

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.
Petitioner,

v.

INGENIOSPEC, LLC.
Patent Owner.

Patent No. 12,313,913

Inter Partes Review No. IPR2026-00419

PETITION FOR *INTER PARTES* REVIEW

UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.100 *et seq.*

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. SUMMARY OF THE '913 PATENT	1
A. Background Of The '913 Patent.....	1
B. Priority Date	1
C. Prosecution History of the '913 Patent	2
D. Level of Ordinary Skill	2
III. CLAIM CONSTRUCTION	3
IV. PRECISE REASONS FOR RELIEF REQUESTED	5
V. GROUND 1: CLAIMS 1-3, 23-37, 40, 41, 45, AND 65-70 ARE RENDERED OBVIOUS BY JANNARD IN VIEW OF ZADESKY	7
A. Summary of Jannard.....	7
B. Summary of Zadesky	9
C. Motivation to Combine	11
D. Claim 1	12
1. [Preamble].....	12
2. [A]	13
3. [B]	14
4. [C]	15
5. [D]	17
6. [E].....	17
7. [F].....	17
8. [G]	18
9. [H]	21
10. [I].....	22
11. [J].....	23
12. [K]	25
13. [L].....	26

TABLE OF CONTENTS
(continued)

	Page
E. Claim 2	27
1. [Preamble]	27
2. [A]	27
3. [B]	27
F. Claim 3	27
1. [Preamble]	27
2. [A]	28
3. [B]	28
G. Claim 23	28
1. [Preamble]	28
2. [A]	28
3. [B]	28
4. [C]	28
5. [D]	28
6. [E]	28
7. [F]	28
8. [G]	29
9. [H]	29
10. [I]	29
H. Claim 24	29
1. [Preamble]	29
2. [A]	29
I. Claim 25	29
1. [Preamble]	29
2. [A]	29
3. [B]	29

TABLE OF CONTENTS
(continued)

	Page
J. Claim 26	30
1. [Preamble]	30
2. [A]	30
3. [B]	30
K. Claim 27	30
1. [Preamble]	30
2. [A]	30
3. [B]	31
L. Claim 28	32
1. [Preamble]	32
2. [A]	32
3. [B]	32
M. Claim 29	34
1. [Preamble]	34
2. [A]	34
3. [B]	34
N. Claim 30	34
1. [Preamble]	34
2. [A]	34
O. Claim 31	35
1. [Preamble]	35
2. [A]	35
3. [B]	35
P. Claim 32	35
1. [Preamble]	35
2. [A]	35

TABLE OF CONTENTS
(continued)

	Page
Q. Claim 33	35
1. [Preamble]	35
2. [A]	36
R. Claim 34	36
1. [Preamble]	36
2. [A]	36
3. [B]	36
S. Claim 35	36
1. [Preamble]	36
2. [A]	36
3. [B]	37
T. Claim 36	37
1. [Preamble]	37
2. [A]	37
3. [B]	37
U. Claim 37	37
1. [Preamble]	37
2. [A]	37
V. Claim 40	38
1. [Preamble]	38
2. [A]	38
3. [B]	39
W. Claim 41	39
1. [Preamble]	39
2. [A]	39
X. Claim 45	39

TABLE OF CONTENTS
(continued)

	Page
1. [Preamble]	39
2. [A]	40
Y. Claim 65	41
1. [Preamble]	41
2. [A]	41
Z. Claim 66	41
1. [Preamble]	41
2. [A]	41
3. [B]	41
AA. Claim 67	41
1. [Preamble]	41
2. [A]	42
BB. Claim 68	42
1. [Preamble]	42
2. [A]	42
CC. Claim 69	42
1. [Preamble]	42
2. [A]	42
DD. Claim 70	42
1. [Preamble]	42
2. [A]	43
VI. GROUND 2: CLAIMS 4-14, 20-22, 46-50, 54-64, AND 94-96 ARE RENDERED OBVIOUS BY JANNARD IN VIEW OF ZADESKY AND RADER	44
A. Summary of Rader	44
B. Motivation to Combine	45

TABLE OF CONTENTS **(continued)**

	Page
1. PCD as Input Source to Audio Device 10D	46
2. Audio Device 10D Implements the PCD Directly	46
C. Claim 4	48
1. [Preamble]	48
2. [A]	48
3. [B]	48
4. [C]	50
5. [D]	53
6. [E]	54
D. Claim 5	54
1. [Preamble]	54
2. [A]	54
E. Claim 6	55
1. [Preamble]	55
2. [A]	55
F. Claim 7	57
1. [Preamble]	57
2. [A]	57
G. Claim 8	59
1. [Preamble]	59
2. [A]	59
3. [B]	59
H. Claim 9	60
1. [Preamble]	60
2. [A]	60
3. [B]	60

TABLE OF CONTENTS
(continued)

	Page
I. Claim 10	60
1. [Preamble]	60
2. [A]	60
J. Claim 11	61
1. [Preamble]	61
2. [A]	61
3. [B]	62
K. Claim 12	63
1. [Preamble]	63
2. [A]	63
L. Claim 13	63
1. [Preamble]	63
2. [A]	63
M. Claim 14	63
1. [Preamble]	63
2. [A]	64
N. Claim 20	64
1. [Preamble]	64
2. [A]	64
O. Claim 21	64
1. [Preamble]	64
2. [A]	64
P. Claim 22	64
1. [Preamble]	64
2. [A]	64
Q. Claim 46	64

TABLE OF CONTENTS
(continued)

	Page
1. [Preamble]	64
2. [A]	65
3. [B]	65
4. [C]	66
5. [D]	66
6. [E]	67
R. Claim 47	67
1. [Preamble]	67
2. [A]	67
S. Claim 48	67
1. [Preamble]	67
2. [A]	68
3. [B]	68
4. [C]	68
5. [D]	68
6. [E]	68
T. Claim 49	68
1. [Preamble]	68
2. [A]	68
U. Claim 50	68
1. [Preamble]	68
2. [A]	68
3. [B]	69
4. [C]	69
V. Claim 54	69
1. [Preamble]	69

TABLE OF CONTENTS
(continued)

	Page
2. [A]	69
W. Claim 55	69
1. [Preamble]	69
2. [A]	69
X. Claim 56	70
1. [Preamble]	70
2. [A]	70
Y. Claim 57	70
1. [Preamble]	70
2. [A]	70
3. [B]	70
Z. Claim 58	70
1. [Preamble]	70
2. [A]	70
3. [B]	70
4. [C]	70
AA. Claim 59	71
1. [Preamble]	71
2. [A]	71
BB. Claim 60	71
1. [Preamble]	71
2. [A]	71
3. [B]	71
CC. Claim 61	71
1. [Preamble]	71
2. [A]	71

TABLE OF CONTENTS
(continued)

	Page
3. [B]	71
DD. Claim 62	72
1. [Preamble]	72
2. [A]	72
3. [B]	72
EE. Claim 63	72
1. [Preamble]	72
2. [A]	72
FF. Claim 64	73
1. [Preamble]	73
2. [A]	73
3. [B]	73
GG. Claim 94	73
1. [Preamble]	73
2. [A]	73
3. [B]	73
4. [C]	73
5. [D]	73
6. [E]	73
7. [F]	74
8. [G]	74
9. [H]	74
10. [I]	74
11. [J]	74
12. [K]	74
13. [L]	74

TABLE OF CONTENTS
(continued)

	Page
14. [M].....	74
15. [N]	74
16. [O]	74
17. [P].....	75
18. [Q]	75
19. [R]	75
HH. Claim 95	75
1. [Preamble].....	75
2. [A]	75
3. [B]	75
II. Claim 96	75
1. [Preamble].....	75
2. [A]	75
VII. GROUND 3: CLAIMS 15-17 ARE RENDERED OBVIOUS BY JANNARD IN VIEW OF ZADESKY, RADER, AND MAHON	76
A. Summary of Mahon.....	76
B. Motivation to Combine	77
C. Claim 15	79
1. [Preamble].....	79
2. [A]	79
D. Claim 16	82
1. [Preamble].....	82
2. [A]	82
E. Claim 17	82
1. [Preamble].....	82
2. [A]	82

TABLE OF CONTENTS
(continued)

	Page
VIII. GROUND 4: CLAIMS 38, 39, 42-44, 71-73, 79, 92, 93, 117-119, 122, 124, AND 125 ARE RENDERED OBVIOUS BY JANNARD IN VIEW OF ZADESKY AND IRVIN	85
A. Summary of Irvin	85
B. Motivation to Combine Jannard and Zadesky with Irvin	89
C. Claim 38	90
1. [Preamble]	90
2. [A]	91
3. [B]	91
D. Claim 39	93
1. [Preamble]	93
2. [A]	93
E. Claim 42	94
1. [Preamble]	94
2. [A]	94
3. [B]	94
F. Claim 43	94
1. [Preamble]	94
2. [A]	94
G. Claim 44	94
1. [Preamble]	94
2. [A]	94
H. Claim 71	95
1. [Preamble]	95
2. [A]	95
3. [B]	95

TABLE OF CONTENTS **(continued)**

	Page
4. [C]	95
5. [D]	96
6. [E]	96
7. [F]	96
8. [G]	96
9. [H]	96
10. [I]	96
11. [J]	96
12. [K]	96
13. [L]	96
14. [M]	96
I. Claim 72	97
1. [Preamble]	97
2. [A]	97
J. Claim 73	97
1. [Preamble]	97
2. [A]	97
3. [B]	97
K. Claim 79	97
1. [Preamble]	97
2. [A]	97
3. [B]	98
L. Claim 92	98
1. [Preamble]	98
2. [A]	98
3. [B]	98

TABLE OF CONTENTS
(continued)

	Page
M. Claim 93	100
1. [Preamble]	100
2. [A]	100
3. [B]	100
N. Claim 117	100
1. [Preamble]	100
2. [A]	100
3. [B]	100
4. [C]	100
5. [D]	100
6. [E]	101
7. [F]	101
8. [G]	101
9. [H]	101
10. [I]	101
11. [J]	101
12. [K]	101
13. [L]	101
O. Claim 118	102
1. [Preamble]	102
2. [A]	102
3. [B]	102
4. [C]	102
P. Claim 119	102
1. [Preamble]	102
2. [A]	102

TABLE OF CONTENTS
(continued)

	Page
3. [B]	102
Q. Claim 122	102
1. [Preamble]	102
2. [A]	102
3. [B]	103
R. Claim 124	103
1. [Preamble]	103
2. [A]	103
3. [B]	103
S. Claim 125	103
1. [Preamble]	103
2. [A]	104
3. [B]	104
IX. GROUND 5: CLAIMS 18, 19, 51-53, 74-78, 80, 81, 83-86, 90, 91, 97-112, 114-116, 120, AND 123 ARE RENDERED OBVIOUS BY JANNARD IN VIEW OF ZADESKY, RADER, AND IRVIN	104
A. Motivation to Combine	104
B. Claim 18	104
1. [Preamble]	104
2. [A]	104
3. [B]	104
C. Claim 19	104
1. [Preamble]	104
2. [A]	104
D. Claim 51	105
1. [Preamble]	105

TABLE OF CONTENTS
(continued)

	Page
2. [A]	105
3. [B]	105
4. [C]	105
5. [D]	105
E. Claim 52	106
1. [Preamble]	106
2. [A]	106
F. Claim 53	106
1. [Preamble]	106
2. [A]	106
G. Claim 74	106
1. [Preamble]	106
2. [A]	106
3. [B]	107
4. [C]	107
5. [D]	107
H. Claim 75	107
1. [Preamble]	107
2. [A]	107
3. [B]	107
I. Claim 76	107
1. [Preamble]	107
2. [A]	107
3. [B]	107
J. Claim 77	108
1. [Preamble]	108

TABLE OF CONTENTS
(continued)

	Page
2. [A]	108
K. Claim 78	108
1. [Preamble]	108
2. [A]	108
L. Claim 80	108
1. [Preamble]	108
2. [A]	108
3. [B]	108
4. [C]	108
5. [D]	109
M. Claim 81	109
1. [Preamble]	109
2. [A]	109
3. [B]	109
N. Claim 83	109
1. [Preamble]	109
2. [A]	109
3. [B]	109
O. Claim 84	109
1. [Preamble]	109
2. [A]	109
P. Claim 85	110
1. [Preamble]	110
2. [A]	110
Q. Claim 86	110
1. [Preamble]	110

TABLE OF CONTENTS
(continued)

	Page
2. [A]	110
R. Claim 90	110
1. [Preamble]	110
2. [A]	110
3. [B]	110
S. Claim 91	110
1. [Preamble]	110
2. [A]	111
T. Claim 97	111
1. [Preamble]	111
2. [A]	111
3. [B]	111
U. Claim 98	111
1. [Preamble]	111
2. [A]	111
V. Claim 99	111
1. [Preamble]	111
2. [A]	111
3. [B]	111
W. Claim 100	112
1. [Preamble]	112
2. [A]	112
3. [B]	112
X. Claim 101	112
1. [Preamble]	112
2. [A]	112

TABLE OF CONTENTS
(continued)

	Page
3. [B]	112
Y. Claim 102	112
1. [Preamble]	112
2. [A]	112
3. [B]	112
Z. Claim 103	113
1. [Preamble]	113
2. [A]	113
AA. Claim 104	113
1. [Preamble]	113
2. [A]	113
BB. Claim 105	113
1. [Preamble]	113
2. [A]	113
3. [B]	113
4. [C]	113
CC. Claim 106	114
1. [Preamble]	114
2. [A]	114
3. [B]	114
DD. Claim 107	114
1. [Preamble]	114
2. [A]	114
EE. Claim 108	114
1. [Preamble]	114
2. [A]	114

TABLE OF CONTENTS
(continued)

	Page
FF. Claim 109	114
1. [Preamble]	114
2. [A]	115
3. [B]	115
4. [C]	115
5. [D]	115
6. [E]	115
7. [F]	115
8. [G]	115
9. [H]	115
10. [I]	115
11. [J]	115
12. [K]	116
13. [L]	116
GG. Claim 110	116
1. [Preamble]	116
2. [A]	116
3. [B]	116
HH. Claim 111	116
1. [Preamble]	116
2. [A]	116
3. [B]	116
II. Claim 112	116
1. [Preamble]	116
2. [A]	117
3. [B]	117

TABLE OF CONTENTS
(continued)

	Page
JJ. Claim 114	117
1. [Preamble]	117
2. [A]	117
3. [B]	117
KK. Claim 115	117
1. [Preamble]	117
2. [A]	117
LL. Claim 116	117
1. [Preamble]	117
2. [A]	117
3. [B]	118
MM. Claim 120	118
1. [Preamble]	118
2. [A]	118
3. [B]	118
4. [C]	118
5. [D]	118
NN. Claim 123	118
1. [Preamble]	118
2. [A]	118
3. [B]	118
4. [C]	119
X. GROUND 6: CLAIMS 82, 87-89, 113, AND 121 ARE RENDERED OBSVIOUS BY JANNARD IN VIEW OF ZADESKY, RADER, IRVIN, AND MAHON	119
A. Motivation to Combine	119

TABLE OF CONTENTS
(continued)

	Page
B. Claim 82	119
1. [Preamble]	119
2. [A]	119
3. [B]	119
4. [C]	119
C. Claim 87	119
1. [Preamble]	119
2. [A]	119
D. Claim 88	120
1. [Preamble]	120
2. [A]	120
E. Claim 89	120
1. [Preamble]	120
2. [A]	120
F. Claim 113	120
1. [Preamble]	120
2. [A]	120
3. [B]	120
4. [C]	120
G. Claim 121	121
1. [Preamble]	121
2. [A]	121
3. [B]	121
4. [C]	121
XI. NOTICES AND STATEMENTS	121
XII. CONCLUSION	123

TABLE OF CONTENTS
(continued)

	Page
CERTIFICATION OF WORD COUNT (37 C.F.R. § 42.24).....	167
CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(E)(4) AND 42.205(A)).....	168

TABLE OF AUTHORITIES

Page

Cases

<i>Realtime Data LLC v. Iancu</i> , 912 F.3d 1368 (Fed. Cir. 2019)	5
--	---

Statutes

35 U.S.C. § 102	passim
35 U.S.C. § 103	5
35 U.S.C. §§ 311-319	5

Other Authorities

37 C.F.R. § 42.6(e)(4)	168
37 C.F.R. §§ 42.8(b)	121, 122
37 C.F.R. § 42.15(a)	123
37 C.F.R. § 42.24	167
37 C.F.R. §§ 42.100.	5
37 C.F.R. §§ 42.104	5, 7, 122
37 C.F.R. § 42.205(a)	168

Exhibit List

Exhibit Description	Exhibit #
U.S. Patent No. 12,313,913 to Howell et al.	EX1001
Prosecution History of U.S. Patent No. 12,313,913	EX1002
Declaration of Dr. Joshua R. Smith	EX1003
U.S. Patent No. 10,222,617 to Jannard	EX1004
U.S. Patent No. 7,046,230 to Zadesky et al.	EX1005
U.S. Patent No. 7,010,332 to Irvin et al.	EX1006
U.S. Patent No. 12,044,901 to Howell et al.	EX1007
U.S. Patent No. 6,944,474 to Rader et al.	EX1008
U.S. Patent No. 6,349,001 to Spitzer	EX1009
U.S. Patent No. 5,835,185 to Kallman et al.	EX1010
U.S. Patent No. 6,433,760 to Vaissie et al.	EX1011
WIPO Pub. No. WO 1997/25790 to Andrea et al.	EX1012
U.S. Patent No. 6,014,320 to Mahon et al.	EX1013
RESERVED	EX1014
Excerpts from R. MURPHY, INTRODUCTION TO AI ROBOTICS (MIT Press 2000)	EX1015
Excerpts from R. GRAF, MODERN DICTIONARY OF ELECTRONICS (Butterworth-Heinemann 7th Ed. 1999)	EX1016
Claim Construction Order, <i>IngenioSpec, LLC v. Apple Inc.</i> , Case No. 1:25-cv-00867, Dkt. No. 69 (W.D. Tex. Apr. 6, 2026)	EX1017

P. Henry et al., <i>Bone Conduction: Anatomy, Physiology, and Communication</i> , Army Research Laboratory, ARL-TR-4138 (May 2007)	EX1018
Excerpts from D. GIANCOLI, PHYSICS: PRINCIPLES WITH APPLICATIONS (2ND ED.) (Prentice-Hall 1985)	EX1019
Curriculum Vitae of Dr. Joshua R. Smith	EX1020

I. INTRODUCTION

Petitioner Apple Inc. (“Petitioner” or “Apple”) petitions for *inter partes* review of claims 1-125 of U.S. Patent No. 12,313,913 (the “’913 Patent” (EX1001)). The challenged claims, issued just over one year ago, do not present any patentable improvement over the prior art, as set forth in this Petition and in the supporting Declaration of Dr. Joshua R. Smith (EX1003).

Accordingly, Petitioner requests that the Board institute *inter partes* review of the ’913 patent and cancel the claims at the conclusion of the instituted proceeding.

II. SUMMARY OF THE ’913 PATENT

A. Background Of The ’913 Patent

The ’913 patent relates to head-worn electronic devices, such as eyeglasses, with electrical components such as for audio output and/or audio pickup. (EX1001, 6:61-7:18; EX1003, ¶24.) The electrical components can support, *e.g.*, signal capturing, processing, and display; and can be used to provide audio output and/or audio pick-up. (EX1001, 6:61-7:18; EX1003, ¶24.)

B. Priority Date

The application that became the ’913 patent (Appl. No. 18/597,874) was filed on March 6, 2024. (EX1001.) The ’913 patent is a continuation of U.S. Patent No. 12,044,901 (EX1007, the “’901 patent”) and claims priority to numerous other provisional and non-provisional U.S. patent applications. For the

purposes of this Petition only, a priority date of October 11, 2005, is assumed.

This is the filing date of the earliest applications (Provisional Appl. Nos.

60/725,896, 60/725,999) to which the '913 patent claims priority.

C. Prosecution History of the '913 Patent

The '913 patent issued after a flawed examination. For example, the applicant secured allowance by arguing that capacitive switches could not sense “force,” and the Examiner accepted that argument. (EX1002, 32-36, 448-449.)

But the specification identifies capacitive switches activated by electrical force—contradicting the applicant’s argument. (EX1001, 38:66-39:3, 40:1-5; EX1003, ¶27.) The Examiner allowed the application (including claims directed to “force sensing”) only by overlooking these specification disclosures, and analogous disclosures in the prior art (Kallman). (EX1010, 16:16-32; EX1003, ¶27.)

Institution is warranted given these material examination errors.

D. Level of Ordinary Skill

Based on the disclosure of the '913 patent and an assumed priority date of October 11, 2005, a person of ordinary skill in the art (“POSITA”) would have had a Bachelor of Science degree and a Master’s degree in Electrical Engineering, Computer Engineering, Physics, or an equivalent field, as well as one to two years of academic or industry experience in mobile devices, wireless communications, or audio electronics, or comparable industry experience. (EX1003, ¶19.)

III. CLAIM CONSTRUCTION

There is no pending litigation involving the '913 patent. In district court litigation involving the parent '901 patent in the Western District of Texas (“the litigation”), Petitioner proposed claim constructions for the '901 patent, and the court entered claim constructions in an oral order on April 6, 2026, as set forth below:

Term / Claims	Petitioner's Proposed Construction	Court's Construction in April 6, 2026, Oral Order
<p>“head-worn personal electronic apparatus” / “head-worn wearable electronic device” / “head-worn electronic personal audio apparatus”/ “head-worn electronic device”</p> <p>'901 patent, claims 1-7, 9-10, 12-15, 18, 20-21, 25-28, 30-31, 35, 38-50, 53-54, 56-58</p>	<p>“electronic eyewear or headwear”</p>	<p>“electronic eyewear or headwear”</p>
<p>“[a/the] speaker[s] ... proximate to an ear of the user” / “the first speaker . . . proximate to a first ear of the user” / “the second speaker ... proximate to a second ear of the user”</p> <p>'901 patent, claims 1, 35</p>	<p>“[a/the] speaker[s] . . . near an ear of the user” / “the first speaker . . . near a first ear of the user” / “the second speaker . . . near a second ear of the user”</p>	<p>Plain and ordinary meaning</p>

(EX1017.)

No other claim terms of any patent to which the '913 patent claims priority were construed by the court, or proposed for construction by Petitioner or Patent

Owner.

In this proceeding, Petitioner does not propose any construction for any claim term. The Board construes the claim terms “only to the extent necessary to resolve the controversy” at hand: here, the invalidity of the claims under 35 U.S.C. § 103. *Realtime Data LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (internal citation omitted). The Board should not construe any of the claim terms because, as set forth in the Petition, the claims are invalid under § 103 under any reasonable interpretation and thus no claim construction is necessary to resolve any issue before the Board. (EX1003, ¶29.) However, even if the Board were to apply the same claim constructions proposed by Petitioner in the litigation for the ’901 patent, or the claim constructions ordered by the court on April 6, 2026, for that patent, the challenged claims are invalid under § 103 as set forth herein. (EX1003, ¶31.)

IV. PRECISE REASONS FOR RELIEF REQUESTED

Pursuant to 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42.100 *et seq.* (including § 42.104(b)), Petitioner requests cancellation of claims 1-125 of the ’913 patent based on the following references and the accompanying Declaration of Dr. Joshua R. Smith. (EX1003.) All claims are unpatentable, *e.g.*, as obvious, in view of the prior art, at least as set forth herein.

Prior Art Reference	Abbreviation
U.S. Patent No. 10,222,617	Jannard (EX1004)
U.S. Patent No. 7,046,230	Zadesky (EX1005)
U.S. Patent No. 7,010,332	Irvin (EX1006)
U.S. Patent No. 6,944,474	Rader (EX1008)
U.S. Patent No. 6,014,320	Mahon (EX1013)

The statutory grounds for the challenge of each claim are set forth below. Throughout the Petition, all statutory citations are pre-AIA based on the earliest possible priority date of October 11, 2005.

Ground	35 U.S.C. §	Claims	Prior Art References
1	103	1-3, 23-37, 40, 41, 45, 65-70	Jannard, Zadesky
2	103	4-14, 20-22, 46-50, 54-64, 94-96	Jannard, Zadesky, Rader
3	103	15-17	Jannard, Zadesky, Rader, Mahon
4	103	38, 39, 42-44, 71-73, 79, 92, 93, 117-119, 122, 124, 125	Jannard, Zadesky, Irvin
5	103	18, 19, 51-53, 74-78, 80, 81, 83-86, 90, 91, 97-112, 114-116, 120, 123	Jannard, Zadesky, Rader, Irvin
6	103	82, 87-89, 113, 121	Jannard, Zadesky, Rader, Irvin, Mahon

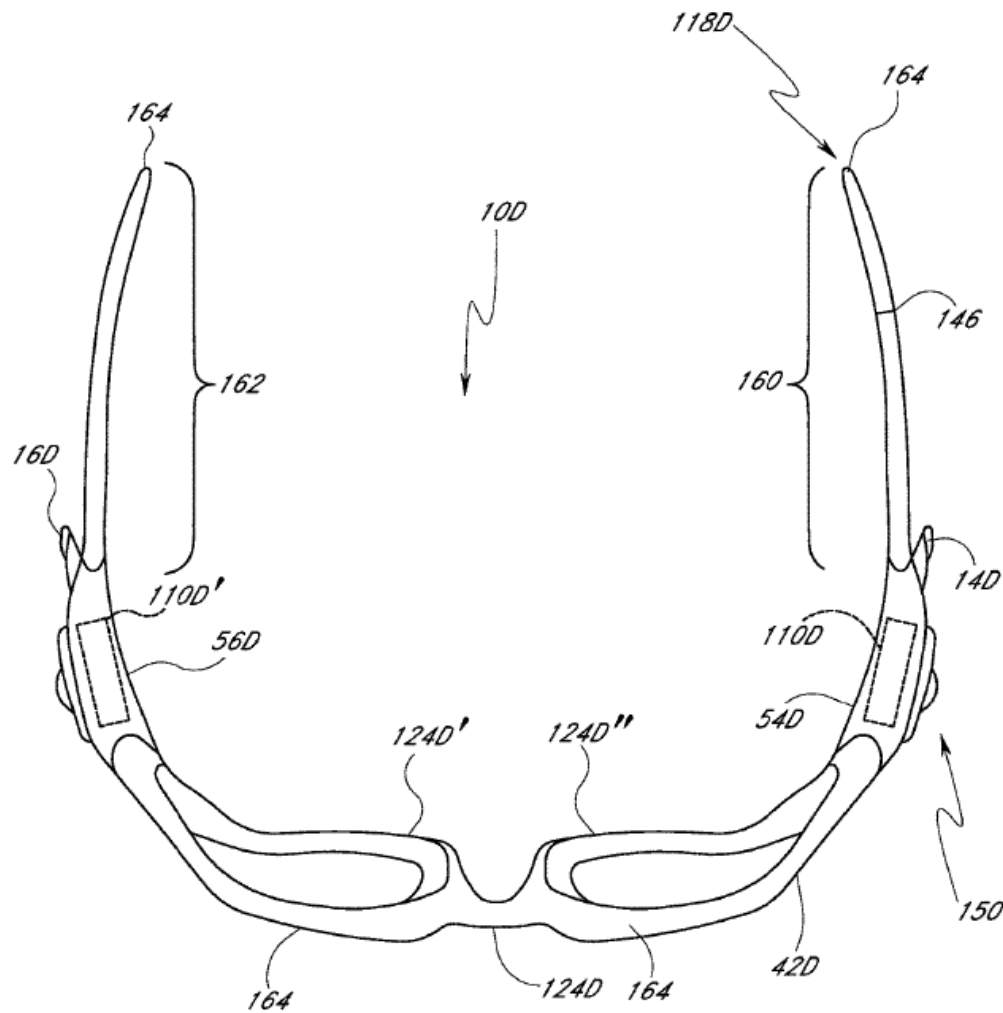
Below, Petitioner discusses why the challenged claims are unpatentable, including by specifying how and where the prior art satisfies each limitation of each challenged claim, as required by 37 C.F.R. § 42.104(b)(4). Petitioner's showing establishes a reasonable likelihood that it will prevail on each ground of invalidity as to each challenged claim.

V. GROUND 1: CLAIMS 1-3, 23-37, 40, 41, 45, AND 65-70 ARE RENDERED OBVIOUS BY JANNARD IN VIEW OF ZADESKY

A. Summary of Jannard

Jannard is a U.S. Patent issued from a continuation of Appl. No. 11/022,367, which was filed on December 22, 2004. (EX1004, (63).) Jannard is thus prior art to the '913 patent under at least 35 U.S.C. §§ 102(a) and (e).

Jannard discloses wearable electronic devices, and systems for managing their connection to data sources. (EX1004, 1:15-18; EX1003, ¶33.) For example, Jannard discloses eyeglasses that may include an audio device with speakers for presenting audio signals to the wearer of the eyeglasses. (EX1004, 5:13-6:46; EX1003, ¶33.) The audio signals may be provided by a remote device, such as a cell phone, that communicates wirelessly with the eyeglasses. (EX1004, 20:57-21:42; EX1003, ¶33.) FIG. 12 illustrates an embodiment:

**FIG. 12**

(EX1004, 30:21-27, FIG. 12; EX1003, ¶33.)

Jannard's wearable devices can include an electronic interface 601, which provides the wearer with data from one or more input sources, such as sensors, cell phones, or digital audio devices. (EX1004, 23:10-15, 23:49-24:2; EX1003, ¶34.)

A selector 610 can switch between input sources. (EX1004, 26:50-55; EX1003, ¶34.)

Jannard is analogous art to the claimed invention at least because it is directed to the same field of endeavor: portable devices (*e.g.*, eyewear) with electronic components, *e.g.*, for audio or communications functionality. (*See, e.g.*, EX1001, 5:66-7:18; EX1004, 5:13-6:46; EX1003, ¶35.) By disclosing electronic eyewear systems that can interact with remote devices such as cell phones, Jannard is reasonably pertinent to a problem faced by the '913 patent inventors, *e.g.*, improving wireless communications for mobile device users. (EX1001, 6:25-57; EX1004, 20:57-21:42; EX1003, ¶35.)

