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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/139,076	04/19/2022	11310582	20608-0080US00	4158

131839 7590 03/30/2022

Metis IP LLC
PO Box 423
McLean, VA 22101

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

Chaowu LI, Shenzhen, CHINA;
Yongjian LI, Shenzhen, CHINA;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

SHENZHEN SHOKZ CO., LTD., Shenzhen, CHINA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/139,076	12/31/2020	Chaowu LI	20608-0080US00	4158

131839 7590 03/22/2022

Metis IP LLC
PO Box 423
McLean, VA 22101

EXAMINER	
OJO, OYESOLA C	

ART UNIT	PAPER NUMBER
2654	

NOTIFICATION DATE	DELIVERY MODE
03/22/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@metis-ip.com
xbzhang@metis-ip.com

Corrected ***Notice of Allowability***	**Application No.** 17/139,076	**Applicant(s)** LI et al.	
	Examiner OYESOLA C OJO	**Art Unit** 2654	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to Printer Rush dated 01/19/2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-15,18-20 and 23-24 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☑ All b) ☐ Some* c) ☐ None of the:

   1. ☑ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/OYESOLA C OJO/
Primary Examiner, Art Unit 2654

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/139,076	03/11/2022 09:10:46 PM ET	20608-0080US00

Title of Invention

LOUDSPEAKER APPARATUS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4158	FILED BY	ping cheng
PATENT CENTER #	60570054	AUTHORIZED BY	Yangzhou Du
CUSTOMER #	131839	FILING DATE	12/31/2020
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Chaowu LI

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 7965	E20223AL11031220	Yangzhou Du

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1501	UTILITY ISSUE FEE	1200.00	1	1200.00
			TOTAL AMOUNT:	$1,200.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage

submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

131839 7590 01/12/2022
Metis IP LLC
PO Box 423
McLean, VA 22101

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

Yangzhou Du	(Typed or printed name)
/Yangzhou Du/	(Signature)
March 11, 2022	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/139,076	12/31/2020	Chaowu LI	20608-0080US00	4158

TITLE OF INVENTION: LOUDSPEAKER APPARATUS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	04/12/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
OJO, OYESOLA C	2654	381-074000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 METIS IP LLC
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: SHENZHEN SHOKZ CO., LTD.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Shenzhen, CHINA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Yangzhou Du/ Date March 11, 2022

Typed or printed name Yangzhou Du Registration No. 65310

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

UNITED STATES
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/139,076	**03/11/2022 09:10:46 PM ET**	**20608-0080US00**

Title of Invention

LOUDSPEAKER APPARATUS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4158	FILED BY	ping cheng
PATENT CENTER #	60570054	FILING DATE	12/31/2020
CUSTOMER #	131839	FIRST NAMED INVENTOR	Chaowu LI
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Yangzhou Du

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2022-03-11-Issue fee transmittal-20608-0080US00.pdf	1	Issue Fee Payment (PTO-85B)	1924 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2022-03-11-Issue fee transmittal-20608-0080US00.pdf	9F76304D7E1D78227EF822D424958C4933699E7EF8125862260661B97BE5A25F55AE8F94EF037EA60391CFBFCE051D2C20C05E512F1192941ACC1B3046761E0C

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/139,076	12/31/2020	2654	1820	20608-0080US00	20	1

CONFIRMATION NO. 4158

CORRECTED FILING RECEIPT

131839
Metis IP LLC
PO Box 423
McLean, VA 22101

OC000000132016883

Date Mailed: 02/24/2022

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Chaowu LI, Shenzhen, CHINA;
Yongjian LI, Shenzhen, CHINA;

Applicant(s)

SHENZHEN SHOKZ CO., LTD., Shenzhen, CHINA;

Assignment For Published Patent Application

SHENZHEN SHOKZ CO., LTD., Shenzhen, CHINA

Power of Attorney: The patent practitioners associated with Customer Number 131839

Domestic Priority data as claimed by applicant

This application is a CON of PCT/CN2019/102393 08/24/2019

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
CHINA 201910009927.4 01/05/2019 Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 01/14/2021
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/139,076**
Projected Publication Date: Not Applicable
Non-Publication Request: No
Early Publication Request: No
Title

LOUDSPEAKER APPARATUS

Preliminary Class

381

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

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NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/139,076	12/31/2020	Chaowu LI	20608-0080US00

CONFIRMATION NO. 4158

131839
Metis IP LLC
PO Box 423
McLean, VA 22101

POA ACCEPTANCE LETTER

OC000000132016851

Date Mailed: 02/24/2022

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/22/2022.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ctuazon/

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET NO	TOT CLAIMS	IND CLAIMS
17/139,076	12/31/2020	3747	1820	20608-0080US00	20	1

CONFIRMATION NO. 4158

FILING RECEIPT

131839
Metis IP LLC
PO Box 423
McLean, VA 22101

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Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Chaowu LI, Shenzhen, CHINA;
Yongjian LI, Shenzhen, CHINA;

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~~SHENZHEN VOXTECH CO., LTD., Shenzhen, CHINA;~~ SHENZHEN SHOKZ CO., LTD., Shenzhen, CHINA

Assignment For Published Patent Application

~~SHENZHEN VOXTECH CO., LTD., Shenzhen, CHINA~~ SHENZHEN SHOKZ CO., LTD., Shenzhen, CHINA

Power of Attorney: The patent practitioners associated with Customer Number 131839

Domestic Priority data as claimed by applicant

This application is a CON of PCT/CN2019/102393 08/24/2019

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CHINA 201910009927.4 01/05/2019 Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 01/14/2021
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/139,076**
Projected Publication Date: 04/29/2021
Non-Publication Request: No
Early Publication Request: No
Title

LOUDSPEAKER APPARATUS

Preliminary Class

123

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/139,076	**02/22/2022 08:48:04 PM ET**	**20608-0080US00**

Title of Invention

LOUDSPEAKER APPARATUS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4158	FILED BY	GAO SINI
PATENT CENTER #	60540868	FILING DATE	12/31/2020
CUSTOMER #	131839	FIRST NAMED INVENTOR	Chaowu LI
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Yangzhou Du

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2022-02-22-AIA-0041-20608-0080US00.pdf	2	Request under 37CFR1.46(c) to correct, update, change applicant	562 KB
2022-02-22-AIA-0096-20608-0080US00.pdf	3	Assignee showing of ownership per 37 CFR 3.73	458 KB
2022-02-22-Corrected ADS-20608-0080US00.pdf	8	Application Data Sheet	489 KB
Warning: This is not a USPTO supplied ADS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.			
2022-02-22-Corrected Filing	4	Request for Corrected Filing	4486 KB

Receipt-20608-0080US00.pdf		Receipt	
2022-02-22-POA-20608-0080US00.pdf	2	Power of Attorney	2186 KB
2022-02-22-Transmittal-20608-0080US00.pdf	2	Transmittal Letter	473 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2022-02-22-AIA-0041-20608-0080US00.pdf	31E32AE2DB23E30EE39E948B37C3311703FA0EE03E71A9F309B066D1D9B4094D763381069636D43D4B2F3A97C614744F5781E322938A0A3E157105740CA9C501
2022-02-22-AIA-0096-20608-0080US00.pdf	F0683BDE38576366E08F9E234A865FE2FF7B441E2AE056F20E9C2AA6DA82C932EDBF216257B46B411CBB4BBBD89B169AD0FA72848FAFD9101644637DD0E6156D
2022-02-22-Corrected ADS-20608-0080US00.pdf	A22AF9237D1D942A4DF0421BFA2E6DB1E423FF3E9EE2663AD0CD1C2E355C8AD20B91409C657785BBEA4E175BA4D59587AAD3C48C87ED5231BACE8579D9D9DC88
2022-02-22-Corrected Filing Receipt-20608-0080US00.pdf	E08B17894010E52758BE89FFF9B7210E35942D36BFE0E9AA4F16EB3433F084C0E50A638381860910A13AF5E651380261C5CA38C1CE553D183054081D832654AD
2022-02-22-POA-20608-0080US00.pdf	94B24CC4515422984214 9E75BDBDF4519544C0B1BDF90ACB61A578F12968925B74201229F6DDB0C69B080963438924479025AD096663F51FA3D52A34EEE7F120
2022-02-22-Transmittal-20608-0080US00.pdf	DEE1713AF4D894A34C83614F8CCE4ECC72A56E0C7D48628B455C7F644855DDEFCE592C106D6E4AE13C3D9E060ACFC7B33137E16CFFB99B139C92D9C4F08220CC

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as

described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
LI, Chaowu et al.

Application No.: 17/139,076

Filed: December 31, 2020

For: LOUDSPEAKER APPARATUS

Group Art Unit: 2654

Examiner: OYESOLA C OJO

Confirmation No.: 4158

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

REQUEST TO CHANGE APPLICANT NAME UNDER 37 C.F.R. § 1.46

Applicant respectfully requests that the name of Applicant of the present application be changed from SHENZHEN VOXTECH CO., LTD. ("VOXTECH") to SHENZHEN SHOKZ CO., LTD. ("SHOKZ") under 37 C.F.R. § 1.46(c)(2). Specifically, VOXTECH has changed its name to SHOKZ, and the Notice of Applicant Name Change document has been recorded with United States Patent and Trademark Office (Recordation Date: January 20, 2022; Reel/Frame: 058785/0552).

Applicant concurrently submits herewith a marked-up Application Data Sheet and a corrected Filing Receipt to specify the Applicant in the applicant information section. Applicant respectfully requests the provision of a new Filing Receipt that reflects the new Applicant name as SHOKZ.

If there is any question or problem, the Examiner is cordially invited to contact Applicant's representative at the number provided below in order to resolve any issues promptly.

Respectfully submitted,

METIS IP LLC

Date: February 22, 2022

By: /Yangzhou Du/
Yangzhou Du
Reg. No. 65,310
Tel: (202) 580-8894, Ext.105

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	17/139,076
Title of Invention	LOUDSPEAKER APPARATUS	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fail under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Chaowu		LI	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Shenzhen	Country of Residence	CN

Mailing Address of Inventor:

Address 1	Floors 1-4, Factory Building 26, Shancheng		
Address 2	Industrial Park, Shiyan Street, Bao'an District		
City	Shenzhen, Guangdong	**State/Province**	
Postal Code	518108	**Country**	CN

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Yongjian		LI	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Shenzhen	Country of Residence	CN

Mailing Address of Inventor:

Address 1	Floors 1-4, Factory Building 26, Shancheng		
Address 2	Industrial Park, Shiyan Street, Bao'an District		
City	Shenzhen, Guangdong	**State/Province**	
Postal Code	518108	**Country**	CN

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	17/139,076
Title of Invention	LOUDSPEAKER APPARATUS	

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	131839		
Email Address	docketing@metis-ip.com	Add Email	Remove Email

Application Information:

Title of the Invention	LOUDSPEAKER APPARATUS		
Attorney Docket Number	20608-0080US00	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	14	**Suggested Figure for Publication (if any)**	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	131839		

PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	17/139,076
Title of Invention	LOUDSPEAKER APPARATUS	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	PCT/CN2019/102393	2019-08-24

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
201910009927.4	CN	2019-01-05	95DA

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

PTO/AIA/14 (11-15)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	17/139,076
Title of Invention	LOUDSPEAKER APPARATUS	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	17/139,076
Title of Invention	LOUDSPEAKER APPARATUS	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:	
If the Applicant is an Organization check here. ☒	
Organization Name	~~SHENZHEN VOXTECH CO., LTD.~~ SHENZHEN SHOKZ CO., LTD.

Mailing Address Information For Applicant:

Address 1	Floors 1-4, Factory Building 26, Shancheng		
Address 2	Industrial Park, Shiyan Street, Bao'an District		
City	Shenzhen, Guangdong	**State/Province**	
Country	CN	Postal Code	518108
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	17/139,076
Title of Invention	LOUDSPEAKER APPARATUS	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	~~SHENZHEN VOXTECH CO., LTD.~~ SHENZHEN SHOKZ CO., LTD.

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	Floors 1-4, Factory Building 26, Shancheng		
Address 2	Industrial Park, Shiyan Street, Bao'an District		
City	Shenzhen, Guangdong	**State/Province**	
Country	CN	Postal Code	518108
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Yangzhou Du/			Date (YYYY-MM-DD)	2020-12-31
First Name	Yangzhou	Last Name	Du	Registration Number	65310

Additional Signature may be generated within this form by selecting the Add button.

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	17/139,076
Title of Invention	LOUDSPEAKER APPARATUS	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/AIA/96 (08-12)
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: SHENZHEN SHOKZ CO., LTD.

Application No./Patent No.: 17/139,076 Filed/Issue Date: December 31, 2020

Titled: LOUDSPEAKER APPARATUS

SHENZHEN SHOKZ CO., LTD., a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: LI, Chaowu et al. To: SHENZHEN VOXTECH CO., LTD.

   The document was recorded in the United States Patent and Trademark Office at Reel 055964, Frame 0351, or for which a copy thereof is attached.

2. From: SHENZHEN VOXTECH CO., LTD. To: SHENZHEN SHOKZ CO., LTD.

   The document was recorded in the United States Patent and Trademark Office at Reel 058785, Frame 0552, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/96 (08-12)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Yangzhou Du/	February 22, 2022
Signature	Date
Yangzhou Du	65310
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	17/139,076
Filing Date	December 31, 2020
First Named Inventor	LI, Chaowu
Title	LOUDSPEAKER APPARATUS
Art Unit	2654
Examiner Name	OYESOLA C OJO
Attorney Docket Number	20608-0080US00

SIGNATURE of Applicant or Patent Practitioner

Signature	/Yangzhou Du/	Date (Optional)	
Name	Yangzhou Du	Regisiration Number	65310
Title (if Applicant is a juristic entity)	Patent Attorney		
Applicant Name (if Applicant is a juristic entity)	SHENZHEN SHOKZ CO., LTD.		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 11/30/2014. OMB 0651-0051
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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 131839

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

SHENZHEN SHOKZ CO., LTD.

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Chen Hao	Date (Optional)	
Name	CHEN, Hao		
Title	General Manager		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: R46C.REQ
Document Description: Request under 37 CFR 1.46(c) to correct, update or change the applicant.

PTO/AIA/41 (04-15)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

REQUEST TO CORRECT OR UPDATE THE NAME OF THE APPLICANT UNDER 37 CFR 1.46(c)(1), OR CHANGE THE APPLICANT UNDER 37 CFR 1.46(c)(2)
(FOR USE ONLY IN APPLICATIONS FILED ON OR AFTER SEPTEMBER 16, 2012)

Application Number	17/139,076
Filing Date	December 31, 2020
First Named Inventor	LI, Chaowu
Art Unit	2654
Examiner Name	OYESOLA C OJO
Practitioner Docket Number	20608-0080US00

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Applicant hereby **requests that the name of the applicant be corrected or updated under 37 CFR 1.46(c)(1), or that the applicant be changed under 37 CFR 1.46(c)(2),** in the above-identified application. **Requests under 37 CFR 1.46(c)(1) or (c)(2) cannot be submitted after payment of the issue fee or if the application has been patented.**

Please check the applicable box(es) below.

☐ 1. This request is to **correct or update the name of the applicant (under 37 CFR 1.46(c)(1))** and includes:

☐ An application data sheet (ADS) in accordance with 37 CFR 1.76(c) with the corrected or updated information shown with markings (*e.g.*, underlining for insertions, strikethrough for deletions). A Corrected Web-based ADS may be used.

Note: Requests under 37 CFR 1.46(c)(1) may be filed to correct typographical errors in the name of the § 1.46 applicant, or for updating the name of the § 1.46 applicant (*i.e.*, where there is no change in the applicant itself but just in the applicant's name). See the Manual of Patent Examining Procedure (MPEP) section 605.01.

■ 2. This request is to **change the applicant (under 37 CFR 1.46(c)(2))** and includes:

■ An application data sheet (ADS) in accordance with 37 CFR 1.76(c) that identifies the changes with proper markings (underlining for insertions and strikethrough for deletions). A Corrected Web-based ADS may be used.

■ A Statement Under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent). See MPEP 325.

I am the

☐ applicant* ■ attorney or agent of record Registration number 65319 ☐ attorney or agent acting under 37 CFR 1.34 Registration number _____

Signature /Yangzhou Du/

Typed or printed name Yangzhou Du

Date February 22, 2022

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. *Juristic entities must be represented by a patent practitioner (See 37 CFR 1.31, applicable to any paper filed on or after September 16, 2012 that is presented on behalf of a juristic entity, regardless of application filing date). Submit multiple forms if more than one signature is required, see below**.

☒ ** Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/139,076	12/31/2020	Chaowu LI	20608-0080US00	4158

131839 7590 01/26/2022

Metis IP LLC
PO Box 423
McLean, VA 22101

EXAMINER	
OJO, OYESOLA C	

ART UNIT	PAPER NUMBER
2654	

NOTIFICATION DATE	DELIVERY MODE
01/26/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@metis-ip.com
xbzhang@metis-ip.com

Corrected ***Notice of Allowability***	**Application No.** 17/139,076	**Applicant(s)** LI et al.	
	Examiner OYESOLA C OJO	**Art Unit** 2654	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to an Applicant-Initiated Interview held on 1/18/2022..
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-15,18-20 and 23-24 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☑ All b) ☐ Some* c) ☐ None of the:

   1. ☑ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☑ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/OYESOLA C OJO/
Primary Examiner, Art Unit 2654

Applicant-Initiated Interview Summary	**Application No.** 17/139,076	**Applicant(s)** Ll et al.		
	Examiner OYESOLA C OJO	**Art Unit** 2654	**AIA (First Inventor to File) Status** Yes	**Page** **1 of 1**

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
OYESOLA C OJO	Primary Examiner	Telephonic
YANGZHOU DU	Attorney of Record	

Date of Interview: 18 January 2022

Issues Discussed:

Other

The applicant's representative called the attention of the examiner to a minor typo error on the allowed claims on the PTOL-37 form mailed on 01/12/2022. In the said form, originally canceled claim 22 was listed amongst the allowed claims. Also the indicated date for the amendment on box 1 of the form is incorrect, it is supposed to be 12/27/2021 instead of 12/31/21 on the form. A new PTOL-37 Corrected Notice of Allowance form is attached herewith.

/OYESOLA C OJO/ Primary Examiner, Art Unit 2654	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

131839 7590 01/12/2022

Metis IP LLC
PO Box 423
McLean, VA 22101

EXAMINER
OJO, OYESOLA C

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 01/12/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/139,076	12/31/2020	Chaowu LI	20608-0080US00	4158

TITLE OF INVENTION: LOUDSPEAKER APPARATUS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	04/12/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

131839 7590 01/12/2022

Metis IP LLC
PO Box 423
McLean, VA 22101

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/139,076	12/31/2020	Chaowu LI	20608-0080US00	4158

TITLE OF INVENTION: LOUDSPEAKER APPARATUS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	04/12/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
OJO, OYESOLA C	2654	381-074000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/139,076	12/31/2020	Chaowu LI	20608-0080US00	4158

131839 7590 01/12/2022

Metis IP LLC
PO Box 423
McLean, VA 22101

EXAMINER	
OJO, OYESOLA C	
ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 01/12/2022

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 17/139,076	Applicant(s) LI et al.	
	Examiner OYESOLA C OJO	Art Unit 2654	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to amendments filed on 12/31/2021.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-15,18-20 and 22-24 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☑ All b) ☐ Some* c) ☐ None of the:

   1. ☑ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☑ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☑ Other Foreign Patent Documents.

/OYESOLA C OJO/
Primary Examiner, Art Unit 2654

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Status of Claims

Claims 16-17 and 21-22 are cancelled.

Claims 1-15, 18-20 and 23-24 are allowed.

Terminal Disclaimer

2. The terminal disclaimer filed on 12/31/2021 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of any **patent** granted on **US Application No. 17305245** has been reviewed and is **accepted**. The terminal disclaimer has been recorded.

Allowable Subject Matter

3. Claim 1-15, 18-20 and 23-24 are allowed.

4. The following is an examiner's statement of reasons for allowance:

Claim 1 (amended) is allowable over the prior arts of record because none of the prior arts taken singly or in combination with the others explicitly discloses all the limitations of claim 1 as currently amended. For instance, the closest prior art of record, **Li et al (CN 107484054)** discloses a loudspeaker apparatus, comprising: an ear hook including a first plug end and a second plug end, the ear hook being surrounded by a protective sleeve, a core housing for accommodating an earphone core, the core housing being fixed to the first plug end, including a housing panel facing human body and a housing back panel opposite to the housing panel, and the vibration of the earphone core drives the housing panel and the housing back panel to

vibrate, and a circuit housing for accommodating a control circuit or a battery, the control circuit or the battery driving the earphone core to vibrate to generate a sound.

However, the examiner found neither of the prior art cited in its entirety, nor based on the prior art, found any motivation to combine any of the said prior arts which teaches the following limitations in combination with the other limitations of **claim 1**: ***the protective sleeve being made of an elastic waterproof material: the core housing being fixed to the first plug end and elastically abutted against the protective sleeve***; *and* ***the core housing including a housing panel facing human body and a housing back panel opposite to the housing panel, and the vibration of the earphone core drives the housing panel and the housing back panel to vibrate, the vibration of the housing panel having a first phase, the vibration of the housing back panel having a second phase, wherein when the vibration frequencies of the housing panel and the housing back panel is within a range of 2000 Hz to 3000 Hz, an absolute value of a difference between the first phase and the second phase is less than 60 degrees; the circuit housing being fixed to the second plug end.***

Claims 2-15, 18-20 and 23-24 are allowed based on their respective dependency from **claim 1.**

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to OYESOLA C OJO whose telephone number is (571)272-0848. The examiner can normally be reached Monday through Friday 8:00am to 4:00pm Central Time.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/OYESOLA C OJO/
Primary Examiner, Art Unit 2654.

Notice of References Cited	Application/Control No. 17/139,076	Applicant(s)/Patent Under Reexamination LI et al.	
	Examiner OYESOLA C OJO	Art Unit 2654	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20090154755-A1	06-2009	Yamagishi; Makoto	H04R1/345	381/382
*	B	US-5761298-A	06-1998	Davis; Michael G.	H04M1/05	379/430
*	C	US-20170257692-A1	09-2017	Yang; Shaocong	H04R1/1016	1/1
*	D	US-8654987-B2	02-2014	Palma; Dennis	H04R1/1041	381/74
*	E	US-20110110553-A1	05-2011	Logan; Ty	H04R1/1058	381/380
*	F	US-20020102005-A1	08-2002	Lin, Jiu-Lin	H04R1/1066	381/381
*	G	US-7539525-B2	05-2009	Kim; Young S.	H04M1/05	379/433.13
*	H	US-20090262964-A1	10-2009	Havenith; Michel Martin Marie	H04R25/505	381/314
*	I	US-9049515-B2	06-2015	Clow; Keith Allen	H04R1/1091	1/1
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N	JP-02056121-A	02-1990	JP	MURASE, MASAJI	H04B1/38
	O	CN-210536887-U	05-2020	CN	ZHOU ET AL	H0R1/10
	P	CN-107484054	12-2017	CN	LI ET AL	H04R1/1083
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/139,076	LI et al.
	Examiner	Art Unit
	OYESOLA C OJO	2654

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04R1/105, H04R1/023, H04R1/026, H04R1/1008, H04R1/1041	11/22/2021	OCO
H04R1/1058, H04R1/1091, H04R1/44, H04R9/025, H04R31/00,	11/22/2021	OCO
H04R1/1016, H04R1/1025, H04R2201/10, H04R2460/13, H04R1/1066	11/22/2021	OCO
H04R1/347, H04R5/0335, H04R5/033, H04R1/06, H04R11/02	11/22/2021	OCO
H04R2225/63	11/22/2021	OCO

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
Performed Inventors and Assignee searches	11/22/2021	OCO
Considered IDS submitted by the Applicant	11/22/2021	OCO
searches in EAST limited by keywords, text strings and CPC symbols	11/22/2021	OCO
Performed searches in Global Dossier, WIPO, EPO as applicable.	11/30/2021	OCO
Performed updated and Interference searches in EAST	01/04/2022	OCO

/OYESOLA C OJO/ Primary Examiner, Art Unit 2654	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/139,076	LI et al.
	Examiner	Art Unit
	OYESOLA C OJO	2654

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	SAME AS ABOVE	01/04/2022	OCO

/OYESOLA C OJO/ Primary Examiner, Art Unit 2654	

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/139,076	LI et al.
	Examiner	**Art Unit**
	OYESOLA C OJO	2654

CPC						
Symbol					**Type**	**Version**
H04R	/	1	/	105	F	2013-01-01
H04R	/	1	/	026	I	2013-01-01
H04R	/	1	/	023	I	2013-01-01
H04R	/	31	/	00	I	2013-01-01
H04R	/	1	/	1008	I	2013-01-01
H04R	/	1	/	1041	I	2013-01-01
H04R	/	1	/	1058	I	2013-01-01
H04R	/	1	/	1091	I	2013-01-01
H04R	/	9	/	025	I	2013-01-01
H04R	/	1	/	44	I	2013-01-01
H04R	/	1	/	1016	A	2013-01-01
H04R	/	1	/	1025	A	2013-01-01
H04R	/	2201	/	10	A	2013-01-01
H04R	/	2460	/	13	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
/OYESOLA C OJO/ Primary Examiner, Art Unit 2654	04 January 2022	O.G. Print Claim(s)	O.G. Print Figure
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INTERNATIONAL CLASSIFICATION				
CLAIMED				
H04R1/10	/	1	/	10
H04R1/02	/	1	/	02
H04R31/00	/	31	/	00
H04R9/02	/	9	/	02
H04R1/44	/	1	/	44

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
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(Primary Examiner)	(Date)	1	1

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	OYESOLA C OJO	2654

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	10	19	23										
2	2	11	11	20	24										
3	3	12	12												
4	4	13	13												
5	5	14	14												
6	6	15	15												
7	7	16	18												
8	8	17	19												
9	9	18	20												

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審査請求　未請求　請求項の数 4　(全8頁)

⑤4発明の名称　耳掛式送受信装置

⑳特　願　昭63-174375
㉒出　願　昭63(1988)7月13日
優先権主張　㉜昭62(1987)10月14日㉝日本(JP)㉛特願　昭62-259036

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明　細　書

1．発明の名称

耳掛式送受信装置

2．特許請求の範囲

1．耳に当てがわれるスピーカと、頭部に当てがわれる骨伝導マイクロホンとを耳掛部材に取付け、この耳掛部材は耳と頭部の間の凹部に掛けられ、かつ耳と頭部との間に緊迫力をもって装着され、さらに前記スピーカ及び骨伝導マイクロホンはそれぞれリード線を介して送受信機に接続されることを特徴とする耳掛式送受信装置。

2．前記耳掛部材はスピーカが取付けられるスピーカ支持部と、骨伝導マイクロホンが取付けられるマイクロホン支持部と、耳の裏側に当てがわれる耳掛部とを有し、このマイクロホン支持部と耳掛部とを二又に分岐して外方に広がる方向へ付勢力を与え、耳掛部を耳の裏側へ圧接して装着されることを特徴とする請求項1記載の耳掛式送受信装置。

3．前記耳掛部材はスピーカが取付けられるスピーカ支持部と、骨伝導マイクロホンが取付けられるマイクロホン支持部と、頭部に当接する頭部支持部とを有し、この頭部支持部と耳の裏側に当てがわれる耳掛部とを二又に分岐し、互いに外方に広がる方向へ付勢力を与え、耳掛部を耳の裏側へ圧接して装着されることを特徴とする請求項1記載の耳掛式送受信装置。

4．前記骨伝導マイクロホンは弾性体を介して前記耳掛部材のマイクロホン支持部に取付けられることを特徴とする請求項2項又は3項の記載の耳掛式送受信装置。

3．発明の詳細な説明

[産業上の利用分野]

この発明は耳掛式送受信装置に係り、詳しくは小型、軽量で、しかも確実に装着される耳掛式送受信装置に関する。

[従来の技術]

従来から、水上スキーでのスキーヤーとボートの運転者等との会話や、スキー場でのパトロールスキーヤーと管理事務所等との会話、その他ラジ

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オやテレビ中継での呼出し等に、送受信装置が使用されている。

この種の送受信装置としてヘッドホーンタイプが用いられているが、このものは例えば頭にバンドを掛けてスピーカ部を両耳に当てがい、マイクロホンはバンドから伸るレバーに取付けられ、顔の前面に導き口部の前方に位置させるようになっている。

［発明が解決しようとする課題］

ところで、このようなヘッドホーンタイプの送受信装置は、バンドが頭の両側から耳を圧接する力で保持されたため、大型でサイズや重量があり、特に前記のように水上スキーヤーやパトロールスキーヤーが使用する場合等には邪魔になる。また、水上スキーで落水したときや、雪上スキーで転倒した場合等に簡単に脱落してしまう等の問題がある。

この発明はかかる点に鑑みなされたもので、小型、軽量で、しかも確実に装着される耳掛式送受信装置を提供することを目的としている。

［課題を解決するための手段］

前記課題を解決するために、この発明の耳掛式送受信装置は、耳に当てがわれるスピーカと、頭部に当てがわれる骨伝導マイクロホンとを耳掛部材に取付け、この耳掛部材は耳と頭部の間の凹部に掛けられ、かつ耳と頭部との間に緊迫力をもって装着され、さらに前記スピーカ及び骨伝導マイクロホンはそれぞれリード線を介して送受信機に接続されることを特徴としている。

また、この発明の耳掛式送受信装置において、耳掛部材はスピーカが取付けられるスピーカ支持部と、骨伝導マイクロホンが取付けられるマイクロホン支持部と、耳の裏側に当てがわれる耳掛部とを有し、このマイクロホン支持部と耳掛部とを二又に分岐して外方に広がる方向へ付勢力を与え、耳掛部を耳の裏側へ圧接して装着することができる。

さらに、この発明の耳掛式送受信装置において、耳掛部材はスピーカが取付けられるスピーカ支持部と、骨伝導マイクロホンが取付けられるマイクロホン支持部と、頭部に当接する頭部支持部とを有し、この頭部支持部と耳の裏側に当てがわれる耳掛部とを二又に分岐し、互いに外方に広がる方向へ付勢力を与え、耳掛部を耳の裏側へ圧接して装着することができる。

また、この発明の耳掛式送受信装置において、骨伝導マイクロホンは弾性体を介して前記耳掛部材のマイクロホン支持部に取付けることができる。

［作用］

この発明の耳掛式送受信装置において、スピーカと骨伝導マイクロホンとが耳掛部材で一体に支持され、しかも耳掛部材がこの耳掛部材は耳と頭部の間の凹部に掛けられ、かつ耳と頭部との間に緊迫力をもって装着されるため、スピーカと骨伝導マイクロホンとが一体で、確実に耳に保持され、しかも小型で軽量になる。

また、この発明の耳掛式送受信装置において、耳掛部材はスピーカ支持部と、マイクロホン支持部と、耳掛部とを有しており、耳部に装着するとマイクロホン支持部と二又に分岐した耳掛部が外方に広がる付勢力で、耳の裏側へ圧接されるため確実に装着することができる。

さらに、この発明の耳掛式送受信装置において、耳掛部材はスピーカ支持部と、マイクロホン支持部と、頭部支持部とを有しており、耳部へ装着すると、頭部支持部と耳掛部とが互いに外方に広がる方向の付勢力で、耳掛部が耳の裏側へ圧接するため、確実に装着することができる。

また、この発明の耳掛式送受信装置において、骨伝導マイクロホンは弾性体を介して耳掛部材のマイクロホン支持部に取付けると、取付位置にかかわらず確実に骨伝導マイクロホンを圧接することができる。

［実施例］

以下、この発明を図示の実施例に基づいて詳細に説明する。

第１図はこの発明を水上スキー、ウィンドサーヒン、水上スキー等水上において使用される耳掛式送受信装置の全体取付状態を示す図、第２図は

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耳掛式送受信装置の要部の斜視図、第３図及び第４図は耳掛式送受信装置の要部の取付状態を示す図である。

図中符号１は耳掛部材で、水上スキーヤーの耳２と頭部の間の凹部に掛けられ、かつ耳と頭部との間に緊迫力をもって装着される。この耳掛部材１には耳に当てがわれるスピーカ３と、頭部に当てがわれる骨伝導マイクロホン４が取付けられている。このスピーカ３及び骨伝導マイクロホン４はそれぞれリード線５，６を介して送受信装置７に接続され、このリード線５，６はアンテナも兼ねており、特別にアンテナを設けないで送受信できるようにしている。送受信装置７はファスナー８でライフジャケット９に取付けられ、送受信装置７が確実に取付けると共に、容易に脱着できるようにしている。なお、図面中想像で示す通り、送受信装置７はホルダーケース５０に収容された状態で、ホルダーケース５０と一体化されたベルト５１によって腕部に取付けられるようにしてもよい。この例では、送受信装置７はアンテナ７ａを持つ。

そして、スピーカ３、骨伝導マイクロホン４及び送受信装置７はそれぞれ公知のものを防水したものが用いられ、骨伝導マイクロホン４はこの実施例では耳の下で顎の後側に当てがわれており、音声信号をピックアップして送信する。

前記耳掛部材１は第２図に示すように、スピーカ３が取付けられるスピーカ支持部１０と、骨伝導マイクロホン４が取付けられるマイクロホン支持部１１と、耳の裏側に当てがわれる耳掛部１２とを有している。このマイクロホン支持部１１と耳掛部１２とは適度な合成と弾力性とを有する芯材に合成樹脂を被覆したもので形成されている。また、両者は連結部材１３でスピーカ支持部１０と連結されており、ここから二又に分岐されている。また、このマイクロホン支持部１１と耳掛部１２とは、それぞれ広がる方向へ付勢力が与えられている。

さらに、スピーカ３及び骨伝導マイクロホン４に接続されるリード線５，６は、それぞれスピーカ支持部１０とマイクロホン支持部１１とに内蔵され、リード線５，６が邪魔にならないようになっている。

耳掛部材１は第３図及び第４図に示すように耳２に取付けられる。即ち、耳掛部材１を耳に装着すると、スピーカ支持部１０に取付けられたスピーカ３が耳に当てがわれる。一方、マイクロホン支持部１１と耳掛部１２は耳２の裏側の部分に圧縮した状態で装着され、この開く方向の付勢力によって、マイクロホン支持部１１が骨伝導マイクロホン４を耳の下で顎の後側に圧接させ、耳掛部１２が耳２の裏側へ圧接し、適切な力で耳２を挟むようにして確実に装着される。この装着状態で骨伝導マイクロホン４は顔の耳２の後の付け根から下方の首方向にかけた耳の下で顎の後側に適切な力で圧接され、顔の前面方向へ突出しない位置にあり、落水しても邪魔にならないようになっている。

第５図は耳掛部材の他の実施例を示している。この耳掛部材１のマイクロホン支持部１１に押え部１４が形成され、この押え部１４にはスポンジ等の弾性体１５を介して骨伝導マイクロホン４が取付けられている。

耳掛部材１で骨伝導マイクロホン４が耳の下で顎の後側に圧接して取付けられるが、この耳の下で顎の後側の取付面の形状が人によってそれぞれ微妙に異なるが、この弾性体１４で調整して骨伝導マイクロホン４を適切にフィットさせることができる。

第６図乃至第８図はさらに他の実施例を示し、第６図は耳掛式送受信装置の正面図、第７図は第６図のⅦ－Ⅶ断面図、第８図は耳掛式送受信装置を取付け状態を示す図である。

耳掛部材２０は第６図に示すように、耳２の外周に沿って合成樹脂で一体に形成され、スピーカ２１がカバー２１ａを介して取付けられるスピーカ支持部２２と、骨伝導マイクロホン２３が取付けられるマイクロホン支持部２４と、耳２の裏側に当てがわれる耳掛部２５とを有している。骨伝導マイクロホン２３は第７図に示すように、軸部

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２３ａをマイクロホン支持部２４に遊合され、さらにこのマイクロホン支持部２４と骨伝導マイクロホン２３との間にスプリング２６が設けられている。

従って、骨伝導マイクロホン２３はマイクロホン支持部２４に対してスプリング２６に抗して矢印イ方向と、矢印ロ方向の任意な方向へ移動し、揺動可能になっている。このため、骨伝導マイクロホン２３の圧接位置の形状が人によってそれぞれ微妙に異なっていても、調整して骨伝導マイクロホン４を適切にフィットさせることができると共に、耳と頭部との間に緊迫力をもって装着することができる。

第９図乃至第１１図はさらに他の実施例を示し、第９図は耳掛式送受信装置の正面図、第１０図は第９図のＡ矢視図、第１１図はスピーカの使用状態を示す図である。

スピーカ２１はカバー２１ａを介してスピーカ支持部２２に支持されているため、第１０図に示すように、使用時に耳２の外耳管２ａに覆うように取付けた状態で、カバー２１ａが風の影響を受けないようにしている。

さらに、このスピーカ２１は第１１図に示すようにスポンジ等の吸音材２７を介して支持されているから、この吸音材２７により出力音声の支持部材側への伝導を防止し、耳に対する音声出力効率を向上させることができる。

第１２図は第９図に示す耳掛部材の取付前の状態を示し、第１３図は耳掛部材の取付後の状態を示している。

耳掛部材２０の取付前は第１２図に示すように、骨伝導マイクロホン２３が取付けられるマイクロホン支持部２４と、耳２の裏側に当てがわれる耳掛部２５との間に所定の角度Ｘを有している。

この耳掛部材２０を第１３図に示すように取付けると、骨伝導マイクロホン２３が首部３０に押圧されてマイクロホン支持部２４がたわみ、耳掛部２５と、マイクロホン支持部２４との角度Ｙが小さくなる。これにより、耳掛部２５に外方の耳２側へ、マイクロホン支持部２４には内方の頭部３１及び首部３０側へ弾性反力で受け、それぞれ矢印で示した大きさの付勢力が生じ、この付勢力で耳掛部材２０を確実に保持する。

第１４図乃至第１７図はさらに他の実施例を示し、第１４図は耳掛式送受信装置の正面図、第１５図は取付状態を示す図、第１６図は第１５図のＡ矢視図、第１７図は第１５図のＢ矢視図である。

耳掛部材２０のスピーカ支持部２２側に、骨伝導マイクロホン２３が取付けられるマイクロホン支持部２９を設けたものであり、このマイクロホン支持部２９は第１４図に示すように、支点を中心に回動して骨伝導マイクロホン２３の位置を変更できるようになっている。

このマイクロホン支持部２９と反対側には、頭部３１に当接する頭部支持部２８が形成されており、この頭部支持部２８と耳２の裏側に当てがわれる耳掛部２５とを二又に分岐し、マイクロホン支持部２９及び頭部支持部２８と、耳掛部２５とに互いに外方に広がる方向へ付勢力を与え、耳掛部２５を耳の裏側へ圧接して装着するようになっている。

前記の各実施例はステレオタイプとすることができ、この一例例を第１８図に示す。この実施例では一方の耳には第６図に示すものを用い、反対側の耳にスピーカ２１を当てがうようにしている。

［発明の効果］

この発明は前記のように、スピーカと骨伝導マイクロホンとが耳掛部材で一体に支持され、しかも耳掛部材がこの耳掛部材は耳と頭部の間の凹部に掛けられ、かつ耳と頭部との間に緊迫力をもって装着されるため、スピーカと骨伝導マイクロホンとが一体で、確実に耳に保持され、しかも小型で軽量になる。

また、この発明の耳掛式送受信装置において、耳掛部材はスピーカ支持部と、マイクロホン支持部と、耳掛部とを有しており、耳部に装着するとマイクロホン支持部と二又に分岐した耳掛部が外

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方に広がる付勢力を有するから、耳の裏側へ圧接され確実に装着することができる。

さらに、この発明の耳掛式送受信装置において、耳掛部材はスピーカ支持部と、マイクロホン支持部と、頭部支持部とを有しており、耳部へ装着すると、頭部支持部と耳掛部とが互いに外方に広がる方向の付勢力を有するから、耳掛部が耳の裏側へ圧接し、確実に装着することができる。

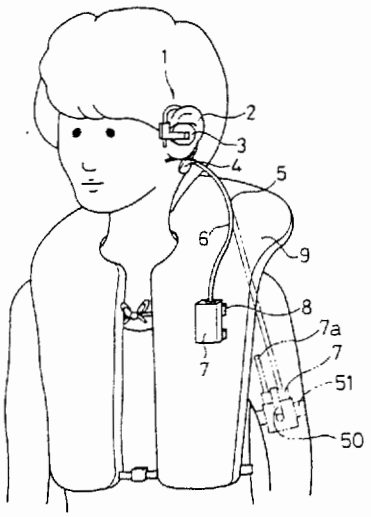
また、この発明の耳掛式送受信装置において、骨伝導マイクロホンは弾性体を介して耳掛部材のマイクロホン支持部に取付けると、取付位置にかかわらず確実に骨伝導マイクロホンを圧接することができる。

4．図面の簡単な説明

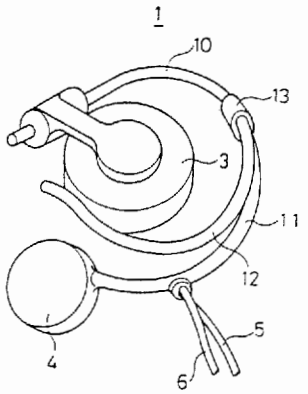
第1図はこの発明を水上スキー、ウィンドサーヒン、水上スキー等水上において使用される耳掛式送受信装置の全体取付状態を示す図、第2図は耳掛式送受信装置の要部の斜視図、第3図及び第4図は耳掛式送受信装置の要部の取付状態を示す図、第5図は耳掛部材の他の実施例を示す斜視図、第6図乃至第8図はさらに他の実施例を示し、第6図は耳掛式送受信装置の正面図、第7図は第6図のVII－VII断面図、第8図は耳掛式送受信装置を取付け状態を示す図、第9図乃至第11図はさらに他の実施例を示し、第9図は耳掛式送受信装置の正面図、第10図は第9図のA矢視図、第11図はスピーカの使用状態を示す図、第12図は第9図に示す耳掛部材の取付前の状態を示す図、第13図は耳掛部材の取付後の状態を示す図、第14図乃至第17図はさらに他の実施例を示し、第14図は耳掛式送受信装置の正面図、第15図は取付状態を示す図、第16図は第15図のA矢視図、第17図は第15図のB矢視図、第18図はステレオタイプにした実施例を示す図である。

図中符号1，20は耳掛部材、3，21はスピーカ、4，23は骨伝導マイクロホン、5，6はリード線、7は送受信装置である。

特許出願人　　三信工業株式会社

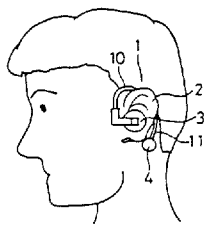


第1図

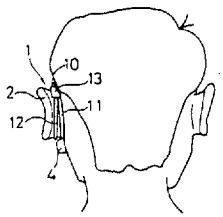


第2図

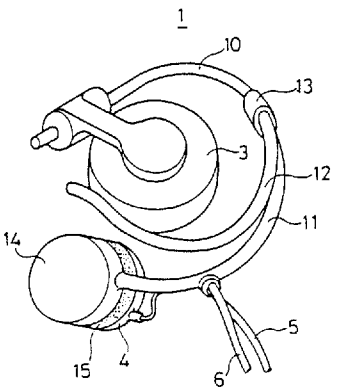
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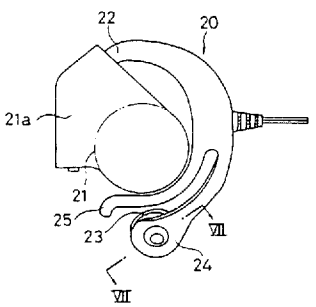
第 3 図



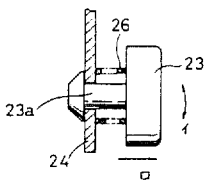
第 4 図



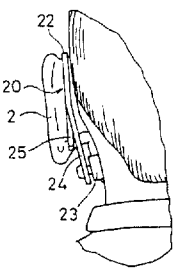
第 5 図



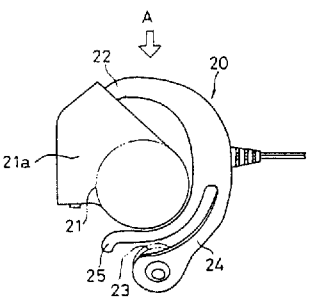
第 6 図



第 7 図

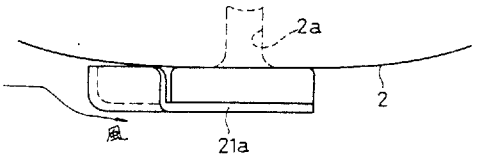


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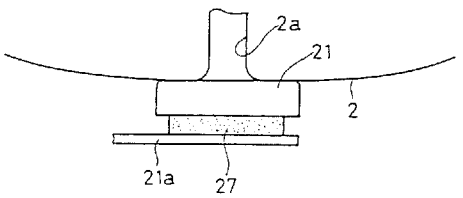


第 9 図

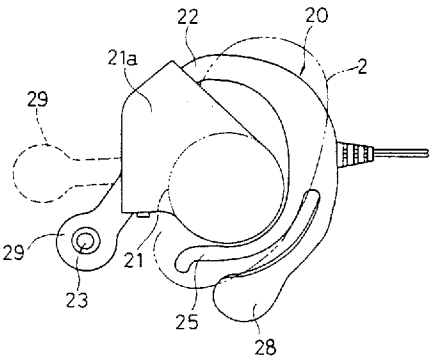
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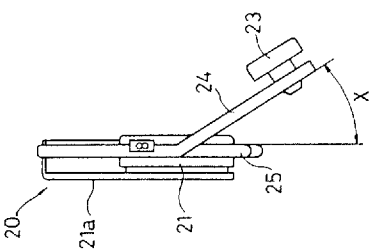
第 10 図



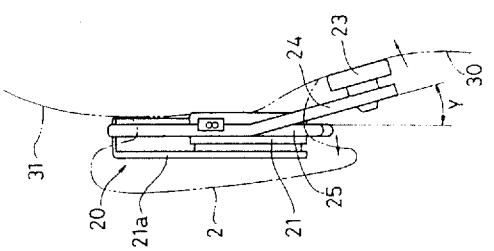
第 11 図



第 14 図

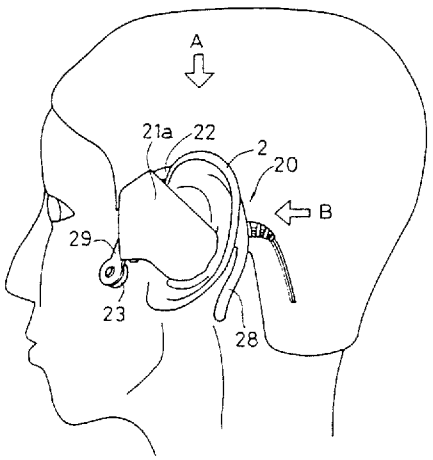


第 12 図

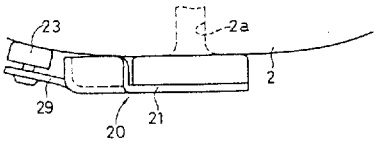


第 13 図

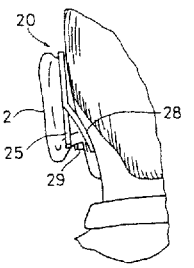
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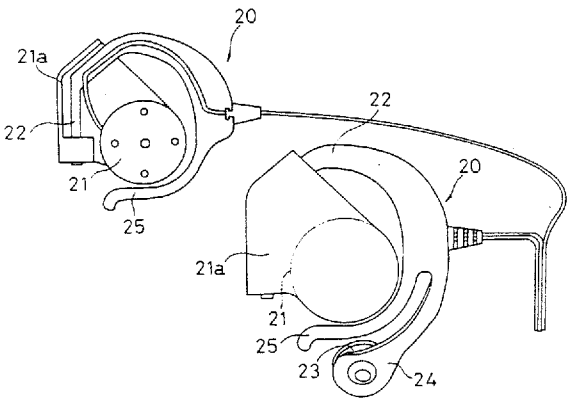
第 1 5 図



第 1 6 図



第 1 7 図



第 1 8 図

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PAT-NO: JP402056121A
DOCUMENT-IDENTIFIER: JP 02056121 A
TITLE: EAR-MOUNT TYPE TRANSMITTER-RECEIVER
PUBN-DATE: February 26, 1990

INVENTOR-INFORMATION:

NAME	COUNTRY
MURASE, MASAJI	
ITO, SABURO	
NAGAFUSA, MAKOTO	

ASSIGNEE-INFORMATION:

NAME	COUNTRY
SANSHIN IND CO LTD	N/A

APPL-NO: JP63174375
APPL-DATE: July 13, 1988

INT-CL (IPC): H04B001/38

US-CL-CURRENT: 381/326 , 381/330 , 381/FOR.130 , 381/FOR.134

ABSTRACT:

PURPOSE: To surely mount a speaker and a bone conduction microphone to an ear by integrating the speaker and the bone conduction microphone to an ear-mount member, and mounting the ear-mount member to a recessed part between the ear and a bead with stressing force.

CONSTITUTION: A speaker support 10 mounted with a speaker 3, a microphone support 11 mounted with a bone conduction microphone 4 and an ear-mount 12 touched to the rear side of the ear constitute an ear latch member 1. When the ear latch member

1 is mounted to the ear, the speaker 3 is touched to the ear. On the other hand, the microphone support 11 and the ear latch part 12 are mounted to the rear side of the ear 2 while being compressed. Then the microphone support 11 presses the microphone 4 into contact with a chin under the ear. Moreover, the ear latch part 12 is abutted on the rear side of the ear 2 to clip the ear 2 with a proper force.

