PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/139,076

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	320
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	700
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 480 =	0.00
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).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1820

APPLICATION AS AMENDED - PART II

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

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** 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 found in the appropriate box in column 1.

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

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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	
Filing Date	
First Named Inventor	LI, Chaowu
Title	LOUDSPEAKER APPARATUS
Art Unit	
Examiner Name	
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 VOXTECH 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.**

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

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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 VOXTECH 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)	2017.6.26
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.

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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	20608-0080US00
First Named Inventor	LI, Chaowu
Title	LOUDSPEAKER APPARATUS
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. [ ] **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. [ ] **Applicant asserts small entity status.** See 37 CFR 1.27
3. [ ] **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. [✓] **Specification** [*Total Pages* 66] Both the claims and abstract must start on a new page. *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. [✓] **Drawing(s)** (35 U.S.C. 113) [*Total Sheets* 14]
6. **Inventor's Oath or Declaration** [*Total Pages* 2] *(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. [✓] Newly executed (original or copy)
   b. [ ] A copy from a prior application (37 CFR 1.63(d))
7. [✓] **Application Data Sheet** ** See note below.* See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. **CD-ROM or CD-R** in duplicate, large table, or Computer Program (*Appendix*)
   [ ] Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** *(if applicable, items a. – c. are required)*
   a. [ ] Computer Readable Form (CRF)
   b. [ ] Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

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

ACCOMPANYING APPLICATION PAPERS

10. [ ] **Assignment Papers** (cover sheet & document(s)) Name of Assignee .....
11. [ ] **37 CFR 3.73(c) Statement** (*when there is an assignee*) [✓] **Power of Attorney**
12. [ ] **English Translation Document** (*if applicable*)
13. [ ] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [ ] Copies of citations attached
14. [✓] **Preliminary Amendment**
15. [ ] **Return Receipt Postcard** (*MPEP § 503*) (*Should be specifically itemized*)
16. [ ] **Certified Copy of Priority Document(s)** (*if foreign priority is claimed*)
17. [ ] **Nonpublication Request** Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. [ ] **Other:** .....

***Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 must be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS

[✓] The address associated with Customer Number: 131838 **OR** [ ] Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	

Signature	/Yangzhou Du/	Date	2020-12-31
Name (Print/Type)	Yangzhou Du	Registration No. (Attorney/Agent)	65310

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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:

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.

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

发明名称 Title of Invention	A SPEAKER DEVICE

作为下方署名的发明人，本人兹此声明：
As the below named inventor, I hereby declare that:

本声明指：
This declaration is directed to:

☐ 随附的申请，或
The attached application, or

☒ 美国申请号码或 PCT 国际申请号码 PCT/CN2019/102393 备案于 August 24, 2019。
United States application or PCT international application number _____ filed on _____.

上述申请由本人提交或授权提交。
The above-identified application was made or authorized to be made by me.

本人相信，本人是该申请中所主张发明的原发明人或原联合发明人。
I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

本人兹此承认，此声明中若有任何故意的虚假陈述，本人将根据 18 U.S.C. 1001 的规定被处以罚款或五 (5) 年以下有期徒刑，或者两刑并处。
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

警告：
WARNING:

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Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

发明人依法登记的姓名
LEGAL NAME OF INVENTOR

发明人：LI, Chaowu　　日期（选填）：_____
Inventor: _____　　Date (Optional): _____

签名：Li Chaowu
Signature: _____

注意：此表格必须随附包含整个发明实体命名的申请信息表（PTO/AIA/14 或同等信息表），或者此信息表必须先前已被提交。其他每名发明人均需使用一份 PTO/AIA/01 信息表。
Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

发明名称 Title of Invention	A SPEAKER DEVICE

作为下方署名的发明人，本人兹此声明：
As the below named inventor, I hereby declare that:

本声明指：
This declaration is directed to:

☐ 随附的申请，或
This attached application, or

☒ 美国申请号码或 PCT 国际申请号码 PCT/CN2019/102393 备案于 August 24, 2019。
United States application or PCT international application number _____ filed on _____

上述申请由本人提交或授权提交。
The above-identified application was made or authorized to be made by me.

本人相信，本人是该申请中所主张发明的原发明人或原联合发明人。
I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

本人兹此承认，此声明中若有任何故意的虚假陈述，本人将根据 18 U.S.C. 1001 的规定被处以罚款或五 (5) 年以下有期徒刑，或者两罚并施。
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

警告：
WARNING:

呈请人/申请人应小心避免在专利申请中备案的文件中提交个人信息，这有可能会造成身份盗窃。USPTO 从不要求为支持呈请或申请而提供社保号码、银行账号或信用卡号码等个人信息（除非是用于付款目的的支票或信用卡授权表 PTO-2038）。如果在提交给 USPTO 的文件中有此类个人信息，呈请人/申请人应当考虑在向 USPTO 提交文件之前编辑此类个人信息。兹告知呈请人/申请人，在公布申请（除非根据 37 CFR 1.213(a) 的规定在申请中提出不予公布的请求）或签发专利之后，专利申请记录将公之于众。而且，如果在公布的申请或签发的专利中引用了该申请，那么已弃用的申请记录也会公之于众（见37 CFR 1.14）。为付款目的而提交的支票和信用卡授权表 PTO-2038 不会保留在申请文件中，因此不会向公众公布。

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发明人依法登记的姓名
LEGAL NAME OF INVENTOR

发明人：LI, Yongjian　　日期（选填）：
Inventor: _____　　Date (Optional): _____

签名：LI, Yongjian
Signature: _____

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Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
LI, Chaowu et al.

Application No.: *To Be Assigned*
(Continuation of International Application No. PCT/CN2019/102393)

Filed: On even date herewith

For: LOUDSPEAKER APPARATUS

Group Art Unit: *To Be Assigned*

Examiner: *To Be Assigned*

Confirmation No.: *To Be Assigned*

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

Dear Commissioner:

PRELIMINARY AMENDMENT UNDER 37 C.F.R. § 1.115

Prior to the examination of the above application, please amend this application as follows:

Amendments to the Claims begin on page 2 of this paper.

Remarks begin after the Amendments Section.

AMENDMENTS TO THE CLAIMS

Please amend the claims as indicated below. This listing of claims will replace all prior versions and listings of claims in the application:

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

By the above amendments, Applicant cancels claims 16-17 and 21-22 without prejudice or disclaimer of the subject matter thereof. No new matter has been introduced. The entry of the amendment is respectfully requested.

Applicant submits that the present Application is in condition for examination and respectfully requests the same. 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

Dated: December 31, 2020

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

LOUDSPEAKER APPARATUS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a Continuation of International Application No. PCT/CN2019/102393 filed on August 24, 2019, which claims priority of Chinese Patent Application No. 201910009927.4, filed on January 5, 2019, the entire contents of each of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to a loudspeaker apparatus, and in particular, to a loudspeaker apparatus with a waterproof function.

BACKGROUND

[0003] Generally, people can hear the sound because air transmits vibration to the eardrum through the external ear canal, and the vibration formed by the eardrum drives the human auditory nerve, thereby perceiving the sound. At present, earphones are widely used in people's lives. For example, users can use earphones to play music, answer calls, etc. Earphones have become an important item in people's daily life. Ordinary earphones can no longer meet the normal use of users in some special scenes (e.g., swimming, rainy days, etc.). Thus, earphones with waterproof function and better sound quality are more popular with consumers. Therefore, it may be necessary to provide a loudspeaker apparatus with waterproof function and easy to produce and assemble.

SUMMARY

[0004] The embodiments of the present disclosure provide a loudspeaker apparatus. The loudspeaker apparatus may include an ear hook, a core housing, and a circuit housing. The ear hook may include a first plug end and a second plug end. The ear hook may be surrounded by a protective sleeve. The protective sleeve may be made of an elastic waterproof material. The core housing may be used for accommodating an earphone core. The core housing may be fixed to the first plug end and elastically abutted against the protective sleeve. The core housing may include a housing panel facing human

body and a housing back panel opposite to the housing panel. The vibration of the earphone core may drive the housing panel and the housing back panel to vibrate. The vibration of the housing panel may have a first phase. The vibration of the housing back panel may have a second phase. 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 may be less than 60 degrees. The circuit housing may be used for accommodating a control circuit or a battery. The circuit housing may be fixed to the second plug end. The control circuit or the battery may drive the earphone core to vibrate to generate a sound.

[0005] In some embodiments, the ear hook may include an elastic metal wire, a wire, and a fixed sleeve. The fixed sleeve may fix the wire on the elastic metal wire. The protective sleeve may be 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.

[0006] In some embodiments, the first plug end and the second plug end may be formed, by injection molding, at both ends of the elastic metal wire respectively. The first plug end and the second plug end may be arranged with a first wiring channel and a second wiring channel respectively. The wire may extend along the first wiring channel and the second wiring channel.

[0007] In some embodiments, the wire may pass through the first wiring channel and the second wiring channel.

[0008] In some embodiments, the first wiring channel may include 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 may extend 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 may include a second wiring groove and a second wiring hole connecting the second wiring groove and the outer end surface of the first plug end. The wire may extend along the

second wiring groove and the second wiring hole and may be exposed on the outer end surface of the second plug end.

[0009] In some embodiments, the ear hook may include at least two fixed sleeves spaced apart along the elastic metal wire.

[0010] In some embodiments, the core housing may be arranged with a first socket connecting with an outer end surface of the core housing. A stopping block may be arranged on an inner sidewall of the first socket. The first socket may be connected to the first plug end.

[0011] In some embodiments, the first plug end may include an inserting portion and two elastic hooks. The inserting portion may be at least partially inserted into the first socket and abutting against an outer side surface of the stopping block. The two elastic hooks may be arranged on a side of the inserting portion facing inside of the core housing. The two elastic hooks may be brought together under action of external thrust and the stopping block. After passing through the stopping block, the two elastic hooks may be 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.

[0012] In some embodiments, the inserting portion may be partially inserted into the first socket. An exposed part of the inserting portion may be arranged in a stepped manner to form an annular table surface spaced apart from the outer end surface of the core housing.

[0013] In some embodiments, the protective sleeve may further extend to a side of the annular table surface facing the outer end surface of the core housing. When the core housing and the first plug end are fixed, the protective sleeve may elastically abut against the core housing to realize sealing.

[0014] In some embodiments, the loudspeaker apparatus may further include a fastener. The circuit housing may be arranged with a second socket. The second plug end may be at least partially inserted into the second socket and connected to the second socket by the fastener.

[0015] In some embodiments, the second plug end may be arranged with a slot perpendicular to an inserting direction of the second socket. A through hole corresponding to a position of the slot may be arranged on a first sidewall of the circuit housing. The fastener may include two parallel pins and a connecting portion for connecting the pins. The pins may be 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.

[0016] In some embodiments, the ear hook may further include a housing sheath integrally formed with the protective sleeve. The housing sheath may be wrapped around periphery of the circuit housing.

[0017] In some embodiments, the vibration of the housing panel may have a first amplitude. The vibration of the housing back panel may have a second amplitude. A ratio of the first amplitude to the second amplitude may be within a range of 0.5 to 1.5.

[0018] In some embodiments, the vibration of the housing panel may generate a first leaked sound wave. The vibration of the housing back panel may generate a second leaked sound wave. The first leaked sound wave and the second leaked sound wave may be superimposed on each other, which reduces an amplitude of the first leaked sound wave.

[0019] In some embodiments, the housing panel and other parts of the housing may be connected by at least one of glue, clamping, welding, or threaded connecting.

[0020] In some embodiments, the housing panel and the housing back panel may be made of fiber reinforced plastic materials.

[0021] In some embodiments, the earphone core may further include a magnetic circuit component generating a first magnetic field. The magnetic circuit component may include 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 may surround the first magnetic unit and form a magnetic gap with the first magnetic unit. A magnetic field strength of the first magnetic field in the magnetic gap may be greater than a magnetic field strength of the second magnetic field in the magnetic gap.

[0022] In some embodiments, the magnetic circuit component may further include 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.

[0023] In some embodiments, the magnetic circuit component may further include 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.

[0024] In some embodiments, the magnetic circuit component may further include at least one fifth magnetic unit being connected to an upper surface of the first magnetically conductive unit.

[0025] In some embodiments, the magnetic circuit component may further include a third magnetically conductive unit being connected to an upper surface of the fifth magnetic unit. The third magnetically conductive unit may be configured to suppress a leakage of a field strength of the first magnetic field.

[0026] In some embodiments, the first magnetically conductive unit may be connected to the upper surface of the first magnetic unit. The second magnetically conductive unit may include a bottom plate and a sidewall. The first magnetic unit may be connected to the bottom plate of the second magnetically conductive unit.

[0027] In some embodiments, the magnetic circuit component may further include at least one electrically conductive unit may be connected to at least one unit of the first magnetic unit, the first magnetically conductive unit, or the second magnetically conductive unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The present disclosure is further described in terms of exemplary embodiments. These exemplary embodiments are described in detail with reference to the drawings. These embodiments are non-limiting exemplary embodiments, in which like reference numerals represent similar structures, and wherein:

[0029] FIG. 1 is a flowchart illustrating an exemplary process for generating auditory sense through a loudspeaker apparatus according to some embodiments of the present disclosure;

[0030] FIG. 2 is an exploded structural diagram of an MP3 player according to some embodiments of the present disclosure;

[0031] FIG. 3 is a partial structural diagram of an ear hook of an MP3 player according to some embodiments of the present disclosure;

[0032] FIG. 4 is a partial enlarged view of part A in FIG.3;

[0033] FIG. 5 is a partial sectional view of an MP3 player according to some embodiments of the present disclosure;

[0034] FIG. 6 is a partial enlarged view of part B in FIG.5;

[0035] FIG. 7 is a partial structural diagram of a core housing according to some embodiments of the present disclosure;

[0036] FIG. 8 is a partial enlarged view of part D in FIG. 7;

[0037] FIG. 9 is a partial sectional view of a core housing according to some embodiments of the present disclosure;

[0038] FIG. 10 a longitudinal sectional view illustrating a bone conduction speaker according to some embodiments of the present disclosure;

[0039] FIG. 11 is a structural diagram illustrating a bone conduction speaker according to some embodiments of the present disclosure;

[0040] FIG. 12 is a structural diagram illustrating another bone conduction speaker according to some embodiments of the present disclosure;

[0041] FIG. 13 is a structural diagram illustrating another bone conduction speaker according to some embodiments of the present disclosure;

[0042] FIG. 14 is a structural diagram illustrating a housing of a bone conduction speaker according to some embodiments of the present disclosure;

[0043] FIG. 15 is a structural diagram illustrating a speaker according to some embodiments of the present disclosure;

[0044] FIG. 16 is a longitudinal sectional view illustrating a magnetic circuit component 2100 according to some embodiments of the present disclosure;

[0045] FIG. 17 is a longitudinal sectional view illustrating a magnetic circuit component 2600 according to some embodiments of the present disclosure;

[0046] FIG. 18 is a longitudinal sectional view illustrating a magnetic circuit component 2700 according to some embodiments of the present disclosure;

[0047] FIG. 19 is a longitudinal sectional view illustrating a magnetic circuit component 2900 according to some embodiments of the present disclosure;

[0048] FIG. 20 is a longitudinal sectional view illustrating a magnetic circuit component 3000 according to some embodiments of the present disclosure;

[0049] FIG. 21 is a longitudinal sectional schematic diagram illustrating a magnetic circuit component 3100 according to some embodiments of the present disclosure; and

[0050] FIG. 22 is a schematic diagram illustrating transmitting a sound through air conduction according to some embodiments of the present disclosure.

DETAILED DESCRIPTION

[0051] In the following detailed description, numerous specific details are set forth by way of examples in order to provide a thorough understanding of the relevant disclosure. Obviously, drawings described below are only some examples or embodiments of the present disclosure. Those skilled in the art, without further creative efforts, may apply the present disclosure to other similar scenarios according to these drawings. It should be understood that the purposes of these illustrated embodiments are only provided to those skilled in the art to practice the application, and not intended to limit the scope of the present disclosure. Unless obviously obtained from the context or the context illustrates otherwise, the same numeral in the drawings refers to the same structure or operation.

[0052] As used in the disclosure and the appended claims, the singular forms "a," "an," and "the" may include plural referents unless the content clearly dictates otherwise. In general, the terms "comprise" and "include" merely prompt to include steps and elements that have been clearly identified, and these steps and elements do not constitute an exclusive listing. The methods or devices may also include other steps or elements. The term "based on" is "based at least in part on." The term "one embodiment" means "at least one embodiment;" the term "another embodiment" means "at least one other

embodiment." Related definitions of other terms will be given in the description below. In the following, without loss of generality, the description of "player", "loud speaking component", "loudspeaker device" or "loudspeaker component" may be used when describing a related technology of sound conduction in the present disclosure. This description is only a form of sound conduction application. For those skilled in the art, "player", "playing device", "loud speaking component", "loudspeaker device" or "hearing aid" may also be replaced with other similar words. In fact, various implementations in the present disclosure may be easily applied to other non-speaker component hearing devices. For example, for those skilled in the art, after understanding the basic principle of the loud speaking component, it may be possible to make various modifications and changes in the form and details of the specific methods and operations of implementing the loud speaking component without departing from the principles. In particular, an environmental sound collection and processing function may be added to the loud speaking component to implement the function of a hearing aid. For example, in the case of using a bone conduction loud speaking component, adding a microphone that may pick up the sound of a user/wearer's surrounding environment, processing the sound using a certain algorithm and transmit the processed sound (or generated electrical signal) to a loud speaking component of eyeglasses. That is, the bone conduction loud speaking component may be modified to include the function of collecting the environmental sound, and after a certain signal processing, the sound may be transmitted to the user/wearer via the bone conduction loud speaking component, thereby implementing the function of the bone conductive hearing aid. As an example, the algorithm mentioned herein may include noise cancellation, automatic gain control, acoustic feedback suppression, wide dynamic range compression, active environment recognition, active noise reduction, directional processing, tinnitus processing, multi-channel wide dynamic range compression, active howling suppression, volume control, or the like, or any combination thereof.