B. Summary of Zadesky

Zadesky is a U.S. Patent that was filed on July 1, 2002, published on April 24, 2003, and issued on May 16, 2006. (EX1005.) Zadesky is thus prior art to the '913 patent under at least 35 U.S.C. §§ 102(a), (b), and (e).

Zadesky relates generally to portable media players, and describes that a media player can include a touchpad for receiving touch input from a user and controlling the media player. (EX1005, 1:47-3:22; EX1003, ¶38.) The touchpad can be based on pressure sensing (including by piezoelectric transducers), capacitive sensing, or other sensing technologies. (EX1005, 2:31-34, 9:47-53; EX1003, ¶38.)

The touchpad can control the media player based on a sliding input from the user, as shown in FIG. 3C:

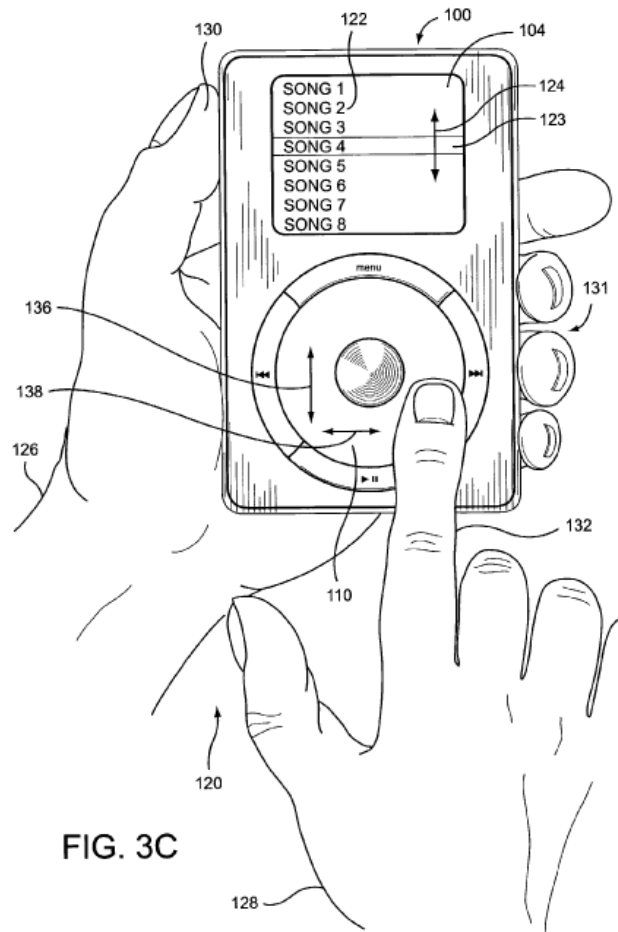


FIG. 3C

(EX1005, FIG. 3C; EX1003, ¶¶39.)

Zadesky is analogous art to the claimed invention at least because it belongs to the same field of endeavor, *i.e.*, portable devices with electronic components, such as for audio functionality. (*See, e.g.*, EX1001, 5:66-7:18; EX1005, 3:26-4:3, 4:37-5:13; EX1003, ¶¶40.) For example, Zadesky describes techniques for “facilitat[ing] user interaction” with portable devices, *e.g.*, by using touchpad inputs to control audio functions. (EX1005, 3:38-46, 4:37-49; EX1003, ¶¶40.) Moreover, by describing technologies to improve the usability of portable

electronic devices, such as by improving user interaction with such devices, Zadesky is reasonably pertinent to the problems faced by the '913 patent inventors. (See EX1001, 6:25-7:18; EX1005, 4:37-45; EX1003, ¶40.)

C. Motivation to Combine

A POSITA would have been motivated to combine Jannard and Zadesky. (EX1003, ¶41.) Jannard discloses a wearable audio device with a touchpad, processor, and executable software for controlling the device, but does not detail the touchpad's functionality or interaction with the processor. (EX1004, 41:46-58, 42:21-32, 43:65-44:7; EX1003, ¶41.)

The POSITA would have looked to Zadesky because it teaches touchpad techniques that “facilitate user interaction” with media players, including sliding inputs for functions such as volume control. (EX1005, 3:26-37, 4:37-40, 5:61-6:8, 10:40-51, 13:36-60; EX1003, ¶42.) Applying Zadesky's sliding-input techniques to Jannard's touchpad would have predictably improved ease, speed, accessibility, ergonomics, and reliability—advantages especially useful for wearable glasses operated without seeing the touchpad and used outdoors. (EX1004, 44:15-23; EX1003, ¶42.)

The POSITA would have had a reasonable expectation of success because Jannard and Zadesky use analogous, well-understood components, including portable devices, processors, and touchpad inputs. (EX1004, 41:46-42:32, 43:65-

44:7; EX1005, 5:27-6:8; EX1003, ¶43.) Zadesky’s teachings could be implemented using Jannard’s existing user controls 322 and processor 312 to perform common functions such as volume control. (EX1003, ¶43.)

D. Claim 1

1. [Preamble]¹

Jannard discloses systems including a wearable audio device 10 that provides audio and/or video to a user wearing the device. (EX1004, 2:53-55; EX1003, ¶44.) For example, audio may be provided by an MP3 player or a cell phone and may be presented to the user via wearable speakers. (EX1004, 2:1-6, 5:13-6:29; EX1003, ¶44.)

Jannard’s wearable audio device embodiments 10A, 10A’, 10A”, 10B, 10C, 10D, and 10E are all “modifications” of audio device 10 with analogous components, so a POSITA would understand their corresponding disclosures as applicable to, *e.g.*, audio device 10D. (EX1004, 3:12-4:27, 6:30-34, 9:23-31, 18:35-43, 20:13-19, 20:51-56, 30:21-27, 35:33-39; EX1003, ¶45.) FIG. 12 illustrates audio device 10D, an electronic eyewear system:

¹ See the claims appendix for a full recitation of each claim.

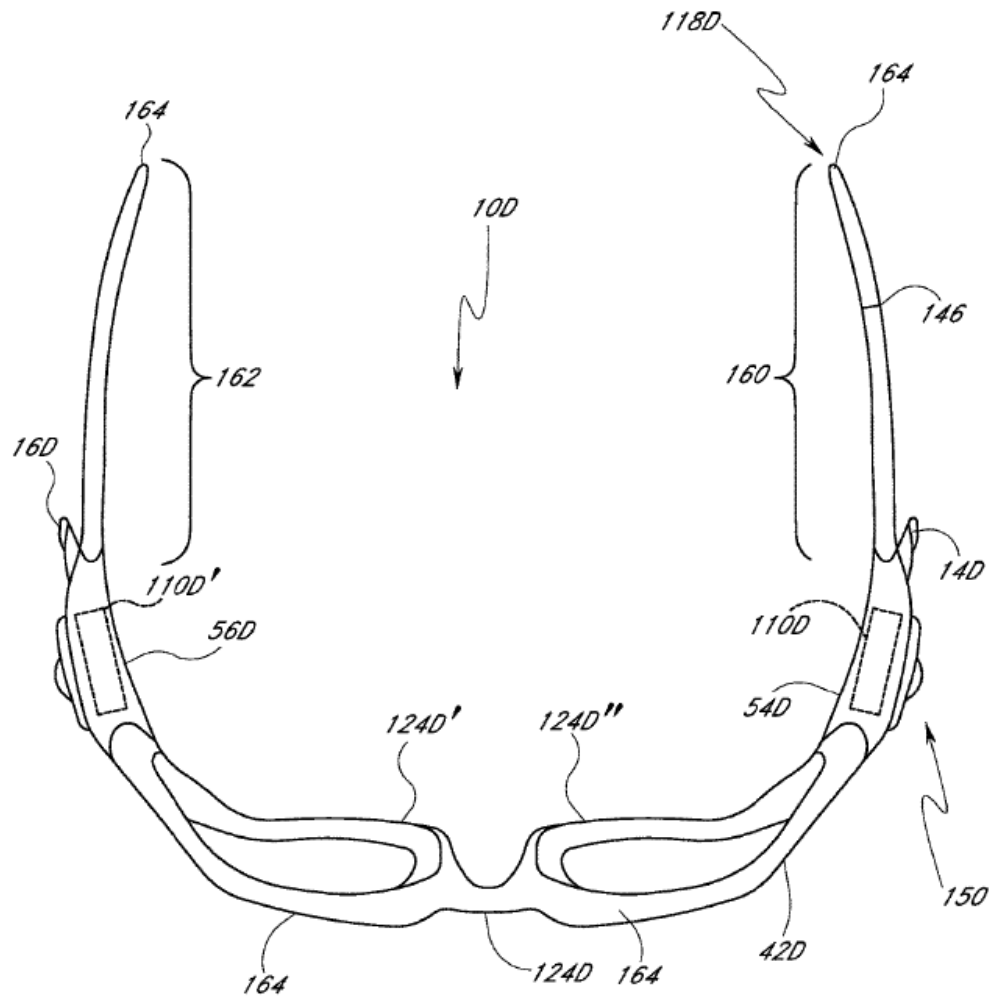


FIG. 12

(EX1004, 4:11-17, 26:10-20, 30:21-31:14, 33:16-32, 44:39-49; EX1003, ¶45.)

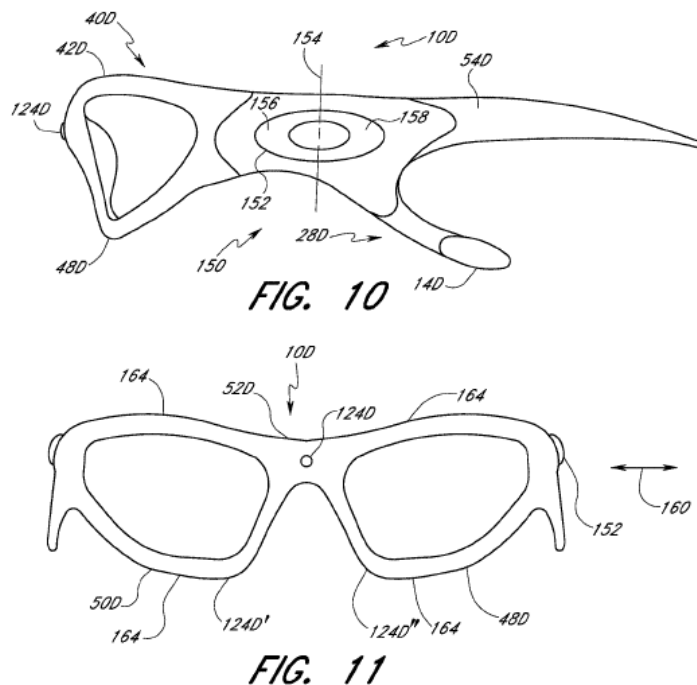
2. [A]

Consistent with the '913 disclosure, the POSITA would have understood electronic eyewear (*e.g.*, eyeglasses), such as Jannard's audio device 10D, to be an example of a head-worn personal electronic apparatus. (*See* EX1001, 6:63-67;

EX1004, 26:10-20, 30:21-31:14; EX1003, ¶46.) This is consistent with Petitioner’s proposal in the litigation, adopted by the court, that “head-worn personal electronic apparatus” should be construed as “electronic eyewear or headwear.” (EX1017, 2-3; EX1003, ¶46.)

3. [B]

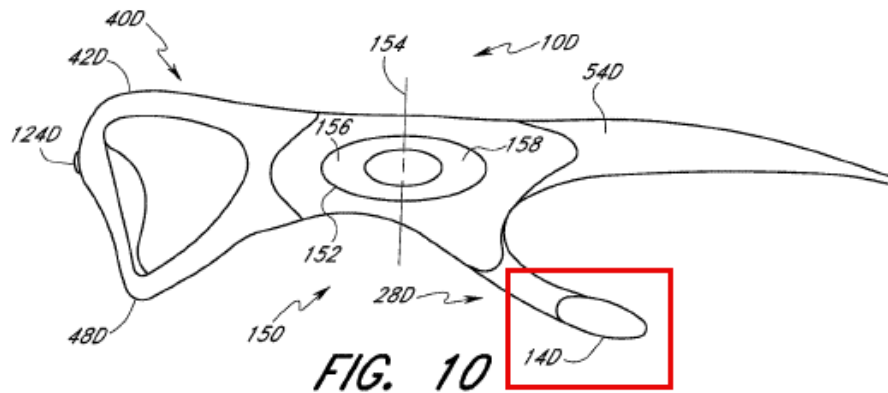
Jannard's audio device 10D includes the claimed head-worn structure because it is eyewear with a support structure, such as frame 42D, worn on the user's head. (*See* EX1001, 6:63-67; EX1004, 30:21-31:14; EX1003, ¶47.) FIGS. 10-11 illustrate side and front views of the audio device 10D:

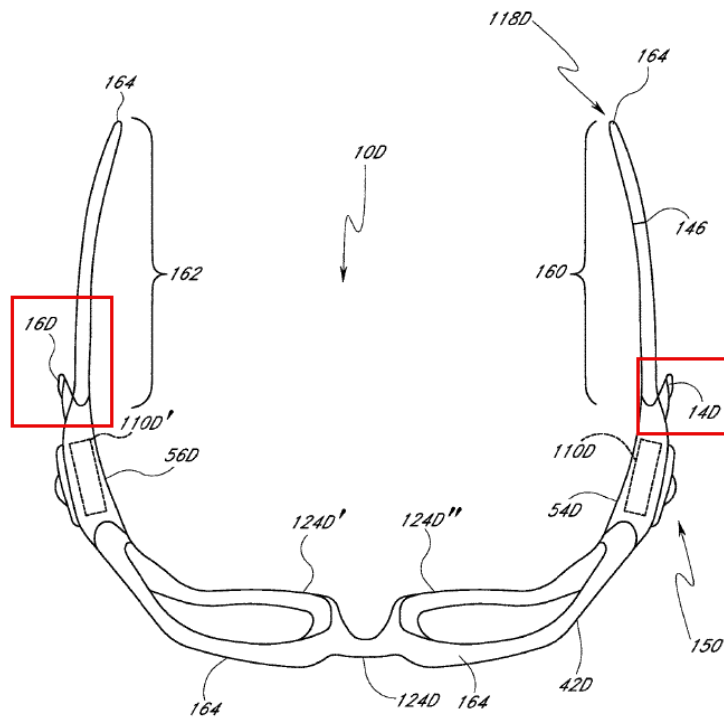


(EX1004, FIGS. 10-11, 5:13-22, 30:21-34; EX1003, ¶47.)

4. [C]

Jannard's audio device 10D includes left and right speakers 14D, 16D within the eyewear frame for audio output, which are thus at least partially contained within the head-worn structure. (EX1004, 5:13-14, 32:45-52, FIGS. 10-12; EX1003, ¶48.) FIGS. 10 and 12 illustrate:



**FIG. 12**

(EX1004, FIGS. 10, 12 (annotated); EX1003, ¶48.)

The speakers are proximate (near) the user's ears: gaps 32, 34 between the speakers and the ears are adjustable such that the speakers are preferably between 2 mm and 3 cm from the ears. (EX1004, 6:8-29; EX1003, ¶49.) This is consistent with Apple's proposal in the litigation that "proximate to an ear of the user" be construed as "near an ear of the user," because Jannard's speakers 14D, 16D are configured to be worn near the user's ears. (EX1017, 3; EX1003, ¶49.) Likewise, it is consistent with the court's construction (and Patent Owner's proposal) of that term as plain and ordinary meaning. (EX1017, 3; EX1003, ¶49.)

5. [D]

Audio device 10D can include motion sensors. (EX1004, 35:4-9; EX1003, ¶50.) For example, a wearable electronic interface 601 of audio device 10D includes a sensor that measures and indicates a time-varying parameter, such as speed or acceleration. (EX1004, 24:61-25:3; EX1003, ¶50.) The sensor may be “built into ... a pair of eyewear” and thus contained within the head-worn structure and providing motion data (*e.g.*, velocity) of the audio device. (EX1004, 25:26-28; EX1003, ¶50.)

6. [E]

Audio device 10D includes one or more microphones configured to receive “verbal input from the user,” such as for voice commands or cell phone communications. (EX1004, 30:8-15, 34:10-45; EX1003, ¶51.) For example, microphone 75 may face the wearer, be disposed anywhere on the frame, and include a transducer “within the frame.” (EX1004, 18:44-19:43, 30:8-15, 34:10-45, FIGS. 4A-4B; EX1003, ¶51.) Additionally, microphone 124D can have analogous function and structure. (EX1004, 30:28-44; EX1003, ¶51.) The microphone output may be provided as audio input 616 of interface 601. (EX1004, 26:3-25, 27:28-33, FIG. 8A; EX1003, ¶51.)

7. [F]

A “noise-canceling-microphone” bank is disposed “within the audio device”

and provides an “ambient noise-cancellation function.” (EX1004, 34:10-45; EX1003, ¶52.) Microphones of this bank can be “arranged in any suitable combination” to permit algorithms to “discern, reduce, and/or eliminate noise.” (EX1004, 34:19-33; EX1003, ¶52.)

Additionally, audio device 10D can include two microphones 124D (described above for element [E]). (EX1004, 30:36-44; EX1003, ¶53.)

8. [G]

Jannard’s electronic eyewear can include an electronic interface 601, which provides the wearer with data from one or more input sources, such as sensors, cell phones, or digital audio devices. (EX1004, 23:10-15, 23:49-24:2; EX1003, ¶54.) The POSITA would have understood audio device 10D to include interface 601 because Jannard discloses that interface 601 can belong to its electronic eyewear, including audio device 10D. (EX1004, 26:10-13; EX1003, ¶54.)

The wearer can select the input source (*e.g.*, an audio input source) by using a selector 610 of the interface 601. (EX1004, 26:21-25, 26:50-55; EX1003, ¶55.) Jannard discloses that selector 610 can be a touchpad located on the eyewear. (EX1004, 27:12-19; EX1003, ¶55.) However, Jannard does not describe the touchpad, nor explain how it would be implemented to receive user input for a portable electronic device such as audio device 10D. (EX1003, ¶55.)

The POSITA seeking to implement Jannard’s touchpad would thus have

looked to other references, such as Zadesky, for guidance. (EX1003, ¶56.)

Zadesky, in the same field of endeavor, describes using touchpads to provide control functions, such as user selections, to media players such as Jannard's wearable audio device. (EX1005, 3:26-37, 5:61-6:1, 13:36-60; EX1003, ¶56.) The POSITA would have been motivated to make the combination as described above in Section V.C. (EX1003, ¶56.)

Zadesky discloses that the touchpad can be based on "piezoelectric transducers," *i.e.*, to sense a user's input pressure on the touchpad and generate a signal accordingly. (EX1005, 9:39-61; EX1003, ¶57.) The POSITA would have recognized advantages of using piezoelectric transducers to implement Jannard touchpad: for example, lack of moving parts, durability, and low power consumption compared to other touch sensing technologies. (EX1003, ¶57.) These advantages are well-suited for a wearable device, such as audio device 10D, that is exposed to the elements and benefits from improved battery life. (EX1003, ¶57.)

The POSITA would have understood that, for a surface such as a touchpad, input pressure is force per unit area. (*See, e.g.*, EX1019, 172; EX1003, ¶58.) Thus, the user input received by the piezoelectric touchpad is based on a force induced on the touchpad, *i.e.*, as the user's finger presses against the touchpad. (EX1003, ¶58.) The POSITA would thus understand the piezoelectric touchpad to

be a force sensing device. (EX1003, ¶58.) The wearer can use the piezoelectric touchpad to alter device operation by, *e.g.*, switching between audio/video inputs, or answering an incoming telephone call, as Jannard describes for selector 610. (EX1004, 28:5-18, FIG. 8B; EX1003, ¶58.)

The POSITA would have understood the piezoelectric touchpad to be contained within the head-worn structure. (EX1003, ¶59.) For example, Jannard depicts the selector 610 (*i.e.*, the piezoelectric touchpad in the combination) as contained within the electronic interface 601 of the eyewear:

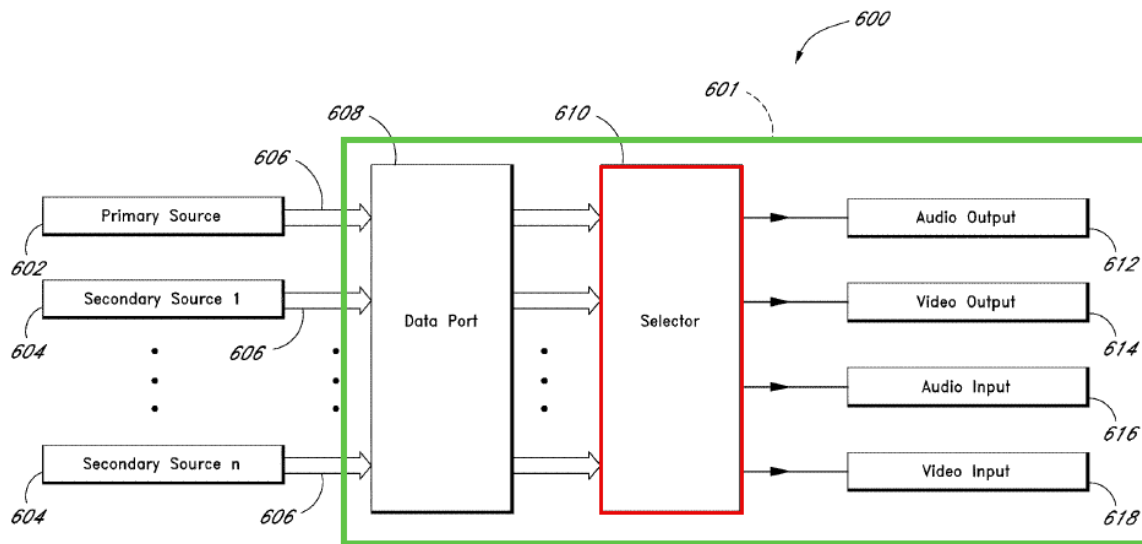


FIG. 8A

(EX1004, 26:3-25, FIG. 8A; EX1003, ¶59.)

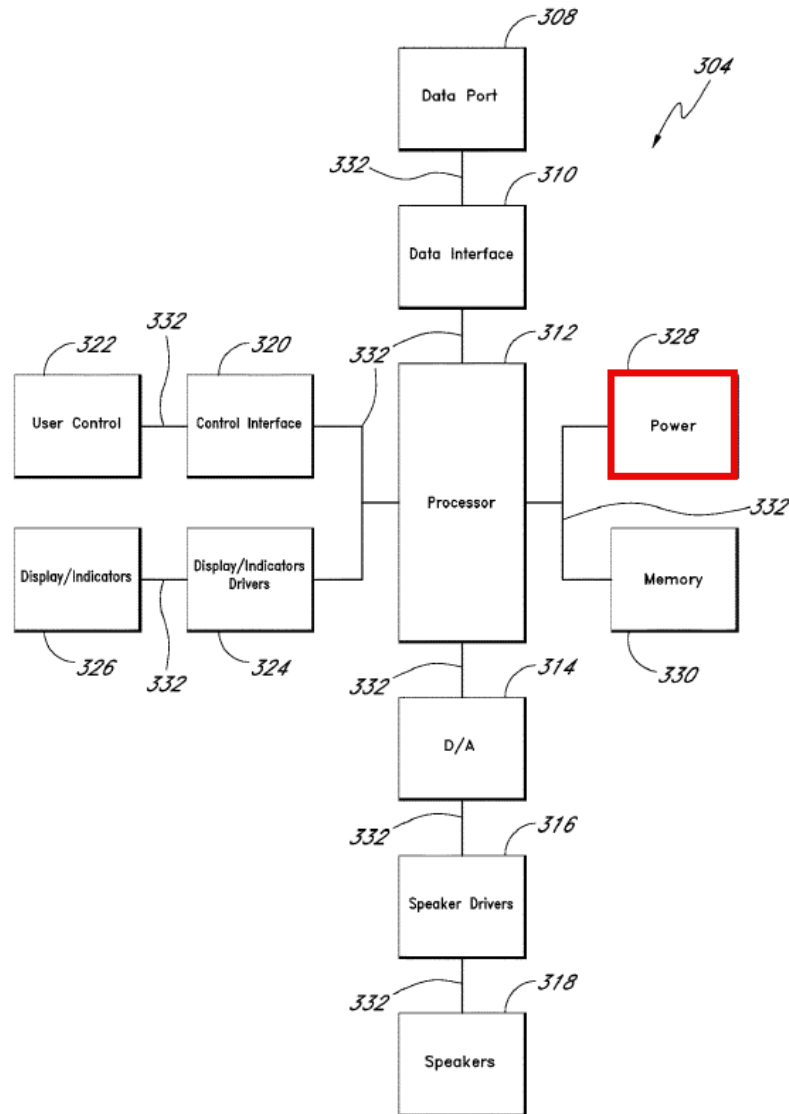
Jannard additionally discloses that the selector 610 can be located on an earstem, orbital, or bridge of the eyewear (or “[a]ny other ... selector 610

location”); the POSITA would have understood this to disclose that a touch surface is exposed to the user via a surface of the eyewear (*e.g.*, a surface of an earstem, orbital, or bridge) to receive the user input, and that the piezoelectric device itself is contained within the eyewear (*i.e.*, beneath the surface of the eyewear). (EX1004, 27:13-20; EX1003, ¶60.)

9. [H]

Jannard discloses that audio device 304² “includes a power module 328,” which provides power to audio device 304. (EX1004, 44:39-41; EX1003, ¶61.) Jannard further discloses that the power module 328 may be a rechargeable battery, such as a lithium-ion polymer battery. (EX1004, 44:47-48; EX1003, ¶61.) FIG. 22 illustrates power module 328 contained within audio device 304:

² Jannard explains that “audio device 304 may be any of the audio devices described above with respect to FIGS. 1-19 ...”. (EX1004, 41:22-24.) Thus, audio device 304 may be audio device 10D, because audio device 10D is described in Jannard with respect to at least FIGS. 10-12. (EX1004, 30:21-27, FIGS. 10-12; EX1003, ¶61 n. 2.) Accordingly, throughout this document, references to audio device 304 should be understood to include a reference to audio device 10D.

**FIG. 22**

(EX1004, FIG. 22 (annotated); EX1003, ¶61.)

10. [I]

Jannard's audio device 304 includes processor 312 and conductors 332, which are examples of the claimed electronic circuitry. (EX1004, 41:46-58, 42:18-32, 45:22-45, FIG. 22; EX1003, ¶62.) For example, processor 312 "controls the

overall function and operation” of the audio device. (EX1004, 41:46-49, 42:21-32, FIG. 22; EX1003, ¶62.) Processor 312 can couple “directly or indirectly to the various electronic components” of the audio device, *i.e.*, via conductors 332, which is electronic circuitry that “provide[s] direct or indirect electrical communication between the various components of the audio device 304.” (EX1004, 42:18-32, 45:22-26; EX1003, ¶62.) Conductors 332 may be “embedded within,” and thus contained within, the frame of the audio device 304. (EX1004, 45:36-45, FIG. 22; EX1003, ¶62.)

Conductors 332 are used to distribute power from the power module 328 to the various components of the audio device 304, including processor 312 and user controls 322 (which may include the touchpad as described above). (EX1004, 44:39-47, FIG. 22; EX1003, ¶63.) The POSITA would thus understand conductors 332 to electrically connect the processor 312 to the rechargeable battery (*i.e.*, power module 328). (EX1003, ¶63.)

11. [J]

Jannard’s audio device 304 includes a data port 308, which can include “a wireless receiver, a radio, an RF receiver, a BLUETOOTH receiver, or the like” for “coupling of audio device 304 with communications link 306.” (EX1004, 41:47-67; EX1003, ¶64.) The POSITA would thus understand the head-worn structure to contain wireless communication circuitry via its data port 308.

(EX1003, ¶64.) Conductors 332 electrically connect data port 308 to the rechargeable battery (*i.e.*, power module 328), as described above and illustrated by FIG. 22:

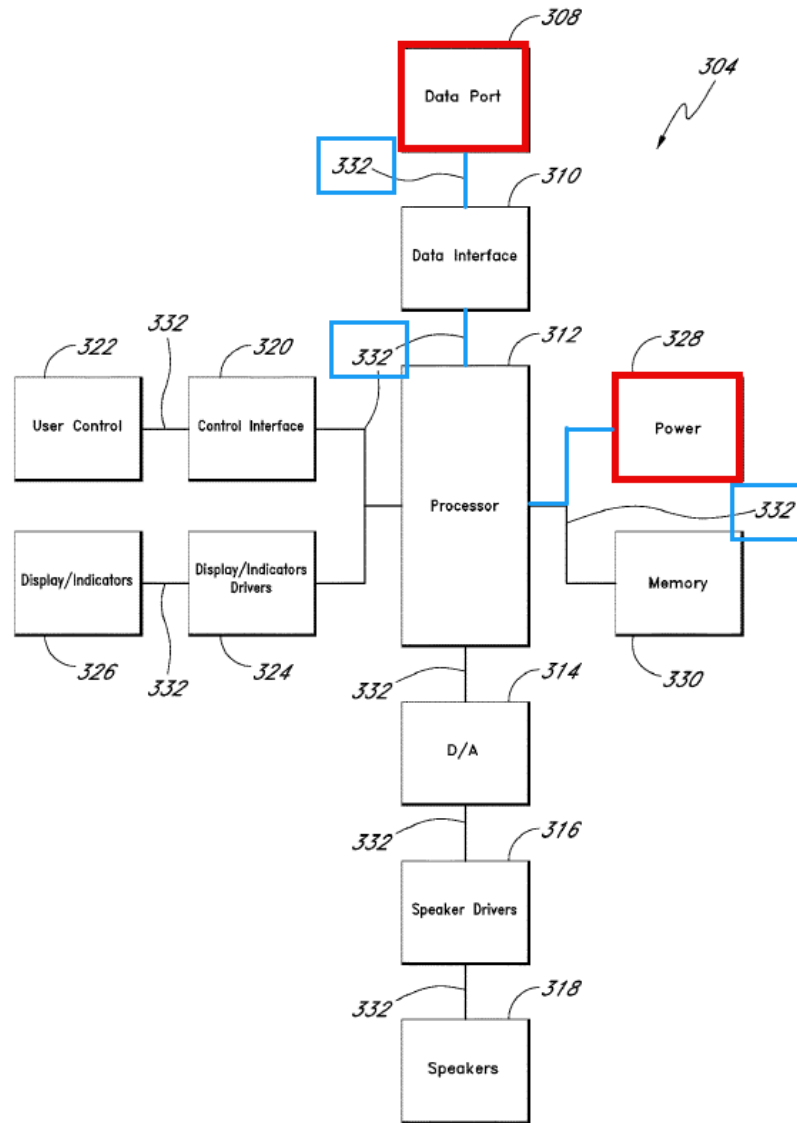


FIG. 22

(EX1004, 44:39-52, FIG. 22 (annotated); EX1003, ¶64.)

