Title: EVENT DETECTION FOR PLAYBACK MANAGEMENT IN AN AUDIO DEVICE

Abstract: In accordance with embodiments of the present disclosure, a method for processing audio information in an audio device may include reproducing audio information by generating an audio output signal for communication to at least one transducer of the audio device, receiving at least one input signal indicative of ambient sound external to the audio device, detecting from the at least one input signal a near-field sound in the ambient sound, and modifying a characteristic of the audio information reproduced to the at least one transducer in response to detection of the near-field sound.
### 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 64(a).

### 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 fee, 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:
   - ☐ the 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.
**INTERNATIONAL SEARCH REPORT**

**International application No**
PCT/US2016/045834

**A. CLASSIFICATION OF SUBJECT MATTER**

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**ADD.**
According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

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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**

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<td>6, 10-15, 17, 19-23, 28, 37, 41-46, 48, 50-54, 59, 60, 63-68</td>
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**X** Further documents are listed in the continuation of Box C. **X** 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

"A" document member of the same patent family

**Date of the actual completion of the international search**

27 February 2017

**Date of mailing of the international search report**

13/03/2017

**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**

Borowski, Michael
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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-6, 32-37, 63-68

A method for processing audio information in an audio device comprising: reproducing audio information by generating an audio output signal for communication to at least one transducer of the audio device; receiving at least one input signal indicative of ambient sound external to the audio device; detecting from the at least one input signal a near-field sound in the ambient sound; and modifying a characteristic of the audio information reproduced to the at least one transducer in response to detection of the near-field sound, and a circuit for implementing such a method, respectively, further comprising modifying the characteristic of the audio information in response to a detection of the near-field sound being persistent for at least a predetermined time. It is further noted that independent method claim 63 corresponds to claim 5, with the difference that the audio event in not caused by a near-field sound. Claim 63 and independent correspondent apparatus claim 66 are thus considered to correspond to claims 5 and 36, respectively.

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2. claims: 7-15, 38-46

A method for processing audio information in an audio device comprising: reproducing audio information by generating an audio output signal for communication to at least one transducer of the audio device; receiving at least one input signal indicative of ambient sound external to the audio device; detecting from the at least one input signal a near-field sound in the ambient sound; and modifying a characteristic of the audio information reproduced to the at least one transducer in response to detection of the near-field sound, and a circuit for implementing such a method, respectively, further comprising:
in addition to detecting the near-field sound, detecting from the at least one input signal ambient sound other than the near-field sound in the ambient sound; and modifying the characteristic of the audio information reproduced to the at least one transducer in response to detection of the ambient sound.

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3. claims: 16-23, 47-54

A method for processing audio information in an audio device comprising: reproducing audio information by generating an audio output signal for communication to at least one transducer of the audio device; receiving at least one input signal indicative of ambient
sound external to the audio device; detecting from the at least one input signal a near-field sound in the ambient sound; and modifying a characteristic of the audio information reproduced to the at least one transducer in response to detection of the near-field sound, and a circuit for implementing such a method, respectively, wherein detecting the near-field sound in the ambient sound comprises:
detecting from the at least one input signal a direction of the ambient sound;
detecting from the at least one input signal a presence of speech in the ambient sound;
detecting from the at least one input signal near-field spatial statistics of the ambient sound; and
detecting the near-field sound based on the direction, presence or absence of speech, and the near-spatial statistics of the ambient sound.

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4. claims: 24-31, 55-62

A method for processing audio information in an audio device comprising: reproducing audio information by generating an audio output signal for communication to at least one transducer of the audio device; receiving at least one input signal indicative of ambient sound external to the audio device; detecting from the at least one input signal a near-field sound in the ambient sound; and modifying a characteristic of the audio information reproduced to the at least one transducer in response to detection of the near-field sound, and a circuit for implementing such a method, respectively, further comprising:
detecting from the at least one input signal a direction of the ambient sound;
detecting from the at least one input signal a presence of background noise in the ambient sound;
detecting from the at least one input signal a presence of proximity speech in the ambient sound;
detecting from the at least one input signal a volume of the ambient sound;
detecting from the at least one input signal near-field spatial statistics of the ambient sound;
detecting, based on the direction, presence or absence of background noise, presence or absence of the speech, the volume, and the near-spatial statistics of the ambient sound, a presence of an audio event comprising a proximity sound event; and
modifying the characteristic of the audio information reproduced to the at least one transducer in response to presence of the audio event.

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