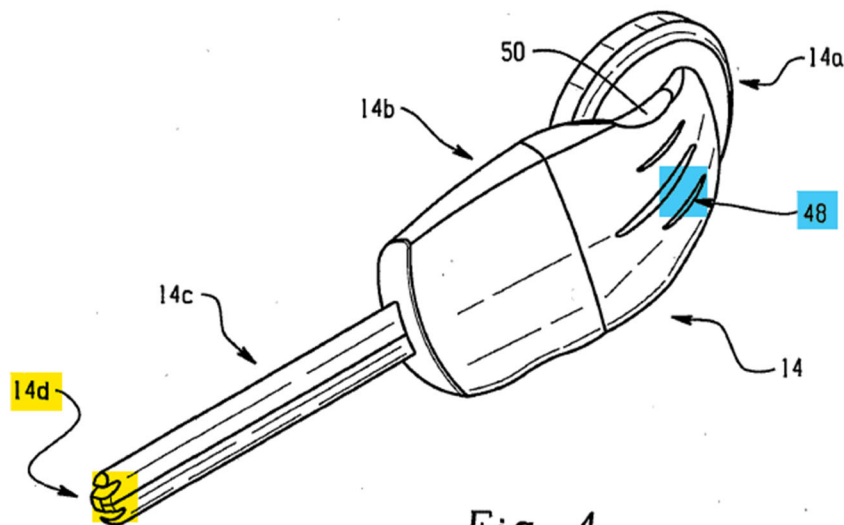


Fig. 4

19. **Claim 20: “A system as recited in claim 19, wherein the head-worn personal electronic apparatus comprises: a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus.”**

287. As explained above in relation to limitation [1C], the headset in the Griffin-Hollemans combination includes a “*touch sensitive surface*,” and as explained above in relation to claim 2, “*the sensed touch input operat[es]*” to “*alter operation*” of the headset.

20. **Claim 21: “A system as recited in claim 20, wherein the head-worn electronic personal audio apparatus is configured to support audio output to the user via the speaker, and wherein the at least one operation of the head-worn electronic personal audio apparatus being altered concerns control of the audio output being provided to the user.”**

288. As explained above in relation to claim 4, the headset in the Griffin-Hollemans combination is “*configured to support audio output*” such as a phone call “*to the user via the speaker*,” and a user can alter “*at least one operation...[that] concerns control of the audio output*” such adjusting the volume or hanging up a phone call.

21. **Claim 23 “A system as recited in claim 18, wherein the sensor is positioned to be directed towards the user's head when the head-worn structure is being worn.”**

289. As discussed above in relation to claims 8 and 11-12, the headset in the Griffin-Hollemans combination contains Hollemans’ second touch-sensitive surface

that uses one or more sensors including a temperature sensor, pressure sensor, capacitive sensor, electromagnetic field sensor and/or IR movement sensor.

290. POSAs would orient these sensors used in Hollemans for determining if the headset is being worn “*towards the user’s head*” to determine if the headset is being worn. For example, POSAs would direct the Hollemans temperature sensor in the combination toward the user’s head to obtain an accurate temperature reading. Using a different orientation (such as pointing away from the user) would lead to an inaccurate temperature reading given that sensor is used to determine whether the headset is being worn on the user’s head.

22. Claim 24: “A system as recited in claim 23, wherein the data captured by the sensor is dependent on thermal characteristics of the user’s head when the head-worn structure is being worn.

291. As explained above in relation to claim 8, the headset in the Griffin-Hollemans combination includes a temperature sensor used to determine whether the headset is being worn. POSAs would understand that this temperature sensor would capture data “*dependent on thermal characteristics of the user’s head*” in order to make this determination. For example, when the headset is being worn, the temperature sensor would capture a higher temperature based on the thermal characteristics of the user’s head than if the headset has been removed.

23. Claim 25: “A system as recited in claim 18, wherein the head-worn personal electronic apparatus is configured to receive a voice input via the first microphone, determine or receive a

determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus based on the requested operation.”

292. As explained above in relation to claim 10, the headset in the Griffin-Hollemans combination is “*configured to receive a voice input from the first microphone*” and to use “*voice recognition*” to “*control an operation*” of the headset, such as initiating a telephone call.

24. Claim 26: “A system as recited in claim 18, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.”

293. As explained above in relation to claim 13, the headset in the Griffin-Hollemans combination is “*configured to at least alter operation*” of the headset “*based at least in part on the sensed data from the sensor*” such send a signal to a connected device like a phone or PDA to pause or resume audio when the sensor senses the headset is removed or put back on.

25. Claim 27: A system as recited in claim 26, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

294. As discussed above in relation to limitation [1B], the headset of Griffin-Hollemans combination is “*is configured to support audio output to the user via the speaker*.” As explained above in relation to claims 13 and 14, the headset in the

Griffin-Hollemans combination is configured to alter operation of the headset that “*concerns control of the audio output being provided to the user*” such as sending a signal to a connected device like a phone or PDA to pause or resume audio when the sensor senses the headset is removed or put back on.

26. **Claim 28: “A system as recited in claim 18, wherein the head-worn personal electronic apparatus comprises: a user input device supported by the head-worn structure, the user input device being configured to receive a user input, the user input device is based on at least capacitive effect, wherein the user input being received induces at least a capacitive change to produce at least an electrical response.”**

295. As discussed above in relation to limitation [1C], the Griffin-Hollemans headset includes Hollemans’ touch-sensitive surface. POSAs would understand this surface to be a “*user input device*” because a user can tap or otherwise touch it to control a function of the device with which the headset is wirelessly connected. For example, Hollemans discloses that the earbud “is arranged to detect a temporal pattern in the touch-sensitive area being touch, and to send the control signal in response to detecting the temporal pattern.” Hollemans, 2:5-19. Hollemans further explains that “[t]he temporal pattern is a particularly appropriate user interface, because it is easy to create temporal patterns in touching the area rhythmically and because the temporal patterns can constitute a natural and consistent interface.” *Id.*; *see also id.*, 1:4-11, 3:17-24, 5:55-6:64.

296. Hollemans teaches that its touch-sensitive surface “can be realized in many ways, including a sensor for changes in capacity or induced voltages or currents.” Hollemans, 3:38-40; *see also id.*, 6:15-18 (discussing “cross-capacitance sensor”). Hollemans thus teaches an embodiment in which its touch-sensitive surface (i.e. a “*user input device*”), used in Griffin-Hollemans, is “*based on at least capacitive effect, wherein the user input being received induces at least a capacitive change to produce at least an electrical response.*”

27. Claim 29: “A system as recited in claim 28, wherein the user input device is configured to distinguish at least a direction of the user input with respect to the user input device.”

297. As explained above in relation to claim 5, the touch sensitive surface in the headset of the Griffin-Hollemans combination can detect the direction of a user sliding their finger when swiping and/or making a gesture on the surface and thus “*is configured to distinguish at least a direction of the user input with respect to the user input device.*”

28. Claim 30: “A system as recited in claim 28, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to detect at least a sliding of a finger action with respect to the user input device using at least the electronic circuitry and the user input data.”

