



(11)

EP 4 358 543 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
03.07.2024 Bulletin 2024/27

(51) International Patent Classification (IPC):
H04R 25/00 (2006.01)

(43) Date of publication A2:
24.04.2024 Bulletin 2024/17

(52) Cooperative Patent Classification (CPC):
H04R 25/554; H04R 2225/49; H04R 2225/51

(21) Application number: **24161480.9**

(22) Date of filing: **21.07.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
21172399.4 / 3 886 464
18190641.3 / 3 442 246
15177659.8 / 3 122 071

(71) Applicant: **GN Hearing A/S**
2750 Ballerup (DK)

(72) Inventors:
• **Ruaro, Andrea**
2750 Ballerup (DK)
• **Jeppesen, Brian**
2750 Ballerup (DK)

(74) Representative: **Zacco Denmark A/S**
Arne Jacobsens Allé 15
2300 Copenhagen S (DK)

(54) **AN IN-THE-EAR HEARING AID HAVING COMBINED ANTENNAS**

(57) Disclosed is an in-the-ear hearing aid, the hearing aid having a first end and a second end, the hearing aid comprising a microphone configured to receive an audio signal, a printed circuit board comprising a processing unit configured to process the audio signal for compensating a hearing loss of a user, a receiver configured to transmit the processed audio signal, a battery having a first side and a second side, where the battery is provided at the second end of the hearing aid, one or more wireless communication units for wireless communication, a first antenna for emission and/or reception of an electromagnetic field being interconnected with one of the one or more wireless communication units, where the first antenna is provided at the second end of the hearing aid, and a second antenna for emission and/or reception of an electromagnetic field being interconnected with one of the one or more wireless communication units, where the second antenna is provided at the second end of the hearing aid, wherein the second antenna is provided at the second side of the battery, wherein the printed circuit board is provided at the first side of the battery, and wherein the first antenna is fed from the printed circuit board at the first side of the battery and extends to the second side of the battery.

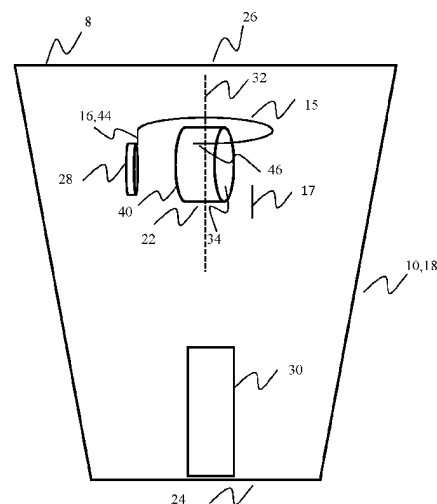


Fig. 3

Application Number

EP 24 16 1480

5

10

15

20

25

30

35

40

45

1

The present search report has been drawn up for all claims

50

Place of search

The Hague

Date of completion of the search

23 May 2024

Examiner

Lörch, Dominik

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

55



EUROPEAN SEARCH REPORT

Application Number

EP 24 16 1480

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	<p>Jason Galster: "Making sense of modern wireless hearing aid technologies", ent and audiology news, November/December 2014, vol 23 no 5, 1 November 2014 (2014-11-01), pages 1-2, XP055666090, Retrieved from the Internet: URL:https://www.entandaudiologynews.com/media/4032/entnd14-galster-new.pdf [retrieved on 2020-02-06]</p> <p>* the whole document *</p>	1-13	
A	<p>WO 2014/086392 A1 (PHONAK AG) 12 June 2014 (2014-06-12)</p> <p>* page 1 *</p> <p>* page 3, line 17 - page 5, line 28; figures 1 - 3 *</p>	1-13	
A	<p>US 2006/147069 A1 (SVAJDA MIROSLAV [US] ET AL) 6 July 2006 (2006-07-06)</p> <p>* paragraphs [0007], [0037] *</p>	13	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
Place of search		Date of completion of the search	Examiner
The Hague		23 May 2024	Lörch, Dominik
CATEGORY OF CITED DOCUMENTS		<p>T : theory or principle underlying the invention</p> <p>E : earlier patent document, but published on, or after the filing date</p> <p>D : document cited in the application</p> <p>L : document cited for other reasons</p> <p>.....</p> <p>& : member of the same patent family, corresponding document</p>	
<p>X : particularly relevant if taken alone</p> <p>Y : particularly relevant if combined with another document of the same category</p> <p>A : technological background</p> <p>O : non-written disclosure</p> <p>P : intermediate document</p>			

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 24 16 1480

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23 - 05 - 2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2200119 A2	23-06-2010	DK 2200119 T3 EP 2200119 A2 US 2010158295 A1 US 2014307904 A1 US 2016183013 A1	06-06-2016 23-06-2010 24-06-2010 16-10-2014 23-06-2016
US 2009315787 A1	24-12-2009	EP 2047714 A1 US 2009315787 A1 WO 2008012355 A1	15-04-2009 24-12-2009 31-01-2008
WO 2014086392 A1	12-06-2014	EP 2929701 A1 US 2015289067 A1 WO 2014086392 A1	14-10-2015 08-10-2015 12-06-2014
US 2006147069 A1	06-07-2006	EP 1196008 A2 US 2002039428 A1 US 2006147069 A1	10-04-2002 04-04-2002 06-07-2006