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	47	((("LI") near3 ("Chaowu")) OR (("LI") near3 ("Yongjian"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2021/11/22 17:08
S2	454	SHENZHEN near VOXTECH.as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 17:08
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S4	7	"207039851"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 17:19
S5	26	("10154334" | "20010002928" | "20040032964" | "20160381472" | "20170195770" | "20200221221" | "20210165243" | "9967646").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 17:30
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		sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))	DERWENT; IBM_TDB			
S8	1,525,179	(((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) with (Device module element component apparatus piece unit assembly system mechanism package structure arrangement equipment or instrument item part gadget member peripheral article entity object body machine subunit subassembly))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 17:39

S9	80,862	(H04R1/105 or H04R1/023 or H04R1/026 or H04R1/1008 or H04R1/1041 or H04R1/1058 or H04R1/1091 or H04R1/44 or H04R9/025 or H04R31/00 or H04R1/1016 or H04R1/1025 or H04R2201/10 or H04R2460/13 or H04R1/1066 or H04R1/347 or H04R5/0335 or H04R5/033 or H04R1/06 or H04R11/02).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 18:31
S11	101	H04R2225/63.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 18:31
S12	311,483	((Earpiece earphone earbud earset earinsert eardome earspeaker earplug eartip earmold ear$1phone ear$1piece ear$1bud ear$1set ear$1mold ear$1speaker ear$1insert ear$1tip ear$1plug ear$1dome ear$1receiver) or (ear concha conchae canal in$1ear in$1the$1ear in$1the$1canal in adj ear in adj the adj ear) near (insert tip bud set piece phone shroud dome insertable speaker receiver mold) or (in$1the$1ear completely$1in$1the$1canal receiver$1in$1the$1canal receiver$1in$1the$1concha receiver$1in$1the$1ear))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 18:48
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		(Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) with (Device module element component apparatus piece unit assembly system mechanism package structure arrangement equipment or instrument item part gadget member peripheral article entity object body machine subunit subassembly))				
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S17	133	S14 and (S15 S16)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:30
S18	1,890	S14 and (ear near (hook loop hanger clip holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:43

S19	1,984	S14 and (earhook earhanger ear$1hook ear$1hanger ear near (hook loop hanger clip holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:44
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S21	936	S19 and (S9 S10)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:51
S22	67	S21 and (S15 S16)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:52
S23	348	oyesola near ojo	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:53
S25	3	S23 and S19	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:53
S26	828	S14 same (earhook earhanger ear$1hook ear$1hanger ear near (hook loop hanger clip holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:54

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S30	361	S26 and (S9 S10)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 20:27
S31	36	S30 and (S15 S16)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 20:27
S32	182	S26 and (S9 S10)	US-PGPUB	OR	ON	2021/11/22 20:28
S33	3	S31 not S32	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 20:28
S34	325	S30 not S31	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2021/11/22 20:28

			JPO; DERWENT; IBM_TDB			
S35	149	S30 not S31	US-PGPUB	OR	ON	2021/11/22 20:31
S36	4	("20130163791" | "20160329041" | "20170318369" | "20200336824").PN.	US-PGPUB; USPAT	OR	ON	2021/11/22 20:32
S37	186,801	(B60Q1/2665 OR B60Q1/2661 OR B60Q3/217 OR B60Q2500/10 OR B60Q3/54 OR B60Q1/323 OR B60Q3/20 OR B60Q3/64 OR B60Q3/78 OR B60Q1/0041 OR B60Q1/26 OR B60Q1/2607 OR B60Q1/302 OR B60Q2400/10 OR B60Q3/233 OR B60Q3/76 OR B60Q1/22 OR B60Q1/24 OR B60Q1/2669 OR B60Q1/34 OR B60Q1/38 OR B60Q1/484 OR B60Q1/525 OR B60Q2400/40 OR B60Q2400/50 OR B60Q3/62 OR B60Q3/745 OR B60Q3/80 OR B60Q5/005 OR B60Q9/00 OR B60Q9/002 OR B60R1/1207 OR B60R1/02 OR B60R1/12 OR B60R13/0243 OR B60R2013/0287 OR B60R1/06 OR B60R11/02 OR B60R11/0217 OR B60R13/02 OR B60R13/0206 OR B60R13/04 OR B60R13/0815 OR B60R16/0215 OR B60R16/037 OR B60R16/0373 OR B60R2001/1253 OR B60R2001/1284 OR B60R2011/0021 OR B60R2325/101 OR B60R2325/106 OR B60R25/2036 OR B60R25/245 OR B60R25/31 OR G10K11/162 OR G10K11/175 OR G10K11/1754 OR G10K15/02).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 15:47
S38	311,598	((Earpiece earphone earbud earset earinsert eardome earspeaker earplug eartip earmold ear$1phone ear$1piece ear$1bud ear$1set ear$1mold ear$1speaker ear$1insert ear$1tip ear$1plug ear$1dome ear$1receiver) or (ear concha conchae canal in$1ear in$1the$1ear in$1the$1canal in adj ear in adj the adj ear) near (insert tip bud set piece phone shroud dome insertable speaker receiver mold) or (in$1the$1ear completely$1in$1the$1canal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:46

		receiver$1in$1the$1canal receiver$1in$1the$1concha receiver$1in$1the$1ear))				
S39	1,526,129	(((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) with (Device module element component apparatus piece unit assembly system mechanism package structure arrangement equipment or instrument item part gadget member peripheral article entity object body machine subunit subassembly))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:46
S40	77,601	S38 same S39	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:46
S41	828	S40 same (earhook earhanger ear$1hook ear$1hanger ear near (hook loop hanger clip holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:46
S42	78	S41 same (Bone cartilage cartilaginous cartilagenous skull	US-PGPUB; USPAT;	OR	ON	2021/11/23 22:46

		cranium bony mastoid stapedes stapedius ossicle ossicular incus malleus stape temporal mandibular body head cranial pinna auricle auricular house housing casing) near2 (conduct$3 conduction vibrate vibrating vibration vibrated)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S43	219	S41 and (Bone cartilage cartilaginous cartilagenous skull cranium bony mastoid stapedes stapedius ossicle ossicular incus malleus stape temporal mandibular body head cranial pinna auricle auricular house housing casing) near2 (conduct$3 conduction vibrate vibrating vibration vibrated)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:46
S44	5	"17139076"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:57
S45	1	S42 and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:57
S46	47	((("LI") near3 ("Chaowu")) OR (("LI") near3 ("Yongjian"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2021/11/23 22:58
S47	454	SHENZHEN near VOXTECH.as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:58
S48	20	S42 and (S46 S47)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:58

S49	58	S42 not S48	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:58
S50	5	"17139076"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/24 13:28
S51	4	"103327435"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/24 19:35
S52	89,841	(((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) with (Device or module or element or component or apparatus or unit or assembly or system or mechanism or package or structure or arrangement))).CLM.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 22:56

S53	119,225	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))).CLM.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 22:57
S54	289	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 22:58

		loop or hanger or clip or holder))).CLM.				
S55	138	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear))).CLM.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:12
S56	103	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:29

		sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis)).CLM.				
S57	27	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:33

		audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3)).CLM.				
S59	18	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:38

		acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective)).CLM.				
S60	6	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:40

		(Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband)).CLM.				
S61	6	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:42

		(Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)).CLM.				
S62	6	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:06

		or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)).CLM.				
S63	9	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:06

		acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)).ti,ab,clm.				
S64	307	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	AND	ON	2021/11/30 01:07

		mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply))	DERWENT; IBM_TDB			

S65	12	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)).ti,ab,clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:08

S66	794	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:08

S67	395	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear or in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:09

		microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply))				
S68	253	(((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) and (((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear or in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) same (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder))) and ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) with (vibrate or vibrating or vibration or vibratory or oscillat$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:20

S69	236	S68 and (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:21
S70	220	S68 and (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply) and (frequency or frequencies or broadband) and (sound acoustic wave audio)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:22
S71	80,957	(H04R1/105 or H04R1/023 or H04R1/026 or H04R1/1008 or H04R1/1041 or H04R1/1058 or H04R1/1091 or H04R1/44 or H04R9/025 or H04R31/00 or H04R1/1016 or H04R1/1025 or H04R2201/10 or H04R2460/13 or H04R1/1066 or H04R1/347 or H04R5/0335 or H04R5/033 or H04R1/06 or H04R11/02).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:23
S72	101	H04R2225/63.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:23
S73	0	S70 and (S71 and S72)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:23
S74	0	S68 and (S71 and S72)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:23
S75	129	S68 and (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply) and (frequency	US-PGPUB	OR	ON	2021/11/30 01:24

		or frequencies or broadband) and (sound acoustic wave audio)				
S76	110	S70 and H04R$.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:24
S77	69	S70 and H04R$.CPC.	US-PGPUB	OR	ON	2021/11/30 01:25
S78	0	S76 not S77	US-PGPUB	OR	ON	2021/11/30 01:25
S79	41	S76 not S77	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:25
S80	1,824,616	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic or acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:55
S81	1,915,462	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2021/11/30 01:57

		sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic or acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)))	DERWENT; IBM_TDB			
S82	98,331	S81 same ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear or in$1ear) adj (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:58
S83	977	S82 same (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:59
S84	22	S83 same ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) near4 (mastoid bone vibrate or vibrating or vibration or vibratory))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:00
S85	52	S83 and ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) near4	US-PGPUB; USPAT; USOCR; FPRS; EPO;	AND	ON	2021/11/30 02:01

		(mastoid bone vibrate or vibrating or vibration or vibratory))	JPO; DERWENT; IBM_TDB			
S86	30	S85 not S84	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:08
S87	1,975	S82 and ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) near4 (mastoid bone vibrate or vibrating or vibration or vibratory))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:23
S88	128	S87 and (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:24
S89	849	S82 same2 ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) near4 (mastoid bone vibrate or vibrating or vibration or vibratory))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:24
S90	0	"1074848054"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 02:35
S91	6	"107484054"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 02:35
S92	48	S89 and (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	AND	ON	2021/11/30 02:38

			DERWENT; IBM_TDB			
S93	246	S82 same2 ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) near4 (mastoid bone vibrate or vibrating or vibration or vibratory)) and (sound audio acoustic)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:39
S94	1,915,462	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic or acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 11:17
S95	98,331	S94 same ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear or in$1ear) adj (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 11:17
S96	849	S95 same2 ((House or casing or frame or enclosure or housing or cover or covering or box or shell or	US-PGPUB; USPAT; USOCR;	AND	ON	2021/11/30 11:17

		container or chassis plate panel) near4 (mastoid bone vibrate or vibrating or vibration or vibratory))	FPRS; EPO; JPO; DERWENT; IBM_TDB			
S97	48	S96 and (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 11:17
S98	42	S97 and H04R$.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 11:17
S106	6	"107484054"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 10:54
S107	7	"207039851"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 11:01
S108	5	"17139076"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 13:33
S109	8	"17305245"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 17:44
S110	1	"17305245" and ((core housing) same (circuit) same plug)	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2021/12/01 17:45

			JPO; DERWENT; IBM_TDB			
S111	0	"17305245" and ((core housing) same (circuit) same plug).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 17:46
S112	0	"17305245" and ((core housing) same plug and (circuit) same plug).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 17:46
S113	1	"17305245" and ((core housing) same plug).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 17:46
S114	0	"17305245" and (circuit same plug).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 17:47
S115	1,915,462	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 22:15

		magnetic or acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)))				
S116	98,331	S115 same ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear or in$1ear) adj (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 22:15
S117	71	S116 and ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) with (mastoid bone vibrate or vibrating or vibration or vibratory)) same (phase) same (frequency frequencies)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/12/01 22:15
S118	47	((("LI") near3 ("Chaowu")) OR (("LI") near3 ("Yongjian"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2021/12/01 22:31
S119	457	SHENZHEN near VOXTECH.as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 22:31
S120	14	S117 and (S118 S119)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/12/01 22:31
S121	10	S116 and (((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) with (mastoid bone vibrate or vibrating or vibration	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	AND	ON	2021/12/01 22:32

		or vibratory)) same (phase) same (frequency frequencies)).CLM.	DERWENT; IBM_TDB			
S124	4	"103327435"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/02 03:16
S125	39	("10149041" | "10154334" | "10299025" | "10735842" | "20020102005" | "20090262964" | "20110110553" | "20170257692" | "7539525" | "8654987" | "9049515").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/02 03:35
S126	11	("10149041" | "10154334" | "10299025" | "10735842" | "20020102005" | "20090262964" | "20110110553" | "20170257692" | "7539525" | "8654987" | "9049515").PN.	US-PGPUB; USPAT	OR	ON	2021/12/02 03:35

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L11	1	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) ((earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) same (plug or socket or connector or jack or adaptor or adapter or coupler)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or	US-PGPUB; USPAT	AND	ON	2022/01/04 22:25

		ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) ((sleeve or jacket or wrapper or shield or shielding or protector or protective) with (waterproof or water$1proof or water$1impervious or liquid$1resistant or water adj (proof or resistant or impervious))) ((frequency or frequencies or broadband) same (phase))).CLM.				
S99	136	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear))).CLM.	US-PGPUB; USPAT	AND	ON	2021/11/30 16:28

S100	11	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3))).CLM.	US-PGPUB; USPAT	AND	ON	2021/11/30 16:28
S101	9	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder))	US-PGPUB; USPAT	AND	ON	2021/11/30 16:42

		((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective)).CLM.				
S102	5	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or	US-PGPUB; USPAT	AND	ON	2021/11/30 16:51

		jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband)).CLM.				
S103	5	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)).CLM.	US-PGPUB; USPAT	AND	ON	2021/11/30 16:56
S104	3	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or	US-PGPUB; USPAT	AND	ON	2021/11/30 17:02

		audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (waterproof or water$1proof or water$1impervious or liquid$1resistant or water adj (proof or resistant or impervious)) (frequency or frequencies or broadband)).CLM.				
S105	3	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) ((earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) same (plug or socket or connector or jack or	US-PGPUB; USPAT	AND	ON	2021/11/30 23:04

		adaptor or adapter or coupler)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (waterproof or water$1proof or water$1impervious or liquid$1resistant or water adj (proof or resistant or impervious)) (frequency or frequencies or broadband)).CLM.				
S122	2	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) ((earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) same (plug or socket or connector or jack or adaptor or adapter or coupler)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or	US-PGPUB; USPAT	AND	ON	2021/12/02 01:08

		completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (waterproof or water$1proof or water$1impervious or liquid$1resistant or water adj (proof or resistant or impervious)) ((frequency or frequencies or broadband) same (phase))).CLM.				
S123	1	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) ((earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) same (plug or socket or connector or jack or adaptor or adapter or coupler)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) ((sleeve or jacket or wrapper or shield or shielding or	US-PGPUB; USPAT	AND	ON	2021/12/02 01:13

		protector or protective) with (waterproof or water$1proof or water$1impervious or liquid$1resistant or water adj (proof or resistant or impervious))) ((frequency or frequencies or broadband) same (phase))).CLM.				

1/4/2022 10:28:45 PM
C:\Users\oojo\Documents\EAST\Workspaces\CASE17139076.wsp

Bibliographic Data

Application No: 17/139,076

Foreign Priority claimed: (•) Yes ( ) No

35 USC 119 (a-d) conditions met: [✓] Yes [ ] No [ ] Met After Allowance

Verified and Acknowledged: /OYESOLA C OJO/ Examiner's Signature | Initials

Title: LOUDSPEAKER APPARATUS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/31/2020	381	2654	20608-0080US00
RULE			

APPLICANTS

SHENZHEN VOXTECH CO., LTD., Shenzhen, CHINA

INVENTORS

Chaowu LI, Shenzhen, CHINA

Yongjian LI, Shenzhen, CHINA

CONTINUING DATA

This application is a CON of PCT/CN2019/102393 08/24/2019

FOREIGN APPLICATIONS

CHINA CN201910009927.4 01/05/2019

IF REQUIRED, FOREIGN LICENSE GRANTED**

01/14/2021

STATE OR COUNTRY

CHINA

ADDRESS

Metis IP LLC
PO Box 423
McLean, VA 22101
UNITED STATES

FILING FEE RECEIVED

$1,820

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/139,076	Filing Date 12/31/2020	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $480 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	12/27/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/ANTJUAN M RIVERA/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: DIST.E.FILE Document Description: Electronic Terminal Disclaimer - Filed	PTO/SB/25 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING REJECTION OVER A PENDING "REFERENCE" APPLICATION**
Application Number	17139076
Filing Date	31-Dec-2020
First Named Inventor	Chaowu LI
Attorney Docket Number	20608-0080US00
Title of Invention	LOUDSPEAKER APPARATUS

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
SHENZHEN VOXTECH CO., LTD.	100%

The owner(s) of percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending reference Application Number(s)

17305245 filed on 07/01/2021

as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the reference application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term of any patent granted on said reference application, "as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application," in the event that any such patent granted on the pending reference application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

○	I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.

Applicant claims the following fee status:

○ Small Entity

○ Micro Entity

◉ Regular Undiscounted

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Registration Number 65310

○ A sole inventor

○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application

○ A joint inventor; all of whom are signing this request

Signature	/Yangzhou Du/
Name	Yangzhou Du

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal

Application Number:	17139076
Filing Date:	31-Dec-2020
Title of Invention:	LOUDSPEAKER APPARATUS
First Named Inventor/Applicant Name:	Chaowu LI
Filer:	Yangzhou Harry Du/Aiqi Gu
Attorney Docket Number:	20608-0080US00

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	170	170
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**170**

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 17139076

Filing Date: 31-Dec-2020

Applicant/Patent under Reexamination: LI

Electronic Terminal Disclaimer filed on December 27, 2021

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt

EFS ID:	44608718
Application Number:	17139076
International Application Number:	
Confirmation Number:	4158
Title of Invention:	LOUDSPEAKER APPARATUS
First Named Inventor/Applicant Name:	Chaowu LI
Customer Number:	131839
Filer:	Yangzhou Harry Du/Aiqi Gu
Filer Authorized By:	Yangzhou Harry Du
Attorney Docket Number:	20608-0080US00
Receipt Date:	27-DEC-2021
Filing Date:	31-DEC-2020
Time Stamp:	02:46:13
Application Type:	Utility under 35 USC 111(a)

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Payment was successfully received in RAM	$170
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	43788 5e2af561d70c71aec33ec9abfd3cd0db47b2ba29	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37912 f383661fb5a460007ba361b60edb6be2f313a5c8	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	81700		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: LI, Chaowu et al.	Group Art Unit: 2654
Application No.: 17/139,076	Examiner: OJO, OYESOLA C
Filed: December 31, 2020	Confirmation No.: 4158
For: LOUDSPEAKER APPARATUS	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

AMENDMENT PURSUANT TO 37 C.F.R. § 1.111

In response to the Non-Final Office Action mailed on December 6, 2021, having a three-month shortened statutory period for response set to expire on March 6, 2022 reconsideration of the above-identified application is respectfully requested in view of the following remarks.

LISTING OF THE CLAIMS begins on page **2** of this paper.

REMARKS begin on page **10** of this paper.

LISTING OF THE CLAIMS:

This listing of claims is provided for the Examiner's convenience:

1. (Original) A loudspeaker apparatus, comprising:

an ear hook including a first plug end and a second plug end, the ear hook being surrounded by a protective sleeve, the protective sleeve being made of an elastic waterproof material;

a core housing for accommodating an earphone core, the core housing being fixed to the first plug end and elastically abutted against the protective sleeve, wherein

the core housing including a housing panel facing human body and a housing back panel opposite to the housing panel, and

the vibration of the earphone core drives the housing panel and the housing back panel to vibrate, the vibration of the housing panel having a first phase, the vibration of the housing back panel having a second phase, wherein when the vibration frequencies of the housing panel and the housing back panel is within a range of 2000 Hz to 3000 Hz, an absolute value of a difference between the first phase and the second phase is less than 60 degrees; and

a circuit housing for accommodating a control circuit or a battery, the circuit housing being fixed to the second plug end, the control circuit or the battery driving the earphone core to vibrate to generate a sound.

2. (Original) The loudspeaker apparatus of claim 1, wherein the ear hook further includes:

an elastic metal wire;

a wire; and

a fixed sleeve, the fixed sleeve fixing the wire on the elastic metal wire, the protective sleeve being formed, by injection molding, on periphery of the elastic metal wire, the wire, the fixed sleeve, the first plug end, and the second plug end.

3. (Original) The loudspeaker apparatus of claim 2, wherein

the first plug end and the second plug end are formed, by injection molding, at both ends of the elastic metal wire respectively,

the first plug end and the second plug end are arranged with a first wiring channel and a second wiring channel respectively, and

the wire extends along the first wiring channel and the second wiring channel.

4. (Original) The loudspeaker apparatus of claim 3, wherein the wire passes through the first wiring channel and the second wiring channel.

5. (Original) The loudspeaker apparatus of claim 3, wherein

the first wiring channel includes a first wiring groove and a first wiring hole connecting the first wiring groove and an outer end surface of the first plug end,

the wire extends along the first wiring groove and the first wiring hole and is exposed on the outer end surface of the first plug end,

the second wiring channel includes a second wiring groove and a second wiring hole connecting the second wiring groove and the outer end surface of the first plug end, and

the wire extends along the second wiring groove and the second wiring hole and is exposed on the outer end surface of the second plug end.

6. (Original) The loudspeaker apparatus of claim 2, wherein the ear hook includes at least two fixed sleeves spaced apart along the elastic metal wire.

7. (Original) The loudspeaker apparatus of claim 1, wherein

the core housing is arranged with a first socket connecting with an outer end surface of the core housing,

a stopping block is arranged on an inner sidewall of the first socket, and

the first socket is connected to the first plug end.

8. (Original) The loudspeaker apparatus of claim 7, wherein the first plug end includes:

an inserting portion being at least partially inserted into the first socket and abutting against an outer side surface of the stopping block; and

two elastic hooks being arranged on a side of the inserting portion facing inside of the core housing, wherein:

the two elastic hooks are brought together under action of external thrust and the stopping block, and

after passing through the stopping block, the two elastic hooks are elastically restored to be stuck on an inner surface of the stopping block to realize the fixation of the core housing and the first plug end.

9. (Original) The loudspeaker apparatus of claim 8, wherein

the inserting portion is partially inserted into the first socket, and

an exposed part of the inserting portion is arranged in a stepped manner to form an annular table surface spaced apart from the outer end surface of the core housing.

10. (Original) The loudspeaker apparatus of claim 9, wherein

the protective sleeve further extends to a side of the annular table surface facing the outer end surface of the core housing, and

when the core housing and the first plug end are fixed, the protective sleeve elastically abuts against the core housing to realize sealing.

11. (Original) The loudspeaker apparatus of claim 1, wherein

the loudspeaker apparatus further includes a fastener,

the circuit housing is arranged with a second socket, and

the second plug end is at least partially inserted into the second socket and connected to the second socket by the fastener.

12. (Original) The loudspeaker apparatus of claim 11, wherein

the second plug end is arranged with a slot perpendicular to an inserting direction of the second socket,

a through hole corresponding to a position of the slot is arranged on a first sidewall of the circuit housing;

the fastener includes two parallel pins and a connecting portion for connecting the pins, and

the pins are inserted into the slot from outside of the circuit housing through the through hole to realize the plug and fixation of the circuit housing and the second plug end.

13. (Original) The loudspeaker apparatus of claim 1, wherein the ear hook further includes a housing sheath integrally formed with the protective sleeve, the housing sheath being wrapped around periphery of the circuit housing.

14. (Original) The loudspeaker apparatus of claim 1, wherein the vibration signal of the housing panel has a first amplitude, the vibration signal of the housing back panel has a second amplitude, and a ratio of the first amplitude to the second amplitude is within a range of 0.5 to 1.5.

15. (Original) The loudspeaker apparatus of claim 1, wherein the vibration of the housing panel generates a first leaked sound wave, the vibration of the housing back panel generates a second leaked sound wave, wherein the first leaked sound wave and the second leaked sound wave are superimposed on each other, which reduces an amplitude of the first leaked sound wave.

16-17. (Cancelled)

18. (Original) The loudspeaker apparatus of claim 1, wherein the earphone core further includes a magnetic circuit component generating a first magnetic field, the magnetic circuit component including:

a first magnetic unit configured to generate a second magnetic field;

a first magnetically conductive unit; and

at least one second magnetic unit, the at least one second magnetic unit surrounding the first magnetic unit and forming a magnetic gap with the first magnetic

unit, a magnetic field strength of the first magnetic field in the magnetic gap being greater than a magnetic field strength of the second magnetic field in the magnetic gap.

19. (Original) The loudspeaker apparatus of claim 18, wherein the magnetic circuit component further includes:

a second magnetically conductive unit; and

at least one third magnetic unit being connected to the second magnetically conductive unit and the at least one second magnetic unit.

20. (Original) The loudspeaker apparatus of claim 19, wherein the magnetic circuit component further includes:

at least one fourth magnetic unit being located below the magnetic gap and connected to the first magnetic unit and the second magnetically conductive unit.

21-22. (Cancelled)

23. (Original) The loudspeaker apparatus of claim 19, wherein

the first magnetically conductive unit is connected to the upper surface of the first magnetic unit,

the second magnetically conductive unit includes a bottom plate and a sidewall; and

the first magnetic unit is connected to the bottom plate of the second magnetically conductive unit.

24. (Original) The loudspeaker apparatus of claim 19, further comprising:

at least one electrically conductive unit being connected to at least one unit of the first magnetic unit, the first magnetically conductive unit, or the second magnetically conductive unit.

REMARKS

In the Non-Final Office Action mailed on December 6, 2021 (the "Office Action"),[1] the Office took the following actions:

i) rejected claim 1 on the ground of nonstatutory double patenting as allegedly being unpatentable over claim 11 of copending Application No. 17305245 (reference application);

ii) indicated that claims 1-15, 18-20, 23-24 contain allowable subject matter.

In this response, the claims are not amended and no new matter is introduced. Claims 16-17 and 21-22 were previously cancelled. Claims 1-15, 18-20 and 23-24 are currently pending and under examination, of which claim 1 is independent.

I. Rejection on the ground of nonstatutory double patenting

Claim 1 stand rejected on the ground of nonstatutory double patenting as allegedly being unpatentable over claim 11 (when its base claim 1 is incorporated) of copending Application No. 17305245.

Without conceding to the merits of the rejection, and merely in the interest of advancing prosecution of the present application, Applicant files herewith a terminal disclaimer.

[1] As Applicant's remarks with respect to the rejections are sufficient to overcome these rejections, Applicant's silence as to assertions in the Office Action or certain requirements that may be applicable to the rejections (e.g., whether a reference constitutes prior art, ability to combine references, assertions as to patentability of dependent claims) is not a concession that such assertions are accurate or such requirements have been met, and Applicant reserves the right to analyze and dispute such in the future.

In view of the foregoing, Applicant respectfully submits that the Examiner reconsider and withdraw the rejection of claim 1 on the ground of nonstatutory double patenting.

II. Allowable Subject Matter

Applicant thanks the Examiner for indicating that claims 1-15, 18-20 and 23-24 contain allowable subject matter.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims. If the Examiner determines the prompt allowance of these claims could be facilitated by a telephone conference, the Examiner is invited to contact the undersigned at the number provided below in order to resolve any issues promptly.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 506942.

Respectfully submitted,

METIS IP LLC

Dated: December 27, 2021

By: /Yangzhou Du/
Yangzhou Du
Registration No. 65,310
Tel.: 202.580.8894 ext. 105

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/139,076	**12/27/2021 02:44:22 AM ET**	**20608-0080US00**

Title of Invention

LOUDSPEAKER APPARATUS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4158	FILED BY	cheng dan
PATENT CENTER #	60461395	FILING DATE	12/31/2020
CUSTOMER #	131839	FIRST NAMED INVENTOR	Chaowu LI
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Yangzhou Du

Documents

TOTAL DOCUMENTS: 3

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
2021-12-27-Rspn_to_NFOA-20608-0080US00.pdf		12	-	212 KB
2021-12-27-Rspn_to_NFOA-20608-0080US00-A...pdf	(1-1)	1	Amendment/Req. Reconsideration-After Non-Final Reject	135 KB
2021-12-27-Rspn_to_NFOA-20608-0080US00-CLM.pdf	(2-9)	8	Claims	135 KB
2021-12-27-Rspn_to_NFOA-20608-0080US00-REM.pdf	(10-12)	3	Applicant Arguments/Remarks Made in an Amendment	123 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2021-12-27-Rspn_to_NFOA-20608-0080US00.pdf	F183CA5AECDA701078A7C5776191C05F9DD6CB84C99F4AA0709A5C9863E28B7EA3A072583413A9EC87CEAFF1E24B062C53F778608DD73523F0A4BE2D7090C274
2021-12-27-Rspn_to_NFOA-20608-0080US00-A....pdf	12581F3DCC7ABC31BC9440255D836A2472FB13D2AFFAFE2D5DE7EE16380C8E1561F18CE89E49C770AA2CFBCD5C009D81461DE19F2E850D41548D5E5B44DA24F2
2021-12-27-Rspn_to_NFOA-20608-0080US00-CLM.pdf	33545B3DB0F937517277AC2E118C86D801CC003EA6A9149E1F225700B0527523BDB833EB3A02F23B415D333B0A34D4AA9F5BC09E3A91262B783702DFE6E03AB9
2021-12-27-Rspn_to_NFOA-20608-0080US00-REM.pdf	2C96A7715E76773AD0A836BA8156DF8B478FD31F7A8EFD9E166B4F935683CE82F944CCDB11A21BA80CDC4A5CA84CDC8C69C8C7DD08130BC5B796A39F96CDD725

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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/139,076	12/31/2020	Chaowu LI	20608-0080US00	4158

131839 7590 12/06/2021

Metis IP LLC
PO Box 423
McLean, VA 22101

EXAMINER	
OJO, OYESOLA C	

ART UNIT	PAPER NUMBER
2654	

NOTIFICATION DATE	DELIVERY MODE
12/06/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@metis-ip.com
xbzhang@metis-ip.com

Office Action Summary	Application No. 17/139,076	Applicant(s) LI et al.	
	Examiner OYESOLA C OJO	Art Unit 2654	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 08/24/2019.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-15,18-20 and 23-24 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☐ Claim(s) _____ is/are rejected.

8) ☑ Claim(s) 1-15,18-20 and 23-24 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 08/24/2019 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☑ All b)☐ Some** c)☐ None of the:

1.☑ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☑ Other: Foreign Patent Documents.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Status of Claims

Claims 16-17, 21-22 are cancelled.

Claims 1-15, 18-20 and 23-24 are objected to.

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the

scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

2. **Claim 1** is provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over **claim 11** of copending Application No. **17305245** (reference application). Although the claims at issue are not identical, they are not patentably distinct from each other because the claims are similar in scope and are directed toward the same subject-matter as shown in the chat below.

This is a provisional nonstatutory double patenting rejection because the patentably indistinct claims have not in fact been patented.

Instant Application: **17139076**	Co-pending Application: **17305245**
1. *A loudspeaker apparatus, comprising: a core housing for accommodating an earphone core, wherein the core housing including a housing panel facing human body and a housing back panel opposite to the*	*1. A speaker device,* comprising: *a core housing configured to accommodate the earphone core; the core housing including a housing front panel facing a human body and a housing rear panel opposite to the housing*

housing panel, and the vibration of the earphone core drives the housing panel and the housing back panel to vibrate, the vibration of the housing panel having a first phase, the vibration of the housing back panel having a second phase, wherein when the vibration frequencies of the housing panel and the housing back panel is within a range of 2000 Hz to 3000 Hz, an absolute value of a difference between the first phase and the second phase is less than 60 degrees; and a *circuit housing for accommodating a control circuit or a battery, the circuit housing being fixed to the second plug end, the control circuit or the battery driving the earphone core to vibrate to generate a sound, an ear hook, the ear hook being surrounded by a protective sleeve, the core housing being fixed to the first plug end and elastically abutted against the protective sleeve, the protective sleeve being* made of an elastic *waterproof material*, the ear hook including a first plug end and a second plug end.	*front panel; the earphone core being configured to cause the housing front panel and the housing rear panel to vibrate, vibration of the housing front panel having a first phase, and vibration of the housing rear panel having a second phase; wherein an absolute value of a difference between the first phase and the second phase is less than 60 degrees when a frequency of each of the vibration of the housing front panel and the vibration of the housing rear panel is within a range between 2000 Hz and 3000 Hz; a circuit housing configured to accommodate a control circuit or a battery, the control circuit or the battery being configured to drive an earphone core to vibrate to generate a sound, an ear hook* configured to *connect the core housing and the circuit housing; and a housing sheath at least partially covering the circuit housing and the ear hook,* the housing sheath being made of *a waterproof material*. **11.** The speaker device of claim 1, wherein… *the ear hook includes… a first plug end, the*

	first plug end… connected to the first socket in a plugged-in connection.

From the chart above, it can be seen that **claim 1** of instant application and **claim 11** (when its base claim 1 is incorporated) of the co-pending application 17305245 are obvious variant of each other; the claims are similar in scope with only minor wording variations.

Allowable Subject Matter

3. **Claims 1-15, 18-20 and 23-24** are objected to as *being under a nonstatutory double patenting rejection*, but would be allowable *if a proper Terminal Disclaimer is filed by the applicant and approved by the office*.

4. The following is an examiner's statement of reasons for indication of subject matter:
Claim 1 (amended) is allowable over the prior arts of record because none of the prior arts taken singly or in combination with the others explicitly discloses all the limitations of claim 1 as currently amended. For instance, the closest prior art of record, **Li et al (CN 107484054)** discloses a loudspeaker apparatus, comprising: an ear hook including a first plug end and a second plug end, the ear hook being surrounded by a protective sleeve, a core housing for accommodating an earphone core, the core housing being fixed to the first plug end, including a housing panel facing human body and a housing back panel opposite to the housing panel, and the vibration of the earphone core drives the housing panel and the housing back panel to vibrate, and a circuit housing for accommodating a control circuit or a battery, the control circuit or the battery driving the earphone core to vibrate to generate a sound.
However, the examiner found neither of the prior art cited in its entirety, nor based on the prior art, found any motivation to combine any of the said prior arts which teaches the following limitations in combination with the other limitations of **claim 1**: ***the protective sleeve being***

made of an elastic waterproof material: the core housing being fixed to the first plug end and elastically abutted against the protective sleeve*; and* ***the core housing including a housing panel facing human body and a housing back panel opposite to the housing panel, and the vibration of the earphone core drives the housing panel and the housing back panel to vibrate, the vibration of the housing panel having a first phase, the vibration of the housing back panel having a second phase, wherein when the vibration frequencies of the housing panel and the housing back panel is within a range of 2000 Hz to 3000 Hz, an absolute value of a difference between the first phase and the second phase is less than 60 degrees; the circuit housing being fixed to the second plug end.***

Claims 2-15, 18-20 and 23-24 are allowed based on their respective dependency from **claim 1.**

5. As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to OYESOLA C OJO whose telephone number is (571)272-0848. The examiner can normally be reached Monday through Friday 8:00am to 4:00pm Central Time.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/OYESOLA C OJO/
Primary Examiner, Art Unit 2654.

Notice of References Cited	Application/Control No. 17/139,076	Applicant(s)/Patent Under Reexamination LI et al.	
	Examiner OYESOLA C OJO	Art Unit 2654	Page 1 of 1

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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/139,076	LI et al.
	Examiner	Art Unit
	OYESOLA C OJO	2654

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04R1/105, H04R1/023, H04R1/026, H04R1/1008, H04R1/1041	11/22/2021	OCO
H04R1/1058, H04R1/1091, H04R1/44, H04R9/025, H04R31/00,	11/22/2021	OCO
H04R1/1016, H04R1/1025, H04R2201/10, H04R2460/13, H04R1/1066	11/22/2021	OCO
H04R1/347, H04R5/0335, H04R5/033, H04R1/06, H04R11/02	11/22/2021	OCO
H04R2225/63	11/22/2021	OCO

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
Performed Inventors and Assignee searches	11/22/2021	OCO
Considered IDS submitted by the Applicant	11/22/2021	OCO
searches in EAST limited by keywords, text strings and CPC symbols	11/22/2021	OCO
Performed searches in Global Dossier, WIPO, EPO as applicable.	11/30/2021	OCO

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
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Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

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✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/30/2021								
	1	O								
	2	O								
	3	O								
	4	O								
	5	O								
	6	O								
	7	O								
	8	O								
	9	O								
	10	O								
	11	O								
	12	O								
	13	O								
	14	O								
	15	O								
	18	O								
	19	O								
	20	O								
	23	O								
	24	O								

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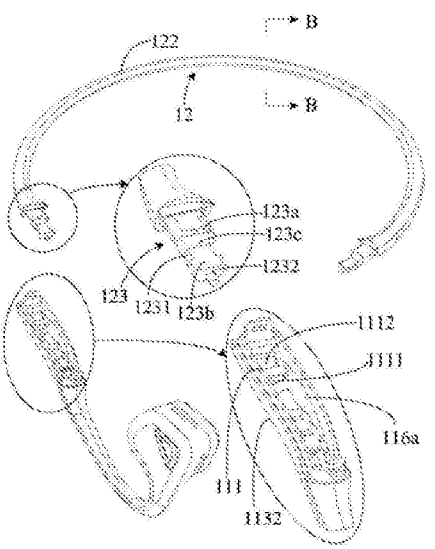
权利要求书1页 说明书10页 附图8页

(54)发明名称

一种骨传导耳机

(57)摘要

本发明实施例提供一种骨传导耳机包括两个耳挂组件，所述耳挂组件包括第一壳体、第二壳体以及连接所述第一壳体和第二壳体的连接部件，所述骨传导耳机进一步包括后挂组件，所述后挂组件两端设置有接插部，所述接插部分别与所述两个耳挂组件的第一壳体接插配合，并固定连接。通过上述方式，本发明能够使得骨传导耳机结构更简便。



CN 107484054 A

1.一种骨传导耳机，其特征在于，所述骨传导耳机包括两个耳挂组件，所述耳挂组件包括第一壳体、第二壳体以及连接所述第一壳体和第二壳体的连接部件，所述骨传导耳机进一步包括后挂组件，所述后挂组件两端设置有接插部，所述接插部分别与所述两个耳挂组件的第一壳体接插配合，并固定连接。

2.根据权利要求1所述的骨传导耳机，其特征在于，所述第一壳体的端部设置有用于允许所述接插部插入的接插孔以及在所述接插部的插入方向的垂直方向连通所述接插孔与外部的开孔，以允许从外部经所述开孔向所述接插孔内施加胶水或安装卡止件，以使得所述接插部在所述胶水或卡止件的作用下固定在所述接插孔内。

3.根据权利要求2所述的骨传导耳机，其特征在于，所述接插部的侧壁上设置有开槽，所述开槽经所述开孔外露，并用于接收所述胶水或卡止件。

4.根据权利要求3所述的骨传导耳机，其特征在于，所述连接部件包括两端分别连接所述第一壳体和所述第二壳体的第一弹性金属丝以及包覆在所述第一弹性金属丝上的第一弹性覆层，所述后挂组件包括第二弹性金属丝以及包覆在所述第二弹性金属丝上的第二弹性覆层，所述接插部设置在第二弹性金属丝两端。

5.根据权利要求4所述的骨传导耳机，其特征在于，所述接插部包括与所述第二弹性金属丝连接的第一接插段以及与所述第一接插段连接且远离所述第二弹性金属丝设置的第二接插段，所述接插孔沿所述接插部的插入方向划分为用于接收所述第一接插段的第一孔段和用于接收所述第二接插段的第二孔段，其中所述第一孔段的尺寸设置成允许所述第二接插段沿所述插入方向在所述第一孔段内自由移动，且使得所述第一接插段与所述第一孔段之间紧配合。

6.根据权利要求5所述的骨传导耳机，其特征在于，所述第二孔段的尺寸设置成使得所述第二接插段与所述第一孔段之间紧配合；和/或，

所述第一接插段两侧与所述第一孔段接触的接触面的形状不同。

7.根据权利要求5所述的骨传导耳机，其特征在于，所述开槽设置于所述第二接插段上。

8.根据权利要求5所述的骨传导耳机，其特征在于，所述第一接插段和所述第二接插段的底面呈阶梯状设置且在所述第一接插段和所述第二接插段的连接处设置有第一楔形过渡段，并且所述第一孔段和所述第二孔段的连接处设置有与所述第一楔形过渡段对应的第二楔形过渡段。

9.根据权利要求4所述的骨传导耳机，其特征在于，所述后挂组件进一步包括由所述第二弹性覆层包覆的第二导线组，其中所述第二导线组的两端从所述第二弹性覆层外露，所述接插部的顶面设置有用于容纳所述第二导线组的外露部分的埋线槽。

10.根据权利要求4所述的骨传导耳机，其特征在于，所述第一壳体和第二壳体分别以注塑方式与所述第一弹性金属丝的两端固定连接，所述第一弹性覆层以注塑方式固定包覆于所述第一弹性金属丝上，所述接插部以注塑方式固定于所述第二弹性金属丝的两端。

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一种骨传导耳机

技术领域

[0001] 本发明涉及耳机领域，特别是涉及一种骨传导耳机。

背景技术

[0002] 骨传导是一种声音传导方式，即将声音转化为不同频率的机械振动，通过人的颅骨、骨迷路、内耳淋巴液传递、螺旋器、听神经、听觉中枢来传递声波。骨传导耳机利用骨传导技术受话，紧贴骨头，声波直接通过骨头传至听神经。因此可以开放双耳，不伤害鼓膜，也因此受到广大消费者的喜爱。但是现有的骨传导耳机各部分一般都是通过螺丝等进行固定连接，尤其是现有的骨传导耳机的后挂与耳挂需要通过螺丝连接，由于螺丝及螺丝孔的存在使得耳机的整体尺寸无法缩小、组装不方便等问题。

发明内容

[0003] 本发明主要解决的技术问题是提供一种骨传导耳机，能够有效改善现有骨传导耳机后挂与耳挂通过螺丝和螺丝孔连接所带来的耳机尺寸无法缩小等问题。

[0004] 为解决上述技术问题，本发明实施例提供一种骨传导耳机包括两个耳挂组件，所述耳挂组件包括第一壳体、第二壳体以及连接所述第一壳体和第二壳体的连接部件，所述骨传导耳机进一步包括后挂组件，所述后挂组件两端设置有接插部，所述接插部分别与所述两个耳挂组件的第一壳体接插配合，并固定连接。

[0005] 与现有技术相比，本发明的有益效果是：本发明通过在后挂组件两端设置接插部，所述接插部分别与所述两个耳挂组件的第一壳体接插配合，取消了现有骨传导耳机的螺丝配合固定的方式，能够有效减小骨传导耳机的后挂与耳挂连接位置的尺寸，以此可以减小耳机尺寸，且便于组装。

附图说明

[0006] 图1是本发明骨传导耳机实施例中耳挂组件的结构示意图；

[0007] 图2是本发明骨传导耳机实施例中骨传导耳机整体结构拆解示意图；

[0008] 图3是本发明骨传导耳机实施例中耳挂组件的另一结构示意图；

[0009] 图4是图3中A-A的截面结构示意图；

[0010] 图5是本发明骨传导耳机实施例中骨传导耳机部分结构拆解示意图；

[0011] 图6是图5中C-C的截面结构示意图；

[0012] 图7是本发明骨传导耳机实施例中电路示意图；

[0013] 图8是本发明骨传导耳机实施例中第四壳体的结构示意图；

[0014] 图9是本发明骨传导耳机实施例中骨传导耳机接插部与接插孔结构放大示意图；

[0015] 图10是本发明骨传导耳机实施例中接插部与接插孔截面结构示意图；

[0016] 图11是本发明骨传导耳机实施例中接插孔结构示意图；

[0017] 图12是本发明骨传导耳机实施例中接插部结构示意图；

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[0018] 图13是图9的B-B的截面结构示意图；

[0019] 图14是本发明骨传导耳机实施例中骨传导耳机另一部分结构拆解示意图；

[0020] 图15是图14的部分结构截面示意图；

[0021] 图16是本发明骨传导耳机实施例中控制电路组件结构示意图；

[0022] 图17是本发明骨传导耳机实施例中控制电路组件另一结构示意图。

具体实施方式

[0023] 参阅图1和图2，本发明骨传导耳机实施例包括耳挂组件11，耳挂组件11包括第一壳体111、第二壳体112以及连接第一壳体111和第二壳体112的连接部件113，其中连接部件113包括两端分别连接第一壳体111和第二壳体112的第一弹性金属丝1131以及包覆在第一弹性金属丝1131上的第一弹性覆层1132。

[0024] 一般，骨传导耳机还包括骨传导扬声器、电池、控制电路等元件，例如骨传导扬声器用于以骨传导的方式通过振动向用户输出声音。电池用于给骨传导耳机各元件供电。控制电路用于控制骨传导耳机例如实现调节音量、开关机、播放音频以及蓝牙通讯等功能。

[0025] 耳挂组件11一般用于用户在佩戴骨传导耳机时挂于其耳部，如此可以使骨传导耳机较稳固地佩戴于用户的耳部。耳挂组件11需要具备良好的抗压以及抗变形能力，以便在用户在使用时不容易将骨传导耳机损坏或者致其变形。

[0026] 在本实施例中，连接部件113可直接接触耳部并通过人耳根部支承骨传导耳机，连接部件113包括第一弹性金属丝1131以及包覆在第一弹性金属丝1131上的第一弹性覆层1132，通过第一弹性金属丝1131连接第一壳体111与第二壳体112，能够有效增强骨传导耳机的弯折性能以及结构稳定性，使耳挂组件11在受到弯折时能够有效地进行弹性回复而恢复原状，不易变形。此外采用第一弹性金属丝1131能够改善传统骨传导耳机采用塑料作为耳挂组件的材料所导致的易损坏等问题。可选的是，连接部件113可以包括多根第一弹性金属丝1131，例如可以设置多根细小的第一弹性金属丝1131能够进一步提高耳挂组件11的弯折可靠性，例如设置3根第一弹性金属丝1131，每根第一弹性金属丝1131的直径0.3mm，此时3根第一弹性金属丝的材料可以相同也可以部分相同，或者全部不同，当然每根第一弹性金属丝1131的直径也可以相同、部分相同或者全部不同。

[0027] 在本实施例中，可选的是，第一弹性金属丝1131可以为金属单质，也可以为包括多种金属材料的合金材料，例如弹簧钢、铝合金、镁合金、钛合金、镍合金、钛镍合金、镁锂合金、铬钼钢等，也可以是包括金属材料与非金属材料的复合材料。可选的是，第一弹性金属丝1131为钛合金丝，或者至少由钛合金材料制成，例如直径为0.8-1.5mm的钛合金丝，可选为1.0-1.25mm。

[0028] 在本实施例中，第一弹性金属丝1131外包覆第一弹性覆层1132，第一弹性覆层1132直接与耳部接触，由于第一弹性覆层1132的弹性作用能够使得用户可以舒适地佩戴骨传导耳机。此外，第一弹性覆层1132由于其弹性作用的存在能够更有力地包覆第一弹性金属丝1131，即使在经过多次弯折后仍能有效包覆第一弹性金属丝1131，保证骨传导耳机结构的有效性。可选的是，第一弹性覆层1132为硅胶层，当然在其他实施例中，第一弹性覆层1132还可以是乳胶层或者橡胶层，或者其他有弹性的塑料层，或者为包含硅胶的复合材料层。

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[0029] 可选的是，第一壳体111和第二壳体112分别以注塑方式与第一弹性金属丝1131的两端固定连接，第一弹性覆层1132以注塑方式固定包覆于第一弹性金属丝1131上。可选的是，第一壳体111以及第二壳体112为塑料壳体，以注塑成型的方式固定在第一弹性金属丝1131的两端，以及第一弹性覆层1132是一体成型包覆第一弹性金属丝1131上，如此使得第一壳体111、第二壳体112与第一弹性金属丝1131之间的连接更稳固，且使得骨传导耳机的一体感与质感更强，使骨传导耳机的结构更紧凑更轻便。在本实施例中，注塑方式可以是注塑成型、热塑成型、压塑成型等中的一种，但不限于此。

[0030] 参阅图3和图4，可选的是，第一弹性覆层1132由不同颜色的两个子弹性覆层1132a、1132b拼合而成，其中两个子弹性覆层1132a、1132b的拼合缝分别位于连接部件113的相对设置的两个侧面113a、113b上，其中拼合缝在同一侧面上例如在外侧面113a上的投影彼此错开。例如在进行注塑成型时，采用至少两套模具对第一弹性覆层1132的两个子弹性覆层1132a、1132b分别进行成型，由此可形成不同配比的两种颜色例如为淡灰色与深灰色或者其他颜色的组合，且拼合缝位于连接部件113相对设置的两侧面113a、113b上，且在同一侧面上投影彼此错开，使得骨传导耳机的视觉效果更佳，进一步由于错开包覆第一弹性金属丝1131使得包覆效果更好。当然第一弹性覆层1132也可以由同颜色的两个子弹性覆层拼合而成。通过两次注塑成型分别在连接部件113的两侧面113a、113b上形成两个子弹性覆层1132a、1132b，能够改善一次注塑成型或者上下分开注塑成型时由于注塑压力的存在容易导致第一弹性覆层1132内的元件例如第一弹性金属丝1131产生移位降低连接部件113的成型质量。当然，在其他实施例中，第一弹性覆层1132可以直接形成一个覆层，或者形成数量多于两个的子弹性覆层。

[0031] 在本实施例中，连接部件113的两侧面包括相对设置内侧面113b与外侧面113a，是指在佩戴时耳挂组件11挂于人耳，连接部件113朝向人头部的一侧为内侧面113b，朝向人耳的一侧为外侧面113a。

[0032] 继续参阅图3和图4，可选的是，两个子弹性覆层1132a、1132b的拼合缝分别位于连接部件113的内侧面113b和外侧面113a上，且位于连接部件113的外侧面113a上的拼合缝的投影相较于位于连接部件113的内侧面113b上的拼合缝的投影更靠近连接部件113与人耳的接触位置。由此可知道，一条拼合缝位于外侧面113a的靠近接触人耳的位置，而另一条拼合缝位于内侧面113b以使得外侧面113a上几乎显示同一种颜色的子弹性覆层1132a或者1132b，例如外侧面113a几乎显示淡灰色，使得骨传导耳机一体感更强，更加美观。

[0033] 可选的是，拼合缝设置成使得两个子弹性覆层1132a、1132b在同一侧面例如113a或者113b上的面积彼此不同。在其他实施例中，拼合缝可以设置成使得两个子弹性覆层1132a、1132b在同一侧面上的面积相同或者大体相同。

[0034] 参阅图2至图4，可选的是，拼合缝设置成使得两个子弹性覆层1132a、1132b的颜色相对较浅的子弹性覆层1132a在外侧面113a上占据面积相对较大。也即，浅颜色的子弹性覆层1132a更多地位于外侧面113a，深颜色的子弹性覆层1132b更多地位于内侧面113b，如此使得连接件113的表面更具协调性，在保证结构性能的同时增强骨传导耳机的美学性能。