298. As explained above in relation to claim 6, the touch sensitive surface in the headset of the Griffin-Hollemans combination can detect a user sliding their

finger when swiping and/or making a gesture on the surface and thus “*is configured to detect at least a sliding of a finger action with respect to the user input device using at least the electronic circuitry and the user input data.*”

- 29. Claim 31: “A system as recited in claim 28, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to distinguish at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the user input device using at least the electronic circuitry and the user input data.”**

299. As explained above in relation to claim 7, the touch sensitive surface in the headset of the Griffin-Hollemans combination can detect the direction of a user sliding their finger when swiping and/or making a gesture and thus “*is configured to distinguish at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the user input device using at least the electronic circuitry and the user input data.*”

- 30. Claim 34: “A system as recited in claim 18, wherein the conductive element is a conductive pad.”**

300. As discussed above in relation to limitation [1G], Griffin’s headset includes charging terminals 56. POSAs would understand Griffin’s depiction of these charging terminals in Figure 5 to be a disclosure of the charging terminals being “*conductive pads.*”

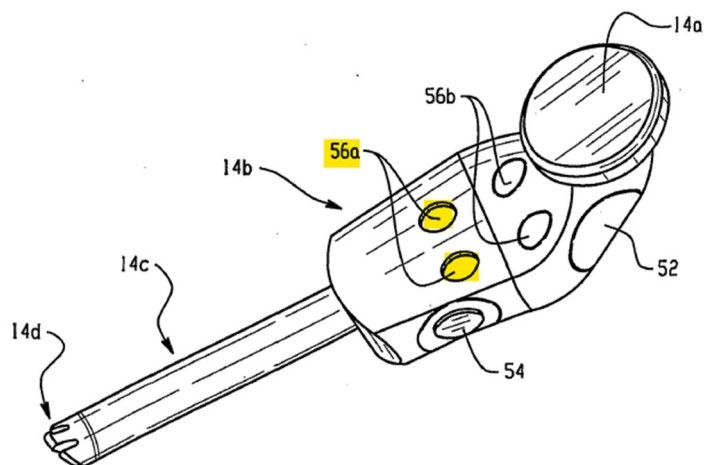


Fig. 5

31. Claim 35

301. Independent claim 35 is nearly identical to claim 18 as shown in the comparison chart below that color codes identical or near-identical language:

Claim 18	Claim 35
[18PRE] A system, comprising:	[35PRE] A system, comprising: a head-worn personal electronic apparatus, including at least:
[18A] a head-worn personal electronic apparatus, including at least:	[35A] a head-worn structure configured to be worn by a user;
[18B] a head-worn structure configured to be worn by a user; a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent to an ear of the user when the head-worn structure is being worn by the user;	[35B] a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;
[18C] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;	[35C] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

[18D] a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;	[35D] a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus’;
[18E] a rechargeable battery contained within the head-worn structure;	[35E] a rechargeable battery contained within the head-worn structure;
[18F] a sensor at least partially contained within the head-worn structure and configured to capture data;	[35F] a “being worn” sensor at least partially contained within the head-worn structure and configured to detect data indicative of whether the head-worn structure of the head-worn personal electronic apparatus is being worn;
[18G] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the data captured by the sensor, and the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data;	[35G] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the “being worn” sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the detected data captured by the “being worn” sensor;
[18H] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being	[35H] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being

electrically connected to at least the rechargeable battery; and	electrically connected to at least the rechargeable battery; and
[18I] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and	[35I] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and
[18J] a charging apparatus having at least a charging connector,	[35J] a charging apparatus having at least a charging connector,
[18K] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.	[35K] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

302. As depicted above, the lone substantive difference between these claims is that claim 18 recites “a sensor...configured to capture data” ([18F]) and “electronic circuitry...configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data” ([35G]) whereas claim 35 recites “a ‘being worn’ sensor...configured to detect data indicative of whether the [headset] is being worn” ([35F]).

303. As discussed above in relation to claims 8 and 11-13, the headset in Griffin-Hollemans includes a second touch-sensitive surface that uses a sensor, *e.g.*, a temperature sensor, connected to the electrical circuitry, to “*detect data indicative of whether the [headset] is being worn.*” The headset in Griffin-Hollemans thus meets all the limitations of claim 35 for the reasons discussed above in relation to claims 8, 11-13, and 18.

32. Claim 36: “A system as recited in claim 35, wherein the detected data by the “being worn” sensor is dependent on a physical characteristic of the user.”

304. As discussed above in relation to claims 8 and 35, Griffin’s headset includes a second touch-sensitive surface that uses a temperature sensor to detect whether the headset is being worn by detecting data “*dependent on a physical characteristic of the user*” such as the user’s temperature.

C. GROUND 2B: The Griffin-Hollemans Combination in View of Irvin Renders Obvious Claims 12-15, 18-21, 23-31, 34-39, 41-45, 47-54, 56-59

305. Most of the additional claims challenged in Ground 2B (37-39, 41-45, and 47-49) require that the claimed “*system*” include “*a motion sensor,*” “*accelerometer,*” or “*motion detector*” that detects movement of the “*head-worn personal electronic apparatus.*” Those claims (and certain related claims) would have been obvious over the Griffin-Hollemans combination in further view of Irvin.

306. Further, as discussed below, Irvin discloses its own “*being worn*” sensor and thus claims 12-14, 18-21, 23-31, and 34-36 (discussed above with relation to Ground 2A) are also rendered obvious by Griffin-Hollemans in view of Irvin.

307. The remaining claim discussed in Ground 2B, claim 15, requires the “*head-worn personal electronic apparatus*” operate in “*a low power operational mode.*” As discussed below, adding this functionality to the Griffin-Hollemans combination would also have been obvious in view of Irvin.

1. Irvin (EX1008)

308. Irvin is directed to a “wireless headset for use with a separate communications device, such as a cellular telephone,” depicted in Figure 1 below. Irvin, Abstract.

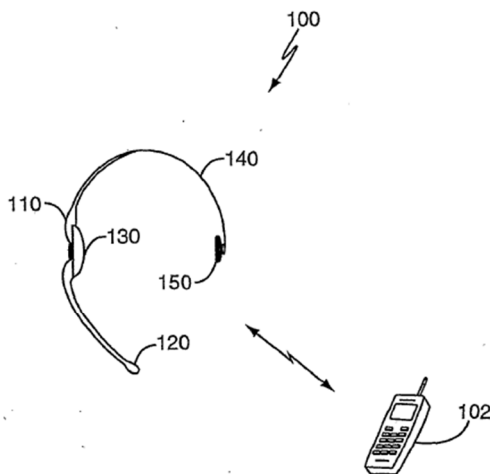


FIG. 1

309. Irvin teaches that “several obstacles impede wireless headset designers in their efforts to provide consumers with small but reliable and convenient headsets.” Irvin, 1:18-20. One of these obstacles noted by Irvin is that “[h]eadset miniaturization places severe limitations on the physical size of batteries that may be included within the headset.” Irvin, 2:12-21. As Irvin teaches, “[e]ven with the significant energy densities afforded by newer battery technologies, these very small battery cells have significantly limited capacity” and “[b]ecause battery life is a key component of operator convenience, it is important that wireless headset design incorporates provisions maximizing battery life.” *Id.*

310. Irvin further notes that “[a] manually operated on-off switch works against this need to maximize battery life” as “a user may forget to turn off the wireless headset after usage, thereby needlessly expending valuable battery life.” Irvin, 2:19-21.

311. In order to solve this problem, Irvin teaches that “[b]y detecting a user's interaction, such as picking up the headset or placing it upon the user's body, the wireless headset automatically transitions from an inactive state to an active state.” Irvin, Abstract. Thus, “[w]hen not in use, the wireless headset reverts to an inactive state and draws essentially no power.” *Id.*, 3:1-2. This allows the headset to “minimize power consumption, thereby maximizing the life of its power source, such as a battery.” *Id.*, 2:29-31.

312. Irvin further discloses a “sensor,” which “may be based on a variety of technologies” and whose “purpose is to provide a signal responsive to a natural stimulus associated with use of the headset by a user.” Irvin, 7:10-14. Irvin’s sensor can “provide[] indication that a user has placed the wireless headset 100 upon their body.” 9:12-13; *see also id.*, Abstract, 7:10-17. Irvin discloses various sensors that can be used “individually or in any combination,” such as an “accelerometer” that can detect movement of the headset and a “proximity sensor” that “may be an active or passive IR sensor, may be a resistive or other type of thermal sensor, or may be an acoustic sensor.” Irvin, Abstract, 7:15-17, 9:9-17.