12. [K]

Audio device 10D can “include” power contacts 164 (a conductive element) for “recharging any rechargeable batteries connected thereto.” (EX1004, 33:13-15; EX1003, ¶65.) The audio device can interconnect with a recharging cradle: the audio device can be laid on or inserted into the cradle, “thereby making contact between the power contacts 164 and corresponding contacts in the cradle (not shown).” (EX1004, 33:13-27; EX1003, ¶65.) For example, “the power contacts 164 can be disposed at the ends of the ear stems 54D, 56D” and thus exposed for interconnection between the power contacts 164 and the corresponding contacts of the cradle. (EX1004, 33:13-27; EX1003, ¶65.) FIG. 12 illustrates:

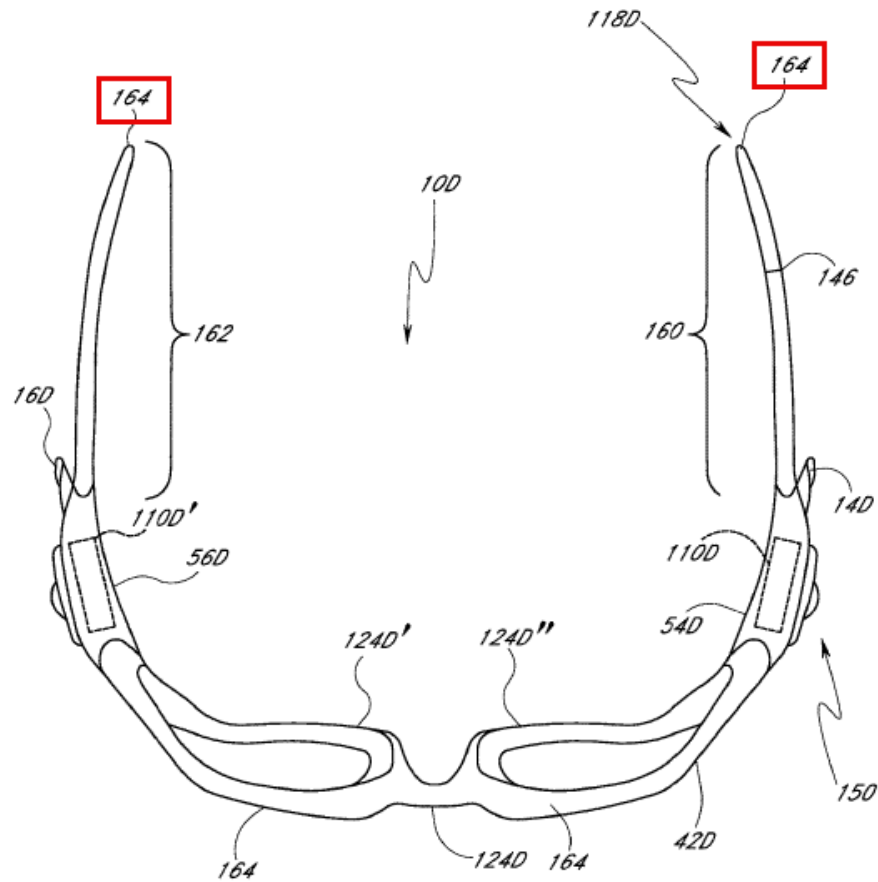


FIG. 12

(EX1004, FIG. 12 (annotated); EX1003, ¶65.)

The power contacts 164 are electrically connected to the audio device's rechargeable battery (*i.e.*, power module 328), so that the power contacts can deliver power from the recharging cradle to the battery. (EX1004, 33:13-15; EX1003, ¶66.)

13. [L]

As described for element [K], Jannard's system includes a recharging cradle

(a charging apparatus) that connects to the head-worn audio device 10D to recharge its battery. (EX1004, 33:14-35; EX1003, ¶67.) For example, power contacts 164 may be located in the audio device's ear stems, which can be inserted into vertically oriented holes of the recharging cradle. (EX1004, 33:20-27; EX1003, ¶67.) By inserting the ear stems into the cradle, power contacts 164 make an electrical connection with the cradle's corresponding contacts, such that the battery of the audio device (*i.e.*, power module 328) is recharged via the cradle. (EX1004, 33:14-35; EX1003, ¶67.)

E. Claim 2

1. [Preamble]

See claim 1. (EX1003, ¶68.)

2. [A]

See claim 1[C]. (EX1003, ¶69.) Speakers 14D, 16D present audio output to the user. (*See* EX1004, 11:27-31; EX1003, ¶69.)

3. [B]

See claim 1[G]. (EX1003, ¶70.) The touchpad (selector 610) can switch between audio inputs for presentation to the wearer. (EX1004, 28:5-18; EX1003, ¶70.)

F. Claim 3

1. [Preamble]

See claim 1. (EX1003, ¶71.)

2. [A]

See claim 1[G]. (EX1003, ¶72.) Selector 610 is used to answer an incoming telephone call. (EX1004, 28:5-18, FIG. 8B, claim 14; EX1003, ¶72.)

3. [B]

See element [A]. (EX1003, ¶73.)

G. Claim 23**1. [Preamble]**

See claim 1[A]. (EX1003, ¶74.)

2. [A]

See claim 1[B]. (EX1003, ¶75.)

3. [B]

See claim 1[C]. (EX1003, ¶76.)

4. [C]

See claim 1[D]. (EX1003, ¶77.)

5. [D]

See claim 1[E]. (EX1003, ¶78.)

6. [E]

See claim 1[F]. (EX1003, ¶79.)

7. [F]

See claim 1[G]. (EX1003, ¶80.) The POSITA would have understood the piezoelectric touchpad to be a force sensing device as described for 1[G].

(EX1003, ¶80.)

8. [G]

See claim 1[H]. (EX1003, ¶81.)

9. [H]

See claim 1[I]. (EX1003, ¶82.)

10. [I]

See claim 1[J]. (EX1003, ¶83.)

H. Claim 24

1. [Preamble]

See claim 23. (EX1003, ¶84.)

2. [A]

See claim 1[K]. (EX1003, ¶85.)

I. Claim 25

1. [Preamble]

See claim 23. (EX1003, ¶86.)

2. [A]

See claim 2[A]. (EX1003, ¶87.)

3. [B]

See claim 2[B]. (EX1003, ¶88.)

J. Claim 26**1. [Preamble]**

See claim 23. (EX1003, ¶¶89.)

2. [A]

See claim 3[A]. (EX1003, ¶¶90.)

3. [B]

See claim 3[A]. (EX1003, ¶¶91.)

K. Claim 27**1. [Preamble]**

See claim 23. (EX1003, ¶¶92.)

2. [A]

Jannard's audio device 10D includes a "noise-canceling-microphone" bank that provides an "ambient noise-cancellation function." (EX1004, 34:10-45; EX1003, ¶¶93.) Microphones in the bank can be "arranged in any suitable combination" to permit algorithms to "discern, reduce, and/or eliminate noise" picked up from the environment, such as wind-generated noise. (EX1004, 19:40-43, 34:22-33; EX1003, ¶¶93.) The POSITA would thus have understood a second microphone (of the noise-cancelling microphone bank) to detect ambient noise in the environment (an environmental audio input), so that the ambient noise can be discerned, reduced, and/or eliminated. (EX1003, ¶¶93.)

3. [B]

Jannard discloses a first microphone for “verbal input from the user” and a second “noise-canceling” microphone for “ambient noise-cancellation.” (EX1004, 34:10-45; EX1003, ¶¶94.) Signals from these microphones are applied to algorithms that “discern, reduce, and/or eliminate noise in any suitable manner,” including filtering wind-generated noise from the first microphone. (EX1004, 19:40-43, 19:65-67, 34:22-34; EX1003, ¶¶94.) A POSITA would have understood those algorithms to discern a noise component, such as wind noise, and reduce or eliminate it from the first microphone’s audio input 616 based on environmental noise detected by the second microphone. (EX1004, 19:40-43, 19:65-67, 27:28-33, 34:10-45; EX1003, ¶¶94.) The POSITA would have understood “eliminat[ing]” the noise component to mean subtracting it from the audio input 616. (EX1003, ¶¶95.)

Additionally, Jannard discloses implementing a noise-cancelling technique used by Andrea Electronics Corporation. (EX1004, 34:22-30; EX1003, ¶¶95.) The POSITA would have understood this disclosure to refer to a technique described in, *e.g.*, WIPO Pub. No. WO 1997/25790 (EX1012, “Andrea”), which is a PCT application filed by Andrea Electronics Corporation and cited by Jannard. (EX1004, (56); EX1012, 1:33-2:4, 17:14-26, 23:36-24:13; EX1003, ¶¶95.) Andrea describes the noise-cancelling technique as “subtract[ing] the noise signal from the

second [noise cancellation] microphone” from “the speech and noise signal from the first [speech] microphone”. (EX1004, (56); EX1012, 1:33-2:4, 17:14-26, 23:36-24:13; EX1003, ¶¶95.)

L. Claim 28

1. [Preamble]

See claim 23. (EX1003, ¶¶96.)

2. [A]

See claim 27[A]. (EX1003, ¶¶97.)

3. [B]

See claim 27[B]. (EX1003, ¶¶98.) As described for claim 27[B], Jannard discloses microphones that detect environmental noise, including wind noise, and processing algorithms that “discern, reduce, and/or eliminate noise.” (EX1004, 34:10-45; EX1003, ¶¶98.) Jannard also discloses electronic circuitry that receives audio output signals and routes them to audio output 612, which includes the speakers. (EX1004, 26:3-25, 27:3-11, FIG. 8A; EX1003, ¶¶98.) Jannard further discloses that its audio device can include “static and/or noise correction, and/or active or passive noise cancellation,” and that the audio device processes audio signals before sending them to the speakers. (EX1004, 46:58-47:2; EX1003, ¶¶98.)

A POSITA would have understood that the speaker output is heard by the user in the presence of the environmental noise detected by the second

microphone. (EX1003, ¶¶99.) A POSITA therefore would have found it obvious to modify the audio output signals supplied to Jannard's speakers based on the environmental audio input detected by the second microphone, such as by subtracting a noise-cancelling component corresponding to the detected environmental noise, so that the resulting speaker output cancels at least a portion of that environmental noise at the user's ear. (EX1003, ¶¶99.)

The POSITA would have been motivated to make this modification to obtain the "best possible signal to ambient noise ratio from the speakers"—an express goal of Jannard. (EX1004, 11:40-43; EX1003, ¶¶100.) This motivation would have been especially strong because Jannard's speakers may be spaced from the user's ears, allowing environmental noise to reach the ears alongside the speaker output. (EX1004, 6:8-29, 11:44-47, 23:64-24:2, 27:52-58; EX1003, ¶¶100.)

A POSITA would have had a reasonable expectation of success because Jannard already discloses the components needed to implement the modification: a noise-cancelling microphone bank for detecting environmental noise, processing circuitry and algorithms for reducing or eliminating noise (as for audio input 616), and an audio output path for processing and sending audio output signals to the speakers. (EX1004, 26:3-25, 34:10-45, 46:58-47:2, FIG. 8A; EX1003, ¶¶101.) Applying Jannard's noise-cancellation functionality to audio output 612 (which belongs to the same audio interface 601 as the audio input 616) would have been a

straightforward use of these existing components and techniques for their intended purposes, yielding predictable improvement in the signal-to-ambient-noise ratio heard by the user. (EX1003, ¶101.)

M. Claim 29

1. [Preamble]

See claim 28. (EX1003, ¶102.)

2. [A]

Jannard describes that audio device 10D can “include ... a variety of sensors,” *i.e.*, that the audio device (a head-worn structure) at least partially contains a sensor. (EX1004, 25:16-28, 35:4-10; EX1003, ¶103.) The sensor can be a medical monitoring sensor that can detect, *e.g.*, the user’s physical conditions such as temperature or blood pressure. (EX1004, 24:20-25, 25:16-28, 35:4-10; EX1003, ¶103.)

3. [B]

See element [A]. (EX1003, ¶104.)

N. Claim 30

1. [Preamble]

See claim 28. (EX1003, ¶105.)

2. [A]

See claim 27[B]. (EX1003, ¶106.)

O. Claim 31**1. [Preamble]**

See claim 23. (EX1003, ¶107.)

2. [A]

See claim 27[B]. (EX1003, ¶108.)

3. [B]

See claim 28[B]. (EX1003, ¶109.) The POSITA would have understood that the higher the ambient noise level, the more the audio output signals are modified to compensate. (EX1003, ¶109.)

P. Claim 32**1. [Preamble]**

See claim 23. (EX1003, ¶110.)

2. [A]

See claim 27[A]. (EX1003, ¶111.) The first (speaking) microphone is configured to detect verbal speech input, and is “positioned so as to face toward the user” in order to best detect the speech input (emitted from the user’s mouth) when worn by the user. (EX1004, 18:44-47, 30:28-44, 34:11-45; EX1003, ¶111.)

Q. Claim 33**1. [Preamble]**

See claim 32. (EX1003, ¶112.)

2. [A]

See claim 27[B]. (EX1003, ¶113.) The POSITA would have understood Jannard to teach positioning the second (noise-canceling) microphone directed away from the user's head, at least because this microphone is configured to detect ambient environmental noise, such as wind; and Jannard discloses that such noise is minimized when the microphone faces the user. (EX1004, 18:44-47, 30:37-41; *see also* EX1009, 8:1-16; EX1003, ¶113.) This positioning is consistent with Jannard's disclosure that noise-cancelling microphones can be "aimed in different directions." (EX1004, 34:36-45; EX1003, ¶113.)

R. Claim 34**1. [Preamble]**

See claim 33. (EX1003, ¶114.)

2. [A]

See claim 27[A]. (EX1003, ¶115.)

3. [B]

See claim 28[B]. (EX1003, ¶116.)

S. Claim 35**1. [Preamble]**

See claim 33. (EX1003, ¶117.)

2. [A]

See claim 27[A]. (EX1003, ¶118.)

3. [B]

See claim 27[B]. (EX1003, ¶119.)

T. Claim 36

1. [Preamble]

See claim 33. (EX1003, ¶120.)

2. [A]

See claim 27[B]. (EX1003, ¶121.)

3. [B]

See claim 31[B]. (EX1003, ¶122.)

U. Claim 37

1. [Preamble]

See claim 23. (EX1003, ¶123.)

2. [A]

Jannard's audio device's interface includes a speech recognition engine configured to "recognize the voice of the user," convert the speech to commands, and control a source device (*i.e.*, a mobile phone) based on the commands. (EX1004, 40:25-40; EX1003, ¶124.) The POSITA would have understood controlling the source device, such as to make a call, controls an operation of the audio device. (EX1004, 40:25-40; EX1003, ¶124.) Jannard also discloses user controls 322 that include "a microphone that receives a voice command," which processor 312 receives to "control[] the overall function and operation" of the

audio device. (EX1004, 42:21-25, 43:65-44:13; EX1003, ¶124.) Thus, Jannard's audio device receives voice inputs, determines commands using voice recognition, and controls device operation based on those commands. (EX1003, ¶124.)

A POSITA would have understood this microphone to be the first microphone described for claim 1[E], *i.e.*, microphone 75 or 124D, because Jannard's first microphone is configured to detect verbal input. (EX1004, 44:4-14; EX1003, ¶125.)

V. Claim 40

1. [Preamble]

See claim 23. (EX1003, ¶126.)

2. [A]

Audio device 10D can include a sensor for determining the user's sight direction when the device is worn by the user. (EX1004, 24:31-38, 25:15-28; EX1003, ¶127.) The sensor may belong to source electronics that are built into the eyewear. (EX1004, 25:26-28; EX1003, ¶127.) As Jannard discloses, the sensor can determine the sight direction by "sensing the position of the wearer's eyes." (EX1004, 24:34-36; EX1003, ¶127.) Using "well known" techniques, the sensor "measur[es] reflected light off of a wearer's eye." (EX1004, 24:36-38; EX1003, ¶127.) The POSITA would have been familiar with the "well known" techniques referenced in Jannard, and would understand them to include well-known eye

tracking methods in which a light (radiation) emitter directs light toward the user's eye, so that the reflected light can be detected and measured by the sensor, and the sight direction determined accordingly. (EX1001, 21:58-60; *see* EX1011 (describing one such method); EX1003, ¶127.) Thus, the POSITA would have understood Jannard to teach the claimed radiation emitter. (EX1003, ¶127.)

3. [B]

See element [A]. (EX1003, ¶128.) The POSITA would have understood the reflected light to be detected by a light (radiation) detector. (EX1001, 21:58-60; EX1003, ¶128.)

W. Claim 41

1. [Preamble]

See claim 40. (EX1003, ¶129.)

2. [A]

The POSITA would have understood Jannard's sensor to comprise a photodetector because it measures reflected light. (*See* EX1016, 557; EX1004, 24:36-38; EX1003, ¶130.)

X. Claim 45

1. [Preamble]

See claim 23. (EX1003, ¶131.)

2. [A]

Audio device 10D can include “a variety of sensors.” (EX1004, 34:33-36, 35:4-12; EX1003, ¶132.) Jannard incorporates by reference U.S. Patent No. 6,349,001 to Spitzer (EX1009), which discloses electronic eyeglasses with a “magnetic sensor ... based on the Hall effect” that captures magnetic field strength and direction for user-position tracking. (EX1004, 27:39-42; EX1009, 11:24-41; EX1003, ¶133.) Jannard (via its incorporation of Spitzer) thus teaches that the sensors of its audio device can similarly include a Hall effect sensor to capture such magnetic characteristic data. (EX1003, ¶133.) The POSITA would have been motivated to include the Hall effect sensor in Jannard’s audio device sensor at least by Jannard’s express reference to (and incorporation of) Spitzer to describe Jannard’s audio device; and to realize the tracking advantages described in Spitzer to improve Jannard’s ability to “sense the position ... of the head” of the user. (EX1004, 24:31-34; EX1003, ¶133.) The POSITA would have had a reasonable expectation of success at least because Jannard discloses that its audio device includes “a variety of sensors”; and expressly includes Spitzer in describing Jannard’s audio device, indicating that Spitzer’s teachings of additional sensors are compatible. (EX1004, 35:4-12; EX1003, ¶133.)

Y. Claim 65**1. [Preamble]**

See claim 23. (EX1003, ¶134.)

2. [A]

Jannard discloses that microphone 75 of audio device 10D can be a bone conduction microphone (an electronic element), and may be built into a nose pad of the device. (EX1004, 19:16-32, *see also* 27:28-33; EX1003, ¶135.)

Z. Claim 66**1. [Preamble]**

See claim 65. (EX1003, ¶136.)

2. [A]

See claim 65[A]. (EX1003, ¶137.) Jannard discloses that vibrations are generated from the user's voice, travel through the bone, and are conducted to the microphone. (EX1004, 19:27-30; EX1003, ¶137.)

3. [B]

Jannard discloses that the bone conduction microphone converts the vibrations of the user's voice into an electronic signal. (EX1004, 19:27-30, 27:28-33; *see* EX1018, 2; EX1003, ¶138.)

AA. Claim 67**1. [Preamble]**

See claim 23. (EX1003, ¶139.)

2. [A]

See claim 1[D]. (EX1003, ¶140.) A sensor of Jannard's interface 601 measures acceleration. (EX1004, 24:61-25:3; EX1003, ¶140.)

BB. Claim 68**1. [Preamble]**

See claim 23. (EX1003, ¶141.)

2. [A]

See claim 1[J]. (EX1003, ¶142.) Jannard's audio device includes a "BLUETOOTH receiver" for coupling with communications link 306. (EX1004, 41:47-67, *see also* 22:13-28; EX1003, ¶142.)

CC. Claim 69**1. [Preamble]**

See claim 23. (EX1003, ¶143.)

2. [A]

Jannard's audio device includes processor 312, which "controls the overall function and operation" of the audio device. (EX1004, 41:46-58, 42:18-32, FIG. 22; EX1003, ¶144.)

DD. Claim 70**1. [Preamble]**

See claim 23. (EX1003, ¶145.)

2. [A]

Jannard's audio device 10D comprises a head-supported interface device 110 that includes an onboard antenna 118. (EX1004, 22:3-38; EX1003, ¶146.)

Antenna 118 is contained within the head-worn structure, as shown:

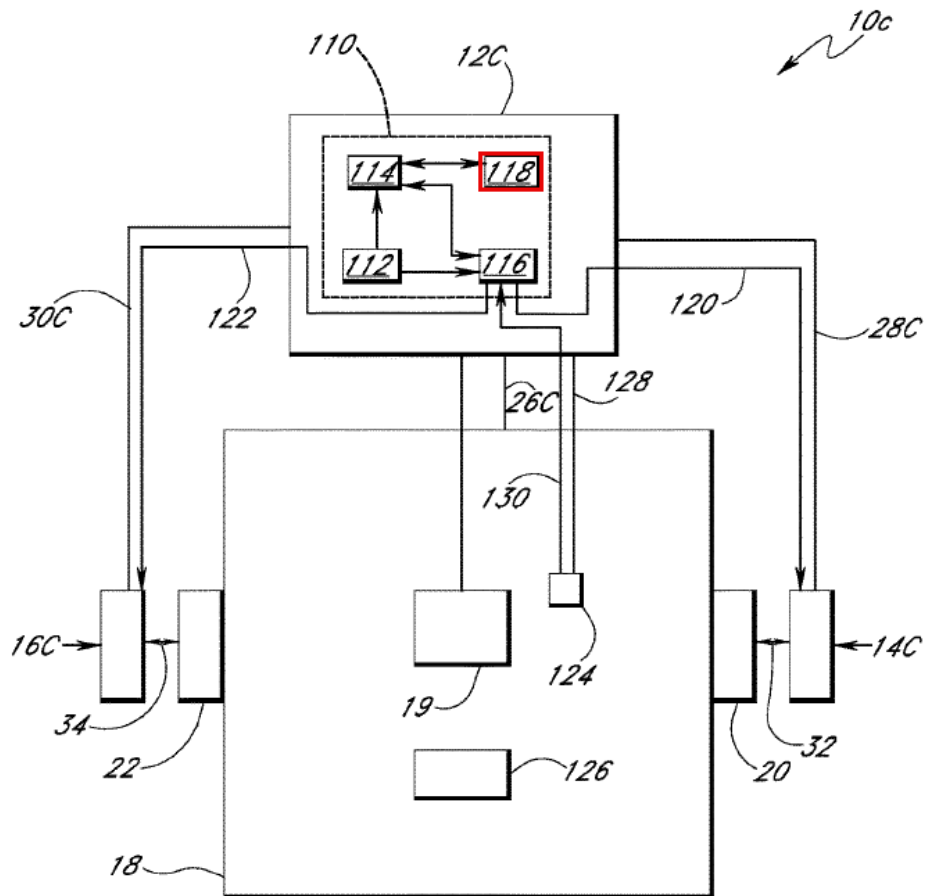


FIG. 9A

(EX1004, 22:3-9, FIG. 9A (annotated); EX1003, ¶146.)

VI. GROUND 2: CLAIMS 4-14, 20-22, 46-50, 54-64, AND 94-96 ARE RENDERED OBVIOUS BY JANNARD IN VIEW OF ZADESKY AND RADER

A. Summary of Rader

Rader is a U.S. Patent that was filed on September 20, 2001, published on April 3, 2003, and issued on September 13, 2005. (EX1008.) Rader is thus prior art to the '913 patent under at least 35 U.S.C. §§ 102(a), (b), and (e).

Rader discloses “enhancing sound based upon an individual’s hearing profile.” (EX1008, 1:11-12; EX1003, ¶148.) Rader’s personal communication device (“PCD”), which may be mobile phone 200, uses signal processing “to accommodate for lost functionality of the cochlea suggested by the hearing profile”. (EX1008, 2:21-22, 4:65-67; EX1003, ¶148.) FIG. 2 illustrates an embodiment:

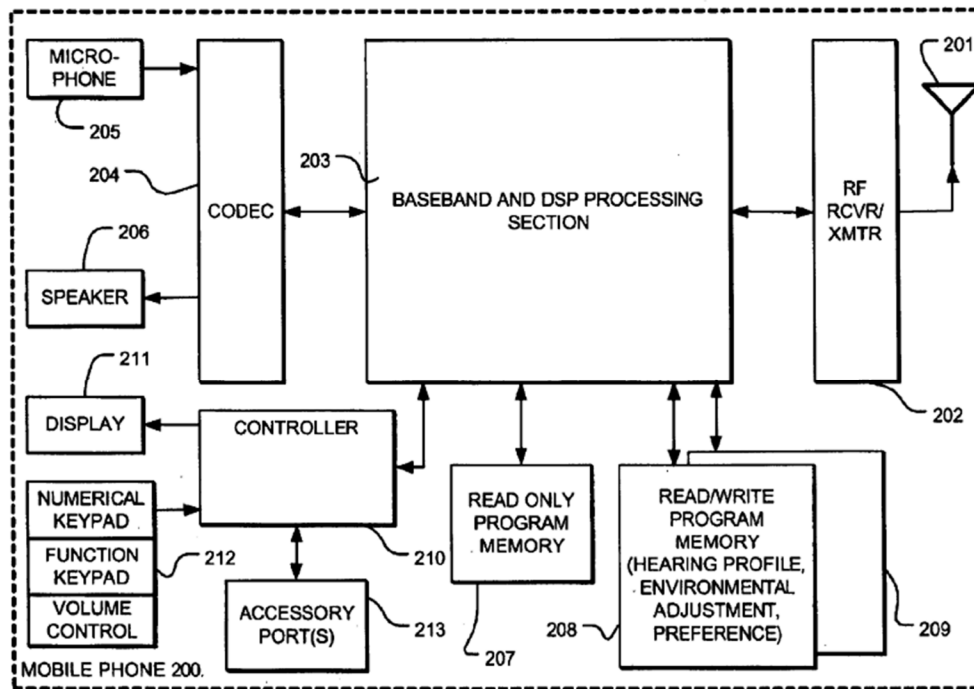


FIG. 2

(EX1008, FIG. 2; EX1003, ¶148.)

The PCD includes baseband/DSP processing section 203, which processes received audio signals using the hearing profile stored in memory 208 to produce customized audio for the user. (EX1008, 1:28-29, 2:32-34, 5:1-15, 5:43-47; EX1003, ¶149.) Processing section 203 is coupled to input/output controller 210 and accessory ports 213, allowing the user to receive customized audio through, *e.g.*, headphones. (EX1008, 4:15-19, 5:23-33; EX1003, ¶149.)

B. Motivation to Combine

It would have been obvious to the POSITA to combine the teachings of Jannard and Zadesky with those of Rader to meet the claim limitations. (EX1003,

¶150.) The POSITA would have combined the references in at least two ways.

(EX1003, ¶150.)

1. PCD as Input Source to Audio Device 10D

First, the POSITA would have modified Jannard's audio device 10D to use Rader's PCD as one of its audio input sources. (EX1003, ¶151.) Jannard's audio device can be "used as an audio output device for *any type of device which provides an audio output signal*," including mobile phones. (EX1004, 9:11-13 (emphasis added), 23:37-40, 23:66-24:2; EX1003, ¶151.) Rader's PCD, which may be a mobile phone, produces customized audio and expressly contemplates presenting it through accessories such as headsets. (EX1008, 4:15-19, 9:49-51, 19:48-51; EX1003, ¶¶151-152.) The POSITA therefore would have used Jannard's head-worn audio device to output Rader's customized audio to improve reception and usability for hearing-impaired users, users with listening preferences, and users in noisy environments. (EX1008, Abstract, 2:15-24; EX1003, ¶151.) A POSITA would have reasonably expected success at least because Jannard expressly receives audio from mobile phones, while Rader expressly uses a mobile phone to output customized audio through headsets. (EX1004, 23:37-24:2; EX1008, 1:20-24, 9:49-51; EX1003, ¶152.)

2. Audio Device 10D Implements the PCD Directly

Second, the POSITA also would have implemented Rader's PCD teachings

directly in Jannard's audio device 10D, so that the eyewear wirelessly receives and customizes audio based on a hearing profile. (EX1003, ¶153.) Rader contemplates implementing its audio-customization functionality in devices beyond a stand-alone phone, including devices with phone-system attributes, audio playback functionality, audio transducers, headsets, and computational tools. (EX1008, 4:30-48; EX1003, ¶153.)

Jannard's audio device 10D already includes corresponding components, including speakers, microphones, wireless receiving circuitry, processor 312, memory module 330, control circuitry, speaker drivers, and conductors interconnecting those components. (EX1004, Abstract, 5:13-6:46, 23:10-24:2, 41:3-42:32, 45:22-28, FIGS. 21-22; EX1003, ¶154.) Its source electronics (such as sensors, cell phones, and digital audio devices), can be either carried by the eyewear or communicating wirelessly. (EX1004, Abstract, 5:13-6:46, 23:10-15, 23:37-24:2, 41:3-42:10; EX1003, ¶154.)

The POSITA would have been motivated to implement Rader's hearing-profile processing locally in Jannard's eyewear, in order to apply user-specific customization to audio from multiple input sources (*e.g.*, phone, MP3 player), and to reduce dependence on an external device to perform the processing. (EX1004, 23:37-24:2, 41:3-42:32; EX1008, 4:7-48, 5:1-47; EX1003, ¶155.) A POSITA would have reasonably expected success because both references disclose

conventional components for receiving, processing, storing, and outputting audio, and Rader teaches flexibly implementing its processing in software, dedicated circuitry, or both. (EX1004, 41:46-42:32, 45:22-28; EX1008, 5:1-47, 7:12-18; EX1003, ¶155.)