[0035] 继续参阅图1，可选的是，第一弹性金属丝1131的两端呈扁平状设置并分别嵌入第一壳体111和第二壳体112。也即在第一壳体111与第二壳体112以注塑的方式形成且固定于第一弹性金属丝1131呈扁平状设置的两端，如此可以增大第一弹性金属丝1131与第一壳体

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111、第二壳体112的接触面积，使得第一弹性金属丝1131与第一壳体111、第二壳体112更稳定地相互固定。可选的是，第一弹性金属丝1131呈扁平设置的两端的宽度大于连接该呈扁平设置的两端的连接部分的宽度，如此在成型后起到一个限位的作用，防止将第一弹性金属丝1131从第一壳体111、第二壳体112中拉出或者脱落。可选的是，第一弹性金属丝1131的两端呈螺纹状设置。在成型时，部分壳体可以成型于螺纹中，以起到固定的作用。当然，第一弹性金属丝1131的两端可以分别呈扁平状以及螺纹状设置。在其他实施例中，第一弹性金属丝1131两端还可以内凹以形成凹陷部，第一壳体111与第二壳体112在成型时，部分位于凹陷部内，以起到固定作用。

[0036] 参阅图1和图2，可选的是，第一弹性覆层1132进一步包覆第一壳体111和第二壳体112的至少部分外表面，例如全部外表面。即第一弹性覆层1132以注塑成型的方式包覆第一弹性金属丝1131、第一壳体111的至少部分外表面、第二壳体112的至少部分外表面，如此使得骨传导耳机的质感以及一体感更强，而且第一弹性覆层1132的存在，可以进一步保护壳体以及壳体内部的元件，使得骨传导耳机更耐磨损。

[0037] 参阅图5和图6，可选的是，第二壳体112上形成有通孔1121。即通孔1121贯穿第二壳体112的内侧面与外侧面。第一弹性覆层1132覆盖通孔1121并进一步在通孔1121上方且远离第二壳体112(即远离第二壳体112的内侧面)的一侧形成有按键容置部1121a。按键容置部1121a是由第一弹性覆层1132在注塑过程中覆盖通孔1121而形成，按键容置部1121a内由于第一弹性覆层1132的存在是可以隔绝水份、尘土等进入第二壳体内112。耳挂组件11进一步包括按键118和开关组件119，其中按键118设置于按键容置部1121a内。开关组件119设置于第二壳体112的远离第一弹性覆层1132的一侧，即第二壳体112的内侧面，并与按键118下方的第一弹性覆层1132抵接。可选的是，按键容置部1121a内设置有一凸台1121b，按键118以例如黏贴的方式固定在凸台1121b上。在本实施例中，由于第一弹性覆层1132以注塑方式固定包覆在第二壳体112上，且覆盖通孔1121，具有更好防水效果。可选的是，凸台1121b是在第一弹性覆层1132覆盖通孔1121时由第一弹性覆层1132一体成型而形成的。

[0038] 在本实施例中，第二壳体112上的开关组件119主要是用于控制骨传导耳机的功能开关，例如音乐的播放与暂停、语音的接听与挂断、连通无线信号以连接移动设备例如蓝牙通讯，或者骨传导耳机工作模式的选择等，不限于此。

[0039] 参阅图1、图2、图4和图7，可选的是，第一弹性覆层1132的内部进一步设置有用于连通第一壳体111和第二壳体112的引线通道1134，耳挂组件11进一步包括从第一壳体111经引线通道1134延伸至第二壳体112的第一导线组1133，引线通道1134的径向尺寸设置成允许第一导线组1133沿引线通道1134移动。

[0040] 通过设置引线通道1134，例如在后期组装时可以先将第一导线组1133一端连接(例如以板载的方式)第二壳体112内的元件例如骨传导扬声器，再将第一导线组1133另一端穿过引线通道1134以连接第一壳体111内的元件例如电池组件13、控制电路组件14或者转接电路板15等，如此可以减少组装工艺，而且能够改善现有骨传导耳机在第一弹性覆层1132在注塑成型时埋入第一导线组1133所带来的接线困难且不利于后期维修等问题。当然，在后期组装时也可以先将第一导线组1133一端连接(例如以板载的方式)第一壳体111内的元件例如电池组件13、控制电路组件14或者转接电路板15，再将第一导线组1133另一端穿过引线通道1134以连接第二壳体112内的元件例如骨传导扬声器等。

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[0041] 在本实施例中，引线通道1134具体的成型方式例如包括首先提供一个第一弹性金属丝1131连接的第一壳体111与第二壳体112的组件，进一步在第二壳体112与第一壳体111之间以可拆卸的方式设置附加金属丝(图未示)，再进一步在第一弹性金属丝1131、附加金属丝以及第一壳体111和第二壳体112的部分外表面以注塑方式形成第一弹性覆层1132，成型后抽取附加金属丝以形成引线通道1134。在其他实施例中，例如第一弹性覆层1132注塑成型时，埋入易融性材料，在第一弹性覆层1132注塑成型时，该易融性材料融化而流出，形成引线通道1134。又例如引线通道1134可以在第一弹性覆层1132成型后，通过穿针的方式形成通道，再通过热熔的方式扩大通道形成引线通道1134。

[0042] 继续参阅图1和图4，在本实施例中，可选的是，引线通道1134设置于第一弹性金属丝1131的下侧，以在使用时相较于第一弹性金属丝1131更靠近连接部件113与人耳的接触位置。在本实施例中，第一引线通道1134与第一弹性金属丝1131间隔独立设置。在其他实施例中，第一引线通道1134可以与第一弹性金属丝1131合并设置，即第一导线组1133在第一引线通道1134内可接触第一弹性金属丝1131。在本实施例中，引线通道1134设置于第一弹性金属丝1131的下侧，以在使用时相较于第一弹性金属丝1131更靠近连接部件113与人耳的接触位置，由于引线通道1134的存在，可以使得靠近人耳的第一弹性覆层1132更具弹性更加柔和，佩戴更加舒适。在其他实施例中，当然第一引线通道1134也可以设置在第一弹性金属丝1131的上侧，在使用时第一弹性金属丝1131更靠近人耳。

[0043] 参阅图1、图2和图8，可选的是，耳挂组件11包括第三壳体114和第四壳体115。其中第三壳体114与第一壳体111配合，以形成用于收容电池组件13或控制电路组件14的第一容置空间116。第四壳体115与第二壳体112配合，以形成用于收容骨传导扬声器的第二容置空间117。可选的是，第四壳体115与第三壳体114为塑料壳体。

[0044] 可选的是，第二壳体112与第四壳体115通过第一卡扣组件(未标注)连接，第一卡合组件包括第一卡合部以及第一扣合部，第一卡合部设置于第四壳体115上，第一扣合部设置于第二壳体112上，第二壳体112与第四壳体115配合时，第四壳体115上的第一卡合部卡入第二壳体112的第一扣合部，以将第二壳体112与第四壳体115固定在一起。可选的是，第二壳体112与第四壳体115通过至少一组第一卡扣组件例如4组第一卡扣组件进行连接。当然第二壳体112与第四壳体115也可以通过胶水粘合，或者通过第一卡合组件与胶水同时作用进行固定，或者通过螺丝等紧固件连接固定。

[0045] 可选的是，第三壳体114与第一壳体111通过第二卡扣组件(未标注)连接，第二卡扣组件包括第二卡合部以及第二扣合部，第二卡合部设置在第三壳体114上，第二扣合部设置在第一壳体111上，在第一壳体111与第三壳体114配合时，第三壳体114的第二卡合部卡入第一壳体111的第二扣合部，以将第一壳体111与第三壳体114固定在一起。

[0046] 在本实施例中，耳挂组件11的第三壳体114与第一壳体111配合，以形成用于收容电池组件13或控制电路组件14的第一容置空间116，第四壳体115与第二壳体112配合，以形成用于收容骨传导扬声器的第二容置空间117，第一导线组1133可以移动穿过引线通道1134用于电连接骨传导扬声器与电池组件13或控制电路组件14。在本实施例中，电池组件13例如包括电池以及电池管理电路，电池通过电池管理电路为骨传导耳机其他部件进行供电，例如电池管理电路包括充电电路，过流保护电路、过放保护电路、过压保护电路等。例如电池为可充电电池，例如为锂电池。参阅图7，可选的是，骨传导耳机还进一步包括例如转接

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电路板15，设置于第一容置空间116内，电池组件14通过转接电路板15分成多个接线焊点，以相对应连接骨传导耳机的两个骨传导扬声器、控制电路组件14、麦克风、以及开关组件119等，上述元件相关导线与上述接线焊点连接并按图7方式导通，便于接线和组装。例如电池组件14通过正负极的两个接线焊点连接转接电路板15，转接电路板15分出10个接线焊点，以连接骨传导耳机的其他部件。

[0047] 参阅图1和图2，可选的是，第一壳体111内设置有第一子容置空间116a，第三壳体114内设置有第二子容置空间116b，并在第三壳体114与第一壳体111配合时与第一子容置空间116a共同形成第一容置空间116，例如通过第一卡扣组件进行固定连接。其中第二子容置空间116b的体积大于第一子容置空间116a。例如第二子容置空间116b的体积是第一子容置空间116a的2-5倍，例如为3-4倍，例如为3.2倍，或例如为2.5倍。

[0048] 在组装电池组件13或者控制电路组件14，例如先将电池组件13或者控制电路组件14放置在第一子容置空间116a内，例如电池通过胶材或者双面胶粘贴于第一子容置空间116a内，或者控制电路组件14通过卡合结构固定于第一子容置空间116a内，使得电池组件13或者控制电路组件14大部分外露，便于组装和接线等工艺，再将第三壳体114通过第二卡扣组件与第一壳体111盖合，第一子容置空间116a与第二子容置空间116b形成第一容置空间116，如此改善了传统骨传导耳机需要将电池或者控制电路板装配并容纳在与耳挂一体成型的壳体内并进一步利用硅胶条贴于电池控制电路板外部部分进行包覆所导致的组装工序复杂的问题，简化结构以及组装工序。

[0049] 参阅图2和图8，可选的是，第四壳体115呈棱柱状设置，其中在第四壳体115的至少一侧面上设置有条形引音孔1151，其中条形引音孔1151的长度方向与第四壳体115的底面平行或者大致平行设置，且条形引音孔1151的长度不小于其所在的侧面的宽度的三分之二。在本实施例中，条形引音孔相对平行的底面115e是指在佩戴时第四壳体115朝向人体脸部的一面的开口边缘所定义的平面。

[0050] 一般，骨传导扬声器在振动的过程中会向周边的环境传递声音，除了佩戴者外，环境中的他人也能够听到扬声器的声音，例如骨传导扬声器的振动引起了第二容置空间117内空气的振动以及引起第四壳体115等的振动，从而出现漏音现象，会影响骨传导耳机的音质。引音孔1151是将第二容置空间117内的声波引导传播至空间外，与漏音声波同在空气中传播发生干涉，从而降低漏音声波的振幅，减小漏音。

[0051] 继续参阅图8，为了进一步改善漏音现象，本实施例通过在第四壳体115的至少一侧面设置条形引音孔1151，并适当设置其尺寸和方向改善了传统骨传导耳机带来的漏音现象仍比较严重的问题。进一步地，条形引音孔1151的长度方向与第四壳体115的底面平行设置，不仅可以保证美观，而且经平行引导的声波强度的均匀性，从而保证干涉效果。在本实施例中，条形引音孔1151的长度不小于其所在的侧面的宽度的三分之二，能够有效引导第二容置空间117内的声波。可选为，条形引音孔1151的长度为其所在的侧面的宽度的四分之三。当然，在其他实施例中，其中在第四壳体115的至少一侧面上并列设置有至少两条条形引音孔1151，例如在至少一侧面上设置两条平行的条形引音孔1151，且与第四壳体115的底面115e平行。

[0052] 可选的是，第四壳体115在骨传导耳机使用时靠近人耳的侧面115d上不设置条形引音孔1151。当然，在其他实施例中，也可以在第四壳体115在骨传导耳机使用时靠近人耳

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的侧面115d上设置引音孔，可以是点式引音孔，或者条形引音孔1151。

[0053] 继续参阅图2和图8，可选的是，第四壳体115呈四棱柱状设置，其中在第四壳体115与连接部件113相邻设置的两个侧面115a、115c上设置有条形引音孔1151，进一步剩余的两个侧面115b、115d中的在骨传导耳机使用时远离人耳的侧面115b同样设置条形引音孔1151，且剩余的两个侧面115b、115d中的在骨传导耳机使用时靠近人耳的侧面115b上不设置条形引音孔1151。也即在三个侧面115a、115b、115c上设置三个条形引音孔1151，在骨传导耳机使用时靠近人耳的侧面115d不设置条形引音孔1151，如此可以进一步减少漏音现象，保证骨传导耳机的音质。

[0054] 在本实施例中，第四壳体115呈四棱柱状设置，例如包括正四棱柱以及类四棱柱状。例如具体地，第四壳体115的与连接部件113相邻设置的两个侧面115a、115c的任一个侧面的长度均大于剩余的两个侧面115b、115d的任一个侧面的长度，进一步地，第四壳体115的与连接部件113相邻设置的两个侧面115a、115c的长度不相等或者相等。在其他实施例中，第四壳体115呈四棱柱状设置，其四个侧面的长度均可相等。

[0055] 在本实施例中，可选的是，第四壳体115的与连接部件113相邻设置的两个侧面115a、115c之间的夹角为90°-150°，可选为100°-130°，可选为110°-120°。

[0056] 可选的是，第四壳体115内进一步设置有覆盖条形引音孔1151的防水防尘滤网，例如防水透气膜(图未示)。设置防水防尘滤网，可以防止骨传导耳机外的灰尘以及防水骨传导耳机进水进入损坏骨传导扬声器。

[0057] 在本实施例中，第二壳体112与第四壳体115上分别设置有一麦克风孔(图未示)，具体的，第一麦克风孔设置在第四壳体115不直接与连接部件113连接的剩余两侧面115b、115d的连接处，第二麦克风孔设置在第二壳体112的外侧面且靠近第四壳体115与连接部件113的连接处。通过在两个错开设置的麦克风孔内设置两个麦克风，能够增强语音输入质量，且起到有效的降噪作用，由此提高语音输入的清晰度。

[0058] 参阅图2以及图9，在本实施例中，耳挂组件11的数量为两个，骨传导耳机进一步包括后挂组件12。后挂组件12包括第二弹性金属丝121、包覆在第二弹性金属丝121上的第二弹性覆层122以及设置于第二弹性金属丝121两端的接插部123。接插部123分别与两个耳挂组件11的第一壳体111接插配合，并固定连接。可选的是，接插部123以注塑方式固定于第二弹性金属丝121的两端，如此可以使接插部123更稳固地固定于第二弹性金属丝121的两端。可选的是，第二弹性金属丝121可以为金属单质，也可以为包括多种金属材料的合金材料，例如弹簧钢、铝合金、镁合金、钛合金、镍合金、钛镍合金、镁锂合金、铬钼钢等，也可以是包括金属材料与非金属材料的复合材料。在本实施例中，第二弹性金属丝121为钛合金丝，或者至少由钛合金材料制成。在本实施例中，第二弹性覆层122为硅胶层。在其他实施例方式中，第二弹性覆层122也可以为橡胶层或者乳胶层，或者是包括硅胶的复合材料层。

[0059] 通过后挂组件12的接插部123与两个耳挂组件11的第一壳体111进行接插配合，改善了现有的骨传导耳机采用螺丝等固定方式带来的耳机尺寸较大等问题，从而简化结构，减轻骨传导耳机的重量，方便后期接线且能降低成本。

[0060] 参阅图9和图10，可选的是，第一壳体111的端部设置有用于允许接插部123插入的接插孔1111以及在接插部123的插入方向的垂直方向连通接插孔1111与外部的开孔1112，以允许从外部经开孔1112向接插孔1111内施加胶水或安装卡止件(图未示)，以使得接插部

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123在胶水或卡止件的作用下固定在接插孔1111内。在本实施中，开孔1112位于所述第一子容置空间116a内。在其他实施例中，第一壳体111的端部设置有用于允许接插部123插入的接插孔1111，接插部123上具有一凹部，接插孔1111内具有一弹性凸部，接插部123插入接插孔1111时，弹性凸部卡入凹部，以将接插部123与接插孔1111配合固定。例如接插部123插入接插孔1111时，弹性凸部先被挤压，后在弹性恢复力的作用下卡入凹部内。可选的是，接插部123插入接插孔1111的深度为6-11mm，可选为8-10mm。

[0061] 继续参阅图9和图10，可选的是，接插部123的侧壁上设置有开槽1231。开槽1231经开孔1112外露或者部分外露，并用于接收胶水或卡止件。可选的是，接插部123的至少一个侧壁上设置有开槽1231，例如两个侧壁上均设置有开槽1231。在其他实施例中，可以同时使用胶水和卡止件，例如先使用卡止件固定，再施加胶水进一步固定。在本实施例中，卡止件例如是楔子或者销钉、或者具有一定弹性的固定件插入开槽1231进行过盈配合。

[0062] 参阅图2、图9和图10，可选的是，接插部123包括与第二弹性金属丝121连接的第一接插段123a以及与第一接插段123a连接且远离第二弹性金属丝121设置的第二接插段123b。接插孔1111沿接插部123的插入方向划分为用于接收第一接插段123a的第一孔段1111a和用于接收第二接插段123b的第二孔段1111b。其中第一孔段1111a的尺寸设置成允许第二接插段123b沿插入方向在第一孔段1111a内自由移动，且使得第一接插段123a与第一孔段1111a之间紧配合。通过两段接插段与两端孔段的分别配合固定，可以使得接插部123更稳固地固定在第一壳体111内，增强骨传导耳机的结构稳定性。

[0063] 继续参阅图9和图10，可选的是，开槽1231进一步设置在第二接插段123b的侧壁。开孔1112连通接插孔1111的第二孔段1111b。在本实施例中，在接插部123第二接插段123b依次通过第一孔段1111a以及第二孔段1111b，以使第一接插段123a与第一孔段1111a紧配合，第二接插段123b的开槽1231经开孔1112外露，以用于接收胶水或者卡止件。通过第一接插段123a与第一孔段1111a的紧配合以及第二接插孔1111与第二孔段1111b的进一步配合固定，能够有效地将后挂与耳挂固定连接。在其他实施例中，开槽1231可以设置在第一接插段123a的侧壁上。开孔1112连通接插孔1111的第二孔段1111b。

[0064] 可选的是，第二孔段1111b的尺寸设置成使得第二接插段123b与第二孔段1111b之间紧配合。如此通过第一接插段123a与第一孔段1111a的紧配合、第二接插孔1111与第二孔段1111b的紧配合以及施加的胶水或者卡止件进行固定，进一步有效地将后挂与耳挂固定连接，且能够简化结构，使骨传导耳机轻便化。当然，在其他实施例中，第一接插段123a与第一孔段1111a之间紧配合，而第二接插段123b与第二孔段1111b可以是其他类型的固定配合例如卡扣配合。

[0065] 参阅图11，可选的是，第一接插段123a两侧与第一孔段1111a接触的接触面的形状不同。第一接插段123a的两侧形状不同，相对应地第一孔段1111a与第一接插段123a接触的两侧面1111a1、1111a2也不同。例如，第一孔段1111a的两侧面均呈弧形设置，内侧面1111a2的曲率半径大于外侧面1111a1的曲率半径，也即内侧面1111a2的弧度变化相对较缓，而外侧面1111a1的弧度变化相对较大，第一接插段123a两侧面相对应设置。当然，在其他实施例中，第一孔段1111a的两侧面均呈弧形设置，内侧面1111a2的曲率半径小于外侧面1111a1的曲率半径，也即内侧面1111a2的弧度变化相对较大，而外侧面1111a1的弧度变化相对较小。第一孔段1111a的两侧面在佩戴时靠近人体头部的为内侧面1111a2，远离人体头部即为外

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侧面1111a1。第一接插段123a两侧与第一孔段1111a接触的接触面的形状不同，使得第一接插段123a不能反插，且也使得后挂两个接插部123不能混插，起到有效的防呆效果，方便组装。

[0066] 参阅图9和图10，可选的是，第一接插段123a和第二接插段123b的底面呈阶梯状设置且在第一接插段123a和第二接插段123b的连接处设置有第一楔形过渡段123c，并第一孔段1111a和第二孔段1111b的连接处设置有与第一楔形过渡段123c对应的第二楔形过渡段1111c。

[0067] 在本实施例中，第一接插段123a与第二接插段123b的底面是指在佩戴时靠近人耳根部的一面。顶面则为远离人耳根部的一面。

[0068] 在本实施例中，第一接插段123a厚度要大于第二接插段123b的厚度即呈阶梯状设置，两者的连接处存在厚度差，且设置第一楔形过渡段123c，相对应的在第一孔段1111a和第二孔段1111b的连接处设置与第一楔形过渡段123c相适应的第二楔形过渡段1111c，在第一接插段123a与第二接插段123b依次插入第一孔段1111a与第二孔段1111b时，第一楔形过渡段123c与第二楔形过渡段1111c相抵接，能够方便第二接插段123b与第一接插段123a的插入，且起到缓冲过渡、限位以及进一步固定的作用。

[0069] 参阅图9、图12以及图13，可选的是，后挂组件12进一步包括由第二弹性覆层122包覆的第二导线组124，其中第二导线组124的两端从第二弹性覆层122外露，接插部123的顶面设置有用于容纳第二导线组124的外露部分的埋线槽1232。在本实施例中，第二导线组124，用于连接两个耳挂组件11内的元件例如连接电池以及控制电路组件14等。设置埋线槽1232，一方面可以有效布置和固定第二导线组124，另一方面可以减少体积。在其他实施例中，也可以不设置埋线槽1232，而通过其他方式例如胶水或者双面胶等将第二导线组124进行固定，或者在接插部123顶面设置有两排并列设置的凸块(图未示)，两排凸块之间可以容纳第二导线组124。

[0070] 参阅图2，可选的是，骨传导耳机进一步包括电池组件13和控制电路组件14，其中电池组件13设置于两个耳挂组件11中的一者的第一容置空间116，控制电路组件14设置于两个耳挂组件11中的另一者的第一容置空间116内。

[0071] 参阅图14和图15，可选的是，用于容纳控制电路组件14的耳挂组件11的第三壳体114上设置有按键开孔1141和与按键开孔1141连通的容置槽1142，控制电路组件14包括电路板141、固定于电路板141上的开关142、防水衬板143以及按键144，其中按键144设置于按键开孔1141内且经按键开孔1141外露，防水衬板143包括衬板主体143a以及以注塑方式包覆在衬板主体143a上的第三弹性覆层143b，防水衬板143设置于容置槽1142内且第三弹性覆层143b与容置槽1142的侧壁弹性抵接，按键144和开关142分别设置于防水衬板143的两侧且分别与防水衬板143抵接。在本实施中，第三弹性覆层143b包覆衬板主体143a的一侧面以及衬板主体143a的边缘，当然至少包覆部分边缘，也可以包覆全部边缘。在其他实施例中，第三弹性覆层143b可以完全包覆衬板主体143a，即包覆衬板主体143a的两侧面。

[0072] 在本实施例中，电路板141上的开关142主要是用于开关机、音量调节、或者其他切换功能等。

[0073] 继续参阅图14和图15，防水衬板143主体上以注塑方式包覆有第三弹性覆层143b，以使第三弹性覆层143b不容易从防水衬板143主体上脱落，且第三弹性覆层143b与防水衬

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板主体143a之间的致密性更好，改善了现有骨传导耳机防水性能，保证防水的有效性。在本实施例中，衬板主体143a可以为塑料，第三弹性覆层143b可以为硅胶、乳胶、橡胶或者为合成物。

[0074] 可选的是，防水衬板143靠近开关142的一侧设置有用于容纳开关142的定位槽1431。

[0075] 在本实施例中，组装控制电路组件14的方法例如首先将按键144、防水衬板143依次安置在第二壳体114上，且按键144设经按键开孔1141外露，接着电路板141通过开关142以及防水衬板143的定位槽1431与防水衬板143抵接。通过设置定位槽1431，能使开关142精准地与按键144进行定位配合，从而能够通过按键144有效地操作开关142。

[0076] 参阅图16和图17，可选的是，控制电路组件14进一步包括设置于电路板141上的天线145，天线145包括与电路板141间隔设置的天线主体145a以及连接天线主体145a与电路板141的接地部145b和馈电部145c，其中在垂直于电路板141的方向上观察时，天线主体145a从接地部145b向电路板141的一侧弯折延伸。在本实施例中，天线主体145a向电路板141的一侧弯折，能够在有限空间内增大天线145的长度，增大辐射效率。在本实施例中，天线145一般是用于进行无线通讯的，例如蓝牙通讯。在其他实施例中，还可以是WiFi通讯、蜂窝数据通讯，NFC近场通讯等。

[0077] 可选的是，天线主体145a包括平行部145a1与弯折部145a2，在垂直于电路板141的方向上观察，平行部145a1的宽度大于弯折部145a2的宽度，平行部145a1一端连接接地部145b以及馈电部145c，另一端连接弯折部145a2，平行部145a1与弯折部145a2在连接处呈阶梯状设置，弯折部145a2从连接处向电路板141的一侧弯折。

[0078] 可选的是，控制电路组件14进一步包括设置于电路板141上的接地部件146，其中天线主体145a向电路板141的远离接地部件146的一侧弯折延伸。在本实施例中，接地部件146为USB接口和/或电路上的开关142，或者其他接地部件146。一般，接地部件146例如USB接口，都会对天线145造成一定的干扰，在本实施例中，天线主体145a向电路板141的远离接地部件146的一侧弯折延伸，能够在有限空间内改善接地部件146对天线145信号的干扰，保证信号质量。在本实施例中，USB接口可用于在骨传导耳机与外界设备例如移动终端传输数据，也可用于为电池组件13充电。

[0079] 可选的是，天线主体145a的宽度沿天线主体145a的延伸方向逐渐变小。例如具体地，平行部145a1的宽度从一端到另一端宽度不变，弯折部145a2的宽度逐渐沿延伸方向逐渐变小。当然在其他实施例中，平行部145a1的宽度从一端到另一端可以逐渐变小，但平行部145a1另一端的宽度仍大于弯折部145a2的宽度。

[0080] 可选的是，天线主体145a的弯折角度沿天线主体145a的延伸方向逐渐变大。例如弯折角度逐渐变大，一般是为了远离接地部件146例如USB等，从而保证天线145的辐射效率。可选的是，在弯折部145a2远离平行部145a1的一端具有弯折脚145a3，此处的弯折角度最大，一方面为了满足天线145尺寸的需要，另一方面是为了提升辐射效率。

[0081] 以上所述仅为本发明的实施方式，并非因此限制本发明的专利范围，凡是利用本发明说明书及附图内容所作的等效结构或等效流程变换，或直接或间接运用在其他相关的技术领域，均同理包括在本发明的专利保护范围内。

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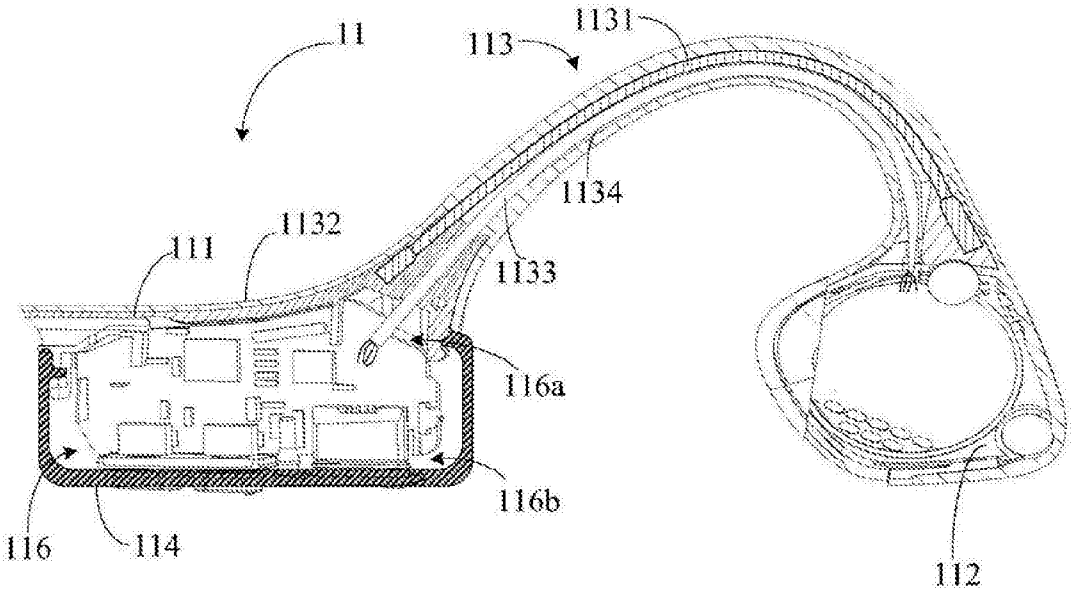


图1

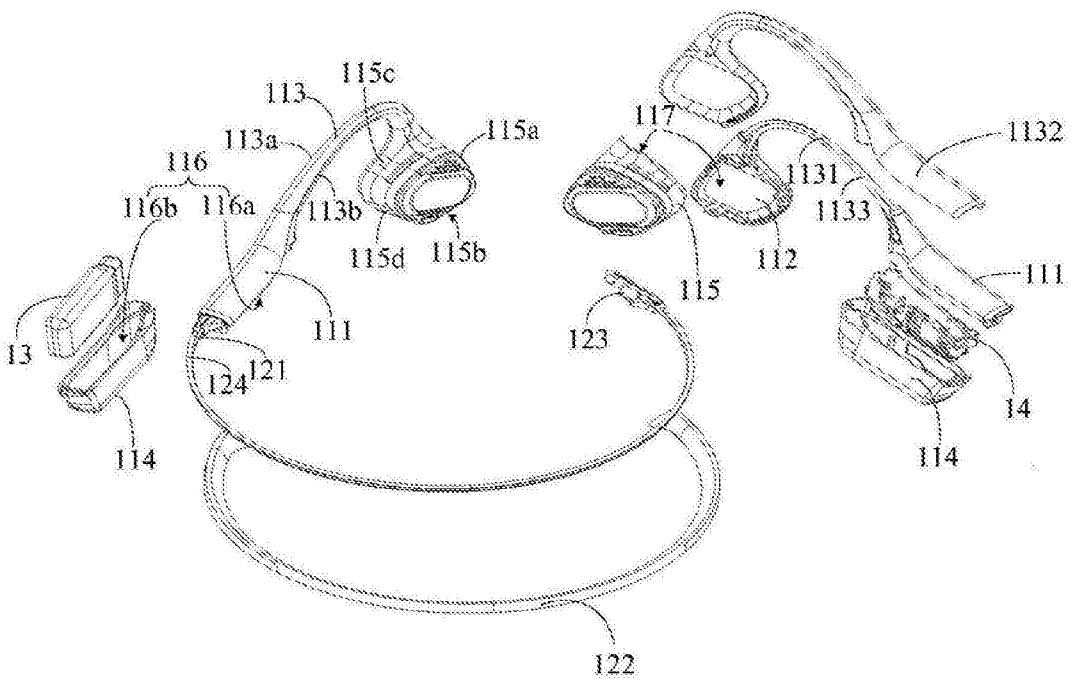


图2

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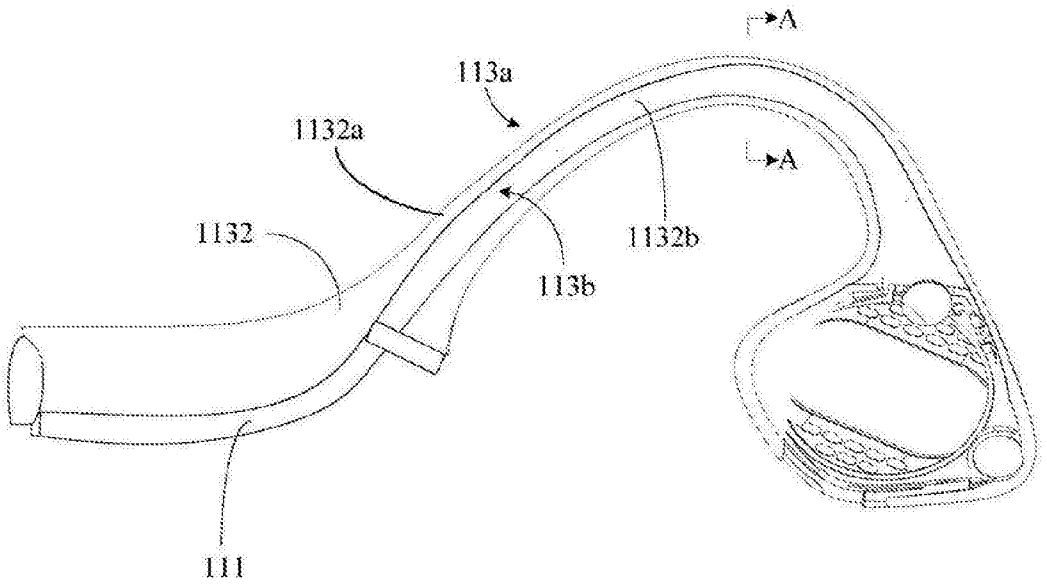


图3

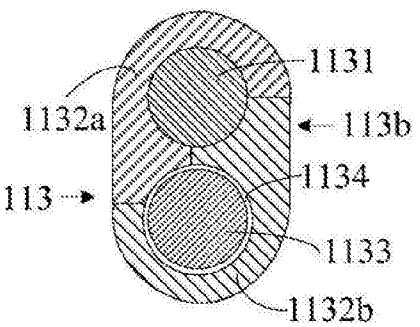


图4

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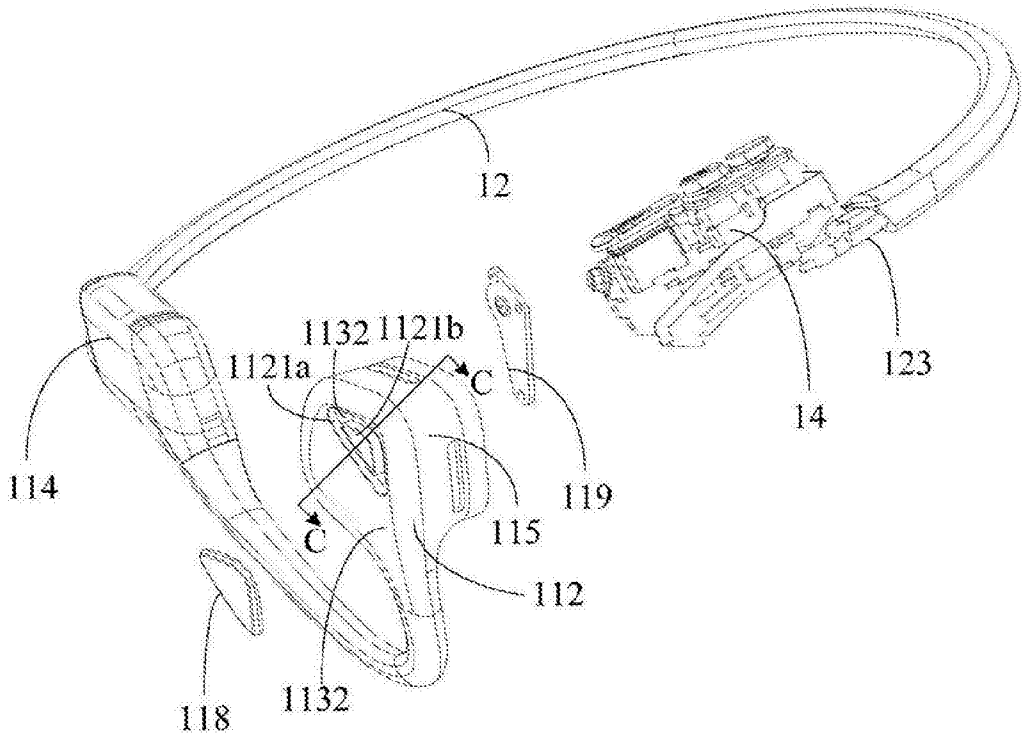


图5

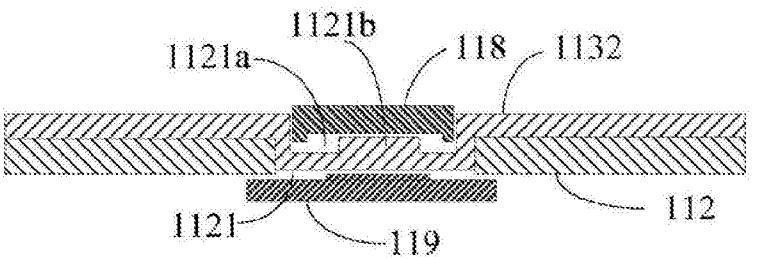


图6

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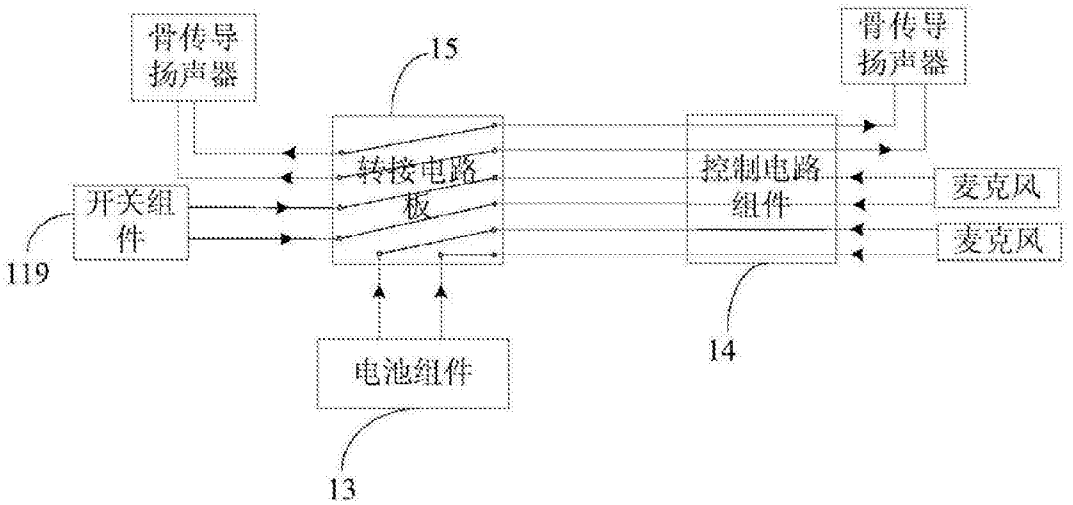


图7

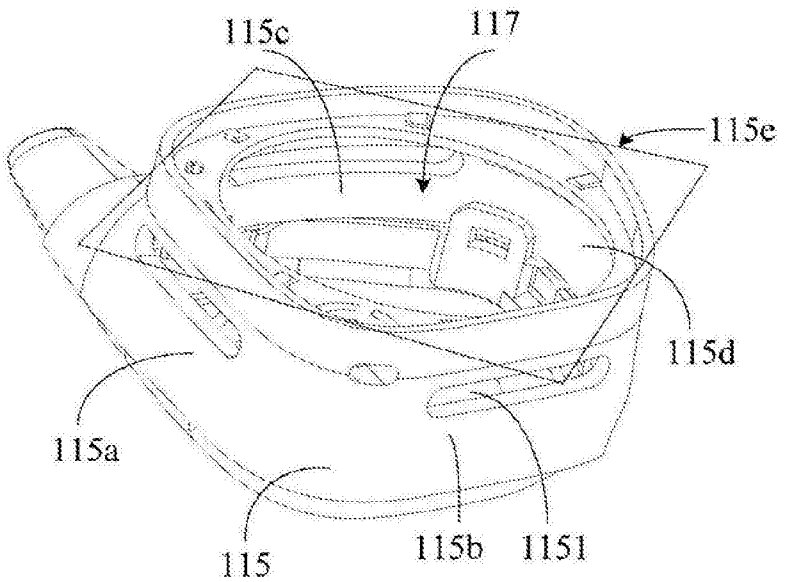


图8

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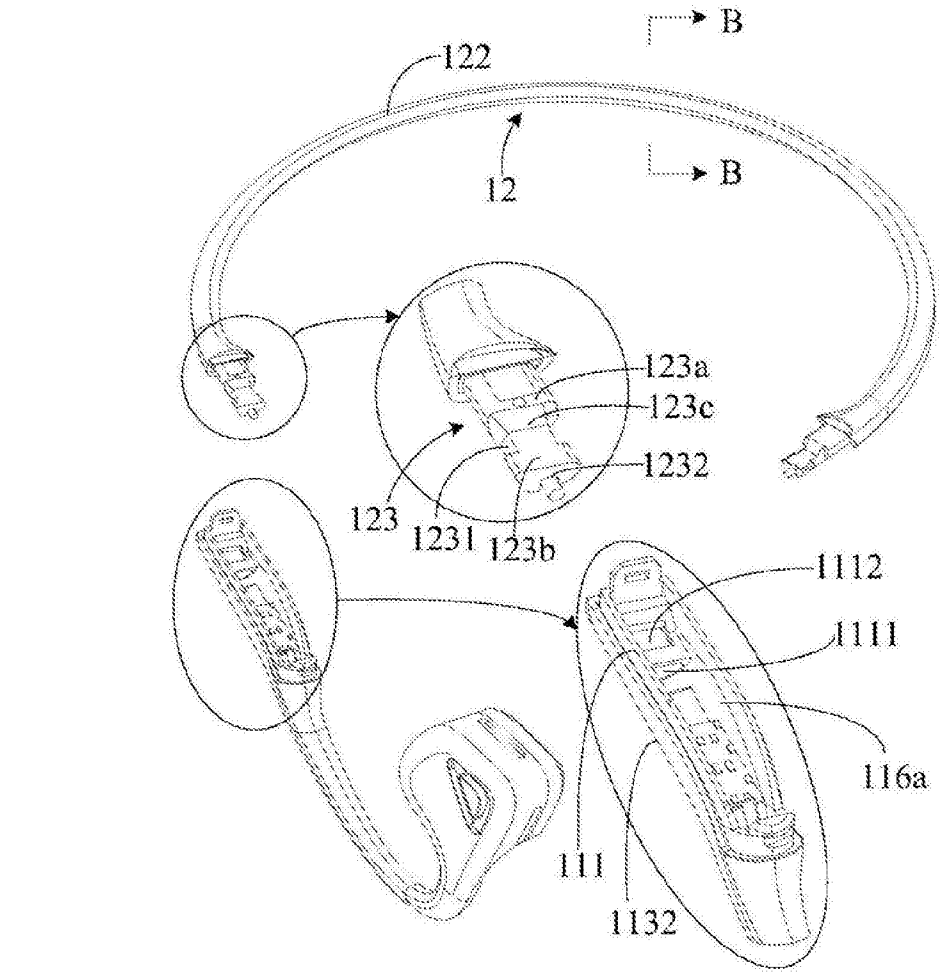


图9

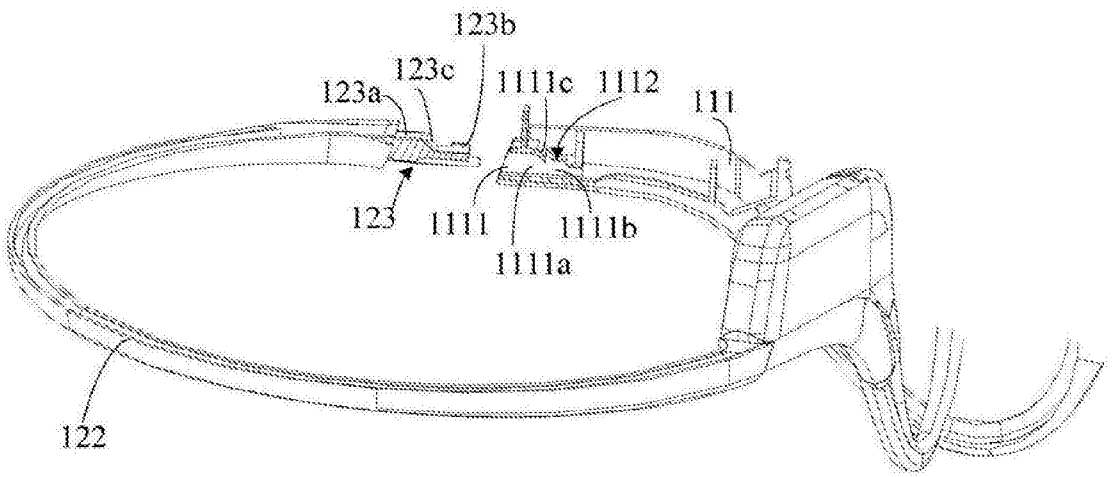


图10

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Ex. 2018 - Page 157

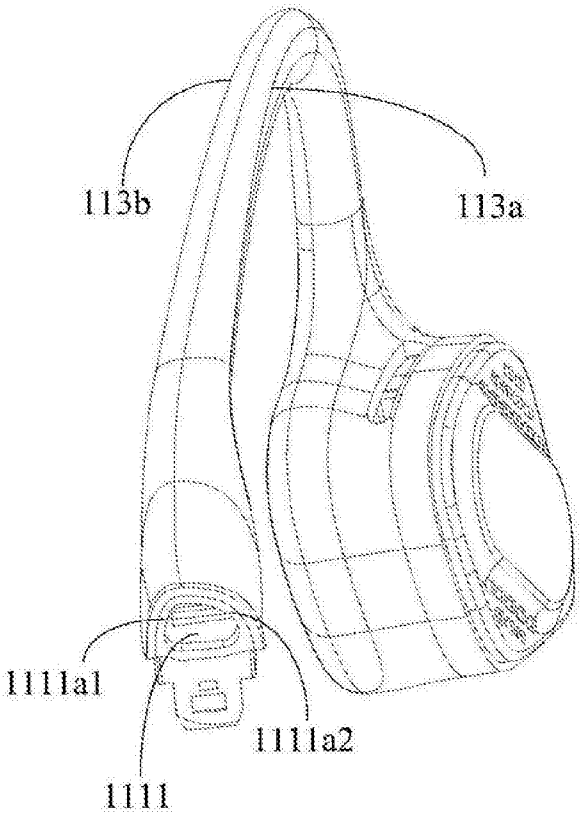


图11

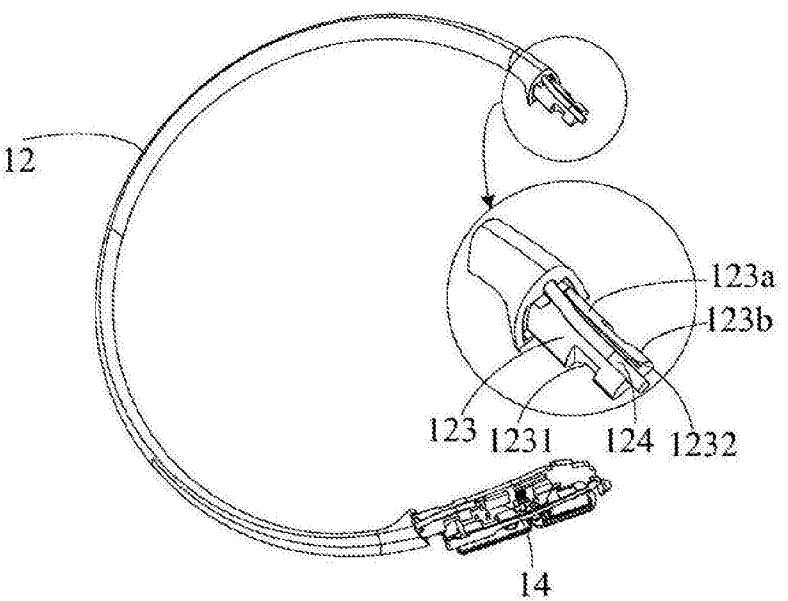


图12

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Ex. 2018 - Page 158

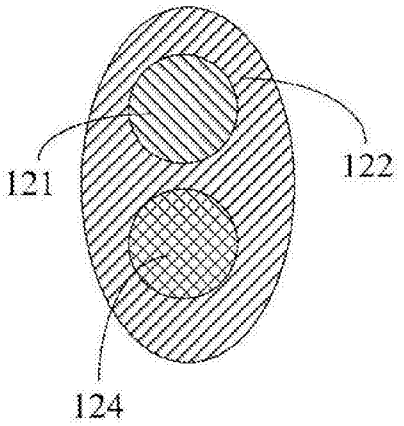


图13

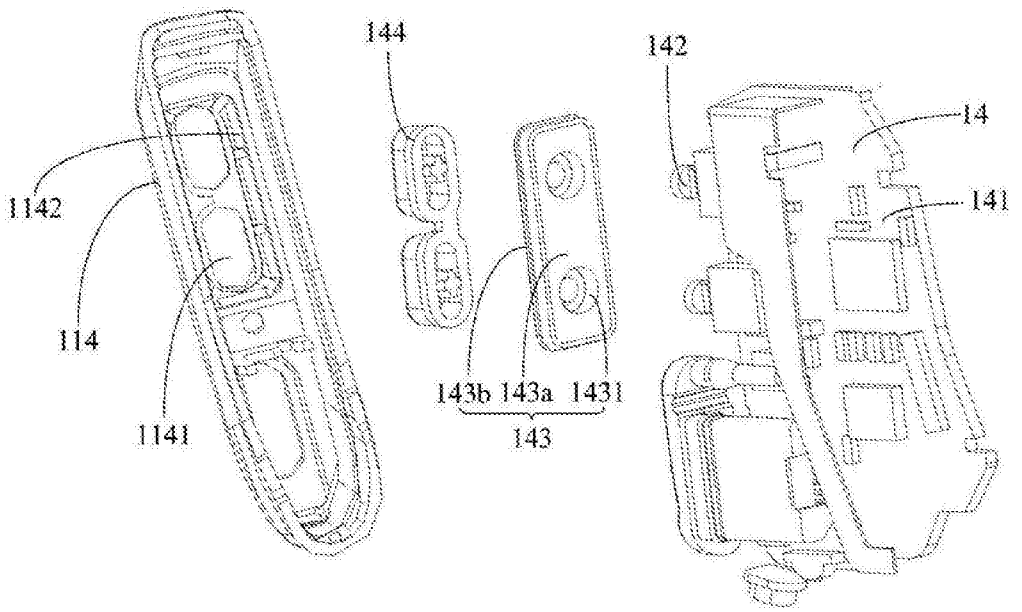


图14

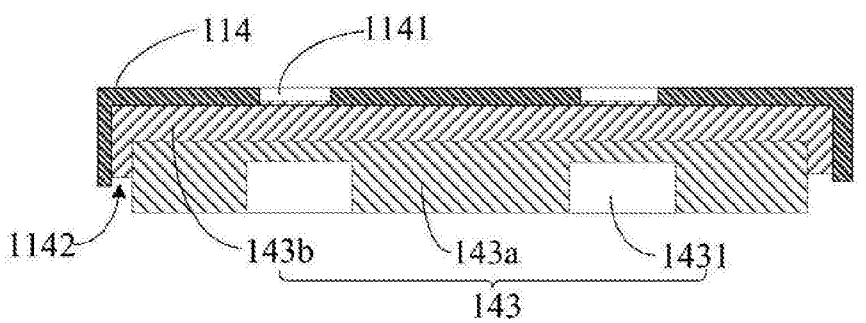


图15

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Ex. 2018 - Page 159

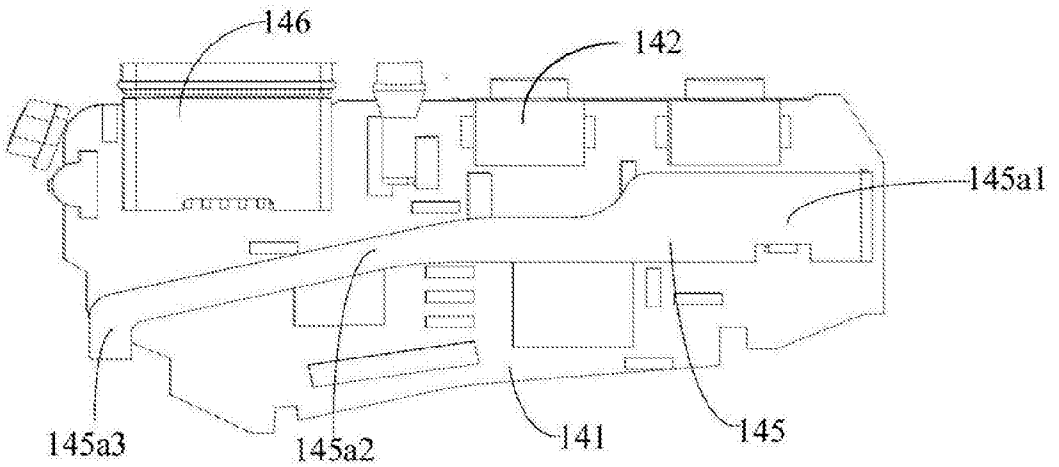


图16

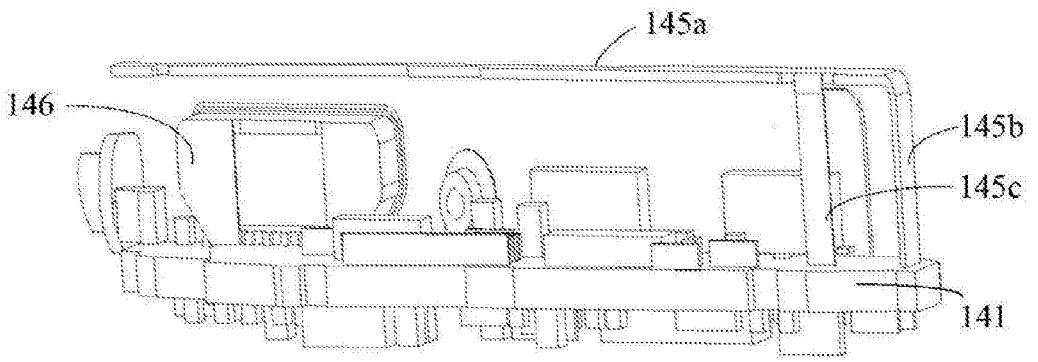


图17

IPR2025-00842; Shokz
Ex. 2018 - Page 160

Bibliographic Data

Application No: 17/139,076

Foreign Priority claimed: (•) Yes ( ) No

35 USC 119 (a-d) conditions met: [✓] Yes [ ] No [ ] Met After Allowance

Verified and Acknowledged: /OYESOLA C OJO/ Examiner's Signature | Initials

Title: LOUDSPEAKER APPARATUS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/31/2020	381	2654	20608-0080US00
RULE			