[0053] FIG.1 is a flowchart illustrating an exemplary process for generating auditory sense through a loudspeaker apparatus according to some embodiments of the present disclosure. The loudspeaker apparatus may transfer sound to an auditory system through bone conduction or air conduction by a built-in loudspeaker, thereby generating an auditory sense. As shown in FIG.1, the process for generating the auditory sense through the loudspeaker apparatus may include operations 101-104.

[0054] In 101, the loudspeaker apparatus may acquire or generate a signal (also referred to as a "sound signal") containing sound information. In some embodiments, the sound information may refer to a video file or an audio file with a specific data format. The sound information may refer to data or files that may be converted to be sound through specific approaches. In some embodiments, the signal containing the sound information may be obtained from a storage unit of a loudspeaker apparatus itself. In some embodiments, the signal containing the sound information may be obtained from an information generation system, a storage system, or a delivery system other than the loudspeaker apparatus. The signal containing the sound information may be not limited to an electrical signal, and may also include other forms of signals other than the electrical signal, such as an optical signal, a magnetic signal, and a mechanical signal, or the like. In principle, as long as the signal includes information that may be used to generate sounds by loudspeaker apparatus, the signal may be processed as the sound signal. In some embodiments, the sound signal may not be limited to one signal source, and it may come from a plurality of signal sources. The plurality of signal sources may be independent of or dependent on each other. In some embodiments, manners of generating or transmitting the sound signal may be wired or wireless and may be real-time or time-delayed. For example, the loudspeaker apparatus may receive an electrical signal containing sound information via a wired or wireless connection or may obtain data directly from a storage medium and generate a sound signal. Taking bone conduction technology as an example, components with sound collection function may be added to a bone conductive loudspeaker. The bone

conductive loudspeaker may pick up sound from ambient environment and convert mechanical vibration of the sound into an electrical signal. Further, the electrical signal may be processed through an amplifier to meet special requirements. The wired connection may be realized by using including but not limited to metal cables, optical cables, or hybrid cables of metal and optical, such as coaxial cables, communication cables, flexible cables, spiral cables, non-metal sheathed cables, metal sheathed cables, multi-core cables, twisted pair cables, ribbon cables, shielded cables, telecommunications cables, double-stranded cables, parallel twin-core wires, and twisted pairs. Examples described above are only used for illustration purposes. The wired connection may also be realized by using other types of transmission carriers, such as transmission carriers for electrical or optical signal.

[0055] The storage device or storage unit mentioned herein may include a direct attached storage, a network attached storage, a storage area network, and other storage systems. The storage device may include but is not limited to common types of storage devices such as a solid-state storage device (a solid-state drive, a solid-state hybrid hard drive, etc.), a mechanical hard drive, a USB flash drive, a memory stick, a storage card (e.g., CF, SD, etc.), and other drives (e.g., CD, DVD, HD DVD, Blu-ray, etc.), a random access memory (RAM), a read-only memory (ROM), etc. The RAM may include but is not limited to a decimal counter, a selection tube, a delay line memory, a Williams tube, a dynamic random access memory (DRAM), a static random access memory (SRAM), a thyristor random access memory (T-RAM), a zero capacitive random access memory (Z-RAM), etc. The ROM may include but is not limited to a magnetic bubble memory, a magnetic button line memory, a thin film memory, a magnetic plating line memory, a magnetic core memory, a drum memory, an optical disk driver, a hard disk, a magnetic tape, an early non-volatile memory(NVRAM), a phase change memory, a magneto-resistive random access memory, a ferroelectric random access memory, a non-volatile SRAM, a flash memory, an electronically erasable rewritable read-only memory, an erasable programmable read-only

memory, a programmable read-only memory, a shielded heap read memory, a floating connection gate random access memory, a nano random access memory, a racetrack memory, a variable resistance memory, a programmable metallization unit, etc. The storage device/storage unit mentioned above are only used for illustration purposes. The storage medium used in the storage device/storage is not limited.

[0056] In 102, the loudspeaker apparatus may convert the signal containing sound information into vibrations to generate a sound. The loudspeaker apparatus may use a specific transducer to convert the signal into mechanical vibrations accompanying with energy conversion. The conversion process may include multiple types of energy coexistence and conversion. For example, the electrical signal may be directly converted into mechanical vibrations by the transducers to generate a sound. As another example, the sound information may be included in an optical signal, which may be converted into mechanical vibrations by a specific transducer. Other types of energy that may be coexisted and converted when the transducer works may include thermal energy, magnetic field energy, or the like. In some embodiments, an energy conversion manner of the transducer may include but is not limited to, a moving coil type, an electrostatic type, a piezoelectric type, a moving iron type, a pneumatic type, an electromagnetic type, or the like. A frequency response range and sound quality of the loudspeaker apparatus may be affected by the energy conversion manner and a property of each physical component of the transducer. For example, in a transducer with the moving coil type, a wound cylindrical coil is connected to a vibration plate, the coil driven by a signal current drives the vibration plate to vibrate in the magnetic field, and generate a sound. Factors, such as material expansion and contraction, folds deformation, size, shape, and fixed manner of the vibration plate, the magnetic density of the permanent magnet, etc., may have a large impact on the sound quality of the loudspeaker apparatus.

[0057] The term "sound quality" used herein may indicate the quality of sound, which refers to an audio fidelity after post-processing, transmission, or the like. In an audio

device, the sound quality may include audio intensity and magnitude, audio frequency, audio overtone, or harmonic components, or the like. When the sound quality is evaluated, measuring manner and the evaluation criteria for objectively evaluating the sound quality may be used, other manners that combine different elements of sound and subjective feelings for evaluating various properties of the sound quality may also be used. Thus, the sound quality may be affected during the processes of generating the sound, transmitting the sound, and receiving the sound.

[0058] In 103, the sound is delivered by a delivery system. In some embodiments, the delivery system refers to a substance that can deliver vibration signals containing sound information, such as the skull, bony labyrinth, inner ear lymph, and spiral organs of humans or/and animals with auditory systems. As another example, the delivery system also refers to a medium that may transmit sound (e.g., air and liquid). To illustrate the process of transmitting sound information by the delivery system, a bone conductive loudspeaker may be taken as an example. The bone conductive loudspeaker may directly transmit sound waves (vibration signals) converted from electrical signals to an auditory center through bones. In addition, the sound waves may be transmitted to the auditory center through air conduction. For the content of air conduction, please refer to the description elsewhere in the specification.

[0059] In 104, the sound information is transferred to a sensing terminal. Specifically, the sound information is transmitted to the sensing terminal through the delivery system. In a working scenario, the loudspeaker apparatus picks up or generates a signal containing sound information, converts the sound information into a sound vibration by the transducer. The loudspeaker apparatus transmits the sound to the sensing terminal through the delivery system, and finally a user can hear the sound. Generally, the subject of the sensing terminal, the auditory system, the sensory organ, etc. described above may be a human or an animal with an auditory system. It should be noted that the following description of the loudspeaker apparatus used by a human does not constitute a restriction

on the use scene of the loudspeaker apparatus, and similar descriptions may also be applied to other animals.

[0060] The above description of the process of the loudspeaker apparatus is only a specific example and should not be regarded as the only feasible implementation. Obviously, for persons having ordinary skills in the art, after understanding the basic principle of the loudspeaker apparatus, various modifications and changes may be made in the form and details to the specific ways and steps of implementing the loudspeaker apparatus without departing from the principle. However, those modifications and changes are still within the scope of the present disclosure. For example, between acquiring a signal containing sound information in operation 101 and generating sound in operation 102, a signal correction or enhancement step may be additionally added, which may enhance or modify the signal acquired in operation 101 according to a specific algorithm or parameter. Furthermore, between generating sound in operation 102 and transmitting sound in operation 103, an enhancement or a correction step of the vibration may be additionally added.

[0061] The loudspeaker apparatus in the specification of the present disclosure may include, but is not limited to, an earphone, an MP3 player, and a hearing aid. In the following specific embodiments of the present disclosure, an MP3 player is taken as an example to describe the loudspeaker apparatus in detail. FIG. 2 is an exploded structural diagram of an MP3 player according to some embodiments of the present disclosure. FIG. 3 is a partial structural diagram of an ear hook in an MP3 player according to some embodiments of the present disclosure. FIG. 4 is an enlarged view of part A in FIG. 3. As shown in FIG. 1, in some embodiments, an MP3 player may include an ear hook 10, a core housing 20, a circuit housing 30, a rear hook 40, an earphone core 50, a control circuit 60, and a battery 70. The core housing 20 and the circuit housing 30 are arranged at two ends of the ear hook 10 respectively, and the rear hook 40 is further arranged at an end of the circuit housing 30 away from the ear hook 10. The number of the core housings 20 is

two, which are used to accommodate two earphone cores 50 respectively. The number of the circuit housings 30 is also two, which are used to accommodate the control circuit 60 and the battery 70 respectively. The two ends of the rear hook 40 are connected to the corresponding circuit housings 30 respectively. The ear hook 10 refers to a structure surrounding and supporting a user's ear when the user wears a bone conductive MP3 player, and then suspending and fixing the core housing 20 and the earphone core 50 at a predetermined position of the user's ear.

[0062] Combining FIG. 2, FIG. 3, and FIG. 4, in some embodiments, the ear hook 10 may include an elastic metal wire 11, a wire 12, a fixed sleeve 13, a plug end 14, and a plug end 15. The plug end 14 and the plug end 15 may be arranged at both ends of the elastic metal wire 11. In some embodiments, the ear hook 10 may further include a protective sleeve 16 and a housing sheath 17 integrally formed with the protective sleeve 16. The elastic metal wire 11 is mainly used to keep the ear hook 10 in a shape that matches the user's ear. The elastic metal wire 11 has a certain elasticity, so as to generate a certain elastic deformation according to the user's ear shape and head shape to adapt to users with different ear shapes and head shapes. In some embodiments, the elastic metal wire 11 may be made of a memory alloy, which has good deformation recovery ability. Thus, even if the ear hook 10 is deformed by an external force, it may still be restored to its original shape when the external force is removed, and continue to be used by users, thereby extending the life of the MP3 player. In other embodiments, the elastic metal wire 11 may also be made of a non-memory alloy. The wire 12 may be used for electrical connection with the earphone core 50, the control circuit 60, the battery 70, etc. for power supply and data transmission for the operation of the earphone core 50.

[0063] The fixed sleeve 13 may be used to fix the wire 12 on the elastic metal wire 11. In this embodiment, there are at least two fixed sleeves 13. The at least two fixed sleeves 13 may be spaced apart along the elastic metal wire 11 and the wire 12, and arranged on

the outer periphery of the wire 12 and the elastic metal wire 11 by wrapping to fix the wire 12 on the elastic metal wire 11.

[0064] In some embodiments, the plug end 14 and the plug end 15 may be made of hard materials, such as plastic. In some embodiments, the plug end 14 and the plug end 15 may be formed respectively on both ends of the elastic metal wire 11 by injection molding. In some embodiments, the plug end 14 and the plug end 15 may be formed by injection molding separately. Connection holes to connect with the end of the elastic metal wire 11 are respectively reserved during the injection molding of the plug end 14 and the plug end 15. After the injection molding is completed, the plug end 14 and the plug end 15 may be inserted into the corresponding ends of the elastic metal wire 11 respectively by the connection holes or fixed by bonding.

[0065] It should be noted that, in this embodiment, the plug end 14 and the plug end 15 may not be directly formed by injection molding on the periphery of the wire 12, which avoids the wire 12 during injection molding. Specifically, when the plug end 14 and the plug end 15 are injection molded, the wire 12 located at both ends of the elastic metal wire 11 may be fixed to be far away from the position of the plug end 14 and the plug end 15. Further, a first wiring channel 141 and a second wiring channel 151 may be arranged respectively on the plug 14 and the plug end 15 to extend the wire 12 along the first wiring channel 141 and the second wiring channel 151 after the injection molding. Specifically, the wire 12 may be threaded into the first wiring channel 141 and the second wiring channel 151 in a threading way after the first wiring channel 141 and the second wiring channel 151 are formed. In some embodiments, the plug end 14 and the plug end 15 may be directly injection molded on the periphery of the wire 12 according to actual conditions, which is not specifically limited herein.

[0066] In some embodiments, the first wiring channel 141 may include a first wiring groove 1411 and a first wiring hole 1412 connecting with the first wiring groove 1411. The first wiring groove 1411 may be connected with the sidewall of the plug end 14. One end of

the first wiring hole 1412 may be connected with one end of the first wiring groove 1411 and another end of the first wiring hole 1412 may be connected with the outer end surface of the plug end 14. The wire 12 at the plug end 14 may extend along the first wiring groove 1411 and the first wiring hole 1412 and be exposed on the outer end surface of the plug end 14 to further connect with other structures.

[0067] In some embodiments, the second wiring channel 151 may include a second wiring groove 1511 and a second wiring hole 1512 connecting with the second wiring groove 1511. The second wiring groove 1511 may be connected with the sidewall of the plug end 15, one end of the second wiring hole 1512 may be connected with one end of the second wiring groove 1511, and another end of the second wiring hole 1512 may be connected with the outer end surface of the plug end 15. The wire 12 at the plug end 15 may extend along the second wiring groove 1511 and the second wiring hole 1512 and be exposed on the outer end surface of the plug end 15 to further connect to other structures.

[0068] In some embodiments, the outer end surface of the plug end 14 refers to the surface of the end of the plug end 14 away from the plug end 15. The outer end surface of the plug end 15 refers to the surface of the end of the plug end 15 away from the plug end 14.

[0069] In some embodiments, the protective sleeve 16 may be injection molded around periphery of the elastic metal wire 11, the wire 12, the fixed sleeve 13, the plug end 14, and the plug end 15. Thus, the protective sleeve 16 may be fixedly connected with the elastic metal wire 11, the wire 12, the fixed sleeve 13, the plug end 14, and the plug end 15 respectively. There is no need to form the protective sleeve 16 separately by injection molding and then further wrap protective sleeve 16 around the periphery of the elastic metal wire 11, the plug end 14, and the plug end 15. It may simplify the manufacturing and assembly processes and make the fixation of the protective sleeve 16 more reliable and stable.

[0070] In some embodiments, when the protective sleeve 16 is formed, a housing sheath 17 disposed on the side close to the plug end 15 may be integrally formed with the protective sleeve 16. In some embodiments, the housing sheath 17 may be integrally formed with the protective sleeve 16 to form a whole structure. The circuit housing 30 may be connected to one end of the ear hook 10 by being fixedly connected to the plug end 15. The housing sheath 17 may be further wrapped around the periphery of the circuit housing 30 in a sleeved manner.

[0071] Specifically, when manufacturing the ear hook 10 of the MP3 player, the following steps may be implemented.

[0072] Step S101, the fixed sleeve 13 may be used to fix the wire 12 on the elastic metal wire 11. An injection position is reserved at both ends of the elastic metal wire 11. Specifically, the elastic metal wire 11 and the wire 12 may be placed side by side in a preset way, and then the fixed sleeve 13 is further sleeved around the wire 12 and the elastic metal wire 11, so as to fix the wire 12 on the elastic metal wire 11. Since the two ends of the elastic metal wire 11 still need the injection molded plug end 14 and the plug end 15, the two ends of the elastic metal wire 11 may not be completely wrapped by the fixed sleeve 13. A corresponding injection position needs to be reserved for injection molding of the plug end 14 and the plug end 15.

[0073] Step S102, the plug end 14 and the plug end 15 may be injection molded at the injection positions of the two ends of the elastic metal wire 11, respectively. The first wiring channel 141 and the second wiring channel 151 are arranged on the plug end 14 and the plug end 15, respectively.

[0074] Step S103, the wire 12 may be arranged to extend along the first wiring channel 141 and the second wiring channel 151. Specifically, after the forming of the plug end 14 and the plug end 15 is completed, the two ends of the wire 12 may be further threaded into the first wiring channel 141 and the second wiring channel 151 manually or by a machine.

The part of the wire 12 located between the first wiring channel 141 and the second wiring channel 151 may be fixed on the elastic metal wire 11 by the fixed sleeve 13.

[0075] Step S104, the protective sleeve 16 may be formed by injection molding on the periphery of the elastic metal wire 11, the wire 12, the fixed sleeve 13, the plug end 14, and the plug end 15.

[0076] In some embodiments, when step S104 is performed, the housing sheath 17 may be integrally formed with the protective sleeve 16 on the periphery of the plug end 15 by injection molding.

[0077] In some embodiments, it should be noted that the wire 12 may not be arranged when the fixed sleeve 13 is installed. The wire 12 may be further arranged after the plug end 14 and the plug end 15 are injection molded. The specific steps are as follows.

[0078] Step S201, the fixed sleeve 13 may be sleeved on the elastic metal wire 11. The injection molding positions may be reserved at both ends of the elastic metal wire 11.

[0079] Step S202, the plug end 14 and the plug end 15 may be injection molded at the injection positions of the two ends of the elastic metal wire 11, respectively. The first wiring channel 141 and the second wiring channel 151 may be arranged on the plug end 14 and the plug end 15, respectively.

[0080] Step S203, the wire 12 may be threaded inside the fixed sleeve 13, so as to use the fixed sleeve 13 to fix the wire 12 on the elastic metal wire 11. Further, the wire 12 may be arranged to extend along the first wiring channel 141 and the second wiring channel 151.