C. Claim 4

1. [Preamble]

See claim 1. (EX1003, ¶156.)

2. [A]

Jannard's audio device 10D receives audio from a source device (602, 604) that provides audio output (*e.g.*, wirelessly via Bluetooth) and can be selected by selector 610. (EX1004, 23:23-48, 26:26-55; EX1003, ¶157.) The source device can be "any source, conduit, or provider of audio" and may be a mobile phone. (EX1004, 23:37-24:2; EX1003, ¶157.) The POSITA would have applied Rader's PCD (which may be a mobile phone) as a source device for Jannard's audio device 10D as described above in Section VI.B.1, *i.e.*, such that Rader's PCD provides audio to audio device 10D for presentation via its speakers 14D, 16D. (EX1008, 4:31-47; EX1003, ¶157.) In this combination, Rader's PCD supports audio output via audio device 10D. (EX1003, ¶157.)

3. [B]

Rader discloses "enhancing sound based upon an individual's hearing

profile,” which can be based on a hearing impairment of the user. (EX1008, 1:9-25, 2:15-23, 10:32-50; EX1003, ¶158.) For example, the hearing profile can be calculated based on the user’s responses to an auditory test in which the user is presented with audio stimuli. (EX1008, 7:19-31; EX1003, ¶158.) The hearing profile indicates the user’s “threshold of audibility” for an audio tone at a particular frequency, which can reflect the user’s degree of hearing loss at that frequency. (EX1008, 5:43-6:7; EX1003, ¶158.) For example, the hearing profile can indicate the user’s “threshold due to the impairment” (THi), which is a factor affecting the user’s overall threshold of audibility. (EX1008, 5:43-6:51; EX1003, ¶158.)

The hearing profile is stored in the read/write memory 208 of the PCD 200:

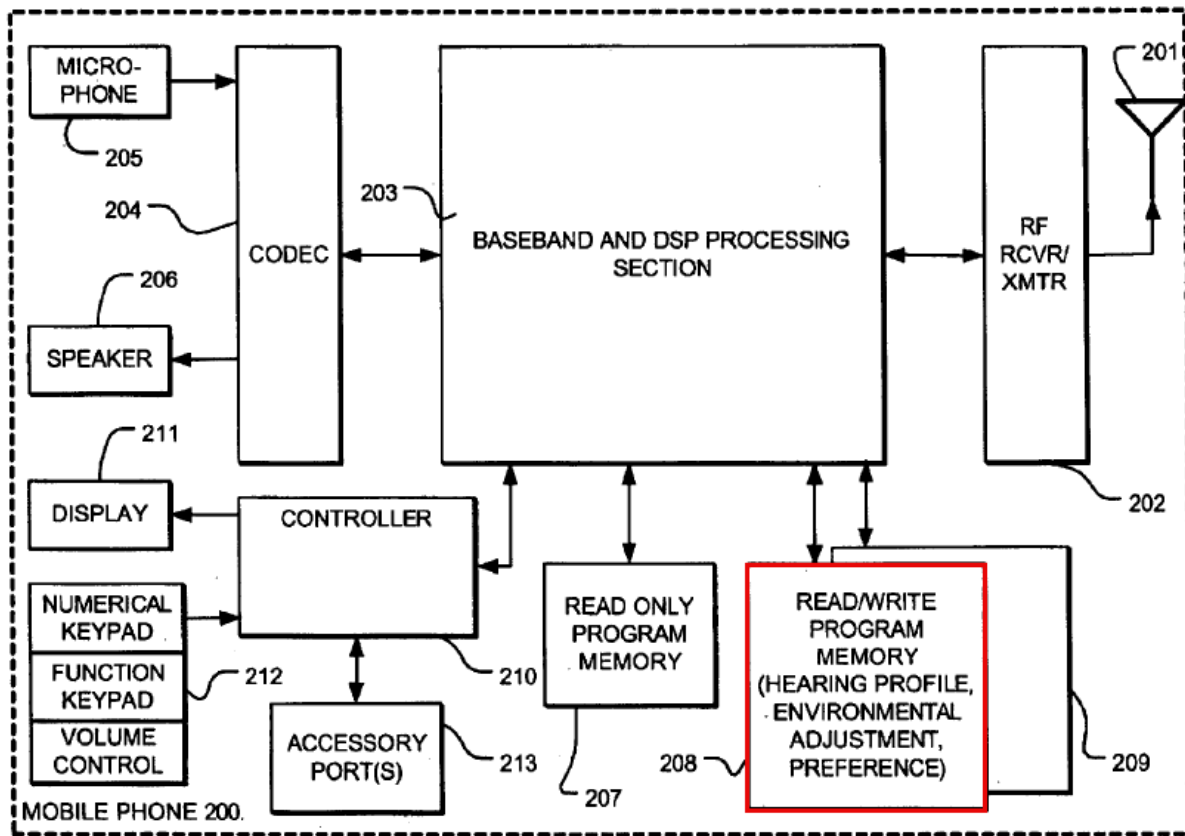


FIG. 2

(EX1008, 5:10-15, 5:43-47, FIG. 2 (annotated); EX1003, ¶159.)

4. [C]

Rader's hearing profile is used to produce customized audio for a user based upon the user's hearing impairment. (EX1008, 1:28-29, 2:17-18; EX1003, ¶160.) In embodiments, as shown in FIG. 5, unprocessed audio is delivered to Rader's PCD 22, which may be a mobile phone; the audio may be received from a landline or mobile phone 29; from a remote system 24 (*e.g.*, stored audio or an automated response system), or from a local processing system 25, which may be a networked

PC:

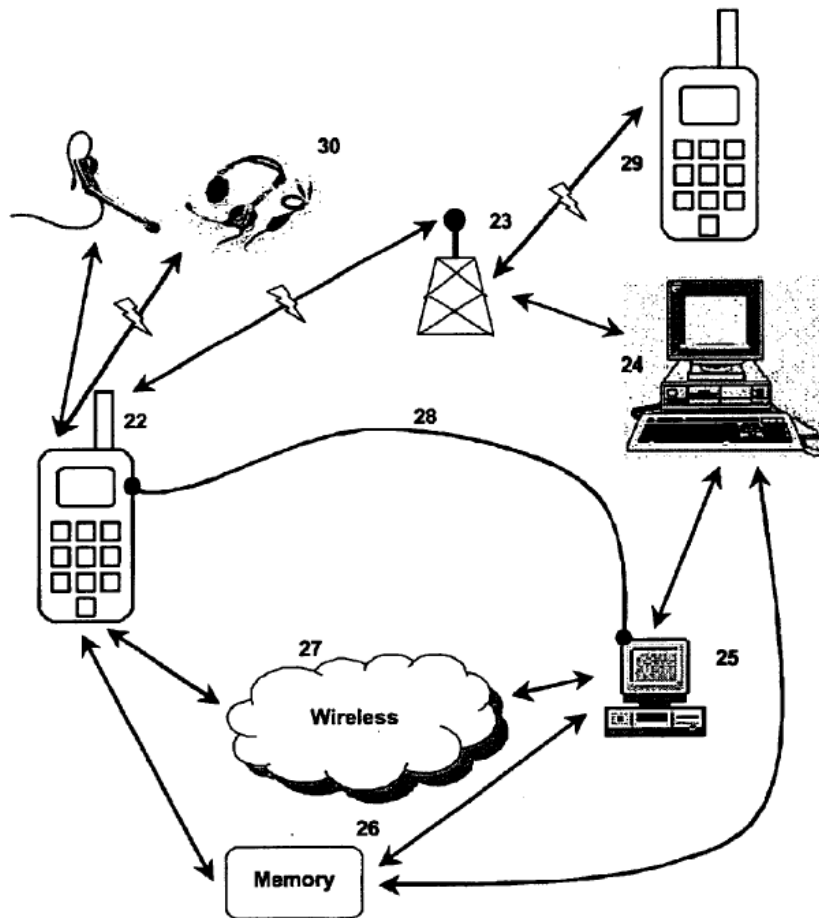


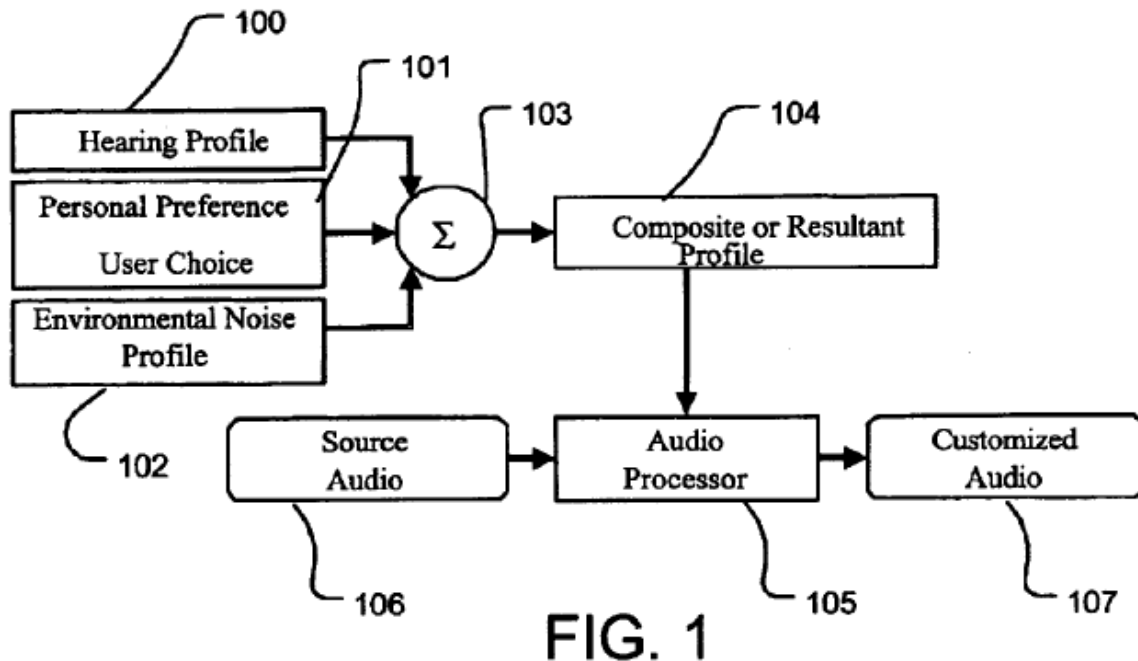
FIG. 5

(EX1008, 9:31-51, FIG. 5; EX1003, ¶160.)

The PCD can receive the audio signals via a wired link 28 or a wireless link 27. (EX1008, 9:39-42; EX1003, ¶161.) Upon receiving the input audio, the PCD “customize[s] the audio” based on the user’s hearing profile. (EX1008, 10:61-67; EX1003, ¶161.) As described for element [B], the hearing profile can characterize a hearing impairment of the user, *e.g.*, the user’s threshold of audibility for specific

audio frequencies, and is stored in memory of the PCD. (EX1008, 3:1-14, 5:43-6:51; EX1003, ¶161.)

The stored hearing profile 100 can be combined with other data to generate a composite profile 104; a processor 105 of the PCD then applies the profile 104 to the source audio 106 to produce customized audio 107. (EX1008, 4:7-25, FIG. 1; EX1003, ¶162.) FIG. 1 illustrates:



(EX1008, 4:7-25, FIG. 1; EX1003, ¶162.)

Applying the profile 104 to produce the customized audio 107 can include applying a compression process to the source audio 106, which adjusts the gain of the audio signal for various frequencies to compensate for the user's "reduced audibility." (EX1008, 6:52-7:18; EX1003, ¶163.) This process replicates the

behavior of a healthy human cochlea and restores “normal” auditory perception.

(EX1008, 6:52-60; EX1003, ¶163.)

5. [D]

Rader’s PCD can present the customized audio output “through accessories 30 such as headsets.” (EX1008, 9:49-51; EX1003, ¶164.) FIG. 5 illustrates the PCD 22 communicating the customized audio output to headset 30:

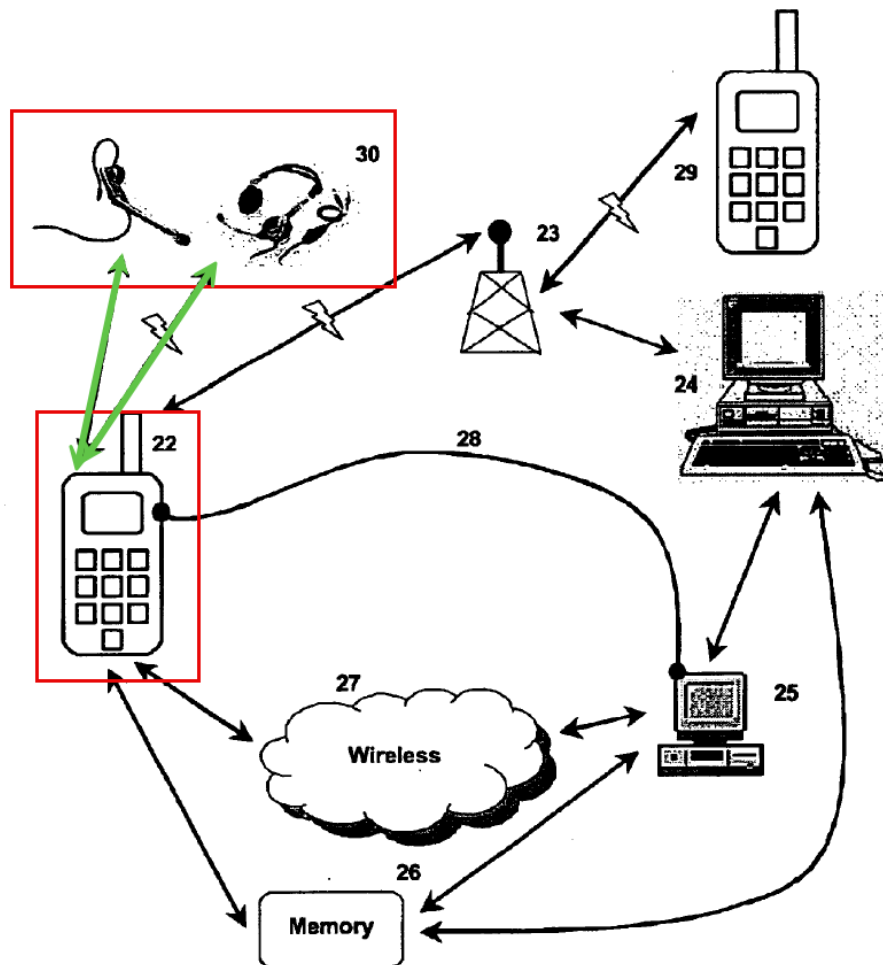


FIG. 5

(EX1008, 9:31-51, FIG. 5 (annotated) ; EX1003, ¶164.)

In the combination, Rader's PCD transmits the customized audio output to Jannard's wireless headset, as for headset 30 above. (EX1003, ¶165.) The communication medium is wireless and the transmitter/receiver includes a mobile phone with an antenna. (EX1008, 3:15-19; EX1003, ¶165.)

6. [E]

Jannard's audio device 10D receives audio signals (the customized audio signals) transmitted from the source device (Rader's PCD) via a wireless receiver. (EX1004, 9:20-22, 26:35-40; EX1003, ¶166.) Speakers 14D, 16D present the audio output to the user via audio output 612. (EX1004, 9:11-22, 23:10-22, 27:3-33; EX1003, ¶166.)

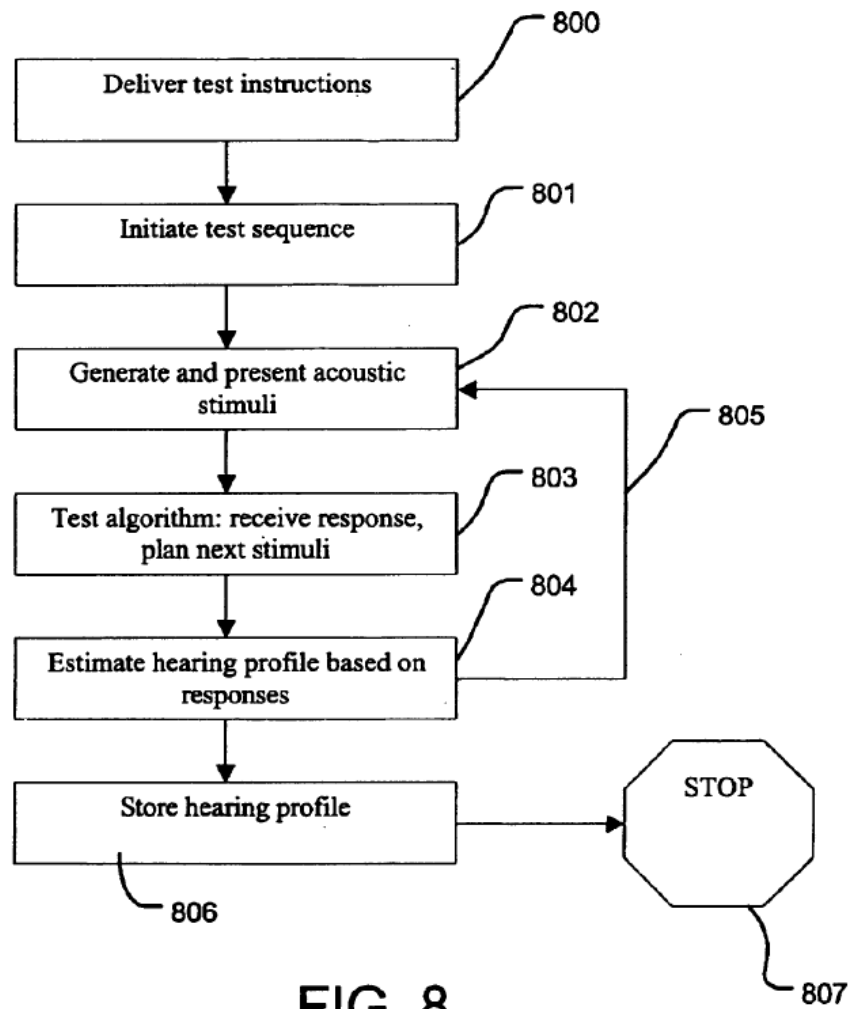
D. Claim 5

1. [Preamble]

See claim 4. (EX1003, ¶167.)

2. [A]

Rader's PCD can prompt the user to provide information used to define the hearing profile. (EX1008, 3:8-14; EX1003, ¶168.) For example, the PCD presents the user with audio stimuli (tones) in a hearing test, receives feedback from the user, and uses the feedback to calculate the hearing profile. (EX1008, 3:8-14, 7:19-31, 11:23-12:67; EX1003, ¶168.) FIG. 8 illustrates:

**FIG. 8**

(EX1008, 3:8-14, 11:23-12:67, FIG. 8; EX1003, ¶168.)

E. Claim 6

1. [Preamble]

See claim 5. (EX1003, ¶169.)

2. [A]

See claim 5[A]. (EX1003, ¶170.) FIG. 8 illustrates establishing the hearing profile:

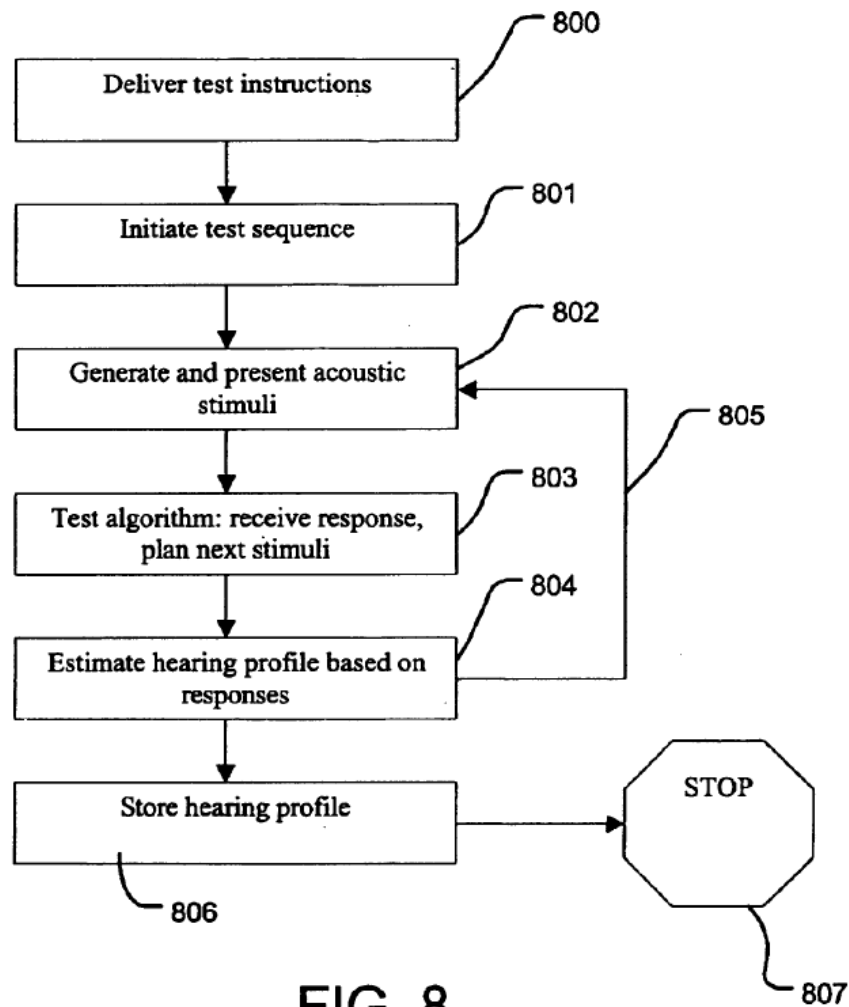


FIG. 8

(EX1008, 3:8-14, 11:23-12:67, FIG. 8; EX1003, ¶170.)

Rader's PCD generates audio tones ("acoustic stimuli") and presents them to the user (802). (EX1008, 11:28-29, 11:63-64, FIG. 8; EX1003, ¶171.) The tones are presented via the PCD's internal or external speaker. (EX1008, 11:28-29, 12:7-11, FIG. 8; EX1003, ¶171.) The PCD receives the user's response to the tones (803), and the responses are used to generate the hearing profile (804). (EX1008, 11:30-31, 12:30-36; EX1003, ¶171.) In some embodiments, the user's

response can identify which of several tones “sounds better.” (EX1008, 9:1-16; EX1003, ¶171.) Rader discloses that the responses are used to determine the user’s combined “threshold of audibility” of a tone (*i.e.*, “THtot”)—that is, the threshold level at which the user is able to hear the tone. (EX1008, 5:49-6:51; EX1003, ¶171.)

F. Claim 7

1. [Preamble]

See claim 4. (EX1003, ¶172.)

2. [A]

Rader’s PCD customizes audio signals by applying compression to improve audibility. (EX1008, 6:61-67; EX1003, ¶173.) For example, FIG. 10 illustrates applying a compression algorithm (922) to an input speech signal (923) to produce a modified speech signal (924) for output (925):

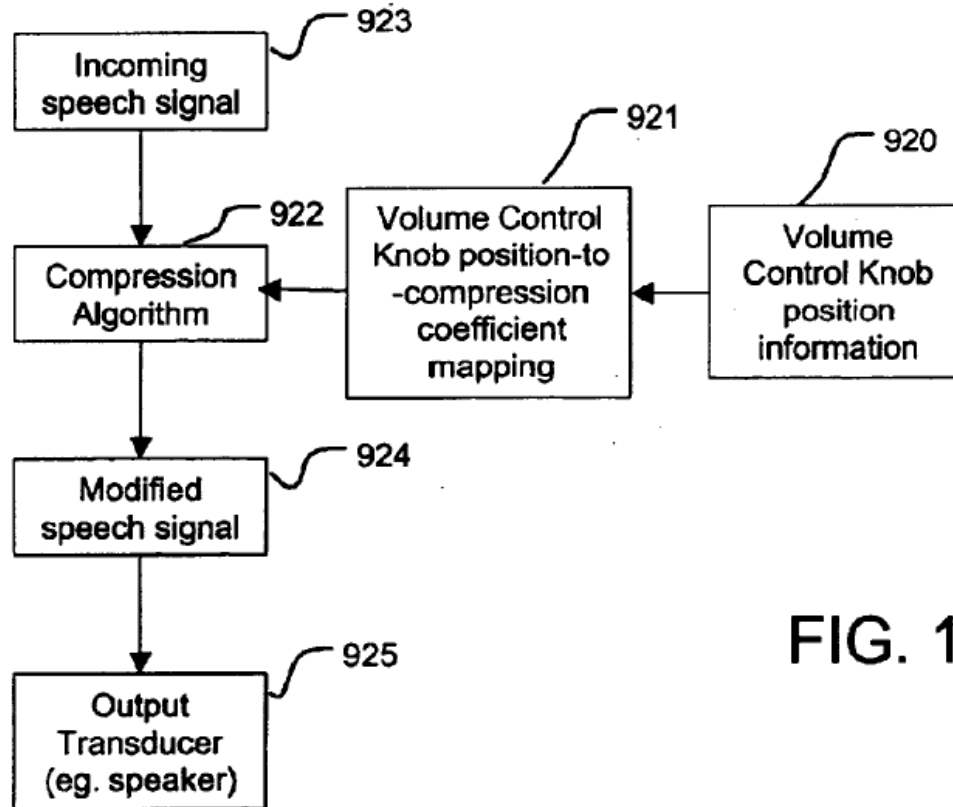


FIG. 10

(EX1008, 14:64-15:13, FIG. 10; EX1003, ¶173.)

The compression is performed in accordance with the stored hearing profile, in order to “properly compensate” for the user’s reduced audibility as specified by the hearing profile. (EX1008, 6:63-67; EX1003, ¶174.) The compression acts as a gain control: the PCD compresses the input signal according to a gain ratio as the input signal level changes. (EX1008, 6:61-7:5; EX1003, ¶174.) For example, the gain can be reduced as the input signal increases. (EX1008, 6:61-7:5; EX1003, ¶174.) In embodiments, quiet sounds can have a large effective gain (which may correspond to amplifying the sounds), while louder sounds can have a lower

effective gain (which may correspond to attenuating the sounds). (EX1008, 16:14-19; EX1003, ¶174.) A volume knob can set a user's desired volume level for audio output. (EX1008, 15:8-13; EX1003, ¶174.)

The gain ratio varies with frequency, such that the signal is amplified or attenuated differently (*i.e.*, at different gain ratios) within individual frequency regions (bands). (EX1008, 7:5-15; EX1003, ¶175.) These compression parameters are based on the hearing profile, which specifies the user's threshold of audibility at various frequencies and thus describes hearing characteristics of the user. (EX1008, 5:49-51, 14:64-15:13, 16:37-44, *see* claim 1; EX1003, ¶175.) The compressed signal is then amplified (*e.g.*, by the PCD's transducer) to render the signal audible. (EX1008, 6:61-7:18, *see* claim 29; EX1003, ¶175.)

G. Claim 8

1. [Preamble]

See claim 4. (EX1003, ¶176.)

2. [A]

Rader's PCD is preferably a mobile phone. (EX1008, 4:31-35; EX1003, ¶177.)

3. [B]

Rader discloses that the mobile phone includes "music player" functionality, and that the "customized audio products" include pre-recorded music modified by

the listener's hearing profile. (EX1008, 1:26-31, 4:26-29; EX1003, ¶178.)

H. Claim 9

1. [Preamble]

See claim 4. (EX1003, ¶179.)

2. [A]

See claim 8[A]. (EX1003, ¶180.)

3. [B]

Rader's PCD is preferably a mobile phone with "phone system attributes" that performs "phone call processing" and sends and receives voice information. (EX1008, 4:31-48; EX1003, ¶181.) For example, an incoming speech signal 932 is customized to produce modified speech signal 934, which is output by the phone's speaker. (EX1008, 15:5-7; EX1003, ¶181.) In the context of a mobile phone, the POSITA would have understood these speech signals to include voice conversations conducted using the phone. (EX1003, ¶181.)

I. Claim 10

1. [Preamble]

See claim 4. (EX1003, ¶182.)

2. [A]

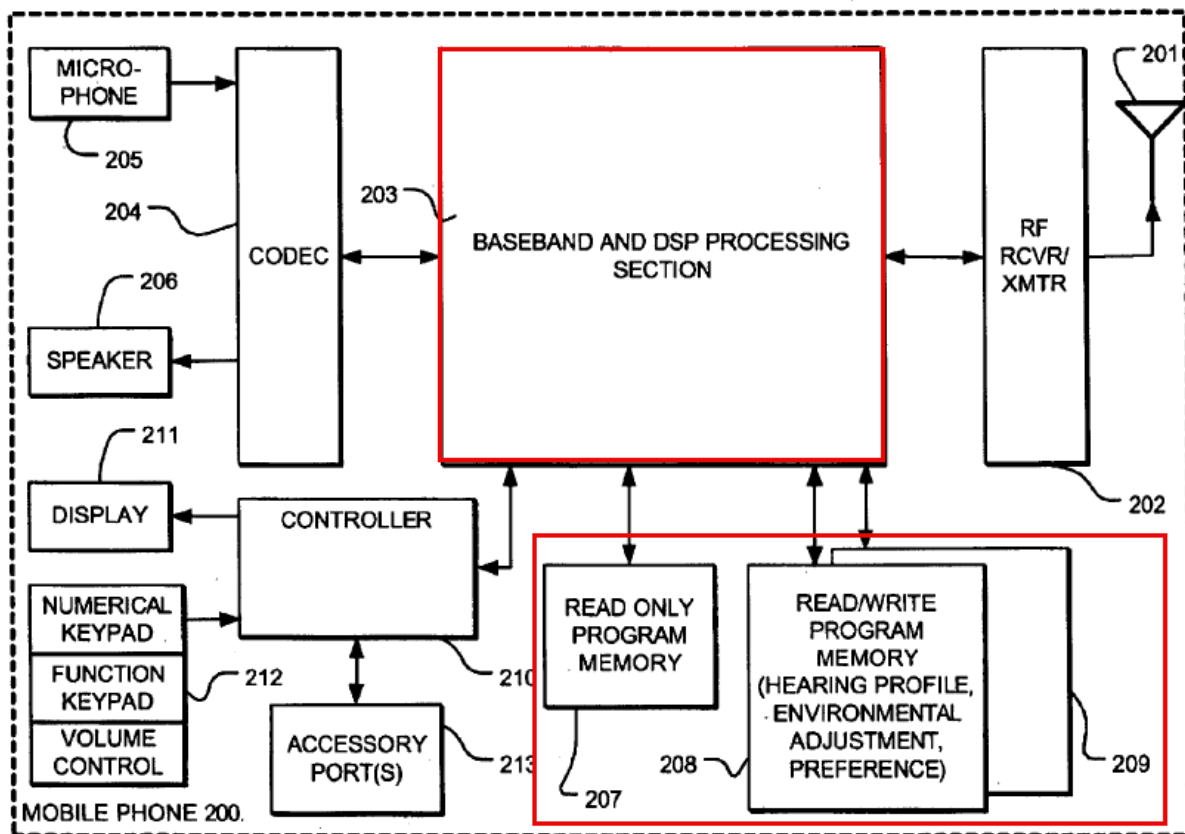
See claim 7[A]. (EX1003, ¶183.)