APPLICANTS

SHENZHEN VOXTECH CO., LTD., Shenzhen, CHINA

INVENTORS

Chaowu LI, Shenzhen, CHINA

Yongjian LI, Shenzhen, CHINA

CONTINUING DATA

This application is a CON of PCT/CN2019/102393 08/24/2019

FOREIGN APPLICATIONS

CHINA CN201910009927.4 01/05/2019

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	17139076
	Filing Date	2020-12-31
	First Named Inventor	Chaowu LI
	Art Unit	2654
	Examiner Name	
	Attorney Docket Number	20608-0080US00

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20130163791	A1	2013-06-27	XIN QI et al.	Corresponding to CN102497612A
	2	20160329041	A1	2016-11-10	XIN QI et al.	Corresponding to CN103716739A
	3	20170318369	A1	2017-11-02	JUNG-KUN WANG	
	4	20200336824	A1	2020-10-22	JINGBO ZHENG et al.	Corresponding to CN209120433U
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]

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	Application Number	17139076
	Filing Date	2020-12-31
	First Named Inventor	Chaowu LI
	Art Unit	2654
	Examiner Name	
	Attorney Docket Number	20608-0080US00

	1	203827497	CN	U	2014-09-10	MA QIANG		☒
	2	204465795	CN	U	2015-07-08	SHENZHEN RUIDIEN SCIENCE & TECH. CO., LTD.		☒
	3	107484054	CN	A	2017-12-15	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	4	207010974	CN	U	2018-02-13	XIAMEN NEWSOUND TECHNOLOGY CO., LTD.		☒
	5	207039848	CN	U	2018-02-23	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	6	207039849	CN	U	2018-02-23	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	7	207039851	CN	U	2018-02-23	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	8	207070282	CN	U	2018-03-02	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	9	207783068	CN	U	2018-08-28	SHENZHEN GRANDSUN ELECTRONICS CO., LTD.		☒
	10	2018175192	WO	A1	2018-09-27	BOSE CORPORATION		☐
	11	109547905	CN	A	2019-03-29	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒

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	Application Number	17139076
	Filing Date	2020-12-31
	First Named Inventor	Chaowu LI
	Art Unit	2654
	Examiner Name	
	Attorney Docket Number	20608-0080US00

	12	109660901	CN	A	2019-04-19	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	13	109714687	CN	A	2019-05-03	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	14	109769167	CN	A	2019-05-17	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	15	109788386	CN	A	2019-05-21	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	16	209089198	CN	U	2019-07-09	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	17	209184800	CN	U	2019-07-30	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	18	209184801	CN	U	2019-07-30	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	19	209267804	CN	U	2019-08-16	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	20	209358729	CN	U	2019-09-06	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒

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NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5

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	Application Number	17139076
	Filing Date	2020-12-31
	First Named Inventor	Chaowu LI
	Art Unit	2654
	Examiner Name	
	Attorney Docket Number	20608-0080US00

	1	International Search Report in PCT/CN2019/102397 mailed on October 29, 2019, 6 pages	☒
	2	International Search Report in PCT/CN2019/102399 mailed on October 30, 2019, 7 pages	☒
	3	International Search Report in PCT/CN2019/102392 mailed on November 21, 2019, 7 pages	☒
	4	International Search Report in PCT/CN2019/102400 mailed on November 22, 2019, 8 pages	☒
	5	International Search Report in PCT/CN2019/102393 mailed on November 25, 2019, 7 pages	☒

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EXAMINER SIGNATURE

Examiner Signature	/OYESOLA C OJO/	Date Considered	11/22/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Application Number	17139076
	Filing Date	2020-12-31
	First Named Inventor	Chaowu LI
	Art Unit	2654
	Examiner Name	
	Attorney Docket Number	20608-0080US00

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Yangzhou Du/	Date (YYYY-MM-DD)	2021-03-30
Name/Print	Yangzhou Du	Registration Number	65310

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	47	((("LI") near3 ("Chaowu")) OR (("LI") near3 ("Yongjian"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2021/11/22 17:08
S2	454	SHENZHEN near VOXTECH.as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 17:08
S3	5	"17139076"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 17:16
S4	7	"207039851"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 17:19
S5	26	("10154334" | "20010002928" | "20040032964" | "20160381472" | "20170195770" | "20200221221" | "20210165243" | "9967646").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 17:30
S6	8	("10154334" | "20010002928" | "20040032964" | "20160381472" | "20170195770" | "20200221221" | "20210165243" | "9967646").PN.	US-PGPUB; USPAT	OR	ON	2021/11/22 17:30
S7	1,901,432	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2021/11/22 17:38

		sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))	DERWENT; IBM_TDB			
S8	1,525,179	(((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) with (Device module element component apparatus piece unit assembly system mechanism package structure arrangement equipment or instrument item part gadget member peripheral article entity object body machine subunit subassembly))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 17:39

S9	80,862	(H04R1/105 or H04R1/023 or H04R1/026 or H04R1/1008 or H04R1/1041 or H04R1/1058 or H04R1/1091 or H04R1/44 or H04R9/025 or H04R31/00 or H04R1/1016 or H04R1/1025 or H04R2201/10 or H04R2460/13 or H04R1/1066 or H04R1/347 or H04R5/0335 or H04R5/033 or H04R1/06 or H04R11/02).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 18:31
S11	101	H04R2225/63.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 18:31
S12	311,483	((Earpiece earphone earbud earset earinsert eardome earspeaker earplug eartip earmold ear$1phone ear$1piece ear$1bud ear$1set ear$1mold ear$1speaker ear$1insert ear$1tip ear$1plug ear$1dome ear$1receiver) or (ear concha conchae canal in$1ear in$1the$1ear in$1the$1canal in adj ear in adj the adj ear) near (insert tip bud set piece phone shroud dome insertable speaker receiver mold) or (in$1the$1ear completely$1in$1the$1canal receiver$1in$1the$1canal receiver$1in$1the$1concha receiver$1in$1the$1ear))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 18:48
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		(Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) with (Device module element component apparatus piece unit assembly system mechanism package structure arrangement equipment or instrument item part gadget member peripheral article entity object body machine subunit subassembly))				
S14	77,556	S12 same S13	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 18:53
S15	47	((("LI") near3 ("Chaowu")) OR (("LI") near3 ("Yongjian"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2021/11/22 19:30
S16	454	SHENZHEN near VOXTECH.as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:30
S17	133	S14 and (S15 S16)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:30
S18	1,890	S14 and (ear near (hook loop hanger clip holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:43

S19	1,984	S14 and (earhook earhanger ear$1hook ear$1hanger ear near (hook loop hanger clip holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:44
S20	70	S19 and (S15 S16)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:51
S21	936	S19 and (S9 S10)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:51
S22	67	S21 and (S15 S16)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:52
S23	348	oyesola near ojo	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:53
S25	3	S23 and S19	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:53
S26	828	S14 same (earhook earhanger ear$1hook ear$1hanger ear near (hook loop hanger clip holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:54

S27	39	S26 and (S15 S16)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 19:55
S28	10	("20110317845" | "20130163791" | "20150319526" | "20160249129" | "20170006400" | "20170087364" | "20170295431" | "20180063626" | "20190253786" | "20200336824").PN. OR ("11109142").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2021/11/22 19:57
S29	18	("10154334" | "20010002928" | "20040032964" | "20040235364" | "20080119078" | "20130163791" | "20140254848" | "20160007127" | "20160329041" | "20160337766" | "20160381472" | "20170195770" | "20170318369" | "20200221221" | "20200336824" | "20210165243" | "5784470" | "9967646").PN. OR ("11159877").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2021/11/22 19:57
S30	361	S26 and (S9 S10)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 20:27
S31	36	S30 and (S15 S16)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 20:27
S32	182	S26 and (S9 S10)	US-PGPUB	OR	ON	2021/11/22 20:28
S33	3	S31 not S32	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/22 20:28
S34	325	S30 not S31	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2021/11/22 20:28

			JPO; DERWENT; IBM_TDB			
S35	149	S30 not S31	US-PGPUB	OR	ON	2021/11/22 20:31
S36	4	("20130163791" | "20160329041" | "20170318369" | "20200336824").PN.	US-PGPUB; USPAT	OR	ON	2021/11/22 20:32
S37	186,801	(B60Q1/2665 OR B60Q1/2661 OR B60Q3/217 OR B60Q2500/10 OR B60Q3/54 OR B60Q1/323 OR B60Q3/20 OR B60Q3/64 OR B60Q3/78 OR B60Q1/0041 OR B60Q1/26 OR B60Q1/2607 OR B60Q1/302 OR B60Q2400/10 OR B60Q3/233 OR B60Q3/76 OR B60Q1/22 OR B60Q1/24 OR B60Q1/2669 OR B60Q1/34 OR B60Q1/38 OR B60Q1/484 OR B60Q1/525 OR B60Q2400/40 OR B60Q2400/50 OR B60Q3/62 OR B60Q3/745 OR B60Q3/80 OR B60Q5/005 OR B60Q9/00 OR B60Q9/002 OR B60R1/1207 OR B60R1/02 OR B60R1/12 OR B60R13/0243 OR B60R2013/0287 OR B60R1/06 OR B60R11/02 OR B60R11/0217 OR B60R13/02 OR B60R13/0206 OR B60R13/04 OR B60R13/0815 OR B60R16/0215 OR B60R16/037 OR B60R16/0373 OR B60R2001/1253 OR B60R2001/1284 OR B60R2011/0021 OR B60R2325/101 OR B60R2325/106 OR B60R25/2036 OR B60R25/245 OR B60R25/31 OR G10K11/162 OR G10K11/175 OR G10K11/1754 OR G10K15/02).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 15:47
S38	311,598	((Earpiece earphone earbud earset earinsert eardome earspeaker earplug eartip earmold ear$1phone ear$1piece ear$1bud ear$1set ear$1mold ear$1speaker ear$1insert ear$1tip ear$1plug ear$1dome ear$1receiver) or (ear concha conchae canal in$1ear in$1the$1ear in$1the$1canal in adj ear in adj the adj ear) near (insert tip bud set piece phone shroud dome insertable speaker receiver mold) or (in$1the$1ear completely$1in$1the$1canal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:46

		receiver$1in$1the$1canal receiver$1in$1the$1concha receiver$1in$1the$1ear))				
S39	1,526,129	(((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) with (Device module element component apparatus piece unit assembly system mechanism package structure arrangement equipment or instrument item part gadget member peripheral article entity object body machine subunit subassembly))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:46
S40	77,601	S38 same S39	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:46
S41	828	S40 same (earhook earhanger ear$1hook ear$1hanger ear near (hook loop hanger clip holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:46
S42	78	S41 same (Bone cartilage cartilaginous cartilagenous skull	US-PGPUB; USPAT;	OR	ON	2021/11/23 22:46

		cranium bony mastoid stapedes stapedius ossicle ossicular incus malleus stape temporal mandibular body head cranial pinna auricle auricular house housing casing) near2 (conduct$3 conduction vibrate vibrating vibration vibrated)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S43	219	S41 and (Bone cartilage cartilaginous cartilagenous skull cranium bony mastoid stapedes stapedius ossicle ossicular incus malleus stape temporal mandibular body head cranial pinna auricle auricular house housing casing) near2 (conduct$3 conduction vibrate vibrating vibration vibrated)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:46
S44	5	"17139076"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:57
S45	1	S42 and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:57
S46	47	((("LI") near3 ("Chaowu")) OR (("LI") near3 ("Yongjian"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2021/11/23 22:58
S47	454	SHENZHEN near VOXTECH.as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:58
S48	20	S42 and (S46 S47)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:58

S49	58	S42 not S48	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/23 22:58
S50	5	"17139076"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/24 13:28
S51	4	"103327435"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/24 19:35
S52	89,841	(((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) with (Device or module or element or component or apparatus or unit or assembly or system or mechanism or package or structure or arrangement))).CLM.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 22:56

S53	119,225	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))).CLM.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 22:57
S54	289	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 22:58

		loop or hanger or clip or holder))).CLM.				
S55	138	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear))).CLM.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:12
S56	103	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:29

		sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis)).CLM.				
S57	27	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:33

		audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3)).CLM.				
S59	18	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:38

		acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective)).CLM.				
S60	6	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:40

		(Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband)).CLM.				
S61	6	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/29 23:42

		(Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)).CLM.				
S62	6	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:06

		or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)).CLM.				
S63	9	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:06

		acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)).ti,ab,clm.				
S64	307	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	AND	ON	2021/11/30 01:07

		mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply))	DERWENT; IBM_TDB			

S65	12	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)).ti,ab,clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:08

S66	794	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:08

S67	395	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear or in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) (House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) (vibrate or vibrating or vibration or vibratory or oscillat$3) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:09

		microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply))				
S68	253	(((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or (Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic) near (transducer) or (acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)) and (((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear or in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) same (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder))) and ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) with (vibrate or vibrating or vibration or vibratory or oscillat$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:20

S69	236	S68 and (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:21
S70	220	S68 and (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply) and (frequency or frequencies or broadband) and (sound acoustic wave audio)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:22
S71	80,957	(H04R1/105 or H04R1/023 or H04R1/026 or H04R1/1008 or H04R1/1041 or H04R1/1058 or H04R1/1091 or H04R1/44 or H04R9/025 or H04R31/00 or H04R1/1016 or H04R1/1025 or H04R2201/10 or H04R2460/13 or H04R1/1066 or H04R1/347 or H04R5/0335 or H04R5/033 or H04R1/06 or H04R11/02).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:23
S72	101	H04R2225/63.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:23
S73	0	S70 and (S71 and S72)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:23
S74	0	S68 and (S71 and S72)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:23
S75	129	S68 and (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply) and (frequency	US-PGPUB	OR	ON	2021/11/30 01:24

		or frequencies or broadband) and (sound acoustic wave audio)				
S76	110	S70 and H04R$.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:24
S77	69	S70 and H04R$.CPC.	US-PGPUB	OR	ON	2021/11/30 01:25
S78	0	S76 not S77	US-PGPUB	OR	ON	2021/11/30 01:25
S79	41	S76 not S77	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:25
S80	1,824,616	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic or acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:55
S81	1,915,462	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2021/11/30 01:57

		sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic or acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)))	DERWENT; IBM_TDB			
S82	98,331	S81 same ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear or in$1ear) adj (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 01:58
S83	977	S82 same (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 01:59
S84	22	S83 same ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) near4 (mastoid bone vibrate or vibrating or vibration or vibratory))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:00
S85	52	S83 and ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) near4	US-PGPUB; USPAT; USOCR; FPRS; EPO;	AND	ON	2021/11/30 02:01

		(mastoid bone vibrate or vibrating or vibration or vibratory))	JPO; DERWENT; IBM_TDB			
S86	30	S85 not S84	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:08
S87	1,975	S82 and ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) near4 (mastoid bone vibrate or vibrating or vibration or vibratory))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:23
S88	128	S87 and (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:24
S89	849	S82 same2 ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) near4 (mastoid bone vibrate or vibrating or vibration or vibratory))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:24
S90	0	"1074848054"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 02:35
S91	6	"107484054"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 02:35
S92	48	S89 and (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	AND	ON	2021/11/30 02:38

			DERWENT; IBM_TDB			
S93	246	S82 same2 ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) near4 (mastoid bone vibrate or vibrating or vibration or vibratory)) and (sound audio acoustic)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 02:39
S94	1,915,462	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic or acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 11:17
S95	98,331	S94 same ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear or in$1ear) adj (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 11:17
S96	849	S95 same2 ((House or casing or frame or enclosure or housing or cover or covering or box or shell or	US-PGPUB; USPAT; USOCR;	AND	ON	2021/11/30 11:17

		container or chassis plate panel) near4 (mastoid bone vibrate or vibrating or vibration or vibratory))	FPRS; EPO; JPO; DERWENT; IBM_TDB			
S97	48	S96 and (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/11/30 11:17
S98	42	S97 and H04R$.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/30 11:17
S106	6	"107484054"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 10:54
S107	7	"207039851"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 11:01
S108	5	"17139076"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 13:33
S109	8	"17305245"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 17:44
S110	1	"17305245" and ((core housing) same (circuit) same plug)	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2021/12/01 17:45

			JPO; DERWENT; IBM_TDB			
S111	0	"17305245" and ((core housing) same (circuit) same plug).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 17:46
S112	0	"17305245" and ((core housing) same plug and (circuit) same plug).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 17:46
S113	1	"17305245" and ((core housing) same plug).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 17:46
S114	0	"17305245" and (circuit same plug).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 17:47
S115	1,915,462	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator acoustic$1generator) or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 22:15

		magnetic or acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator)))				
S116	98,331	S115 same ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear or in$1ear) adj (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 22:15
S117	71	S116 and ((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) with (mastoid bone vibrate or vibrating or vibration or vibratory)) same (phase) same (frequency frequencies)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/12/01 22:15
S118	47	((("LI") near3 ("Chaowu")) OR (("LI") near3 ("Yongjian"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2021/12/01 22:31
S119	457	SHENZHEN near VOXTECH.as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/12/01 22:31
S120	14	S117 and (S118 S119)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2021/12/01 22:31
S121	10	S116 and (((House or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis plate panel) with (mastoid bone vibrate or vibrating or vibration	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	AND	ON	2021/12/01 22:32

		or vibratory)) same (phase) same (frequency frequencies)).CLM.	DERWENT; IBM_TDB			

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S99	136	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear))).CLM.	US-PGPUB; USPAT	AND	ON	2021/11/30 16:28
S100	11	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter	US-PGPUB; USPAT	AND	ON	2021/11/30 16:28

		producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3))).CLM.				
S101	9	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container	US-PGPUB; USPAT	AND	ON	2021/11/30 16:42

		or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective)).CLM.				
S102	5	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband)).CLM.	US-PGPUB; USPAT	AND	ON	2021/11/30 16:51
S103	5	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or	US-PGPUB; USPAT	AND	ON	2021/11/30 16:56

		electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (frequency or frequencies or broadband) (circuit or circuitry or controller or processor or microprocessor or microcontroller or battery or batteries or (voltage or DC or power) adj supply)).CLM.				
S104	3	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) (earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or	US-PGPUB; USPAT	AND	ON	2021/11/30 17:02

		ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (waterproof or water$1proof or water$1impervious or liquid$1resistant or water adj (proof or resistant or impervious)) (frequency or frequencies or broadband)).CLM.				
S105	3	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) ((earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) same (plug or socket or connector or jack or adaptor or adapter or coupler)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or	US-PGPUB; USPAT	AND	ON	2021/11/30 23:04

		cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (waterproof or water$1proof or water$1impervious or liquid$1resistant or water adj (proof or resistant or impervious)) (frequency or frequencies or broadband)).CLM.				
S122	2	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) ((earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) same (plug or socket or connector or jack or adaptor or adapter or coupler)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) (sleeve or jacket or sheath or wrapper or shield or shielding or protector or protective) (waterproof or water$1proof or water$1impervious or liquid$1resistant or water adj (proof or resistant or impervious))	US-PGPUB; USPAT	AND	ON	2021/12/02 01:08

		((frequency or frequencies or broadband) same (phase))).CLM.				
S123	1	((Speaker or sounder or loudspeaker or loud$1speaker or microspeaker or micro$1speaker or mini$1speaker or speakerlet or speaker$1let or micro$1loudspeaker or mini$1loudpseaker or sound$1producer or sound$1reproducer or sound$1transducer or acoustic$1receiver or acoustic$1reproducer or acoustic$1transducer or audio$1receiver or audio$1reproducer or audio$1transducer or sound$1generator or audio$1generator or acoustic$1generator or ((Electroacoustic or electromagnetic or electro$1acoustic or electro$1magnetic or electro adj magnetic acoustic or audio or sound) adj (driver emitter producer or generator or transducer receiver or reproducer or exciter radiator))) ((earhook or earhanger or ear$1hook or ear$1hanger or ear near (hook or loop or hanger or clip or holder)) same (plug or socket or connector or jack or adaptor or adapter or coupler)) ((Earpiece or earphone or earbud or earset or earinsert or earspeaker or ear$1phone or ear$1piece or ear$1bud or ear$1set or ear$1speaker or ear$1insert or ear$1tip or ear$1receiver) or (ear in$1ear) near (insert or bud or set or piece or phone or speaker or receiver) or (in$1the$1ear or in$1the$1canal or in adj ear or in adj the adj ear or completely$1in$1the$1canal or receiver$1in$1the$1canal or receiver$1in$1the$1concha or receiver$1in$1the$1ear)) ((House or case or casing or frame or enclosure or housing or cover or covering or box or shell or container or chassis) near4 (vibrate or vibrating or vibration or vibratory or oscillat$3)) ((sleeve or jacket or wrapper or shield or shielding or protector or protective) with (waterproof or water$1proof or water$1impervious or liquid$1resistant or water adj (proof or resistant or impervious))) ((frequency or frequencies or broadband) same (phase))).CLM.	US-PGPUB; USPAT	AND	ON	2021/12/02 01:13

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CN107484054A Bone conduction earphone

Data originating from sources other than the EPO may not be accurate, complete, or up to date.

The wording below is an initial machine translation of the original publication. To generate a version using the latest translation technology, go to the original language text and use Patent Translate.

Technical field

The present invention relates to the field of earphones, and more particularly to a bone conduction earphone.

Background technique

Bone conduction is a sound conduction method, that is to say, the sound is transformed into mechanical vibration of different frequencies, and the sound waves are transmitted through the human skull, bone lost, internal ear lymph fluid, spiral, auditory nerve and auditory center. Bone conduction headset using bone conduction technology, close to the bones, sonic waves directly to the auditory nerve through the bones. So you can open both ears, do not hurt the tympanic membrane, and therefore by the vast number of consumers. However, various parts of the existing bone conduction earphone are usually fixedly connected by screws, etc. In particular, the existing bone conduction earphone is connected with the earhook through a screw. Due to the presence of the screw and the screw hole, the overall size of the earphone Can not be reduced, inconvenient assembly and other issues.

Content of the invention

The main technical problem to be solved by the present invention is to provide a bone conduction earphone which can effectively solve the problems that the earphone size can not be reduced after the existing bone conduction earphone is connected and connected with the earphone through the screws and the screw holes.

In order to solve the above technical problem, an embodiment of the present invention provides a bone conduction earphone including two ear hook assemblies, the ear hook assembly including a first shell, a second shell, and a second shell connecting the first shell and the second shell Body connecting component, the bone conduction earphone further comprises a rear hanging component, two ends of the rear hanging component are provided with a plugging portion, the plugging portions are respectively connected with the first housings of the two earhook components With, and fixed connection.

Compared with the prior art, the beneficial effects of the present invention are as follows: in the present invention, two ends of the rear hanging assembly are provided with inserting portions respectively mating with the first shells of the two ear hanging assemblies, , The existing bone conduction earphone screw is canceled and the fixing method is adopted, which can effectively reduce the size of the connection position of the ear bone conduction earphone

and the ear hanging device, so as to reduce the size of the earphone and facilitate the assembly.

BRIEF DESCRIPTION OF THE DRAWINGS FIG

Fig. 1 is a schematic structural view of an ear hanging assembly in an embodiment of a bone conduction earphone according to the present invention;

Figure 2 is a bone conduction earphone in accordance with an embodiment of the present invention,

Figure 3 is a schematic diagram of another structure of the ear suspension assembly of the bone conduction earphone of the present invention;

Figure 4 is a schematic cross-sectional structure A-A in Figure 3;

Figure 5 is a bone conduction earphone in the embodiment of the present invention,

Figure 6 is a schematic cross-sectional structure of the C-C in Figure 5;

Figure 7 is a circuit diagram of the bone conduction earphone embodiment of the present invention;

Figure 8 is a schematic structural view of the fourth housing of the bone conduction earphone of the present invention;

Fig. 9 is an enlarged schematic diagram of a structure of a bone conduction earphone connector and a connector hole in an embodiment of the bone conduction earphone of the present invention;

Figure 10 is a schematic cross-sectional view of a connector and a connector hole in an embodiment of a bone conduction earphone according to the present invention;

Figure 11 is a schematic diagram of the jack structure of the bone conduction earphone of the present invention;

Figure 12 is a schematic diagram of the structure of the connector in the embodiment of the bone conduction earphone of the present invention;

Figure 13 is a schematic cross-sectional structure of the B-B of Figure 9;

14 is a disassembled schematic diagram of another part of the bone conduction earphone in the bone conduction earphone embodiment of the present invention;

Figure 15 is a schematic cross-sectional view of a portion of the structure of Figure 14;

Figure 16 is a schematic diagram of the structure of the control circuit assembly in the embodiment of the bone conduction earphone of the present invention;

FIG. 17 is another schematic structural view of the control circuit assembly in the embodiment of the bone conduction earphone of the present invention.

detailed description

1 and 2, an embodiment of a bone conduction earphone according to the present invention includes an ear hook assembly 11. The ear hook assembly 11 includes a first shell 111, a second shell 112, and a first shell 111 connecting the first shell 111 and the second shell 112 The connecting member 113 includes a first elastic wire 1131 with two ends respectively connected to the first shell 111 and the second shell 112 and a first elastic coating 1132 coated on the first elastic wire 1131.

In general, the bone conduction earphone also includes components such as bone conduction speakers, batteries, control circuits, and the like, such as bone conduction speakers, for outputting sound to the user by vibration in a bone conduction manner. The battery is used to power the components of the bone conduction headset. The control circuit is used for controlling the bone conduction earphone, for example, to realize the functions of adjusting the volume, switching on and off, playing audio, and Bluetooth communication.

The ear hook assembly 11 is generally used for the user to hang on the ear when wearing the bone conduction earphone so that the bone conduction earphone can be worn on the ear of the user more firmly. The ear hook assembly 11 needs good compression resistance and deformation resistance so that the bone conduction earphone can not easily be damaged or deformed when the user is using the ear hook assembly 11.

In this embodiment, the connecting component 113 can directly contact the ear and support the bone conduction earphone through the root of the human ear. The connecting component 113 includes a first elastic metal wire 1131 and a first elastic layer coated on the first elastic metal wire 1131 The layer 1132 is connected to the first shell 111 and the second shell 112 through the first elastic wire 1131 to effectively enhance the bending performance and structural stability of the bone conduction earphone so that the ear hook assembly 11 can be effectively bent Elastic response to restore the status quo, not easy to deformation. In addition, the use of the first elastic wire 1131 can improve the traditional bone conduction earphone using plastic as a material of the ear hook assembly, which can cause damage and other problems. Optionally, the connecting component 113 may include a plurality of first elastic wires 1131. For example, a plurality of small first elastic wires 1131 may be provided to further improve the bending reliability of the ear hook assembly 11. For example, A flexible metal wire 1131, each of the first flexible metal wires 1131 has a diameter of 0.3 mm. In this case, the materials of the three first flexible metal wires may be the same or partly the same or different from each other. Of course, each first flexible metal wire 1131 The diameters may also be the same, partially the same or all different.

In this embodiment, optionally, the first elastic wire 1131 may be a metal element, or may be an alloy material including various metal materials, such as spring steel, aluminum alloy, magnesium alloy, titanium alloy, nickel alloy, Titanium-nickel alloy, magnesium-lithium alloy, chromium-molybdenum steel, etc., and may also include a composite material of a metal material and a non-metal material. Alternatively, the first elastic wire 1131 is a titanium alloy wire or at least made of a titanium alloy material, for example, a titanium alloy wire having a diameter of 0.8-1.5 mm, optionally 1.0-1.25 mm.

In this embodiment, the first elastic metal wire 1131 is coated on the first elastic coating 1132, and the first elastic coating 1132 directly contacts the ear. Due to the elastic action of the first elastic coating 1132, the user can comfortably Wear bone conduction headphones. In addition, the first elastic coating 1132 can more effectively cover the first elastic wire 1131 due to the elastic action thereof, and can effectively coat the first elastic wire 1131 even after multiple bends to ensure the bone conduction The effectiveness of the headset structure. Optionally, the first elastic coating layer 1132 is a silicone layer. Of course, in other embodiments, the first elastic coating layer 1132 may also be a latex layer or a rubber layer or other elastic plastic layer, or may be a silicone-containing Composite material layer.

Optionally, the first shell 111 and the second shell 112 are respectively fixedly connected to the two ends of the first elastic wire 1131 by injection molding. The first elastic shell 1132 is injection-molded to cover the first elastic metal Wire 1131. Optionally, the first shell 111 and the second shell 112 are plastic shells and are fixed on both ends of the first elastic wire 1131 by injection molding, and the first elastic shell 1132 is integrally molded The first elastic metal wire 1131, so that the connection between the first shell 111 and the second shell 112 and the first elastic wire 1131 is more stable, and the integrality and texture of the bone conduction earphone are made stronger so that the bone Conductive headphones more compact structure and more portable. In this embodiment, the injection molding method may be one of injection molding, thermoforming, compression molding and the like, but not limited thereto.

Referring to FIG. 3 and FIG. 4, optionally, the first elastic coating 1132 is formed by splitting two elastic sublayers 1132a and 1132b of different colors, wherein the split joints of the two elastic sublayers 1132a and 1132b are respectively located on the connecting part 113 on opposite sides 113 a, 113 b, wherein the projections of split stitches on the same side, for example on the outer side 113 a, are offset from one another. For example, in the injection molding process, the two elastic sub-layers 1132a and 1132b of the first elastic coating layer 1132 are respectively molded by using at least two sets of molds, so that the two colors with different proportions, for example, light gray and dark gray Or a combination of other colors, and the split seam is located on the two side surfaces 113a and 113b opposite to the connecting member 113, and the projections on the same side are staggered from each other, so that the visual effect of the bone conduction earphone is better. Further, The metal wire 1131 makes the coating more effective. Of course, the first elastic coating 1132 may also be formed by two sub-elastic coating of the same color. By forming the two elastic sublayers 1132a and 1132b respectively on the two side surfaces 113a and 113b of the connecting member 113 by two injection molding processes, the first elastic coating layer can be easily improved due to the injection pressure during the single injection molding or the vertical and separate injection molding The displacement of elements within 1132, such as the first resilient wire 1131, reduces the forming quality of the connecting member 113. Of course, in other embodiments, the first elastic coating 1132 may form one coating directly or form more than two elastic coating layers.

In this embodiment, the two side surfaces of the connecting member 113 include the inner side surface 113b and the outer side surface 113a, which are opposite to each other when the earloop assembly 11 is hung from the ear of an ear while the side facing the head of the connecting member 113 is the inner side surface 113b, and the side facing the human ear is the outer side surface 113a.

3 and 4, optionally, the split seams of the two elastic sub-layers 1132a and 1132b are respectively located on the inner surface 113b and the outer surface 113a of the connecting member 113 and on the outer surface 113a of the connecting member 113 The projection of the split stitch is closer to the contact position of the connecting member 113 and the human ear than the projection of the split stitch on the inner side surface 113 b of the connecting member 113. Therefore, one split seam is located on the outer side surface 113 a near the contact ear, and the other split seam is located on the inner side surface 113 b so that almost the same color of the bulging coating 1132 a or 1132 b is displayed on the outer side surface 113 a. For example, The outer surface 113 a almost shows light gray, making the bone conduction earphone more integrated and more aesthetically pleasing.

Optionally, the split seams are arranged such that the areas of the two bullet-like claddings 1132a, 1132b on the same side, for example 113a or 113b, differ from one another. In other embodiments, the split seam may be arranged such that the areas of the two bulging layers 1132a, 1132b on the same side are the same or substantially the same.

Referring to FIGS. 2-4, optionally, the split stitches are arranged such that the relatively lighter-colored sub-elastic coating 1132 a of the two bulging layers 1132 a, 1132 b occupies a relatively larger area on the outer side surface 113 a. That is, the light-colored sub-elastic coating 1132a is located more on the outer side surface 113a, and the dark-colored sub-elastic coating 1132b is located more on the inner side surface 113b so that the surface of the connection member 113 is more coordinated, Performance while enhancing the aesthetic performance of bone conduction headphones.

With continued reference to FIG. 1, optionally, both ends of the first elastic wire 1131 are flatly disposed and respectively embedded in the first shell 111 and the second shell 112. That is, the first shell 111 and the second shell 112 are formed by injection molding and are fixed to both ends of the first elastic wire 1131 which are arranged in a flat shape, so that the first elastic wire 1131 and the first shell The body 111 and the second housing 112 such that the first elastic metal wire 1131 and the first housing 111 and the second housing 112 are more stably fixed to each other. Optionally, the width of the two ends of the first flexible metal wire 1131 that are flatly disposed is greater than the width of the connecting portion that connects the flatly disposed ends, so as to play a limiting role after molding to prevent the first elastic metal The wire 1131 is pulled out or detached from the first case 111 and the second case 112. Optionally, both ends of the first elastic wire 1131 are threadedly disposed. When forming, part of the shell can be formed in the thread to play a fixed role. Of course, both ends of the first elastic wire 1131 may be flat and screw-shaped. In other embodiments, the two ends of the first elastic wire 1131 may also be concave to form a concave portion, and the first shell 111 and the second shell 112 are partially located in the concave portion during the forming so as to perform a fixing function.

Referring to FIGS. 1 and 2, optionally, the first elastic coating 1132 further covers at least part of the outer surface of the first shell 111 and the second shell 112, for example, the entire outer surface. That is, the first elastic coating 1132 is injection-molded to cover the first elastic wire 1131, at least a portion of the outer surface of the first shell 111, and at least a portion of the outer surface of the second shell 112, so that the texture of the bone conduction earphone And the sense of unity is stronger, and the presence of the first elastic coating 1132 can further protect the housing and the components inside the housing, so that the bone conduction earphone is more resistant to abrasion.

Referring to FIGS. 5 and 6, optionally, a through hole 1121 is formed in the second casing 112. That is, the through hole 1121 penetrates the inner surface and the outer surface of the second shell 112. The first elastic coating 1132 covers the through hole 1121 and is further formed with a key accommodating portion 1121 a on a side above the through hole 1121 and away from the second shell 112 (ie, an inner side away from the second shell 112). The key receiving portion 1121a is formed by covering the through hole 1121 with the first elastic coating 1132 in the injection molding process. The presence of the first elastic coating 1132 in the key accommodating portion 1121 a can prevent moisture and dirt from entering the second Inside the housing 112. The earhook assembly 11 further includes a button 118 and a switch assembly 119, wherein the button 118 is disposed in the button accommodating portion 1121a. The switch assembly 119 is disposed on a side of the second casing 112 away from the first elastic coating 1132, that is, an inner surface of the second casing 112, and abuts on the first elastic coating 1132 under the button 118. Optionally, a protrusion 1121 b is disposed in the key accommodation portion 1121 a, and the button 118 is fixed on the boss 1121 b by, for example, gluing. In this embodiment, the first elastic coating layer 1132 is fixedly coated on the second casing 112 by injection molding and covers the through hole 1121, so as to have a better waterproof effect. Optionally, the boss 1121 b is integrally formed with the first elastic coating 1132 when the first elastic coating 1132 covers the through hole 1121.

In this embodiment, the switch assembly 119 on the second housing 112 is mainly used for controlling function switches of the bone conduction earphone, such as playing and pause of music, answering and hanging up of voice, and connecting wireless signals to connect a mobile device such as Bluetooth communication, or bone conduction headset choice of working mode, is not limited to this.

1, 2, 4 and 7, optionally, the interior of the first elastic coating layer 1132 is further provided with a lead passage 1134 for connecting the first shell 111 and the second shell 112. The earhook assembly 11 further includes a first wire set 1133 extending from the first housing 111 through the lead channel 1134 to the second housing 112 and having a radial dimension that is configured to allow the first wire set 1133 to move along the lead channel 1134.

By providing the lead channel 1134, for example, the first lead set 1133 may be connected (eg, on-board mounted) with an element such as a bone conduction speaker in one end of the first lead set 1133, and then the first lead set 1133 One end of the lead-through channel 1134 is connected to the lead frame 1134 to connect components such as the battery assembly 13, the control circuit assembly 14, the adapter circuit board 15, and the like in the first housing 111, so as to reduce the assembly process and improve the performance of the existing bone conduction earphone in the first The elastic coating 1132 embedded in the first wire set 1133 during injection molding is difficult to wire and is not conducive to post-maintenance and other issues. Of course, the components of the first housing 111, such as the battery assembly 13, the control circuit assembly 14, or the adapter circuit board 15, may be connected (eg, on-board mounted) to one end of the first wire set 1133 The other end of the first wire set 1133 is passed through the lead channel 1134 to connect an element in the second housing 112, such as a bone conduction speaker or the like.

In this embodiment, the specific forming manner of the lead channel 1134 includes, for example, first providing an assembly of the first shell 111 and the second shell 112 to which the first elastic wire 1131 is connected, further connecting the second shell 112 and the first An additional wire (not shown) is detachably disposed between the housings 111, and further

the first elastic wire 1131, the additional wires, and a part of the outer surfaces of the first shell 111 and the second shell 112 are formed with The first elastic coating 1132 is formed by injection molding, and additional wires are drawn after molding to form the lead passage 1134. In other embodiments, for example, when the first elastic coating layer 1132 is injection-molded, the meltable material is embedded. When the first elastic coating layer 1132 is injection-molded, the meltable material flows out to form the lead channel 1134. For another example, the lead channel 1134 may be formed by threading a channel after the first elastic coating layer 1132 is formed, and then expanding the channel-forming lead channel 1134 by hot melt.

With continued reference to FIGS. 1 and 4, in the present embodiment, it is optional that the lead passage 1134 is disposed on the lower side of the first elastic wire 1131 to be closer to the connection than the first elastic wire 1131 in use The contact position of the member 113 with the human ear. In this embodiment, the first lead channel 1134 and the first elastic wire 1131 are disposed separately from each other. In other embodiments, the first lead channel 1134 may be combined with the first elastic metal wire 1131, that is, the first conductive wire group 1133 may contact the first elastic metal wire 1131 within the first lead channel 1134. In this embodiment, the lead passage 1134 is disposed under the first elastic wire 1131 to be closer to the contact position between the connecting member 113 and the human ear than the first elastic wire 1131 in use. Since the lead passage 1134 The first elastic coating 1132 near the human ear can be made more flexible, softer and more comfortable to wear. In other embodiments, of course, the first lead channel 1134 may also be disposed on the upper side of the first elastic wire 1131, and in use, the first elastic wire 1131 is closer to the human ear.

Referring to FIGS. 1, 2 and 8, optionally, the ear hook assembly 11 includes a third shell 114 and a fourth shell 115. The third housing 114 cooperates with the first housing 111 to form a first receiving space 116 for receiving the battery assembly 13 or the control circuit assembly 14. The fourth housing 115 cooperates with the second housing 112 to form a second receiving space 117 for receiving a bone conduction speaker. Optionally, the fourth housing 115 and the third housing 114 are plastic housings.

Optionally, the second shell 112 and the fourth shell 115 are connected by a first buckling component (not labeled), and the first engagement component includes a first engagement portion and a first engagement portion, and the first engagement The first engaging portion is disposed on the second shell 112. When the second shell 112 and the fourth shell 115 are engaged with each other, the first engaging portion on the fourth shell 115 The first snap-in portion of the second shell 112 is snapped in to secure the second shell 112 and the fourth shell 115 together. Optionally, the second shell 112 and the fourth shell 115 are connected by at least one set of first buckle assemblies, for example, four sets of first buckle assemblies. Of course, the second shell 112 and the fourth shell 115 may be glued together, fixed together by the first engagement component and glue, or fastened by fasteners such as screws.

Optionally, the third shell 114 and the first shell 111 are connected by a second fastening component (not labeled), the second fastening component includes a second fastening part and a second fastening part, and the second fastening The second engaging portion is disposed on the first shell 111. When the first shell 111 and the third shell 114 are engaged with each other, the second engaging portion of the third shell 114 The second snap-in portion of the first shell 111 is locked to fix the first shell 111 and the third shell 114 together.

In this embodiment, the third shell 114 of the ear hanging assembly 11 cooperates with the first shell 111 to form a first accommodating space 116 for accommodating the battery assembly 13 or the control circuit assembly 14. The fourth shell 115 Cooperates with the second housing 112 to form a second receiving space 117 for receiving the bone conduction speaker. The first wire set 1133 can move through the lead channel 1134 for electrically connecting the bone conduction speaker and the battery assembly 13 or the control circuit Component 14. In this embodiment, the battery assembly 13 includes, for example, a battery and a battery management circuit. The battery supplies power to other components of the bone conduction earphone through the battery management circuit. For example, the battery management circuit includes a charging circuit, an over-current protection circuit, an over-current protection circuit, Pressure protection circuit. For example, the battery is a rechargeable battery, for example, a lithium battery. 7, optionally, the bone conduction earphone further includes, for example, an adapter circuit board 15 disposed in the first accommodation space 116, and the battery assembly 14 is divided into a plurality of connection pads by the adapter circuit board 15, Corresponding to the two bone conduction speakers connected to the bone conduction earphone, the control circuit assembly 14, the microphone, the switch assembly 119 and the like. The relevant components of the above components are connected to the above-mentioned connection pads and are conducted according to the method shown in FIG. 7, facilitating connection and assembly. For example, the battery assembly 14 is connected to the adapter circuit board 15 through two connection pads of positive and negative poles, and the adapter circuit board 15 is divided into ten connection pads to connect other components of the bone conduction earphone.

1 and 2, optionally, a first sub-accommodating space 116 a is disposed in the first shell 111, a second sub-accommodating space 116 b is disposed in the third shell 114, and a second sub-accommodating space 116 b is defined in the third shell 114 cooperates with the first shell 111 to form a first accommodating space 116 together with the first sub-accommodating space 116a, for example, the first connecting member is fixedly connected by the first snap-fitting member. The second sub-accommodating space 116 b has a larger volume than the first sub-accommodating space 116 a. For example, the volume of the second sub-accommodating space 116b is 2-5 times, for example, 3-4 times, for example, 3.2 times or for example 2.5 times the first sub-accommodating space 116a.

In assembling the battery assembly 13 or the control circuit assembly 14, for example, the battery assembly 13 or the control circuit assembly 14 is first placed in the first sub-accommodating space 116a. For example, the battery is adhered to the first sub-assembly by glue or double-sided tape Space 116a, or the control circuit assembly 14 is fixed in the first sub-accommodating space 116a by a snap-fit structure so that the battery assembly 13 or the control circuit assembly 14 is mostly exposed to facilitate the assembly and wiring processes, and then the third housing 114 is covered with the first shell 111 through the second buckle assembly. The first sub-accommodating space 116a and the second sub-accommodating space 116b form a first accommodating space 116, which improves the traditional bone conduction earphone that requires the battery or The control circuit board is assembled and accommodated in the housing integrally formed with the earhook and further the problem of the complicated assembly process caused by the application of the silicone rubber strip to the outer part of the battery control circuit board and the simplification of the structure and the assembly process are also solved.

Referring to FIG. 2 and FIG. 8, optionally, the fourth housing 115 is provided in a prism shape, wherein at least one side of the fourth housing 115 is provided with a strip-shaped

sound hole 1151, wherein the strip-shaped sound hole 1151 Is parallel to or substantially parallel to the bottom surface of the fourth housing 115, and the length of the strip-shaped sound hole 1151 is not less than two-thirds of the width of the side surface on which it is located. In the present embodiment, the relatively parallel bottom surface 115e of the stencil is a plane defined by the opening edge of the fourth casing 115 facing the face of the human body when worn.

In general, the bone conduction speaker transmits sound to the surrounding environment during vibration. Besides the wearer, others in the environment can hear the sound of the speaker. For example, the vibration of the bone conduction speaker causes the inside of the second accommodation space 117 Vibration of the air, and vibration of the fourth housing 115 and the like, resulting in a sound leakage phenomenon that affects the sound quality of the bone conduction earphone. The sound guide hole 1151 guides the sound wave in the second accommodation space 117 to the outside of the space and interferes with the sound wave of the sound leakage in the air to reduce the amplitude of the sound wave of the sound leakage and reduce the sound leakage.

8, in order to further improve the sound leakage phenomenon, in this embodiment, the syllabus 1151 is provided on at least one side of the fourth housing 115, and its size and orientation are properly set to improve the effect of the traditional bone conduction earphone Leakage sound is still a serious problem. Further, the longitudinal direction of the strip-shaped sound hole 1151 is parallel to the bottom surface of the fourth housing 115, which not only ensures the appearance but also the uniformity of the acoustic wave intensity guided in parallel so as to ensure the interference effect. In this embodiment, the length of the strip-shaped sound hole 1151 is not less than two-thirds of the width of the side where the strip-shaped sound hole 1151 is located, so as to effectively guide the sound wave in the second accommodation space 117. Optionally, the length of the strip-shaped sound hole 1151 is three-fourths the width of the side on which it is located. Of course, in other embodiments, at least two strip-shaped sound holes 1151 are arranged in parallel on at least one side surface of the fourth housing 115, for example, two parallel strip-shaped sound holes 1151 are provided on at least one side surface And is parallel to the bottom surface 115e of the fourth housing 115.

Optionally, the fourth casing 115 is not provided with the barreled sound hole 1151 on the side 115d near the human ear when the bone conduction earphone is used. Of course, in other embodiments, the fourth shell 115 may also be a timbre hole or a strip-shaped vocal hole 1151 provided on the side surface 115d near the human ear when the bone conduction earphone is used.

With continued reference to FIGS. 2 and 8, optionally, the fourth housing 115 is formed in a quadrangular prism shape, wherein two sides 115 a and 115 c of the fourth housing 115 adjacent to the connecting member 113 are provided with a bar The lead-out hole 1151 and the further remaining two side faces 115b and 115d are also provided with the barreled sound-guiding holes 1151 at the sides 115b away from the human ear when the bone conduction earphone is used, and the remaining two sides 115b and 115d Conductive earphones are not provided with a stripe-shaped sounding hole 1151 on the side 115b near the human ear when used. That is, the three side surfaces 115a, 115b, 115c are provided with three barreled sound holes 1151, and the barreled sound holes 1151 are not provided near the side 115d of the human ear when the bone conduction earphone is used, so as to further

reduce the sound leakage phenomenon , To ensure the quality of bone conduction headphones.

