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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
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— with international search report (Art. 21(3))

[Continued on next page]

(54) Title: ACTIVE NOISE CANCELLATION DECISIONS IN A PORTABLE AUDIO DEVICE

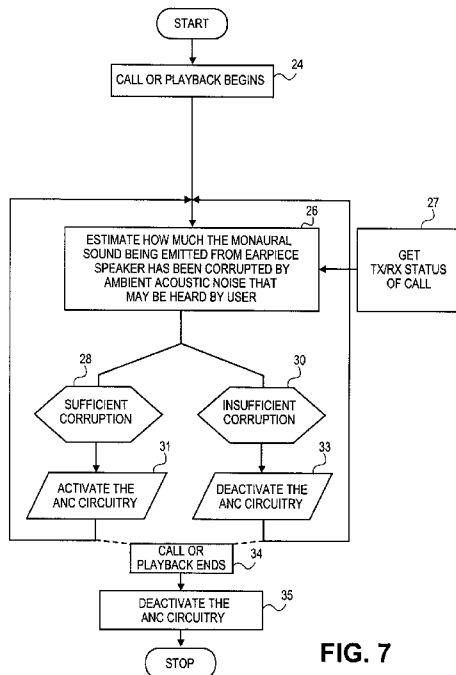


FIG. 7

(57) Abstract: Active noise cancellation (ANC) circuitry is coupled to the input of an earpiece speaker in a portable audio device, to control the ambient acoustic noise outside of the device and that may be heard by a user of the device. A microphone is to pickup sound emitted from the earpiece speaker, as well as the ambient acoustic noise. Control circuitry deactivates the ANC in response to determining that an estimate of how much sound emitted from the earpiece speaker has been corrupted by noise indicates insufficient corruption by noise. In another embodiment, the ANC decision is in response to determining that an estimate of the ambient noise level is greater than a threshold level of an audio artifact that could be induced by the ANC. Other embodiments are also described and claimed.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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26 July 2012

# INTERNATIONAL SEARCH REPORT

International application No PCT/US2011/038617
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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. G10K11/178 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) G10K H04R		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009/147969 A1 (KINOUCI TAKASHI [JP] ET AL) 11 June 2009 (2009-06-11) paragraphs [0063] - [0074]; figures 1-2 -----	1-8, 12-17
A	JP 2010 019876 A (NEC ELECTRONICS CORP) 28 January 2010 (2010-01-28) abstract paragraphs [0016] - [0029]; figure 1 -----	1-8, 12-17
A	GB 2 455 827 A (WOLFSON MICROELECTRONICS PLC [GB]) 24 June 2009 (2009-06-24) page 3, line 7 - page 6, line 16; figures 1-2 ----- -/--	1-8, 12-17
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents :		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search	Date of mailing of the international search report	
1 June 2012	13/06/2012	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Trique, Michael	

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2011/038617

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 42 00 811 A1 (SENNHEISER ELECTRONIC [DE]) 22 July 1993 (1993-07-22) column 1, lines 3-39; figure 1 column 1, line 57 - column 2, line 14; figure 2	9-11, 18-20
A	----- US 2008/162072 A1 (COPLEY DAVID C [US] ET AL) 3 July 2008 (2008-07-03) paragraphs [0001] - [0003] paragraphs [0015] - [0025], [0033], [0040]; figure 1	9-11, 18-20
Y	----- US 2009/034748 A1 (SIBBALD ALASTAIR [GB]) 5 February 2009 (2009-02-05) paragraphs [0001], [0064] - [0065]; figure 1	21
Y	----- US 2010/022283 A1 (TERLIZZI JEFFREY J [US]) 28 January 2010 (2010-01-28) paragraphs [0002], [0013], [0110] -----	21

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2011/038617

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8, 12-17

Portable audio device with deactivation of the ANC functionality in a relative silent environment  
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2. claims: 9-11, 18-20

Portable audio device with deactivation of the ANC functionality in case of instability  
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3. claim: 21

Portable audio device with deactivation of the ANC functionality when headset is not in use  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2011/038617
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Patent document cited in search report	A1	Publication date	Patent family member(s)	Publication date
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