J. Claim 11**1. [Preamble]**

See claim 4. (EX1003, ¶184.)

2. [A]

Rader's PCD includes computing capabilities (*e.g.*, a processor such as a DSP) and a storage device (memory 207-209). (EX1008, 4:7-25, 4:65-5:42, FIG. 1, FIG. 2; EX1003, ¶185.) FIG. 2 illustrates:

**FIG. 2**

(EX1008, 4:65-5:42, FIG. 2 (annotated) ; EX1003, ¶185.)

The memory 207-209 stores a process that can be executed by the PCD's

processor to establish the hearing profile. (EX1008, 7:19-31, 7:58-8:6, 11:23-12:67, FIG. 8, *see* claims 36, 39; EX1003, ¶186.) FIG. 8 illustrates an example process:

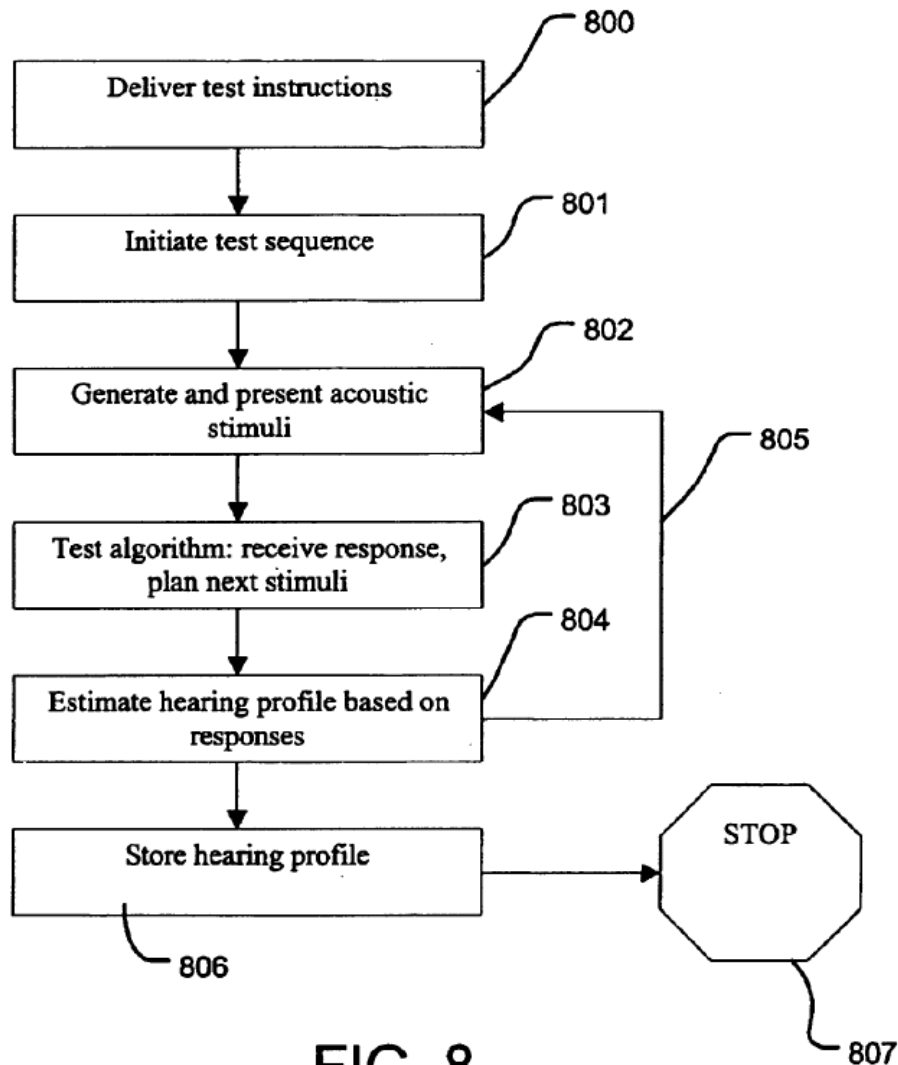


FIG. 8

(EX1008, 11:23-12:67, FIG. 8; EX1003, ¶186.)

3. [B]

In the process of FIG. 8, the PCD presents the user with acoustic stimuli

(802), to which the user interacts by providing responses. (EX1008, 11:23-12:67, FIG. 8; EX1003, ¶187.) For example, the user's response can identify which of several tones "sounds better." (EX1008, 9:1-16; EX1003, ¶187.) The PCD receives the user's responses to the tones (803), and uses them to establish the hearing profile (804). (EX1008, 11:30-31, 12:30-36; EX1003, ¶187.)

K. Claim 12

1. [Preamble]

See claim 11. (EX1003, ¶188.)

2. [A]

See claim 11[B]. (EX1003, ¶189.) Rader's hearing test program interactively guides the user by presenting the acoustic stimuli for response by the user. (EX1008, 11:23-12:67, FIG. 8; EX1003, ¶189.)

L. Claim 13

1. [Preamble]

See claim 12. (EX1003, ¶190.)

2. [A]

See claim 12[B]. (EX1003, ¶191.)

M. Claim 14

1. [Preamble]

See claim 13. (EX1003, ¶192.)

2. [A]

See claim 4[D]. (EX1003, ¶193.)

N. Claim 20

1. [Preamble]

See claim 4. (EX1003, ¶194.)

2. [A]

See claim 29[A]. (EX1003, ¶195.)

O. Claim 21

1. [Preamble]

See claim 20. (EX1003, ¶196.)

2. [A]

See claim 29[A]. (EX1003, ¶197.)

P. Claim 22

1. [Preamble]

See claim 20. (EX1003, ¶198.)

2. [A]

See claim 29[A]. (EX1003, ¶199.)

Q. Claim 46

1. [Preamble]

See claim 23. (EX1003, ¶200.)

2. [A]

Jannard's audio device 10D receives audio from a source device (602, 604) that provides audio output (*e.g.*, wirelessly via Bluetooth) and can be selected by selector 610. (EX1004, 23:23-48, 26:26-55; EX1003, ¶201.) The source device can be "any source, conduit, or provider of audio". (EX1004, 23:37-40; EX1003, ¶201.)

Rader's PCD likewise outputs customized audio output as described for claim 4[C]. (EX1003, ¶202.) That is, the PCD receives audio input from sources including a mobile phone or a networked PC, and customizes the audio based on the user's hearing profile. (EX1008, 9:31-51, 10:61-67, FIG. 5; EX1003, ¶202.)

As discussed in Section VI.B.2, the POSITA would have modified audio device 10D to directly implement Rader's teachings of wirelessly receiving and customizing audio signals based on a hearing profile. (EX1003, ¶203.) In this combination, audio device 10D would wirelessly receive audio input from an input source 602/604, such as an mp3 player or mobile phone, as described for claim 4[A]; customize the audio output based on the hearing profile, as described for claim 4[B] and [C]; and present the customized audio output to the user via speakers 14D, 16D. (EX1003, ¶203.)

3. [B]

See claim 1[J]. (EX1003, ¶204.) Audio device 10D receives audio signals

via a wireless receiver. (EX1004, 9:20-22, 26:35-40; EX1003, ¶204.) In combination with Rader as described for element [A], the audio signals are customized, and speakers 14D, 16D present the audio output to the user via audio output 612. (EX1004, 9:11-22, 23:10-22, 27:3-33; EX1003, ¶204.)

4. [C]

See claim 1[I]. (EX1003, ¶205.) Jannard's processor 312 of the electronic circuitry can include an application-specific integrated circuit (ASIC). (EX1004, 41:46-58, 42:18-32; EX1003, ¶205.) Jannard further can include an ASIC for noise cancellation. (EX1004, 34:10-45; EX1003, ¶205.)

5. [D]

Rader's PCD teachings, as implemented by Jannard's audio device 10D as described above, meet this limitation. (EX1003, ¶206.) Rader teaches storing the hearing profile as described for claim 4[B]; customizing the audio output signals based on the hearing profile as described for claim 4[C]; and outputting the customized output “through accessories 30 such as headsets”—mapping to audio device 10D—as described for claim 4[D]. (EX1003, ¶206.) The hearing profile meets the claimed hearing characteristics at least because, as described for claim 4[B], it indicates the user's threshold for audibility for audio tones at particular frequencies, which can reflect the user's degree of hearing loss at that frequency. (EX1008, 5:43-6:7; EX1003, ¶206.) In the combination with Jannard described

for element [A], the hearing profile would be stored in Jannard's memory (*e.g.*, memory module 330); customizing the signals would be performed by Jannard's processor (*e.g.*, processor 312); and the output would be presented by speakers 14D, 16D. (EX1004, 9:11-22, 23:10-22, 27:3-33, 41:46-58; EX1003, ¶206.)

6. [E]

Speakers 14D, 16D present the audio output, customized as described above for element [D], to the user via audio output 612. (EX1004, 9:11-22, 23:10-22, 27:3-33; EX1003, ¶207.)

R. Claim 47

1. [Preamble]

See claim 46. (EX1003, ¶208.)

2. [A]

Jannard discloses receiving wirelessly input audio from an input source 602, which may be a mobile phone. (EX1004, 23:23-48, 26:26-55; EX1003, ¶209.)

This is consistent with Rader, which teaches that the PCD wirelessly receives input audio from, *e.g.*, a mobile phone 29, or a networked PC 25 via a wireless link 27. (EX1008, 9:31-51, FIG. 5; EX1003, ¶209.)

S. Claim 48

1. [Preamble]

See claim 23. (EX1003, ¶210.)

2. [A]

See claim 46[A]. (EX1003, ¶211.)

3. [B]

See claim 46[B]. (EX1003, ¶212.)

4. [C]

See claim 46[C]. (EX1003, ¶213.)

5. [D]

See claim 46[D]. (EX1003, ¶214.)

6. [E]

See claim 46[E]. (EX1003, ¶215.)

T. Claim 49

1. [Preamble]

See claim 48. (EX1003, ¶216.)

2. [A]

See claim 47[A]. (EX1003, ¶217.)

U. Claim 50

1. [Preamble]

See claim 49. (EX1003, ¶218.)

2. [A]

See claim 27[A]. (EX1003, ¶219.)

3. [B]

See claim 27[B]. (EX1003, ¶220.)

4. [C]

See claim 27[B]. (EX1003, ¶221.) The POSITA would have understood that the higher the ambient noise level, the more the audio input is modified to compensate. (EX1003, ¶221.)

V. Claim 54**1. [Preamble]**

See claim 49. (EX1003, ¶222.)

2. [A]

See claim 37[A]. (EX1003, ¶223.)

W. Claim 55**1. [Preamble]**

See claim 49. (EX1003, ¶224.)

2. [A]

Jannard discloses that an audio input source 602, 604 can comprise a music source, such as an MP3 player, enabling the user to listen to music. (EX1004, 1:66-2:28, 27:38-48; EX1003, ¶225.) Thus, the customized audio output, based on the audio input received by audio device 10D's wireless receiver from the source input, comprises music. (EX1003, ¶225.)

X. Claim 56**1. [Preamble]**

See claim 49. (EX1003, ¶226.)

2. [A]

See claim 7[A]. (EX1003, ¶227.)

Y. Claim 57**1. [Preamble]**

See claim 56. (EX1003, ¶228.)

2. [A]

See claim 27[A]. (EX1003, ¶229.)

3. [B]

See claim 28[B]. (EX1003, ¶230.)

Z. Claim 58**1. [Preamble]**

See claim 23. (EX1003, ¶231.)

2. [A]

See claim 4[A] and [E]. (EX1003, ¶232.)

3. [B]

See claim 4[C], [D], and [E]. (EX1003, ¶233.)

4. [C]

See claim 4[E]. (EX1003, ¶234.)

AA. Claim 59**1. [Preamble]**

See claim 58. (EX1003, ¶235.)

2. [A]

See claim 4[E]. (EX1003, ¶236.)

BB. Claim 60**1. [Preamble]**

See claim 58. (EX1003, ¶237.)

2. [A]

See claim 32[A]. (EX1003, ¶238.)

3. [B]

See claim 33[A]. (EX1003, ¶239.)

CC. Claim 61**1. [Preamble]**

See claim 58. (EX1003, ¶240.)

2. [A]

See claim 33[A]. (EX1003, ¶241.)

3. [B]

See claims 32[A] and 33[A]. (EX1003, ¶242.) Jannard's microphone banks can be "positioned at any suitable location or combination of locations" and "arranged in an array" to be used for noise reduction. (EX1004, 34:11-45;

EX1003, ¶242.) Accordingly, the POSITA would have understood the first microphone to be positioned close to the user's mouth and facing the user, in order to best detect the user's speech input, and the second microphone to be positioned further away from the mouth and facing away from the user, to best detect environmental sounds (rather than speech input); because this configuration would improve the microphones' detection of their respective signals and thus improve noise reduction. (See EX1009, 8:1-16; EX1003, ¶242.)

DD. Claim 62

1. [Preamble]

See claim 61. (EX1003, ¶243.)

2. [A]

See claim 32[A]. (EX1003, ¶244.)

3. [B]

See claim 61[B]. (EX1003, ¶245.)

EE. Claim 63

1. [Preamble]

See claim 62. (EX1003, ¶246.)

2. [A]

See claim 29[A]. (EX1003, ¶247.)

FF. Claim 64

1. [Preamble]

See claim 58. (EX1003, ¶248.)

2. [A]

See claim 27[A]. (EX1003, ¶249.)

3. [B]

See claim 27[B]. (EX1003, ¶250.)

GG. Claim 94

1. [Preamble]

See claim 1[Preamble]. (EX1003, ¶251.)

2. [A]

See claim 1[A]. (EX1003, ¶252.)

3. [B]

See claim 1[B]. (EX1003, ¶253.)

4. [C]

See claim 1[C]. (EX1003, ¶254.)

5. [D]

See claim 1[D]. (EX1003, ¶255.)

6. [E]

See claim 1[E]. (EX1003, ¶256.)

7. [F]

See claim 1[F]. (EX1003, ¶257.)

8. [G]

See claim 23[F]. (EX1003, ¶258.)

9. [H]

See claim 1[H]. (EX1003, ¶259.)

10. [I]

See claim 1[I]. (EX1003, ¶260.)

11. [J]

See claim 1[J]. (EX1003, ¶261.)

12. [K]

See claim 1[K]. (EX1003, ¶262.)

13. [L]

See claim 1[L]. (EX1003, ¶263.)

14. [M]

See claim 4[A]. (EX1003, ¶264.)

15. [N]

See claim 4[B] and [C]. (EX1003, ¶265.)

16. [O]

See claim 4[D]. (EX1003, ¶266.)

17. [P]

See claim 4[E]. (EX1003, ¶267.)

18. [Q]

See claim 1[L]. (EX1003, ¶268.)

19. [R]

See claim 7[A]. (EX1003, ¶269.)

HH. Claim 95

1. [Preamble]

See claim 94. (EX1003, ¶270.)

2. [A]

See claim 11[A]. (EX1003, ¶271.)

3. [B]

See claim 11[B]. (EX1003, ¶272.)

II. Claim 96

1. [Preamble]

See claim 95. (EX1003, ¶273.)

2. [A]

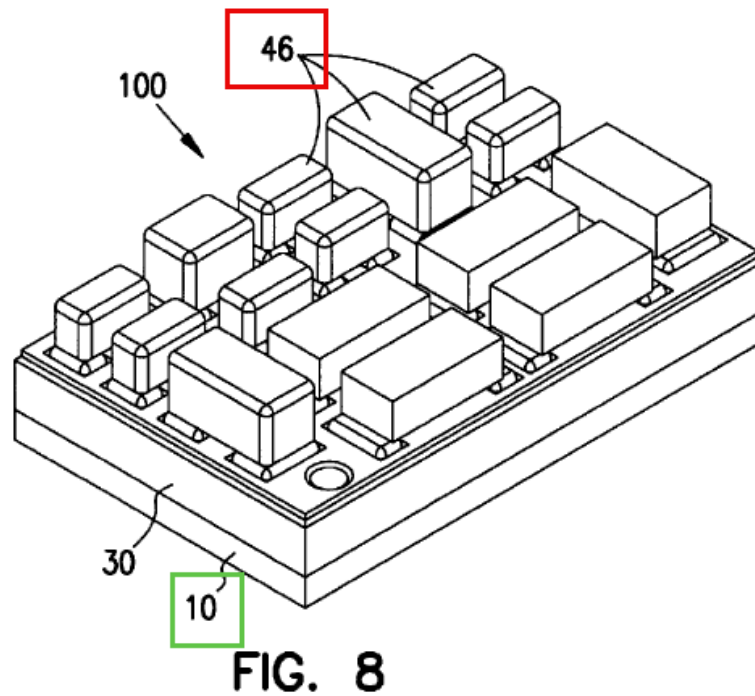
See claim 12[B]. (EX1003, ¶274.)

VII. GROUND 3: CLAIMS 15-17 ARE RENDERED OBVIOUS BY JANNARD IN VIEW OF ZADESKY, RADER, AND MAHON

A. Summary of Mahon

Mahon is a U.S. Patent that was filed on March 30, 1998 and issued on January 11, 2000. (EX1013.) Mahon is thus prior art to the '913 patent under at least 35 U.S.C. §§102(a), (b), and (e).

Mahon discloses circuit fabrication techniques for “small” and “high density” circuits, including audio circuits used in hearing aids. (EX1013, 1:12-28, 2:25-33; EX1003, ¶276.) Mahon mounts components, including integrated circuits, on both sides of a flexible circuit board. (EX1003, ¶276.) For example, in FIG. 8, components 46 (including a first integrated circuit) are mounted to a first side of flexible circuit board 40, and a second integrated circuit 20 (not shown) is mounted to substrate 10 on the opposite side:



(EX1013, 2:34-3:9, 3:32-54, FIG. 8 (annotated); EX1003, ¶276.)

This arrangement allows multiple component sets to share the same footprint, reducing size in compact circuits. (EX1013, 4:3-28; EX1003, ¶277.)

Mahon is analogous art because it addresses compact electronic audio devices, and is reasonably pertinent to the '913 patent's problem of optimizing limited space in wearable devices. (EX1001, Abstract, 6:2-10, 6:61-7:18; EX1013, Abstract, 2:25-33; EX1003, ¶278.)

B. Motivation to Combine

The POSITA would have been motivated to combine Jannard with Zadesky and Rader as discussed in Sections V.C and VI.B, and further with Mahon.

(EX1003, ¶279.) Jannard discloses eyewear audio device 10D with printed circuit

boards 264 and 284 and integrated circuits (e.g., processor 312) in the temples, where circuit board 284 includes a memory, amplifier, and processor:

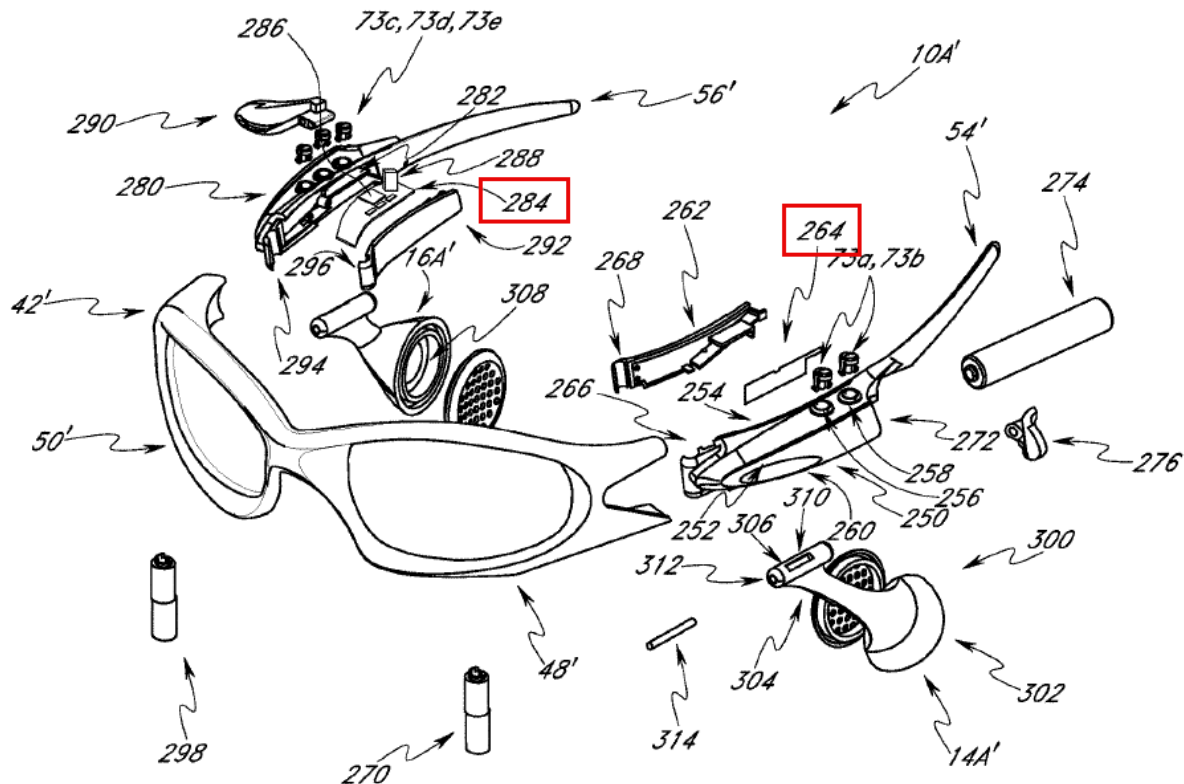


FIG. 3J

(EX1004, 14:5-13, 14:60-15:14, FIG. 3J (annotated); EX1003, ¶279.)

Jannard also discloses, via its incorporation of Spitzer, temple electronics implemented as integrated circuits on a Kapton flexible circuit board; and further discloses conductors 332 as a flexible printed circuit board. (EX1004, 27:39-42, 45:22-28; EX1009, 8:17-44, FIG. 15; EX1003, ¶280.)

However, Jannard does not detail how its compact temple circuitry would be manufactured or packaged. (EX1003, ¶281.) A POSITA therefore would have

looked to Mahon, which teaches “small” and “high density” circuit fabrication for devices with “very small physical constraints”; is applicable wherever “a small circuit module configuration is needed”; and uses flexible circuit boards and integrated circuits like Jannard. (EX1013, 1:12-28, 2:25-33; EX1003, ¶281.) Applying Mahon’s teachings to Jannard would have predictably optimized space, lowered cost, and simplified integration. (EX1013, Abstract, 1:12-28, 2:25-33; EX1003, ¶281.)

The POSITA would have had a reasonable expectation of success because Jannard and Mahon disclose analogous compact audio devices using conventional integrated circuits and flexible circuit boards, and Mahon mounts those components using “generally known” methods that had been “successfully applied” to hearing aids. (EX1004, 14:5-13, 14:60-15:14, 45:22-28; EX1013, 2:25-53; EX1003, ¶282.) Given Jannard’s detailed figures with specific circuit locations, implementing its eyewear circuitry using Mahon’s circuit-board teachings would have been predictable. (EX1004, FIG. 3J; EX1003, ¶282.)

C. Claim 15

1. [Preamble]

See claim 4. (EX1003, ¶283.)

2. [A]

Jannard discloses printed circuit boards 264 and 284 within the temples of

audio device 10D:

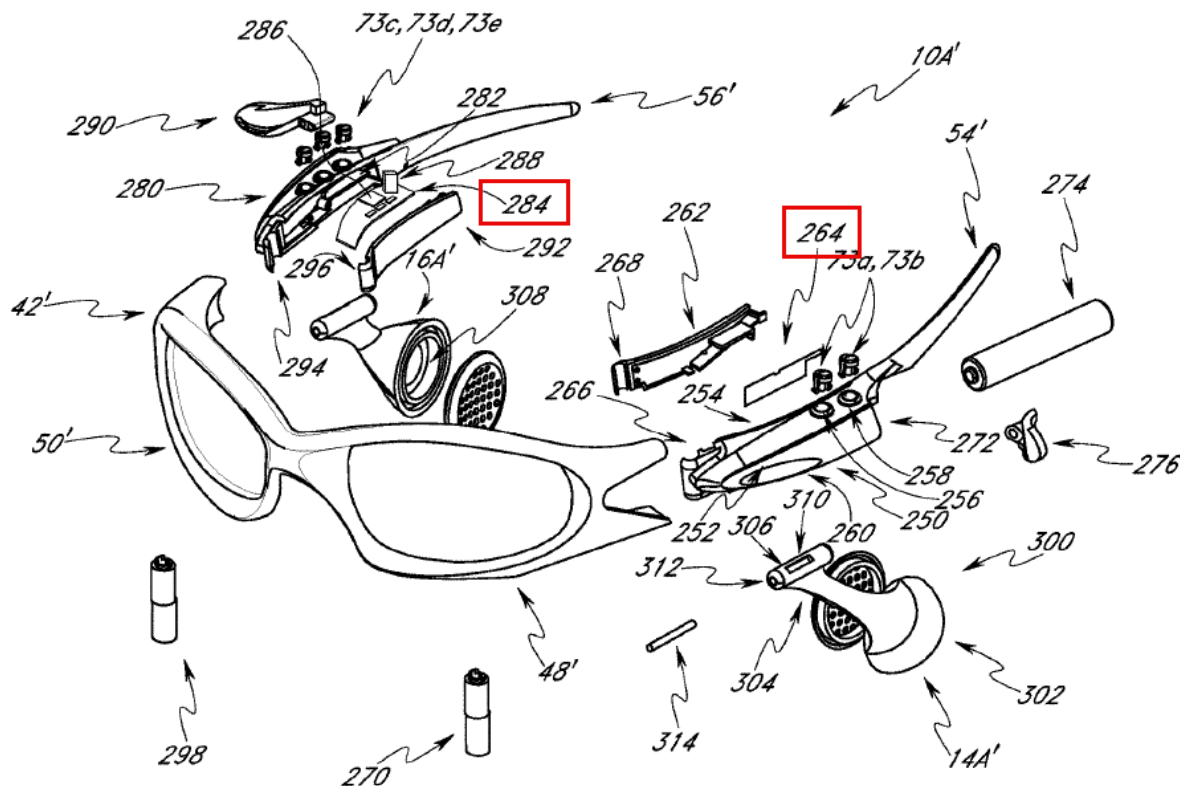


FIG. 3J

(EX1004, 14:5-13, 14:60-15:14, FIG. 3J (annotated); EX1003, ¶284.)

Circuit boards 264 and 284 include components for implementing control switches and controlling audio output; and circuit board 284 additionally includes a memory, amplifier, and processor. (EX1004, 14:10-13, 14:62-15:14; EX1003, ¶285.) The POSITA would have understood that these electronic components for both circuit boards are commonly implemented as integrated circuits, and thus that each circuit board could include at least one integrated circuit. (EX1003, ¶285.)

Jannard's circuit boards may be flexible: Spitzer (as incorporated by Jannard)

discloses that electronics in the eyewear temples are implemented as integrated circuits 849 mounted to a Kapton flexible circuit board; and Jannard's conductors 332, which provide electrical communication between the components of audio device 10D, include a flexible printed circuit board. (EX1004, 27:39-42, 45:22-28; EX1009, 8:17-44, FIG. 15; EX1003, ¶285.)

Mahon teaches that multiple integrated circuits can be beneficially mounted to flexible circuit boards in compact electronic circuits. (EX1013, 2:34-38; EX1003, ¶286.) For example, Mahon discloses that integrated circuits 46 are mounted to flex circuit 40:

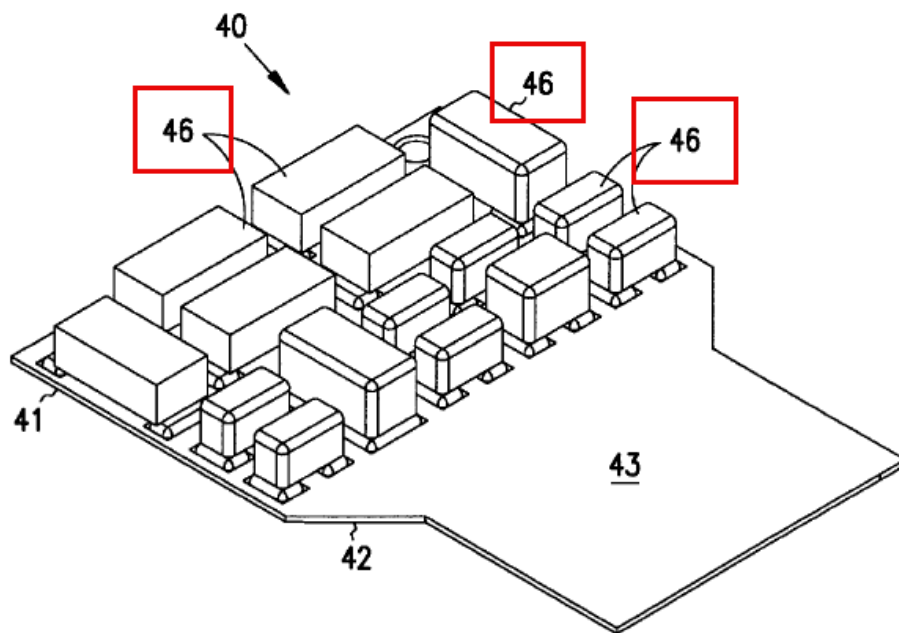


FIG. 4

(EX1013, 3:32-38, FIG. 4 (annotated); EX1003, ¶286.)