In this embodiment, the fourth housing 115 is arranged in a quadrangular prism shape, and includes, for example, a regular quadrangular prism and a quasi-quadrangular prism. For example, the length of any one of the two side surfaces 115 a, 115 c of the fourth housing 115 adjacent to the connecting member 113 is greater than the length of any one of the two remaining side surfaces 115 b, 115 d. Further, The lengths of the two side faces 115a, 115c of the fourth housing 115 adjacent to the connecting member 113 are not equal or equal. In other embodiments, the fourth housing 115 is formed in a rectangular prism shape, and four sides of the fourth housing 115 are equal in length.

In this embodiment, optionally, the angle between the two side surfaces 115a and 115c of the fourth casing 115 adjacent to the connecting member 113 is 90 ° -150 °, and may alternatively be 100 ° -130 °, optionally 110 ° -120 °.

Optionally, a waterproof and dustproof filter covering the strip-shaped sound hole 1151, such as a waterproof breathable membrane (not shown), is further disposed in the fourth casing 115. Set a waterproof dust filter can prevent bone conduction headphones outside the dust and waterproof bone conduction headphones into the damaged bone conduction speaker.

In this embodiment, a microphone hole (not shown) is respectively disposed on the second casing 112 and the fourth casing 115. Specifically, the first microphone hole is disposed on the fourth casing 115 and is not directly connected to the connecting member 113 And the second microphone hole is disposed on the outer side of the second casing 112 and close to the connection between the fourth casing 115 and the connecting member 113. By placing two microphones in two staggered microphone holes, the quality of voice input can be enhanced and effective noise reduction can be achieved, thereby increasing the clarity of voice input.

Referring to FIG. 2 and FIG. 9, in this embodiment, the number of the ear hook assemblies 11 is two, and the bone conduction earphone further includes the rear hook assembly 12. The rear hanging assembly 12 includes a second elastic metal wire 121, a second elastic coating 122 coated on the second elastic metal wire 121, and a connector 123 disposed at two ends of the second elastic metal wire 121. The plugging portions 123 are respectively engaged with and fixedly connected to the first shell 111 of the two ear hook assemblies 11. Optionally, the connectors 123 are fixed to the two ends of the second elastic wire 121 through injection molding so that the connectors 123 can be more firmly fixed to the two ends of the second elastic wire 121. Optionally, the second elastic metal wire 121 may be a metal element, or may be an alloy material including various metal materials such as spring steel, aluminum alloy, magnesium alloy, titanium alloy, nickel alloy, titanium-nickel alloy, magnesium lithium Alloy, chrome-molybdenum steel and the like, and may also be a composite material including a metal material and a non-metal material. In the present embodiment, the second elastic metal wire 121 is a titanium alloy wire or at least made of a titanium alloy material. In this embodiment, the second elastic coating layer 122 is a silicone layer. In other embodiments, the second elastic coating layer 122 may also be a rubber layer or a latex layer, or a composite material layer including silica gel.

The connector 123 of the rear hanging assembly 12 is mated with the first housing 111 of the two ear hook assemblies 11 to improve the problem that the existing bone conduction

earphone has a large size of the earphone due to fixing methods such as screws , Thus simplifying the structure, reducing the weight of bone conduction headphones, to facilitate late wiring and reduce costs.

9 and 10, optionally, an end of the first housing 111 is provided with a socket 1111 for allowing the socket 123 to be inserted and a socket for vertically connecting the socket 123 in an inserting direction of the socket 123 1111 and the outer opening 1112 to allow glue to be applied to the insertion hole 1111 through the opening 1112 from the outside or to install a locking member (not shown), so that the insertion portion 123 is pressed by the glue or the locking member Fixed in the socket 1111. In the present embodiment, the opening 1112 is located in the first sub-accommodating space 116a. In other embodiments, an end of the first housing 111 is provided with a receiving hole 1111 for allowing insertion of the inserting portion 123. The inserting portion 123 has a concave portion thereon. The inserting hole 1111 has a resilient convex portion When the inserting portion 123 is inserted into the inserting hole 1111, the elastic protrusion is engaged in the concave portion to cooperatively fix the inserting portion 123 and the inserting hole 1111. For example, when the inserting portion 123 is inserted into the inserting hole 1111, the elastic protruding portion is first pressed and then snapped into the recessed portion under the elastic restoring force. Optionally, the depth of the inserting portion 123 inserted into the inserting hole 1111 is 6-11mm, optionally 8-10mm.

With continued reference to FIG. 9 and FIG. 10, optionally, a slot 1231 is provided on a sidewall of the plug portion 123. The slot 1231 is exposed or partially exposed through the opening 1112, and is used for receiving glue or a locking member. Optionally, at least one side wall of the connector portion 123 is provided with a slot 1231, for example, both side walls are provided with a slot 1231. In other embodiments, the glue and the locking member may be used at the same time, for example, the locking member may be used first and then the glue may be further fixed. In this embodiment, the locking member is, for example, a wedge or a pin, or the fixing member with a certain elasticity is inserted into the slot 1231 for interference fit.

2, 9 and 10, optionally, the plug portion 123 includes a first plug segment 123a connected with the second elastic wire 121 and a first plug segment 123a connected with the first plug segment 123a and far away from the second elastic metal The second patch segment 123b is disposed on the wire 121. The insertion hole 1111 is divided into a first hole section 1111 a for receiving the first insertion section 123 a and a second hole section 1111 b for receiving the second insertion section 123 b in the insertion direction of the insertion section 123. Wherein the first hole section 1111a is sized to allow the second insertion section 123b to freely move within the first hole section 1111a in the insertion direction and to allow a tight fit between the first insertion section 123a and the first hole section 1111a. Through the two segments of the plug and the two ends of the hole segment are respectively and cooperatively fixed, the plug portion 123 can be more firmly fixed in the first housing 111, which enhances the structural stability of the bone conduction earphone.

With continued reference to FIGS. 9 and 10, optionally, the slot 1231 is further disposed on the sidewall of the second patch segment 123 b. The opening 1112 communicates with the second hole 1111 b of the socket 1111. In the present embodiment, the second connecting portion 123b passes through the first hole portion 1111a and the second hole portion 1111b in order to make the first inserting portion 123a tightly fit with the first hole portion 1111a, and the second The slot 1231 of the inserting section 123b is exposed through the opening 1112

for receiving the glue or the locking member. The tight fit between the first insertion section 123a and the first hole section 1111a and the further connection and fixing between the second insertion hole 1111 and the second hole section 1111b make it possible to fix the rear hook and the ear hook effectively. In other embodiments, the slot 1231 may be disposed on a sidewall of the first patch segment 123 a. The opening 1112 communicates with the second hole 1111 b of the socket 1111.

Optionally, the second hole section 1111b is dimensioned such that a tight fit between the second and third hole sections 123b, 1111b is provided. In this way, the tight fit of the first insertion section 123a and the first hole section 1111a, the close fit of the second insertion hole 1111 and the second hole section 1111b and the applied glue or locking member further effectively fix the rear connection And ear hanging fixed connection, and can simplify the structure, the bone conduction headset lightweight. Of course, in other embodiments, the first patch segment 123a and the first aperture segment 1111a are tightly mated, and the second patch segment 123b and the second aperture segment 1111b may be other types of fixed mates, such as snap-fit.

Referring to FIG. 11, optionally, the shape of the contact surface contacting with the first hole segment 1111a on both sides of the first patch segment 123a is different. The shapes of the two sides of the first insertion section 123 a are different, and the two side surfaces 1111 a 1 and 1111 a 2 of the first hole section 1111 a and the first insertion section 123 a are also different. For example, both sides of the first hole segment 1111a are arc-shaped, the radius of curvature of the inner side surface 1111a2 is greater than the radius of curvature of the outer side surface 1111a1, that is, the curvature of the inner side surface 1111a2 is relatively gentle and the curvature of the outer side surface 1111a1 is relatively Larger, the two sides of the first patch section 123a are correspondingly arranged. Of course, in other embodiments, both sides of the first hole section 1111 a are arc-shaped, the radius of curvature of the inner side surface 1111 a 2 is smaller than the radius of curvature of the outer side surface 1111 a 1, that is, the curvature of the inner side surface 1111 a 2 is relatively large, The change in radian of the side surface 1111a1 is relatively small. Both sides of the first hole section 1111 a are an inner side surface 1111 a 2 near a human head when worn and an outer side surface 1111 a 1 away from a human head. The shapes of the contact surfaces of both sides of the first insertion section 123a contacting with the first hole section 1111a are different so that the first insertion section 123a can not be inserted backwards and the two rear insertion sections 123 can not be inserted together, Effective foolproof effect, easy assembly.

9 and FIG. 10, optionally, the bottom surfaces of the first patch section 123a and the second patch section 123b are arranged in a step-like manner and are arranged at the connection between the first patch section 123a and the second patch section 123b There is a first wedge-shaped transition section 123c, and a junction of the first hole section 1111a and the second hole section 1111b is provided with a second wedge-shaped transition section 1111c corresponding to the first wedge-shaped transition section 123c.

In the present embodiment, the bottom surface of the first patch section 123 a and the second patch section 123 b refers to the side near the root of the human ear when worn. The top is far from the root of the human ear side.

In this embodiment, the thickness of the first patch segment 123 a is greater than the thickness of the second patch segment 123 b, ie, the thickness of the first patch segment 123 b is set to be stepped. The thickness of the first patch segment 123 a is greater than the

thickness of the second patch segment 123 b. A second wedge-shaped transition section 1111 c is provided at the connection between the first hole section 1111 a and the second hole section 1111 b, and the second wedge-shaped transition section 1111 c is matched with the first wedge-shaped transition section 123 c. The first and second connection sections 123 a, When a hole section 1111a and a second hole section 1111b are formed, the first wedge-shaped transition section 123c abuts on the second wedge-shaped transition section 1111c to facilitate the insertion of the second connecting section 123b and the first connecting section 123a, Transition, limit and further fixed role.

9, 12, and 13, optionally, the rear hanging component 12 further includes a second conductor set 124 covered by the second elastic coating 122, wherein both ends of the second conductor set 124 extend from the second elastic The coating layer 122 is exposed. A top surface of the plug portion 123 is provided with a buried wire groove 1232 for receiving an exposed portion of the second conductive wire set 124. In this embodiment, the second conductive wire set 124 is used to connect the components in the two earhook assemblies 11, for example, the connecting battery and the control circuit assembly 14. The embedding groove 1232 is provided so that the second wire set 124 can be effectively arranged and fixed on the one hand and the volume can be reduced on the other hand. In other embodiments, the second wire set 124 may be fixed by other means such as glue or double-sided tape without providing the embedding groove 1232, or two rows of conductive wires may be disposed on the top surface of the connector 123 The bumps (not shown) can accommodate the second conductor set 124 between the two rows of bumps.

2, optionally, the bone conduction earphone further comprises a battery assembly 13 and a control circuit assembly 14, wherein the battery assembly 13 is disposed in the first accommodation space 116 of one of the two ear suspension assemblies 11, and the control circuit assembly 14 is disposed in the first receiving space 116 of the other of the two ear hook assemblies 11.

14 and 15, optionally, the third housing 114 for receiving the ear hook assembly 11 of the control circuit assembly 14 is provided with a keyhole 1141 and a receiving slot 1142 communicating with the keyhole 1141, The control circuit assembly 14 includes a circuit board 141, a switch 142 fixed on the circuit board 141, a waterproof liner 143, and a button 144. The button 144 is disposed in the button opening 1141 and exposed through the button opening 1141. The waterproof liner 143 includes A liner body 143a, and a third elastic coating 143b injection-molded on the liner body 143a. The waterproof liner 143 is disposed in the accommodation groove 1142, and the third elastic coating 143b and the sidewalls of the accommodating groove 1142 The button 144 and the switch 142 are respectively provided on both sides of the waterproof liner 143 and respectively abut against the waterproof liner 143. In the present embodiment, the third elastic coating 143b covers one side surface of the lining body 143a and the edge of the lining body 143a, and certainly covers at least a part of the edges, and may also cover all the edges. In other embodiments, the third elastic coating 143 b may completely cover the lining body 143 a, ie, both side surfaces of the covering body 143 a.

In this embodiment, the switch 142 on the circuit board 141 is mainly used for switching on and off, volume adjustment, or other switching functions.

With continued reference to FIGS. 14 and 15, the main body of the water-proof liner 143 is injection-coated with a third elastic coating 143 b so that the third elastic coating 143 b is not

easily detached from the main body of the waterproof backing plate 143, and the third elastic The tightness between the coating 143b and the waterproof lining main body 143a is better, which improves the waterproof performance of the existing bone conduction earphone and ensures the waterproofing effectiveness. In the present embodiment, the liner body 143a may be plastic, and the third elastic coating 143b may be silicone, latex, rubber or composite.

Optionally, a positioning groove 1431 for receiving the switch 142 is disposed on a side of the waterproof liner 143 close to the switch 142.

In this embodiment, the control circuit assembly 14 is assembled by, for example, first disposing the button 144 and the waterproof liner 143 on the third casing 114 in sequence and exposing the button 144 via the button opening 1141, and then the circuit board 141 is turned on by the switch 142 and the positioning groove 1431 of the waterproof lining 143 are in contact with the waterproof lining 143. By providing the positioning slot 1431, the switch 142 can be precisely aligned with the button 144, so that the switch 142 can be effectively operated by the button 144.

16 and 17, optionally, the control circuit assembly 14 further includes an antenna 145 disposed on the circuit board 141. The antenna 145 includes an antenna body 145 a spaced apart from the circuit board 141 and an antenna body 145 a connecting the antenna body 145 a and the circuit board 141 The ground portion 145b and the power feeding portion 145c, wherein the antenna main body 145a bends and extends from the ground portion 145b to the side of the circuit board 141 when viewed in a direction perpendicular to the circuit board 141. In the present embodiment, In this embodiment, the antenna body 145 a is bent toward one side of the circuit board 141, so that the length of the antenna 145 can be increased within a limited space to increase the radiation efficiency. In this embodiment, the antenna 145 is generally used for wireless communication, for example, Bluetooth communication. In other embodiments, it may be WiFi communication, cellular data communication, NFC near field communication or the like.

Optionally, the antenna body 145 a includes a parallel portion 145 a 1 and a bent portion 145 a 2. A width of the parallel portion 145 a 1 is greater than a width of the bent portion 145 a 2 when viewed in a direction perpendicular to the circuit board 141. One end of the parallel portion 145 a 1 is connected to the ground portion 145 b And a feeding portion 145c. The other end is connected to the bent portion 145a2. The parallel portion 145a1 and the bent portion 145a2 are formed in a stepped shape at the connecting portion. The bent portion 145a2 is bent from the connecting portion toward the circuit board 141.

Optionally, the control circuit assembly 14 further includes a grounding component 146 disposed on the circuit board 141, wherein the antenna body 145 a bends and extends toward a side of the circuit board 141 away from the grounding component 146. In this embodiment, the grounding member 146 is a switch 142 on the USB interface and / or circuit, or other grounding member 146. Generally, the grounding member 146 such as the USB interface may cause some interference to the antenna 145. In this embodiment, the antenna body 145a is bent toward the side of the circuit board 141 away from the grounding member 146 to improve the grounding in a limited space The interference of the component 146 to the antenna 145 signal ensures signal quality. In this embodiment, the USB interface can be used to transmit data between the bone conduction earphone and an external device such as a mobile terminal, and also can be used to charge the battery assembly 13.

Optionally, the width of the antenna main body 145a gradually becomes smaller along the extending direction of the antenna main body 145a. For example, specifically, the width of the parallel portion 145 a 1 is constant from one end to the other end, and the width of the bent portion 145 a 2 gradually decreases in the extending direction. Of course, in other embodiments, the width of the parallel portion 145a1 may gradually decrease from one end to the other end, but the width of the other end of the parallel portion 145a1 is still greater than the width of the bent portion 145a2.

Alternatively, the bending angle of the antenna main body 145 a gradually increases along the extending direction of the antenna main body 145 a. For example, the bending angle gradually increases, generally to keep away from the grounding component 146 such as USB and so on, so as to ensure the radiation efficiency of the antenna 145. Optionally, a bent leg 145a3 is provided at an end of the bent portion 145a2 far away from the parallel portion 145a1, where the bent angle is the largest, so as to meet the requirement of the size of the antenna 145 on the one hand and to improve the radiation efficiency on the other hand.

The above is only the embodiments of the present invention, and does not intend to limit the scope of the present invention. All equivalent structures or equivalent processes using the description of the present invention and the accompanying drawings are directly or indirectly used in other related technologies Are all included in the scope of the patent protection of the present invention.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/139,076	12/31/2020	Chaowu LI	20608-0080US00

CONFIRMATION NO. 4158

131839
Metis IP LLC
PO Box 423
McLean, VA 22101

PUBLICATION NOTICE

OC000000125253502

Title:LOUDSPEAKER APPARATUS

Publication No.US-2021-0127193-A1
Publication Date:04/29/2021

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

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Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17139076
Filing Date	2020-12-31
First Named Inventor	Chaowu LI
Art Unit	2654
Examiner Name	
Attorney Docket Number	20608-0080US00

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20130163791	A1	2013-06-27	XIN QI et al.	Corresponding to CN102497612A
	2	20160329041	A1	2016-11-10	XIN QI et al.	Corresponding to CN103716739A
	3	20170318369	A1	2017-11-02	JUNG-KUN WANG	
	4	20200336824	A1	2020-10-22	JINGBO ZHENG et al.	Corresponding to CN209120433U

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17139076
	Filing Date	2020-12-31
	First Named Inventor	Chaowu LI
	Art Unit	2654
	Examiner Name	
	Attorney Docket Number	20608-0080US00

	1	203827497	CN	U	2014-09-10	MA QIANG		☒
	2	204465795	CN	U	2015-07-08	SHENZHEN RUIDIEN SCIENCE & TECH. CO., LTD.		☒
	3	107484054	CN	A	2017-12-15	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	4	207010974	CN	U	2018-02-13	XIAMEN NEWSOUND TECHNOLOGY CO., LTD.		☒
	5	207039848	CN	U	2018-02-23	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	6	207039849	CN	U	2018-02-23	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	7	207039851	CN	U	2018-02-23	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	8	207070282	CN	U	2018-03-02	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	9	207783068	CN	U	2018-08-28	SHENZHEN GRANDSUN ELECTRONICS CO., LTD.		☒
	10	2018175192	WO	A1	2018-09-27	BOSE CORPORATION		☐
	11	109547905	CN	A	2019-03-29	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17139076
	Filing Date	2020-12-31
	First Named Inventor	Chaowu LI
	Art Unit	2654
	Examiner Name	
	Attorney Docket Number	20608-0080US00

	12	109660901	CN	A	2019-04-19	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	13	109714687	CN	A	2019-05-03	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	14	109769167	CN	A	2019-05-17	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	15	109788386	CN	A	2019-05-21	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	16	209089198	CN	U	2019-07-09	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	17	209184800	CN	U	2019-07-30	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	18	209184801	CN	U	2019-07-30	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	19	209267804	CN	U	2019-08-16	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒
	20	209358729	CN	U	2019-09-06	SHENZHEN VOXTECH TECHNOLOGY CO., LTD.		☒

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NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17139076
	Filing Date	2020-12-31
	First Named Inventor	Chaowu LI
	Art Unit	2654
	Examiner Name	
	Attorney Docket Number	20608-0080US00

	1	International Search Report in PCT/CN2019/102397 mailed on October 29, 2019, 6 pages	☒
	2	International Search Report in PCT/CN2019/102399 mailed on October 30, 2019, 7 pages	☒
	3	International Search Report in PCT/CN2019/102392 mailed on November 21, 2019, 7 pages	☒
	4	International Search Report in PCT/CN2019/102400 mailed on November 22, 2019, 8 pages	☒
	5	International Search Report in PCT/CN2019/102393 mailed on November 25, 2019, 7 pages	☒

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17139076
	Filing Date	2020-12-31
	First Named Inventor	Chaowu LI
	Art Unit	2654
	Examiner Name	
	Attorney Docket Number	20608-0080US00

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Yangzhou Du/	Date (YYYY-MM-DD)	2021-03-30
Name/Print	Yangzhou Du	Registration Number	65310

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	42326592
Application Number:	17139076
International Application Number:	
Confirmation Number:	4158
Title of Invention:	LOUDSPEAKER APPARATUS
First Named Inventor/Applicant Name:	Chaowu LI
Customer Number:	131839
Filer:	Yangzhou Harry Du/Nie Rui
Filer Authorized By:	Yangzhou Harry Du
Attorney Docket Number:	20608-0080US00
Receipt Date:	30-MAR-2021
Filing Date:	31-DEC-2020
Time Stamp:	22:39:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	2019-10-29-PCT-ISA-210-20608-0081WO00.pdf	1313983 a939dea173500689987532d77746ea5205e193b3	no	6

Warnings:

Information:					
2	Non Patent Literature	2019-10-30-PCT-ISA-210-20608-0082WO00.pdf	1365694 b8941ecddac551c43b2f0e95520c576fa0231bf7	no	7
Warnings:					
Information:					
3	Non Patent Literature	2019-11-21-PCT-ISA-210-20608-0079WO00.pdf	1706200 a428a4a2908500e0fc12cdddd5f287624dd9c5e4	no	7
Warnings:					
Information:					
4	Non Patent Literature	2019-11-22-PCT-ISA-210-20608-0083WO00.pdf	2014049 93ad12b362c6b316f7f83183871994f235aab5d4	no	8
Warnings:					
Information:					
5	Non Patent Literature	2019-11-25-PCT-ISA-210-20608-0080WO00.pdf	1760700 f68725054d7e6453562ad59c5114f4470c90d924	no	7
Warnings:					
Information:					
6	Information Disclosure Statement (IDS) Form (SB08)	2021-03-30-IDS_Disclosure_List-20608-0080US00.pdf	1301685 f8eb388a2af37e41c4bc4297cf550ac5903c3d24	no	6
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Information:					
This is not an USPTO supplied IDS fillable form					
7	Foreign Reference	CN107484054A.pdf	1706002 73eda59f405821b657eddb7b3332f2707b9812e1	no	47
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Information:					
8	Foreign Reference	CN109547905A.pdf	3091683 62f76a9dc5eac9ec0936483b232feaccc839893e	no	82
Warnings:					
Information:					

9	Foreign Reference	CN109660901A.pdf	3132929 1b2fd97014438eb8dc20184d1d242046340e3c8b	no	82
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10	Foreign Reference	CN109714687A.pdf	2969434 2997806acbd6024e54750a255db66ab3d3464fa3	no	82
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11	Foreign Reference	CN109769167A.pdf	3047887 ebbb4b7b568e03ef85daabcc8c9434ac3f6f70b5	no	82
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12	Foreign Reference	CN109788386A.pdf	3054466 48d7749a3b3966a64e3f4b1140bbfd0f76775c5e	no	83
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Information:					
13	Foreign Reference	CN203827497U.pdf	498840 5b6a2b09aa12b22cbcc249e8e3e9d2a1ab8faa4d	no	18
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Information:					
14	Foreign Reference	CN204465795U.pdf	584158 696a9dd21bef8718d0ce2695f2b653b025ae99dd	no	14
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15	Foreign Reference	CN207010974U.pdf	785007 e11f29cca37a8291b2951294bf6dc02ca1108408	no	27
Warnings:					
Information:					

16	Foreign Reference	CN207039848U.pdf	1789880 2f9778f2e3f4a9046903c44b6046acfa28b5ec1a	no	49
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17	Foreign Reference	CN207039849U.pdf	1790148 0c60e934c82cf7223eff7ad6c556766ff08187b5	no	48
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18	Foreign Reference	CN207039851U.pdf	1824281 cebf5fdc2303e7be02f927ae80d932d2080eb37f	no	49
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Information:					
19	Foreign Reference	CN207070282U.pdf	1731200 0a2e45fb19822373d6087e6cb4a3b2d578212c3e	no	47
Warnings:					
Information:					
20	Foreign Reference	CN207783068U.pdf	745703 6898fc9342cf7a1be2e989c6b547446f4be86597	no	22
Warnings:					
Information:					
21	Foreign Reference	CN209089198U.pdf	2920403 63dc0cc35bad0e1f884e316b14622b489617fade	no	82
Warnings:					
Information:					
22	Foreign Reference	CN209184800U.pdf	3090730 c796fde8b3af814767a19e53882e78beb0b8ff69	no	82
Warnings:					
Information:					

23	Foreign Reference	CN209184801U.pdf	2950010 e456682e3979e89a506a4461bee9e629071305f2	no	81
Warnings:					
Information:					
24	Foreign Reference	CN209267804U.pdf	2933151 52b8c8d3ac637cff7c46cc1820235b97cf24e4f7	no	81
Warnings:					
Information:					
25	Foreign Reference	CN209358729U.pdf	2978623 b4f36320b0a2233d3c9421e1f76effd1c5e68b74	no	82
Warnings:					
Information:					
26	Foreign Reference	WO2018175192A1.pdf	1781134 4b776f96d5407e01a331c2c382722ce4549a8491	no	27
Warnings:					
Information:					
		Total Files Size (in bytes):	52867980		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/102397

A. CLASSIFICATION OF SUBJECT MATTER

H04R 1/10(2006.01)i

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)

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)

CNABS; CNTXT; CNKI; VEN: 耳机, 耳挂, 壳体, 振动, 驱动, 法线, 不平行, 相交, 平行, earphone, ear w hang+, shell, librat +, driv+, normal line, parallel, corss+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 109788386 A (SHENZHEN VOXTECH CO., LTD.) 21 May 2019 (2019-05-21) description, paragraphs 0035-0050 and 0066-099, and figure 1	1-25
X	CN 207039851 U (SHENZHEN VOXTECH CO., LTD.) 23 February 2018 (2018-02-23) description, paragraphs 0023-0053, and figure 2	1-25
A	CN 207070282 U (SHENZHEN VOXTECH CO., LTD.) 02 March 2018 (2018-03-02) entire document	1-25
A	CN 204465795 U (SHENZHEN RUIDIEN SCIENCE & TECHNOLOGY CO., LTD.) 08 July 2015 (2015-07-08) entire document	1-25
A	CN 107484054 A (SHENZHEN VOXTECH CO., LTD.) 15 December 2017 (2017-12-15) entire document	1-25

☐ Further documents are listed in the continuation of Box C. ☑ 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
22 October 2019	**29 October 2019**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

TRANSLATION

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/102397

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN	109788386	A	21 May 2019	None	
CN	207039851	U	23 February 2018	None	
CN	207070282	U	02 March 2018	None	
CN	204465795	U	08 July 2015	None	
CN	107484054	A	15 December 2017	None	

专 利 合 作 条 约

PCT

国际检索报告

(PCT 第 18 条和细则 43 和 44)

申请人或代理人的档案号 206080081WO0	关于后续行为	见 PCT/ISA/220 表和 适用时，见下面第 5 项
国际申请号 PCT/CN2019/102397	国际申请日 *(日/月/年)* 24.8 月 2019(24.08.2019)	(最早的)优先权日 *(日/月/年)* 05.1 月 2019(05.01.2019)
申请人 深圳市韶音科技有限公司		

按照条约第 18 条，本国际检索报告由本国际检索单位做出并送交申请人。报告副本送交国际局。

本国际检索报告总计 4 页。

☐ 它还附有本报告所引用的各现有技术文件的副本。

1. 报告的基础

a.关于语言，进行国际检索基于：

☒ 国际申请提交时使用的语言。

☐ 该国际申请的_____语言译文，为了国际检索的目的提供该种语言的译文(细则 12.3(a)和 23.1(b))。

b.☐ 本国际检索报告考虑了本单位许可或被通知的根据细则91所做出的明显错误更正。(细则43.6之二(a))。

c.☐ 关于国际申请中公开的任何核苷酸和/或氨基酸序列(见第 I 栏)。

2. ☐ 某些权利要求被认为是不能检索的(见第 II 栏)。

3. ☐ 缺乏发明的单一性(见第 III 栏)。

4. 关于**发明名称**，

☒ 同意申请人提出的发明名称。

☐ 发明名称由本单位确定如下：

5. 关于**摘要**，

☒ 同意申请人提出的摘要。

☐ 根据细则 38.2(b)，摘要由本单位制定，如第 IV 栏中所示。自本国际检索报告发文日起一个月内，申请人可以向本单位提出意见。

6. 关于**附图**，

a.随摘要一起公布的**附图**是：图 2

☒ 按照申请人建议的。

☐ 由本单位选择的，因为申请人没有建议一幅图。

☐ 由本单位选择的，因为该图能更好地表示发明的特征。

b. ☐ 没有与摘要一起公布的附图。

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国际申请号
PCT/CN2019/102397

国际检索报告

A. 主题的分类

H04R 1/10(2006.01)i

按照国际专利分类（IPC）或者同时按照国家分类和 IPC 两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

IPC：H04R

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

CNABS;CNTXT;CNKI;VEN：耳机，耳挂，壳体，振动，驱动，法线，不平行，相交，平行，earphone, ear w hang+, shell, librat+, driv+, normal line, parallel, corss+

C. 相关文件

类　型*	引用文件，必要时，指明相关段落	相关的权利要求
PX	CN 109788386A (深圳市韶音科技有限公司) 21.5 月 2019(21.05.2019) 说明书第 0035-0050，0066-0099 段，图 1	1-25
X	CN 207039851U (深圳市韶音科技有限公司) 23.2 月 2018(23.02.2018) 说明书第 0023-0053 段，图 2	1-25
A	CN 207070282U (深圳市韶音科技有限公司) 02.3 月 2018(02.03.2018) 全文	1-25
A	CN 204465795U (深圳瑞迪恩科技有限公司) 08.7 月 2015(08.07.2015) 全文	1-25
A	CN 107484054A (深圳市韶音科技有限公司) 15.12 月 2017(15.12.2017) 全文	1-25

☐其余文件在 C 栏的续页中列出。　　☒见同族专利附件。

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国际申请号
PCT/CN2019/102397

国际检索报告

* 引用文件的具体类型： "A" 认为不特别相关的表示了现有技术一般状态的文件 "E" 在国际申请日的当天或之后公布的在先申请或专利 "L" 可能对优先权要求构成怀疑的文件，或为确定另一篇 引用文件的公布日而引用的或者因其他特殊理由而引 用的文件（如具体说明的） "O" 涉及口头公开、使用、展览或其他方式公开的文件 "P" 公布日先于国际申请日但迟于所要求的优先权日的文件	"T" 在申请日或优先权日之后公布，与申请不相抵触，但为了 理解发明之理论或原理的在后文件 "X" 特别相关的文件，单独考虑该文件，认定要求保护的 发明不是新颖的或不具有创造性 "Y" 特别相关的文件，当该文件与另一篇或者多篇该类文件 结合并且这种结合对于本领域技术人员为显而易见时， 要求保护的发明不具有创造性 "&" 同族专利的文件
国际检索实际完成的日期 22. 10 月 2019(22. 10. 2019)	国际检索报告邮寄日期 29. 10 月 2019(29. 10. 2019)
ISA/CN 的名称和邮寄地址： 中国国家知识产权局(ISA/CN) 北京市海淀区蓟门桥西土城路 6 号 100088 传真号：(86-10)62019451	受权官员： 吴江霞 电话号码： 86-(010)-62412034

IPR2025-00842; Shokz
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国际申请号
PCT/CN2019/102397

国际检索报告

检索报告中引用的专利文件	公布日期	同族专利	公布日期
CN109788386A	21.05.2019	无	
CN207039851U	23.02.2018	无	
CN207070282U	02.03.2018	无	
CN204465795U	08.07.2015	无	
CN107484054A	15.12.2017	无	

TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/102399

A. CLASSIFICATION OF SUBJECT MATTER

H04R 1/10(2006.01)i

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)

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)

CNABS; CNTXT; CNKI; VEN: 耳机, 骨传导, 耳挂, 壳体, 弹性, 贴合, 靠近, 入耳, 耳朵, 耳, 防水, earphone, bone conduct +, ear w hang+, shell, elastic, near, match, ear, water w proof

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 109788386 A (SHENZHEN VOXTECH LIMITED CORPORATION) 21 May 2019 (2019-05-21) description, paragraphs [0035]-[0050] and [0066]-[0099], and figure 1	1-22
X	CN 207039851 U (SHENZHEN VOXTECH LIMITED CORPORATION) 23 February 2018 (2018-02-23) description, paragraphs [0023]-[0053], and figure 2	1-22
A	CN 204465795 U (SHENZHEN RUIDIEN SCIENCE & TECHNOLOGY CO., LTD.) 08 July 2015 (2015-07-08) entire document	1-22
A	CN 207039849 U (SHENZHEN VOXTECH LIMITED CORPORATION) 23 February 2018 (2018-02-23) entire document	1-22
A	CN 207070282 U (SHENZHEN VOXTECH LIMITED CORPORATION) 02 March 2018 (2018-03-02) entire document	1-22

☑ Further documents are listed in the continuation of Box C. ☑ 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
22 October 2019	**30 October 2019**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/102399

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 107484054 A (SHENZHEN VOXTECH LIMITED CORPORATION) 15 December 2017 (2017-12-15) entire document	1-22

TRANSLATION

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/102399

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN	109788386	A	21 May 2019	None	
CN	207039851	U	23 February 2018	None	
CN	204465795	U	08 July 2015	None	
CN	207039849	U	23 February 2018	None	
CN	207070282	U	02 March 2018	None	
CN	107484054	A	15 December 2017	None	

专 利 合 作 条 约

PCT

国际检索报告

(PCT 第 18 条和细则 43 和 44)

申请人或代理人的档案号 206080082WO0	关于后续行为	见 PCT/ISA/220 表和 适用时，见下面第 5 项
国际申请号 PCT/CN2019/102399	国际申请日 *(日/月/年)* 24.8 月 2019(24.08.2019)	(最早的)优先权日 *(日/月/年)* 05.1 月 2019(05.01.2019)

申请人

深圳市韶音科技有限公司

按照条约第 18 条，本国际检索报告由本国际检索单位做出并送交申请人。报告副本送交国际局。

本国际检索报告总计 4 页。

☐ 它还附有本报告所引用的各现有技术文件的副本。

1. 报告的基础

a.关于语言，进行国际检索基于：

☒ 国际申请提交时使用的语言。

☐ 该国际申请的_____语言译文，为了国际检索的目的提供该种语言的译文(细则 12.3(a)和 23.1(b))。

b.☐ 本国际检索报告考虑了本单位许可或被通知的根据细则91所做出的明显错误更正。(细则43.6之二(a))。

c.☐ 关于国际申请中公开的任何核苷酸和/或氨基酸序列(见第 I 栏)。

2. ☐ 某些权利要求被认为是不能检索的(见第 II 栏)。

3. ☐ 缺乏发明的单一性(见第 III 栏)。

4. 关于**发明名称**，

☒ 同意申请人提出的发明名称。

☐ 发明名称由本单位确定如下：

5. 关于**摘要**，

☒ 同意申请人提出的摘要。

☐ 根据细则 38.2(b)，摘要由本单位制定，如第 IV 栏中所示。自本国际检索报告发文日起一个月内，申请人可以向本单位提出意见。

6. 关于**附图**，

a.随摘要一起公布的**附图**是：图 1

☒ 按照申请人建议的。

☐ 由本单位选择的，因为申请人没有建议一幅图。

☐ 由本单位选择的，因为该图能更好地表示发明的特征。

b. ☐ 没有与摘要一起公布的附图。

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Ex. 2018 - Page 243

国际申请号
PCT/CN2019/102399

国际检索报告

A. 主题的分类

H04R 1/10(2006.01)i

按照国际专利分类（IPC）或者同时按照国家分类和 IPC 两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

IPC：H04R

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

CNABS;CNTXT;CNKI;VEN:耳机，骨传导，耳挂，壳体，弹性，贴合，靠近，人耳，耳朵，耳，防水，earphone, bone conduct+, ear w hang+, shell, elastic, near, match, ear, water w proof

C. 相关文件

类　型*	引用文件，必要时，指明相关段落	相关的权利要求
PX	CN 109788386A (深圳市韶音科技有限公司) 21.5 月 2019(21.05.2019) 说明书第 0035-0050，0066-0099 段，图 1	1-22
X	CN 207039851U (深圳市韶音科技有限公司) 23.2 月 2018(23.02.2018) 说明书第 0023-0053 段，图 2	1-22
A	CN 204465795U (深圳瑞迪恩科技有限公司) 08.7 月 2015(08.07.2015) 全文	1-22
A	CN 207039849U (深圳市韶音科技有限公司) 23.2 月 2018(23.02.2018) 全文	1-22
A	CN 207070282U (深圳市韶音科技有限公司) 02.3 月 2018(02.03.2018) 全文	1-22
A	CN 107484054A (深圳市韶音科技有限公司) 15.12 月 2017(15.12.2017) 全文	1-22

☐其余文件在 C 栏的续页中列出。　　☒见同族专利附件。

IPR2025-00842; Shokz
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国际申请号
PCT/CN2019/102399

国际检索报告

* 引用文件的具体类型： "A" 认为不特别相关的表示了现有技术一般状态的文件 "E" 在国际申请日的当天或之后公布的在先申请或专利 "L" 可能对优先权要求构成怀疑的文件，或为确定另一篇 引用文件的公布日而引用的或者因其他特殊理由而引 用的文件（如具体说明的） "O" 涉及口头公开、使用、展览或其他方式公开的文件 "P" 公布日先于国际申请日但迟于所要求的优先权日的文件	"T" 在申请日或优先权日之后公布，与申请不相抵触，但为了 理解发明之理论或原理的在后文件 "X" 特别相关的文件，单独考虑该文件，认定要求保护的 发明不是新颖的或不具有创造性 "Y" 特别相关的文件，当该文件与另一篇或者多篇该类文件 结合并且这种结合对于本领域技术人员为显而易见时， 要求保护的发明不具有创造性 "&" 同族专利的文件
国际检索实际完成的日期 22. 10 月 2019(22. 10. 2019)	国际检索报告邮寄日期 30. 10 月 2019(30. 10. 2019)
ISA/CN 的名称和邮寄地址： 中国国家知识产权局(ISA/CN) 北京市海淀区蓟门桥西土城路 6 号 100088 传真号：(86-10)62019451	受权官员： 吴江霞 电话号码： 86-(010)-62412034

IPR2025-00842; Shokz
Ex. 2018 - Page 245

国际申请号
PCT/CN2019/102399

国际检索报告

检索报告中引用的专利文件	公布日期	同族专利	公布日期
CN109788386A	21.05.2019	无	
CN207039851U	23.02.2018	无	
CN204465795U	08.07.2015	无	
CN207039849U	23.02.2018	无	
CN207070282U	02.03.2018	无	
CN107484054A	15.12.2017	无	

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TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/102392

A. CLASSIFICATION OF SUBJECT MATTER

H04R 1/10(2006.01)i; H04R 31/00(2006.01)i

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)

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)

WPI, EPODOC, CNPAT, CNKI: 扬声器, 扬声装置, 助听器, 播放器, 播放装置, 机芯壳体, 机芯, 电路壳体, 控制电路, 电池, 振动, 产生, 声音, 两个, 多个, 谐振峰, 耳挂, 壳体护套, 防水, 接插端, 接插孔, 振动板, 传振片, 音圈, 磁路, 接触面, 按键, 指示灯, speaker, loudspeak+, audiphone, ear-hook, ear hook, shell, sheath, control, circuit, battery, sound

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PY	CN 109788386 A (SHENZHEN VOXTECH CO., LTD.) 21 May 2019 (2019-05-21) description, paragraphs [0035]-[0159], and figures 1-17	1-26
Y	CN 102497612 A (SHENZHEN VOXTECH CO., LTD.) 13 June 2012 (2012-06-13) description, paragraphs [0024]-[0034]	1-26
PY	CN 109547905 A (SHENZHEN VOXTECH CO., LTD.) 29 March 2019 (2019-03-29) description, paragraphs [0034]-[0158]	1-26
PY	CN 109714687 A (SHENZHEN VOXTECH CO., LTD.) 03 May 2019 (2019-05-03) description, paragraphs [0035]-[0159]	1-26
PY	CN 109769167 A (SHENZHEN VOXTECH CO., LTD.) 17 May 2019 (2019-05-17) description, paragraphs [0034]-[0223]	1-26
PY	CN 109660901 A (SHENZHEN VOXTECH CO., LTD.) 19 April 2019 (2019-04-19) description, paragraphs [0034]-[0223]	1-26
PY	CN 209184801 U (SHENZHEN VOXTECH CO., LTD.) 30 July 2019 (2019-07-30) description, paragraphs [0034]-[0164]	1-26

☑ Further documents are listed in the continuation of Box C. ☑ 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
24 October 2019	**21 November 2019**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/102392

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PY	CN 209267804 U (SHENZHEN VOXTECH CO., LTD.) 16 August 2019 (2019-08-16) description, paragraphs [0034]-[0221]	1-26
A	US 2017318369 A1 (NEATRON CORPORATION) 02 November 2017 (2017-11-02) entire document	1-26

IPR2025-00842; Shokz
Ex. 2018 - Page 248

TRANSLATION

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/102392

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	109788386	A	21 May 2019	CN	209358729	U	06 September 2019
CN	102497612	A	13 June 2012	EP	2773133	A1	03 September 2014
				US	2015030186	A1	29 January 2015
				US	2013163791	A1	27 June 2013
				WO	2013091504	A1	27 June 2013
				US	2019082266	A1	14 March 2019
				US	2016316300	A1	27 October 2016
				KR	20140091602	A	21 July 2014
				EP	3163909	A1	03 May 2017
				JP	2015505204	A	16 February 2015
				ES	2621198	T3	03 July 2017
CN	109547905	A	29 March 2019	CN	209089198	U	09 July 2019
CN	109714687	A	03 May 2019	CN	209184798	U	30 July 2019
CN	109769167	A	17 May 2019	CN	209184800	U	30 July 2019
CN	109660901	A	19 April 2019	CN	209358760	U	06 September 2019
CN	209184801	U	30 July 2019		None		
CN	209267804	U	16 August 2019		None		
US	2017318369	A1	02 November 2017	GB	2550132	A	15 November 2017

专 利 合 作 条 约

PCT

国际检索报告

(PCT 第 18 条和细则 43 和 44)

申请人或代理人的档案号 206080079WO0	关于后续行为	见 PCT/ISA/220 表和 适用时，见下面第 5 项
国际申请号 PCT/CN2019/102392	国际申请日 *(日/月/年)* 24.8 月 2019(24.08.2019)	(最早的)优先权日 *(日/月/年)* 05.1 月 2019(05.01.2019)

申请人

深圳市韶音科技有限公司

按照条约第 18 条，本国际检索报告由本国际检索单位做出并送交申请人。报告副本送交国际局。

本国际检索报告总计 4 页。

☐ 它还附有本报告所引用的各现有技术文件的副本。

1. 报告的基础

a.关于语言，进行国际检索基于：

☒ 国际申请提交时使用的语言。

☐ 该国际申请的_____语言译文，为了国际检索的目的提供该种语言的译文(细则 12.3(a)和 23.1(b))。

b.☐ 本国际检索报告考虑了本单位许可或被通知的根据细则91所做出的明显错误更正。(细则43.6之二(a))。

c.☐ 关于国际申请中公开的任何核苷酸和/或氨基酸序列(见第 I 栏)。

2. ☐ 某些权利要求被认为是不能检索的(见第 II 栏)。

3. ☐ 缺乏发明的单一性(见第 III 栏)。

4. 关于**发明名称**，

☒ 同意申请人提出的发明名称。

☐ 发明名称由本单位确定如下：

5. 关于**摘要**，

☒ 同意申请人提出的摘要。

☐ 根据细则 38.2(b)，摘要由本单位制定，如第 IV 栏中所示。自本国际检索报告发文日起一个月内，申请人可以向本单位提出意见。

6. 关于**附图**，

a.随摘要一起公布的**附图**是：图 2

☒ 按照申请人建议的。

☐ 由本单位选择的，因为申请人没有建议一幅图。

☐ 由本单位选择的，因为该图能更好地表示发明的特征。

b. ☐ 没有与摘要一起公布的附图。

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国际申请号
PCT/CN2019/102392

国际检索报告

A. 主题的分类

H04R 1/10(2006.01)i; H04R 31/00(2006.01)i

按照国际专利分类（IPC）或者同时按照国家分类和 IPC 两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

IPC：H04R

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

WPI，EPODOC，CNPAT，CNKI：扬声器，扬声装置，助听器，播放器，播放装置，机芯壳体，机芯，电路壳体，控制电路，电池，振动，产生，声音，两个，多个，谐振峰，耳挂，壳体护套，防水，接插端，接插孔，振动板，传振片，音圈，磁路，接触面，按键，指示灯，speaker，loudspeak+，audiphone，ear-hook，ear hook，shell，sheath，control，circuit，battery，sound

C. 相关文件

类　型*	引用文件，必要时，指明相关段落	相关的权利要求
PY	CN 109788386A (深圳市韶音科技有限公司) 21.5 月 2019(21.05.2019) 说明书第[0035]- [0159]段，图 1-17	1-26
Y	CN 102497612A (深圳市韶音科技有限公司) 13.6 月 2012(13.06.2012) 说明书第[0024]-[0034]段	1-26
PY	CN 109547905A (深圳市韶音科技有限公司) 29.3 月 2019(29.03.2019) 说明书第[0034]-[0158]段	1-26
PY	CN 109714687A (深圳市韶音科技有限公司) 03.5 月 2019(03.05.2019) 说明书第[0035]-[0159]段	1-26
PY	CN 109769167A (深圳市韶音科技有限公司) 17.5 月 2019(17.05.2019) 说明书第[0034]-[0223]段	1-26
PY	CN 109660901A (深圳市韶音科技有限公司) 19.4 月 2019(19.04.2019) 说明书第[0034]- [0223]段	1-26
PY	CN 209184801U (深圳市韶音科技有限公司) 30.7 月 2019(30.07.2019) 说明书第[0034]-[0164]段	1-26
PY	CN 209267804U (深圳市韶音科技有限公司) 16.8 月 2019(16.08.2019) 说明书第[0034]- [0221]段	1-26
A	US 2017318369A1 (NEATRON CORPORATION) 02.11 月 2017(02.11.2017) 全文	1-26

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国际申请号 PCT/CN2019/102392

国际检索报告

☐其余文件在C栏的续页中列出。	☒见同族专利附件。

* 引用文件的具体类型： "A" 认为不特别相关的表示了现有技术一般状态的文件 "E" 在国际申请日的当天或之后公布的在先申请或专利 "L" 可能对优先权要求构成怀疑的文件，或为确定另一篇 引用文件的公布日而引用的或者因其他特殊理由而引 用的文件（如具体说明的） "O" 涉及口头公开、使用、展览或其他方式公开的文件 "P" 公布日先于国际申请日但迟于所要求的优先权日的文件	"T" 在申请日或优先权日之后公布，与申请不相抵触，但为了 理解发明之理论或原理的在后文件 "X" 特别相关的文件，单独考虑该文件，认定要求保护的 发明不是新颖的或不具有创造性 "Y" 特别相关的文件，当该文件与另一篇或者多篇该类文件 结合并且这种结合对于本领域技术人员为显而易见时， 要求保护的发明不具有创造性 "&" 同族专利的文件

国际检索实际完成的日期 24. 10 月 2019(24. 10. 2019)	国际检索报告邮寄日期 21. 11 月 2019(21. 11. 2019)
ISA/CN的名称和邮寄地址： 中国国家知识产权局(ISA/CN) 北京市海淀区蓟门桥西土城路6号 100088 传真号：(86-10)62019451	受权官员： 杜少凤 电话号码： 86-(10)-53961593

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国际检索报告

检索报告中引用的专利文件	公布日期	同族专利	公布日期
CN109788386A	21.05.2019	CN209358729U	06.09.2019
CN102497612A	13.06.2012	EP2773133A1	03.09.2014
		US2015030186A1	29.01.2015
		US2013163791A1	27.06.2013
		WO2013091504A1	27.06.2013
		US2019082266A1	14.03.2019
		US2016316300A1	27.10.2016
		KR20140091602A	21.07.2014
		EP3163909A1	03.05.2017
		JP2015505204A	16.02.2015
		ES2621198T3	03.07.2017
CN109547905A	29.03.2019	CN209089198U	09.07.2019
CN109714687A	03.05.2019	CN209184798U	30.07.2019
CN109769167A	17.05.2019	CN209184800U	30.07.2019
CN109660901A	19.04.2019	CN209358760U	06.09.2019
CN209184801U	30.07.2019	无	
CN209267804U	16.08.2019	无	
US2017318369A1	02.11.2017	GB2550132A	15.11.2017

TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/102400

A. CLASSIFICATION OF SUBJECT MATTER

H04R 1/10(2006.01)i; H04R 25/00(2006.01)i; H04R 9/06(2006.01)i; H04R 9/02(2006.01)i

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)

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)

CNPAT, CNKI, WPI, EPODOC: 深圳市韶音, 防水, 接插, 抵接, 插接, 辅助片, 耳挂, 后挂, 耳机, 扬声器, 传声器, 麦克风, 耳麦, 喇叭, 电路, 电池, 管套, 套管, 护套, 包裹层, 硅胶套, 覆盖层, 橡胶套, 凸缘, 突块, 凸台, 限位, 卡接, 凸部, 突部, 退模, 模具, 凸块, 卡止, earphone, piece, circuit, mould, current, pattern, electrocircuit, electric, plate?, board?, waterproof

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 109547905 A (SHENZHEN VOXTECH CO., LTD.) 29 March 2019 (2019-03-29) claims 1-12, description, paragraphs [0034]-[0065], [0081]-[0090] and [0122]-[0197], and figures 1-25	1-31
PX	CN 209089198 U (SHENZHEN VOXTECH CO., LTD.) 09 July 2019 (2019-07-09) claims 1-12, description, paragraphs [0034]-[0065], [0081]-[0090] and [0122]-[0197], and figures 1-25	1-31
PX	CN 109769167 A (SHENZHEN VOXTECH CO., LTD.) 17 May 2019 (2019-05-17) claims 1-11, description, paragraphs [0034]-[0086], [0111]-[0251], and figures 1-25	1-31
PX	CN 209184800 U (SHENZHEN VOXTECH CO., LTD.) 30 July 2019 (2019-07-30) claims 1-11, description, paragraphs [0034]-[0086], [0111]-[0251], and figures 1-25	1-31
PX	CN 109788386 A (SHENZHEN VOXTECH CO., LTD.) 21 May 2019 (2019-05-21) claims 1-14, description, paragraphs [0005], [0035]-[0085] and [0112]-[0195], and figures 1-25	1-31
E	CN 209358729 U (SHENZHEN VOXTECH CO., LTD.) 06 September 2019 (2019-09-06) claims 1-10, description, paragraphs [0005], [0035]-[0085] and [0112]-[0195], and figures 1-25	1-31