[0081] It should be noted that, in this way, interference of the wire 12 may be avoided during injection molding of the plug end 14 and the plug end 15, so as to facilitate the smooth progress of molding.

[0082] It should be noted that the structure, function, and formation of the elastic metal wire 11, the wire 12, the fixed sleeve 13, the plug end 14, the plug end 15, and the protective sleeve 16 involved in the embodiment set forth above are the same as those in

the foregoing embodiment, and for related details, please refer to the foregoing embodiment, which are not repeated herein.

[0083] In some embodiments, the core housing 20 may be used to accommodate the earphone core 50 and may be plugged and fixed with the plug end 14. The number of the earphone cores 50 and the core housings 20 are both two, corresponding to the left ear and the right ear of the user, respectively.

[0084] In some embodiments, the core housing 20 and the plug end 14 may be connected by plugging, clamping, etc., so as to fix the core housing 20 and the ear hook 10 together. That is, in this embodiment, the ear hook 10 and the core housing 20 may be formed separately first, and then be assembled together, instead of directly forming the two together.

[0085] In this way, the ear hook 10 and the core housing 20 may be molded separately with corresponding molds instead of using the same larger-sized mold to form the two integrally, which may reduce the size of the mold and the difficulty of mold process. In addition, since the ear hook 10 and the core housing 20 are processed by different molds, when the shape or structure of the ear hook 10 or the core housing 20 needs to be adjusted in the manufacturing process, it is sufficient to adjust the mold corresponding to the structure instead of adjusting the mold of another structure, so as to reduce the cost of production. In other embodiments, the ear hook 10 and the core housing 20 may be integrally formed according to the situation.

[0086] In some embodiments, the core housing 20 may be arranged with a socket 22 connecting with the outer end surface 21 of the core housing 20. The outer end surface 21 of the core housing 20 refers to the end surface of the core housing 20 facing the ear hook 10. The socket 22 provides an accommodating space for the plug end 14 of the ear hook 10 to be inserted into the core housing 20, so as to further realize the plug and fixation between the plug end 14 and the core housing 20.

[0087] FIG. 5 is a partial sectional view of an MP3 player according to some embodiments of the present disclosure. FIG. 6 is a partial enlarged view of part B in FIG. 5.

[0088] Combining FIG. 2, FIG. 5, and FIG. 6, in some embodiments, the plug end 14 may include an inserting portion 142 and two elastic hooks 143. Specifically, the inserting portion 142 may be at least partially inserted into the socket 22 and abut against the outer side surface 231 of a stopping block 23. The shape of the outer sidewall of the inserting portion 142 matches the shape of the inner sidewall of the socket 22, so that the outer sidewall of the inserting portion 142 may abut against the inner sidewall of the socket 22 when the inserting portion 142 is at least partially inserted into the socket 22.

[0089] The outer side surface 231 of the stopping block 23 refers to a side of the stopping block 23 facing the ear hook 10. The inserting portion 142 may further include an end surface 1421 facing the core housing 20. The end surface 1421 may match the outer side surface 231 of the stopping block 23, so that the end surface 1421 of the inserting portion 142 may abut against the outer side surface 231 of the stopping block 23 when the inserting portion 142 is at least partially inserted into the socket 22.

[0090] In some embodiments, the two elastic hooks 143 may be arranged side by side and spaced apart symmetrically on the side of the inserting portion 142 facing the inside of the core housing 20 along the direction of insertion. The two elastic hooks 143 may be brought together under action of external thrust and the stopping block 23. After passing through the stopping block 23, the two elastic hooks 143 may be elastically restored to be stuck on an inner surface of the stopping block 23 to realize the fixation of the core housing 20 and the plug end 14. Each elastic hook 143 may include a beam portion 1431 and a hook portion 1432. The beam portion 1431 may be connected to the side of the inserting portion 142 facing the core housing 20. The hook portion 1432 may be arranged on the beam portion 1431 away from the inserting portion 142 and extend perpendicular to the inserted direction. Each hook portion 1432 may be arranged with a side parallel to the inserted direction and a transitional slope 14321 away from the inserting portion 142.

[0091] In some embodiments, after the core housing 20 and the plug end 14 are plugged and fixed, the inserting portion 142 may be partially inserted into the socket 22. The exposed portion of the inserting portion 142 may be arranged in a stepped manner, so as to form an annular table surfaces 1422 spaced apart from the outer end surface 21 of the core housing 20. The exposed portion of the inserting portion 142 refers to the portion of the inserting portion 142 exposed to the core housing 20. Specifically, the exposed portion of the inserting portion 142 refers to the portion exposed to the core housing 20 and close to the outer end surface of the core housing 20.

[0092] In some embodiments, the annular table surface 1422 may be arranged opposite to the outer end surface 21 of the core housing 20. The spacing between the two may refer to the spacing along the direction of insertion and the spacing perpendicular to the direction of insertion.

[0093] In some embodiments, the protective sleeve 16 may extend to the side of the annular table surface 1422 facing the outer end surface 21 of the core housing 20. When the socket 22 and the plug end 14 of the core housing 20 is plugged and fixed, the protective sleeve 16 may be at least partially filled in the space between the annular table surface 1422 and the outer end surface 21 of the core housing 20, and elastically abut against the core housing 20. Thus, it is difficult for external liquid to enter the inside of the core housing 20 from the junction between the plug end 14 and the core housing 20, thereby realizing the sealing between the plug end 14 and the socket 22, protecting the earphone core 50, etc. inside the core housing 20, and improving the waterproof effect of the bone conductive MP3 player.

[0094] Specifically, in some embodiments, the protective sleeve 16 forms an annular abutting surface 161 on the outer end surface 21 of the annular table surface 1422 facing the outer end surface of the core housing 20. The annular abutting surface 161 may be the end surface of the protective sleeve 16 facing the core housing 20.

[0095] In some embodiments, the protective sleeve 16 may further include an annular boss 162 locating inside the annular abutting surface 161 and protruding from the annular abutting surface 161. Specifically, the annular boss 162 may be formed on the side of the annular abutting surface 161 facing the plug end 14, and be protrudingly arranged toward the core housing 20 relative to the annular abutting surface 161. Further, the annular boss 162 may also be directly formed on the periphery of the annular table surface 1422 and cover the annular table surface 1422.

[0096] In some embodiments, the core housing 20 may include a connecting slope 24 for connecting the outer end surface 21 of the core housing 20 and the inner sidewall of the socket 22. The connecting slope 24 may be the transitional surface between the outer end surface 21 of the core housing 20 and the inner sidewall of the socket 22. The connecting slope 24 may be not on the same plane as the outer end surface 21 of the core housing 20 and the inner sidewall of the socket 22. In some embodiments, the connecting slope 24 may be a flat surface, or may also be a curved surface or other shapes according to actual requirements, there is no specific limitation herein.

[0097] Specifically, when the core housing 20 and the plug end 14 are plugged and fixed, the annular abutting surface 161 and the annular boss 162 may elastically abut against the outer end surface of the core housing 20 and the connecting slope 24, respectively. It should be noted that since the outer end surface 21 of the core housing 20 and the connecting slope 24 are not on the same plane, the elastic abutment between the protective sleeve 16 and the core housing 20 may be not on the same plane. Thus, it is difficult for external liquid to enter the core housing 20 from the junction of the protective sleeve 16 and the core housing 20, and further enter the earphone core 50, so as to improve the waterproof effect of the MP3 player, protect the inner functional structure, and extend the lifetime of the MP3 player.

[0098] In some embodiments, the inserting portion 142 may be further formed with an annular groove 1423 adjacent to the annular table surface 1422 on the side of the annular

table surface 1422 facing the outer end surface 21 of the core housing 20. The annular boss 162 may be formed in the annular groove 1423.

[0099] In some embodiments, an end of the wire 12 of the ear hook 10 arranged outside the core housing 20 may pass through the second wiring channel 151 to connect the circuits outside the core housing 20, such as the control circuit 60, the battery 70, etc. included in the circuit housing 30. Another end of the wire 12 may be exposed to the outer end surface of the plug end 14 along the first wiring channel 141, and further enter the core housing 20 through the socket 22 along with the inserting portion 142.

[0100] FIG. 7 is a partial structural diagram of the core housing according to some embodiments of the present disclosure. FIG. 8 is a partial enlarged view of part D in FIG. 7. FIG. 9 is a partial sectional view of a core housing according to some embodiments of the present disclosure.

[0101] Combing FIG. 2, FIG. 7, FIG. 8, and FIG. 9, in some embodiments, the core housing 20 may include a main housing 25 and a partition component 26. The partition component 26 may be arranged inside the main housing 25 and connected to the main housing 25, so as to divide the inner space 27 of the main housing 25 into a first accommodating space 271 and a second accommodating space 272 on the side close to the socket 22. In some embodiments, the main housing 25 may include a peripheral sidewall 251 and a bottom wall 252 connected to one end surface of the peripheral sidewall 251. The peripheral sidewall 251 and the bottom wall 252 jointly form the inner space 27 of the main housing.

[0102] The partition component 26 may be arranged on the side of the main housing 25 close to the socket 22 and include a side partition 261 and a bottom partition 262. The side partition 261 may be arranged in a direction perpendicular to the bottom wall 252 and both ends of the side partition 261 may be connected with the peripheral sidewall 251, thereby separating the inner space 27 of the main housing 25. The bottom partition 262 and the bottom wall 252 may be parallel or nearly parallel and spaced apart. Further, the

bottom partition 262 and the bottom wall 252 may be connected to the peripheral side wall 251 and the side partition 261, respectively. Thus, the inner space 27 formed by the main housing 25 may be divided into two to form the first accommodating space 271 surrounded by the side partition 261, the bottom partition 262, the peripheral sidewall 251 away from the socket 22, and the bottom wall 252, and the second accommodating space 272 surrounded by the bottom partition 262, the side partition 261, and the peripheral sidewall 251 close to the socket 22. The second accommodating space 272 may be smaller than the first accommodating space 271. The partition component 26 may also divide the inner space 27 of the main housing 25 by other arrangements, which are not specifically limited herein.

[0103] In some embodiments, the earphone core may include a functional component 51 that may be arranged in the first accommodating space 271 and used for vibrating and generating sound. In some embodiments, the MP3 player may further include a wire 80 connected to the functional component 51. An end of the wire 80 may be extended from the first accommodating space 271 to the second accommodating space 272.

[0104] In some embodiments, the side partition 261 may be arranged with a wiring groove 2611 at the top edge away from the bottom wall 252. The wiring groove 2611 may connect the first accommodation space 271 and the second accommodation space 272. Further, an end of the wire 12 away from the functional component may extend into the second accommodating space 272 through the wire groove 2611.

[0105] After the end of the wire 12 away from the circuit housing 30 entering the core housing 20 with the inserting portion 142, the end of the wire 12 may further extend into the second accommodating space 272 and be electrically connected to the wire 80 in the second accommodating space 272, so that a wire path connecting the first accommodating space 271 to an external circuit through the second accommodating space 272 may be formed. Thus, the functional component 51 may be electrically connected to the external circuit arranged outside the core housing 20 through the wire path.

[0106] In some embodiments, the bottom partition 262 may also be arranged with a wiring hole 2621, which connects the socket 22 with the second accommodating space 272, so that the wire 12 entering the core housing from the socket 22 may extend to the second accommodating space 272 through the wiring hole 2621.

[0107] The wire 12 and the wire 80 may be coiled and arranged in the second accommodating space 272 after being connected in the second accommodating space 272. Specifically, the wire 12 and the wire 80 may be connected together by welding. Further, the functional component 51 may be electrically connected to the external circuit, so as to provide power for the normal operation of the functional component 51 through the external circuit or transmit data to the earphone core 50.

[0108] It should be noted that when assembling the bone conductive MP3 player, the wire is often longer than the actual requirement to facilitate assembly. However, if the extra wires of the earphone core 50 may not be placed reasonably, it is easy to vibrate and make abnormal noises when the functional component 51 is working, thereby reducing the sound quality of the bone conductive MP3 player and affecting the user's experience of listening. In this embodiment, the second accommodating space 272 may be separated from the inner space 27 formed by the main housing 25 of the core housing 20 and used for accommodating extra wires 12 and wires 80, so as to avoid or reduce the influence of the extra wires on the sound generated by the bone conductive MP3 player due to vibration, thereby improving the sound quality.

[0109] In some embodiments, the partition component 26 may further include an inner partition 263. The inner partition 263 may further divide the second accommodating space 272 into two sub-accommodating spaces 2721. Specifically, the inner partition 263 may be arranged perpendicular to the bottom wall 252 of the main housing 25 and connected to the side partition 261 and the peripheral sidewall 251 respectively, and further extend to the wiring hole 2621, so as to divide the wiring hole 2621 into two, while dividing the second accommodating space 272 into two sub-accommodating spaces 2721. Each

of the two wiring holes 2621 may be connected with a corresponding sub-accommodating space 2721 respectively.

[0110] In this embodiment, there are two wires 12 and two wires 80. The two wires 12 may extend into respective sub-accommodating spaces 2721 along the corresponding wiring holes 2621 respectively. The two wires 80 may enter the second accommodating space 272 through the wiring groove 2611 together, separate after entering the second accommodating space 272, be welded with the corresponding wires 12 in the corresponding sub-accommodating spaces 2721 respectively, and further be coiled and arranged in the corresponding sub-accommodating space 2721.

[0111] In some embodiments, the second accommodating space 272 may be further filled with sealant. In this way, the wire 12 and the wire 80 included in the second accommodating space 272 may be further fixed, which may reduce the adverse effect on the sound quality caused by the vibration of the wire, improve the sound quality of the bone conductive MP3 player, and protect the welding point between the wire 12 and the wire 80. In addition, the purpose of waterproof and dustproof may also be achieved by sealing the second accommodating space 272.

[0112] Referring to FIG. 2 and FIG. 3, in some embodiments, the circuit housing 30 and the plug end 15 may be plugged and fixed, so that the circuit housing 30 may be fixed to the end of the ear hook 10 away from the core housing 20. When worn by the user, the circuit housing 30 including the battery 70 and the circuit housing 30 including the control circuit 60 may correspond to the left and right side of the user, respectively. The way of plug and connection of the circuit housing 30 and the control circuit 60 may be different from the corresponding plug end 15.

[0113] Specifically, the circuit housing 30 may be connected to the plug end 15 through plug and connection, snap connection, or the like. In other words, in this embodiment, the ear hook 10 and the circuit housing 30 may be formed separately, and then be assembled after the form is completed, instead of directly forming the two together.

[0114] In this way, the ear hook 10 and the circuit housing 30 may be molded separately with respective corresponding molds, instead of using the same larger-sized mold to form the two integrally, which may reduce the size of the molding mold and the difficulty of mold process. In addition, since the ear hook 10 and the circuit housing 30 are processed by different molds, when the shape or structure of the ear hook 10 or the circuit housing 30 needs to be adjusted in the manufacturing process, it is sufficient to adjust the mold corresponding to the structure. There is no need to adjust the mold corresponding to another structure, so as to reduce the cost of production.

[0115] In some embodiments, the circuit housing 30 may be arranged with a socket 31. The shape of the inner surface of the socket 31 may match the shape of at least part of the outer end surface of the plug end 15, so that the plug end 15 may be at least partially inserted into the socket 31.

[0116] Further, a slot 152 perpendicular to the inserted direction of the plug end 15 with respect to the socket 31 may be arranged on opposite sides of the plug end 15, respectively. Specifically, the two slots 152 may be symmetric and spaced apart on opposite sides of the plug end 15, and both are connected to the sidewall of the plug end 15 in the vertical direction along the inserted direction.

[0117] Referring to FIG. 2, the circuit housing 30 may be flat. For example, the cross-section of the circuit housing 30 at the second socket 31 may be elliptical or other shapes that may be flattened. In this embodiment, the two opposite sidewalls of the circuit housing 30 with a larger area are main sidewalls 33 and the two opposite sidewalls with a smaller area connecting the two main sidewalls 33 are auxiliary sidewalls 34.

[0118] It should be noted that the above description of the MP3 player is only a specific example and should not be regarded as the only feasible implementation solution. Obviously, for those skilled in the art, after understanding the basic principles of the MP3 player, various modifications and changes in forms and details of the specific methods and steps for implementing the MP3 player may be made without departing from the principles.

However, those modifications and changes are still within the scope described above. For example, the number of the fixed sleeves 13 is not limited to the at least two described in the embodiments set forth above. The number of the fixed sleeves 13 may also be one, which may be specifically determined according to actual requirements. As another example, the shape of the cross-section of the circuit housing 30 at the socket 31 is not limited to be elliptical. The shape of the cross-section may also be other shapes, such as a triangle, a quadrilateral, a pentagon, and other polygons. Such modifications are all within the protection scope of the present disclosure.

[0119] For illustration purposes, the bone conduction speaker is taken as an example of the loudspeaker apparatus. FIG. 10 is a longitudinal sectional view illustrating a bone conduction speaker according to some embodiments of the present disclosure. It should be noted that the bone conduction speaker 200 in FIG. 10 corresponds to the core housing 20 and the earphone core 50 in FIG. 2. The housing 220 corresponds to the core housing 20, and the multiple components in the housing 220 correspond to the earphone core 50. As shown in FIG. 10, in some embodiments, the bone conduction speaker 200 may include a magnetic circuit component 210, a coil 212, a vibration transmission plate 214, a connector 216, and an housing 220.