The POSITA would have found it obvious to implement Jannard's integrated circuits as mounted to Jannard's flexible circuit boards, *e.g.* circuit boards 264 and 284, as taught by Mahon; and would have been motivated to do so for the reasons described above in Section VII.B. (EX1003, ¶287.)

D. Claim 16

1. [Preamble]

See claim 15. (EX1003, ¶288.)

2. [A]

See claim 15[A]. (EX1003, ¶289.)

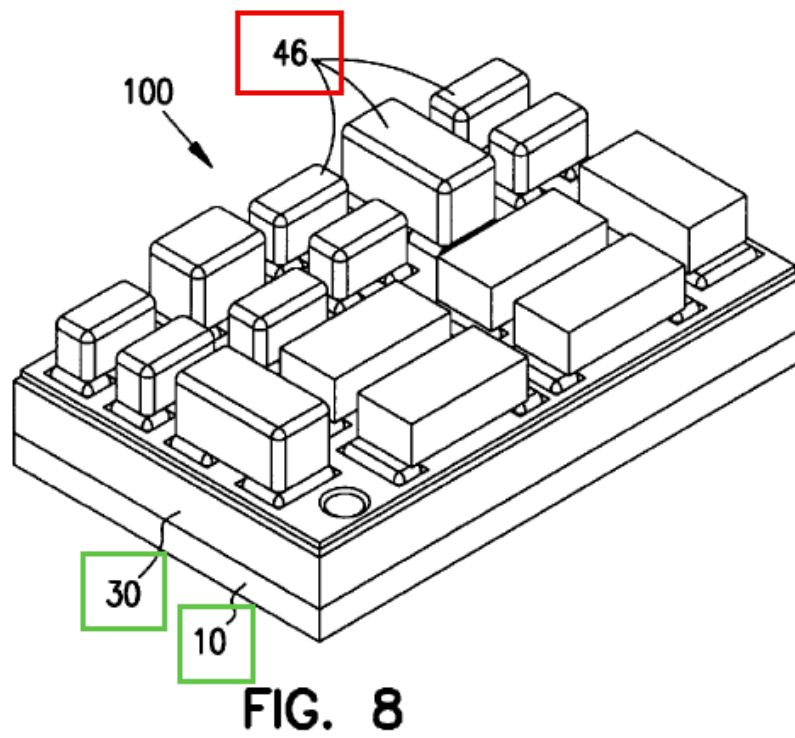
E. Claim 17

1. [Preamble]

See claim 15. (EX1003, ¶290.)

2. [A]

Jannard in view of Mahon teaches mounting an integrated circuit to a first side of a circuit board as described for claim 15[A]. (EX1003, ¶291.) Mahon further teaches mounting additional components, which can include a second integrated circuit, to a second side of the circuit board. (EX1003, ¶291.) For example, FIG. 8 shows a substrate 10 on the second side of the board, opposite components 46 (which may include a first integrated circuit), and encapsulated by an encapsulation layer 30:



(EX1013, 2:34-3:9, FIG. 8 (annotated); EX1003, ¶291.)

Integrated circuit 20 can be mounted to substrate 10, on the second side of the circuit board:

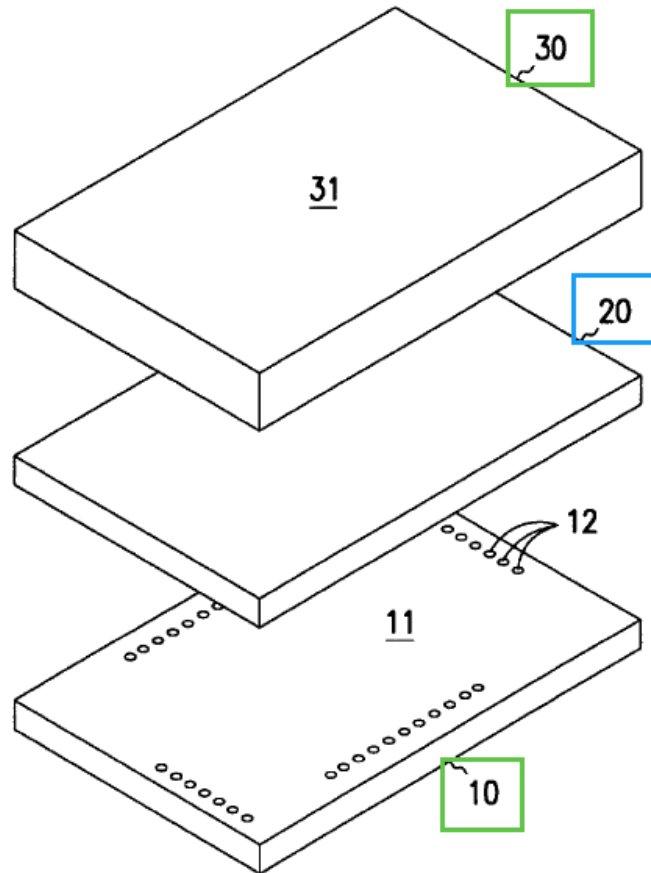


FIG. 1

(EX1013, 2:34-3:9, FIG. 1 (annotated); EX1003, ¶292.)

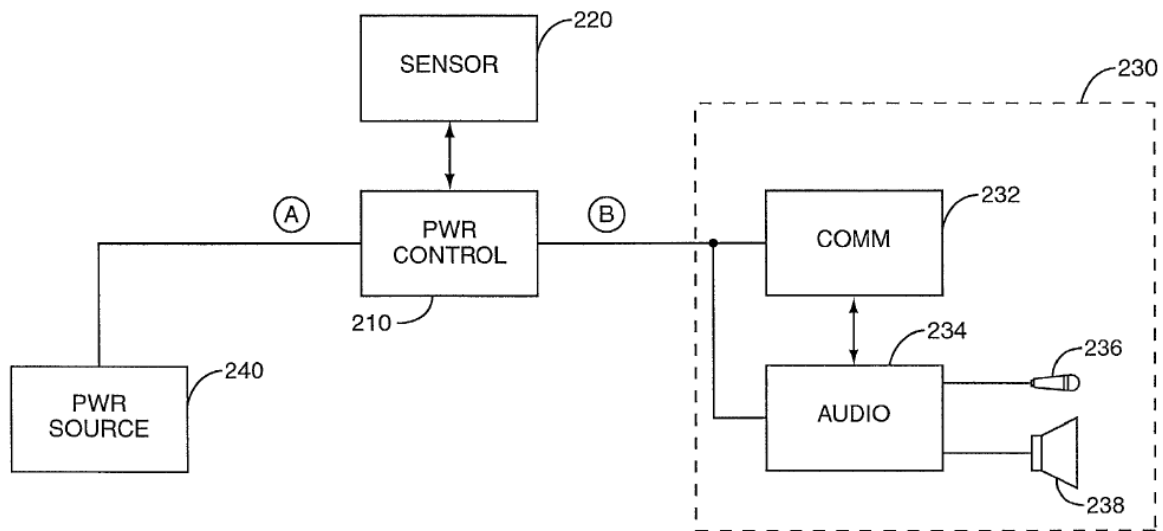
In combination with Jannard as described above, the POSITA would have mounted its multiple integrated circuits—for example, an ASIC of processor 312 and a voice recognition ASIC—according to Mahon’s double-sided mounting technique, allowing the components to share the same footprint on the circuit board and beneficially reducing size requirements within Jannard’s limited physical space. (EX1013, 4:3-28; EX1004, 34:22-30, 42:18-32; EX1003, ¶293.)

VIII. GROUND 4: CLAIMS 38, 39, 42-44, 71-73, 79, 92, 93, 117-119, 122, 124, AND 125 ARE RENDERED OBVIOUS BY JANNARD IN VIEW OF ZADESKY AND IRVIN

A. Summary of Irvin

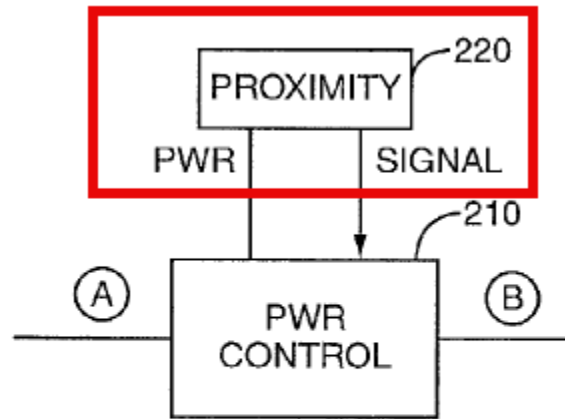
Irvin is a U.S. patent that was filed on Feb. 21, 2000, and issued on March 7, 2006. (EX1006.) Irvin is thus prior art to the '913 patent under at least 35 U.S.C. §§102(a) and (e).

Irvin discloses wireless headsets with “automatic on/off capabilities to maximize battery life.” (EX1006, Abstract, 1:13-51; EX1003, ¶295.) The headset transitions between inactive/sleep states and an active state when mounted on or removed from the user’s head. (EX1006, Abstract, 2:16-51, 8:11-50, 9:40-43; EX1003, ¶295.) In the active state, power control circuit 210 enables communications circuit 230, including wireless communications interface 232 and audio interface 234; in inactive or sleep states, those components are disabled in whole or in part to conserve power. (EX1006, 3:28-4:10, 8:11-9:39, FIG. 2A; EX1003, ¶295.) FIG. 2A illustrates:

**FIG. 2A**

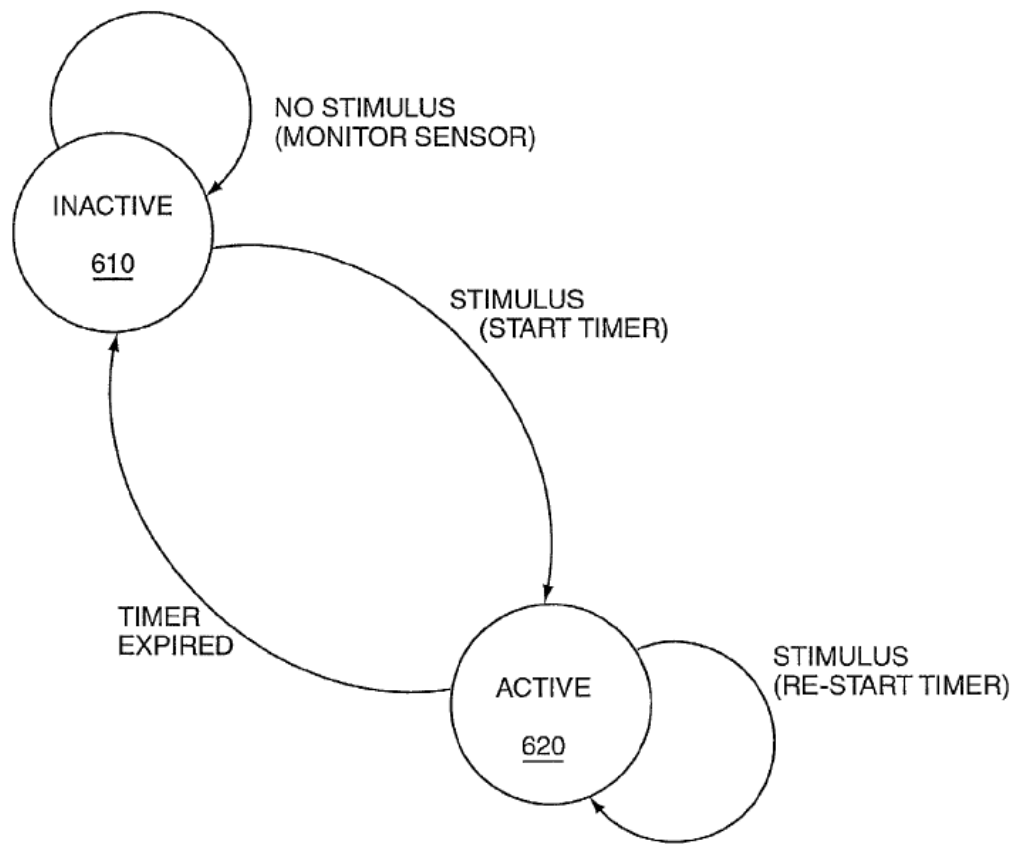
(EX1006, FIG. 2A; EX1003, ¶295.)

A sensor 220, such as a motion or proximity sensor, determines when to transition states. (EX1006, Abstract, 2:16-51, 5:1-6:67; EX1003, ¶296.) For example, proximity sensor 220 detects when the headset is mounted on the user's head, as shown in FIG. 4D:

**FIG. 4D**

(EX1006, Abstract, 2:16-51, 6:3-19, FIG. 4D (annotated); EX1003, ¶296.)

The device transitions between the inactive state 610 and the active state 620 based on the sensor's stimulus signal, as shown in FIG. 6:

**FIG. 6**

(EX1006, 8:11-50, FIG. 6; EX1003, ¶297.)

Irvin is analogous art to the claimed invention at least because it is directed to the same field of endeavor—portable devices with audio or communications functionality. (EX1001, 8:44-9:25; EX1006, 3:28-45; EX1003, ¶298.) Irvin is reasonably pertinent to the problems faced by the '913 patent inventors, because Irvin and the '913 patent both relate to how to determine when a wearable device is being used or worn by the user, so that the device can be controlled accordingly.

(EX1001, 35:11-36:29; EX1006, 2:16-51; EX1003, ¶298.) Additionally, Irvin and the '913 patent both address improving power efficiency and battery life of wearable devices. (EX1001, 35:39-51; EX1006, 2:16-51; EX1003, ¶298.)

B. Motivation to Combine Jannard and Zadesky with Irvin

A POSITA would have been motivated to combine Jannard/Zadesky with Irvin. (EX1003, ¶299.) Jannard describes head-worn electronic eyewear, and the POSITA would have recognized that battery life (and thus power consumption) is a concern for such devices. (EX1003, ¶299.) Irvin confirms that “battery life is a key component of operator convenience” and that wireless headsets should maximize battery life. (EX1006, 2:1-5; EX1003, ¶299.)

Jannard likewise discloses a “power save function” that enters sleep mode or turns the device off after a period of “non-use,” but does not explain how to determine user activation or automatically exit sleep mode other than through manual switch 73c. (EX1004, 17:60-18:13, 44:63-45:3; EX1003, ¶300.) A POSITA would have viewed that approach as vague and suboptimal because manual switches can be inconvenient, unreliable, prone to mechanical failure, and inaccessible to users with impaired motor skills. (EX1003, ¶300.)

The POSITA therefore would have looked to Irvin, which teaches reducing power consumption in wireless headsets by automatically transitioning to and from inactive or sleep states based on a sensor detecting a natural stimulus associated

with use, such as proximity or motion. (EX1006, 1:13-2:51; EX1003, ¶301.)

Applying Irvin’s sensor-based transitions to Jannard would have improved usability, reliability, and power consumption by replacing Jannard’s manual switching with automatic, hands-free power mode transitions. (EX1006, 1:13-2:51; EX1003, ¶301.)

The POSITA would have reasonably expected success because Jannard already discloses turning audio device 10D off, or entering sleep mode, based on whether the user activated the device; and Irvin teaches using known sensor-based methods to make that determination. (EX1004, 44:63-45:3; EX1003, ¶302.)

Jannard and Irvin both involve head-worn devices with analogous components (*e.g.*, batteries, power electronics, sensors, microphones, speakers); and Jannard already contemplates sensors (such as distance and acceleration sensors) analogous to Irvin’s proximity and motion sensors. (EX1004, 22:3-26:25, 35:4-24, FIGS. 10-12; EX1006, 3:28-4:38, FIG. 2A; EX1003, ¶302.) The combination thus would have applied known methods to well-understood components, consistent with Irvin’s broad applicability to “any type of device supporting interactive communications with a user.” (EX1006, 3:29-32; EX1003, ¶302.)

C. Claim 38

1. [Preamble]

See claim 23. (EX1003, ¶303.)

2. [A]

Irvin discloses that a wireless electronic headset can include a sensor 220, which provides data used to determine when to transition from an inactive state to an active state. (EX1006, Abstract, 2:16-51, 5:1-6:67; EX1003, ¶304.) In the combination of Jannard and Irvin, Jannard's audio device 10D would include such a sensor 220 in order to implement Jannard's power save function, as described above. (EX1003, ¶304.)

Irvin discloses that sensor 220 can be an "active or passive [infrared] sensor," which the POSITA would have understood to include an optical sensor configured to capture infrared radiation data (*i.e.*, an amount of infrared radiation detected by the infrared sensor). (*See* EX1001, 25:55-61; EX1006, 6:22-24; EX1015, 216-17; EX1003, ¶305.)

A sensor that senses infrared radiation is within the scope of the claimed optical sensor, and infrared radiation data is within the scope of the claimed optical sensor data, at least as recited in claim 39[A]. (EX1003, ¶306.)

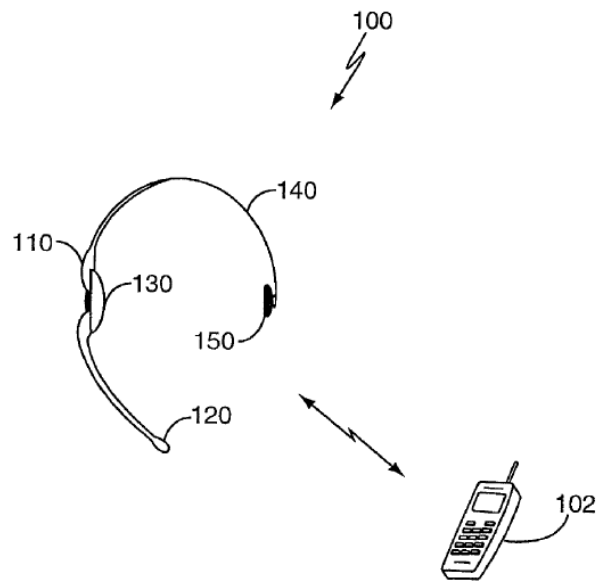
3. [B]

Sensor 220 can be an infrared proximity sensor such that audio device 10D can provide an output signal "based on proximity to the user's body." (EX1006, 6:20-31, FIG. 4D; EX1003, ¶307.) The POSITA would have understood sensor 220 to sense data (*e.g.*, infrared radiation) indicative of whether audio device 10D

is being worn by the user: for example, a proximity sensor “provides indication that a user has placed the wireless headset 100 upon their body”. (EX1001, 21:21-30; EX1006, 6:24-26; EX1003, ¶307.)

Using this data, audio device 10D can thus transition from an inactive state to an active state “in response to a user ... mounting the wireless headset upon their head.” (EX1006, Abstract, 2:16-34; EX1003, ¶308.) Applied to Jannard’s power-save function, the device would turn off or enter sleep mode when sensor 220 indicates it is not worn, and wake or turn on when sensor 220 indicates it is worn and ready for use. (EX1004, 44:63-45:3; EX1006, 1:61-2:13; EX1003, ¶308.)

In the combination, audio device 10D contains the sensor 220. (EX1003, ¶309.) For example, Irvin’s sensor 220 may be contained in the structure (*e.g.*, in a primary enclosure 110) of the wireless headset 100, as shown in FIG. 1:

**FIG. 1**

(EX1006, 3:28-45, 4:11-17, FIG. 1; EX1003, ¶309.)

Jannard's head-worn audio device 10D likewise includes sensors (such as distance sensors), and would thus similarly contain the sensor 220 in the combination. (EX1004, 35:4-24; EX1003, ¶310.)

D. Claim 39

1. [Preamble]

See claim 38. (EX1003, ¶311.)

2. [A]

See claim 38[A]. (EX1003, ¶312.)

E. Claim 42**1. [Preamble]**

See claim 23. (EX1003, ¶313.)

2. [A]

See claim 38[A] and [B]. (EX1003, ¶314.)

3. [B]

See claim 38[B]. (EX1003, ¶315.) Operation is altered at least by transitioning between active and inactive states. (EX1004, 44:63-45:3; EX1006, Abstract, 1:61-2:34; EX1003, ¶315.)

F. Claim 43**1. [Preamble]**

See claim 42. (EX1003, ¶316.)

2. [A]

See claim 38[A]. (EX1003, ¶317.)

G. Claim 44**1. [Preamble]**

See claim 23. (EX1003, ¶318.)

2. [A]

See claim 38[A]. (EX1003, ¶319.) Irvin discloses that its proximity sensor 220 can be an *active* infrared sensor. (EX1006, 6:22-24; EX1003, ¶319.) The POSITA would have understood this disclosure of Irvin to include sensors that

“put out energy in the environment,” *i.e.*, “emit near-infrared energy and measure whether any significant amount of the IR light is returned” to determine whether an object is present. (*See* EX1015, 196, 216-217; EX1003, ¶319.) For example, the infrared radiation can be emitted by an LED. (EX1015, 216; EX1003, ¶319.) Accordingly, in the combination, the POSITA would have understood the apparatus to include an active infrared sensor with an emitter (*e.g.*, an LED) configured to emit infrared radiation toward the user when the headset is worn; and a detector to detect an amount of IR radiation reflected back toward the sensor by the user, with a “significant amount of the IR light” reflected indicating that the user is present and thus that the apparatus is being worn. (*See* EX1015, 196, 216-217; EX1015, 216; EX1003, ¶319.)

H. Claim 71

1. [Preamble]

See claim 1[Preamble], [A]. (EX1003, ¶320.)

2. [A]

See claim 1[B]. (EX1003, ¶321.)

3. [B]

See claim 1[C]. (EX1003, ¶322.)

4. [C]

See claim 1[D]. (EX1003, ¶323.)

5. [D]

See claim 1[E]. (EX1003, ¶324.)

6. [E]

See claim 1[F]. (EX1003, ¶325.)

7. [F]

See claim 23[F]. (EX1003, ¶326.)

8. [G]

See claim 1[H]. (EX1003, ¶327.)

9. [H]

See claim 1[I]. (EX1003, ¶328.)

10. [I]

See claim 1[J]. (EX1003, ¶329.)

11. [J]

See claim 1[K]. (EX1003, ¶330.)

12. [K]

See claim 38[A]. (EX1003, ¶331.) The POSITA would have understood the infrared radiation sensor to include a radiation detector. (EX1003, ¶331.)

13. [L]

See claim 38[B]. (EX1003, ¶332.)

14. [M]

See claim 27[A]. (EX1003, ¶333.)

I. Claim 72**1. [Preamble]**

See claim 71. (EX1003, ¶334.)

2. [A]

See claim 37[A]. (EX1003, ¶335.)

J. Claim 73**1. [Preamble]**

See claim 72. (EX1003, ¶336.)

2. [A]

See claim 1[J]. (EX1003, ¶337.) Audio device 10D receives audio signals via a wireless receiver. (EX1004, 9:20-22, 26:35-40; EX1003, ¶337.) The audio signals can include signals from, *e.g.*, a microphone. (EX1004, 23:64-66; EX1003, ¶337.) Speakers 14D, 16D present the audio output to the user via audio output 612. (EX1004, 9:11-22, 23:10-22, 27:3-33; EX1003, ¶337.)

3. [B]

See claim 28[B]. (EX1003, ¶338.)

K. Claim 79**1. [Preamble]**

See claim 71. (EX1003, ¶339.)

2. [A]

See claim 73[A]. (EX1003, ¶340.)

3. [B]

See claim 28[B]. (EX1003, ¶341.)

L. Claim 92

1. [Preamble]

See claim 71. (EX1003, ¶342.)

2. [A]

In addition to the touchpad selector described for claim 1[G], Jannard discloses that user controls 322 include a touchpad surface for sensing touch input and performing various functions regarding, *e.g.*, audio data files. (EX1004, 44:14-23, 45:4-14; EX1003, ¶343.) For example, by providing touch input sensed by the user controls, the user can fast-forward, skip, cue, play, etc., thus effecting audio playback operations of the audio device. (EX1004, 44:14-23; EX1003, ¶343.)

3. [B]

Zadesky's touchpad 110 receives input from a finger moving across its surface and controls the media player, including by changing volume. (EX1005, 5:61-6:8, 10:40-51; EX1003, ¶344.) A POSITA would have understood this to include sliding input from "linear finger motion," and Zadesky's forward/backward actuation teaches determining first and second sliding directions. (EX1005, 6:9-11, 9:16-21, FIG. 3C; EX1003, ¶344.) FIG. 3C

illustrates sliding input (136, 138) controlling the media player (scroll operation 124):

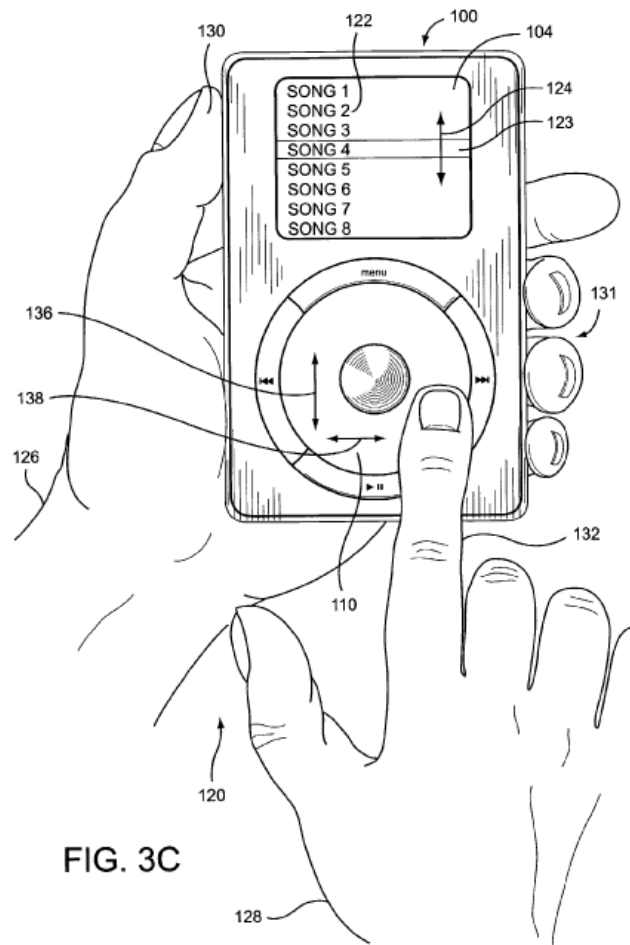


FIG. 3C

(EX1005, 8:52-9:21, FIG. 3C; EX1003, ¶344.)

The POSITA would have combined Zadesky with Jannard by configuring Jannard's touchpad to recognize sliding user input, as in Zadesky, to control Jannard's audio device operations, including "adjust[ing] volume." (EX1004, 44:15-23; EX1003, ¶345.)

M. Claim 93**1. [Preamble]**

See claim 92. (EX1003, ¶346.)

2. [A]

Zadesky explains that such touchpads may be “based on ... capacitive sensing,” by which the touchpad includes electrodes and “detect[s] the change in capacitance at each of the electrodes as the finger passes over the grid.” (EX1005, 2:29-34, 2:60-64; EX1003, ¶347.)

3. [B]

See claim 92[B]. (EX1003, ¶348.)

N. Claim 117**1. [Preamble]**

See claim 1[A]. (EX1003, ¶349.)

2. [A]

See claim 1[B]. (EX1003, ¶350.)

3. [B]

See claim 1[C]. (EX1003, ¶351.)

4. [C]

See claim 1[D]. (EX1003, ¶352.)

5. [D]

See claim 1[E]. (EX1003, ¶353.)

6. [E]

See claim 1[F]. (EX1003, ¶354.)

7. [F]

See claim 1[G]. (EX1003, ¶355.) The '913 patent explains that piezoelectric force is “based on stress,” such that a piezoelectric sensing device such as the touchpad described for claim 1[G] is a stress sensing device. (EX1001, 39:10-12; EX1003, ¶355.)

8. [G]

See claim 1[H]. (EX1003, ¶356.)

9. [H]

See claim 1[I]. (EX1003, ¶357.)

10. [I]

See claim 1[J]. (EX1003, ¶358.)

11. [J]

See claim 1[K]. (EX1003, ¶359.)

12. [K]

See claim 71[K]. (EX1003, ¶360.)

13. [L]

See claim 38[B]. (EX1003, ¶361.)

O. Claim 118**1. [Preamble]**

See claim 117. (EX1003, ¶362.)

2. [A]

See claim 27[A]. (EX1003, ¶363.)

3. [B]

See claim 46[B]. (EX1003, ¶364.)

4. [C]

See claim 28[B]. (EX1003, ¶365.)

P. Claim 119**1. [Preamble]**

See claim 118. (EX1003, ¶366.)

2. [A]

See claim 40[A]. (EX1003, ¶367.)

3. [B]

See claim 40[B]. (EX1003, ¶368.)

Q. Claim 122**1. [Preamble]**

See claim 119. (EX1003, ¶369.)

2. [A]

See claim 1[G]. (EX1003, ¶370.) Jannard's selector 610 of audio device

10D can select and control an input source 602, 604. (EX1004, 26:21-25, 26:50-27:2; EX1003, ¶370.) For example, selector 610 can select whether a primary source (*e.g.*, an mp3 player) or a secondary source (*e.g.*, a cellular telephone) is presented through audio output 612 (*e.g.*, speakers), thus supporting control of audio output via the speaker. (EX1004, 27:52-58; EX1003, ¶370.) Selector 610 can accept an incoming telephone call and route the telephone's output through audio output 612, thus supporting control of voice calls to the user. (EX1004, 27:62-28:18; EX1003, ¶370.)

3. [B]

See element [A]. (EX1003, ¶371.)

R. Claim 124

1. [Preamble]

See claim 117. (EX1003, ¶372.)

2. [A]

See claim 92[A]. (EX1003, ¶373.)

3. [B]

See claim 92[B]. (EX1003, ¶374.)

S. Claim 125

1. [Preamble]

See claim 124. (EX1003, ¶375.)