2. The Griffin-Hollemans-Irvin Combination

313. In view of Irvin, a person of ordinary skill in the art would have known that a variety of sensors could be used—individually or in combination—to determine whether a headset is being worn/used, and that such information could be used to conserve battery power of the headset itself and the device(s) to which it was connected. For example, POSAs would have known that a motion sensor like an accelerometer and/or a proximity sensor like an active IR sensor could be used to determine whether the Griffin-Hollemans headset is being worn/used, and that such sensors could have been used instead of or in combination with Hollemans’ second touch-sensitive surface in the Griffin-Hollemans headset.

314. POSAs thus would have considered using Irvin’s accelerometer or active IR sensor to be the simple substitution (or use) of one known prior-art element (*i.e.*, Hollemans’ second touch-sensitive surface) for another (*i.e.*, Irvin’s various sensors) to yield a predictable result, *i.e.*, a headset with a sensor that generates data indicative of whether the headset is being worn.

315. POSAs would have naturally looked to Irvin when considering modifications to the Griffin-Hollemans headset as Irvin is also directed to a headset that can be connected to a mobile phone. Irvin, Abstract.

316. Moreover, as described above, Irvin explicitly motivates the combination as Irvin teaches using its sensors to detect whether a headset is being worn such that the headset can beneficially enter a low-power mode, conserving battery power (Irvin, 2:29-3:2), which POSAs would have considered important for a wireless device like Griffin’s headset, especially given Griffin’s teaching to “limit power consumption while the module 14 [*i.e.*, headset] is not in use.” Griffin 7:16-18.

317. And while Hollemans’ second touch-sensitive surface disables the headset from being able to accidentally control (*e.g.*, turn on) a remote device like a phone (Hollemans, 2:19-27), Hollemans does not disclose using the touch-sensitive surface to put the headset itself into a low-power mode, thus creating the potential for the headset’s battery to be drained while not in use.

318. POSAs thus would have reason to implement the Griffin-Hollemans combination with Irvin's accelerometer and/or an active IR sensor. The accelerometer and/or active IR sensor would provide data to Griffin's processor (Griffin, 16:5-9; *see also* discussions regarding limitations [1A], [1E], [18G] and claims 13 and 15 above), which would use the data to conserve power by entering a low-power mode when the headset is not worn as taught by Irvin. Irvin, 5:12-7:9; Figures 2A-3B.

319. The resulting Griffin-Hollemans-Irvin combination retains the features of Griffin-Hollemans (*supra* Ground 2A), and includes an accelerometer and/or IR sensor rather than (or in addition to) Hollemans' second touch-sensitive surface.

320. POSAs would have had a reasonable expectation of success in implementing the proposed combination, as accelerometers and active IR sensors as well as the use of their data for various processing purposes was well-known such that implementing Irvin's teachings in Griffin's headset would have required only routine engineering skill.

a. Claims 12-14, 18-21, 23-31, and 34-36

321. As discussed above in relation to Ground 2A, Hollemans' second touch-sensitive surface in the Griffin-Hollemans combination renders obvious certain limitations of claims 12-14, 18-21, 23-31, 34-36 such as "*a sensor at least partially contained within the head-worn structure and configured to sense data*

indicative of whether the head-worn personal electronic apparatus is being worn by the user” and “a ‘being worn’ sensor at least partially contained within the head-worn structure and configured to detect data indicative of whether the head-worn structure of the head-worn personal electronic apparatus is being worn.” These limitations are also rendered obvious by the Irvin accelerometer and/or active IR sensor in the Griffin-Hollemans-Irvin combination.

- i. **Claim 12: “A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises: a sensor at least partially contained within the head-worn structure and configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user.”**

322. In the Griffin-Hollemans-Irvin combination, claim 1 would be rendered obvious for all the same reasons as discussed above regarding Ground 2A.

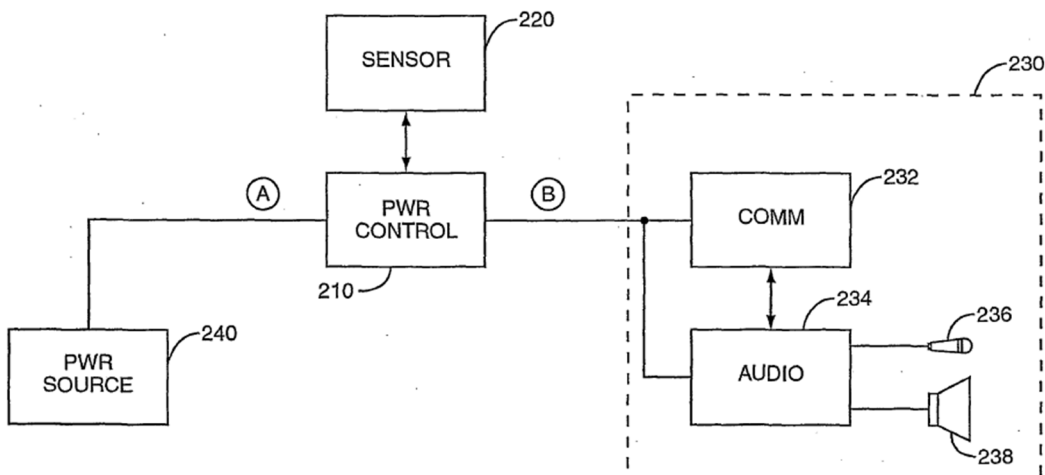
323. As explained above, in the Griffin-Hollemans-Irvin combination, the Irvin sensor (either an accelerometer and/or active IR sensor) is “*a sensor at least partially contained within*” the headset and indicates that the headset has been placed on the user’s body. EX1008, 7:12-17; 9:10-13. POSAs would thus understand that the Irvin sensor is “*configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user.*”

- ii. **Claim 13: “A system as recited in claim 12, wherein the sensor is electrically connected to the electronic circuitry, and wherein the electronic circuitry contained within the head-worn structure**

of the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.”

324. POSAs would further understand the Irvin sensor in the Griffin-Hollemans-Irvin combination would be “*electrically connected to the electronic circuitry*” of the Griffin-Hollemans combination discussed above in relation to limitation [1E]. Such electrical connection would be necessary for the rechargeable battery 188 of the headset to provide power to the sensor and for the sensor to send a signal to the processor 196.

325. Irvin discloses that the a “power control circuit 210 selectively enables (activates) the communications circuit 230 in response to an output from sensor 220” as illustrated below in Figure 2A. Irvin, 5:25-26. The power control circuit 210 can “control[] whether the communications circuit 230 is connected to the power source 240” and/or “control[] the amount of power consumed by communications circuit 230.” *Id.*, 5:26-30.



Irvin, Fig. 2A.

326. POSAs would apply this teaching of Irvin in the Griffin-Hollemans-Irvin combination to modify processor 196 of Griffin (discussed above in claim 13 and limitation 18[G]), which is part of the “*electronic circuitry*,” to perform the function of Irvin’s power control 210 and, based on input from the Irvin sensor potentially in combination with Hollemans’ second touch-sensitive surface, control the power received by other portions of the electronic circuitry of Griffin (such as the microphone and speaker, noise cancellation circuit, and/or short-range RF transceiver) from the rechargeable battery 188 of Griffin. By enabling/disabling the audio interface in this way, the processor 196 of Griffin would “*alter operation of the head-worn personal electronic apparatus*.”

327. POSAs would find this modification of the processor 196 to be routine and easy to implement given the teachings of Irvin.

iii. Claim 14: “A system as recited in claim 13, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.”

328. In the Griffin-Hollemans-Irvin combination, the headset would be “*configured to support audio output to the user via the speaker*” in the same way as the headset in the Griffin-Hollemans combination discussed above for Ground 2A.

329. As explained immediately above with regard to claim 13 for Ground 2B, in the Griffin-Hollemans-Irvin combination, Griffin's processor 196 would enable/disable the audio interface based on data from the Irvin sensor potentially in combination with Hollemans' second touch-sensitive surface. POSAs would understand this as concerning "*control of the audio output being provided to the user.*"

iv. Claim 23: A system as recited in claim 18, wherein the sensor is positioned to be directed towards the user's head when the head-worn structure is being worn.