[0120] In some embodiments, the housing 220 may include a housing panel 222, a housing back panel 224, and a housing side panel 226. The housing back panel 224 may be located on the side opposite to the housing panel 222 and may be arranged on the two ends of the housing side panel 226, respectively. The housing panel 222, the housing back panel 224, and the housing side panel 226 may form an integral structure with a certain accommodation space. In some embodiments, the magnetic circuit component 210, the coil 212, and the vibration transmission plate 214 may be fixed inside the housing 220. In some embodiments, the bone conduction speaker 200 may further include a housing bracket 228. The vibration transmission plate 214 may be connected to the housing 220 by the housing bracket 228, and the coil 212 may be fixed on the housing bracket 228 and may drive the housing 220 to vibrate by the housing bracket 228. In some embodiments, the housing bracket 228 may be a part of the housing 220, or may be a separate component, directly or

indirectly connected to the inside of the housing 220. In some embodiments, the housing bracket 228 may be fixed on the inner surface of the housing side panel 226. In some embodiments, the housing bracket 228 may be pasted on the housing 220 by glue, or may be fixed on the housing 220 by stamping, injection molding, clamping, riveting, threaded connecting or welding.

[0121] In some embodiments, it is possible to design the connection mode of the housing panel 222, the housing back panel 224, and the housing side panel 226 to ensure that the housing 220 has large rigidity. For example, the housing panel 222, the housing back panel 224, and the housing side panel 226 may be integrally formed. As another example, the housing back panel 224 and the housing side panel 226 may be an integral structure. The housing panel 222 and the housing side panel 226 may be directly pasted and fixed by glue, or fixed by clamping, welding, or threaded connecting. The glue may be glue with strong viscosity and high hardness. As another example, the housing panel 222 and the housing side panel 226 may be an integral structure, the housing back panel 224 and the housing side panel 226 may be directly pasted and fixed by glue, or may be fixed by clamping, welding, or threaded connecting. In some embodiments, the housing panel 222, the housing back panel 224, and the housing side panel 226 may be all independent components, which may be fixed by one or a combination of glue, clamping, welding, or threaded connecting. For example, the housing panel 222 and the housing side panel 226 may be connected by glue, the housing back panel 224 and the housing side panel 226 may be connected by clamping, welding, or threaded connecting. As another example, the housing back panel 224 and the housing side panel 226 may be connected by glue, the housing panel 222 and the housing side panel 226 may be connected by clamping, welding, or threaded connecting.

[0122] In different application scenarios, the housing illustrated in the present disclosure may be made by different assembly techniques. For example, as described elsewhere in the present disclosure, the housing may be integrally formed, and may also be formed in a separate combination manner, or a combination thereof. In the separate combination manner, different components may be fixed by glue, or fixed by clamping, welding, or threaded connecting. Specifically, in order to better understand the assembly technique of the housing of the bone conduction earphone in the present disclosure, FIGs. 11-13 describe

several examples of the assembly technique of the housing.

[0123] As shown in FIG. 11, a bone conduction speaker may mainly include a magnetic circuit component 2210 and a housing. In some embodiments, the magnetic circuit component 2210 may include a first magnetic unit 2202, a first magnetically conductive unit 2204, and a second magnetically conductive unit 2206. The housing may include a housing panel 2222, a housing back panel 2224, and a housing side panel 2226. The housing side panel 2226 and the housing back panel 2224 may be made in an integral manner, and the housing panel 2222 may be connected to one end of the housing side panel 2226 in a split combination manner. The split combination manner includes fixing with glue, or fixing the housing panel 2222 to one end of the housing side panel 2226 by means of clamping, welding, or threaded connecting. The housing panel 2222 and the housing side panel 2226 (or the housing back panel 2224) may be made of different, the same, or partially the same materials. In some embodiments, the housing panel 2222 and the housing side panel 2226 may be made of the same material, and Young's modulus of the same material is greater than 2000 MPa. More preferably, Young's modulus of the same material is greater than 4000 MPa. More preferably, Young's modulus of the same material is greater than 6000 MPa. More preferably, Young's modulus of the material of the housing 220 is greater than 8000 MPa. More preferably, Young's modulus of the same material is greater than 12000 MPa. More preferably, Young's modulus of the same material is greater than 15000 MPa, and further preferably, Young's modulus of the same material is greater than 18000 MPa. In some embodiments, the housing panel 2222 and the housing side panel 2226 may be made of different materials, and Young's modulus of the different materials are greater than 4000 MPa. More preferably, Young's modulus of the different materials are greater than 6000 MPa. More preferably, Young's modulus of the different materials are greater than 8000 MPa. More preferably, Young's modulus of the different materials are greater than 12000 MPa. More preferably, Young's modulus of the different materials are greater than 15000 MPa. Further preferably, Young's modulus of the different materials are greater than 18000 MPa. In some embodiments, the material of the housing panel 2222 and/or the housing side panel 2226 includes but is not limited to AcrYlonitrile butadiene stYrene (ABS), PolYstYrene (PS), high High impact polYstYrene (HIPS), PolYpropYlene (PP), PolYethYlene terephthalate (PET), PolYester (PES), PolYcarbonate (PC)), PolYamides (PA), PolYvinYl

chloride (PVC), PolYurethanes (PU), PolYvinYlidene chloride (PVC), PolYethYlene (PE), PolYmethYl methacrYlate (PMMA), PolYetheretherketone (PEEK), Phenolics (PF), Urea-formaldehYde (UF), Melamine-formaldehYde (MF), metals, alloy (such as aluminum alloy, chromium-molybdenum steel, scandium alloy, magnesium alloy, titanium alloy, magnesium-lithium alloy, nickel alloy, etc.), glass fiber or carbon fiber, or the like, or any combination thereof. In some embodiments, the material of the housing panel 2222 is glass fiber, carbon fiber, PolYcarbonate (PC), PolYamides (PA), or the like, or any combination thereof. In some embodiments, the material of the housing panel 2222 and/or the housing side panel 2226 may be made by mixing carbon fiber and polycarbonate (PC) in a certain proportion. In some embodiments, the material of the housing panel 2222 and/or the housing side panel 2226 may be made by mixing carbon fiber, glass fiber, and PolYcarbonate (PC) in a certain proportion. In some embodiments, the material of the housing panel 2222 and/or the housing side panel 2226 may be made by mixing glass fiber and PolYcarbonate (PC) in a certain proportion, or it may be made by mixing glass fiber and PolYamides (PA) in a certain proportion.

[0124] In some embodiments, the housing panel 2222, the housing back panel 2224, and the housing side panel 2226 may form an integral structure with a certain accommodation space. In the integral structure, the vibration transmission plate 2214 may be connected to the magnetic circuit component 2210 by the connector 2216. The two ends of the magnetic circuit component 2210 may be connected to the first magnetically conductive unit 2204 and the second magnetically conductive unit 2206, respectively. The vibration transmission plate 2214 may be fixed inside the integral structure by the housing bracket 2228. In some embodiments, the housing side panel 2226 may have a stepped structure for supporting the housing bracket 2228. After the housing bracket 2228 is fixed on the housing side panel 2226, the housing panel 2222 may be fixed on the housing bracket 2228 and the housing side panel 2226 at the same time, or separately fixed on the housing bracket 2228 or the housing side panel 2226. Under the circumstances, optionally, the housing side panel 2226 and the housing bracket 2228 may be integrally formed. In some embodiments, the housing bracket 2228 may be directly fixed on the housing panel 2222 (for example, by glue, clamping, welding, threaded connecting, etc.). The fixed housing panel 2222 and housing bracket 2228 may be then fixed to the housing side panel (for example, by glue, clamping,

welding, threaded connecting, etc.). Under the circumstances, optionally, the housing bracket 2228 and the housing panel 2222 may be integrally formed.

[0125] In another specific embodiment, as shown in FIG. 12, the bone conduction speaker may mainly include a magnetic circuit component 2240 and a housing. The magnetic circuit component 2240 may include a first magnetic unit 2232, a first magnetically conductive unit 2234, and a second magnetically conductive unit 2236. In the integral structure, a vibration transmission plate 2244 may be connected to the magnetic circuit component 2240 by a connector 2246. This embodiment is different from the embodiment provided in FIG. 11 in that the housing bracket 2258 and the housing side panel 2256 may be integrally formed. The housing panel 2252 may be fixed to an end of the housing side panel 2256 connected to the housing bracket 2258 (for example, by glue, clamping, welding, threaded connecting, etc.), and the housing back 2254 may be fixed to the other end of the housing side panel 2256 (for example, by glue, clamping, welding, threaded connecting, etc.). Under the circumstances, optionally, the housing bracket 2258 and the housing side panel 2256 may be splitable and combined structures. The housing panel 2252, the housing back panel 2254, the housing bracket 2258, and the housing side panel 2256 may be all fixedly connected by glue, clamping, welding, threaded connecting, etc.

[0126] In another specific embodiment, as shown in FIG. 13, the bone conduction speaker in the embodiment may mainly include a magnetic circuit component 2270 and a housing. The magnetic circuit component 2270 may include a first magnetic unit 2262, a first magnetically conductive unit 2264, and a second magnetically conductive unit 2266. In the integral structure, a vibration transmission plate 2274 may be connected to the magnetic circuit component 2270 by a connector 2276. The difference between this embodiment and the embodiment provided in FIG. 12 is that the housing panel 2282 and the housing side panel 2286 may be integrally formed. The housing back panel 2284 may be fixed on an end of the housing side panel 2286 opposite to the housing side panel 2282 (for example, by glue, clamping, welding, threaded connecting, etc.). The housing bracket 2288 may be fixed on the housing panel 2282 and/or the housing side 2286 by glue, clamping, welding, or threaded connecting. Under the circumstances, optionally, the housing bracket 2288, the housing panel 2282, and the housing side panel 2286 may be integrally formed.

[0127] FIG. 14 is a structural diagram illustrating a housing of a bone conduction speaker

according to some embodiments of the present disclosure. As shown in FIG. 14, the housing 700 may include a housing panel 710, a housing back panel 720, and a housing side panel 730. The housing panel 710 may be in contact with the human body and transmits the vibration of the bone conduction speaker to the auditory nerve of the human body. In some embodiments, when the overall rigidity of the housing 700 is relatively large, the vibration amplitudes and phases of the housing panel 710 and the housing back panel 720 keep the same or substantially the same (the housing side panel 730 does not compress air and therefore does not generate sound leakage) within a certain frequency range, so that a first leaked sound signal generated by the housing panel 710 and a second leaked sound signal generated by the housing back panel 720 may be superimposed on each other. The superposition may reduce the amplitude of the first leaked sound wave or the second leaked sound wave, thereby achieving the purpose of reducing the sound leakage of the housing 700. In some embodiments, the certain frequency range includes at least the portion with a frequency greater than 500 Hz. Preferably, the certain frequency range includes at least the portion with a frequency greater than 600 Hz. Preferably, the certain frequency range includes at least the portion with a frequency greater than 800 Hz. Preferably, the certain frequency range includes at least the portion with a frequency greater than 1000 Hz. Preferably, the certain frequency range includes at least the portion with a frequency greater than 2000 Hz. More preferably, the certain frequency range includes at least the portion with a frequency greater than 5000 Hz. More preferably, the certain frequency range includes at least the portion with a frequency greater than 8000 Hz. Further preferably, the certain frequency range includes at least the portion with a frequency greater than 10000 Hz.

[0128] In some embodiments, the rigidity of the housing of the bone conduction speaker may affect the vibration amplitudes and phases of different parts of the housing (for example, the housing panel, the housing back panel, and/or the housing side panel), thereby affecting the sound leakage of the bone conduction speaker. In some embodiments, when the housing of the bone conduction speaker has a relatively large rigidity, the housing panel and the housing back panel may keep the same or substantially the same vibration amplitude and phase at higher frequencies, thereby significantly reducing the sound leakage of the bone conduction earphone.

[0129] In some embodiments, the higher frequency may include a frequency not less than

1000 Hz, for example, a frequency between 1000 Hz and 2000 Hz, a frequency between 1100 Hz and 2000 Hz, a frequency between 1300 Hz and 2000 Hz, a frequency between 1500 Hz and 2000 Hz, a frequency between 1700Hz-2000Hz, a frequency between 1900Hz-2000Hz. Preferably, the higher frequency mentioned herein may include a frequency not less than 2000 Hz, for example, a frequency between 2000 Hz and 3000 Hz, a frequency between 2100 Hz and 3000 Hz, a frequency between 2300 Hz and 3000 Hz, a frequency between 2500 Hz and 3000 Hz, a frequency between 2700Hz-3000Hz, or a frequency between 2900Hz-3000Hz. Preferably, the higher frequency may include a frequency not less than 4000 Hz, for example, a frequency between 4000 Hz and 5000 Hz, a frequency between 4100 Hz and 5000 Hz, a frequency between 4300 Hz and 5000 Hz, a frequency between 4500 Hz and 5000 Hz, a frequency between 4700 Hz and 5000Hz, or a frequency between 4900Hz-5000Hz. More preferably, the higher frequency may include a frequency not less than 6000 Hz, for example, a frequency between 6000 Hz and 8000 Hz, a frequency between 6100 Hz and 8000 Hz, a frequency between 6300 Hz and 8000 Hz, a frequency between 6500 Hz and 8000 Hz, a frequency between 7000Hz-8000Hz, a frequency between 7500Hz-8000Hz, or a frequency between 7900Hz-8000Hz. More preferably, the higher frequency may include a frequency not less than 8000Hz, for example, a frequency between 8000Hz-12000Hz, a frequency between 8100Hz-12000Hz, a frequency between 8300Hz-12000Hz, a frequency between 8500Hz-12000Hz, a frequency between 9000Hz-12000Hz, a frequency between 10000Hz-12000Hz, or a frequency between 11000Hz-12000Hz.

[0130] Keeping vibration amplitudes of the housing panel and the housing back panel the same or substantially the same refers that a ratio of the vibration amplitudes of the housing panel and the housing back panel is within a certain range. For example, the ratio of the vibration amplitudes of the housing panel and the housing back panel is between 0.3 and 3. Preferably, the ratio of the vibration amplitudes of the housing panel and the housing back panel is between 0.4 and 2.5. Preferably, the ratio of the vibration amplitudes of the housing panel and the housing back panel is between 0.4 and 2.5. Preferably, the ratio of the vibration amplitudes of the housing panel and the housing back panel is between 0.5 and 1.5. More preferably, the ratio of the vibration amplitudes of the housing panel and the housing back panel is between 0.6 and 1.4. More preferably, the ratio of the vibration amplitudes of the housing panel and the housing back panel is between 0.7 and 1.2. More

preferably, the ratio of the vibration amplitudes of the housing panel and the housing back panel is between 0.75 and 1.15. More preferably, the ratio of the vibration amplitudes of the housing panel and the housing back panel is between 0.8 and 1.1. More preferably, the ratio of the vibration amplitudes of the housing panel and the housing back panel is between 0.85 and 1.1. More preferably, the ratio of the vibration amplitudes of the housing panel and the housing back panel is between 0.9 and 1.05. In some embodiments, the vibrations of the housing panel and the housing back panel may be represented by other physical quantities that can characterize the vibration amplitude. For example, sound pressures generated by the housing panel and the housing back panel at a point in the space may be used to represent the vibration amplitudes of the housing panel and the housing back panel.

[0131] Keeping the vibration phases of the housing panel and the housing back panel the same or substantially the same refers that a difference between the vibration phases of the housing panel and the housing back panel is within a certain range. For example, the difference between the vibration phases of the housing panel and the housing back panel is between -90° and 90°. Preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -80° and 80°. Preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -60° and 60°. Preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -45° and 45°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -30° and 30°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -20° and 20°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -15° and 15°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -12° and 12°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -10° and 10°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -8° and 8°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -6° and 6°. More preferably, the difference between the vibration phases of the

housing panel and the housing back panel is between -5° and 5°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -4° and 4°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -3° and 3°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -2° and 2°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is between -1° and 1°. More preferably, the difference between the vibration phases of the housing panel and the housing back panel is 0°.

[0132] It should be noted that the illustration of the bone conduction speaker is only a specific example and should not be regarded as the only feasible implementation. Obviously, for those skilled in the art, after understanding the basic principle of the bone conduction speaker, it may be possible to make various modifications and changes in the forms and details of the specific methods and operations of implementing the bone conduction speaker without departing from the principles, but these modifications and changes are still within the scope of the present discloure. For example, the housing side panel, the housing back panel, and the housing bracket may be an integral structure. Such deformations are all within the protection scope of the present disclosure.

[0133] FIG. 15 is a longitudinal sectional view illustrating a loudspeaker apparatus according to some embodiments of the present disclosure. As shown in Figure 15, the speaker may include a first magnetic unit 1502, a first magnetically conductive unit 1504, a second magnetically conductive unit 1506, a first vibration plate 1508, a voice coil 1510, a second vibration plate 1512, and a vibration panel 1514. As used herein, some units of the earphone core of the loudspeaker apparatus may correspond to the magnetic circuit component. In some embodiments, the magnetic circuit component may include the first magnetic unit 1502, the first magnetically conductive unit 1504, and the second magnetically conductive unit 1506. The magnetic circuit component may generate a first

full magnetic field (also referred to "total magnetic field of the magnetic circuit component" or "first magnetic field").

[0134] The magnetic unit described in the present disclosure may refer to a unit that may generate a magnetic field, such as a magnet. The magnetic unit may have a magnetization direction. The magnetization direction may refer to a direction of a magnetic field inside the magnetic unit. In some embodiments, the first magnetic unit 302 may include one or more magnets. The first magnetic unit may generate a second magnetic field. In some embodiments, the magnet may include a metal alloy magnet, ferrite, or the like. The metal alloy magnet may include neodymium iron boron, samarium cobalt, aluminum nickel cobalt, iron chromium cobalt, aluminum iron boron, iron carbon aluminum, or the like, or any combination thereof. Ferrite may include barium ferrite, steel ferrite, manganese ferrite, lithium manganese ferrite, or the like, or any combination thereof.

