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Patent

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Katherine Kelly Vidal

DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE



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(12) **United States Patent**
Jarng

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(54) **MOBILE TERMINAL HAVING HEARING AID FUNCTION, AND EARPHONE-BASED HEARING AID SYSTEM USING THE SAME**

(56) **References Cited**

U.S. PATENT DOCUMENTS

(71) Applicant: **ALGORKOREA CO. LTD.**, Seoul (KR)

2016/0255447 A1 9/2016 Kim et al.
2017/0164124 A1 6/2017 Shennib
2019/0090073 A1 * 3/2019 Wendt A61B 5/125
2019/0349691 A1 * 11/2019 Ungstrup H04M 1/6066

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FOREIGN PATENT DOCUMENTS

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KR 10-1381021 B1 4/2014
KR 101381021 B1 * 4/2014 H04R 25/00
KR 10-2015-0117380 A 10/2015
KR 10-2017-0009062 A 1/2017

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 176 days.

OTHER PUBLICATIONS

(21) Appl. No.: **17/629,226**

English machine translation of KR 10-1381021 (Min et al., System and Method for Self-Fitting Hearing Aid Using Mobile Terminal, published Apr. 2014) (Year: 2014).
International Search Report for PCT/KR2019/009025 dated Jul. 6, 2020.

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* cited by examiner

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(57) **ABSTRACT**

(51) **Int. Cl.**
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H04R 25/00 (2006.01)

A mobile terminal according to an embodiment of the present disclosure includes a microphone configured to obtain and provide an input sound source, an earphone connection module configured to support connection and communication with an earphone, and a hearing aid application configured to set a sound source fitting condition corresponding to a user hearing threshold, convert the input sound source obtained through the microphone into a corrected sound source according to the sound source fitting condition, and then output the corrected sound source to the earphone.

(52) **U.S. Cl.**
CPC **H04M 1/6058** (2013.01); **H04R 1/1083** (2013.01); **H04R 25/70** (2013.01); **H04R 2201/107** (2013.01)

(58) **Field of Classification Search**
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See application file for complete search history.

6 Claims, 9 Drawing Sheets