330. As explained below in more detail in relation to claim 44, POSAs would understand that Irvin's active IR sensor in the Griffin-Hollemans-Irvin combination would be "*directed towards*" the user's head when in use in order to detect if the Griffin headset was being worn.

v. Claim 24: A system as recited in claim 23, wherein the data captured by the sensor is dependent on thermal characteristics of the user's head when the head-worn structure is being worn.

331. As explained below in more detail in relation to claim 44, POSAs would understand that Irvin's active IR sensor in the Griffin-Hollemans-Irvin combination would detect the reflected infrared radiation from a user's head, meaning the data captured by the IR sensor is "*dependent on thermal characteristics of the user's head.*"

vi. Claims 18-21, 25-31, 34-36

332. As explained above, the Griffin-Hollemans-Irvin combination retains the features of the Griffin-Hollemans combination discussed in Ground 2A. Thus, all limitations in claims 12-14, 18-21, 23-31, and 34-36 that do not involve Hollemans' second touch-sensitive surface are met in the same way by the Griffin-Hollemans-Irvin combination as they were met by the Griffin-Hollemans combination in Ground 2A.

333. For limitations regarding the “*sensor*” or “*being-worn sensor*” that Ground 2A maps to Hollemans' second touch-sensitive surface, the Griffin-Hollemans-Irvin combination renders these limitations obvious as the Irvin sensor is a “*sensor*” or “*being-worn sensor*” as described above in relation to claims 12-14 in Ground 2B.

334. The chart below illustrates this mapping.

Claim Language	Griffin-Hollemans-Irvin Combination
[18PRE] A system, comprising:	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[18A] a head-worn personal electronic apparatus, including at least:	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[18B] a head-worn structure configured to be worn by a user; a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent to	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same

an ear of the user when the head-worn structure is being worn by the user;	way as the Griffin-Hollemans combination as discussed above.
[18C] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[18D] a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[18E] a rechargeable battery contained within the head-worn structure;	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[18F] a sensor at least partially contained within the head-worn structure and configured to capture data;	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as it renders Claim 12 obvious as discussed above.
[18G] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the data captured by the sensor, and the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data;	The Griffin-Hollemans-Irvin combination renders the portion of this limitation highlighted in yellow obvious in the same way as the Griffin-Hollemans combination as discussed above. The Griffin-Hollemans-Irvin combination renders the portion of this limitation highlighted in blue obvious in the same way as it renders claims 12 and 13 obvious as discussed above.

[18H] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[18I] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[18J] a charging apparatus having at least a charging connector,	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above
[18K] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[19] A system as recited in claim 18, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.	The Griffin-Hollemans-Irvin combination renders additional limitations in this claim obvious in the same way as the Griffin-Hollemans combination as discussed above.
[20] A system as recited in claim 19, wherein the head-worn personal electronic apparatus comprises: a touch sensitive surface at least partially contained within the head-worn	The Griffin-Hollemans-Irvin combination renders additional limitations in this claim obvious in the same way as the Griffin-

structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus.	Hollemans combination as discussed above.
[21] A system as recited in claim 20, wherein the head-worn electronic personal audio apparatus is configured to support audio output to the user via the speaker, and wherein the at least one operation of the head-worn electronic personal audio apparatus being altered concerns control of the audio output being provided to the user.	The Griffin-Hollemans-Irvin combination renders additional limitations in this claim obvious in the same way as it renders claim 14 obvious as discussed above.
[25] A system as recited in claim 18, wherein the head-worn personal electronic apparatus is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus based on the requested operation.	The Griffin-Hollemans-Irvin combination renders additional limitations in this claim obvious in the same way as the Griffin-Hollemans combination as discussed above.
[26] A system as recited in claim 18, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.	The Griffin-Hollemans-Irvin combination renders additional limitations in this claim obvious in the same way as it renders claim 13 obvious as discussed above.
[27] A system as recited in claim 26, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.	The Griffin-Hollemans-Irvin combination renders additional limitations in this claim obvious in the same way as it renders claim 14 obvious as discussed above.
[28] A system as recited in claim 18, wherein the head-worn personal electronic apparatus comprises: a user input device supported by the head-worn structure, the user input device being configured to receive a user input, the	The Griffin-Hollemans-Irvin combination renders additional limitations in this claim obvious in the same way as the Griffin-

user input device is based on at least capacitive effect, wherein the user input being received induces at least a capacitive change to produce at least an electrical response.	Hollemans combination as discussed above.
[29] A system as recited in claim 28, wherein the user input device is configured to distinguish at least a direction of the user input with respect to the user input device.	The Griffin-Hollemans-Irvin combination renders additional limitations in this claim obvious in the same way as the Griffin-Hollemans combination as discussed above.
[30] A system as recited in claim 28, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to detect at least a sliding of a finger action with respect to the user input device using at least the electronic circuitry and the user input data.	The Griffin-Hollemans-Irvin combination renders additional limitations in this claim obvious in the same way as the Griffin-Hollemans combination as discussed above.
[31] A system as recited in claim 28, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to distinguish at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the user input device using at least the electronic circuitry and the user input data.	The Griffin-Hollemans-Irvin combination renders additional limitations in this claim obvious in the same way as the Griffin-Hollemans combination as discussed above.
[34] A system as recited in claim 18, wherein the conductive element is a conductive pad.	The Griffin-Hollemans-Irvin combination renders additional limitations in this claim obvious in the same way as the Griffin-Hollemans combination as discussed above.
[35PRE] A system, comprising: a head-worn personal electronic apparatus, including at least:	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.

[35A] a head-worn structure configured to be worn by a user;	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[35B] a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[35C] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[35D] a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[35E] a rechargeable battery contained within the head-worn structure;	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[35F] a “being worn” sensor at least partially contained within the head-worn structure and configured to detect data indicative of whether the head-worn structure of the head-worn personal electronic apparatus is being worn;	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as it renders claim 12 obvious as discussed above.
[35G] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the “being worn” sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the	The Griffin-Hollemans-Irvin combination renders the portion of this limitation highlighted in yellow obvious in the same way as the Griffin-Hollemans combination as discussed above. The Griffin-Hollemans-Irvin combination renders the portion of this limitation highlighted in

environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the detected data captured by the “being worn” sensor;	blue obvious in the same way as it renders claims 12 and 13 obvious as discussed above.
[35H] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[35I] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[35J] a charging apparatus having at least a charging connector,	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[35K] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.
[36] A system as recited in claim 35, wherein the detected data by the “being worn” sensor is dependent on a physical characteristic of the user.	The Griffin-Hollemans-Irvin combination renders this limitation obvious in the same way as the Griffin-Hollemans combination as discussed above.

	Additionally, the Griffin-Hollemans-Irvin combination renders this limitation obvious as the “being worn” sensor can include the Irvin active IR sensor, which is dependent on a physical characteristic of the user, namely the degree to which the user’s body reflects infrared radiation. <i>See infra</i>, Claim 44 in Ground 2B.
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- b. Claim 15: “A system as recited in claim 13, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.”**

335. As discussed above, Irvin discloses operating a headset in an “inactive state,” *i.e.*, a “*low power operational mode*,” in which the headset “draws essentially no power” when it is detected that the headset is not being worn. Irvin, Abstract, 2:29-3:10.

336. POSAs would find it obvious to implement this teaching in the Griffin-Hollemans-Irvin combination, configuring the headset to enter a low power mode when Hollemans’ second touch-sensitive surface determines that the headset is not being worn. *Supra* claims 11-12 in Ground 2A.