[0135] In some embodiments, a lower surface of the first magnetically conductive unit 1504 may be connected to an upper surface of the first magnetic unit 1502. The second magnetically conductive unit 1506 may be connected to the first magnetic unit 1502. It should be noted that the magnetically conductive unit herein may also refer to a magnetic field concentrator or an iron core. The magnetically conductive unit may adjust a distribution of a magnetic field (e.g., a second magnetic field generated by the first magnetic unit 1502). The magnetically conductive unit may include a unit made of a soft magnetic material. In some embodiments, the soft magnetic material may include metal materials, metal alloys, metal oxide materials, amorphous metal materials, etc., such as iron, iron-silicon alloys, iron-aluminum alloys, nickel-iron alloys, iron-cobalt series alloys, low carbon steel, silicon steel sheet, silicon steel sheet, ferrite, etc. In some embodiments, the magnetically conductive unit may be processed by casting, plastic processing, cutting processing, powder metallurgy, or the like, or any combination thereof. The casting may include sand casting, investment casting, pressure casting, centrifugal

casting, etc. The plastic processing may include rolling, casting, forging, stamping, extrusion, drawing, or the like, or any combination thereof. The cutting processing may include turning, milling, planing, grinding, or the like. In some embodiments, the processing method of the magnetically conductive unit may include 3D printing, CNC machine tools, or the like. A connection manner between the first magnetically conductive unit 1504, the second magnetically conductive unit 1506, and the first magnetic unit 1502 may include bonding, snapping, welding, riveting, bolting, or the like, or any combination thereof. In some embodiments, the first magnetic unit 1502, the first magnetically conductive unit 1504, and the second magnetically conductive unit 1506 may be disposed as an axisymmetric structure. The axisymmetric structure may be a ring structure, a columnar structure, or other axisymmetric structures.

[0136] In some embodiments, a magnetic gap may form between the first magnetic unit 1502 and the second magnetically conductive unit 1506. The voice coil 1510 may be disposed in the magnetic gap. The voice coil 1510 may be connected to the first vibration plate 1508. The first vibration plate 1508 may be connected to the second vibration plate 1512. The second vibration plate 1512 may be connected to the vibration panel 1514. When a current is passed into the voice coil 1510, the voice coil 1510 may be located in a magnetic field formed by the first magnetic unit 1502, the first magnetically conductive unit 1504, and the second magnetically conductive unit 1506, and applied to an ampere force. The ampere force may drive the voice coil 1510 to vibrate, and the vibration of the voice coil 1510 may drive the vibration of the first vibration plate 1508, the second vibration plate 1512, and the vibration panel 1514. The vibration panel 1514 may transmit the vibration to auditory nerves through tissues and bones, so that a person may hear a sound. The vibration panel 1514 may be in direct contact with human skins, or contact with the skins through a vibration transmission layer made of a specific material.

[0137] In some embodiments, for a loudspeaker apparatus with a single magnetic unit, magnetic induction line(s) passing through the voice coil may not be uniform and divergent.

At the same time, magnetic leakage may form in the magnetic circuit. That is, more magnetic induction lines may leak outside the magnetic gap and fail to pass through the voice coil. As a result, a magnetic induction strength (or magnetic field strength) at the position of the voice coil may decrease, which may affect the sensitivity of the loudspeaker apparatus. Therefore, the loudspeaker apparatus may further include at least one second magnetic unit and/or at least one third magnetically conductive unit (not shown in figures). The at least one second magnetic unit and/or at least one third magnetically conductive unit may suppress the leakage of the magnetic induction lines and restrict the shape of the magnetic induction lines passing through the voice coil. Therefore, more magnetic induction lines may pass through the voice coil as horizontally and densely as possible to increase the magnetic induction strength (or magnetic field strength) at the position of the voice coil, thereby increasing the sensitivity of the loudspeaker apparatus, and further improving the mechanical conversion efficiency of the loudspeaker apparatus (i.e., the efficiency of converting the input power of the loudspeaker apparatus into the mechanical energy of the vibration of the voice coil).

[0138] FIG. 16 is a longitudinal sectional view illustrating a magnetic circuit component 2100 according to some embodiments of the present disclosure. As shown in FIG. 16, the magnetic circuit component 2100 may include a first magnetic unit 2102, a first magnetically conductive unit 2104, a second magnetically conductive unit 2106, and a second magnetic unit 2108. In some embodiments, the first magnetic unit 2102 and/or the second magnetic unit 2108 may include any one or more magnets described in the present disclosure. In some embodiments, the first magnetic unit 2102 may include a first magnet, and the second magnetic unit 2108 may include a second magnet. The first magnet may be the same as or different from the second magnet. The first magnetically conductive unit 2104 and/or the second magnetically conductive unit 2106 may include any one or more magnetically conductive materials described in the present disclosure. The processing manner of the first magnetically conductive unit 2104 and/or the second

magnetically conductive unit 2106 may include any one or more processing manners described in the present disclosure. In some embodiments, the first magnetic unit 2102 and/or the first magnetically conductive unit 2104 may be disposed as an axisymmetric structure. For example, the first magnetic unit 2102 and/or the first magnetically conductive unit 2104 may be a cylinder, a cuboid, or a hollow ring (e.g., the cross-section is a shape of the runway). In some embodiments, the first magnetic unit 2102 and the first magnetically conductive unit 2104 may be coaxial cylinders with the same or different diameters. In some embodiments, the second magnetically conductive unit 2106 may be a groove-type structure. The groove-type structure may include a U-shaped section (as shown in FIG. 15). The groove-type second magnetically conductive unit 2106 may include a bottom plate and a side wall. In some embodiments, the bottom plate and the side wall may be integrally formed as a whole. For example, the side wall may be formed by extending the bottom plate in a direction perpendicular to the bottom plate. In some embodiments, the bottom plate may be connected to the side wall through any one or more connection manners described in the present disclosure. The second magnetic unit 2108 may be disposed as a ring shape or a sheet shape. In some embodiments, the second magnetic unit 2108 may be the ring shape. The second magnetic unit 2108 may include an inner ring and an outer ring. In some embodiments, the shape of the inner ring and/or the outer ring may be a ring, an ellipse, a triangle, a quadrangle, or any other polygons. In some embodiments, the second magnetic unit 2108 may be formed by arranging a number of magnets. Both ends of any one of the number of magnets may be connected to or have a certain distance from both ends of an adjacent magnet. The spacing between the magnets may be the same or different. In some embodiments, the second magnetic unit 2108 may be formed by arranging two or three sheet-shaped magnets equidistantly. The shape of the sheet-shaped magnet may be fan-shaped, a quadrangular shape, or the like. In some embodiments, the second magnetic unit 2108 may be coaxial with the first magnetic unit 2102 and/or the first magnetically conductive unit 2104.

[0139] In some embodiments, the upper surface of the first magnetic unit 2102 may be connected to the lower surface of the first magnetically conductive unit 2104. The lower surface of the first magnetic unit 2102 may be connected to the bottom plate of the second magnetically conductive unit 306. The lower surface of the second magnetic unit 2108 may be connected to the side wall of the second magnetically conductive unit 2106. The connection manners between the first magnetic unit 2102, the first magnetically conductive unit 2104, the second magnetically conductive unit 2106, and/or the second magnetic unit 2108 may include bonding, snapping, welding, riveting, bolting, or the like, or any combination thereof.

[0140] In some embodiments, a magnetic gap may be formed between the first magnetic unit 2102 and/or the first magnetically conductive unit 2104 and the inner ring of the second magnetic unit 2108. A voice coil 2128 may be disposed in the magnetic gap. In some embodiments, heights of the second magnetic unit 2108 and the voice coil 2128 relative to the bottom plate of the second magnetically conductive unit 2106 may be equal. In some embodiments, the first magnetic unit 2102, the first magnetically conductive unit 2104, the second magnetically conductive unit 2106, and the second magnetic unit 2108 may form a magnetic circuit. In some embodiments, the magnetic circuit component 2100 may generate a first full magnetic field (also referred to "total magnetic field of magnetic circuit component" or "first magnetic field"). The first magnetic unit 2102 may generate a second magnetic field. The first full magnetic field may be formed by magnetic fields generated by all components (e.g., the first magnetic unit 2102, the first magnetically conductive unit 2104, the second magnetically conductive unit 2106, and the second magnetic unit 2108) in the magnetic circuit component 2100. The magnetic field strength of the first full magnetic field in the magnetic gap (also referred to as magnetic induction strength or magnetic flux density) may be greater than the magnetic field strength of the second magnetic field in the magnetic gap. In some embodiments, the second magnetic unit 2108 may generate a third magnetic field. The third magnetic field may increase the

magnetic field strength of the first full magnetic field in the magnetic gap. The third magnetic field increasing the magnetic field strength of the first full magnetic field herein may mean that the magnetic strength of the first full magnetic field in the magnetic gap when the third magnetic field exists (i.e., the second magnetic unit 2108 exists) may be greater than that of the first full magnetic field when the third magnetic field does not exist (i.e., the second magnetic unit 2108 does not exist). In other embodiments of the specification, unless otherwise specified, the magnetic circuit component may mean a structure including all magnetic units and magnetically conductive units. The first full magnetic field may represent the magnetic field generated by the magnetic circuit component as a whole. The second magnetic field, the third magnetic field, ..., and the N-th magnetic field may respectively represent the magnetic fields generated by the corresponding magnetic units. In different embodiments, the magnetic unit that generates the second magnetic field (the third magnetic field, ..., or the N-th magnetic field) may be the same or different.

[0141] In some embodiments, an included angle between a magnetization direction of the first magnetic unit 2102 and a magnetization direction of the second magnetic unit 2108 may be between 0 degrees and 180 degrees. In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2102 and the magnetization direction of the second magnetic unit 2108 may be between 45 degrees and 135 degrees. In some embodiments, the induced angle between the magnetization direction of the first magnetic unit 2102 and the magnetization direction of the second magnetic unit 2108 may be equal to or greater than 90 degrees. In some embodiments, the magnetization direction of the first magnetic unit 2102 may be perpendicular to the lower surface or the upper surface of the first magnetic unit 302 and be vertically upward (as shown by the direction a in the figure). The magnetization direction of the second magnetic unit 2108 may be directed from the inner ring of the second magnetic unit 2108 to the outer ring (as shown by the direction b on the right side of the first magnetic unit 2102 in the figure, the

magnetization direction of the first magnetic unit 2102 may deflect 90 degrees in a clockwise direction).

[0142] In some embodiments, at the position of the second magnetic unit 2108, an included angle between the direction of the first full magnetic field and the magnetization direction of the second magnetic unit 2108 may not be greater than 90 degrees. In some embodiments, at the position of the second magnetic unit 2108, the included angle between the direction of the magnetic field generated by the first magnetic unit 2102 and the direction of the magnetization of the second magnetic unit 2108 may be less than or equal to 90 degrees, such as 0 degrees, 10 degrees, 20 degrees, or the like.

[0143] Compared with a magnetic circuit component with a single magnetic unit, the second magnetic unit 2108 may increase the total magnetic flux in the magnetic gap of the magnetic circuit component 2100, thereby increasing the magnetic induction intensity in the magnetic gap. And, under the action of the second magnetic unit 2108, originally scattered magnetic induction lines may converge to the position of the magnetic gap, further increasing the magnetic induction intensity in the magnetic gap.

[0144] FIG.17 is a longitudinal sectional view illustrating a magnetic circuit component 2600 according to some embodiments of the present disclosure. As shown in FIG. 17, different from the magnetic circuit component 2100, the magnetic circuit component 2600 may further include at least one electrically conductive unit (e.g., a first electrically conductive unit 2118, a second electrically conductive unit 2120, and a third electrically conductive unit 2122).

[0145] The electrically conductive unit may include a metal material, a metal alloy material, an inorganic non-metal material, or other conductive materials. The metal material may include gold, silver, copper, aluminum, etc. The metal alloy material may include an iron-based alloy, an aluminum-based alloy material, a copper-based alloys, a zinc-based alloys, etc. The inorganic non-metal material may include graphite, etc. The electrically conductive unit may be a sheet shape, a ring shape, a mesh shape, or the like.

The first electrically conductive unit 2118 may be disposed on an upper surface of the first magnetically conductive unit 2104. The second electrically conductive unit 2120 may be connected to the first magnetic unit 2102 and the second magnetically conductive unit 2106. The third electrically conductive unit 2122 may be connected to a side wall of the first magnetic unit 2102. In some embodiments, the first magnetically conductive unit 2104 may protrude from the first magnetic unit 2102 to form a first concave portion. The third electrically conductive unit 2122 may be disposed on the first concave portion. In some embodiments, the first electrically conductive unit 2118, the second electrically conductive unit 2120, and the third electrically conductive unit 2122 may include the same or different conductive materials. The first electrically conductive unit 2118, the second electrically conductive unit 2120, and the third electrically conductive unit 2122 may be respectively connected to the first magnetically conductive unit 2104, the second magnetically conductive unit 2106 and/or the first magnetic unit 2102 through any one or more connection manners described in the present disclosure.

[0146] A magnetic gap may be formed between the first magnetic unit 2102, the first magnetically conductive unit 2104, and the inner ring of the second magnetic unit 2108. A voice coil 2128 may be disposed in the magnetic gap. The first magnetic unit 2102, the first magnetically conductive unit 2104, the second magnetically conductive unit 2106, and the second magnetic unit 2108 may form a magnetic circuit. In some embodiments, the electrically conductive unit may reduce an inductive reactance of the voice coil 2128. For example, if a first alternating current flows through the voice coil 2128, a first alternating induced magnetic field may be generated near the voice coil 2128. Under the action of the magnetic field in the magnetic circuit, the first alternating induced magnetic field may cause the inductive reactance of the voice coil 2128 and hinder the movement of the voice coil 2128. When an electrically conductive unit (e.g., the first electrically conductive unit 2118, the second electrically conductive unit 2120, and the third electrically conductive unit 2122) is disposed near the voice coil 2128, the electrically conductive unit may induce a

second alternating current under the action of the first alternating induced magnetic field. A third alternating current in the electrically conductive unit may generate a second alternating induced magnetic field near the third alternating current. The second alternating induction magnetic field may be opposite to the first alternating induction magnetic field, and weaken the first alternating induction magnetic field, thereby reducing the inductive reactance of the voice coil 2128, increasing the current in the voice coil, and improving the sensitivity of the speaker.

[0147] FIG.18 is a longitudinal sectional view illustrating a magnetic circuit component 2700 according to some embodiments of the present disclosure. As shown in FIG. 18, different from the magnetic circuit component 2500, the magnetic circuit component 2700 may further include a third magnetic unit 2110, a fourth magnetic unit 2112, a fifth magnetic unit 2114, a third magnetically conductive unit 2116, a sixth magnetic unit 2124, and a seventh magnetic unit 2126. The third magnetic unit 2110, the fourth magnetic unit 2112, the fifth magnetic unit 2114, the third magnetically conductive unit 2116 and/or the sixth magnetic unit 2124, and the seventh magnetic unit 2126 may be disposed as coaxial ring cylinders.

[0148] In some embodiments, an upper surface of the second magnetic unit 2108 may be connected to the seventh magnetic unit 2126. A lower surface of the second magnetic unit 2108 may be connected to the third magnetic unit 2110. The third magnetic unit 2110 may be connected to the second magnetically conductive unit 2106. An upper surface of the seventh magnetic unit 2126 may be connected to the third magnetically conductive unit 2116. The fourth magnetic unit 2112 may be connected to the second magnetically conductive unit 2106 and the first magnetic unit 2102. The sixth magnetic unit 2124 may be connected to the fifth magnetic unit 2114, the third magnetically conductive unit 2116, and the seventh magnetic unit 2126. In some embodiments, the first magnetic unit 2102, the first magnetically conductive unit 2104, the sixth magnetic unit 2124, the second magnetically conductive unit 2106, the second magnetic unit 2108, the third magnetic unit

2110, the fourth magnetic unit 2112, the fifth magnetic unit 2114, the third magnetically conductive unit 2116, and the seventh magnetic unit 2126 may form a magnetic circuit and a magnetic gap.

[0149] In some embodiments, an included angle between a magnetization direction of the first magnetic unit 2102 and a magnetization direction of the sixth magnetic unit 2124 may be between 0 degrees and 180 degrees. In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2102 and the magnetization direction of the sixth magnetic unit 2124 may be between 45 degrees and 135 degrees. In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2102 and the magnetization direction of the sixth magnetic unit 2124 may not be higher than 90 degrees. In some embodiments, the magnetization direction of the first magnetic unit 2102 may be perpendicular to a lower surface or an upper surface of the first magnetic unit 2102 and be vertically upward (as shown by the direction a in the figure). The magnetization direction of the sixth magnetic unit 2124 may be directed from an outer ring of the sixth magnetic unit 2124 to an inner ring (as shown by the direction g on the right side of the first magnetic unit 2102 in the figure, the magnetization direction of the first magnetic unit 2102 may deflect 270 degrees in a clockwise direction). In some embodiments, the magnetization direction of the sixth magnetic unit 2124 may be the same as that of the fourth magnetic unit 2112 in the same vertical direction.

