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[Continued on next page]

(54) **Title:** MONO-SPATIAL AUDIO PROCESSING TO PROVIDE SPATIAL MESSAGING

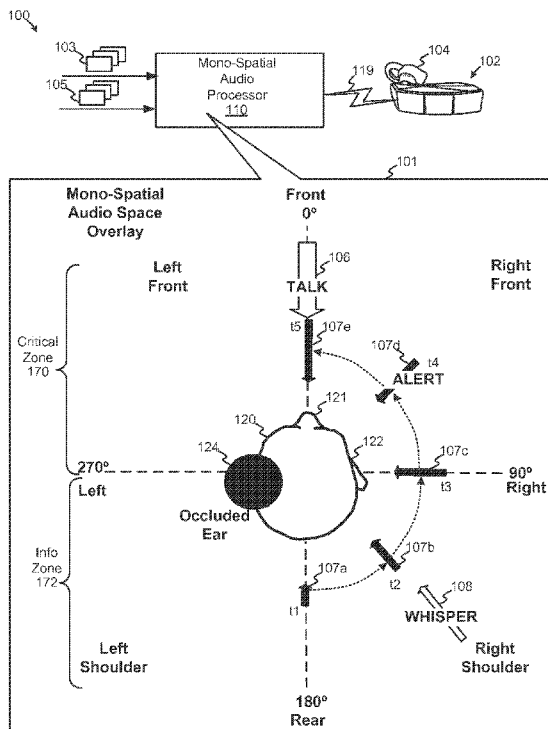


FIG. 1

(57) **Abstract:** Embodiments of the invention relate generally to electrical and electronic hardware, computer software, wired and wireless network communications, and wearable computing and audio devices for communication audio. More specifically, disclosed are an apparatus and a method for processing audio signals to include spatially modulated message audio signals as a portion of a monaural signal. In some embodiments, a method includes receiving a message for a loudspeaker. The method can determine whether an audio signal is in communication with the loudspeaker and a type of a message of the message. Message audio for the message can be spatially modulated as a function of the type of message. A mono-spatial audio signal can be formed based the audio signal and the spatially-modulated message. Thus, a monaural audio signal can be modulated to generate mono-spatial effects for presenting the messages.

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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(8) - H04S 3/00, 3/02; G10L 19/18 (2014.01) CPC - H04S 3/002, 7/30, 2420/01 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) IPC(8): H04R 3/00, 5/00, 5/04 27/00; H04M 3/42, 3/56; H04N 7/14, 7/15; G10L 19/008, 19/02, 19/18; H04S 3/00, 3/02 (2014.01) CPC: H04S 3/002, 3/004, 7/30, 7/302, 2420/01, 2400/01; H04M 3/56, 3/568; H04R 27/00; H04N 7/148, 7/15 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) MicroPatent (US Granted, US Applications, EP-A, EP-B, WO, JP, DE-G, DE-A, DE-T, DE-U, GB-A, FR-A); ProQuest (Derwent, INSPEC, NTIS, PASCAL, Current Contents Search, Dissertation Abstracts Online, Inside Conferences); IP.com; Google Scholar; KEYWORDS: spatial*, audio*, modulat*, conference*, monaural*, bunaural*, ear*1, canal*1, model*, message*, degree*, referenc*		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2010/0316232 A1 (ACERO, A et al.) December 16, 2010; figures 3-7; paragraphs [0033, 0039, 0040, 0044, 0045, 0055]	1-5, 7, 8, 10-20 --- 9
Y	US 2011/0211702 A1 (MUNDT, H et al.) September 1, 2011; abstract; figure 1; paragraphs [0016 and 0039]	9
A	US 2009/0287495 A1 (BREEBAART, D et al.) November 19, 2009; entire document	1-5, 7-20
A	US 7,542,896 B2 (SCHUIJERS, E et al.) June 2, 2009; entire document	1-5, 7-20
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