337. Alternatively, as discussed above in relation to claim 13 in Ground 2B, POSAs would have found it obvious to include the Irvin sensor (accelerometer

and/or active IR sensor) and have the headset enter a low-power mode by configuring the processor of the Griffin headset to control the power received by other portions of the electronic circuitry (such as the microphone and speaker, noise cancellation circuit, and/or short-range RF transceiver) from the rechargeable battery 188 when that sensor determines the headset is not being worn.

338. Both implementations render claim 15 obvious.

Claim 37: “A system as recited in claim 35, wherein the head-worn structure comprises: an accelerometer, operatively connected to the rechargeable battery, at least partially contained within the head-worn structure and configured to sense movement data.”

339. As discussed above, the Griffin-Hollemans-Irvin combination includes Irvin’s sensor inside the Griffin headset that can be an “accelerometer,” which detects movement of the user to determine if the headset is being worn. Irvin, 7:14-17.

340. Irvin further discusses use of a “MEMS device” as its sensor that “may be responsive to general vibration or motion, or may be configured to respond only to specific acceleration along defined access.” *Id.* 7:27-8:14 (discussing use of “MEMS device” acting as an accelerometer to detect movement). POSAs would understand this “MEMS device” to be an “*accelerometer*.”

341. Thus, POSAs would understand the Griffin-Hollemans-Irvin including either Irvin’s accelerometer or Irvin’s “MEMS device” as the “*sensor*” would

include “an accelerometer...at least partially contained within the head-worn structure and configured to sense movement data.”

342. Further, to implement this combination, POSAs would naturally “operatively connect[.]” the accelerometer to “the rechargeable battery” of Griffin, discussed above in relation to limitation [1D] in Ground 2A, to provide power to the accelerometer.

c. Claim 38

343. Claim 38 is nearly identical to claim 18 as shown in the comparison chart below that color codes identical or near-identical language:

Claim 18	Claim 35
[18PRE] A system, comprising:	[35PRE] A system, comprising:
[18A] a head-worn personal electronic apparatus, including at least:	[38A] a head-worn personal electronic apparatus, including at least:
[18B] a head-worn structure configured to be worn by a user; a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent to an ear of the user when the head-worn structure is being worn by the user;	[38B] a head-worn structure configured to be worn by a user;
[18C] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;	[38C] a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent to an ear of the user when the head-worn structure is being worn by the user;
[18D] a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated	[38D] a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;

with an environment around the head-worn personal electronic apparatus;	
[18E] a rechargeable battery contained within the head-worn structure;	[38E] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;
[18F] a sensor at least partially contained within the head-worn structure and configured to capture data;	[38F] a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;
[18G] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the data captured by the sensor, and the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data;	[38G] a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus;
[18H] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and	[38H] a rechargeable battery contained within the head-worn structure;

[18I] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and	[38I] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;
[18J] a charging apparatus having at least a charging connector,	[38J] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and
[18K] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.	[38K] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and
	[38L] a charging apparatus having at least a charging connector,
	[38M] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic

	apparatus is placed in the charging apparatus.
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344. The principal distinction between the two is that claim 18 recites “a sensor...configured to capture data,” ([18F]) whereas claim 38 recites “a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus” ([38D]). As discussed above (claim 37), the Griffin-Hollemans-Irvin combination includes Irvin’s sensor, which can be, among other things, an accelerometer or MEMS device, both of which are a “motion detector” meeting this additional limitation of claim 38.

345. The remaining differences between the claims are that (a) claim 18 recites additional limitations pertaining to the electronic circuitry ([18G]) that are not found in claim 38, and (b) claim 38 requires “*a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus*” ([38G]).

346. The language in limitation [38G] is identical to the language found in claim 20 (and limitation [1C] and claim 2) and thus the Griffin-Hollemans-Irvin combination renders this limitation obvious for the same reasons the Griffin-Hollemans combination did as discussed above in Ground 2A.

- d. **[39PRE]-[39A] A system as recited in claim 38, wherein the head-worn personal electronic apparatus comprises: wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and**

347. As the language of these additional limitations is identical or nearly identical to limitation [18G], the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to limitation [18G].

- e. **[39B] wherein the head-worn personal electronic apparatus is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus based on the requested operation.**

348. As the language of these additional limitations is identical or nearly identical to claim 10, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason the Griffin-Hollemans combination renders obvious claim 10 as discussed above in relation to Ground 2A.

- f. **Claim 41: “A system as recited in claim 39, wherein the head-worn personal electronic apparatus comprises: a sensor at least partially contained within the head-worn structure and configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user, wherein the head-worn personal electronic apparatus**

is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.”

349. As the language of these additional limitations is identical or nearly identical to claims 12 and 13, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to claims 12 and 13.

- g. Claim 42: “A system as recited in claim 41, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.”**

350. As the language of these additional limitations is identical or nearly identical to claim 14, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to claim 14.

- h. Claim 43: “A system as recited in claim 41, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.”**

351. As the language of these additional limitations is identical or nearly identical to claim 15, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to claim 15.

i. **Claim 44**

352. Claim 38 is nearly identical to claim 18 as shown in the comparison chart below that color codes identical or near-identical language:

Claim 18	Claim 44
[18PRE] A system, comprising:	[44PRE] A system, comprising:
[18A] a head-worn personal electronic apparatus, including at least:	[44A] a head-worn personal electronic apparatus, including at least:
[18B] a head-worn structure configured to be worn by a user; a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent to an ear of the user when the head-worn structure is being worn by the user;	[44B] a head-worn structure configured to be worn by a user;
[18C] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;	[44C] a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent to an ear of the user when the head-worn structure is being worn by the user;
[18D] a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;	[44D] a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;
[18E] a rechargeable battery contained within the head-worn structure;	[44E] a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;
[18F] a sensor at least partially contained within the head-worn structure and configured to capture data;	[44F] a second microphone at least partially contained within the head-worn structure; a rechargeable battery contained within the head-worn structure;

[18G] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the data captured by the sensor, and the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data;	[44G] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;
[18H] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and	[44H] wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery;
[18I] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and	[44I] a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn;
[18J] a charging apparatus having at least a charging connector,	[44J] a radiation detector at least partially contained within the head-worn structure and configured to detect at least a portion of the radiation from the radiation emitter that is reflected

	back from the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn; and
[18K] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.	[44K] at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and
	[44L] a charging apparatus having at least a charging connector,
	[44M] wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

353. Independent claim 44 is nearly identical to claim 18 with the lone difference being that claim 18 recites “*a sensor...configured to capture data*” ([18F]), and additional limitations pertaining to the second microphone ([18D]) and electronic circuitry ([18G]) whereas claim 44 recites [38D]’s motion detector

(([44D])) as well as limitations directed to a radiation emitter and radiation detector ([44I]-[44J]) discussed below.

354. As discussed above in relation to limitation [38F], the Griffin-Hollemans-Irvin combination includes a motion detector.

- i. **[44I] “a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn”**

355. As explained above, the Griffin-Hollemans-Irvin combination includes Irvin’s sensor that can take the form of an “active...IR sensor.” Irvin, 9:9-12.

356. Active IR sensors were well known by 2005 and POSAs would have been familiar with the fact that active IR sensors detect objects by emitting infrared radiation and measuring the radiation reflected back from an object.

357. For example, U.S. Patent No. 5,330,226 (“Gentry”, EX1039) was granted in 1994 and discusses using active infrared sensors to determine where a car’s occupant is sitting so that appropriate airbags can be deployed. Gentry, Abstract.

358. As Gentry explains (and as a POSAs would understand): “In an active infrared sensor, a pulsed infrared ray from an LED (light emitting diode) is produced. An infrared receiver or monitoring lens monitors for a reflection of the transmitted infrared pulsed ray.” Gentry, 6:8-13. Gentry also explains that such sensors were

commercially available, further corroborating that POSAs would be well familiar with these sensors. *Id.*, 6:13-16.