[0150] In some embodiments, at the position of the sixth magnetic unit 2124, an included angle between the direction of the magnetic field generated by the magnetic circuit component 2700 and the magnetization direction of the sixth magnetic unit 2124 may not be higher than 90 degrees. In some embodiments, at the position of the sixth magnetic unit 2124, the included angle between the direction of the magnetic field generated by the first magnetic unit 2102 and the magnetized direction of the sixth magnetic unit 2124 may be less than or equal to 90 degrees, such as 0 degrees, 10 degrees, or 20 degrees.

[0151] In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2102 and the magnetization direction of the seventh magnetic unit 2126 may be between 0 degrees and 180 degrees. In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2102 and the magnetization direction of the seventh magnetic unit 2126 may be between 45 degrees and 135 degrees. In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2102 and the magnetization direction of the seventh magnetic unit 2126 may not be higher than 90 degrees. In some embodiments, the magnetization direction of the first magnetic unit 2102 may be perpendicular to a lower surface or an upper surface of the first magnetic unit 2102 and be vertically upward (as shown by the direction a in the figure). The magnetization direction of the seventh magnetic unit 2126 may be directed from the lower surface of the seventh magnetic unit 2126 to the upper surface (as shown in the direction f on the right side of the first magnetic unit 2102 in the figure, the magnetization direction of the first magnetic unit 2102 may deflect 360 degrees in a clockwise direction). In some embodiments, the magnetization direction of the seventh magnetic unit 2126 may be opposite to that of the third magnetic unit 2110.

[0152] In some embodiments, at the position of the seventh magnetic unit 2126, the included angle between the direction of the magnetic field generated by magnetic circuit component 2700 and the direction of magnetization of the seventh magnetic unit 2126 may not be higher than 90 degrees. In some embodiments, at the position of the seventh magnetic unit 2126, the included angle between the direction of the magnetic field generated by the first magnetic unit 2102 and the magnetized direction of the seventh magnetic unit 2126 may be less than or equal to 90 degrees, such as 0 degrees, 10 degrees, or 20 degrees.

[0153] In the magnetic circuit component 2700, the third magnetically conductive unit 2116 may close the magnetic circuit generated by the magnetic circuit component 2700, so that

more magnetic induction lines may be concentrated in the magnetic gap, thereby implementing the effect of suppressing the magnetic leakage, increasing the magnetic induction strength in the magnetic gap, and improving the sensitivity of the loudspeaker apparatus.

[0154] FIG.19 is a longitudinal sectional view illustrating a magnetic circuit component 2900 according to some embodiments of the present disclosure. As shown in FIG. 19, the magnetic circuit component 2900 may include a first magnetic unit 2902, a first magnetically conductive unit 2904, a first full magnetic field changing unit 2906, and a second magnetic unit 2908.

[0155] An upper surface of the first magnetic unit 2902 may be connected to a lower surface of the first magnetically conductive unit 2904. The second magnetic unit 2908 may be connected to the first magnetic unit 2902 and the first full magnetic field changing unit 2906. The connection manners between the first magnetic unit 2902, the first magnetically conductive unit 2904, the first full magnetic field changing unit 2906, and/or the second magnetic unit 2908 may be based on any one or more connection manners described in the present disclosure. In some embodiments, the first magnetic unit 2902, the first magnetically conductive unit 2904, the first full magnetic field changing unit 2906, and/or the second magnetic unit 2908 may form a magnetic circuit and a magnetic gap.

[0156] In some embodiments, the magnetic circuit component 2900 may generate a first full magnetic field. The first magnetic unit 2902 may generate a second magnetic field. A magnetic field intensity of the first full magnetic field in the magnetic gap may be greater than the magnetic field intensity of the second magnetic field in the magnetic gap. In some embodiments, the second magnetic unit 2908 may generate a third magnetic field. The third magnetic field may increase a magnetic field strength of the second magnetic field in the magnetic gap.

[0157] In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2902 and the magnetization direction of the second magnetic unit

2908 may be between 0 degrees and 180 degrees. In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2902 and the magnetization direction of the second magnetic unit 2908 may be between 45 degrees and 135 degrees. In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2902 and the magnetization direction of the second magnetic unit 2908 may not be higher than 90 degrees.

[0158] In some embodiments, at the position of the second magnetic unit 2908, the included angle between a direction of the first full magnetic field and the magnetization direction of the second magnetic unit 2908 may not be higher than 90 degrees. In some embodiments, at the position of the second magnetic unit 2908, the included angle between the direction of the magnetic field generated by the first magnetic unit 2902 and the direction of magnetization of the second magnetic unit 2908 may be a less than or equal to 90 degrees, such as 0 degrees, 10 degrees, or 20 degrees. As another example, the magnetization direction of the first magnetic unit 2902 may be perpendicular to the lower surface or the upper surface of the first magnetic unit 2902 and be vertically upward (as shown by the direction a in the figure). The magnetization direction of the second magnetic unit 2908 may be directed from the outer ring of the second magnetic unit 2908 to the inner ring (as shown by the direction c on the right side of the first magnetic unit 2902 in the figure, the magnetization direction of the first magnetic unit 2902 may deflect 270 degrees in a clockwise direction).

[0159] Compared with a magnetic circuit component with a single magnetic unit, the first full magnetic field changing unit 2906 in the magnetic circuit component 2900 may increase the total magnetic flux in the magnetic gap, thereby increasing the magnetic induction intensity in the magnetic gap. And, under the action of the first full magnetic field changing unit 2906, originally scattered magnetic induction lines may converge to the position of the magnetic gap, further increasing the magnetic induction intensity in the magnetic gap.

[0160] FIG.20 is a longitudinal sectional view illustrating a magnetic circuit component 3000 according to some embodiments of the present disclosure. As shown in FIG. 20, in some embodiments, the magnetic circuit component 3000 may include the first magnetic unit 2902, a first magnetically conductive unit 2904, a first full magnetic field changing unit 2906, a second magnetic unit 2908, a third magnetic unit 2910, a fourth magnetic unit 2912, a fifth magnetic unit 2916, a sixth magnetic unit 2918, a seventh magnetic unit 2920, and a second ring unit 2922. In some embodiments, the first full magnetic field changing unit 2906 and/or the second ring unit 2922 may include a ring-shaped magnetic unit or a ring-shaped magnetically conductive unit. The ring-shaped magnetic unit may include any one or more magnetic materials described in the present disclosure. The ring-shaped magnetically conductive unit may include any one or more magnetically conductive materials described in the present disclosure.

[0161] In some embodiments, the sixth magnetic unit 2918 may be connected to the fifth magnetic unit 2916 and the second ring unit 2922. The seventh magnetic unit 2920 may be connected to the third magnetic unit 2910 and the second ring unit 2922. In some embodiments, the first magnetic unit 2902, the fifth magnetic unit 2916, the second magnetic unit 2908, the third magnetic unit 2910, the fourth magnetic unit 2912, the sixth magnetic unit 2918, and/or the seventh magnetic unit 2920, the first magnetically conductive unit 2904, the first full magnetic field changing unit 2906, and the second ring unit 2922 may form a magnetic circuit.

[0162] In some embodiments, an included angle between the magnetization direction of the first magnetic unit 2902 and a magnetization direction of the sixth magnetic unit 2918 may be between 0 degrees and 180 degrees. In some embodiments, the angle between the magnetization direction of the first magnetic unit 2902 and the magnetization direction of the sixth magnetic unit 2918 may be between 45 degrees and 135 degrees. In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2902 and the magnetization direction of the sixth magnetic unit 2918 may not be

higher than 90 degrees. In some embodiments, the magnetization direction of the first magnetic unit 2902 may be perpendicular to the lower surface or the upper surface of the first magnetic unit 2902 and be vertically upward (as shown by the direction a in the figure). The magnetization direction of the sixth magnetic unit 2918 may be directed from an outer ring of the sixth magnetic unit 2918 to an inner ring (as shown by the direction f on a right side of the first magnetic unit 2902 in the figure, the magnetization direction of the first magnetic unit 2902 may deflect 270 degrees in a clockwise direction). In some embodiments, in the same vertical direction, the magnetization direction of the sixth magnetic unit 2918 may be the same as that of the second magnetic unit 2908. In some embodiments, the magnetization direction of the first magnetic unit 2902 may be perpendicular to the lower surface or the upper surface of the first magnetic unit 2902 and be vertically upward (as shown by the direction a in the figure). The magnetization direction of the seventh magnetic unit 2920 may be directed from the lower surface of the seventh magnetic unit 2920 to the upper surface (as shown by the direction e on the right side of the first magnetic unit 2902 in the figure, the magnetization direction of the first magnetic unit 2902 may deflect 360 degrees in the clockwise direction). In some embodiments, a magnetization direction of the seventh magnetic unit 2920 may be the same as that of the fourth magnetic unit 2912.

[0163] In some embodiments, at a position of the sixth magnetic unit 2918, an included angle between a direction of a magnetic field generated by the magnetic circuit component 2900 and the magnetization direction of the sixth magnetic unit 2918 may not be higher than 90 degrees. In some embodiments, at the position of the sixth magnetic unit 2918, the included angle between the direction of the magnetic field generated by the first magnetic unit 2902 and the direction of magnetization of the sixth magnetic unit 2918 may be less than or equal to 90 degrees, such as 0 degrees, 10 degrees, or 20 degrees.

[0164] In some embodiments, an included angle between the magnetization direction of the first magnetic unit 2902 and the magnetization direction of the seventh magnetic unit

2920 may be between 0 degrees and 180 degrees. In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2902 and the magnetization direction of the seventh magnetic unit 2920 may be between 45 degrees and 135 degrees. In some embodiments, the included angle between the magnetization direction of the first magnetic unit 2902 and the magnetization direction of the seventh magnetic unit 2920 may not be higher than 90 degrees.

[0165] In some embodiments, at a position of the seventh magnetic unit 2920, an included angle between a direction of a magnetic field generated by the magnetic circuit component 3000 and the magnetization direction of the seventh magnetic unit 2920 may not be higher than 90 degrees. In some embodiments, at the position of the seventh magnetic unit 2920, the included angle between the direction of the magnetic field generated by the first magnetic unit 2902 and the direction of magnetization of the seventh magnetic unit 2920 may be less than or equal to 90 degrees, such as 0 degrees, 10 degrees, or 20 degrees.

[0166] In some embodiments, the first full magnetic field changing unit 2906 may be a ring-shaped magnetic unit. In such cases, a magnetization direction of the first full magnetic field changing unit 2906 may be the same as that of the second magnetic unit 2908 or the fourth magnetic unit 2912. For example, on the right side of the first magnetic unit 2902, the magnetization direction of the first full magnetic field changing unit 2906 may be directed from an outer ring to an inner ring of the first full magnetic field changing unit 2906. In some embodiments, the second ring unit 2922 may be a ring-shaped magnetic unit. In such cases, a magnetization direction of the second ring unit 2922 may be the same as that of the sixth magnetic unit 2918 or the seventh magnetic unit 2920. For example, on the right side of the first magnetic unit 2902, the magnetization direction of the second ring unit 2922 may be directed from an outer ring to an inner ring of the second ring unit 2922.

[0167] In the magnetic circuit component 3000, a number of magnetic units may increase the total magnetic flux. Different magnetic units may interact with each other, thereby

suppressing the leakage of the magnetic induction lines, increasing the magnetic induction strength in the magnetic gap, and improving the sensitivity of the loudspeaker apparatus.

[0168] FIG.21 is a longitudinal sectional view illustrating a magnetic circuit component 3100 according to some embodiments of the present disclosure. As shown in FIG. 21, the magnetic circuit component 3100 may include a first magnetic unit 3102, a first magnetically conductive unit 3104, a second magnetically conductive unit 3106, and a second magnetic unit 3108.

[0169] In some embodiments, the first magnetic unit 3102 and/or the second magnetic unit 3108 may include any one or more of the magnets described in the present disclosure. In some embodiments, the first magnetic unit 3102 may include a first magnet. The second magnetic unit 3108 may include a second magnet. The first magnet may be the same as or different from the second magnet. The first magnetically conductive unit 3104 and/or the second magnetically conductive unit 3106 may include any one or more magnetically conductive materials described in the present disclosure. The processing manner of the first magnetically conductive unit 3104 and/or the second magnetically conductive unit 3106 may include any one or more processing manners described in the present disclosure. In some embodiments, the first magnetic unit 3102, the first magnetically conductive unit 3104, and/or the second magnetic unit 3108 may be disposed as an axisymmetric structure. For example, the first magnetic unit 3102, the first magnetically conductive unit 3104, and/or the second magnetic unit 3108 may be cylinders. In some embodiments, the first magnetic unit 3102, the first magnetically conductive unit 3104, and/or the second magnetic unit 3108 may be coaxial cylinders with the same diameter or different diameters. The thickness of the first magnetic unit 3102 may be greater than or equal to the thickness of the second magnetic unit 3108. In some embodiments, the second magnetically conductive unit 3106 may be a groove-type structure. The groove-type structure may include a U-shaped section. The groove-type second magnetically conductive unit 3106 may include a bottom plate and a side wall. In

some embodiments, the bottom plate and the side wall may be integrally formed as a whole. For example, the side wall may be formed by extending the bottom plate in a direction perpendicular to the bottom plate. In some embodiments, the bottom plate may be connected to the side wall through any one or more connection manners described in the present disclosure. The second magnetic unit 3108 may be disposed as a ring shape or a sheet shape. The shape of the second magnetic unit 3108 may refer to descriptions elsewhere in the specification. In some embodiments, the second magnetic unit 3108 may be coaxial with the first magnetic unit 3102 and/or the first magnetically conductive unit 3104.

[0170] An upper surface of the first magnetic unit 3102 may be connected to a lower surface of the first magnetically conductive unit 3104. A lower surface of the first magnetic unit 3102 may be connected to the bottom plate of the second magnetically conductive unit 3106. A lower surface of the second magnetic unit 3108 may be connected to an upper surface of the first magnetically conductive unit 3104. A connection manner between the first magnetic unit 3102, the first magnetically conductive unit 3104, the second magnetically conductive unit 3106 and/or the second magnetic unit 3108 may include one or more manners such as bonding, snapping, welding, riveting, bolting, or the like, or any combination thereof.

[0171] A magnetic gap may be formed between the first magnetic unit 3102, the first magnetically conductive unit 3104, and/or the second magnetic unit 3108 and the side wall of the second magnetically conductive unit 3106. A voice coil may be disposed in the magnetic gap. In some embodiments, the first magnetic unit 3102, the first magnetically conductive unit 3104, the second magnetically conductive unit 3106, and the second magnetic unit 3108 may form a magnetic circuit. In some embodiments, the magnetic circuit component 3100 may generate a first full magnetic field. The first magnetic unit 3102 may generate a second magnetic field. The first full magnetic field may be formed by magnetic fields generated by all components (e.g., the first magnetic unit 3102, the first

magnetically conductive unit 3104, the second magnetically conductive unit 3106, and the second magnetic unit 3108) in the magnetic circuit component 3100. A magnetic field strength of the first full magnetic field in the magnetic gap (also referred to magnetic induction strength or magnetic flux density) may be greater than a magnetic field strength of the second magnetic field in the magnetic gap. In some embodiments, the second magnetic unit 3108 may generate a third magnetic field. The third magnetic field may increase the magnetic field strength of the second magnetic field in the magnetic gap.

[0172] In some embodiments, an included angle between a magnetization direction of the second magnetic unit 3108 and a magnetization direction of the first magnetic unit 3102 may be between 90 degrees and 180 degrees. In some embodiments, the included angle between the magnetization direction of the second magnetic unit 3108 and the magnetization direction of the first magnetic unit 3102 may be between 150 degrees and 180 degrees. In some embodiments, the magnetization direction of the second magnetic unit 3108 may be opposite to that of the first magnetic unit 3102 (the direction a and the direction b shown in the figure).

[0173] Compared with a magnetic circuit component with a single magnetic unit, the magnetic circuit component 3100 may add the second magnetic unit 3108. The magnetization direction of the second magnetic unit 3108 may be opposite to the magnetization direction of the first magnetic unit 3102, which may suppress a magnetic leakage of the first magnetic unit 3102 in the magnetization direction. Therefore, the magnetic field generated by the first magnetic unit 3102 may be more compressed into the magnetic gap, thereby increasing the magnetic induction strength within the magnetic gap.

[0174] It should be noted that the description of the loudspeaker apparatus described above is merely for illustration purposes and should not be regarded as the only feasible implementation solution. Obviously, for those skilled in the art, after understanding the basic principle of the loudspeaker apparatus, it may be possible to make various modifications and changes in forms and details of the specific methods and operations of

implementing the loudspeaker apparatus without departing from the principles, but these modifications and changes are still within the scope described above. For example, the magnetic unit in the magnetic circuit component is not limited to the first magnetic unit, the second magnetic unit, the third magnetic unit, the fourth magnetic unit, the fifth magnetic unit, the sixth magnetic unit, and the seventh magnetic unit. The number of magnetic units may be increased or decreased. Such deformations are all within the protection scope of the present disclosure.

[0175] In some embodiments, the loudspeaker apparatus (e.g., MP3 Player) described above may also transmit the sound to the user through air conduction. When the air condition is used to transmit the sound, the loudspeaker apparatus may include one or more sound sources. The sound source may be located at a specific position of the user's head, for example, the top of the head, a forehead, a cheek, a temple, an auricle, the back of an auricle, etc., without blocking or covering an ear canal. FIG. 22 is a schematic diagram illustrating transmitting a sound through air conduction according to some embodiments of the present disclosure.

[0176] As shown in FIG. 22, a sound source 1510 and a sound source 1520 may generate sound waves with opposite phases ("+" and "-" in the figure indicate the opposite phases). For brevity, the sound source mentioned herein may refer to sound outlets of the loudspeaker apparatus that may output sounds. For example, the sound source 1510 and the sound source 1520 may be two sound outlets respectively located at specific positions of the loudspeaker apparatus (for example, the core housing 20, or the circuit housing 30).