☑ Further documents are listed in the continuation of Box C. ☑ 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
14 November 2019	**22 November 2019**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/102400

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 207039848 U (SHENZHEN VOXTECH CO., LTD.) 23 February 2018 (2018-02-23) description, paragraphs [0023]-[0048] and [0058]-[0063], figures 1-12	1, 11-14, 24-31
Y	CN 207039848 U (SHENZHEN VOXTECH CO., LTD.) 23 February 2018 (2018-02-23) description, paragraphs [0023]-[0048] and [0058]-[0063], figures 1-12	2-9
Y	CN 207010974 U (USNEWSOUND LLC) 13 February 2018 (2018-02-13) description, paragraphs [0029]-[0031] and [0035]-[0036], and figures 1-5	2-9
A	CN 203827497 U (MA, Qiang) 10 September 2014 (2014-09-10) entire document	1-31
A	CN 207783068 U (SHENZHEN GRANDSUN ELECTRONIC CO., LTD.) 28 August 2018 (2018-08-28) entire document	1-31
A	WO 2018175192 A1 (BOSE CORP.) 27 September 2018 (2018-09-27) entire document	1-31

TRANSLATION

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/102400

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	109547905	A	29 March 2019	None			
CN	209089198	U	23 February 2018	None			
CN	109769167	A	17 May 2019	None			
CN	209184800	U	21 May 2019	None			
CN	109788386	A	21 May 2019	None			
CN	209358729	U	21 May 2019	None			
CN	207039848	U	23 February 2018	None			
CN	207010974	U	13 February 2018	None			
CN	203827497	U	10 September 2014	None			
CN	207783068	U	28 August 2018	None			
WO	2018175192	A1	27 September 2018	US	2018270558	A1	20 September 2018

专 利 合 作 条 约

PCT

国际检索报告

(PCT 第 18 条和细则 43 和 44)

申请人或代理人的档案号 206080083WO0	关于后续行为	见 PCT/ISA/220 表和 适用时，见下面第 5 项
国际申请号 PCT/CN2019/102400	国际申请日 *(日/月/年)* 24.8 月 2019(24.08.2019)	(最早的)优先权日 *(日/月/年)* 05.1 月 2019(05.01.2019)

申请人

深圳市韶音科技有限公司

按照条约第 18 条，本国际检索报告由本国际检索单位做出并送交申请人。报告副本送交国际局。

本国际检索报告总计 5 页。

☐ 它还附有本报告所引用的各现有技术文件的副本。

1. 报告的基础

a.关于语言，进行国际检索基于：

☒ 国际申请提交时使用的语言。

☐ 该国际申请的_____语言译文，为了国际检索的目的提供该种语言的译文(细则 12.3(a)和 23.1(b))。

b.☐ 本国际检索报告考虑了本单位许可或被通知的根据细则91所做出的明显错误更正。(细则43.6之二(a))。

c.☐ 关于国际申请中公开的任何核苷酸和/或氨基酸序列(见第 I 栏)。

2. ☐ 某些权利要求被认为是不能检索的(见第 II 栏)。

3. ☐ 缺乏发明的单一性(见第 III 栏)。

4. 关于**发明名称**，

☒ 同意申请人提出的发明名称。

☐ 发明名称由本单位确定如下：

5. 关于**摘要**，

☐ 同意申请人提出的摘要。

☒ 根据细则 38.2(b)，摘要由本单位制定，如第 IV 栏中所示。自本国际检索报告发文日起一个月内，申请人可以向本单位提出意见。

6. 关于**附图**，

a.随摘要一起公布的**附图**是：图 1

☒ 按照申请人建议的。

☐ 由本单位选择的，因为申请人没有建议一幅图。

☐ 由本单位选择的，因为该图能更好地表示发明的特征。

b. ☐ 没有与摘要一起公布的附图。

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国际检索报告

第 IV 栏 摘要正文(续第 1 页第 5 项)

一种扬声器装置（7400），该装置（7400）包括，用于容纳耳机芯（50，1104，7402）的机芯壳体（20，41，751）；用于容纳控制电路（60）或电池（70）的电路壳体（30），控制电路（60）或电池（70）驱动耳机芯（50，1104，7402）振动以产生声音；用于连接机芯壳体（20，41，751）和电路壳体（30）的耳挂（10）；以及壳体护套（17），至少部分包覆于电路壳体（30）和耳挂（10）的外围，壳体护套（17）由防水材料制成。该扬声器装置（7400）通过各个部件间的密封连接，提高了扬声器装置（7400）整体的防水效果。

IPR2025-00842; Shokz
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国际申请号
PCT/CN2019/102400

国际检索报告

A. 主题的分类

H04R 1/10(2006.01)i；H04R 25/00(2006.01)i；H04R 9/06(2006.01)i；H04R 9/02(2006.01)i

按照国际专利分类（IPC）或者同时按照国家分类和IPC两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

IPC：H04R

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

CNPAT, CNKI, WPI, EPODOC：深圳市韶音，防水，接插，抵接，插接，辅助片，耳挂，后挂，耳机，扬声器，传声器，麦克风，耳麦，喇叭，电路，电池，管套，套管，护套，包裹层，硅胶套，覆盖层，橡胶套，凸缘，突块，凸台，限位，卡接，凸部，突部，退模，模具，凸块，卡止，earphone，piece，circuit，mould，current，pattern，electrocircuit，electric，plate?，board?，waterproof

C. 相关文件

类　型*	引用文件，必要时，指明相关段落	相关的权利要求
PX	CN 109547905A (深圳市韶音科技有限公司) 29.3 月 2019(29.03.2019) 权利要求 1-12、说明书第[0034]-[0065]，[0081]-[0090]，[0122]-[0197]段、图 1-25	1-31
PX	CN 209089198U (深圳市韶音科技有限公司) 09.7 月 2019(09.07.2019) 权利要求 1-12、说明书第[0034]-[0065]，[0081]-[0090]，[0122]-[0197]段、图 1-25	1-31
PX	CN 109769167A (深圳市韶音科技有限公司) 17.5 月 2019(17.05.2019) 权利要求 1-11、说明书第[0034]-[0086]，[0111]-[0215]段、图 1-25	1-31
PX	CN 209184800U (深圳市韶音科技有限公司) 30.7 月 2019(30.07.2019) 权利要求 1-11、说明书第[0034]-[0086]，[0111]-[0215]段、图 1-25	1-31
PX	CN 109788386A (深圳市韶音科技有限公司) 21.5 月 2019(21.05.2019) 权利要求 1-14，说明书第[0005]，[0035]-[0085]、[0112]-[0195]段、图 1-25	1-31
E	CN 209358729U (深圳市韶音科技有限公司) 06.9 月 2019(06.09.2019) 权利要求 1-10，说明书第[0005]，[0035]-[0085]、[0112]-[0195]段、图 1-25	1-31

IPR2025-00842; Shokz
Ex. 2018 - Page 259

国际申请号
PCT/CN2019/102400

国际检索报告

X	CN 207039848U (深圳市韶音科技有限公司) 23.2 月 2018(23.02.2018) 说明书第[0023]-[0048]，[0058]-[0063]段、图 1-12	1，11-14，24-31
Y	CN 207039848U (深圳市韶音科技有限公司) 23.2 月 2018(23.02.2018) 说明书第[0023]-[0048]，[0058]-[0063]段、图 1-12	2-9
Y	CN 207010974U (厦门新声科技有限公司) 13.2 月 2018(13.02.2018) 说明书第[0029]-[0031]，[0035]-[0036]段，图 1-5	2-9
A	CN 203827497U (马强) 10.9 月 2014(10.09.2014) 全文	1-31
A	CN 207783068U (深圳市冠旭电子股份有限公司) 28.8 月 2018(28.08.2018) 全文	1-31
A	WO 2018175192A1 (BOSE CORP.) 27.9 月 2018(27.09.2018) 全文	1-31

☐其余文件在 C 栏的续页中列出。　　☒见同族专利附件。

* 引用文件的具体类型：

"A" 认为不特别相关的表示了现有技术一般状态的文件

"E" 在国际申请日的当天或之后公布的在先申请或专利

"L" 可能对优先权要求构成怀疑的文件，或为确定另一篇引用文件的公布日而引用的或者因其他特殊理由而引用的文件（如具体说明的）

"O" 涉及口头公开、使用、展览或其他方式公开的文件

"P" 公布日先于国际申请日但迟于所要求的优先权日的文件

"T" 在申请日或优先权日之后公布，与申请不相抵触，但为了理解发明之理论或原理的在后文件

"X" 特别相关的文件，单独考虑该文件，认定要求保护的发明不是新颖的或不具有创造性

"Y" 特别相关的文件，当该文件与另一篇或者多篇该类文件结合并且这种结合对于本领域技术人员为显而易见时，要求保护的发明不具有创造性

"&" 同族专利的文件

国际检索实际完成的日期	国际检索报告邮寄日期
14. 11 月 2019(14. 11. 2019)	22. 11 月 2019(22. 11. 2019)
ISA/CN 的名称和邮寄地址： 中国国家知识产权局(ISA/CN) 北京市海淀区蓟门桥西土城路 6 号 100088 传真号：(86-10)62019451	受权官员：　向薇 电话号码：　86-(10)-53962455

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Ex. 2018 - Page 260

国际申请号
PCT/CN2019/102400

国际检索报告

检索报告中引用的专利文件	公布日期	同族专利	公布日期
CN109547905A	29.03.2019	无	
CN209089198U	23.02.2018	无	
CN109769167A	17.05.2019	无	
CN209184800U	21.05.2019	无	
CN109788386A	21.05.2019	无	
CN209358729U	21.05.2019	无	
CN207039848U	23.02.2018	无	
CN207010974U	13.02.2018	无	
CN203827497U	10.09.2014	无	
CN207783068U	28.08.2018	无	
WO2018175192A1	27.09.2018	US2018270558A1	20.09.2018

TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/102393

A. CLASSIFICATION OF SUBJECT MATTER

H04R 1/10(2006.01)i; H04R 31/00(2006.01)i

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)

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)

WPI, EPODOC, CNPAT, CNKI: 扬声器, 扬声装置, 助听器, 播放器, 播放装置, 机芯壳体, 机芯, 电路壳体, 控制电路, 电池, 振动, 耳挂, 接插端, 振动, 频率, 相位, 外壳, 面板, 背面, speaker, loudspeak+, audiphone, ear-hook, ear hook, shell, sheath, control, circuit, battery, sound

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PY	CN 109788386 A (SHENZHEN VOXTECH LIMITED CORPORATION) 21 May 2019 (2019-05-21) description, paragraphs [0035]-[0159], and figures 1-17	1-24
PY	CN 209120433 U (SHENZHEN VOXTECH LIMITED CORPORATION) 16 July 2019 (2019-07-16) description, paragraphs [0006]-[0045] and [0090]-[0192]	1-24
PY	CN 109547905 A (SHENZHEN VOXTECH LIMITED CORPORATION) 29 March 2019 (2019-03-29) description, paragraphs [0034]-[0158]	1-24
PY	CN 109769167 A (SHENZHEN VOXTECH LIMITED CORPORATION) 17 May 2019 (2019-05-17) description, paragraphs [0034]-[0223]	1-24
PY	CN 109714687 A (SHENZHEN VOXTECH LIMITED CORPORATION) 03 May 2019 (2019-05-03) description, paragraphs [0035]-[0159]	1-24

☑ Further documents are listed in the continuation of Box C. ☑ 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
25 October 2019	**25 November 2019**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/102393

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PY	CN 109660901 A (SHENZHEN VOXTECH LIMITED CORPORATION) 19 April 2019 (2019-04-19) description, paragraphs [0034]-[0223]	1-24
PY	CN 209267804 U (SHENZHEN VOXTECH LIMITED CORPORATION) 16 August 2019 (2019-08-16) description, paragraphs [0034]-[0221]	1-24
PY	CN 209184801 U (SHENZHEN VOXTECH LIMITED CORPORATION) 30 July 2019 (2019-07-30) description, paragraphs [0034]-[0164]	1-24
A	CN 103716739 A (SHENZHEN VOXTECH LIMITED CORPORATION) 09 April 2014 (2014-04-09) entire document	1-24
A	US 2017318369 A1 (NEATRON CORPORATION) 02 November 2017 (2017-11-02) entire document	1-24

TRANSLATION

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/102393

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	109788386	A	21 May 2019	CN	209358729	U	06 September 2019
CN	209120433	U	16 July 2019		None		
CN	109547905	A	29 March 2019	CN	209089198	U	09 July 2019
CN	109769167	A	17 May 2019	CN	209184800	U	30 July 2019
CN	109714687	A	03 May 2019	CN	209184798	U	30 July 2019
CN	109660901	A	19 April 2019	CN	209358760	U	06 September 2019
CN	209267804	U	16 August 2019		None		
CN	209184801	U	30 July 2019		None		
CN	103716739	A	09 April 2014	WO	2015101181	A1	09 July 2015
				CN	106470371	A	01 March 2017
				JP	2017502615	A	19 January 2017
				CN	106303861	A	04 January 2017
				KR	20170061184	A	02 June 2017
				EP	3094103	A1	16 November 2016
				US	2017374479	A1	28 December 2017
				US	2016329041	A1	10 November 2016
				KR	20170061188	A	02 June 2017
				US	2019132689	A1	02 May 2019
				KR	20160110365	A	21 September 2016
				IN	201617026062	A	31 August 2016
				BR	112016015742	A2	08 August 2017
US	2017318369	A1	02 November 2017	GB	2550132	A	15 November 2017

专 利 合 作 条 约

PCT

国际检索报告

(PCT 第 18 条和细则 43 和 44)

申请人或代理人的档案号 206080080WO0	关于后续行为	见 PCT/ISA/220 表和 适用时，见下面第 5 项
国际申请号 PCT/CN2019/102393	国际申请日 *(日/月/年)* 24.8 月 2019(24.08.2019)	(最早的)优先权日 *(日/月/年)* 05.1 月 2019(05.01.2019)

申请人

深圳市韶音科技有限公司

按照条约第 18 条，本国际检索报告由本国际检索单位做出并送交申请人。报告副本送交国际局。

本国际检索报告总计 4 页。

☐ 它还附有本报告所引用的各现有技术文件的副本。

1. 报告的基础

a.关于语言，进行国际检索基于：

☒ 国际申请提交时使用的语言。

☐ 该国际申请的_____语言译文，为了国际检索的目的提供该种语言的译文(细则 12.3(a)和 23.1(b))。

b.☐ 本国际检索报告考虑了本单位许可或被通知的根据细则91所做出的明显错误更正。(细则43.6之二(a))。

c.☐ 关于国际申请中公开的任何核苷酸和/或氨基酸序列(见第 I 栏)。

2. ☐ 某些权利要求被认为是不能检索的(见第 II 栏)。

3. ☐ 缺乏发明的单一性(见第 III 栏)。

4. 关于**发明名称**，

☒ 同意申请人提出的发明名称。

☐ 发明名称由本单位确定如下：

5. 关于**摘要**，

☒ 同意申请人提出的摘要。

☐ 根据细则 38.2(b)，摘要由本单位制定，如第 IV 栏中所示。自本国际检索报告发文日起一个月内，申请人可以向本单位提出意见。

6. 关于**附图**，

a.随摘要一起公布的**附图**是：图 2

☒ 按照申请人建议的。

☐ 由本单位选择的，因为申请人没有建议一幅图。

☐ 由本单位选择的，因为该图能更好地表示发明的特征。

b. ☐ 没有与摘要一起公布的附图。

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国际检索报告

A. 主题的分类

H04R 1/10(2006.01)i；H04R 31/00(2006.01)i

按照国际专利分类（IPC）或者同时按照国家分类和 IPC 两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

IPC：H04R

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

WPI，EPODOC，CNPAT，CNKI：扬声器，扬声装置，助听器，播放器，播放装置，机芯壳体，机芯，电路壳体，控制电路，电池，振动，耳挂，接插端，振动，频率，相位，外壳，面板，背面，speaker，loudspeaker，audiphone，ear-hook，ear book，shell，sheath，control，circuit，battery，sound

C. 相关文件

类　型*	引用文件，必要时，指明相关段落	相关的权利要求
PY	CN 109788386A (深圳市韶音科技有限公司) 21.5 月 2019(21.05.2019) 说明书第[0035]-[0159]段，图 1-17	1-24
PY	CN 209120433U (深圳市韶音科技有限公司) 16.7 月 2019(16.07.2019) 说明书第[0006]-[0045]、[0090]-[0192]段	1-24
PY	CN 109547905A (深圳市韶音科技有限公司) 29.3 月 2019(29.03.2019) 说明书第[0034]-[0158]段	1-24
PY	CN 109769167A (深圳市韶音科技有限公司) 17.5 月 2019(17.05.2019) 说明书第[0034]-[0223]段	1-24
PY	CN 109714687A (深圳市韶音科技有限公司) 03.5 月 2019(03.05.2019) 说明书第[0035]-[0159]段	1-24
PY	CN 109660901A (深圳市韶音科技有限公司) 19.4 月 2019(19.04.2019) 说明书第[0034]-[0223]段	1-24
PY	CN 209267804U (深圳市韶音科技有限公司) 16.8 月 2019(16.08.2019) 说明书第[0034]-[0221]段	1-24
PY	CN 209184801U (深圳市韶音科技有限公司) 30.7 月 2019(30.07.2019) 说明书第[0034]-[0164]段	1-24
A	CN 103716739A (深圳市韶音科技有限公司) 09.4 月 2014(09.04.2014) 全文	1-24
A	US 2017318369A1 (NEATRON CORPORATION) 02.11 月 2017(02.11.2017) 全文	1-24

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国际检索报告

☐其余文件在 C 栏的续页中列出。　　☒见同族专利附件。

* 引用文件的具体类型：

"A" 认为不特别相关的表示了现有技术一般状态的文件

"E" 在国际申请日的当天或之后公布的在先申请或专利

"L" 可能对优先权要求构成怀疑的文件，或为确定另一篇引用文件的公布日而引用的或者因其他特殊理由而引用的文件（如具体说明的）

"O" 涉及口头公开、使用、展览或其他方式公开的文件

"P" 公布日先于国际申请日但迟于所要求的优先权日的文件

"T" 在申请日或优先权日之后公布，与申请不相抵触，但为了理解发明之理论或原理的在后文件

"X" 特别相关的文件，单独考虑该文件，认定要求保护的发明不是新颖的或不具有创造性

"Y" 特别相关的文件，当该文件与另一篇或者多篇该类文件结合并且这种结合对于本领域技术人员为显而易见时，要求保护的发明不具有创造性

"&" 同族专利的文件

国际检索实际完成的日期	国际检索报告邮寄日期
25. 10 月 2019(25. 10. 2019)	25. 11 月 2019(25. 11. 2019)
ISA/CN 的名称和邮寄地址： 中国国家知识产权局(ISA/CN) 北京市海淀区蓟门桥西土城路 6 号 100088 传真号：(86-10)62019451	受权官员：　杜少凤 电话号码：　86-(10)-53961593

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国际检索报告

检索报告中引用的专利文件	公布日期	同族专利	公布日期
CN109788386A	21.05.2019	CN209358729U	06.09.2019
CN209120433U	16.07.2019	无	
CN109547905A	29.03.2019	CN209089198U	09.07.2019
CN109769167A	17.05.2019	CN209184800U	30.07.2019
CN109714687A	03.05.2019	CN209184798U	30.07.2019
CN109660901A	19.04.2019	CN209358760U	06.09.2019
CN209267804U	16.08.2019	无	
CN209184801U	30.07.2019	无	
CN103716739A	09.04.2014	WO2015101181A1	09.07.2015
		CN106470371A	01.03.2017
		JP2017502615A	19.01.2017
		CN106303861A	04.01.2017
		KR20170061184A	02.06.2017
		EP3094103A1	16.11.2016
		US2017374479A1	28.12.2017
		US2016329041A1	10.11.2016
		KR20170061188A	02.06.2017
		US2019132689A1	02.05.2019
		KR20160110365A	21.09.2016
		IN201617026062A	31.08.2016
		BR112016015742A2	08.08.2017
US2017318369A1	02.11.2017	GB2550132A	15.11.2017

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NATIONAL INTELLECTUAL PROPERTY ADMINISTRATION, PRC

证　　明

本证明之附件是向本局提交的下列专利申请文件副本。

申　　请　　号：201910009927.4

申　请　类　型：发明专利

发明 创造 名称：骨传导扬声装置及其耳挂的制造方法

申　　请　　日：2019 年 01 月 05 日

申　　请　　人：深圳市韶音科技有限公司

发明人或设计人：李朝武、王旭东、李永坚

局长

申长雨

2020 年 08 月 07 日

权 利 要 求 书

1. 一种骨传导扬声装置，其特征在于，所述骨传导扬声装置包括耳挂，所述耳挂包括：

弹性金属丝；

导线及固定套管、所述固定套管将所述导线固定于所述弹性金属丝上；

第一接插端和第二接插端，分别设置于所述弹性金属丝的两端；

保护套管，以注塑形成于所述弹性金属丝、所述导线、所述固定套管、所述第一接插端和第二接插端的外围。

2. 根据权利要求 1 所述的骨传导扬声装置，其特征在于，所述第一接插端和第二接插端分别以注塑方式形成于所述弹性金属丝的两端，所述第一接插端和第二接插端上分别设置有第一走线通道和第二走线通道，所述导线沿所述第一走线通道和第二走线通道延伸。

3. 根据权利要求 1 所述的骨传导扬声装置，其特征在于，所述导线以穿线方式穿入所述第一走线通道和所述第二走线通道。

4. 根据权利要求 2 所述的骨传导扬声装置，其特征在于，所述第一走线通道包括第一走线槽和连通所述第一走线槽和所述第一接插端的外端面的第一走线孔，所述导线沿所述第一走线槽和所述第一走线孔延伸并外露于所述第一接插端的外端面；所述第二走线通道包括第二走线槽和连通所述第二走线槽和所述第一接插端的外端面的第二走线孔，所述导线沿所述第二走线槽和所述第二走线孔延伸并外露于所述第二接插端的外端面。

5. 根据权利要求 1 所述的骨传导扬声装置，其特征在于，所述固定套管为至少两个，并沿所述弹性金属丝间隔设置。

6. 根据权利要求 1 所述的骨传导扬声装置，其特征在于，所述骨传导扬声装置进一步包括：

机芯壳体，用于容纳耳机芯，并与所述第一接插端接插固定；

电路壳体，用于容纳控制电路或电池，并与所述第二接插端接插固定。

7. 根据权利要求 6 所述的骨传导扬声装置，其特征在于，所述机芯壳体设置有与所述机芯壳体的外端面连通的第一接插孔，所述第一接插孔的内侧壁上设置有止挡块，所述第一接插端包括：

插入部，至少部分插入于所述第一接插孔内并抵接于所述止挡块的外侧面上；

两个弹性卡勾，设置于所述插入部朝向所述机芯壳体内部的一侧，两个弹性卡勾能够在外部推力和所述止挡块的作用下彼此并拢，并在经过所述止挡块后弹性回复成卡置于所述止挡块的内侧面上，进而实现所述机芯壳体与所述第一接插端的接插固定。

8. 根据权利要求 7 所述的骨传导扬声装置，其特征在于，所述插入部部分插入于所述第一接插孔内，且在所述插入部的外露部分呈阶梯状设置，进而形成与所述机芯壳体的外端面间隔设置的环形台面，所述保护套管进一步延伸至所述环形台面朝向所述机芯壳体的外端面的一侧，并在所述机芯壳体与所述第一接插端接插固定

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时与所述机芯壳体弹性抵接，进而实现密封。

9. 根据权利要求 6 所述的骨传导扬声装置，其特征在于，所述电路壳体设置有第二接插孔，所述第二接插端至少部分插入至所述第二接插孔内，其中在所述第二接插端的相对两侧分别设置有与所述第二接插端相对于所述第二接插孔的插入方向垂直设置的开槽，所述电路壳体的第一侧壁上设置有与两个所述开槽位置对应的两个通孔，所述骨传导扬声装置进一步包括固定件，所述固定件包括两条平行设置的插脚和用于连接所述插脚的连接部，其中所述插脚从所述电路壳体的外侧经所述通孔插入至所述开槽，进而实现所述电路壳体与所述第二接插端的接插固定。

10. 根据权利要求 6 所述的骨传导扬声装置，其特征在于，所述耳挂进一步包括与所述第二接插端外围的所述保护套管一体成型的壳体护套，所述壳体护套以套装方式包覆于所述电路壳体的外围。

11. 一种骨传导扬声装置的耳挂的制造方法，其特征在于，所述制造方法包括：

将固定套管套设于弹性金属丝上，其中在所述弹性金属丝的两端预留出注塑位；

在所述弹性金属丝的两端的注塑位上分别注塑第一接插端和第二接插端，其中所述第一接插端和第二接插端分别设置有第一走线通道和第二走线通道；

将导线设置成沿所述第一走线通道和第二走线通道延伸，其中，所述导线位于所述第一走线通道和所述第二走线通道之间的部分固定于所述弹性金属丝上；

在所述弹性金属丝、所述导线、所述固定套管、所述第一接插端和第二接插端的外围注塑形成保护套管。

12. 根据权利要求 11 所述的制造方法，其特征在于，将固定套管套设于弹性金属丝上的步骤，进一步包括：

利用所述固定套管将所述导线固定于所述弹性金属丝上。

13. 根据权利要求 11 所述的制造方法，其特征在于，将导线设置成沿所述第一走线通道和第二走线通道延伸，其中，所述导线位于所述第一走线通道和所述第二走线通道之间的部分由所述固定套管固定在所述弹性金属丝上的步骤进一步包括：

将导线穿设于所述固定套管的内部，以利用所述固定套管将所述导线固定于所述弹性金属丝上，并进一步将所述导线设置成沿所述第一走线通道和第二走线通道延伸。

14. 根据权利要求 11 所述的制造方法，其特征在于，所述在所述弹性金属丝、所述导线、所述保护套管、所述第一接插端和第二接插端的外围注塑形成保护套管的步骤进一步包括：

以注塑方式形成与所述第二接插端外围的所述保护套管一体成型的壳体护套，其中所述壳体护套以套装方式包覆于与所述第二接插端接插固定的电路壳体的外围。

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说　明　书

骨传导扬声装置及其耳挂的制造方法

技术领域

本申请涉及骨传导技术领域，特别是涉及一种骨传导扬声装置及其耳挂的制造方法。

背景技术

骨传导是一种声音传导方式，骨传导扬声装置利用骨传导技术接收声音，由于其能够开放双耳、不伤害鼓膜等优点而受到广大消费者的青睐。

骨传导扬声装置包括耳挂，在耳挂的生产过程中，可以将设置在外围保护套管可与内部结构分别成型，并进而将成型后的保护套管套设在内部结构的外围。然而这种方式往往使得耳挂的生产及装配的工序繁琐，且耳挂与内部结构之间可能会出现固定不牢靠的情况，从而降低骨传导扬声装置的质量。

发明内容

本申请主要解决的技术问题是提供一种骨传导扬声装置及其耳挂的制造方法，能够简化骨传导扬声装置的制作及装配工序，并使得骨传导扬声装置的耳挂中的保护套管固定得更加牢靠、稳定。

为解决上述技术问题，本申请采用的一个技术方案是：提供一种骨传导扬声装置，所述骨传导扬声装置包括耳挂，所述耳挂包括：弹性金属丝；导线及固定套管，所述固定套管将所述导线固定于所述弹性金属丝上；第一接插端和第二接插端，分别设置于所述弹性金属丝的两端；保护套管，以注塑形成于所述弹性金属丝、所述导线、所述固定套管、所述第一接插端和第二接插端的外围。

为解决上述技术问题，本申请采用的另一个技术方案是：提供一种骨传导扬声装置的耳挂的制造方法，所述制造方法包括：将固定套管套设于弹性金属丝上，其中在所述弹性金属丝的两端预留出注塑位；在所述弹性金属丝的两端的注塑位上分别注塑第一接插端和第二接插端，其中所述第一接插端和第二接插端分别设置有第一走线通道和第二走线通道；将导线设置成沿所述第一走线通道和第二走线通道延伸，其中，所述导线位于所述第一走线通道和所述第二走线通道之间的部分固定于所述弹性金属丝上；在所述弹性金属丝、所述导线、所述固定套管、所述第一接插端和第二接插端的外围注塑形成保护套管。

本申请的有益效果是：区别于现有技术的情况，本申请骨传导扬声装置中，保护套管可注塑形成于弹性金属丝、导线、固定套管、第一接插端和第二接插端的外围，从而将保护套管分别与弹性金属丝、导线、固定套管、第一接插端和第二接插端固定连接，而无需将保护套管单独注塑形成后再进一步套装在弹性金属丝以及第一接插端、第二接插端的外围，从而能够简化制作及装配工序，且通过这种方式，能够使保护套管的固定更加牢靠、稳定。

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附图说明

为了更清楚地说明本申请实施例中的技术方案，下面将对实施例描述中所需要使用的附图作简单地介绍，显而易见地，下面描述中的附图仅仅是本申请的一些实施例，对于本领域普通技术人员来讲，在不付出创造性劳动的前提下，还可以根据这些附图获得其他的附图。其中：

图1是本申请骨传导扬声装置一实施方式的爆炸结构示意图；

图2是本申请骨传导扬声装置一实施方式中耳挂的部分结构示意图；

图3是图 2 中 A 部分的局部放大图；

图4是本申请骨传导扬声装置一实施方式的局部截面图；

图5是图 4 中 B 部分的局部放大图；

图6是本申请骨传导扬声装置一实施方式的局部结构截面图；

图7是图 6 中 C 部分的局部放大图；

图8是本申请骨传导扬声装置一实施方式的机芯壳体的部分结构示意图；

图9是图 8 中 D 部分的局部放大图；

图10是本申请骨传导扬声装置一实施方式的机芯壳体的局部截面图；

图11是本申请骨传导扬声装置一实施方式中电路壳体与耳挂的部分爆炸图；

图12是本申请骨传导扬声装置一实施方式的部分结构的局部截面图；

图13是图 1 中 E 部分的局部放大图；

图14是本申请骨传导扬声装置一实施方式中电路壳体的截面图；

图15是图 14 中 F 部分的局部放大图；

图16是本申请骨传导扬声装置一实施方式中电路壳体与按键结构的爆炸图；

图17是图 6 中 G 部分的局部放大图；

图18是本申请骨传导扬声装置一实施方式中导电柱的结构示意图；

图19是本申请骨传导扬声装置一实施方式中电路壳体、导电柱及主控电路板的截面图；

图20是图 19 中 H 部分的局部放大图；

图21是本申请骨传导扬声装置一实施方式中电路壳体与辅助片的局部结构爆炸图；

图22是本申请骨传导扬声装置一实施方式中电路壳体与辅助片的局部结构示意图；

图23是本申请骨传导扬声装置一实施方式中电路壳体与后挂的局部结构爆炸图；

图24是本申请骨传导扬声装置一实施方式中电路壳体与后挂的局部结构截面图；

图25是本申请骨传导扬声装置一实施方式中后挂的局部结构示意图。

具体实施方式

下面将结合本申请实施例中的附图，对本申请实施例中的技术方案进行清楚、

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完整地描述，显然，所描述的实施例仅仅是本申请一部分实施例，而不是全部实施例。基于本申请中的实施例，本领域普通技术人员在没有做出创造性的劳动前提下所获得的所有其他实施例，都属于本申请保护的范围。

请一并参阅图 1 至图 25，图 1 至图 25 绘示了本申请骨传导扬声装置。本申请中的骨传导扬声装置可以为基于骨传导的耳机、MP3 或者其它具有扬声功能的装置。具体地，骨传导扬声装置可包括：耳挂 10、机芯壳体 20、电路壳体 30、后挂 40，以及耳机芯 50、控制电路 60、电池 70。其中，机芯壳体 20 与电路壳体 30 分别设置于耳挂 10 的两端，后挂 40 则进一步设置于电路壳体 30 远离耳挂 10 的一端。其中，机芯壳体 20 的数量为两个，分别用于容纳耳机芯 50，电路壳体 30 的数量也为两个，分别用来容纳控制电路 60 和电池 70，后挂 40 的两端分别连接对应的电路壳体 30。

其中，耳挂 10 是指在用户佩戴骨传导扬声装置时，用于环绕并支撑于用户的耳根部位，进而将机芯壳体 20 及耳机芯 50 悬挂并固定于用户耳朵预定位置的结构。

具体地，耳挂 10 包括弹性金属丝 11、导线 12、固定套管 13 以及设置于弹性金属丝 11 两端的接插端 14 和接插端 15，还进一步包括保护套管 16 以及与保护套管 16 一体成型的壳体护套 17。

其中，弹性金属丝 11 主要用于使耳挂 10 保持为与用户耳朵匹配的形状，并具有一定的弹性，从而能够在用户佩戴时根据用户的耳型以及头型产生一定的弹性形变以适配不同耳型以及头型的用户。本实施方式中，弹性金属丝 11 可以由记忆合金制成，具有良好的变形恢复能力，从而即便是耳挂 10 受到外力作用产生形变，在外力去除时，仍然能够恢复至原来的形状以能够继续为用户所使用，从而延长骨传导扬声装置的使用寿命。当然，在其它实施方式当中，弹性金属丝 11 也可以由非记忆合金制成。

导线 12 可用于与耳机芯 50 以及控制电路 60、电池 70 等进行电连接，以为耳机芯 50 的工作进行电量供应以及数据传输。

固定套管 13 用于将导线 12 固定于弹性金属丝 11 上。具体地，固定套管 13 的数量可以为一个或者多个，具体可根据实际需求而定。本实施方式中，固定套管 13 为至少两个，至少两个固定套管 13 可沿弹性金属丝 11 以及导线 12 的走向而间隔设置，并通过包裹设置在导线 12 以及弹性金属丝 11 的外围而将导线 12 固定于弹性金属丝 11 上。

接插端 14 和接插端 15 可由硬质材料，如塑胶等制成。本实施方式中，在制作该接插端 14 和接插端 15 时，可以分别以注塑的方式将二者形成于弹性金属丝 11 的两端。在其它实施方式中，也可以先对接插端 14 和接插端 15 分别进行注塑，并在注塑时分别预留与弹性金属丝 11 端部的连接孔，从而在注塑完成后，通过连接孔而将该接插端 14 和接插端 15 分别插接在弹性金属丝 11 的对应的端部，或者并通过粘接的方式进行固定均可。

需要指出的是，本实施方式中，接插端 14 和接插端 15 可以不直接注塑形成在导线 12 的外围，而是在注塑时避开导线 12。具体地，可以在注塑接插端 14 和接插端 15 时，对位于弹性金属丝 11 两端的导线 12 进行固定，以远离接插端 14 和接插

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端 15 的位置，并进一步在接插端 14 和接插端 15 上分别设置第一走线通道 141 和第二走线通道 151，以在注塑完成后，将导线 12 沿第一走线通道 141 和第二走线通道 151 延伸设置。具体地，在形成第一走线通道 141 和第二走线通道 151 后，可将导线 12 以穿线的方式穿入该第一走线通道 141 和第二走线通道 151。

当然，在其它实施方式中，也可以根据实际情况，将接插端 14 和接插端 15 直接注塑在导线 12 的外围，此处不做具体限定。

具体地，在一实施方式中，第一走线通道 141 可包括第一走线槽 1411 和连通第一走线槽 1411 的第一走线孔 1412。其中，第一走线槽 1411 连通接插端 14 的侧壁面设置，第一走线孔 1412 的一端与第一走线槽 1411 的一端连通，另一端与接插端 14 的外端面连通。接插端 14 处的导线 12 沿第一走线槽 1411 和第一走线孔 1412 延伸并外露于接插端 14 的外端面，以进一步与其它结构连接。

相应地，第二走线通道 151 可包括第二走线槽 1511 和连通第二走线槽 1511 的第二走线孔 1512。其中，第二走线槽 1511 连通接插端 15 的侧壁面设置，第二走线孔 1512 的一端与第二走线槽 1511 的一端连通，另一端与接插端 15 的外端面连通。接插端 15 处的导线 12 沿第二走线槽 1511 和第二走线孔 1512 延伸并外露于接插端 15 的外端面，以进一步与其它结构连接。

其中，接插端 14 的外端面是指接插端 14 远离接插端 15 的一端的端面；相应地，接插端 15 的外端面是指接插端 15 远离接插端 14 的一端的端面。

进一步地，保护套管 16 可注塑形成于弹性金属丝 11、导线 12、固定套管 13、接插端 14 和接插端 15 的外围，从而将保护套管 16 分别与弹性金属丝 11、导线 12、固定套管 13、接插端 14 和接插端 15 固定连接，而无需将保护套管 16 单独注塑形成后再进一步套装在弹性金属丝 11 以及接插端 14、接插端 15 的外围，从而能够简化制作及装配工序，且通过这种方式，能够使得保护套管 16 的固定更加牢靠、稳定。

进一步地，在成型保护套管 16 时，同时与该保护套管 16 一体成型有设置于靠近接插端 15 一侧的壳体护套 17。

其中，壳体护套 17 可与保护套管 16 一体成型而成为一整体，电路壳体 30 可通过与接插端 15 的接插固定而连接设置在耳挂 10 的一端，壳体护套 17 则可进一步以套装的方式包覆于在电路壳体 30 的外围。

其中，保护套管 16 和壳体护套 17 可以由具有一定弹性的软质材料制成，例如软质的硅胶、橡胶等。

具体地，在制造骨传导扬声装置的耳挂 10 时，可通过如下步骤实现：

步骤 S101：利用固定套管 13 将导线 12 固定于弹性金属丝 11 上，其中在弹性金属丝 11 的两端预留出注塑位；

具体地，可以先将弹性金属丝 11 与导线 12 按照预设的方式，如并排放置在一起，然后，将固定套管 13 进一步套设在导线 12 与弹性金属丝 11 的外围，从而将导线 12 固定在弹性金属丝 11 上。

其中，由于弹性金属丝 11 的两端还需要注塑接插端 14 和接插端 15，因此，在固定时，弹性金属丝 11 的两端不能被固定套管 13 完全包裹，而需预留出对应的注塑位，以供接插端 14 和接插端 15 注塑占用。

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步骤 S102: 在弹性金属丝 11 的两端的注塑位上分别注塑接插端 14 和接插端 15，其中接插端 14 和接插端 15 分别设置有第一走线通道 141 和第二走线通道 151；

步骤 S103：将导线 12 设置成沿第一走线通道 141 和第二走线通道 151 延伸；

具体地，此处可在接插端 14 和接插端 15 成型完成后，进一步通过手动或者通过机器将导线 12 的两端分别穿入第一走线通道 141 和第二走线通道 151。其中，导线 12 位于第一走线通道 141 和第二走线通道 151 之间的部分由固定套管 13 固定于弹性金属丝 11 上。

步骤 S104：在弹性金属丝 11、导线 12、固定套管 13、接插端 14 和接插端 15 的外围注塑形成保护套管 16。

在一实施方式中，在执行步骤 S104 时，进一步以注塑的方式形成与接插端 15 外围的保护套管 16 一体成型的壳体护套 17。

需要指出的是，在其它实施方式中，也可以在安装固定套管 13 时先不设置导线 12，而在接插端 14 和接插端 15 注塑之后，再进一步设置导线 12，具体步骤如下：

步骤 S201：将固定套管 13 套设于弹性金属丝 11 上，其中在弹性金属丝 11 的两端预留出注塑位；

步骤 S202: 在弹性金属丝 11 的两端的注塑位上分别注塑接插端 14 和接插端 15，其中接插端 14 和接插端 15 分别设置有第一走线通道 141 和第二走线通道 151；

步骤 S203：将导线 12 穿设于固定套管 13 的内部，以利用固定套管 13 将导线 12 固定于弹性金属丝 11 上，并进一步将导线 12 设置成沿第一走线通道 141 和第二走线通道 151 延伸。

需要指出的是，通过这种方式，能够避免在对接插端 14 和接插端 15 注塑时受到导线 12 的干扰，从而有利于成型的顺利进行。

其中，本实施方式，以及上述实施方式中方法所涉及到的弹性金属丝 11、导线 12、固定套管 13、接插端 14、接插端 15 与保护套管 16 的结构、作用以及形成方式等均与上述实施方式中的相同，相关详细内容请参见上述实施方式，此处不再赘述。

在一实施方式中，机芯壳体 20 可用于容纳耳机芯 50，并与接插端 14 接插固定。其中，耳机芯 50 和机芯壳体 20 的数量均为两个，分别对应用户的左耳和右耳。

具体地，机芯壳体 20 可以与接插端 14 通过插接、卡接等方式连接，以将机芯壳体 20 与耳挂 10 固定在一起。也就是说，本实施方式中，耳挂 10 与机芯壳体 20 可先分别成型，然后再进一步装配在一起，而不是将二者一体直接成型。

通过这种方式，可以采用各自对应的模具对耳挂 10 和机芯壳体 20 分别成型，而无需采用同一个较大尺寸的模具将二者一体成型，从而可减小模具的尺寸，以降低模具的加工难度，以及成型难度；另外，由于耳挂 10 和机芯壳体 20 分别采用不同的模具加工，在生产制造过程中，在需要对耳挂 10 或机芯壳体 20 中的某一个的形状或者构造进行调整时，仅调整该结构对应的模具即可，而无需对另外一个结构的模具进行调整，从而能够降低生产成本。

当然，在其它实施方式当中，也可以根据情况而使耳挂 10 与机芯壳体 20 通过一体成型得到。

在一实施方式中，机芯壳体 20 设置有与机芯壳体 20 的外端面 21 连通的接插孔

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22，接插孔 22 的内侧壁上设置有止挡块 23。

其中，机芯壳体 20 的外端面 21 是指机芯壳体 20 朝向耳挂 10 的端面。接插孔 22 用于为耳挂 10 的接插端 14 插入机芯壳体 20 提供容置空间，以便进一步实现接插端 14 与机芯壳体 20 的接插固定。

止挡块 23 可以由接插孔 22 的内侧壁沿垂直于该内侧壁的方向凸出形成。具体地，止挡块 23 可以为多个间隔设置的块状凸起，或者也可以为沿接插孔 22 内侧壁的环状凸起，此处不做具体限定。

其中，接插端 14 包括插入部 142 和两个弹性卡勾 143。

具体地，插入部 142 至少部分插入于接插孔 22 内并抵接于止挡块 23 的外侧面 231 上。其中，插入部 142 的外侧壁的形状与接插孔 22 的内侧壁的形状匹配，以使得插入部 142 至少部分插入于接插孔 22 内时，使得插入部 142 的外侧壁与接插孔 22 的内侧壁抵接。

止挡块 23 的外侧面 231 是指止挡块 23 朝向耳挂 10 设置的一侧面。插入部 142 可进一步包括一朝向机芯壳体 20 的端面 1421，该端面 1421 可与止挡块 23 的外侧面 231 匹配，从而在插入部 142 至少部分插入于接插孔 22 内时，插入部 142 的端面 1421 与止挡块 23 的外侧面 231 抵接。

具体地，机芯壳体 20 的接插孔 22 的沿垂直于接插端 14 相对于机芯壳体 20 的插入方向上的截面形状可为椭圆环形或近椭圆环形，对应地，插入部 142 的横截面可以为与接插孔 22 匹配的近椭圆形，当然，二者的形状还可以为其它，具体可根据实际需求进行设置。

进一步地，两个弹性卡勾 143 可沿垂直于插入方向并排并间隔且对称设置于插入部 142 朝向机芯壳体 20 内部的一侧。其中，每个弹性卡勾 143 可分别包括梁部 1431 和勾部 1432，梁部 1431 与插入部 142 朝向机芯壳体 20 的一侧连接，勾部 1432 设置在梁部 1431 远离插入部 142 的一端，并沿垂直于插入方向延伸。进一步地，每个勾部 1432 设置有连接平行于插入方向的侧面与远离插入部 142 的端面的过渡斜面 14321。

在耳挂 10 与机芯壳体 20 的安装过程当中，接插端 14 由接插孔 22 逐渐进入机芯壳体 20 内部，在到达止挡块 23 的位置时，两个弹性卡勾 143 的勾部 1432 会受到止挡块 23 的阻挡，在外部推力的作用下，止挡块 23 逐渐挤压勾部 1432 的过渡斜面 14321 而使得两个弹性卡勾 143 发生弹性形变而彼此并拢，在过渡斜面 14321 通过止挡块 23 而到达止挡块 23 靠近机芯壳体 20 内部的一侧时，弹性卡勾 143 因失去止挡块 23 的阻挡而弹性回复，并卡置于止挡块 23 朝向机芯壳体 20 内部的内侧面上，从而将止挡块 23 卡置于接插端 14 的插入部 142 和勾部 1432 之间，进而实现机芯壳体 20 与接插端 14 的接插固定。

其中，在一实施方式中，在机芯壳体 20 与接插端 14 接插固定后，插入部 142 部分插入于接插孔 22 内，且在插入部 142 的外露部分呈阶梯状设置，进而形成与机芯壳体 20 的外端面 21 间隔设置的环形台面 1422。

需要指出的是，插入部 142 的外露部分是指插入部 142 外露于机芯壳体 20 的部分，具体地，可以是指外露于机芯壳体 20 且靠近机芯壳体 20 外端面的部分。

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其中，环形台面 1422 可以与机芯壳体 20 的外端面 21 相对设置，且二者之间的间隔可以是指沿接插方向间隔以及沿垂直于接插方向的间隔。

进一步地，保护套管 16 延伸至环形台面 1422 朝向机芯壳体 20 的外端面 21 的一侧，并在机芯壳体 20 的接插孔 22 与接插端 14 接插固定时，填充于环形台面 1422 与机芯壳体 20 的外端面 21 之间的间隔内，并与机芯壳体 20 弹性抵接，从而使得外部液体难以从接插端 14 与机芯壳体 20 之间的接合处进入机芯壳体 20 内部，进而实现接插端 14 与接插孔 22 之间的密封，以保护机芯壳体 20 内部的耳机芯 50 等，从而能够提高对骨传导扬声装置的防水效果。

具体地，在一实施方式当中，保护套管 16 在环形台面 1422 朝向机芯壳体 20 的外端面的 21 一侧形成一环形抵接面 161。其中，该环形抵接面 161 为保护套管 16 朝向机芯壳体 20 一侧的端面。

进一步地，保护套管 16 还包括位于该环形抵接面 161 内部且相对于环形抵接面 161 凸出设置的环形凸台 162。具体地，该环形凸台 162 具体形成于环形抵接面 161 朝向接插端 14 的一侧，并相对于该环形抵接面 161 沿朝向机芯壳体 20 的方向凸出设置，进一步地，该环形凸台 162 还可直接形成于环形台面 1422 的外围，并覆盖该环形台面 1422。

进一步地，机芯壳体 20 包括用于连接机芯壳体 20 的外端面 21 和接插孔 22 的内侧壁的连接斜面 24。其中，该连接斜面 24 具体为机芯壳体 20 的外端面 21 与接插孔 22 的内侧壁之间的过渡面，该连接斜面 24 与机芯壳体 20 的外端面 21 和接插孔 22 的内侧壁均不在同一平面上。其中，该连接斜面 24 可以为平面，或者也可以根据实际需求而设置成曲面，或者其它形状，此处不做具体限定。

具体地，在机芯壳体 20 与接插端 14 接插固定时，环形抵接面 161 和环形凸台 162 分别与机芯壳体 20 的外端面和连接斜面 24 弹性抵接。

需要指出的是，由于机芯壳体 20 的外端面 21 和连接斜面 24 不在同一平面上，从而使得保护套管 16 与机芯壳体 20 之间的弹性抵接处不位于同一平面上，从而使得外部液体难以由保护套管 16 与机芯壳体 20 之间进入机芯壳体 20 以进一步进入耳机芯 50，从而能够提高骨传导扬声装置的防水效果，以对内部功能结构起到保护作用，进而延长骨传导扬声装置的使用寿命。

其中，在一实施方式中，插入部 142 在环形台面 1422 朝向机芯壳体 20 的外端面 21 的一侧进一步形成有与环形台面 1422 邻接的环形凹槽 1423，其中，环形凸台 162 可形成于环形凹槽 1423 内。

本实施方式中，环形凹槽 1423 可形成于环形台面 1422 朝向机芯壳体 20 的一侧。在一个应用场景中，环形台面 1422 为环形凹槽 1423 的朝向机芯壳体 20 一侧的侧壁面，此时，环形凸台 162 沿该侧壁面形成于环形凹槽 1423 内。

在一实施方式中，耳挂 10 的导线 12 的位于机芯壳体 20 的外部的一端可穿过第二走线通道 151 而进一步连接电路壳体 30 所容纳的控制电路 60、电池 70 等机芯壳体 20 外部的外部电路，另一端则沿第一走线通道 141 而露出于接插端 14 的外端面，并进一步随插入部 142 而通过接插孔 22 而进入机芯壳体 20 内部。

在一实施方式中，机芯壳体 20 可包括主壳体 25 以及隔板组件 26，其中，隔板

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组件 26 位于主壳体 25 内部，并与主壳体 25 连接，进而将主壳体 25 的内部空间 27 分隔成第一容置空间 271 和靠近接插孔 22 一侧的第二容置空间 272。

具体地，主壳体 25 包括周侧壁 251 以及与周侧壁 251 的一端面连接的底端壁 252，周侧壁 251 与底端壁 252 共同围绕形成一主壳体 25 的内部空间 27。