359. Similarly, U.S. Patent No. 6,507,773 (“Parker”, EX1040) was granted in 2003 and describes the use of active infrared sensors in a robot. Parker, 4:45-48. In Parker’s robot, multiple “active infrared emitters” emit signals at different angles and/or times that “reflect off an object at different places in a room.” *Id.*, 4:55-5:29. The reflected signals are then detected by a “signal receiving device” indicating the position and distance of objects. *Id.*

360. Likewise, U.S. Patent No. 5,400,244 (“Watanabe” EX1041) was granted in 1995 and discloses an “IR sensor system” with an “IR sensor 109” that “generates infrared radiation laser light, senses the level of reception of the dispersed and reflected light, and output[s] signals which indicate the degree of attenuation from the received light level from the generated light level” which are used to determine the distance “from the IR sensor 109 to the position of reflection.” Watanabe, 24:14-25.

361. Given their familiarity with active IR sensors, POSAs would understand that the active IR sensor disclosed by Irvin would emit infrared radiation and detect when the radiation is reflected back to the sensor by an object. Irvin, 9:10-12. Thus, the active IR sensor in the Griffin-Hollemans-Irvin combination is a “*radiation emitter*” contained within the headset, and POSAs would know to

configure the sensor to direct its radiation “*towards the user*” when the headset is being worn to detect whether the user is wearing the headset.

362. Irvin further discloses that the IR proximity sensor and accelerometer can be used “in any combination.” Irvin, Abstract. POSAs would thus be motivated to include both the accelerometer and the IR sensor in the Griffin-Hollemans-Irvin combination as doing so would provide a more accurate determination of when the headset is worn.

- ii. **[44J] “a radiation detector at least partially contained within the head-worn structure and configured to detect at least a portion of the radiation from the radiation emitter that is reflected back from the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn; and”**

363. As discussed above, POSAs would understand Irvin’s active IR sensor, like other commonly used active IR sensors, would include a “*radiation detector*” that detects the reflected radiation that the was emitted by the active IR sensor. *See* Gentry, 6:8-13; Parker, 4:55-5:29; Watanabe, 24:14-25.

364. Thus, the Irvin IR sensor in the combination “*detect[s] at least a portion of the radiation from the radiation emitter that is reflected back from the user*” when the Griffin headset is worn.

- j. **Claim 45: “A system as recited in claim 44, wherein the radiation detector is operatively connected to the electronic circuitry, and wherein electronic circuitry within the head-worn structure is configured to**

facilitate determining whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user.”

365. POSAs would understand that Irvin’s active IR sensor (and thus its radiation detector) would be “*electrically connected*” to the electronic circuitry of Griffin, including the rechargeable battery, to provide the sensor with power.

366. Additionally, POSAs would configure the electronic circuitry (e.g., Griffin’s processor 196) to use the data from the IR sensor to “*facilitate determining whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user*” in similar fashion to the discussion of claims 12-13 in Ground 2B.

- k. **Claim 47: “A system as recited in claim 45, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the determination of whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user based on at least the motion data.”**

367. As discussed above in relation to claim 37, the Griffin-Hollemans-Irvin combination uses Irvin’s accelerometer and/or MEMs device to detect movement (i.e., obtain “*motion data*”) indicating the headset is being worn. Thus, for the same reasons discussed in claim 13 in Ground 2B, the Griffin headset in the Griffin-Hollemans-Irvin combination is “*configured to at least alter operation*” of the

headset based on whether it is determined the headset is being worn based at least on “*the motion data.*”

- l. Claim 48: “A system as recited in claim 47, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.”**

368. As the language of these additional limitations is identical or nearly identical to claim 14, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to claim 14.

- m. Claim 49: “A system as recited in claim 47, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.”**

369. As the language of these additional limitations is identical or nearly identical to claim 15, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to claim 15.

- n. [50Pre and 50A]: “A system as recited in claim 45, wherein the second microphone is positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus,**

370. As the language of these additional limitations is identical or nearly identical to limitation [18D], the Griffin-Hollemans-Irvin combination renders these

limitations obvious for the same reason as discussed above in relation to limitation [18D].

- o. [50B]: “wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and”**

371. As the language of these additional limitations is identical or nearly identical to limitation [18G], the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to limitation [18G].

- p. [50C]: “wherein the head-worn personal electronic apparatus is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus based on the requested operation.”**

372. As the language of these additional limitations is identical or nearly identical to claim 10, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason the Griffin-Hollemans combination renders obvious claim 10 as discussed above in relation to Ground 2A.

- q. Claim 51: “A system as recited in claim 45, wherein the radiation detector is an infrared radiation**

detector, and wherein the radiation being detected by the radiation detector includes infrared radiation.”

373. As explained above in relation to claim 44, POSAs would understand that Irvin’s active IR sensor (i.e. active “infrared” sensor) emits and detects infrared radiation. *See* Gentry, 6:8-13; Parker, 4:55-5:29; Watanabe, 24:14-25. Thus, this claim is obvious in view of the Griffin-Hollemans-Irvin combination.

- r. Claim 52: “A system as recited in claim 51, wherein the first microphone is positioned to be directed forward towards the user’s front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user’s head when the head-worn structure is being worn by the user.”**

374. As the language of these additional limitations is identical or nearly identical to claim 19, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to claim 19.

- s. Claim 53: “A system as recited in claim 52, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the determination of whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user.”**

375. As the language of these additional limitations is identical or nearly identical to claim 47, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to claims 13 and 47.

- t. **[54Pre and 54A]: “A system as recited in claim 53, wherein the second microphone is positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus,**

376. As the language of these additional limitations is identical or nearly identical to limitation [18D], the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to limitation [18D].

- u. **[54B]: “wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and”**

377. As the language of these additional limitations is identical or nearly identical to limitation [18G], the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to limitation [18G].

- v. **[54C]: “wherein the head-worn personal electronic apparatus is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus based on the requested operation.”**

378. As the language of these additional limitations is identical or nearly identical to claim 10, the Griffin-Hollemans-Irvin combination renders these

limitations obvious for the same reason the Griffin-Hollemans combination renders obvious claim 10 as discussed above in relation to Ground 2A.

- w. **Claim 56: “A system as recited in claim 44, wherein the head-worn personal electronic apparatus comprises: a force sensor at least partially contained within the head-worn structure and configured to sense a force input associated with the user, wherein the sensed force input operating to at least alter operation of the head-worn electronic personal audio apparatus.”**

379. Hollemans teaches that its first touch-sensitive surface (*i.e.*, the surface a user touches to control functions of Griffin’s headset) can be “an ordinary pressure sensor” rather than a capacitive sensor. Hollemans, 3:38-43. POSAs would have understood that this pressure sensor disclosed by Hollemans is a “*force sensor*” as it senses the forces creating the pressure on the sensor.

380. Therefore, an obvious implementation of Griffin-Hollemans-Irvin is one in which the first touch-sensitive surface is a pressure sensor.

381. Additionally, as explained in relation to claim 2 in Ground 2A, the first touch-sensitive surface is used to “*alter operation of the [headset].*”

- x. **Claim 57: “A system as recited in claim 56, wherein the head-worn electronic personal audio apparatus is configured to support audio output to the user via the speaker, and wherein the at least one operation of the head-worn electronic personal audio apparatus being**

altered concerns control of the audio output being provided to the user.

382. As the language of these additional limitations is identical or nearly identical to claim 4, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason the Griffin-Hollemans combination renders obvious claim 4 as discussed above in relation to Ground 2A.

- y. **Claim 58: “A system as recited in claim 56, wherein the head-worn personal electronic apparatus is configured to support voice calls to the user, and wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.”**

383. As the language of these additional limitations is identical or nearly identical to claim 3, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason the Griffin-Hollemans combination renders obvious claim 3 as discussed above in relation to Ground 2A.