[0177] In some embodiments, the sound source 1510 and the sound source 1520 may be generated by the same vibration device 1501. The vibration device 1501 may include a diaphragm (not shown in the figure). When the diaphragm is driven to vibrate by an electric signal, the front side of the diaphragm may drive the air to vibrate, the sound source 1510 may be formed at the sound outlet through a sound guiding channel 1512, the back of the diaphragm may drive air to vibrate, and the sound source 1520 may be formed

at the sound outlet through a sound guiding channel 1522. The sound guiding channel may refer to a sound transmission route from the diaphragm to the corresponding sound outlet. In some embodiments, the sound guiding channel may be a route surrounded by a specific structure on the loudspeaker apparatus (for example, the core housing 20, or the circuit housing 30). It should be known that, in some alternative embodiments, the sound source 1510 and the sound source 1520 may also be generated by different vibrating diaphragms of different vibration devices, respectively.

[0178] Among the sounds generated by the sound source 1510 and the sound source 1520, one portion may be transmitted to the ear of the user to form the sound heard by the user. Another portion may be transmitted to the environment to form a leaked sound. Considering that the sound source 1510 and the sound source 1520 are relatively close to the ears of the user, for convenience of description, the sound transmitted to the ears of the user may be referred to as a near-field sound. The leaked sound transmitted to the environment may be referred to as a far-field sound. In some embodiments, the near-field/far-field sounds of different frequencies generated by the loudspeaker apparatus may be related to a distance between the sound source 1510 and the sound source 1520. Generally speaking, the near-field sound generated by the loudspeaker apparatus may increase as the distance between the two sound sources increases, while the generated far-field sound (the leaked sound) may increase with the increasing of the frequency.

[0179] For the sounds of different frequencies, the distance between the sound source 1510 and the sound source 1520 may be designed, respectively, so that a low-frequency near-field sound (e.g., a sound with a frequency of less than 800Hz) generated by the loudspeaker apparatus may be as large as possible and a high-frequency far-field sound (e.g., a sound with a frequency greater than 2000 Hz) may be as small as possible. In order to implement the above purpose, the loudspeaker apparatus may include two or more sets of dual sound sources. Each set of the dual sound sources may include two sound sources similar to the sound source 1510 and the sound source 1520, and generate

sounds with specific frequencies, respectively. Specifically, a first set of the dual sound sources may be used to generate low frequency sounds. A second set of the dual sound sources may be used to generate high frequency sounds. In order to obtain more low-frequency near-field sounds, the distance between two sound sources in the first set of the dual sound sources may be set to a larger value. Since the low-frequency signal has a longer wavelength, the larger distance between the two sound sources may not cause a large phase difference in the far-field, and not form excessive leaked sound in the far-field. In order to make the high-frequency far-field sound smaller, the distance between the two sound sources in the second set of the dual sound sources may be set to a smaller value. Since the high-frequency signal has a shorter wavelength, the smaller distance between the two sound sources may avoid the generation of the large phase difference in the far-field, and thus the generation of the excessive leaked sounds may be avoided. The distance between the second set of the dual sound sources may be less than the distance between the first set of the dual sound sources.

[0180] The beneficial effects of the embodiments of the present disclosure may include but be not limited to: (1) the protective sleeve of the ear hook may elastically abut against the core housing, thereby improving the waterproof performance of the loudspeaker apparatus; (2) the size of the forming mold may be reduced by using different molds to form the ear hook and the core housing separately, thereby reducing the difficulty of mold processing and forming the ear hook and the core housing during production; (3) by increasing the overall rigidty of the housing, the housing panel and the housing back panel may vibrate with the same or substantially the same amplitude and phase at higher frequencies, thereby reducing the sound leakage of the loudspeaker apparatus; (4) the sensitivity of the loudspeaker apparatus may be improved by adding a magnetic unit, a magnetically conductive unit and an electrically conductive unit in the magnetic circuit components. It should be noted that different embodiments may have different beneficial

effects. In different embodiments, the possible beneficial effects may be any one or a combination of the above, and may be any other beneficial effects that may be obtained.

[0181] The basic concepts have been described above. Obviously, for persons having ordinary skills in the art, the disclosure of the invention is merely by way of example, and does not constitute a limitation on the present disclosure. Although not explicitly stated here, those skilled in the art may make various modifications, improvements, and amendments to the present disclosure. These alterations, improvements, and modifications are intended to be suggested by this disclosure and are within the spirit and scope of the exemplary embodiments of this disclosure.

WHAT IS CLAIMED IS

1. 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. 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. 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. The loudspeaker apparatus of claim 3, wherein the wire passes through the first wiring channel and the second wiring channel.

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

7. 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. 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. 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. 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. 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. 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. 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. 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. 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. The loudspeaker apparatus of claim 1, wherein the housing panel and other parts of the housing are connected by at least one of glue, clamping, welding, or threaded connecting.

17. The loudspeaker apparatus of claim 1, the housing panel and the housing back panel

are made of fiber reinforced plastic materials.

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

at least one fifth magnetic unit being connected to an upper surface of the first magnetically conductive unit.

22. The loudspeaker apparatus of claim 21, wherein the magnetic circuit component further includes:

a third magnetically conductive unit being connected to an upper surface of the fifth magnetic unit, wherein the third magnetically conductive unit is configured to suppress a leakage of a field strength of the first magnetic field.

23. 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. 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.

ABSTRACT

The present disclosure discloses a loudspeaker apparatus. The loudspeaker apparatus may include an ear hook including a first plug end and a second plug end, a core housing for accommodating an earphone core, and a circuit housing for accommodating a control circuit or a battery. The ear hook may be surrounded by a protective sleeve which is made of an elastic waterproof material. The core housing may be fixed to the first plug end and elastically abutted against the protective sleeve. The core housing may include a housing panel facing human body and a housing back panel opposite to the housing panel. 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 may be less than 60 degrees.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	LOUDSPEAKER APPARATUS
First Named Inventor/Applicant Name:	Chaowu LI
Filer:	Yangzhou Harry Du/GAO SINI
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:				
UTILITY APPLICATION FILING	1011	1	320	320
UTILITY SEARCH FEE	1111	1	700	700
UTILITY EXAMINATION FEE	1311	1	800	800
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1820**

Electronic Acknowledgement Receipt

EFS ID:	41529793
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
Filer Authorized By:	
Attorney Docket Number:	20608-0080US00
Receipt Date:	31-DEC-2020
Filing Date:	
Time Stamp:	10:45:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1820
RAM confirmation Number	E2020BUA46541576
Deposit Account	506942
Authorized User	liuyun shen

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	Application Data Sheet	2020-12-31-ADS-20608-0080US00.pdf	1823433 35feec63b99f3a6b4742df1b8d262f8aade9cdd0	no	8
Warnings:					
Information:					
2	Drawings-only black and white line drawings	2020-12-31-Drawings-20608-0080US00.pdf	1156505 98e103be54cafe01e2bff241814917808df875b4	no	14
Warnings:					
Information:					
3	Power of Attorney	2020-12-31-POA-20608-0080US00.pdf	2284161 2660d3c2865a51211de9fcd762663a8972a93a77	no	2
Warnings:					
Information:					
4	Transmittal Letter	2020-12-31-Transmittal-20608-0070US00.pdf	619146 7842f29dc4a04ec9311a9f81126b7b98b3046a65	no	2
Warnings:					
Information:					
5	Oath or Declaration filed	Declaration-20608-0080US00.pdf	604678 412caa4211eba2aeac5bac96e695127421d41a45	no	2
Warnings:					
Information:					
6		2020-12-31-Preliminary-Amendment-20608-0080US00.pdf	505633 05161326494e3c77b32e31baff09be23db188506	yes	8
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	

	Preliminary Amendment		1	1	
	Claims		2	7	
	Applicant Arguments/Remarks Made in an Amendment		8	8	
Warnings:					
Information:					
7		2020-12-31-Spec-20608-0080US00.pdf	745382 e476378fae41f4d2a2447e560004b3b640d8de29	yes	66
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Specification		1	59	
	Claims		60	65	
	Abstract		66	66	
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	34820 b5c21733b773560c502477d48bba9b8d58ab8011	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	7773758		

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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	
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 fall 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 [i]	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 [i]	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 [i]	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 [i]	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	
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		

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	
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. Add

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[j] (if applicable)
201910009927.4	CN	2019-01-05	95DA

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

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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	
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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	
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 — Remove

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.		
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. Add

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
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	
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.

Remove

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

Organization Name	SHENZHEN VOXTECH 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 i	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. Add

Signature:

Remove

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. Add

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	20608-0080US00
	Application Number	
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.**

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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:

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.

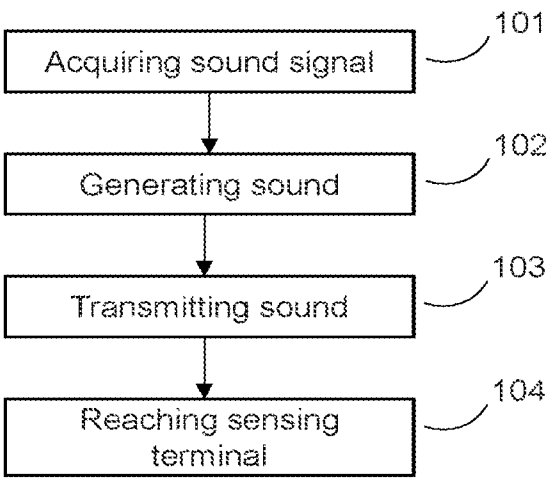

Acquiring sound signal
101
Generating sound
102
Transmitting sound
103
Reaching sensing terminal
104

FIG. 1

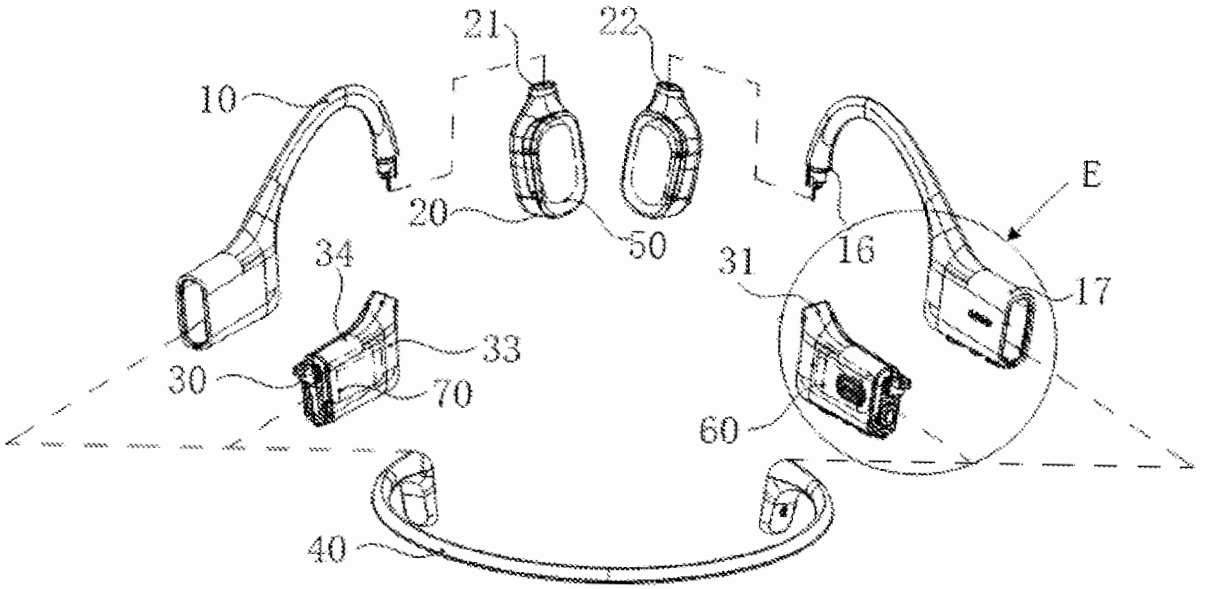


FIG. 2

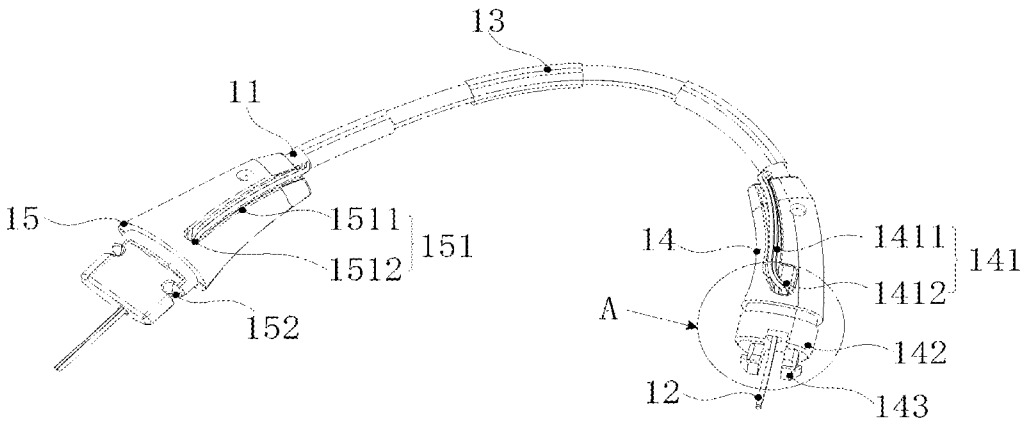

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Fig. 3

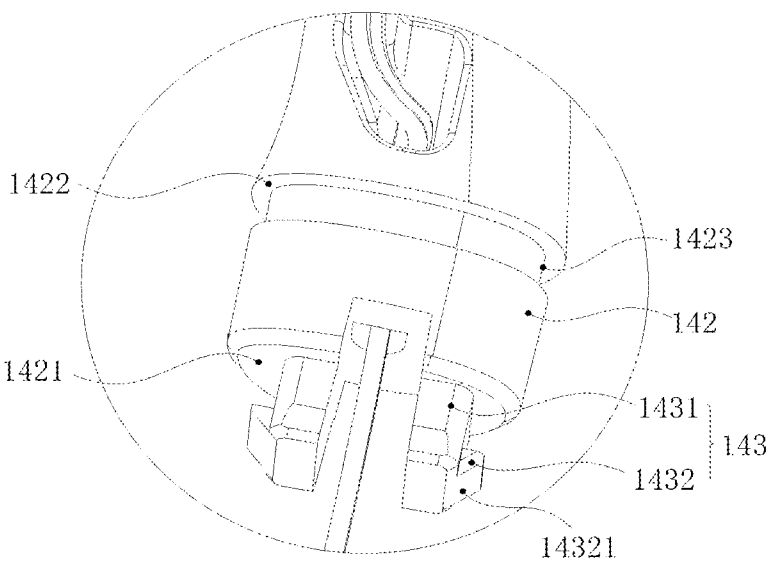

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Fig. 4

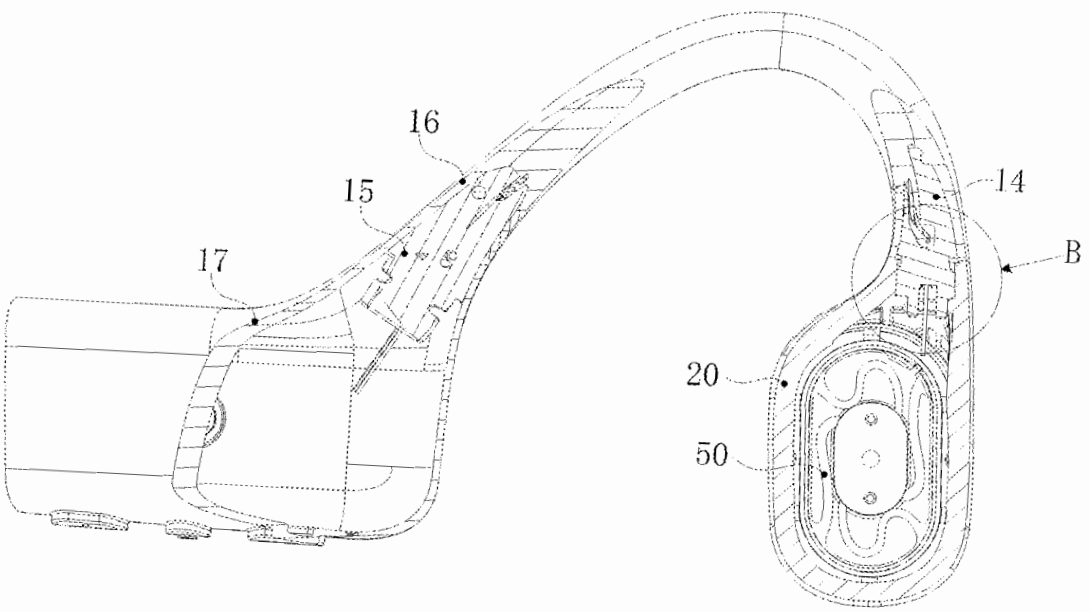


Fig. 5

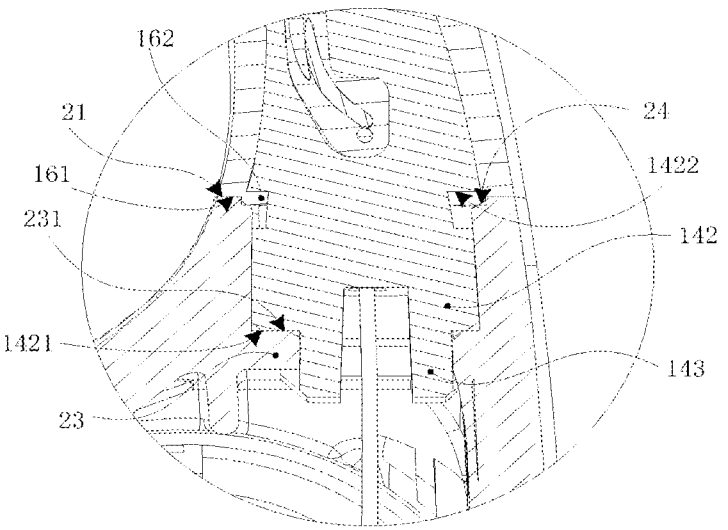

162
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24
161
1422
231
142
1421
143
23