隔板组件 26 位于主壳体 25 的靠近接插孔 22 的一侧，并包括侧隔板 261 以及底隔板 262。其中，侧隔板 261 可沿垂直于底端壁 252 的方向设置，且侧隔板 261 的两端均与周侧壁 251 连接，从而对主壳体 25 的内部空间 27 进行分隔。底隔板 262 可与底端壁 252 平行或者接近平行且间隔设置，并进一步分别与周侧壁 251 和侧隔板 261 连接，从而将主壳体 25 所形成的内部空间 27 一分为二而形成由侧隔板 261、底隔板 262 和远离接插孔 22 的周侧壁 251、底端壁 252 共同围成的第一容置空间 271，以及由底隔板 262 与侧隔板 261 和靠近接插孔 22 的周侧壁 251 共同围成的第二容置空间 272。其中，第二容置空间 272 可小于第一容置空间 271。

当然，隔板组件 26 也可以通过其它的设置方式对主壳体 25 的内部空间 27 进行划分，此处不做具体限定。

进一步地，耳机芯 50 包括功能组件 51，该功能组件 51 设置于第一容置空间 271 内，可用于振动发声。骨传导扬声装置可进一步包括一端与功能组件 51 连接的导线 80，该导线 80 的另一端可由第一容置空间 271 而延伸至第二容置空间 272 内。

具体地，侧隔板 261 可在远离底端壁 252 的顶部边缘设置走线槽 2611，该走线槽 2611 可连通第一容置空间 271 和第二容置空间 272。进一步地，导线 12 的远离功能组件的一端经由该走线槽延伸至第二容置空间 272 内。

另外，耳挂 10 的导线 12 的远离电路壳体 30 的一端随插入部 142 进入机芯壳体 20 内部后，可进一步延伸入第二容置空间 272 内，并在第二容置空间 272 内与导线 80 电连接，以形成从第一容置空间 271 经由第二容置空间 272 而连接至外部电路的导线通路，从而通过该导线通路将功能组件 51 与位于机芯壳体 20 外部的外部电路电连接。

具体地，底隔板 262 上可设置有走线孔 2621，该走线孔 2621 将接插孔 22 与第二容置空间 272 连通，从而使得由接插孔 22 进入机芯壳体 20 的导线 12 能够经由该走线孔 2621 而延伸至第二容置空间 272。

其中，导线 12 与导线 80 在第二容置空间 272 内连接后，盘绕设置于第二容置空间 272 内。具体可通过焊接的方式将导线 12 与导线 80 连接于一起，进而将功能组件 51 与外部电路电连接，以通过外部电路为功能组件 51 的正常工作提供电量或者为耳机芯 50 传输数据。

需要指出的是，在对骨传导扬声装置装配时，导线往往会长于实际需求，以便于装配。然而耳机芯 50 处多余的导线若不能够进行合理的放置，则容易在功能组件 51 工作时产生振动而发出异响，从而降低骨传导扬声装置的声音质量，从而影响用户的听音感受。本实施方式中，在机芯壳体 20 的主壳体 25 所形成的内部空间 27 当中分离出第二容置空间 272 以用于容置多余的导线 12 和导线 80，从而避免或者减少多余的导线对因振动而对骨传导扬声装置所发出的声音的影响，以提高声音质量。

在一实施方式中，隔板组件 26 进一步包括内隔板 263，内隔板 263 进一步将第

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二容置空间 272 分隔成两个子容置空间 2721。具体地，该内隔板 263 垂直于主壳体 25 的底端壁 252 设置，分别与侧隔板 261 和周侧壁 251 连接，并进一步延伸至走线孔 2621 处，从而在将第二容置空间 272 分隔为两个子容置空间 2721 的同时，还进一步将走线孔 2621 划分为两个，两个走线孔 2621 可分别与对应的子容置空间 2721 连通。

本实施方式中，导线 12 和导线 80 可分别为两根，其中两根导线 12 分别沿对应的走线孔 2621 而分开延伸至各自的子容置空间 2721 内，而两根导线 80 则仍一起通过走线槽 2611 而进入第二容置空间 272，并在进入第二容置空间 272 后分开，并分别在对应的子容置空间 2721 内与对应的导线 12 焊接于一起，并进一步盘绕设置于对应的子容置空间 2721 内。

进一步地，在一实施方式中，第二容置空间 272 可进一步由密封胶进行填充。通过这种方式，能够将第二容置空间 272 内所容置的导线 12 和导线 80 进一步固定，以进一步降低由于导线振动而对声音质量造成的不良影响，从而提高骨传导扬声装置的声音质量，同时能够对导线 12 与导线 80 之间的焊接点起到保护作用，另外，将第二容置空间 272 密封设置还能够达到防水防尘的目的。

在一实施方式中，电路壳体 30 与接插端 15 接插固定，从而将电路壳体 30 固定在耳挂 10 远离机芯壳体 20 的一端。其中，在用户佩戴使用时，容纳电池 70 的电路壳体 30 和容纳控制电路 60 的电路壳体 30 可分别对应用户的左侧和右侧，二者在与对应的接插端 15 的接插方式上可以不同。

具体地，电路壳体 30 可以与接插端 15 通过插接、卡接等方式连接。也就是说，本实施方式中，耳挂 10 与电路壳体 30 可先分别独立成型，然后并在成型完成后再进一步装配在一起，而不是直接将二者一体成型。

通过这种方式，可以采用各自对应的模具对耳挂 10 和电路壳体 30 分别成型，而无需采用同一个较大尺寸的模具将二者一体成型，从而可减小成型模具的尺寸，以降低模具的加工难度，以及成型难度；另外，由于耳挂 10 和电路壳体 30 分别采用不同的模具加工，在生产制造过程中，在需要对耳挂 10 或电路壳体 30 中的某一个的形状或者构造进行调整时，仅调整该结构对应的模具即可，而无需对另外一个结构的模具进行调整，从而能够降低生产成本。

进一步地，在一实施方式中，电路壳体 30 设置有接插孔 31，该接插孔 31 的内表面的形状可与接插端 15 的至少部分外表面的形状匹配，从而使得接插端 15 能够至少部分插入至接插孔 31 内。

进一步地，在接插端 15 的相对两侧分别设置有与接插端 15 相对于接插孔 31 的插入方向垂直设置的开槽 152。具体地，两个开槽 152 对称且间隔设置于接插端 15 的相对两侧，且均在沿插入方向的垂直方向上连通接插端 15 的侧壁。

相应地，电路壳体 30 的第一侧壁 30a 上设置有与两个开槽 152 位置对应的贯穿该第一侧壁 30a 的两个通孔 32。

其中，电路壳体 30 可以呈扁平状设置，例如，电路壳体 30 于第二接插孔 31 处的横截面可以为椭圆形，或者能够形成扁平状设置的其它形状。本实施方式中，电路壳体 30 的面积较大的两个相对设置的侧壁为主侧壁 33，连接两个主侧壁 33 的面

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积较小的且相对设置的两对侧壁为辅侧壁 34。本实施方式中，电路壳体 30 的第一侧壁 30a 既可以为该电路壳体 30 的主侧壁 33 也可以为电路壳体 30 的辅侧壁 34，具体可以根据实际需求进行设定。

当然，在其它实施方式中，电路壳体 30 于接插孔 31 处的横截面还可以为圆形等其它形状，具体可根据实际需求进行设置。

进一步地，骨传导扬声装置还可以包括固定件 81，固定件 81 包括两条平行设置的插脚 811 和用于连接插脚 811 的连接部 812。具体地，连接部 812 可垂直连接设置于两条插脚 811 的朝向同一方向的一端，从而形成 U 型的固定件 81。

其中，两个插脚 811 远离连接部 812 的一端从电路壳体 30 的外侧经通孔 32 插入至开槽 152，而将连接部 812 阻挡于电路壳体 30 的外侧，进而实现电路壳体 30 与接插端 15 的接插固定。

进一步地，在一实施方式中，电路壳体 30 的第一侧壁 30a 上进一步形成有用于连接两个通孔 32 的条状凹槽 35，在利用固定件 81 接插固定时，连接部 812 能够进一步部分或者全部沉设于条状凹槽 35 内。从而一方面能够使得骨传导扬声装置整体更加统一，进而使得套装在电路壳体 30 外围的壳体护套 17 上无需专门成型设置与连接部 812 对应的凹槽，简化壳体护套 17 的模具；另一方面，还能够在一定程度上减小骨传导扬声装置整体所占用的空间。

其中，在一个应用场景中，可以在将连接部 812 部分或者全部沉设于条状凹槽 35 内后，进一步在条状凹槽 35 内施胶，通过这种方式，一方面能够将固定件 81 固定在电路壳体 30 上，从而使得接插端 15 与接插孔 31 之间的接插更加稳固；另一方面，在连接部 812 沉设于条状凹槽 35 后，进一步通过施胶将凹槽 35 填平，以与电路壳体 30 的第一侧壁 30a 保持一致，从而在套设壳体护套 17 后，使得该凹槽 35 与周边结构之间更加平整连贯。

其中，在一实施方式中，与电路壳体 30 的第一侧壁 30a 相对的电路壳体 30 的第二侧壁 30b 上进一步设置有与通孔 32 相对的通孔 36，插脚 811 进一步经开槽 152 插入至通孔 36 内。

具体地，电路壳体 30 的第一侧壁 30a 和电路壳体 30 的第二侧壁 30b 均可为电路壳体 30 的主侧壁 33 或者辅侧壁 34。在本实施方式中，电路壳体 30 的第一侧壁 30a 和第二侧壁 30b 分别为电路壳体 30 的两个相对设置的主侧壁 33。也就是说，两个通孔 32 以及两个通孔 36 分别设置于电路壳体 30 的面积较大的侧壁上，进而固定件 81 的两个插脚 811 之间可以设置较大的间隔，以增大固定件 81 的跨度，从而能够提高接插端 15 与接插孔 31 之间接插的稳定性。

本实施方式中，插脚 811 经通孔 32 插入至开槽 152 内，并进一步经开槽 152 插入至通孔 36 内，也就是说插脚 811 能够将电路壳体 30 的两相对主侧壁 33 以及接插端 15 完全贯穿并固定于一起，从而能够使得接插端 15 与电路壳体 30 之间接插更加牢固。

进一步地，如上述实施方式中所述，在保护套管 16 成型时，同时与该保护套管 16 一体成型有设置于靠近接插端 15 一侧的壳体护套 17。

其中，该壳体护套 17 与电路壳体 30 分别成型，并使得该壳体护套 17 的内侧壁

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的形状与电路壳体 30 的外侧壁匹配，进而在二者分别成型完成之后，将壳体护套 17 以套装的方式包覆于电路壳体 30 的外围。

需要指出的是，由于在壳体护套 17 成型时的环境温度较高，而高温环境可能会对电路壳体 30 所容纳的控制电路 60 或电池 70 造成一定的损伤，因此，在成型阶段，将电路壳体 30 和壳体护套 17 分别成型，然后再套装在一起，从而能够避免壳体护套 17 在成型时，高温对控制电路 60 或电池 70 所带来的损伤，从而降低成型对控制电路 60 或电池 70 所带来的不利影响。

进一步地，壳体护套 17 可以为一端开口的袋状结构，以使得电路壳体 30 经由壳体护套 17 的开口端进入壳体护套 17 的内部。

本实施方式中，壳体护套 17 在与保护套管 16 一体成型而形成之后，可以通过从开口端对壳体护套 17 进行翻卷而将其从模具上取下；在对壳体护套 17 进行外观检查以及丝印等表面处理时，可进一步将壳体护套 17 通过开口而套设在预设结构上进行操作，并在操作完成后，进一步通过从开口处对壳体护套 17 进行翻卷而将其从该预设结构上取下；在检查及处理等操作完成后，可进一步通过开口而将壳体护套 17 套装在电路壳体 30 的外围。上述操作中，在将壳体护套 17 取下并不限定于上述翻卷的方式，还可通过充气等方式，此处不做具体限定。

具体地，壳体护套 17 的开口端为壳体护套 17 背离保护套管 16 的一端，从而该电路壳体 30 从壳体护套 17 远离保护套管 16 的一端进入壳体护套 17 的内部，以为该壳体护套 17 所包覆。

在一实施方式中，壳体护套 17 的开口端设置有向内凸出的环状凸缘 171。进一步地，电路壳体 30 远离耳挂 10 的端部呈阶梯状设置，进而形成环形台面 37。当壳体护套 17 包覆于电路壳体 30 的外围时，环状凸缘 171 抵接于环形台面 37 上。

具体地，环状凸缘 171 由壳体护套 17 的开口端的内壁面朝向壳体护套 17 内部凸出一定的厚度形成，并包括一朝向耳挂 10 的凸缘面 172。

其中，环形台面 37 与凸缘面 172 相对，并朝向电路壳体 30 背离耳挂 10 的方向。

该环状凸缘 171 的凸缘面 172 的高度不大于环形台面 37 的高度，从而使得在环状凸缘 171 的凸缘面 172 与环形台面 37 相抵接时，壳体护套 17 的内壁面能够与电路壳体 30 的侧壁面充分抵接，从而使得壳体护套 17 能够紧密包覆于电路壳体 30 的外围。

进一步地，在一实施方式中，在环状凸缘 171 与环形台面 37 上的接合区域内可进一步施加有密封胶。具体地，在对壳体护套 17 进行套装时，可以在环形台面 37 上涂覆密封胶，从而将壳体护套 17 与电路壳体 30 进行密封连接。

其中，在一实施方式中，电路壳体 30 上还设置有定位块 38，该定位块 38 设置于环形台面 37 上，并沿电路壳体 30 背离耳挂 10 的方向延伸。具体地，该定位块 38 可设置于电路壳体 30 的辅侧壁 34 上，且该定位块 38 在辅侧壁 34 上凸出的厚度与环形台面 37 的高度一致。其中，定位块 38 的数量可以根据需求设置一个或者多个。

相应地，壳体护套 17 的环状凸缘 171 处设置有与定位块 38 对应的定位槽 173，从而在壳体护套 17 包覆于电路壳体 30 的外围时，该定位槽 173 覆盖在至少部分定

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位块 38 上。

通过这种方式，在对壳体护套 17 进行套装时，可以根据定位块 38 和定位槽 173 的位置对壳体护套 17 进行定位，以方便操作人员快速、准确得安装。当然，在其它实施方式中，也可以根据实际需求不设置定位块。

在一实施方式中，电路壳体 30 包括彼此扣合的两个子壳体，分别为第一子壳体 301 和第二子壳体 302。具体地，两个子壳体可以沿电路壳体 30 的中线而对称扣合，或者也可以根据实际需求通过其他方式进行扣合。另外，用于容纳控制电路 60 的电路壳体 30 的两个子壳体的扣合方式可以与用于容纳电池 70 的电路壳体 30 的两个子壳体的扣合方式可以相同，也可以不同。

在一个应用场景中，电路壳体 30 的环形台面 37 可形成于第一子壳体 301 上，两个子壳体在环形台面 37 朝向耳挂 10 的一侧接合，从而使得壳体护套 17 能够对两个子壳体的接合缝进行全覆盖，从而能够在一定程度上对电路壳体 30 的内部空间进行密封，以提高骨传导扬声装置的防水效果。

在另一应用场景中，电路壳体 30 的环形台面 37 还可以由两个子壳体共同形成，从而使得二者至少部分部位在环形台面 37 背离耳挂 10 的一侧结合。此时，壳体护套 17 不能够覆盖两个子壳体的位于环形台面 37 背离耳挂 10 一侧的接合缝。本应用场景中，可以进一步通过其它方式对该部分的接合缝进行覆盖。

进一步地，在一实施方式中，两个子壳体彼此对接的接合面为互相契合的阶梯形状。

具体地，第一子壳体 301 的朝向第二子壳体 302 的端面为阶梯状的第一阶梯面 3011，第二子壳体 302 的朝向第一子壳体 301 的端面为阶梯状的第二阶梯面 3021。第一阶梯面 3011 和第二阶梯面 3021 的形状及尺寸均一致，从而能够互相配合抵接在一起。

通过这种方式，电路壳体 30 的两个子壳体互相抵接的结合面成阶梯状而不在同一平面上，从而能够阻挡电路壳体 30 外部的液体由电路壳体 30 的外围进入电路壳体 30 的内部，进而进一步提高骨传导扬声装置的防水效果，以对电路壳体 30 内部的控制电路 60 或者电池 70 等进行保护。

进一步地，在第二子壳体 302 的第二阶梯面 3021 上设置有朝向第一子壳体 30a 的安装卡勾 3022，对应地，第一子壳体 301 的内部设置有与该安装卡勾 3022 匹配的安装勾槽 3012。在对第一子壳体 301 和第二子壳体 302 进行安装时，安装卡勾 3022 能够在外部推力越过安装勾槽 3012 的外侧壁而进入该安装勾槽 3012，并使得安装卡勾 3022 的勾部勾接安装勾槽 3012 的内侧壁，从而实现第一子壳体 301 与第二子壳体 302 的扣合。

在一实施方式中，骨传导扬声装置进一步设置有按键机构。

具体地，电路壳体 30 的辅侧壁 34 的外表面上设置有第一凹陷区 341，该第一凹陷区 341 内进一步设置有按键孔 342，该按键孔 342 连通辅侧壁 34 的外表面和内表面。

其中，电路壳体 30 的辅侧壁 34 可以包括，在用户佩戴该骨传导扬声装置时，朝向用户头部后侧的辅侧壁 34，也可以包括在用户佩戴时，朝向用户头部下侧的辅

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侧壁 34。

第一凹陷区 341 的数量可以为一个或者多个，且每个第一凹陷区 341 内可以设置一个或者多个按键孔 342，具体可以根据实际需求设置，此处不做具体限定。

本实施方式中，骨传导扬声装置还进一步包括弹性衬垫 82、按键 83，控制电路 60 包括按键电路板 61。

其中，弹性衬垫 82 设置于第一凹陷区 341，具体固定于第一凹陷区 341 对应的辅侧壁 34 的外表面上，以覆盖于按键孔 342 的外部从而避免外部液体通过按键孔 342 进入到电路壳体 30 的内部，以起到密封防水的作用。

进一步地，该弹性衬垫 82 上设置有与按键孔 342 对应的第二凹陷区 821，该第二凹陷区 821 延伸至按键孔 342 的内部。

具体地，该弹性衬垫 82 可以由软性材质制成，例如软性的硅胶、橡胶等。且该弹性衬垫 82 较薄，直接与辅侧壁 34 的外表面粘接时，难以粘接牢靠。

因此，在一实施方式中，可进一步在弹性衬垫 82 与电路壳体 30 之间设置刚性衬垫 84，该钢性衬垫 84 与弹性衬垫 82 彼此贴靠固定，具体可以通过贴合、粘接、注塑等的方式实现，并进一步将钢性衬垫 84 与辅侧壁 34 进行粘接，具体可以通过采用双面胶进行粘接，以在钢性衬垫 84 与辅侧壁 34 之间形成一粘胶层，从而使得弹性衬垫 82 能够牢靠地固定在辅侧壁 34 的外表面。而且，由于弹性衬垫 82 质软且薄，因此在用户按压按键的过程当中难以保持平整状态，而通过与钢性衬垫 84 的贴靠固定，能够使弹性衬垫 82 保持平整。

进一步地，钢性衬垫 84 上设置有允许第二凹陷区 821 通过的通孔 841，从而使得弹性衬垫 82 的第二凹陷区 821 能够进一步通过通孔 841 而延伸至按键孔 342 的内部。

具体地，钢性衬垫 84 可以由不锈钢制成，或者其它钢性材料，如塑胶等硬质材料。并可通过一体成型而与弹性衬垫 82 贴靠在一起。

另外，按键 83 包括按键本体 831，以及设置在按键本体 831 一侧凸出设置的按键触头 832。其中，按键本体 831 设置于弹性衬垫 82 远离电路壳体 30 的一侧，且按键触头 832 延伸至第二凹陷区 821 内，以随第二凹陷区 821 而延伸至按键孔 342 内部。

进一步地，由于本实施方式中骨传导扬声装置较为轻薄，按键 83 的按压行程较短，若采用软质的按键则会降低用户按压手感而带来不好的体验。本实施方式中，按键 83 可由硬质的塑胶材料制成，以使得用户按压时能够具有良好的手感。

进一步地，按键电路板 61 设置于电路壳体 30 的内部，其上设置有与按键孔 342 对应的按键开关 611。从而在用户按压按键时，按键触头 832 接触并触发按键开关 611，以进一步实现相应的功能。

本实施方式中，通过在弹性衬垫 82 上设置第二凹陷区 821，一方面，第二凹陷区 821 的设置能够覆盖整个按键孔 342，从而能够同时提高防水效果；另一方面，在自然状态下，按键触头 832 便能够通过第二凹陷区 821 而延伸入按键孔 342 内部，从而能够缩短按键按压的行程，以减小按键结构所占用的空间，进而使骨传导扬声装置既能够有好的防水性能，又占用较少的空间。

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在一实施方式中，按键 83 可包括按键单体 833，按键单体 833 的数量可以为一个或者多个。

在一个应用场景中，按键 83 可包括至少两个彼此间隔设置的按键单体 833 以及用于连接按键单体 833 的连接部 834。其中，多个按键单体 833 以及连接部 834 可一体成型。对应地，每个按键单体 833 对应设置有一个按键触头 832，并进而对应一个按键孔 342 以及一个按键开关 611。

也就是说，本实施方式中，对应于一个第一凹陷区 341 可以设置多个按键单体 833，用户可通过按压不同的按键单体 833 而触发不同的按键开关 611，并进而实现多种功能。

进一步地，弹性衬垫 82 上可设置用于支撑连接部 834 的弹性凸块 822。由于按键 83 包括连接设置的多个按键单体 833，弹性凸块 822 的设置使得用户在按压其中一个按键单体 833 时，能够使得该按键单体 833 受到单独的按压，而避免通过联动而将其它的按键单体 833 一并按压的情况发生，从而能够准确得触发对应的按键开关 611。需要指出的，该弹性凸块 822 并非是必要的，例如也可以是不具有弹性的凸出结构，或者也可以不设置凸出结构，具体可根据实际情况进行设置。

在一实施方式中，壳体护套 17 的内壁上设置有与按键对应的凹槽 174，从而能够以套装方式包覆于电路壳体 30 和按键的外围。

在一实施方式中，骨传导扬声装置还进一步包括有至少一个导电柱 85，容纳于电路壳体 30 内部的控制电路 60 还包括主控电路板 62，该导电柱 85 可用于连接电路壳体 30 内部的主控电路板 62 以及电路壳体 30 外部的充电电路和/或数据传输线路等，以对骨传导扬声装置进行充电和/或数据传输等。

相应地，电路壳体 30 的主侧壁 33 上设置至少一个安装孔 331，导电柱 85 可插置于对应的安装孔 331 内。其中，导电柱 85 和安装孔 331 可一一对应，本实施方式中，导电柱 85 和安装孔 331 的数量均为四个，四个导电柱 85 分别插置于对应的安装孔 331 内，并排呈一条直线而均匀间隔设置。其中，位于外侧的两个导电柱 85 可作为充电接口，而位于中间的两个导电柱 85 可作为数据传输接口。当然，导电柱 85 以及安装孔 331 也可以按照其它的排布方式进行设置，此处不做具体限定。

其中，导电柱 85 可包括插置于安装孔 331 内的柱状本体 851。其中柱状本体 851 的外周面上设置有定位凸台 852，该定位凸台 852 可用于与主侧壁 33 的内表面卡接，进而将导电柱 85 固定于安装孔 331。

具体地，定位凸台 852 可以绕柱状本体 851 的周向呈环形设置，进一步地，在环形的定位凸台 852 朝向电路壳体 30 内部的一侧设置有连接柱状本体 851 外周面以及定位凸台 852 的延伸斜面 853。在安装导电柱 85 时，将该导电柱 85 由电路壳体 30 的外部，沿延伸斜面 853 而逐渐插入安装孔 331 而进入电路壳体 30 的内部，并进而通过定位凸台 852，在定位凸台 852 完全通过安装孔 331 之后，该定位凸台 852 朝向电路壳体 30 外部的台面与主侧壁 33 的内表面卡接，进而将导电柱 85 固定于安装孔 331 内。

上述方式中，定位凸台 852 的设置使得在装配过程中，导电柱 85 能够从电路壳体 30 的主侧壁 33 的外表面插入安装孔 331 后，并可通过按压的方式即可将定位凸

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台 852 按压入安装孔 331 内，从而与电路壳体 30 的主侧壁 33 的内表面卡接固定，而无需从电路壳体 30 的内部进行安装，从而使得骨传导扬声装置的装配更加便捷，提高生产装配效率.进一步地，延伸斜面 853 的设置使得在装配过程中，定位凸台 852 能够更加顺利地通过安装孔 331。定位凸台 852 的设置则能够使得导电柱 85 进入安装孔 331 内时与主侧壁 33 的内表面卡接而不易从导电孔内划出，从而能够将导电柱 85 牢靠地固定于安装孔 331 内。

具体地，在一实施方式中，柱状本体 851 沿柱状本体 851 相对于安装孔 331 的插入方向划分为第一柱状本体 8511 和第二柱状本体 8512，二者可由导电的金属材质，如铜、银或者合金等一体成型而为一整体结构。其中，在垂直于导电柱 85 插入安装孔 331 的插入方向上，第一柱状本体 8511 的横截面可大于第二柱状本体 8512 的横截面。其中，定位凸台 852 可设置于第二柱状本体 8512 上。

相应地，安装孔 331 沿插入方向划分为横截面与第一柱状本体 851 和第二柱状本体 851 对应的第一孔段 3311 和第二孔段 3312，进而在第一孔段 3311 和第二孔段 3312 的连接处形成一环形台面 3313，其中，该环形台面 3313 与主侧壁 33 的外表面连通。

进一步地，当柱状本体 851 插置于安装孔 331 内时，第一柱状本体 8511 朝向第二柱状本体 8512 的一侧支撑于环形台面 3313 上，同时，位于第二柱状本体 8512 外周面上的定位凸台 852 朝向第一柱状本体 8511 的一侧卡接于主侧壁 33 的内表面上，进而将导电柱 85 从安装孔 331 周围的主侧壁 33 的内外两侧面同时卡接，从而将导电柱 85 固定于安装孔 331 内。

在一实施方式中，柱状本体 851 沿轴向设置有容置腔 8513，容置腔 8513 的开口端于第二柱状本体 8512 朝向电路壳体 30 内部的端面上。具体地，该容置腔 8513 可沿平行于插入方向而贯通至第二柱状本体 8512 的位于电路壳体 30 内部一侧的部分，并在到达定位凸台 852 之前终止。当然，在其它实施方式当中，可以根据需求设置容置腔 8513 的具体位置，此处不做限定。

进一步地，导电柱 85 包括设置于容置腔 8513 内的弹簧 854 以及导电触头 855，导电触头 855 的一端可于容置腔 8513 内部与弹簧 854 抵接，另一端从容置腔 8513 的开口端外露于电路壳体 30 的内部。其中，导电触头 855 的材质可与柱状本体 851 的材质相同，弹簧 854 可以通过一定的手段如粘接、焊接等方式与第二柱状本体 851 以及导电触头 855 连接，或者还可以直接放置于容置腔 8513 内，并通过柱状本体 851 与电路壳体 30 的主侧壁 33 的卡接以及导电触头 855 与主控电路板 62 的抵接而弹性夹持于容置腔 8513 内部。

进一步地，电路壳体 30 内部的主控电路板 62 上设置有与导电柱 85 位置对应的触点 621，具体如图 7 所示。具体地，主控电路板 62 包括面积较大的主表面 622 以及连接主表面 622 的面积较小的侧表面 623，其中，主控电路板 62 的主表面 622 可平行或者近似平行于电路壳体 30 的主侧壁 33，其中，触点 621 对应设置于主控电路板 62 的主表面 622 上。

其中，导电柱 85 插入安装孔 331 的插入方向与导电柱 85 的轴向平行，并垂直于主侧壁 33，进而垂直于主控电路板 62 的主表面 622。在将导电柱 85 安装于安装

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孔 331 内后，弹簧 854 受到导电触头 855 以及柱状本体 851 的夹持而产生弹性形变，以将导电触头 855 弹性压持于对应的触点 621 上，从而实现导电柱 85 与主控电路板 62 的电连接。

在一实施方式中，骨传导扬声装置还进一步包括一位于电路壳体 30 内部的辅助片 86。

该辅助片 86 包括一板体 861，该板体 861 上设置有镂空区 8611，该板体 861 可通过热熔或者热压、粘接等方式设置于主侧壁 33 的内表面上，并使得设置于主侧壁 33 上的安装孔 331 位于镂空区 8611 内部。具体地，板体 861 的板面可平行贴靠于主侧壁 33 的内表面上。

其中，该辅助片 86 具有一定的厚度，在其设置于主侧壁 33 的内表面上后，与该辅助片 86 的镂空区 8611 的内侧壁与主侧壁 33 共同构成一位于插置于安装孔 331 内的导电柱 85 外围的胶槽 87。

进一步地，可在胶槽 87 内施加密封胶，从而从电路壳体 30 的内部对安装孔 331 进行密封，以提高电路壳体 30 的密闭性，进而提高骨传导扬声装置的防水性能。

其中，该辅助片 86 的材质可与电路壳体 30 的材质相同，并与电路壳体 30 分别成型。需要指出的是，在电路壳体 30 成型阶段，安装孔 331 附近往往还具有其它结构，例如需要成型按键孔 342 等，这些结构在成型时所对应的模具可能需要从电路壳体 30 的内部退出，而此时若直接在电路壳体 30 内部一体成型对应于安装孔 331 的胶槽 87，则胶槽 87 的凸起可能会干涉这些结构的模具的顺利退出，从而为生产带来不便。本实施方式中，辅助片 86 与电路壳体 30 分别为独立的结构，在二者分别成型后，可通过将辅助片 86 安装于电路壳体 30 的内部而与电路壳体 30 的主侧壁 33 共同构成胶槽 87，从而在电路壳体 30 的成型阶段不会阻挡部分结构的模具从电路壳体 30 的内部退出，从而有利于生产的顺利进行。

在一实施方式中，在对电路壳体 30 进行成型时，模具的退出仅占用胶槽 87 所占据的空间的部分空间，从而，可以在不影响退模的情况下，在主侧壁 33 的内表面上一体成型胶槽 87 的一部分，而胶槽 87 的另一部分仍可由辅助片 86 辅助构成。

具体地，主侧壁 33 的内表面上一体成型有第一条状凸肋 332，该第一条状凸肋 332 所在的位置不影响电路壳体 30 的模具退模。辅助片 86 的镂空区 8611 设置有一缺口 8612。其中，第一条状凸肋 332 与该缺口 8612 对应。在电路壳体 30 和辅助片 86 分别成型之后，可将该辅助片 86 于主侧壁 33 的内表面，以使得第一条状凸肋 332 至少部分嵌合于缺口 8612 处，进而利用第一条状凸肋 332 和辅助片 86 配合使得胶槽 87 呈闭合设置。

本实施方式中，由于第一条状凸肋 332 不会对模具的退出产生阻挡，因此，胶槽 87 的侧壁可由一体成型于主侧壁 33 内表面的第一条状凸肋 332 与辅助片 86 共同构成。

进一步地，在一实施方式中，第一条状凸肋 332 还进一步延伸成与板体 861 的侧边缘 8613 抵接，进而对板体 861 进行定位。

具体地，该第一条状凸肋 332 包括凸肋主体 3321 和定位臂 3322，其中，凸肋主体 3321 用于与镂空区 8611 的缺口 8612 匹配并与其嵌合，从而共同形成胶槽 87

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的侧壁；而定位臂 3322 则由凸肋主体 3321 的一端进一步延伸而成，并延伸至板体 861 的一侧边缘 8613 处与该侧边缘 8613 抵接，从而对该板体 861 于该侧边缘 8613 处进行定位。

其中，第一条状凸肋 332 在主侧壁 33 的内表面上凸出的高度可大于辅助片 86 的厚度，当然，也可以小于或者等于，只要能够与辅助片 86 共同构成胶槽 87，以及能够对辅助片 86 的板体 861 起到定位作用即可，此处不做具体限定。

在一实施方式中，板体 861 上进一步设置有定位孔 8614，其中，定位孔 8614 贯通板体 861 的主板面设置。进一步地，主侧壁 33 的内表面上一体成型有与定位孔 8614 对应的定位柱 333，在将辅助片 86 设置在主侧壁 33 的内表面后，该定位柱 333 插置于定位孔 8614 内，从而进一步对辅助片进行定位。

其中，定位孔 8614 和定位柱 333 的数量一致，本实施方式中，二者的数量均为两个。

在一个应用场景中，板体 861 的侧边缘 8613 形成有至少两个凸耳 8615，两个定位孔 8614 可分别设置于对应的凸耳 8615 上。

进一步地，主侧壁 33 的内表面上一体成型有一第二条状凸肋 334，该第二条状凸肋 334 可沿朝向辅侧壁 34 的方向延伸设置，并可与第一条状凸肋 332 的定位臂 3322 的延伸方向互相垂直。

对应地，板体 861 上还设置有与第二条状凸肋 334 对应的条状定位槽 8616，该定位槽 8616 沿远离该主侧壁 33 的方向凹陷设置，且其一端与板体 861 的侧边缘 8613 连接并可与该侧边缘 8613 垂直设置。

在一个应用场景中，定位槽 8616 可以仅由板体 861 的贴合主侧壁 33 的表面凹陷形成，定位槽 8616 的深度小于板体 861 的厚度，此时，板体 861 的与凹陷的表面相背设置的面不受定位槽 8616 的影响；在另一个应用场景中，定位槽 8616 的深度大于板体 861 的深度，从而使得在板体 861 的靠近主侧壁 33 的表面凹陷时，另一相对表面朝向凹陷的方向凸出，从而配合形成定位槽 8616。

具体地，在将辅助片 86 设置在主侧壁 33 的内表面后，第二条状凸肋 334 嵌入于条状定位槽 8616 内，以进一步对板体 861 进行定位。

在一实施方式中，按键电路板 61 垂直于主控电路板 62 而与电路壳体 30 的辅侧壁 34 平行间隔设置。具体地，如上所述，按键机构所对应的辅侧壁 34 可包括两种，一种是在用户佩戴该骨传导扬声装置时，朝向用户头部后侧的辅侧壁 34，另一种是在用户佩戴时朝向用户头部下侧的辅侧壁 34。本实施方式中，按键电路板 61 可以为两个，并分别与对应的两种辅侧壁 34 平行间隔设置。

其中，按键电路板 61 可设置于辅助片 86 的板体 861 的朝向辅侧壁 34 的一侧。进一步地，辅助片 86 包括相对于板体 861 凸出设置的压持脚 862。具体地，压持脚 862 沿垂直于板体 861 的主表面的方向凸出设置于板体 861 的朝向辅侧壁 34 的侧边缘处，且压持脚 862 的数量可以为一个或者多个。本实施方式中，压持脚 862 可通过其朝向辅侧壁 34 的侧面而将按键电路板 61 压持于辅侧壁 34 的内表面上，从而对按键电路板 61 起到固定的作用。

在一实施方式中，主控电路板 62 与主侧壁 33 间隔设置，而辅助片 86 的板体

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861 的主表面与主侧壁 33 平行而进一步与主控电路板 62 间隔设置。

其中，压持脚 862 具体由板体 861 沿背离辅助片 86 所靠近的电路壳体 30 的主侧壁 33 且朝向主控电路板 62 的方向凸出，并延伸至主控电路板 62 的板面处以对主控电路板 62 起到压持作用，从而使得主控电路板 62 支撑于至少部分压持脚 862 上。

在一实施方式中，壳体护套 17 上设置有与所述导电柱 85 对应的外露孔 175，在将壳体护套 17 套装在电路壳体 30 外围后，导电柱 85 位于电路壳体 30 外部的一端进一步通过该外露孔 175 外露，进而与骨传导扬声装置外部的电路连接，以使得该骨传导扬声装置通过导电柱进行电量供应或者数据传输。

进一步地，电路壳体 30 的外表面凹陷设置有环绕多个安装孔 331 的胶槽 39。具体地，胶槽 39 可为椭圆环形，多个安装孔 331 分别设置于椭圆环形的胶槽 39 所环绕的电路壳体 30 上。

本实施方式中，该胶槽 39 内施加有密封胶，进而壳体护套 17 与电路壳体 30 装配完成后，壳体护套 17 能够通过该密封胶在安装孔 331 的外围与电路壳体 30 密封连接，从而避免外部液体通过外露孔 175 而进入壳体护套 17 内部时，壳体护套 17 在电路壳体 30 外围产生滑动，且能够进一步从电路壳体 30 的外部对安装孔 331 进行密封，以进一步提高电路壳体 30 的密闭性，进而进一步提高骨传导扬声装置的防水性能。

在一实施方式中，电路壳体 30 在远离耳挂 10 的一端进一步设置有接插端 3a，后挂 40 包括弹性金属丝 41 以及设置于弹性金属丝 41 的两端的接插端 42，其中接插端 3a 与接插端 42 彼此接插固定。

其中，由于骨传导扬声装置的耳机芯 50 分别为左右两个，对应的机芯壳体 20、耳挂 10 以及电路壳体 30 也设置为左右两个，后挂 40 通过分别与两个电路壳体 30 接插固定的方式将位于两侧的机芯壳体 20、耳挂 10 以及电路壳体 30 连接在一起，并在用户佩戴时悬挂设置于用户头部后侧。

具体地，弹性金属丝 41 的材质与性能等可以与弹性金属丝 11 相同，相关详细内容请参见前述对弹性金属丝 11 的相关描述，此处不再赘述。

接插端 42 可以通过注塑的方式形成在弹性金属丝 41 的两端。具体地，接插端 42 可以由塑胶等材料制成。

在一实施方式中，接插端 42 设置有接插孔 421，该接插端 3a 至少部分插入至接插孔 421 内，本实施方式中，接插端 3a 可具体设置在环形台面 37 背离耳挂 10 的一侧。接插端 3a 与接插孔 421 之间的接插方式和接插端 15 与接插孔 31 之间的接插方式可以相同，也可以不同。

其中，在接插端 3a 的相对两侧分别设置有与接插端 3a 相对于接插孔 421 的插入方向垂直设置的开槽 3a1。两个开槽 3a1 可间隔且对称设置于接插端 3a 的两侧。进一步地，该两个开槽 3a1 可均在垂直于插入方向上与接插端 3a 的对应的侧壁连通。

相应地，接插端 42 的第一侧壁 422 上设置有与两个开槽 3a1 位置对应的通孔 423。其中，接插端 42 包括用于定义接插孔 421 的环绕设置的侧壁，接插端 42 的第一侧壁 422 可以是在接插端 3a 与接插端 42 接插固定时，接插端 42 的能够与开槽 3a1 的延伸方向相交的侧壁。

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其中，骨传导扬声装置进一步包括固定件 88，固定件 88 包括两条平行设置的插脚 881 和用于连接插脚 881 的连接部 882。本实施方式中，两条插脚 881 平行设置，连接部 882 可垂直连接设置于两条插脚 881 的同一侧，从而形成与固定件 81 形状相似的 U 型的固定件 88。

需要指出的是，固定件 88 可与固定件 81 的形状相似，但是具体的尺寸参数可以适应于周边结构而不同，本实施方式中，插脚 881 的长度大于插脚 811 的长度，连接部 812 长度小于连接部 882 的长度等，此处不做具体限定。

进一步地，插脚 881 可从接插端 42 的外侧经通孔 423 插入至开槽 3a1，而将连接部 882 阻挡于接插端 3a 的外侧，进而实现接插端 42 与接插端 3a 的接插固定。

通过上述方式，骨传导扬声装置的固定件 88 包括两条平行设置的插脚 881 和用于连接插脚 881 的连接部 882，以使得固定件 88 在一定跨度上对接插端 3a 和接插端 42 进行接插固定，从而使得电路壳体 30 与后挂 40 之间的固定更加稳定、牢靠；而且固定件 88 结构简单，插入和取出方便，从而使得接插端 3a 与接插端 42 之间的接插固定为可拆卸，且能够使得骨传导扬声装置的装配更加方便。

进一步地，在一实施方式中，接插端 42 的与第一侧壁 422 相对的第二侧壁 424 上进一步设置有与通孔 423 相对的通孔 425，插脚 881 进一步经开槽 3a1 插入至通孔 425 内。

在本实施方式中，插脚 881 经通孔 423 插入至开槽 3a1 内，并进一步经开槽 3a1 插入至通孔 425 内，也就是说插脚 881 能够将后挂 40 的接插端 42 的相对两侧壁以及接插端 3a 完全贯穿并连接于一起，从而能够使得电路壳体 30 与后挂 40 之间接插更加牢固。

具体地，在一实施方式中，接插端 3a 沿接插端 3a 相对于接插孔 421 的插入方向进一步划分为第一接插段 3a2 和第二接插段 3a3。

其中，接插端 3a 可设置在电路壳体 30 的端部的靠近一辅侧壁 34 一侧，该辅侧壁 34 具体可以是与上述实施方式中的定位块 38 所在的辅侧壁 34 相对的另一辅侧壁 34。

进一步地，第一接插段 3a2 和第二接插段 3a3 可在靠近定位块 38 的一侧沿接插端 3a 相对于接插孔 421 的插入方向而呈阶梯状设置，从而使得在垂直于插入方向的截面方向上，第一接插段 3a2 的截面大于第二接插段 3a3 的截面。

相应地，接插孔 421 沿接插端 3a 相对于接插孔 421 的插入方向进一步划分为形状分别与第一接插段 3a2 和第二接插段 3a3 相匹配的第一孔段 4211 和第二孔段 4212，从而使得在接插端 3a 插入至接插孔 421 内时，第一接插段 3a2 和第二接插段 3a3 分别插置于第一孔段 4211 和第二孔段内 4212。

进一步地，开槽 3a1 可设置于第一接插段 3a2 上，具体地，开槽 3a1 可沿接插端 3a 到定位块 38 的方向，即电路壳体 30 的两个辅侧壁 34 相对的方向而延伸设置，从而贯通第一接插段 3a2 的与电路壳体 30 的主侧壁 33 垂直的两侧壁，且进一步沿垂直插入方向贯穿第一接插段 3a2 的平行于电路壳体 30 的主侧壁 33 的两侧壁。

其中，接插端 42 上设置的通孔 423 可与开槽 3a1 的朝向定位块 38 的一侧对应，而通孔 425 则可与开槽 3a1 的远离定位块 38 的一侧对应。

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进一步地，在一实施方式中，第一接插段 3a2 和第二接插段 3a3 的顶侧彼此共面设置。其中，第一接插段 3a2 和第二接插段 3a3 的顶侧是指在用户正常佩戴骨传导扬声装置时，第一接插段 3a2 和第二接插段 3a3 的朝向头部顶侧的一侧，也即与第一接插段 3a2 和第二接插段 3a3 所形成的阶梯状相背的一侧。

进一步地，第一接插段 3a2 和第二接插段 3a3 的顶侧共面且形成有用于容纳导线的走线槽 3a4。该走线槽 3a4 可沿接插端 3a 与接插孔 421 的接插方向延伸，可用于容纳经过后挂 40 而连通控制电路 60 和电池 70 的导线。

本实施方式中，可先将接插端 3a 插置于接插孔 421 内，然后从第一接插段 3a2 的朝向定位块 38 的一侧插入开槽 3a1。具体地，本实施方式中，接插端 3a 设置于电路壳体 30 的朝向后挂 40 的端面的远离定位块 38 的一侧，因此，在接插端 3a 朝向定位块 38 的一侧还具有一定的空间，从而在对电路壳体 30 以及后挂 40 进行插接安装时，可以将固定件 88 从接插端 3a2 的底侧，即第一接插段 3a2 朝向定位块 38 的一侧由通孔 423 插入至开槽 3a1 并进而插入至通孔 425 内，以实现电路壳体 30 与后挂 40 的插接固定。通过这种方式，能够将固定件 88 完全隐藏于电路壳体 30 与后挂 40 所形成的内部空间当中而不外露，从而无需占用额外的空间。

进一步地，在一实施方式中，后挂 40 还包括注塑于弹性金属丝 41 以及接插端 42 外围的第二保护套管 43 以及与第二保护套管 43 一体成型的端部保护盖 44。

其中，第二保护套管 43 以及端部保护盖 44 的材质均可以与保护套管 16 及壳体护套 17 的材质相同，例如均可以为具有一定弹性的软质材料，例如软质的硅胶、橡胶等。

端部保护盖 44 具体可形成于弹性金属丝 41 的两端，可以与位于弹性金属丝 41 的两端的接插端 42 一体成型于该接插端 42 的外围。

需要指出的是，壳体护套 17 仅由电路壳体 30 的朝向耳挂 10 的一端包裹至电路壳体 30 的环形台面 37 处，因此，电路壳体 30 的环形台面 37 的朝向后挂 40 的部分则外露于壳体护套 17 的外围。进一步地，本实施方式中，端部保护盖 44 以及接插端 42 共同形成的内侧壁的形状与该电路壳体 30 所外露的端部的形状匹配，以进一步覆盖于该外露的电路壳体 30 的端部的外围，且该端部保护盖 44 的朝向电路壳体 30 的端面与壳体护套 17 的朝向后挂 40 的端面弹性抵接，以进一步提供密封。

进一步地，在一实施方式中，壳体护套 17 所外露的电路壳体 30 的端部还设置有按键孔 342，对应地，按键孔 342 内设置有按键 83，端部保护盖 44 覆盖该按键 83，并设置有用于容纳按键 83 的按键容置槽 441。

具体地，该按键孔 342 可间隔设置于接插端 3a 朝向定位块 38 的一侧，且按键孔 342 的数量可以为一个或者多个，具体可根据电路壳体 30 内部的控制电路 60 的具体结构以及电路壳体 30 本身的结构来确定，此处不做具体限定。

以上所述仅为本申请的实施方式，并非因此限制本申请的专利范围，凡是利用本申请说明书及附图内容所作的等效结构或等效流程变换，或直接或间接运用在其他相关的技术领域，均同理包括在本申请的专利保护范围内。

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说 明 书 附 图

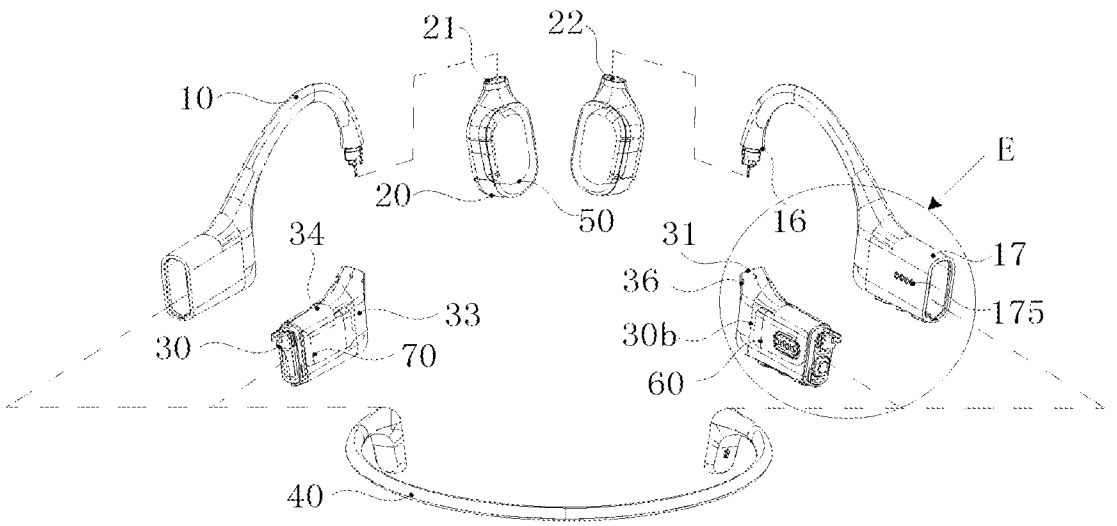


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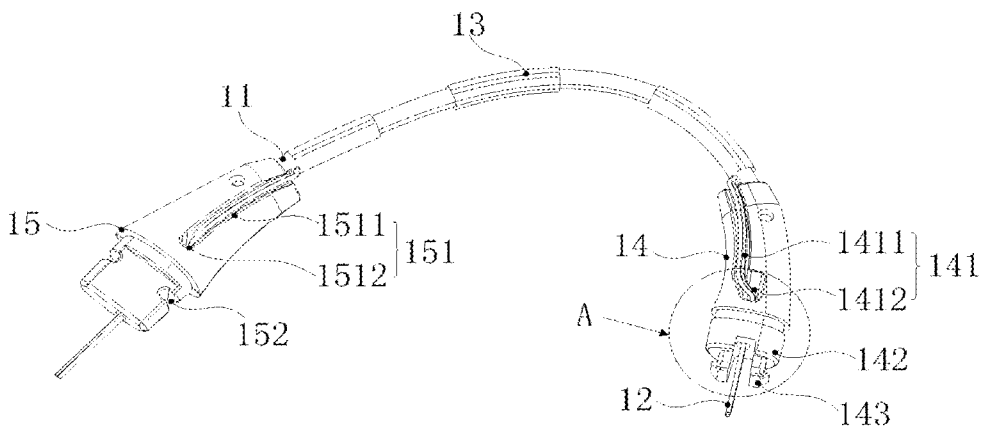


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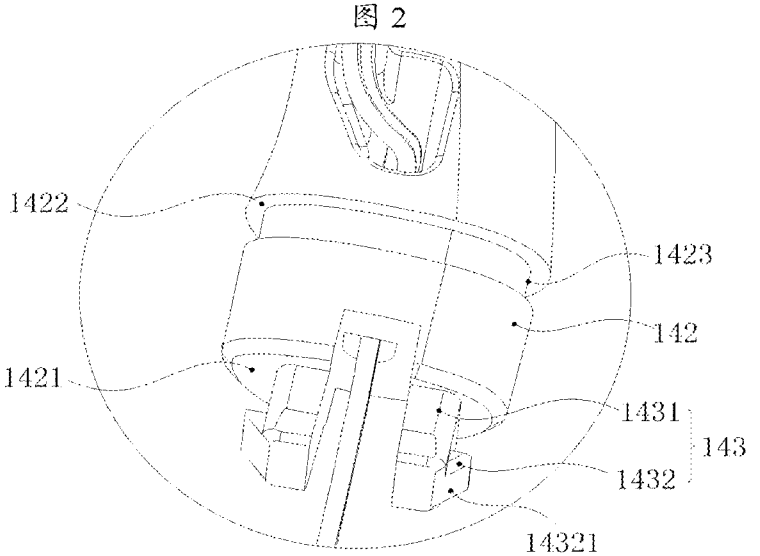