- z. **Claim 59: “A system as recited in claim 44, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.”**

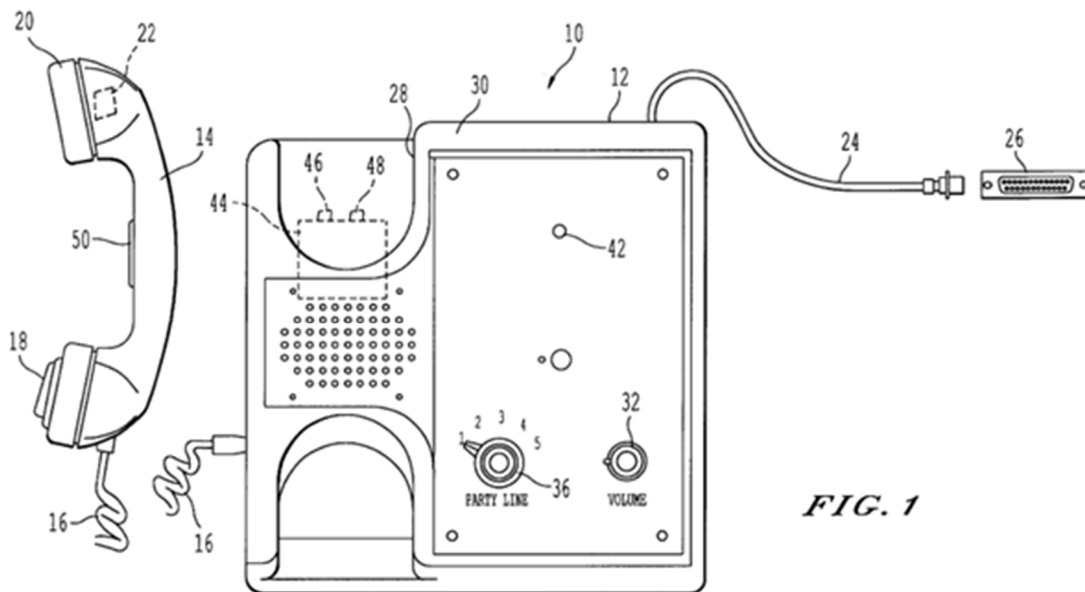
384. As the language of these additional limitations is identical or nearly identical to claim 19, the Griffin-Hollemans-Irvin combination renders these limitations obvious for the same reason as discussed above in relation to claim 19.

D. GROUND 2C: The Griffin-Hollemans and/or Griffin-Hollemans-Irvin Combination in view of Ritter Renders Obvious Claims 16, 22, 32, and 55

385. The four dependent claims challenged in Ground 2C require that “*the system*” include a “*Hall effect detector*” (the “*Hall effect*” limitation).

1. Ritter (EX1029)

386. Ritter discloses a telephone communication station that uses Hall-effect integrated circuits to automatically switch a telephone from an on-hook or off-hook state. Ritter, Abstract. Ritter’s communication station is depicted as a conventional desktop telephone as seen below in Figure 1:



387. Ritter’s communication station includes a Hall-effect device or “HED” within the communications station and which is depicted as elements 46/48 in Figure 1 above. Ritter, 4:39-60. These HEDs detect changes in magnetic flux, as Ritter

explains, “[w]hen a magnetic flux of proper polarity is placed near an [HED] 46, 48, a state change occurs, and an output voltage is generated by one of the HEDs 46, 48.” *Id.*, 6:16-19.

388. Ritter discloses that the HEDs 46 and 48 in its communication station detect a magnet (element 22 in Figure 1) in the handset when the handset is placed into a support cradle on the communication station. Ritter, 2:30-63, 3:64-67, 4:39-60. As Ritter explains, “the handset generates a magnetic field caused by leakage flux from a magnet” and “[a] handset support cradle is attached to the telephone body and comprises a hook-switch board having a Hall-effect integrated circuit which reacts with the magnetic field when the handset is placed in the handset support cradle.” Ritter, 2:51-56. Thus, the Hall-effect devices place the communications station into an on-hook or off-hook state “when the magnetic field generated about the handset 14 by the magnet 22 is present or absent with respect to the support cradle 28.” *Id.*, 4:43-47.

2. The Combinations

389. Griffin discloses that its headset “is also configured to turn on automatically when removed from its assembled position within the first communication module 12 [*i.e.*, charging station], and to turn off automatically when replaced in its mounted position.” Griffin, 7:18-21. However, Griffin does not teach a particular technique for automatically switching the power state of the

headset. Accordingly, POSAs would be motivated to incorporate a known technique to turn the headset on and off automatically based on whether it mounted on the first communication module.

390. POSAs, however, would have been aware of known techniques for automatically switching the state of an electronic telecommunication device, including Ritter's use of a Hall-effect sensor to detect when a handset has been placed into a mounted position on its telephone station. Applying Ritter's teachings would have been the simple use of a known technique (a Hall-effect sensor and magnet to detect the presence or absence of a component) to improve similar telecommunication devices in the same predictable way.

391. In an obvious implementation of the combination, POSAs would have added a Hall-effect sensor to Griffin's second module (headset) and a magnet to Griffin's first module (charging station). The Hall-effect sensor would detect the presence of the magnet in Griffin's first module when the headset was mounted in the first module for charging, and the headset would use that information to enter an OFF state. Likewise, when the Hall-effect sensor detected the absence of the magnet, the headset would use the information to enter an ON state.

392. Although Ritter places its Hall-effect sensor in the station (not the handset), placing it in Griffin's headset would have been the most logical way to

395. As another example, GB2,318,825 (“Wynne,” EX1043) was published in 1998 and discloses using a Hall sensor in an electromagnetic lock to ensure that lock parts are correctly aligned before they are engaged. Wayne, 2:20-3:20; 7:21-8:2; *see also id.*, 3:21-4:1 (noting that use of “Hall effect devices” was already known in electromagnetic locks).

396. Thus, POSAs would have a reasonable expectation of success implementing the Ritter Hall-effect device into the Griffin-Hollemans and/or Griffin Hollemans-Irvin combinations given that Hall-effect sensors and magnets had been used for similar purposes long prior to 2005.

3. The “*Hall Effect*” Claims

- a. **Claim 16: “A system as recited in claim 1, wherein the system comprises: a Hall effect detector configured to capture data associated with a magnetic characteristic.”**

397. As discussed above, in view of Ritter, POSAs had reason to add a Hall effect sensor/detector to the headset of Griffin-Hollemans. POSAs would understand this Hall effect sensor/detector would “*capture data associated with a magnetic characteristic*” as it would determine whether or not the headset was in the presence of the magnet added to Griffin’s first module and thus mounted on the first module. Thus, the resulting Griffin-Hollemans-Ritter combination renders claim 16 obvious.

- b. Claim 22: “A system as recited in claim 20, wherein the system comprises: a Hall effect detector configured to capture data associated with a magnetic characteristic.”**

398. As discussed above, in view of Ritter, POSAs had reason to add a Hall effect sensor/detector to the headset of the Griffin-Hollemans-Irvin combination. POSAs would understand this Hall effect sensor/detector would “*capture data associated with a magnetic characteristic*” as it would determine whether or not the headset was in the presence of the magnet added to Griffin’s first module and thus mounted on the first module. Thus, the resulting Griffin-Hollemans-Irvin-Ritter combination renders claim 22 obvious.

- c. Claim 32: “A system as recited in claim 18, wherein the system comprises: a Hall effect detector.”**

399. As the language of these additional limitations is identical or nearly identical to claim 22, the Griffin-Hollemans-Irvin-Ritter combination renders these limitations obvious for the same reason as discussed above in relation to claim 22.

- d. Claim 55: “A system as recited in claim 54, wherein the motion detector comprises an accelerometer, and wherein the system comprises a Hall effect detector.**

400. The Griffin-Hollemans-Irvin-Ritter combination includes a “*Hall effect detector*” for the same reason as discussed above in relation to claim 22.

401. Additionally, the motion detector in the Griffin-Hollemans-Irvin-Ritter combination is an “*accelerometer*” as discussed above in relation to claim 37 in Ground 2B.