2. [A]

See claim 93[A]. (EX1003, ¶376.)

3. [B]

See claim 92[B]. (EX1003, ¶377.)

IX. GROUND 5: CLAIMS 18, 19, 51-53, 74-78, 80, 81, 83-86, 90, 91, 97-112, 114-116, 120, AND 123 ARE RENDERED OBVIOUS BY JANNARD IN VIEW OF ZADESKY, RADER, AND IRVIN

A. Motivation to Combine

The POSITA would have been motivated to combine Jannard with Zadesky, Rader, and Irvin as described in Sections V.C, VI.B, and VIII.B. (EX1003, ¶378.)

B. Claim 18

1. [Preamble]

See claim 4. (EX1003, ¶379.)

2. [A]

See claim 44[A]. (EX1003, ¶380.)

3. [B]

See claim 44[A]. (EX1003, ¶381.)

C. Claim 19

1. [Preamble]

See claim 18. (EX1003, ¶382.)

2. [A]

See claim 38[B]. (EX1003, ¶383.)

D. Claim 51**1. [Preamble]**

See claim 49. (EX1003, ¶384.)

2. [A]

See claim 44[A]. (EX1003, ¶385.)

3. [B]

See claim 44[A]. (EX1003, ¶386.)

4. [C]

The POSITA would have understood that in the combination, the proximity sensor would be implemented by Jannard's user controls 322, which include "any ... input device that may be used by a user to control the audio device 304", and are operatively connected to Jannard's electronic circuitry by conductors 332. (EX1004, 41:22-24, 41:46-58, 44:4-47, FIG. 22; EX1003, ¶387.)

5. [D]

Irvin's communications circuit 230 transitions to an active state 620 after the proximity sensor 220 indicates a stimulus (*e.g.*, that an infrared sensor detects reflected infrared radiation indicating that the user is wearing the device); and transitions to an inactive state 610 or a sleep state 720 after the indication is no longer provided. (EX1006, 8:11-9:39; FIG. 6, FIG. 7; EX1015, 216-217; EX1003, ¶388.)

E. Claim 52**1. [Preamble]**

See claim 51. (EX1003, ¶389.)

2. [A]

See claim 44[A]. (EX1003, ¶390.)

F. Claim 53**1. [Preamble]**

See claim 52. (EX1003, ¶391.)

2. [A]

Jannard discloses adjustable gaps 32, 34 between speakers 14, 16 and the tragus of the user's ears. (EX1004, 5:62-6:29; EX1003, ¶392.) The gaps can be reduced such that the speakers "make contact with the ears," and can be adjusted further, such that the speakers are at least partially inserted in the ear (*i.e.*, adjusted to a position between the tragus and the auditory canal). (EX1004, 6:8-25; EX1003, ¶392.)

G. Claim 74**1. [Preamble]**

See claim 73. (EX1003, ¶393.)

2. [A]

See claim 46[A]. (EX1003, ¶394.)

3. [B]

See claim 46[C]. (EX1003, ¶395.)

4. [C]

See claim 46[D]. (EX1003, ¶396.)

5. [D]

See claim 46[E]. (EX1003, ¶397.)

H. Claim 75**1. [Preamble]**

See claim 74. (EX1003, ¶398.)

2. [A]

See claim 44[A]. (EX1003, ¶399.)

3. [B]

See claim 44[A]. (EX1003, ¶400.)

I. Claim 76**1. [Preamble]**

See claim 75. (EX1003, ¶401.)

2. [A]

See claim 122[A]. (EX1003, ¶402.)

3. [B]

See claim 122[A] and claim 1[G]. (EX1003, ¶403.) The received user input alters the operation of the apparatus via selector 610, as described for claim

122[A]. (EX1003, ¶403.)

J. Claim 77

1. [Preamble]

See claim 76. (EX1003, ¶404.)

2. [A]

See claim 45[A]. (EX1003, ¶405.)

K. Claim 78

1. [Preamble]

See claim 77. (EX1003, ¶406.)

2. [A]

See claims 65[A], 66[A], and 66[B]. (EX1003, ¶407.)

L. Claim 80

1. [Preamble]

See claim 79. (EX1003, ¶408.)

2. [A]

See claim 46[A]. (EX1003, ¶409.)

3. [B]

See claim 46[C]. (EX1003, ¶410.)

4. [C]

See claim 46[D]. (EX1003, ¶411.)

5. [D]

See claim 46[E]. (EX1003, ¶412.)

M. Claim 81

1. [Preamble]

See claim 80. (EX1003, ¶413.)

2. [A]

See claim 40[A]. (EX1003, ¶414.)

3. [B]

See claim 40[B]. (EX1003, ¶415.)

N. Claim 83

1. [Preamble]

See claim 81. (EX1003, ¶416.)

2. [A]

See claim 122[A]. (EX1003, ¶417.)

3. [B]

See claim 122[A]. (EX1003, ¶418.)

O. Claim 84

1. [Preamble]

See claim 83. (EX1003, ¶419.)

2. [A]

See claim 45[A]. (EX1003, ¶420.)

P. Claim 85**1. [Preamble]**

See claim 83. (EX1003, ¶421.)

2. [A]

See claims 65[A], 66[A], and 66[B]. (EX1003, ¶422.)

Q. Claim 86**1. [Preamble]**

See claim 85. (EX1003, ¶423.)

2. [A]

See claim 45[A]. (EX1003, ¶424.)

R. Claim 90**1. [Preamble]**

See claim 81. (EX1003, ¶425.)

2. [A]

See claim 92[A]. (EX1003, ¶426.)

3. [B]

See claim 92[B]. (EX1003, ¶427.)

S. Claim 91**1. [Preamble]**

See claim 90. (EX1003, ¶428.)

2. [A]

See claim 92[B]. (EX1003, ¶429.)

T. Claim 97**1. [Preamble]**

See claim 95. (EX1003, ¶430.)

2. [A]

See claim 44[A]. (EX1003, ¶431.)

3. [B]

See claim 44[A]. (EX1003, ¶432.)

U. Claim 98**1. [Preamble]**

See claim 97. (EX1003, ¶433.)

2. [A]

See claim 38[B]. (EX1003, ¶434.)

V. Claim 99**1. [Preamble]**

See claim 97. (EX1003, ¶435.)

2. [A]

See claim 27[A]. (EX1003, ¶436.)

3. [B]

See claim 27[B]. (EX1003, ¶437.)

W. Claim 100**1. [Preamble]**

See claim 97. (EX1003, ¶438.)

2. [A]

See claim 27[A]. (EX1003, ¶439.)

3. [B]

See claim 28[B]. (EX1003, ¶440.)

X. Claim 101**1. [Preamble]**

See claim 95. (EX1003, ¶441.)

2. [A]

See claim 27[A]. (EX1003, ¶442.)

3. [B]

See claim 27[B]. (EX1003, ¶443.)

Y. Claim 102**1. [Preamble]**

See claim 95. (EX1003, ¶444.)

2. [A]

See claim 40[A]. (EX1003, ¶445.)

3. [B]

See claim 40[B]. (EX1003, ¶446.)

Z. Claim 103**1. [Preamble]**

See claim 95. (EX1003, ¶447.)

2. [A]

See claim 45[A]. (EX1003, ¶448.)

AA. Claim 104**1. [Preamble]**

See claim 95. (EX1003, ¶449.)

2. [A]

See claims 65[A], 66[A], and 66[B]. (EX1003, ¶450.)

BB. Claim 105**1. [Preamble]**

See claim 95. (EX1003, ¶451.)

2. [A]

See claim 92[A]. (EX1003, ¶452.)

3. [B]

See claim 92[B]. (EX1003, ¶453.)

4. [C]

See claim 92[B]. (EX1003, ¶454.)

CC. Claim 106**1. [Preamble]**

See claim 105. (EX1003, ¶455.)

2. [A]

See claim 40[A]. (EX1003, ¶456.)

3. [B]

See claim 40[B]. (EX1003, ¶457.)

DD. Claim 107**1. [Preamble]**

See claim 106. (EX1003, ¶458.)

2. [A]

See claim 45[A]. (EX1003, ¶459.)

EE. Claim 108**1. [Preamble]**

See claim 107. (EX1003, ¶460.)

2. [A]

See claims 65[A], 66[A], and 66[B]. (EX1003, ¶461.)

FF. Claim 109**1. [Preamble]**

See claim 1[A]. (EX1003, ¶462.)

2. [A]

See claim 1[B]. (EX1003, ¶463.)

3. [B]

See claim 1[C]. (EX1003, ¶464.)

4. [C]

See claim 1[D]. (EX1003, ¶465.)

5. [D]

See claim 1[E]. (EX1003, ¶466.)

6. [E]

See claim 1[F]. (EX1003, ¶467.)

7. [F]

See claim 1[G]. (EX1003, ¶468.)

8. [G]

See claim 1[H]. (EX1003, ¶469.)

9. [H]

See claim 1[I]. (EX1003, ¶470.)

10. [I]

See claim 1[J]. (EX1003, ¶471.)

11. [J]

See claim 1[K]. (EX1003, ¶472.)

12. [K]

See claim 38[A] and [B]. (EX1003, ¶473.)

13. [L]

See claim 27[A]. (EX1003, ¶474.)

GG. Claim 110**1. [Preamble]**

See claim 109. (EX1003, ¶475.)

2. [A]

See claim 92[A]. (EX1003, ¶476.)

3. [B]

See claim 92[B]. (EX1003, ¶477.)

HH. Claim 111**1. [Preamble]**

See claim 110. (EX1003, ¶478.)

2. [A]

See claim 93[A]. (EX1003, ¶479.)

3. [B]

See claim 92[B]. (EX1003, ¶480.)

II. Claim 112**1. [Preamble]**

See claim 111. (EX1003, ¶481.)

2. [A]

See claim 44[A]. (EX1003, ¶482.)

3. [B]

See claim 44[A]. (EX1003, ¶483.)

JJ. Claim 114**1. [Preamble]**

See claim 112. (EX1003, ¶484.)

2. [A]

See claim 122[A]. (EX1003, ¶485.)

3. [B]

See claim 76[B]. (EX1003, ¶486.)

KK. Claim 115**1. [Preamble]**

See claim 114. (EX1003, ¶487.)

2. [A]

See claims 65[A], 66[A], and 66[B]. (EX1003, ¶488.)

LL. Claim 116**1. [Preamble]**

See claim 111. (EX1003, ¶489.)

2. [A]

See claim 44[A]. (EX1003, ¶490.)

3. [B]

See claim 44[A]. (EX1003, ¶491.)

MM. Claim 120**1. [Preamble]**

See claim 119. (EX1003, ¶492.)

2. [A]

See claim 46[A]. (EX1003, ¶493.)

3. [B]

See claim 46[C]. (EX1003, ¶494.)

4. [C]

See claim 46[D]. (EX1003, ¶495.)

5. [D]

See claim 46[E]. (EX1003, ¶496.)

NN. Claim 123**1. [Preamble]**

See claim 122. (EX1003, ¶497.)

2. [A]

See claim 4[A] and [E]. (EX1003, ¶498.)

3. [B]

See claim 4[C], [D], and [E]. (EX1003, ¶499.)

4. [C]

See claim 4[E]. (EX1003, ¶500.)

X. GROUND 6: CLAIMS 82, 87-89, 113, AND 121 ARE RENDERED OBVIOUS BY JANNARD IN VIEW OF ZADESKY, RADER, IRVIN, AND MAHON

A. Motivation to Combine

The POSITA would have been motivated to combine the references as described above in Sections V.C, VI.B, VII.B, and VIII.B. (EX1003, ¶501.)

B. Claim 82

1. [Preamble]

See claim 81. (EX1003, ¶502.)

2. [A]

See claim 45[A]. (EX1003, ¶503.)

3. [B]

See claim 15[A]. (EX1003, ¶504.)

4. [C]

See claim 17[A]. (EX1003, ¶505.)

C. Claim 87

1. [Preamble]

See claim 83. (EX1003, ¶506.)

2. [A]

See claim 15[A]. (EX1003, ¶507.)

D. Claim 88**1. [Preamble]**

See claim 87. (EX1003, ¶508.)

2. [A]

See claim 15[A]. (EX1003, ¶509.)

E. Claim 89**1. [Preamble]**

See claim 87. (EX1003, ¶510.)

2. [A]

See claim 17[A]. (EX1003, ¶511.)

F. Claim 113**1. [Preamble]**

See claim 112. (EX1003, ¶512.)

2. [A]

See claim 45[A]. (EX1003, ¶513.)

3. [B]

See claim 15[A]. (EX1003, ¶514.)

4. [C]

See claim 17[A]. (EX1003, ¶515.)

G. Claim 121**1. [Preamble]**

See claim 120. (EX1003, ¶516.)

2. [A]

See claim 45[A]. (EX1003, ¶517.)

3. [B]

See claim 15[A]. (EX1003, ¶518.)

4. [C]

See claim 17[A]. (EX1003, ¶519.)

XI. NOTICES AND STATEMENTS

Pursuant to 37 C.F.R. § 42.8(b)(1), Apple Inc. is the real party-in-interest for Petitioner.

Pursuant to 37 C.F.R. § 42.8(b)(2), Petitioner identifies the following related matters. The '913 Patent was asserted in the following litigation matter: *IngenioSpec, LLC v. Apple, Inc.*, Case No. 1:25-cv-1101 (W.D. Tex.). The matter was dismissed on August 20, 2025, without prejudice.

Pursuant to 37 C.F.R. § 42.8(b)(3), Petitioner identifies the following counsel (and a power of attorney accompanies this Petition).

Lead Counsel	Backup Counsel
<p>Alex S. Yap Registration No.: 60,609 MORRISON & FOERSTER LLP 707 Wilshire Boulevard, Suite 6000 Los Angeles, CA 90017 Tel: (213) 892-5688 Fax: (213) 892-5454 Email: AYap@mofo.com</p>	<p>Mehran Arjomand Registration No.: 48,231 MORRISON & FOERSTER LLP 707 Wilshire Boulevard, Suite 6000 Los Angeles, CA 90017 Tel: (213) 892-5630 Fax: (213) 892-5454 Email: MArjomand@mofo.com</p>
Backup Counsel	
<p>Bryan Blumenkopf Registration No.: 73,282 MORRISON & FOERSTER LLP 12531 High Bluff Drive, Suite 200 San Diego, CA 92130 Tel: (213) 892-5269 Fax: (213) 892-5454 Email: BBlumen@mofo.com</p>	

Pursuant to 37 C.F.R. § 42.8(b)(4), service information for lead and back-up counsel is provided above. Petitioner consents to electronic service by email to Apple-IngenioSpec-IPR@mofo.com.

Pursuant to 37 C.F.R. § 42.104(a), Petitioners certify that the '913 patent is available for *inter partes* review and that Petitioners are not barred or estopped from requesting an *inter partes* review challenging the patent claims on the grounds identified in this Petition.

XII. CONCLUSION

Petitioner requests that the Board initiate *inter partes* review and cancel all challenged claims of the '913 Patent.

The USPTO is authorized to charge any required fees, including the fee as set forth in 37 C.F.R. § 42.15(a) and any excess claim fees, to Deposit Account No. **03-1952** referencing Docket No. **10684-0000931**.

Dated: July 13, 2026

Respectfully submitted,

By: /Alex S. Yap/

Alex S. Yap
Registration No.: 60,609
MORRISON & FOERSTER LLP
707 Wilshire Boulevard, Suite 6000
Los Angeles, CA 90017
Tel: (213) 892-5688
Fax: (213) 892-5454
Email: AYap@mofo.com

XIII. CLAIMS APPENDIX

Claim 1

[Preamble] *A system, comprising:*

[A] *a head-worn personal electronic apparatus, including at least:*

[B] *a head-worn structure configured to be worn by a user;*

[C] *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;*

[D] *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;*

[E] *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;*

[F] *a second microphone at least partially contained within the head-worn structure;*

[G] *a piezoelectric device configured to receive a user input based on a force induced on the piezoelectric device, the piezoelectric device being contained within the head-worn structure, wherein the received user input operating to at least alter an operation of the head-worn personal electronic apparatus;*

[H] *a rechargeable battery contained within the head-worn structure;*

[I] *electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;*

[J] *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*

[K] *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*

[L] *a charging apparatus having at least a charging connector, wherein on placement of the head-worn personal electronic apparatus at least partially in the charging apparatus, electrical connection is configured to result 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 at least partially in the charging apparatus.*

Claim 2

[Preamble] *A system as recited in claim 1,*

[A] *wherein the head- worn personal electronic apparatus is configured to support audio output to the user via the speaker, and*

[B] *wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.*

Claim 3

[Preamble] *A system as recited in claim 1,*

[A] *wherein the head- worn personal electronic apparatus is configured to support voice calls to the user, and*

[B] *wherein the operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.*

Claim 4

[Preamble] *A system as recited in claim 1,*

[A] *wherein the system comprises: a mobile communication device at least for supporting audio output,*

[B] *the mobile communication device configured to store at least a hearing profile associated with the user, the stored hearing profile associated with the user at least characterizes hearing impairment regarding the user's ability to hear,*

[C] *the mobile communication device configured to produce audio output signals customized for the user based on at least the stored hearing profile associated with the user such that the customized audio output signals at least compensate for the hearing impairment regarding the user's ability to hear, and*

[D] *the mobile communication device configured to transmit the customized audio output signals to the head-worn personal electronic apparatus,*

[E] *wherein the speaker is configured to generate at least a portion of the customized audio output for the user in accordance with at least the portion of the customized audio output signals being received by the head-worn personal electronic apparatus.*

Claim 5

[Preamble] *A system as recited in claim 4,*

[A] *wherein the mobile communication device is configured to support establishment of the hearing profile for the user.*

Claim 6

[Preamble] *A system as recited in claim 5,*

[A] *wherein the hearing profile for the user is established by the mobile communication device at least via generating audio tones and outputting such to at least the speaker and receiving a user indication corresponding to the user's ability to hear the generated audio tones.*

Claim 7

[Preamble] *A system as recited in claim 4,*

[A] *wherein the mobile communication device is configured to produce the customized audio output signals using frequency-dependent amplification.*

Claim 8

[Preamble] *A system as recited in claim 4,*

[A] *wherein the mobile communication device is or includes a mobile phone, and*
[B] *wherein the customized audio output includes music.*

Claim 9

[Preamble] *A system as recited in claim 4,*

[A] *wherein the mobile communication device is or includes a mobile phone, and*

[B] *wherein the customized audio output includes a voice conversation.*

Claim 10

[Preamble] *A system as recited in claim 4,*

[A] *wherein the customized audio output signals are produced based on amplifying or attenuating different frequency bands differently according to at least the stored hearing profile.*

Claim 11

[Preamble] *A system as recited in claim 4,*

[A] *wherein the mobile communication device includes computing capabilities and a storage device, the storage device storing at least a software program executed by the mobile communication device to enable the user to establish the hearing profile associated with the user, and*

[B] *wherein the mobile communication device is configured to establish the hearing profile associated with the user via the software program executed by the mobile communication device based on the user interacting with the software program via the mobile communication device.*

Claim 12

[Preamble] *A system as recited in claim 11,*

[A] wherein the software program at least interactively guides the user to establish the hearing profile for the user.

Claim 13

[Preamble] A system as recited in claim 12,

[A] wherein the software program at least interactively guides the user to establish the hearing profile for the user by at least causing various audio tones to be output to the user via at least the speaker, prompting the user to provide a hearing input with respect to one or more of the various audio tones being output, and receiving the hearing input pertaining to one or more of the various audio tones being output.

Claim 14

[Preamble] A system as recited in claim 13,

[A] wherein the mobile communication device is configured to wirelessly communicate with the head-worn personal electronic apparatus over a wireless network using the wireless communication circuitry.

Claim 15

[Preamble] A system as recited in claim 4,

[A] wherein the head- worn personal electronic apparatus includes a plurality of circuit boards, each of the plurality of circuit boards including at least one integrated circuit mounted thereto.

Claim 16

[Preamble] A system as recited in claim 15,

[A] wherein at least one of the plurality of circuit boards is a flexible printed circuit board.

Claim 17

[Preamble] *A system as recited in claim 15,*

[A] *wherein at least one of the plurality of circuit boards has at least one integrated circuit mounted on a first side of the at least one of the plurality of circuit boards, and at least one integrated circuit mounted on a second side of the at least one of the plurality of circuit boards.*

Claim 18

[Preamble] *A system as recited in claim 4,*

[A] *wherein the head- worn structure comprises: an infrared emitter configured to at least direct infrared signals towards the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn; and*

[B] *an infrared detector configured to detect infrared radiation reflected back from the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn.*

Claim 19

[Preamble] *A system as recited in claim 18,*

[A] *wherein the electronic circuitry within the head-worn structure is configured to facilitate determining whether the head-worn structure is being worn by the user based on at least the detected infrared radiation.*

Claim 20

[Preamble] *A system as recited in claim 4,*

[A] *wherein the head- worn structure comprises: a physical condition sensor configured to acquire data pertaining to at least a physical condition of the user, the physical condition sensor being provided at least partially internal to the head-worn structure.*

Claim 21

[Preamble] *A system as recited in claim 20,*

[A] *wherein the acquired data by the physical condition sensor includes data regarding temperature of the user.*

Claim 22

[Preamble] *A system as recited in claim 20,*

[A] *wherein the acquired data by the physical condition sensor includes data regarding vital signs of the user.*

Claim 23

[Preamble] *A head-worn personal electronic apparatus, comprising:*

[A] *a head-worn structure configured to be worn by a user;*

[B] *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;*

[C] *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;*

[D] *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;*

[E] *a second microphone at least partially contained within the head-worn structure;*

[F] *a force sensing device configured to receive a user input based on a force induced on the force sensing device, the force sensing device being an electrical component configured to sense force, the force sensing device being contained within the head-worn structure, wherein the received user input operating to at least alter an operation of the head-worn personal electronic apparatus;*

[G] *a rechargeable battery contained within the head-worn structure;*

[H] *electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery; and*

[I] *wireless communication circuitry at least partially contained within the head-worn structure.*

Claim 24

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the head-worn personal electronic apparatus comprises: 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.*

Claim 25

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and*

[B] *wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.*

Claim 26

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the head-worn personal electronic apparatus is configured to support voice calls to the user, and*

[B] *wherein the operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.*

Claim 27

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] wherein the second microphone is configured to pick-up an environmental audio input, and

[B] wherein the environmental audio input picked-up from at least the second microphone is used at least for noise cancelation, and at least a portion of the environmental audio input picked-up from the second microphone is subtracted from the audio input picked-up from the first microphone.

Claim 28

[Preamble] A head-worn personal electronic apparatus as recited in claim 23,

[A] wherein the second microphone is configured to pick-up an environmental audio input, and

[B] wherein the electronic circuitry is configured to receive audio output signals to be output to the user via the speaker, and modify the audio output signals to be output to the user via the speaker to cancel at least a portion of noise associated with the environment, the modification of the audio output signals being dependent at least in part on the environmental audio input picked-up via the second microphone.

Claim 29

[Preamble] A head-worn personal electronic apparatus as recited in claim 28,

[A] wherein the head-worn personal electronic apparatus comprises: a physical condition sensor configured to acquire data pertaining to at least a physical condition of the user, the physical condition sensor being provided at least partially internal to the head-worn structure,

[B] wherein the acquired data by the physical condition sensor includes data regarding vital signs or temperature of the user.

Claim 30

[Preamble] A head-worn personal electronic apparatus as recited in claim 28,

[A] wherein the environmental audio input picked-up from at least the second microphone is used at least for noise cancelation, and at least a portion of the environmental audio input picked-up from the second microphone is used to remove undesired noise from the audio input picked-up from the first microphone.

Claim 31

[Preamble] A head-worn personal electronic apparatus as recited in claim 23,

[A] wherein the electronic circuitry is configured to: determine an ambient noise level based on at least signals picked-up from at least the second microphone; and

[B] modify at least a portion of audio output signals to be output to the user via the speaker, with the modification being at least in part dependent on the ambient noise level.

Claim 32

[Preamble] A head-worn personal electronic apparatus as recited in claim 23,

[A] wherein the first microphone faces the user when the head-worn personal electronic apparatus is being worn.

Claim 33

[Preamble] A head-worn personal electronic apparatus as recited in claim 32,

[A] wherein the second microphone faces away from the user when the head-worn personal electronic apparatus is being worn.

Claim 34

[Preamble] A head-worn personal electronic apparatus as recited in claim 33,

[A] wherein the second microphone is configured to pick-up an environmental audio input, and

[B] *wherein the electronic circuitry is configured to receive audio output signals to be output to the user via the speaker, and modify the audio output signals to be output to the user via the speaker to cancel at least a portion of noise associated with the environment, the modification of the audio output signals being dependent at least in part on the environmental audio input picked-up via the second microphone.*

Claim 35

[Preamble] *A head-worn personal electronic apparatus as recited in claim 33,*

[A] *wherein the second microphone is configured to pick-up an environmental audio input, and*

[B] *wherein the environmental audio input picked-up from at least the second microphone is used at least for noise cancelation, and at least a portion of the environmental audio input picked-up from the second microphone is used to remove undesired noise from the audio input picked-up from the first microphone.*

Claim 36

[Preamble] *A head-worn personal electronic apparatus as recited in claim 33,*

[A] *wherein the electronic circuitry is configured to: determine an ambient noise level based on at least signals picked-up from at least the second microphone; and*

[B] *modify at least a portion of audio output signals to be output to the user via the speaker, with the modification being at least in part dependent on the ambient noise level.*

Claim 37

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the head-worn personal electronic apparatus is configured to receive a voice input from the user via at least the first microphone, support or*

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

Claim 38

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the head-worn personal electronic apparatus comprises: an optical sensor contained within the head-worn structure and configured to capture optical sensor data,*

[B] *wherein the head-worn personal electronic apparatus is configured to determine whether the head-worn personal electronic apparatus is being worn by the user based on the optical sensor data captured by the optical sensor.*

Claim 39

[Preamble] *A head-worn personal electronic apparatus as recited in claim 38,*

[A] *wherein the optical sensor is configured to sense at least infrared radiation, and wherein the optical sensor data captured includes at least infrared radiation data.*

Claim 40

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the head-worn personal electronic apparatus comprises: a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when the head-worn personal electronic apparatus is being worn; and*

[B] *a radiation detector at least partially contained within the head-worn structure and configured to detect a portion of the radiation directed towards the user that is reflected back from the user when the head-worn personal electronic apparatus is being worn.*

Claim 41

[Preamble] *A head-worn personal electronic apparatus as recited in claim 40,*

[A] *wherein the radiation detector comprises a photodetector.*

Claim 42

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the head-worn personal electronic apparatus comprises: an optical sensor at least partially contained within the head-worn structure and configured to capture data, the captured data being indicative of whether the head-worn personal electronic apparatus is being worn by the user,*

[B] *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 captured data.*

Claim 43

[Preamble] *A head-worn personal electronic apparatus as recited in claim 42,*

[A] *wherein the optical sensor is configured to sense at least infrared radiation.*

Claim 44

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the head-worn personal electronic apparatus comprises: an infrared emitter contained within the head-worn structure and configured to emit infrared radiation towards the user when the head-worn personal electronic apparatus is being worn.*

Claim 45

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] wherein the head-worn personal electronic apparatus comprises: at least a portion of a Hall effect detector at least partially contained within the head-worn structure, the Hall effect detector being configured to capture data associated with a magnetic characteristic.

Claim 46

[Preamble] A head-worn personal electronic apparatus as recited in claim 23,

[A] wherein the head-worn personal electronic apparatus is operable to at least output customized audio output,

[B] wherein the wireless communication circuitry includes at least a wireless receiver configured to wirelessly receive audio output signals to be output to the user via the speaker,

[C] wherein the electronic circuitry including at least an integrated circuit,

[D] the electronic circuitry being configured to (i) store hearing characteristics associated with the user; (ii) customize the received audio output signals to produce customized audio output signals for the user based on at least a portion of the stored hearing characteristics associated with the user such that the customized audio output signals at least compensate for hearing impairment regarding the user's ability to hear; and (iii) output the customized audio output signals to the speaker, and

[E] wherein the speaker is configured to generate at least a portion of the customized audio output for the user in accordance with at least the portion of the customized audio output signals.

Claim 47

[Preamble] A head-worn personal electronic apparatus as recited in claim 46,

[A] wherein the received audio output signals are wirelessly received from a mobile communication device associated with the user.

Claim 48

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the head-worn personal electronic apparatus is operable to at least output customized audio output,*

[B] *wherein the wireless communication circuitry includes at least a wireless receiver configured to wirelessly receive audio output signals to be output to the user via the speaker,*

[C] *wherein the electronic circuitry including at least an integrated circuit,*

[D] *the electronic circuitry being configured to (i) store attributes associated with the user; (ii) customize the received audio output signals to produce customized audio output signals for the user based on at least a portion of the stored attributes associated with the user; and (iii) output the customized audio output signals to the speaker, and*

[E] *wherein the speaker is configured to generate at least a portion of the customized audio output for the user in accordance with at least the portion of the customized audio output signals.*

Claim 49

[Preamble] *A head-worn personal electronic apparatus as recited in claim 48,*

[A] *wherein the received audio output signals are wirelessly received from a mobile communication device associated with the user.*

Claim 50

[Preamble] *A head-worn personal electronic apparatus as recited in claim 49,*

[A] *wherein the second microphone is configured to pick up at least ambient noise associated with an environment in the vicinity of the head-worn personal electronic apparatus, and*

[B] *wherein the electronic circuitry is configured to: determine an ambient noise level based on at least the ambient noise; and*

[C] modify at least a portion of the audio input picked-up via the first microphone, with the modification being at least in part dependent on the ambient noise level.

Claim 51

[Preamble] A head-worn personal electronic apparatus as recited in claim 49,

[A] wherein the head-worn personal electronic apparatus comprises: a radiation emitter at least partially contained within the head-worn personal electronic apparatus and configured to at least direct radiation towards the user when at least the head-worn personal electronic apparatus of the head-worn personal electronic apparatus is being worn; and

[B] a radiation detector at least partially contained within the head-worn personal electronic apparatus and configured to detect a portion of the radiation directed towards the user that is reflected back from the user when the head-worn structure of the head-worn personal electronic apparatus is being worn,

[C] wherein the radiation detector is operatively connected to the electronic circuitry, and

[D] wherein the electronic circuitry is configured to facilitate determining whether the head-worn personal electronic apparatus is being worn by the user based on at least the detected radiation.