图 3

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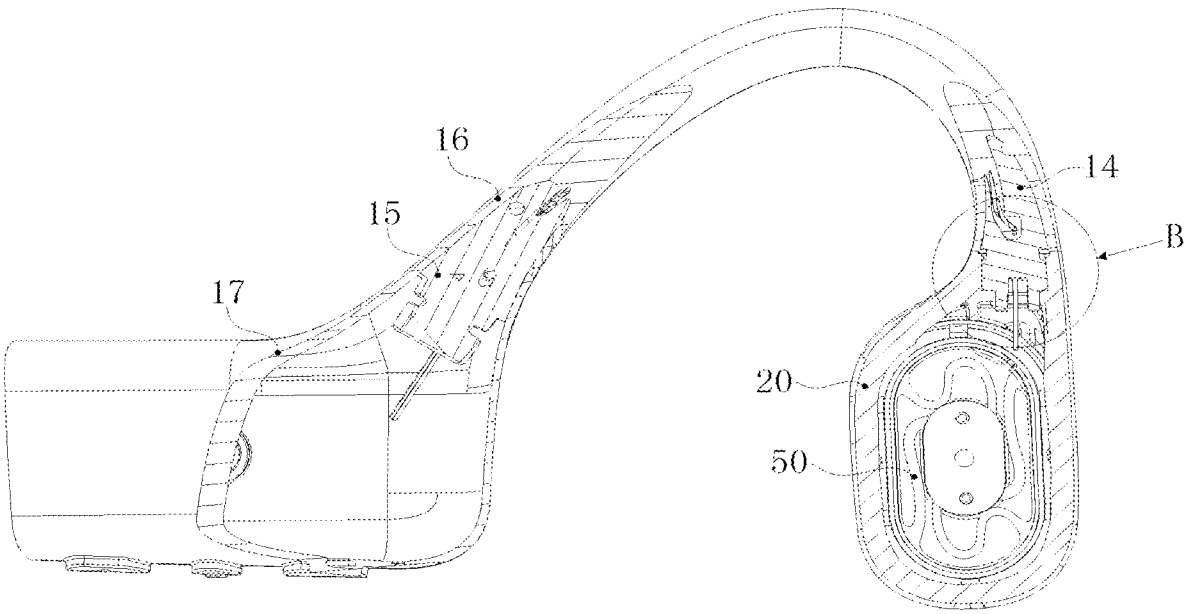


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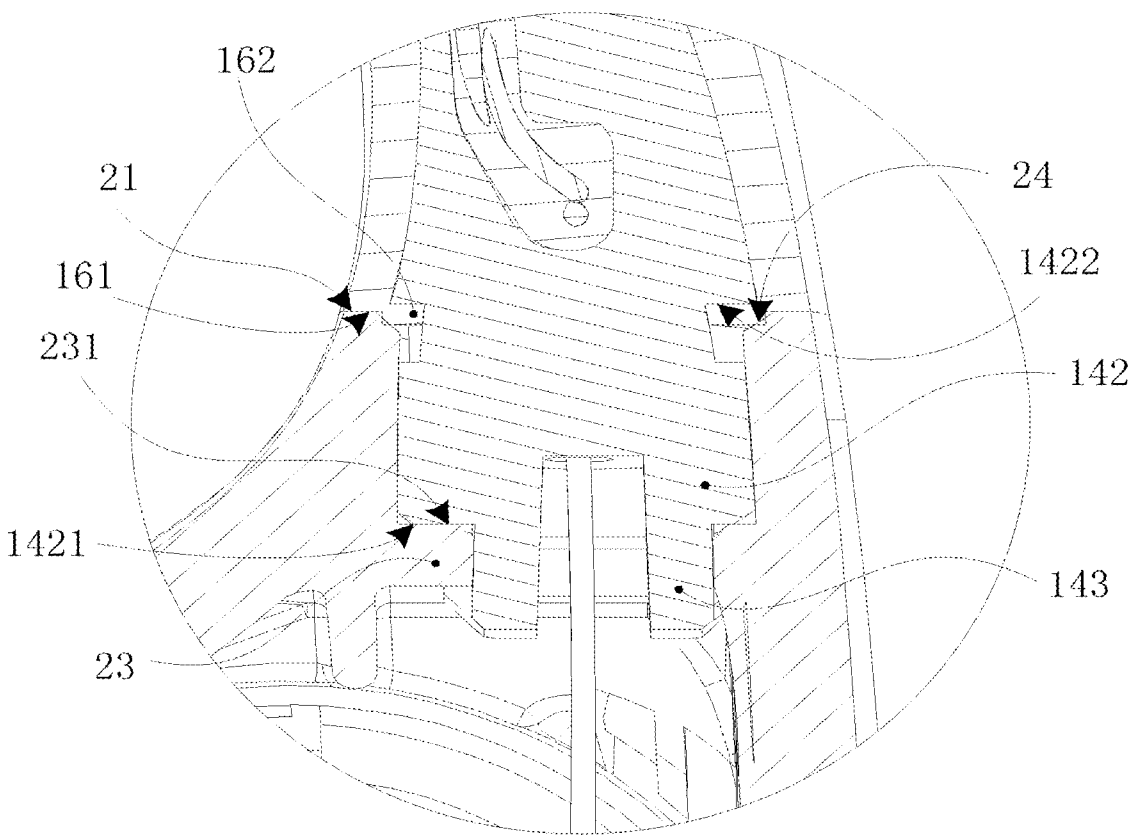


图 5

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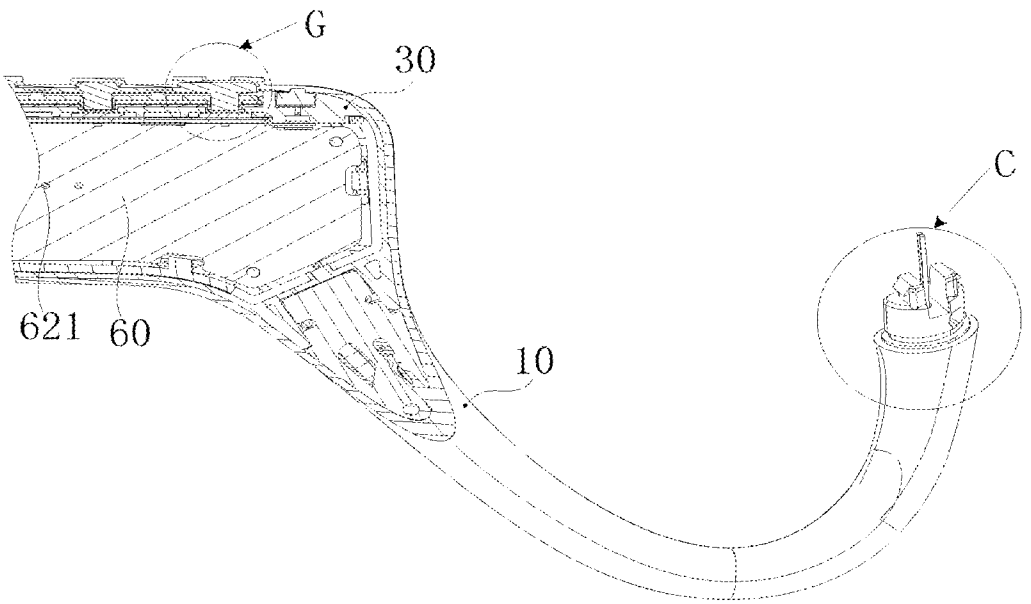


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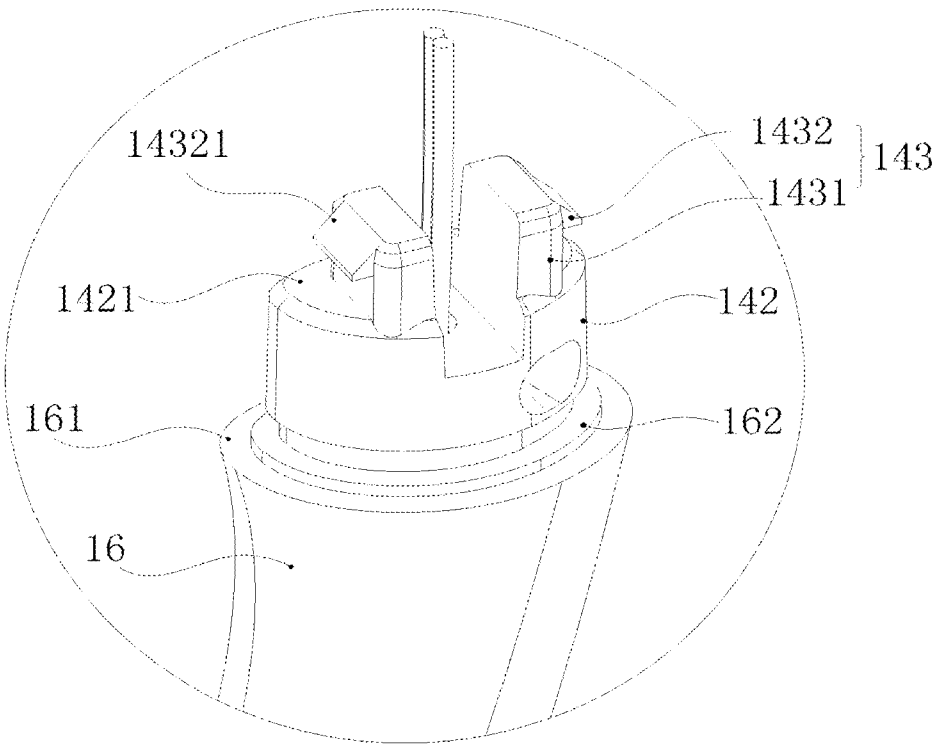


图 7

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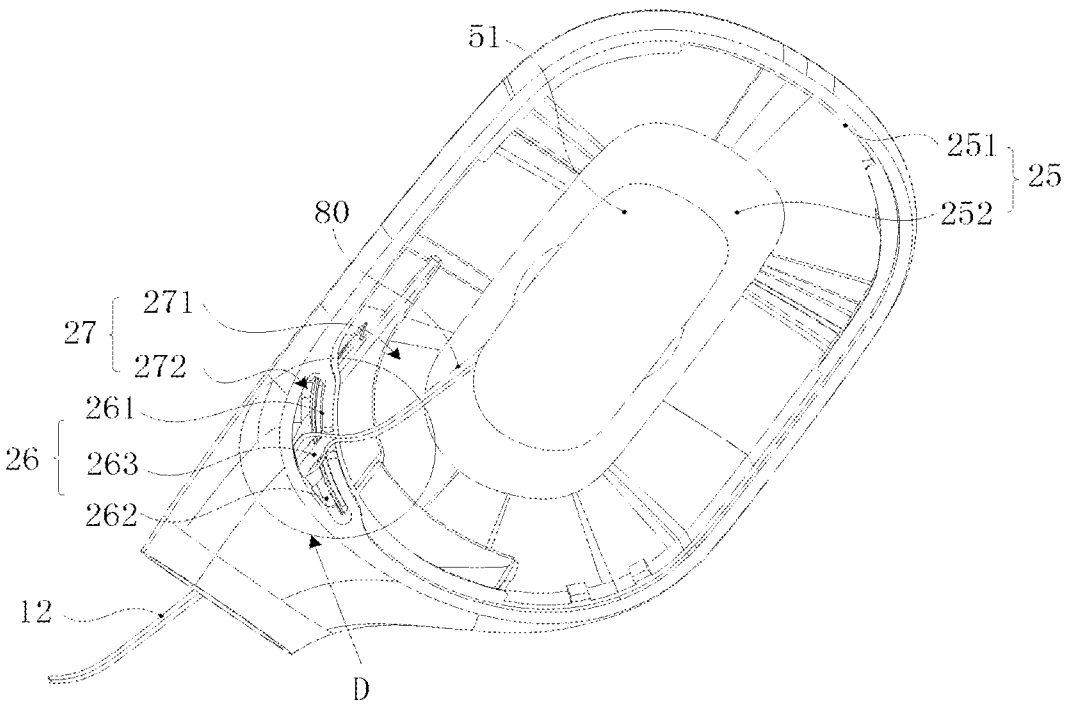


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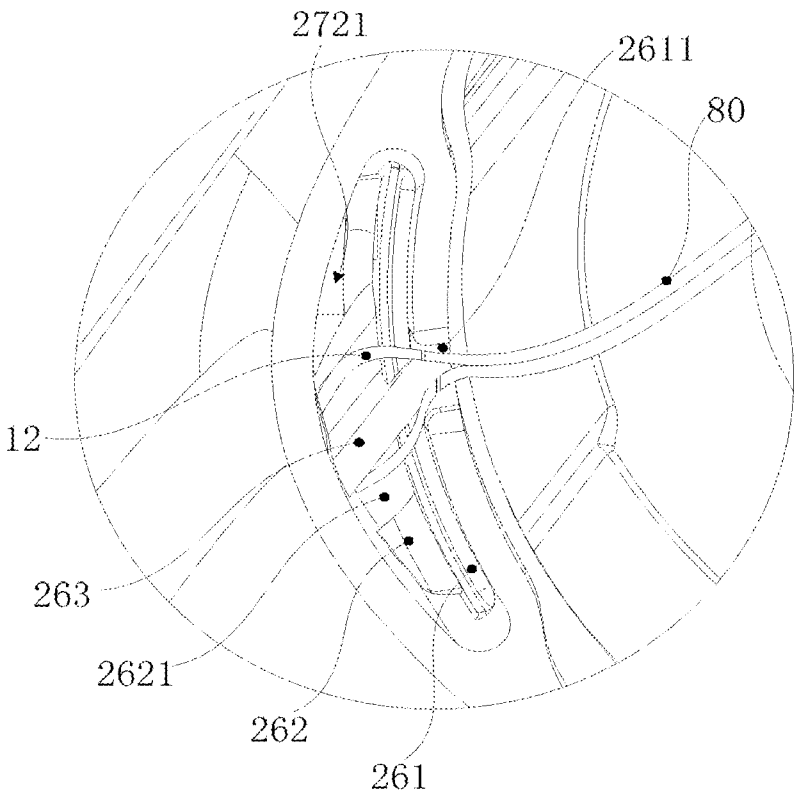


图 9

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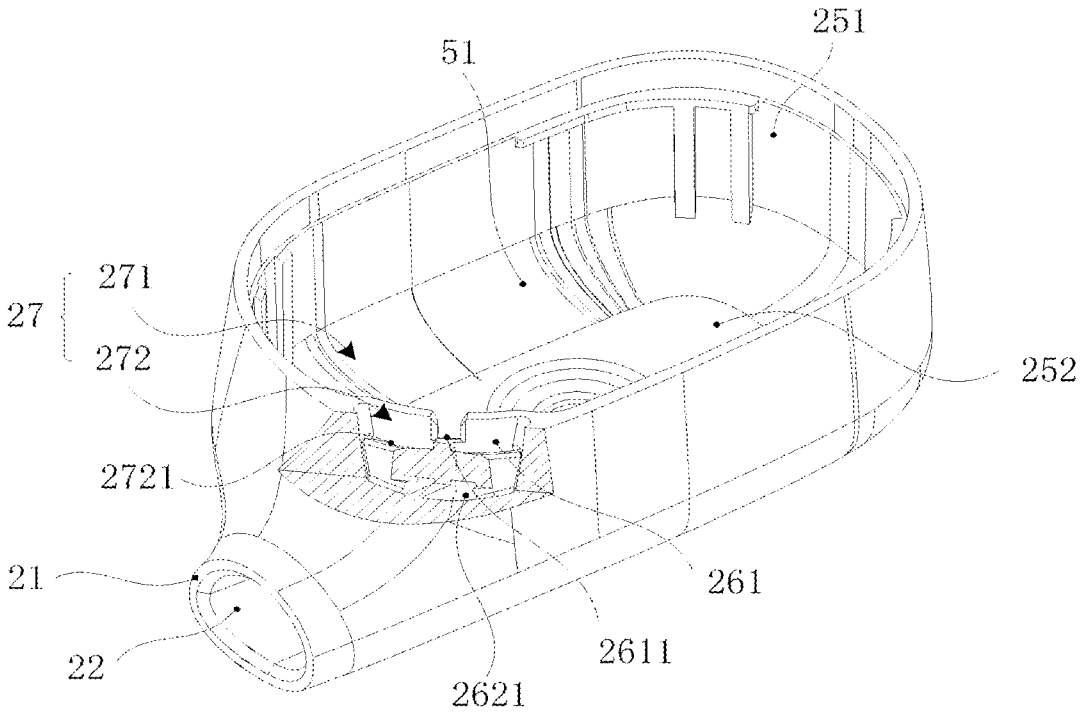

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图 10

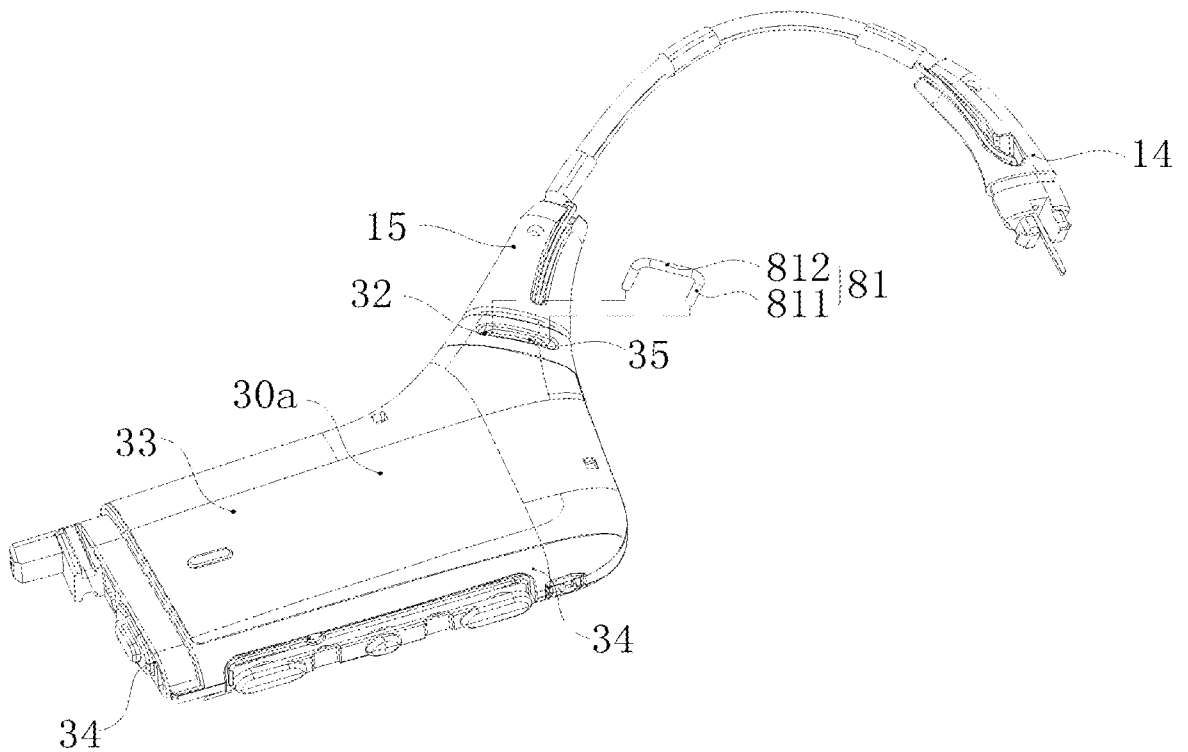

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图 11

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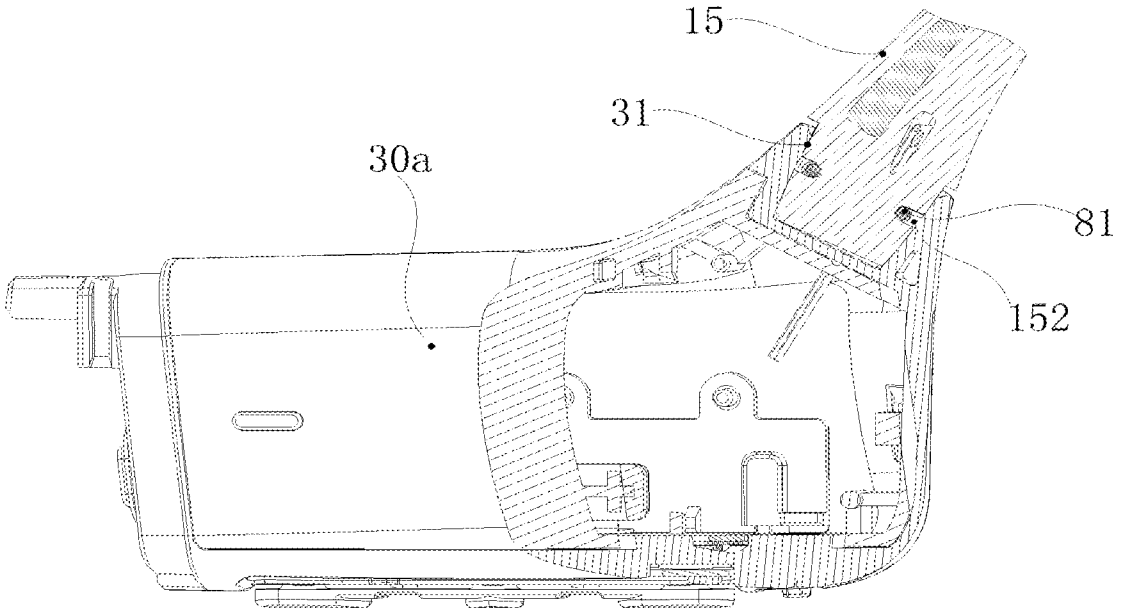


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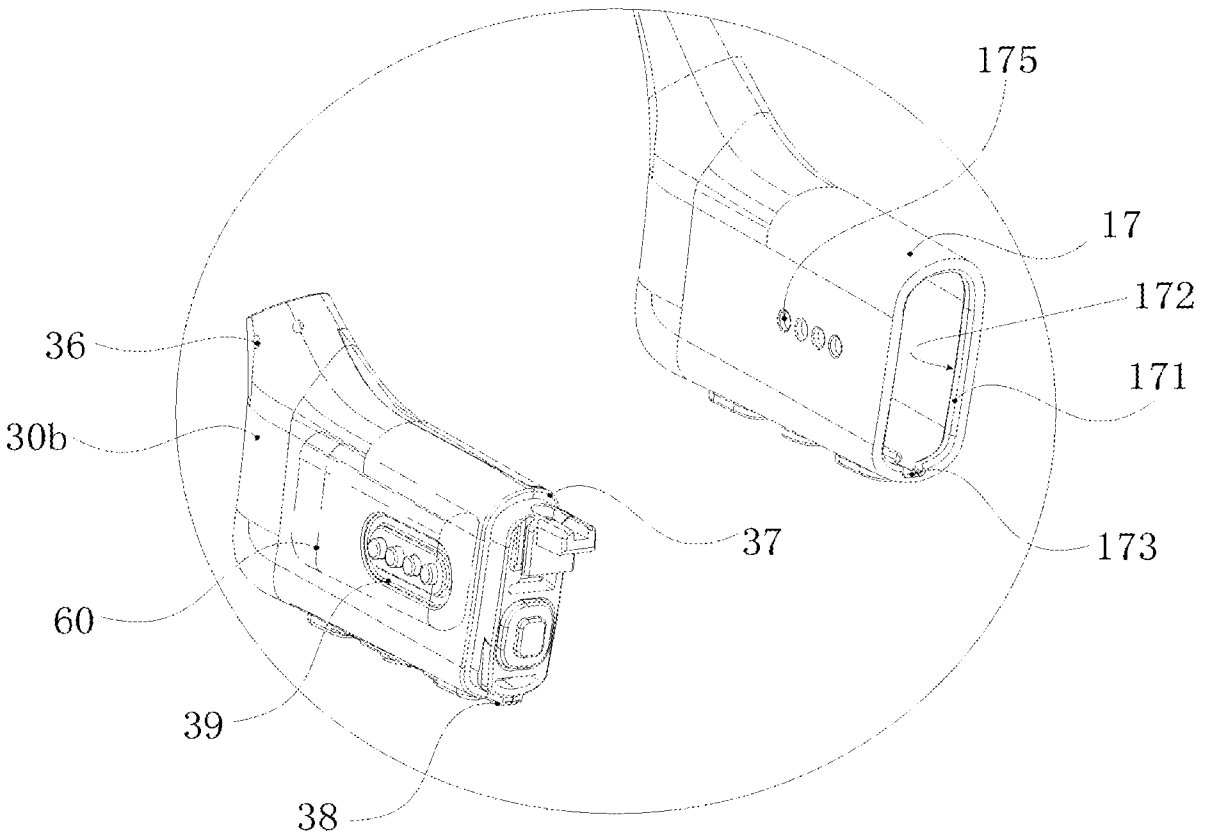


图 13

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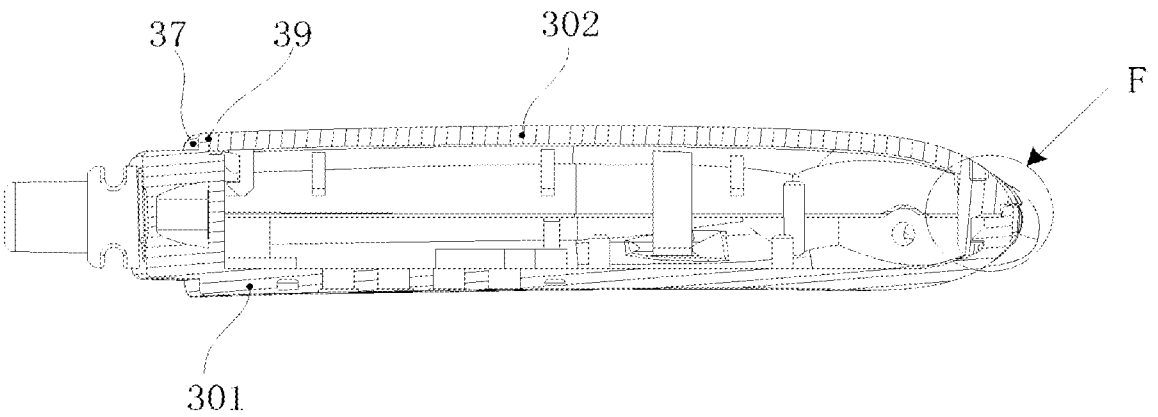


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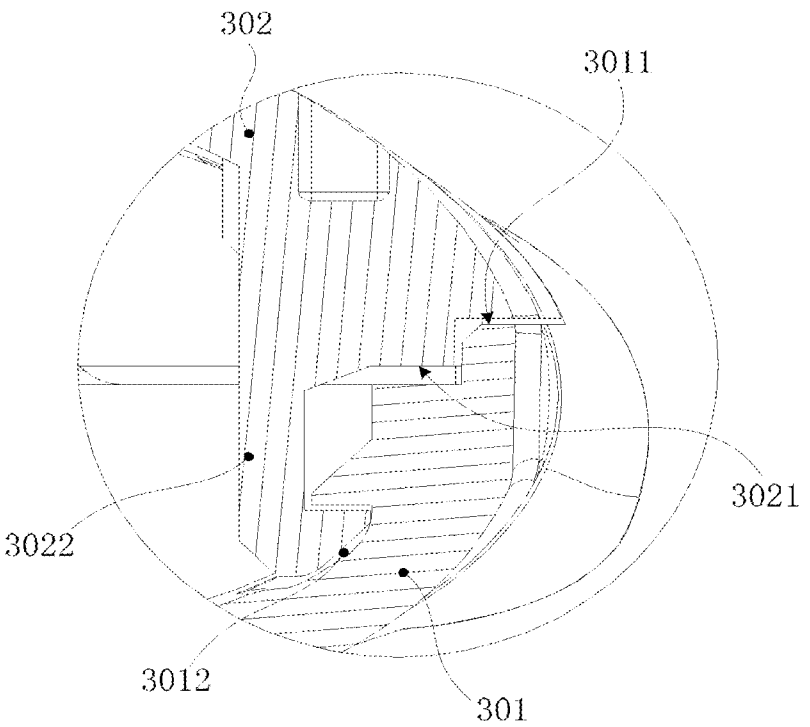


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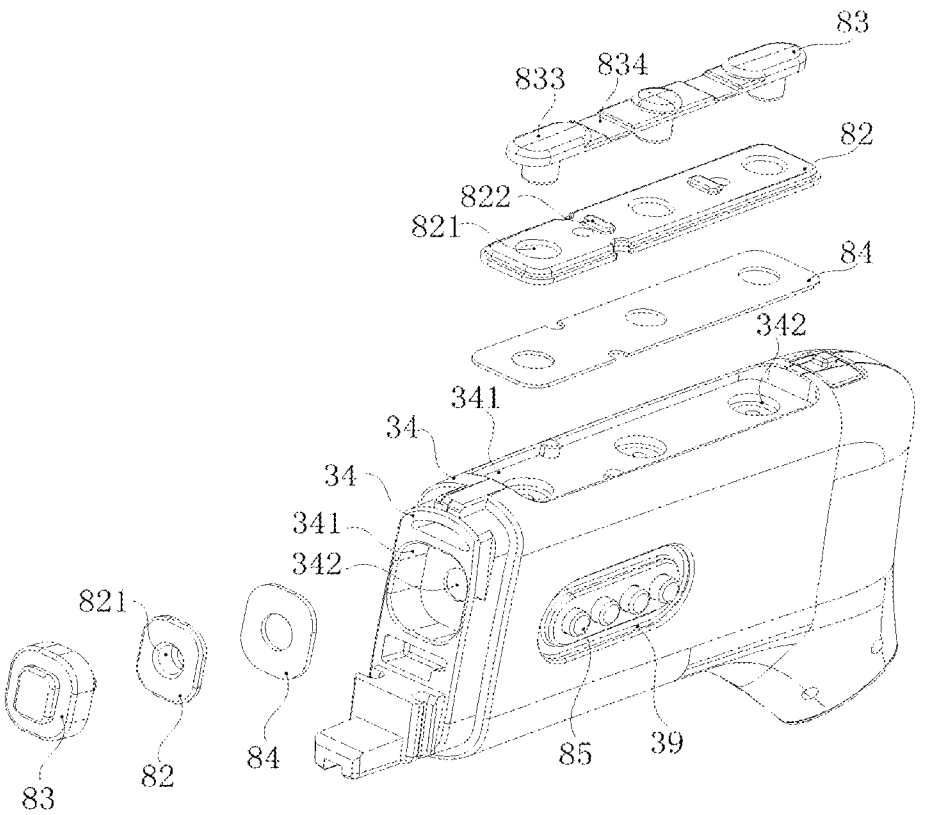


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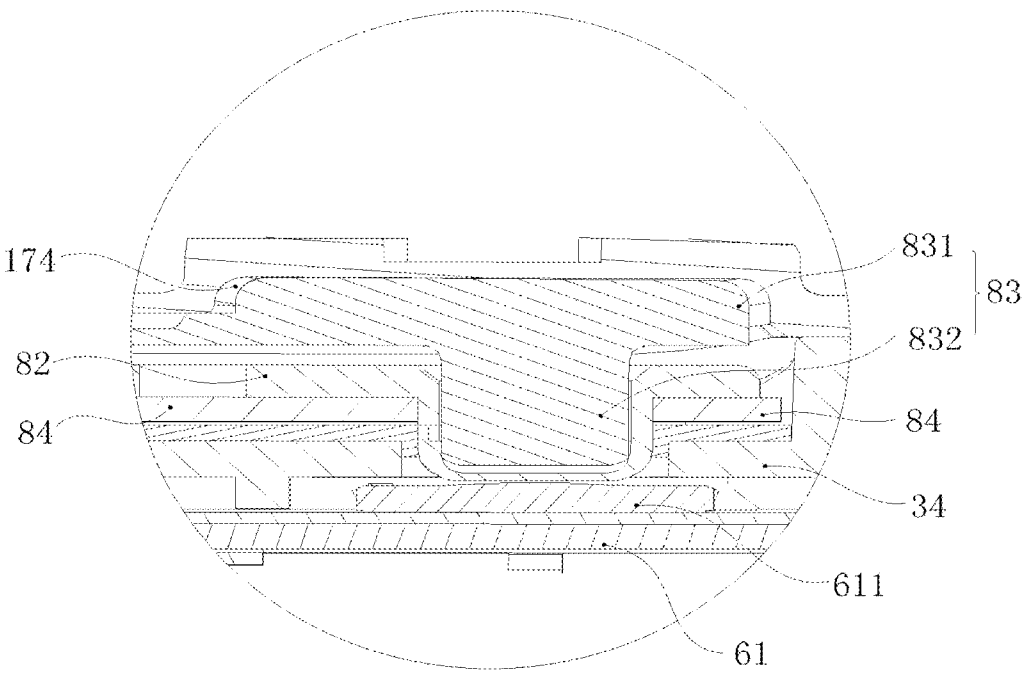


图 17

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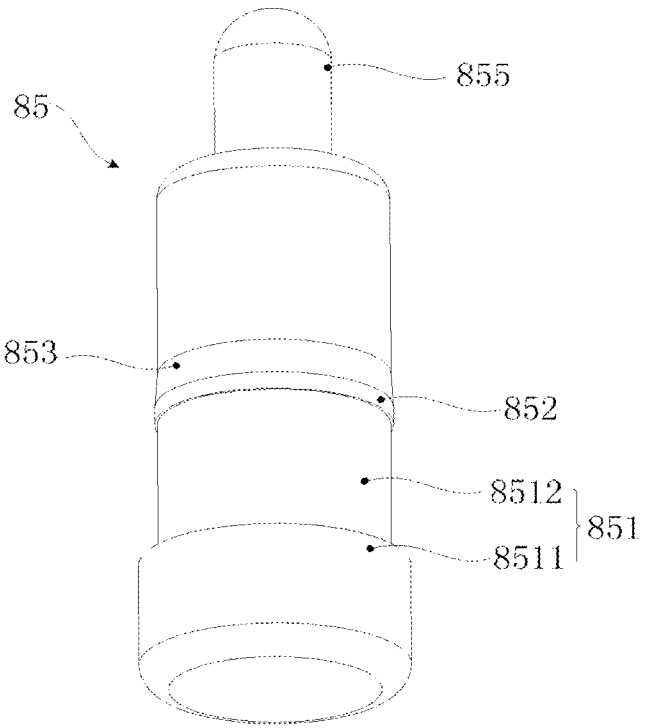


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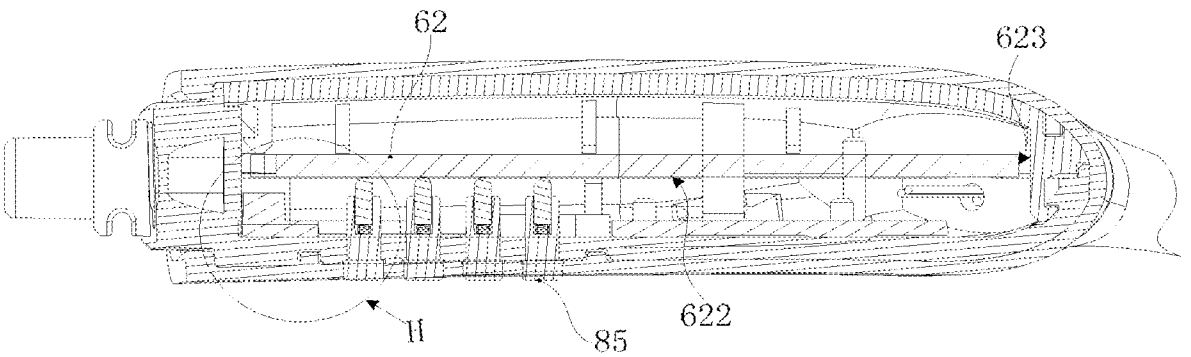


图 19

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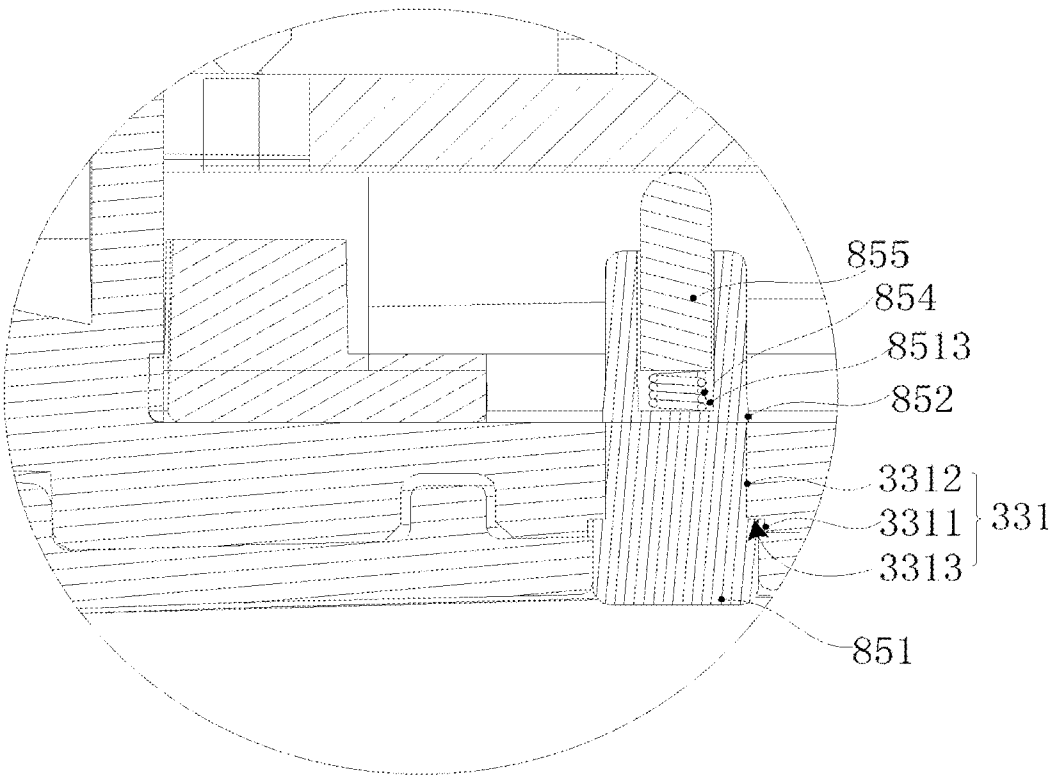

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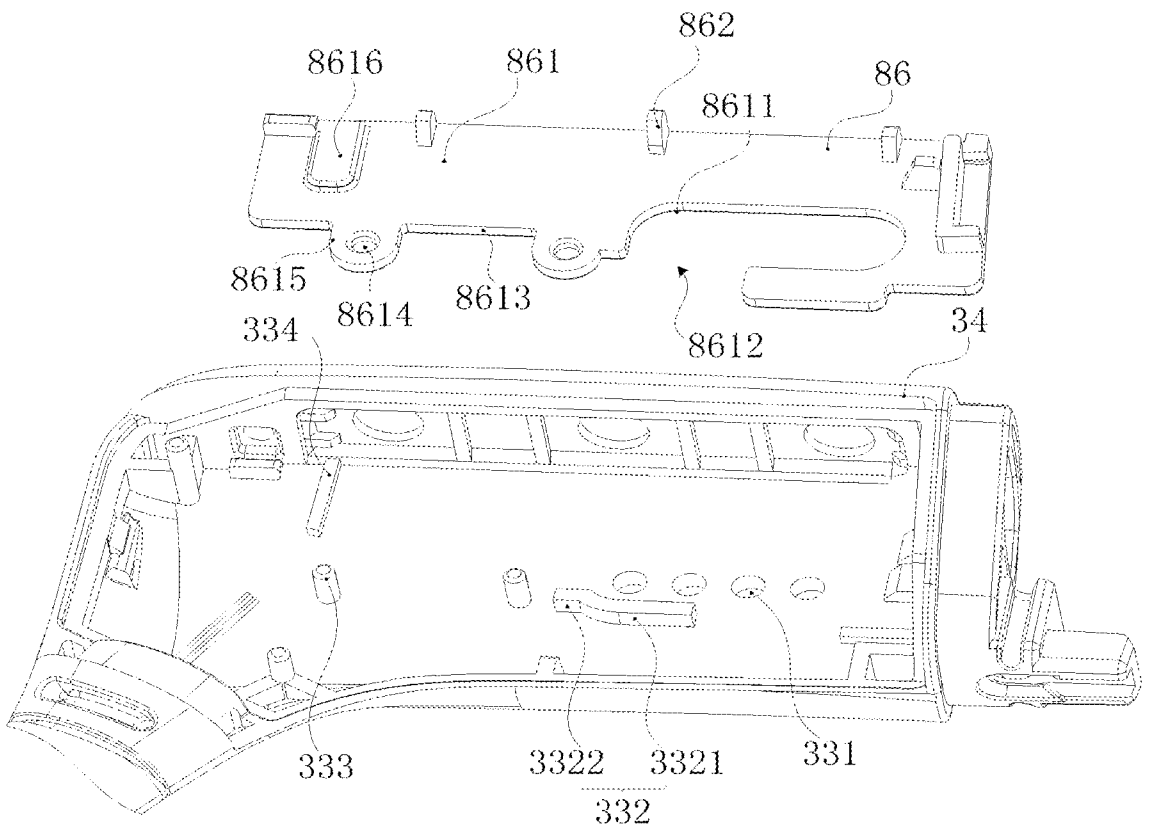

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图 21

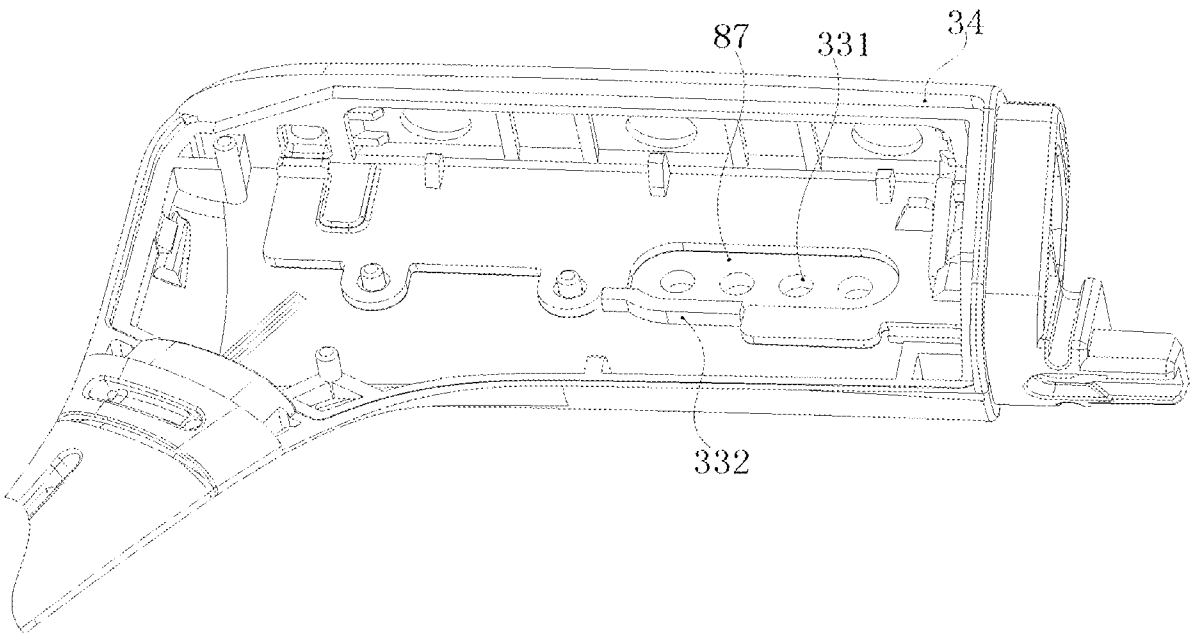


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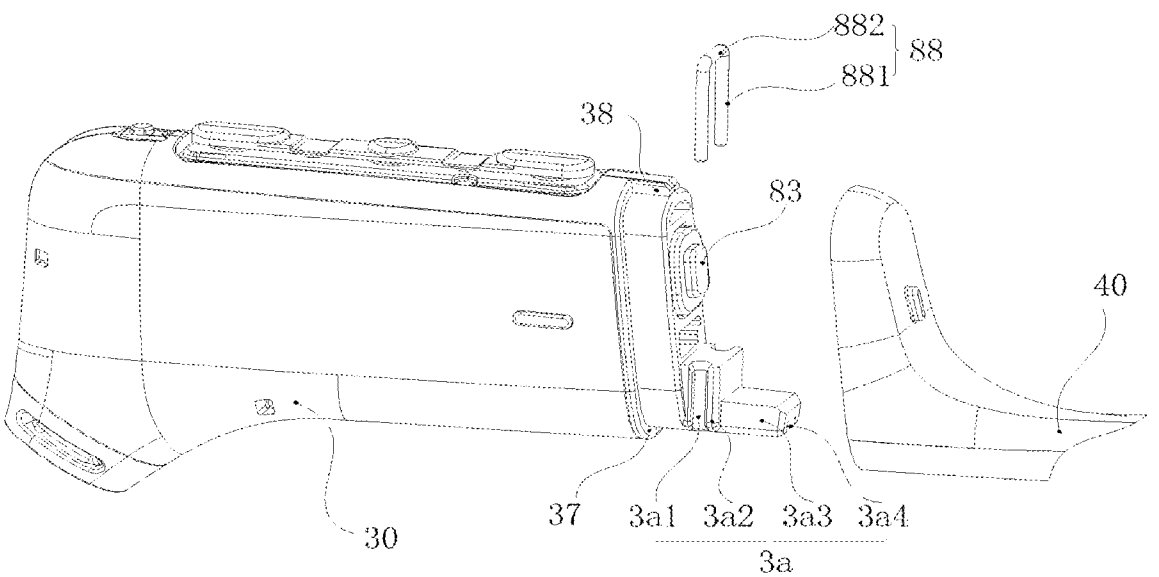


图 23

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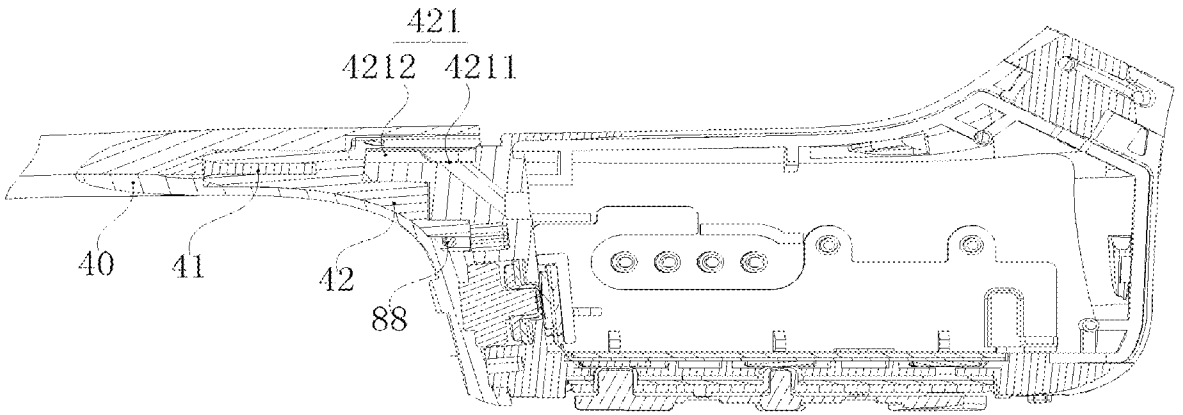


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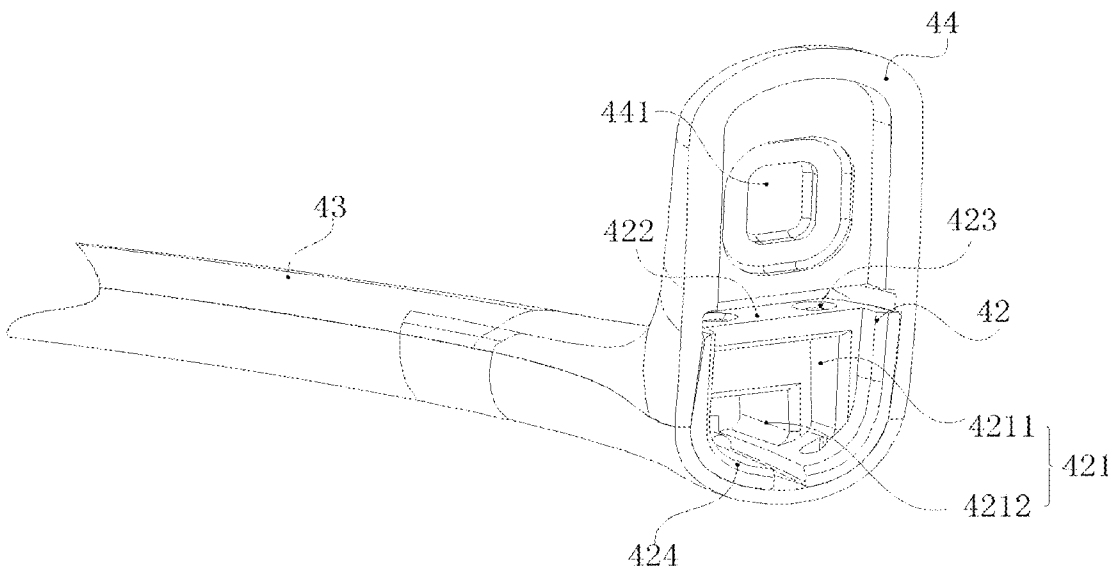


图 25

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17/139,076	12/31/2020	3747	1820	20608-0080US00	20	1

CONFIRMATION NO. 4158

131839
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Date Mailed: 01/19/2021

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Inventor(s)

Chaowu LI, Shenzhen, CHINA;
Yongjian LI, Shenzhen, CHINA;

Applicant(s)

SHENZHEN VOXTECH CO., LTD., Shenzhen, CHINA;

Assignment For Published Patent Application

SHENZHEN VOXTECH CO., LTD., Shenzhen, CHINA

Power of Attorney: The patent practitioners associated with Customer Number 131839

Domestic Priority data as claimed by applicant

This application is a CON of PCT/CN2019/102393 08/24/2019

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Projected Publication Date: 04/29/2021
Non-Publication Request: No
Early Publication Request: No
Title

LOUDSPEAKER APPARATUS

Preliminary Class

123

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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