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15/711,793 21 September 2017 (21.09.2017) US

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(54) Title: METHOD FOR USER VOICE ACTIVITY DETECTION IN A COMMUNICATION ASSEMBLY, COMMUNICATION ASSEMBLY THEREOF

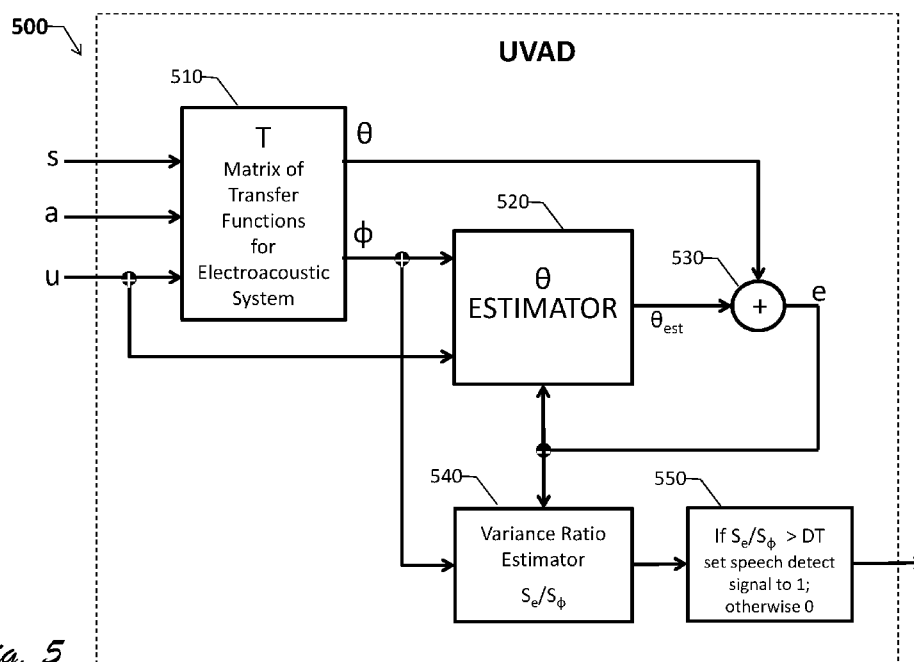


Fig. 5

(57) Abstract: Many headsets include automatic noise cancellation (ANC) which dramatically reduces perceived background noise and improves user listening experience. Unfortunately, the voice microphones in these devices often capture ambient noise that the headsets output during phone calls or other communication sessions to other users. In response, many headsets and communication devices provide manual muting circuitry, but users frequently forget to turn the muting on and/or off, creating further problems as they communicate. To address this, the present inventors devised, among other things, an exemplary headset that detects the absence or presence of user speech based on two signal derived from the microphones using a matrix of transfer functions, automatically muting and unmuting the voice microphone without user intervention. Some embodiments leverage relationships between feedback and feedforward signals in ANC circuitry to detect user speech, avoiding the addition of extra hardware to the headset. Other embodiments also leverage the speech detection function to activate and deactivate keyword detectors, and/or sidetone circuits, thus extending battery.



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Published:

- *with international search report (Art. 21(3))*
- *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))*
- *with information concerning request for restoration of the right of priority in respect of one or more priority claims (Rules 26bis.3 and 48.2(b)(vii))*

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INTERNATIONAL SEARCH REPORT

International application No PCT/US2018/018075

A. CLASSIFICATION OF SUBJECT MATTER INV. G10L25/78 H04R3/00 ADD. H04R5/033 G06F1/32 G10K11/16		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) G10L G10K H04R G06F		
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		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2011/288860 A1 (SCHEVCIW ANDRE GUSTAVO PUCCI [US] ET AL) 24 November 2011 (2011-11-24) abstract; figure 3B figures 1A,4A, paragraphs [0071], [0074], [0081], [0082], [0084], [0085], [0086], [0090], [0092], [0095] paragraph [0097] paragraphs [0141] - [0143]; figure 12 paragraphs [0067], [0070], [0147] - [0148] <p style="text-align: center;">----- -/--</p>	1-13
<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 "E" earlier application or patent but published on or after the international filing date "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) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"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 "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 "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 "&" document member of the same patent family	
Date of the actual completion of the international search	Date of mailing of the international search report	
13 June 2018	13/08/2018	
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 Krembel, Luc	

INTERNATIONAL SEARCH REPORT

International application No PCT/US2018/018075

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 2008/134642 A1 (PERSONICS HOLDINGS INC [US]; GOLDSTEIN STEVEN WAYNE [US]; USHER JOHN []) 6 November 2008 (2008-11-06) paragraphs [0030], [0031], [0033] paragraphs [0038], [0045], [0047], [0048], [0049], [0050], [0051], [0052] figures 3,4</p> <p align="center">-----</p>	1-3,11, 13
A	<p>US 2014/072148 A1 (SMITH WESLEY S [US] ET AL) 13 March 2014 (2014-03-13) figures 2,3 paragraph [0014]</p> <p align="center">-----</p>	2-4
A	<p>US 2008/057857 A1 (SMITH DALE TRENTON [US]) 6 March 2008 (2008-03-06) paragraphs [0012], [0090]</p> <p align="center">-----</p>	7,8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2018/018075

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.: 1(partially)
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:
see FURTHER INFORMATION sheet PCT/ISA/210

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.:
1-13

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: 1-13

Multi-microphone voice activity detection.

2. claims: 14-17

Power-saving method for communication assembly.

3. claims: 18-20

Communication assembly adapted for a simulation setup.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 1(partially)

Claim 1 lacks clarity in the sense of Article 6 PCT to such an extent that no meaningful search can be done based on the wording of the claim alone. The definition of signals phi and theta which phi and signals satisfying a constraint based on a ratio of transfer functions is equivalent to a result to be achieved, while not clearly defining how the signals phi and theta are to be derived from the two or more transducers. In order to perform a search, the subject-matter disclosed in page 20, line 13-page 22, line 13 has been taken into account to clarify how the signals phi and theta are derived and how these signals are assessed in order to perform voice activity detection.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2018/018075

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011288860	A1	24-11-2011	CN 102893331 A 23-01-2013
			EP 2572353 A1 27-03-2013
			JP 5714700 B2 07-05-2015
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			US 2014093094 A1 03-04-2014
			WO 2008134642 A1 06-11-2008

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			US 2014072148 A1 13-03-2014
			WO 2014039243 A1 13-03-2014

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