Claim 52

[Preamble] A head-worn personal electronic apparatus as recited in claim 51,

[A] wherein the detected radiation is at least infrared radiation.

Claim 53

[Preamble] A head-worn personal electronic apparatus as recited in claim 52,

[A] wherein the speaker is configured to be at least partially inserted into the ear of the user.

Claim 54

[Preamble] *A head-worn personal electronic apparatus as recited in claim 49,*

[A] *wherein the head-worn personal electronic apparatus is configured to receive a voice input, support a determination of a requested operation from the voice input using voice recognition, and control operation by the head-worn personal electronic apparatus based on the requested operation.*

Claim 55

[Preamble] *A head-worn personal electronic apparatus as recited in claim 49,*

[A] *wherein the customized audio output includes music that was wirelessly received via the wireless receiver.*

Claim 56

[Preamble] *A head-worn personal electronic apparatus as recited in claim 49,*

[A] *wherein the customized audio output signals result from amplifying or attenuating different frequency bands differently according to at least the predetermined hearing characteristics associated with the user.*

Claim 57

[Preamble] *A head-worn personal electronic apparatus as recited in claim 56,*

[A] *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, and*

[B] *wherein the electronic circuitry is configured to modify the customized audio output signals to be output to the user via the at least one speaker to cancel at least a portion of noise associated with the environment, the modification of the customized audio output signals being dependent at least in part on the environmental audio input picked-up via the second microphone.*

Claim 58

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the head-worn personal electronic apparatus is operable to at least output customized audio output,*

[B] *wherein the wireless communication circuitry includes at least a wireless receiver configured to wirelessly receive customized audio output signals for the user, the customized audio output signals having been customized based on at least predetermined hearing characteristics associated with the user such that the customized audio output signals at least compensate for hearing impairment regarding the user's ability to hear, and*

[C] *wherein the speaker is configured to generate at least a portion of the customized audio output for the user in accordance with at least the portion of the customized audio output signals.*

Claim 59

[Preamble] *A head-worn personal electronic apparatus as recited in claim 58,*

[A] *wherein the customized audio output signals are wirelessly received from a mobile communication device associated with the user.*

Claim 60

[Preamble] *A head-worn personal electronic apparatus as recited in claim 58,*

[A] *wherein the first microphone is positioned to be directed towards the user when the head-worn personal electronic apparatus is being worn by the user; and*

[B] *wherein the second microphone is configured to pick up at least ambient sound input associated with an environment in the vicinity of the head-worn personal electronic apparatus, the second microphone being positioned to be directed away from the user when the head-worn personal electronic apparatus is being worn by the user.*

Claim 61

[Preamble] *A head-worn personal electronic apparatus as recited in claim 58,*

[A] *wherein the second microphone is configured to pick up at least ambient sound input associated with an environment in the vicinity of the head-worn personal electronic apparatus, and*

[B] *wherein the second microphone is positioned to be further away from mouth of the user than the first microphone when the head-worn personal electronic apparatus is being worn.*

Claim 62

[Preamble] *A head-worn personal electronic apparatus as recited in claim 61,*

[A] *wherein the first microphone is positioned so as to be directed towards the user of the head-worn personal electronic apparatus, and*

[B] *wherein the second microphone is positioned so as to be directed away from the user of the head-worn personal electronic apparatus, relative to the first microphone.*

Claim 63

[Preamble] *A head-worn personal electronic apparatus as recited in claim 62,*

[A] *wherein the head-worn personal electronic apparatus comprises: a physical condition sensor configured to acquire data pertaining to at least a physical condition of the user, the physical condition sensor being provided at least partially internal to the head-worn structure, the acquired data by the physical condition sensor includes (i) data regarding temperature of the user, or (ii) data regarding vital signs of the user.*

Claim 64

[Preamble] *A head-worn personal electronic apparatus as recited in claim 58,*

[A] wherein the second microphone is configured to pick up at least environmental audio input associated with an environment in the vicinity of the head-worn personal electronic apparatus, and

[B] wherein the electronic circuitry is configured to process the audio input from at least the user picked-up 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.

Claim 65

[Preamble] A head-worn personal electronic apparatus as recited in claim 23,

[A] wherein the head-worn personal electronic apparatus comprises: a bone conducting electronic element at least partially contained within the head-worn structure.

Claim 66

[Preamble] A head-worn personal electronic apparatus as recited in claim 65,

[A] wherein the bone conducting electronic element associated with vibrations, and

[B] wherein the bone conducting electronic element having electrical signals associated with the vibration.

Claim 67

[Preamble] A head-worn personal electronic apparatus as recited in claim 23,

[A] wherein the motion detector includes at least an accelerometer.

Claim 68

[Preamble] A head-worn personal electronic apparatus as recited in claim 23,

[A] wherein the wireless receiver is configured to operate with a Bluetooth network.

Claim 69

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the electronic circuitry includes at least a microprocessor.*

Claim 70

[Preamble] *A head-worn personal electronic apparatus as recited in claim 23,*

[A] *wherein the head-worn personal electronic apparatus comprises: an antenna contained within the head-worn structure of the head-worn personal electronic apparatus.*

Claim 71

[Preamble] *A head-worn personal electronic apparatus, comprising:*

[A] *a head-worn structure configured to be worn by a user;*

[B] *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;*

[C] *a motion detector contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;*

[D] *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;*

[E] *a second microphone at least partially contained within the head-worn structure;*

[F] *a force sensing device configured to receive a user input based on a force induced on the force sensing device, the force sensing device being contained within the head-worn structure, wherein the received user input operating to at least alter an operation of the head-worn personal electronic apparatus;*

[G] *a rechargeable battery contained within the head-worn structure;*

[H] *electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;*

[I] *wireless communication circuitry contained within the head-worn structure;*

[J] *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*

[K] *a radiation detector at least partially contained within the head-worn structure and configured to capture radiation data,*

[L] *wherein the head-worn personal electronic apparatus is configured to determine whether the head-worn personal electronic apparatus is being worn by the user based on the radiation data captured by the radiation detector, and*

[M] *wherein the second microphone is configured to at least pick-up an environmental audio input.*

Claim 72

[Preamble] *A head-worn personal electronic apparatus as recited in claim 71,*

[A] *wherein the head-worn personal electronic apparatus is configured to receive a voice input from the user via at least the first microphone, support or receive determination of a requested operation from the voice input using voice recognition, and control operation by the head-worn personal electronic apparatus based on the requested operation.*

Claim 73

[Preamble] *A head-worn personal electronic apparatus as recited in claim 72,*

[A] *wherein the wireless communication circuitry includes at least a wireless receiver configured to wirelessly receive audio output signals to be output to the user via the speaker, and*

[B] *wherein the electronic circuitry is configured to modify the audio output signals to be output to the user via the speaker to cancel at least a portion of environmental noise, the modification of the audio output signals being*

dependent at least in part on the environmental audio input picked-up via the second microphone.

Claim 74

[Preamble] *A head-worn personal electronic apparatus as recited in claim 73,*

[A] *wherein the head-worn personal electronic apparatus is operable to at least output customized audio output,*

[B] *wherein the electronic circuitry includes at least an integrated circuit, and*

[C] *the electronic circuitry being configured to (i) store hearing characteristics associated with the user; (ii) customize the received audio output signals to produce customized audio output signals for the user based on at least a portion of the stored hearing characteristics associated with the user such that the customized audio output signals at least compensate for hearing impairment regarding the user's ability to hear; and (iii) output the customized audio output signals to the speaker, and*

[D] *wherein the speaker is configured to generate at least a portion of the customized audio output for the user in accordance with at least the portion of the customized audio output signals.*

Claim 75

[Preamble] *A head-worn personal electronic apparatus as recited in claim 74,*

[A] *wherein the head-worn personal electronic apparatus comprises: a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when the head-worn personal electronic apparatus is being worn, and*

[B] *wherein the radiation detector at least partially contained within the head-worn structure and configured to detect a portion of the radiation directed towards the user by the radiation emitter that is reflected back from the user when the head-worn personal electronic apparatus is being worn.*

Claim 76

[Preamble] *A head-worn personal electronic apparatus as recited in claim 75,*

[A] *wherein the head-worn personal electronic apparatus is configured to support control of (i) audio output to the user via the speaker and (ii) voice calls to the user, and*

[B] *wherein the operation of the head-worn personal electronic apparatus being altered concerns at least control of the audio output being provided to the user and/or accepting or declining a voice call to the user.*

Claim 77

[Preamble] *A head-worn personal electronic apparatus as recited in claim 76,*

[A] *wherein the head-worn personal electronic apparatus comprises: at least a portion of a Hall effect detector at least partially contained within the head-worn personal electronic apparatus, the Hall effect detector being configured to capture data associated with a magnetic characteristic.*

Claim 78

[Preamble] *A head-worn personal electronic apparatus as recited in claim 77,*

[A] *wherein the head-worn personal electronic apparatus comprises: a bone conducting electronic element at least partially contained within the head-worn structure, the bone conducting electronic element being associated with vibrations, and the bone conducting electronic element utilizing electrical signals associated with the vibration.*

Claim 79

[Preamble] *A head-worn personal electronic apparatus as recited in claim 71,*

[A] wherein the wireless communication circuitry includes at least a wireless receiver configured to wirelessly receive audio output signals to be output to the user via the speaker, and

[B] wherein the electronic circuitry is configured to modify the audio output signals to be output to the user via the speaker to cancel at least a portion of environmental noise, the modification of the audio output signals being dependent at least in part on the environmental audio input picked-up via the second microphone.

Claim 80

[Preamble] A head-worn personal electronic apparatus as recited in claim 79,

[A] wherein the head-worn personal electronic apparatus is operable to at least output customized audio output,

[B] wherein the electronic circuitry includes at least an integrated circuit, and

[C] the electronic circuitry being configured to (i) store attributes associated with the user; (ii) customize the received audio output signals to produce customized audio output signals for the user based on at least a portion of the stored attributes associated with the user; and (iii) output the customized audio output signals to the speaker, and

[D] wherein the speaker is configured to generate at least a portion of the customized audio output for the user in accordance with at least the portion of the customized audio output signals.

Claim 81

[Preamble] A head-worn personal electronic apparatus as recited in claim 80,

[A] wherein the head-worn personal electronic apparatus comprises: a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when the head-worn personal electronic apparatus is being worn, and

[B] wherein the radiation detector at least partially contained within the head-worn structure and configured to detect a portion of the radiation directed

towards the user by the radiation emitter that is reflected back from the user when the head-worn personal electronic apparatus is being worn.

Claim 82

[Preamble] *A head-worn personal electronic apparatus as recited in claim 81,*

[A] *wherein the head-worn personal electronic apparatus comprises: at least a portion of a Hall effect detector at least partially contained within the head-worn personal electronic apparatus, the Hall effect detector being configured to capture data associated with a magnetic characteristic; and*

[B] *a plurality of circuit boards, each of the plurality of circuit boards including at least one electrical component mounted thereto, at least one of the plurality of circuit boards being a flexible printed circuit board,*

[C] *at least one of the plurality of circuit boards has at least one integrated circuit mounted on a first side of the at least one of the plurality of circuit boards, and at least one integrated circuit mounted on a second side of the at least one of the plurality of circuit boards.*

Claim 83

[Preamble] *A head-worn personal electronic apparatus as recited in claim 81,*

[A] *wherein the head-worn personal electronic apparatus is configured to support control of (i) audio output to the user via the speaker and (ii) voice calls to the user, and*

[B] *wherein the operation of the head-worn personal electronic apparatus being altered concerns at least control of the audio output being provided to the user and/or accepting or declining a voice call to the user.*

Claim 84

[Preamble] *A head-worn personal electronic apparatus as recited in claim 83,*

[A] *wherein the head-worn personal electronic apparatus comprises: at least a portion of a Hall effect detector at least partially contained within the head-worn*

personal electronic apparatus, the Hall effect detector being configured to capture data associated with a magnetic characteristic.

Claim 85

[Preamble] *A head-worn personal electronic apparatus as recited in claim 83,*

[A] *wherein the head-worn personal electronic apparatus comprises: a bone conducting electronic element at least partially contained within the head-worn structure, the bone conducting electronic element being associated with vibrations, and the bone conducting electronic element utilizing electrical signals associated with the vibration.*

Claim 86

[Preamble] *A head-worn personal electronic apparatus as recited in claim 85,*

[A] *wherein the head-worn personal electronic apparatus comprises: at least a portion of a Hall effect detector at least partially contained within the head-worn personal electronic apparatus, the Hall effect detector being configured to capture data associated with a magnetic characteristic.*

Claim 87

[Preamble] *A head-worn personal electronic apparatus as recited in claim 83,*

[A] *wherein the head-worn personal electronic apparatus comprises: a plurality of circuit boards, each of the plurality of circuit boards including at least one electrical component mounted thereto.*

Claim 88

[Preamble] *A head-worn personal electronic apparatus as recited in claim 87,*

[A] *wherein at least one of the plurality of circuit boards is a flexible printed circuit board.*

Claim 89

[Preamble] *A head-worn personal electronic apparatus as recited in claim 87,*

[A] *wherein at least one of the plurality of circuit boards has at least one integrated circuit mounted on a first side of the at least one of the plurality of circuit boards, and at least one integrated circuit mounted on a second side of the at least one of the plurality of circuit boards.*

Claim 90

[Preamble] *A head-worn personal electronic apparatus as recited in claim 81,*

[A] *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,*

[B] *wherein at least the electronic circuitry is configured to facilitate determination at least whether the touch input associated with the user pertains to a first sliding direction or a second sliding direction with respect to the touch sensitive surface.*

Claim 91

[Preamble] *A head-worn personal electronic apparatus as recited in claim 90,*

[A] *wherein the touch input by the touch sensitive surface operates to at least control audio volume level of the customized audio output for the user via the speaker.*

Claim 92

[Preamble] *A head-worn personal electronic apparatus as recited in claim 71,*

[A] *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,*

[B] *wherein at least the electronic circuitry is configured to facilitate determination at least whether the touch input associated with the user pertains to a first sliding direction or a second sliding direction with respect to the touch sensitive surface.*

Claim 93

[Preamble] *A head-worn personal electronic apparatus as recited in claim 92,*

[A] *wherein the touch sensitive surface senses the touch input by at least sensing capacitance, and*

[B] *wherein the touch input by the touch sensitive surface operates to at least control audio volume level of audio output configured to be provided to the user via the speaker.*

Claim 94

[Preamble] *A system, comprising:*

[A] *a head-worn personal electronic apparatus, including at least:*

[B] *a head-worn structure configured to be worn by a user;*

[C] *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;*

[D] *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;*

[E] *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;*

[F] *a second microphone at least partially contained within the head-worn structure;*

[G] *a force sensing device configured to receive a user input based on a force induced on the force sensing device, the force sensing device being contained*

within the head-worn structure, wherein the received user input operating to at least alter an operation of the head-worn personal electronic apparatus;

[H] a rechargeable battery contained within the head-worn structure;

[I] electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;

[J] 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

[K] 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;

[L] a charging apparatus having at least a charging connector; and

[M] a mobile communication device at least for supporting audio output,

[N] the mobile communication device configured to store at least a hearing profile associated with the user, the stored hearing profile associated with the user at least characterizes hearing impairment regarding the user's ability to hear, the mobile communication device configured to produce audio output signals customized for the user based on at least the stored hearing profile associated with the user such that the customized audio output signals at least compensate for the hearing impairment regarding the user's ability to hear, and

[O] the mobile communication device configured to wirelessly transmit the customized audio output signals to the head-worn personal electronic apparatus,

[P] wherein the speaker is configured to generate at least a portion of the customized audio output for the user in accordance with at least the portion of the customized audio output signals being received by the head-worn personal electronic apparatus,

[Q] wherein on placement of the head-worn personal electronic apparatus at least partially in the charging apparatus, electrical connection is configured to result 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 at least partially in the charging apparatus, and

[R] wherein the customized audio output signals are produced based on amplifying or attenuating different frequency bands differently according to at least the stored hearing profile.

Claim 95

[Preamble] A system as recited in claim 94,

[A] wherein the mobile communication device includes computing capabilities and a storage device, the storage device storing at least a software program executed by the mobile communication device to enable the user to establish the hearing profile associated with the user, and

[B] wherein the mobile communication device is configured to establish the hearing profile associated with the user via the software program executed by the mobile communication device based on the user interacting with the software program via the mobile communication device.

Claim 96

[Preamble] A system as recited in claim 95,

[A] wherein the software program at least interactively guides the user to establish the hearing profile for the user by at least causing various audio tones to be output to the user via at least the speaker, prompting the user to provide a hearing input with respect to one or more of the various audio tones being output, and receiving the hearing input pertaining to one or more of the various audio tones being output.

Claim 97

[Preamble] A system as recited in claim 95,

[A] wherein the head-worn structure comprises: an infrared emitter configured to at least direct infrared signals towards the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn; and

[B] an infrared detector configured to detect infrared radiation reflected back from the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn.

Claim 98

[Preamble] A system as recited in claim 97,

[A] wherein the electronic circuitry within the head-worn structure is configured to facilitate determining whether the head-worn structure is being worn by the user based on at least the detected infrared radiation.

Claim 99

[Preamble] A system as recited in claim 97,

[A] wherein the second microphone is configured to pick-up an environmental audio input, and

[B] wherein the environmental audio input picked-up from at least the second microphone is used at least for noise cancelation, and at least a portion of the environmental audio input picked-up from the second microphone is canceled from the audio input picked-up from the first microphone.

Claim 100

[Preamble] A system as recited in claim 97,

[A] wherein the second microphone is configured to pick-up an environmental audio input, and

[B] wherein the electronic circuitry is configured to receive audio output signals to be output to the user via the speaker, and modify the audio output signals to be output to the user via the speaker to cancel at least a portion of noise associated with the environment, the modification of the audio output signals being

dependent at least in part on the environmental audio input picked-up via the second microphone.

Claim 101

[Preamble] *A system as recited in claim 95,*

[A] *wherein the second microphone is configured to pick-up an environmental audio input, and*

[B] *wherein the environmental audio input picked-up from at least the second microphone is used at least for noise cancelation, and at least a portion of the environmental audio input picked-up from the second microphone is used to remove undesired noise from the audio input picked-up from the first microphone.*

Claim 102

[Preamble] *A system as recited in claim 95,*

[A] *wherein the head-worn structure comprises: a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when the head-worn structure is being worn, and*

[B] *a radiation detector at least partially contained within the head-worn structure and configured to detect a portion of the radiation directed towards the user by the radiation emitter that is reflected back from the user when the head-worn structure is being worn.*

Claim 103

[Preamble] *A system as recited in claim 95,*

[A] *wherein the head-worn structure comprises: at least a portion of a Hall effect detector at least partially contained within the head-worn structure, the Hall effect detector being configured to capture data associated with a magnetic characteristic.*

Claim 104

[Preamble] *A system as recited in claim 95,*

[A] *wherein the head-worn structure comprises: a bone conducting electronic element at least partially contained within the head-worn structure, the bone conducting electronic element being associated with vibrations, and the bone conducting electronic element utilizing electrical signals associated with the vibration.*

Claim 105

[Preamble] *A system as recited in claim 95,*

[A] *wherein the head-worn structure 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,*

[B] *wherein at least the electronic circuitry is configured to facilitate determination at least whether the touch input associated with the user pertains to a first sliding direction or a second sliding direction with respect to the touch sensitive surface, and*

[C] *wherein the touch input by the touch sensitive surface operates to at least control audio volume level of the customized audio output for the user via the speaker.*

Claim 106

[Preamble] *A system as recited in claim 105,*

[A] *wherein the head-worn structure comprises: a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when the head-worn structure is being worn, and*

[B] *a radiation detector at least partially contained within the head-worn structure and configured to detect a portion of the radiation directed towards the*

user by the radiation emitter that is reflected back from the user when the head-worn structure is being worn.

Claim 107

[Preamble] *A system as recited in claim 106,*

[A] *wherein the system comprises: a Hall effect detector configured to capture data associated with a magnetic characteristic.*

Claim 108

[Preamble] *A system as recited in claim 107,*

[A] *wherein the head-worn structure comprises: a bone conducting electronic element at least partially contained within the head-worn structure, the bone conducting electronic element being associated with vibrations, and the bone conducting electronic element utilizing electrical signals associated with the vibration.*

Claim 109

[Preamble] *A head-worn personal electronic apparatus, comprising:*

[A] *a head-worn structure configured to be worn by a user;*

[B] *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;*

[C] *a motion detector contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;*

[D] *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;*

[E] *a second microphone at least partially contained within the head-worn structure;*

[F] *a piezoelectric device configured to receive a user input based on a force induced on the piezoelectric device, the piezoelectric device being contained within the head-worn structure, wherein the received user input operating to at least alter an operation of the head-worn personal electronic apparatus;*

[G] *a rechargeable battery contained within the head-worn structure;*

[H] *electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;*

[I] *wireless communication circuitry contained within the head-worn structure;*

[J] *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*

[K] *a radiation detector at least partially contained within the head-worn structure and configured to capture radiation data, wherein the head-worn personal electronic apparatus is configured to determine whether the head-worn personal electronic apparatus is being worn by the user based on the radiation data captured by the radiation detector, and*

[L] *wherein the second microphone is configured to at least pick-up an environmental audio input.*

Claim 110

[Preamble] *A head-worn personal electronic apparatus as recited in claim 109,*

[A] *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,*

[B] *wherein at least the electronic circuitry is configured to facilitate determination at least whether the touch input associated with the user pertains to a first sliding direction or a second sliding direction with respect to the touch sensitive surface.*

Claim 111

[Preamble] *A head-worn personal electronic apparatus as recited in claim 110,*

[A] *wherein the touch sensitive surface senses the touch input by at least sensing capacitance, and*

[B] *wherein the touch input by the touch sensitive surface operates to at least control audio volume level of audio output configured to be provided to the user via the speaker.*

Claim 112

[Preamble] *A head-worn personal electronic apparatus as recited in claim 111,*

[A] *wherein the head-worn personal electronic apparatus comprises: a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when the head-worn personal electronic apparatus is being worn, and*

[B] *wherein the radiation detector at least partially contained within the head-worn structure and configured to detect a portion of the radiation directed towards the user by the radiation emitter that is reflected back from the user when the head-worn personal electronic apparatus is being worn.*

Claim 113

[Preamble] *A head-worn personal electronic apparatus as recited in claim 112,*

[A] *wherein the head-worn personal electronic apparatus comprises: at least a portion of a Hall effect detector at least partially contained within the head-worn personal electronic apparatus, the Hall effect detector being configured to capture data associated with a magnetic characteristic; and*

[B] *a plurality of circuit boards, each of the plurality of circuit boards including at least one electrical component mounted thereto, at least one of the plurality of circuit boards being a flexible printed circuit board,*

[C] at least one of the plurality of circuit boards has at least one integrated circuit mounted on a first side of the at least one of the plurality of circuit boards, and at least one integrated circuit mounted on a second side of the at least one of the plurality of circuit boards.

Claim 114

[Preamble] A head-worn personal electronic apparatus as recited in claim 112,

[A] wherein the head-worn personal electronic apparatus is configured to support control of (i) audio output to the user via the speaker and (ii) voice calls to the user, and

[B] wherein the operation of the head-worn personal electronic apparatus being altered concerns at least control of the audio output being provided to the user and/or accepting or declining a voice call to the user.

Claim 115

[Preamble] A head-worn personal electronic apparatus as recited in claim 114,

[A] wherein the head-worn personal electronic apparatus comprises: a bone conducting electronic element at least partially contained within the head-worn structure, the bone conducting electronic element being associated with vibrations, and the bone conducting electronic element utilizing electrical signals associated with the vibration.

Claim 116

[Preamble] A head-worn personal electronic apparatus as recited in claim 111,

[A] wherein the head-worn personal electronic apparatus comprises: an infrared radiation emitter at least partially contained within the head-worn structure and configured to at least direct infrared radiation towards the user when the head-worn personal electronic apparatus is being worn, and

[B] wherein the radiation detector at least partially contained within the head-worn structure and configured to detect a portion of the infrared radiation

directed towards the user by the infrared radiation emitter that is reflected back from the user when the head-worn personal electronic apparatus is being worn.

Claim 117

[Preamble] *A head-worn personal electronic apparatus, comprising:*

[A] *a head-worn structure configured to be worn by a user;*

[B] *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;*

[C] *a motion detector contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;*

[D] *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;*

[E] *a second microphone at least partially contained within the head-worn structure;*

[F] *a stress sensing device configured to receive a user input based on a force induced on the stress sensing device, the stress sensing device being contained within the head-worn structure and configured to produce an electrical signal indicative of stress, wherein the received user input operating to at least alter an operation of the head-worn personal electronic apparatus;*

[G] *a rechargeable battery contained within the head-worn structure;*

[H] *electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;*

[I] *wireless communication circuitry contained within the head-worn structure;*

[J] *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*

[K] *a radiation detector at least partially contained within the head-worn structure and configured to capture radiation data,*

[L] *wherein the head-worn personal electronic apparatus is configured to determine whether the head-worn personal electronic apparatus is being worn by the user based on the radiation data captured by the radiation detector.*

Claim 118

[Preamble] *A head-worn personal electronic apparatus as recited in claim 117,*

[A] *wherein the second microphone is configured to at least pick-up an environmental audio input,*

[B] *wherein the wireless communication circuitry includes at least a wireless receiver configured to wirelessly receive audio output signals to be output to the user via the speaker, and*

[C] *wherein the electronic circuitry is configured to modify the audio output signals to be output to the user via the speaker to cancel at least a portion of environmental noise, the modification of the audio output signals being dependent at least in part on the environmental audio input picked-up via the second microphone.*

Claim 119

[Preamble] *A head-worn personal electronic apparatus as recited in claim 118,*

[A] *wherein the head-worn personal electronic apparatus comprises: a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when the head-worn personal electronic apparatus is being worn, and*

[B] *wherein the radiation detector at least partially contained within the head-worn structure and configured to detect a portion of the radiation directed towards the user by the radiation emitter that is reflected back from the user when the head-worn personal electronic apparatus is being worn.*

Claim 120

[Preamble] *A head-worn personal electronic apparatus as recited in claim 119,*

[A] *wherein the head-worn personal electronic apparatus is operable to at least output customized audio output,*

[B] *wherein the electronic circuitry includes at least an integrated circuit, and*

[C] *the electronic circuitry being configured to (i) store attributes associated with the user; (ii) customize the received audio output signals to produce customized audio output signals for the user based on at least a portion of the stored attributes associated with the user; and (iii) output the customized audio output signals to the speaker, and*

[D] *wherein the speaker is configured to generate at least a portion of the customized audio output for the user in accordance with at least the portion of the customized audio output signals.*

Claim 121

[Preamble] *A head-worn personal electronic apparatus as recited in claim 120,*

[A] *wherein the head-worn personal electronic apparatus comprises: at least a portion of a Hall effect detector at least partially contained within the head-worn personal electronic apparatus, the Hall effect detector being configured to capture data associated with a magnetic characteristic; and*

[B] *a plurality of circuit boards, each of the plurality of circuit boards including at least one electrical component mounted thereto, at least one of the plurality of circuit boards being a flexible printed circuit board,*

[C] *at least one of the plurality of circuit boards has at least one integrated circuit mounted on a first side of the at least one of the plurality of circuit boards, and at least one integrated circuit mounted on a second side of the at least one of the plurality of circuit boards.*

Claim 122

[Preamble] *A head-worn personal electronic apparatus as recited in claim 119,*

[A] *wherein the head-worn personal electronic apparatus is configured to support control of (i) audio output to the user via the speaker and (ii) voice calls to the user, and*

[B] *wherein the operation of the head-worn personal electronic apparatus being altered concerns at least control of the audio output being provided to the user and/or accepting or declining a voice call to the user.*

Claim 123

[Preamble] *A head-worn personal electronic apparatus as recited in claim 122,*

[A] *wherein the head-worn personal electronic apparatus is operable to at least output customized audio output,*

[B] *wherein the wireless communication circuitry includes at least a wireless receiver configured to wirelessly receive customized audio output signals for the user, the customized audio output signals having been customized based on at least predetermined hearing characteristics associated with the user such that the customized audio output signals at least compensate for hearing impairment regarding the user's ability to hear, and*

[C] *wherein the speaker is configured to generate at least a portion of the customized audio output for the user in accordance with at least the portion of the customized audio output signals.*

Claim 124

[Preamble] *A head-worn personal electronic apparatus as recited in claim 117,*

[A] *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,*

[B] *wherein at least the electronic circuitry is configured to facilitate determination at least whether the touch input associated with the user pertains to a first sliding direction or a second sliding direction with respect to the touch sensitive surface.*

Claim 125

[Preamble] *A head-worn personal electronic apparatus as recited in claim 124,*

[A] *wherein the touch sensitive surface senses the touch input by at least sensing capacitance, and*

[B] *wherein the touch input by the touch sensitive surface operates to at least control audio volume level of audio output configured to be provided to the user via the speaker.*

Certification of Word Count (37 C.F.R. § 42.24)

I hereby certify that this Petition for *Inter Partes* Review has 13,958 words (as counted by the “Word Count” feature of the Microsoft Word™ word-processing system), exclusive of “a table of contents, a table of authorities, mandatory notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing.”

Dated: July 13, 2026

By: /Bryan Blumenkopf/
Bryan Blumenkopf

Certificate of Service (37 C.F.R. § 42.6(e)(4) and 42.205(a))

I hereby certify that the attached Petition for *Inter Partes* Review and supporting materials are being filed on July 13, 2026, via the P-TACTS system and served on July 14, 2026, via UPS, on the Patent Owner at the correspondence address indicated for U.S. Patent No. 12,313,913:

IPVENTURE, INC.
4010 Moorpark Avenue
Suite 211
San Jose, CA 95117

Dated: July 13, 2026

By: */Bryan Blumenkopf/*
Bryan Blumenkopf