E. GROUND 2D: The Griffin-Hollemans and/or Griffin-Hollemans-Irvin combination in view of Lowles Render Obvious Claims 9, 40, and 46

402. The three dependent claims challenged in Ground 2D require that “the head-worn structure” contain “at least one magnetic element...configured to support a magnetic force that facilitates an electrical connection” (the “magnetic element” limitation).

1. Lowles (EX1030)

403. Lowles is directed to “[a] holster for use with a handheld device and a peripheral device.” Lowles, Abstract. Lowel discloses that in a preferred embodiment, the peripheral device is a “wireless headset” and the handheld device is a “mobile device such as a cellular phone.” *Id.*, 4:33-38; *see also, id.*, 1:14-16, 1:62-64.

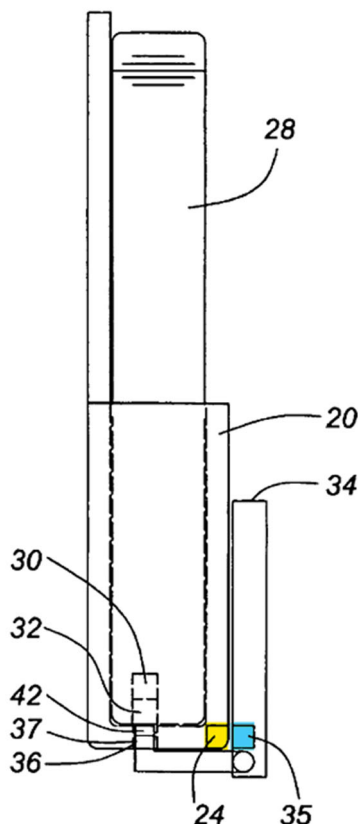
404. Lowles further discloses that its holster “provides a mating structure for holding [the headset] so that a mobile device charges the [headset].” *Id.*, Abstract. “The mobile device has a charging port,” and “[t]he holster mating structure holds the peripheral device in such a way so as to permit the mobile device to charge the peripheral device.” Lowles, 1:65-2:8. This allows the headset to be charged via the battery of the cellphone instead of a more traditional power source.

405. The mating structure is for “releasably retaining the [headset] such that a charging contact integral with the [headset] is in direct physical and electrical

contact with the mobile device” so as to allow the mobile device’s battery to charge the headset. *Id.*, claim 1; *see also* claim 5; 1:58-60.

406. Lowles explains that there are many known mating structure that are suitable for releasably securing a headset to a charging source, “including magnetic fastening.” *Id.*, 5:30-34; *see also id.*, 1:67-2:2 (“Other examples of mating structures include...magnets...”); 3:42-47 (“One skilled in the art will readily appreciate that there are a number of implementations for such a mating device. These may include...magnets....”); 3:53-55 (“Examples of mating structures include...magnets”).

407. In one exemplary embodiment, Lowles discloses the use of a magnet on the headset that secures the headset to the holster via a magnetic attraction to a magnet on the holster. *Id.*, 5:30-40. As Lowles explains, “mating structures 24 and 35 provide a secure fastening of peripheral device 34 to holster 20” via “magnetic fastening.” *Id.* The headset is secured in the holster such that “[c]harging contact 42” on the headset is in electrical connection with a charging port of a mobile device “to recharge the batteries” of the headset. *Id.* Figure 11 below illustrates this magnetic fastening with mating structure 24 highlighted in yellow and mating structure 35 highlighted in blue.



Lowles, Fig. 11.

2. The Combinations

408. Griffin explains that its first module (charging station) includes a cavity 16 that has “retention means” to detachably hold the headset within the cavity. Griffin, 5:17-6:4. Griffin identifies certain exemplary retention means but explicitly teaches that “other retention means” can be used. *Id.*, 5:24-6:2. Griffin thus leaves the particular retention means used to detachably hold the headset within the first module for recharging for a POSA to decide.

409. In view of Lowles, POSAs had reason to add a magnet to Griffin’s headset and a magnet (of opposite polarity) to Griffin’s charging station so as to

releasably secure the headset to the charging station and align the headset's charging terminals 56 with the charging stations' charging terminals 46. Like Griffin, Lowles recognizes there are various means for retaining a headset to a power-source, including magnets. *See, e.g.,* Lowles, 1:67-2:2 (“Other examples of mating structures include retaining brackets, magnets, tabs, latches, flanges, hooks, clamps, and friction fits.”); 5:30-34.

410. The choice to use Lowles' magnets as Griffin's “other retention means” would have been the use of a known technique to improve similar devices in a predictable manner given that magnets for detachably coupling electronic devices, including headsets, to power sources was well known in the art by 2005.

411. In addition to Lowles' own disclosure, U.S. Patent No. 3,786,391 (“Mathauser”, EX1035) was granted in 1974 and is directed to “[a] magnetic self-aligning electrical connector” that uses “magnet means” to hold two “coupling halves together” in electrical contact. Mathauser, Abstract; *see also id.*, 1:6-9 (“This invention relates to a quick connect electrical connector for low voltage electrical current, wherein magnet means is used to hold the coupling halves together.”); 3:49-54 (“In use, the male coupling half 2 is brought into close proximity with the female coupling half 3 as seen in FIG. 2, and the magnetic attraction between magnet 8 and upstanding portion 19 of plate 17 causes the coupling halves to move toward one another with a ‘snap’ action.”); Fig. 2.

412. As another example, WO Application No. 2005/053289 (Kasapoglu, EX1036) was published on June 9, 2005 and discloses a “dockable accessory” mounted on an electronic device (a preferred embodiment of which is a “headset”) that uses “magnets and magnet responsive elements” to “locate the accessory firmly against” a “charging port” allowing for “electrical contact between two contact points.” Kasapoglu, Abstract, 1:10-16, 7:11-13, 10:15-33; 14:19-24; Fig. 4.

413. In the Griffin-Hollemans-Lowles and/or Griffin-Hollemans-Irvin-Lowles combinations, Griffin’s headset and first module would be modified to include magnets of opposite polarity to attract one another and thus releasably secure the headset to the first module and align their respective charging ports. All other aspects of the headset would remain as described in Grounds 2A (Griffin-Hollemans) and Ground 2B (Griffin-Hollemans-Irvin).

414. POSAs would have had a reasonable expectation of success implementing the combination given that the use of magnets as a retention means was conventional by 2005. *See* Mathauser, Abstract, 1:6-9, 3:49-54; Kasapoglu, 10:15-33.

3. The “Magnetic Element” Claims

- a. **Claim 9: “A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises: at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.”**

415. As discussed above, in view of Lowles, POSAs had reason to add a magnet to the headset of the Griffin-Hollemans combination. As further discussed above, the resulting Griffin-Hollemans-Lowles combination would include a “*magnetic element*” (i.e. the magnet in the headset) that “*facilitates an electrical connection*” by releasably securing the headset to the first module while aligning their respective charging ports rendering this claim obvious.

- b. **Claim 40: “A system as recited in claim 39, wherein the head-worn personal electronic apparatus comprises: at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.”**

416. As discussed above, in view of Lowles, POSAs had reason to add a magnet to the headset of the Griffin-Hollemans-Irvin combination. As further discussed above, the resulting Griffin-Hollemans-Irvin-Lowles combination would include a “*magnetic element*” (i.e. the magnet in the headset) that “*facilitates an electrical connection*” by releasably securing the headset to the first module while aligning their respective charging ports rendering this claim obvious.

- c. **Claim 46: A system as recited in claim 45, wherein the head-worn personal electronic apparatus comprises: at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.**

417. As the language of these additional limitations is identical or nearly identical to claim 40, the Griffin-Hollemans-Irvin-Lowles combination renders these limitations obvious for the same reason as discussed above in relation to claim 40.

I declare that all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

I declare under penalty of perjury that the foregoing is true and correct.

Dated: 9/2/2025



Andrew De Jacobo