Fig. 6

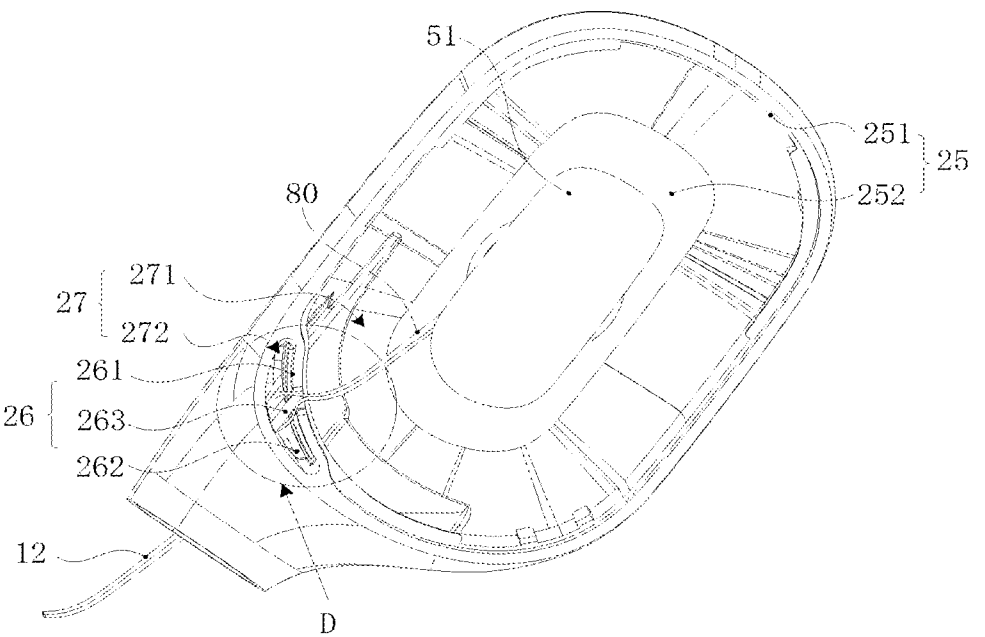

51
251
25
80
252
271
27
272
261
26
263
262
12
D

Fig. 7

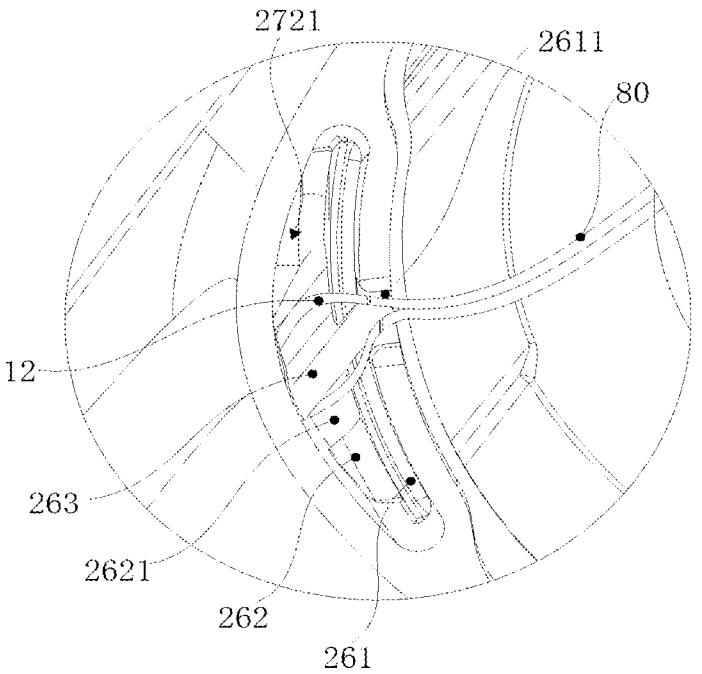

2721
2611
80
12
263
2621
262
261

Fig. 8

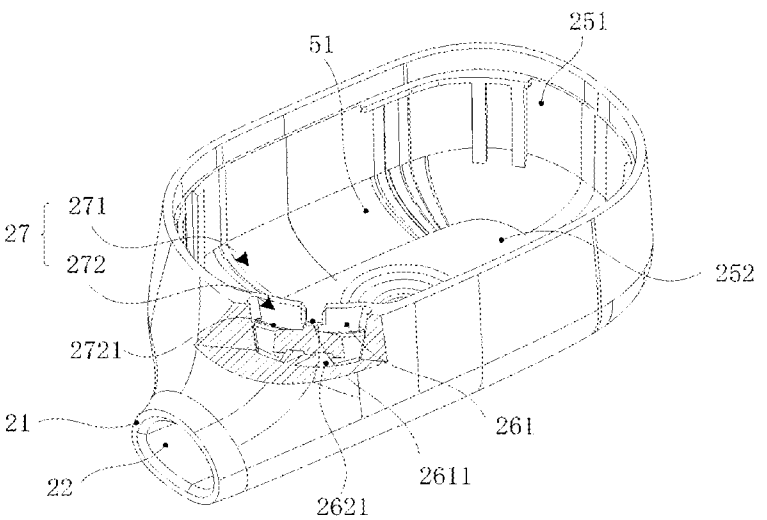

251
51
271
27
272
252
2721
21
261
22
2611
2621

Fig. 9

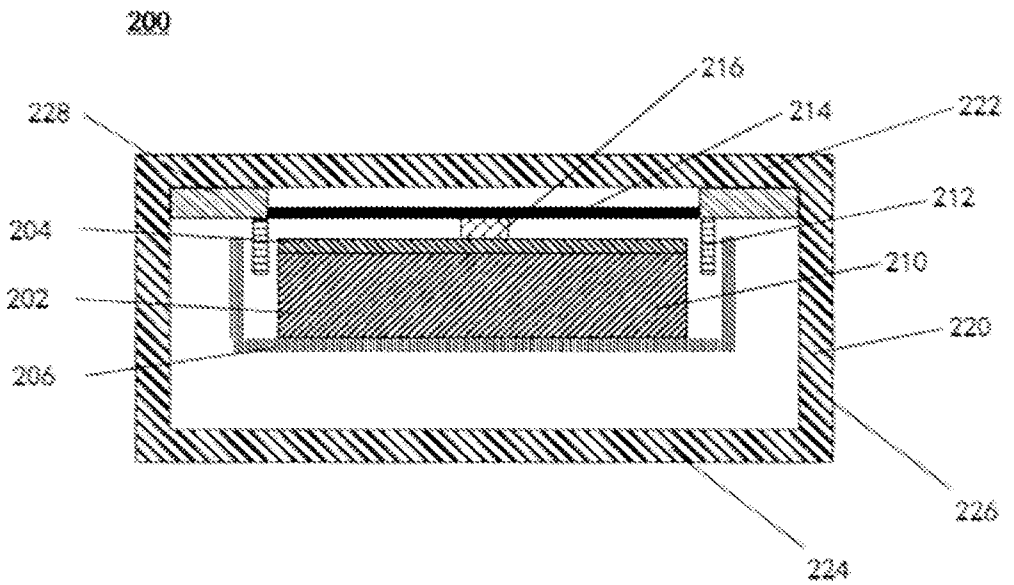

200
216
214
222
228
212
204
210
202
220
206
226
224

Fig. 10

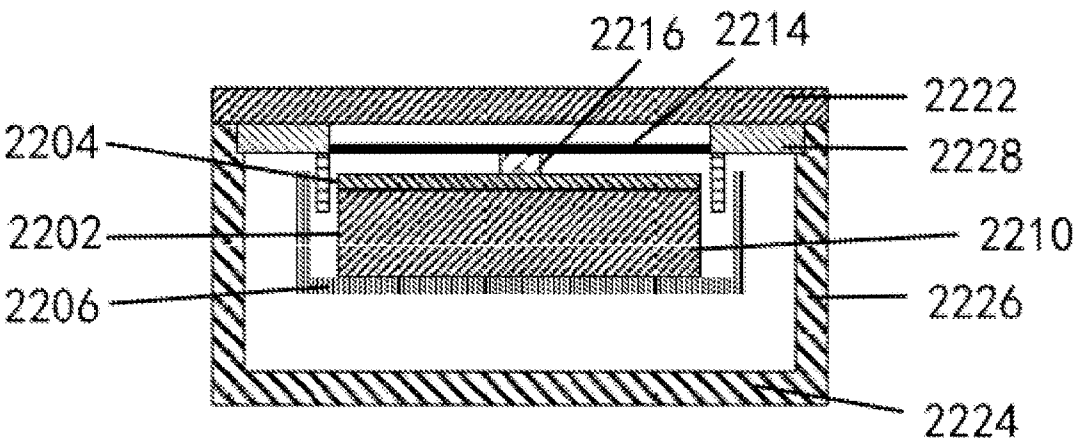

2216
2214
2222
2204
2228
2202
2210
2206
2226
2224

Fig. 11

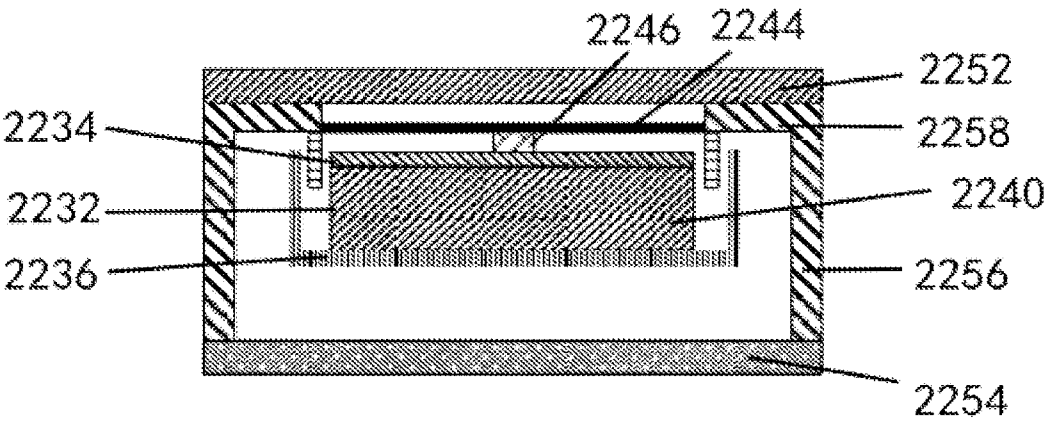

2246
2244
2252
2234
2258
2232
2240
2236
2256
2254

Fig. 12

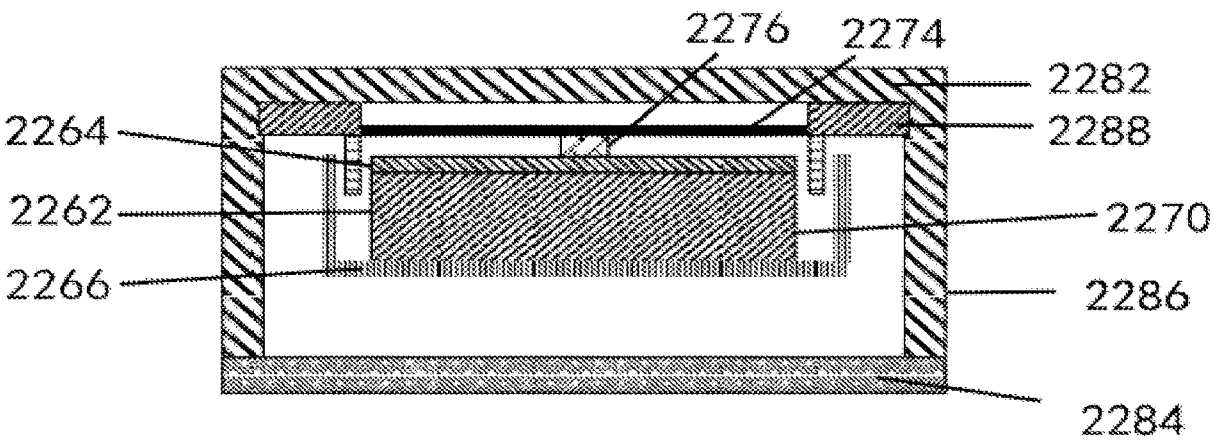

2276
2274
2282
2264
2288
2262
2270
2266
2286
2284

Fig. 13

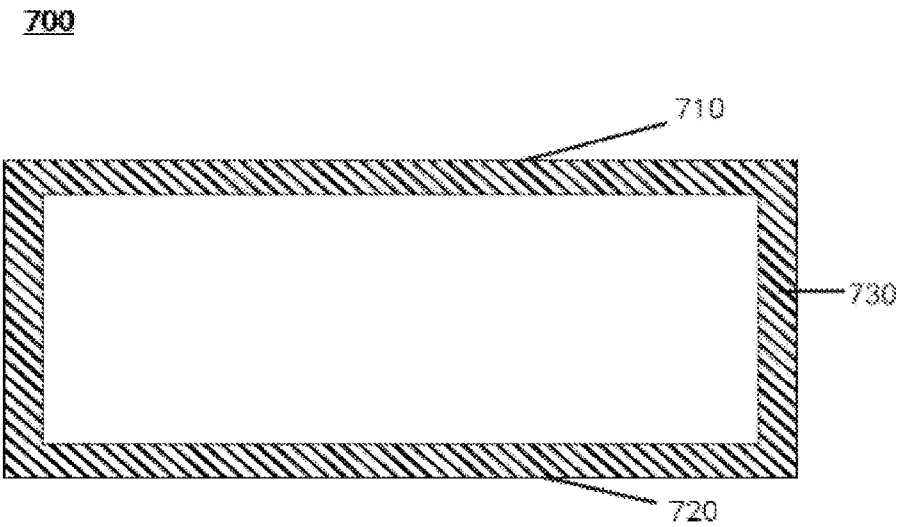


Fig. 14

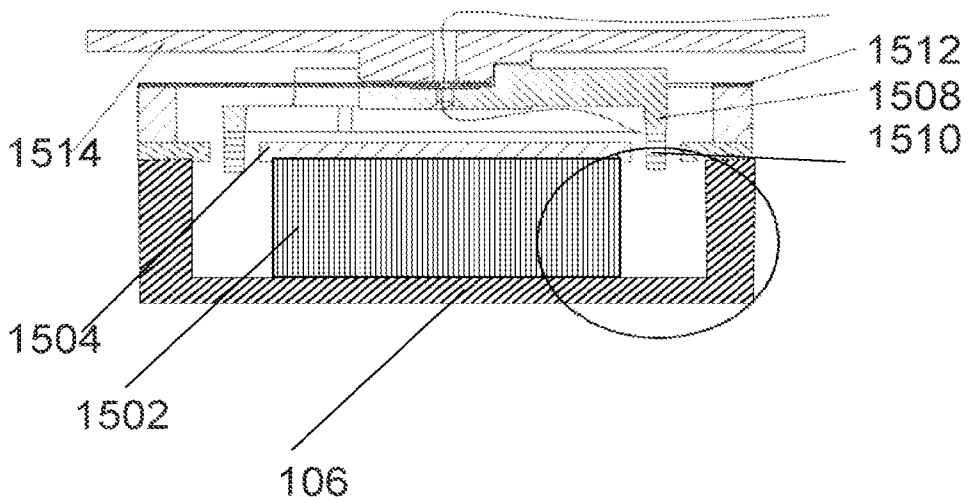


Fig. 15

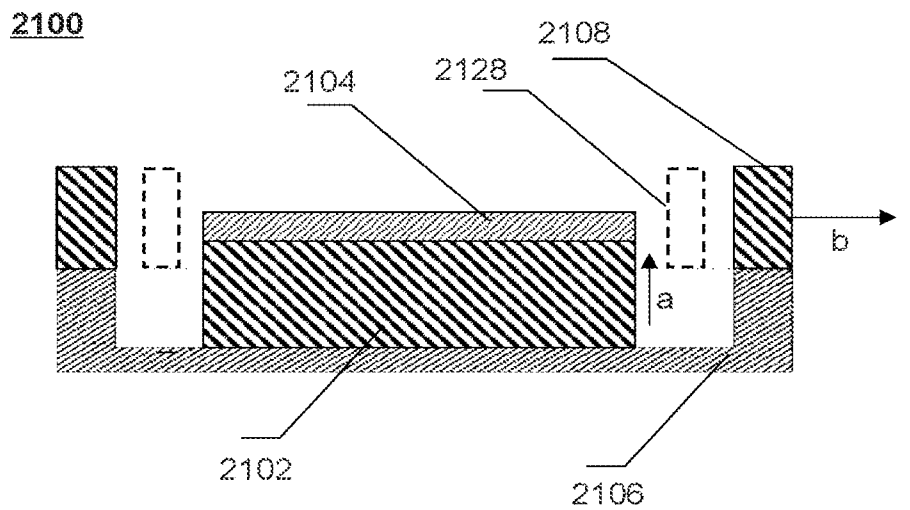

2100
2108
2104
2128
b
a
2102
2106

FIG. 16

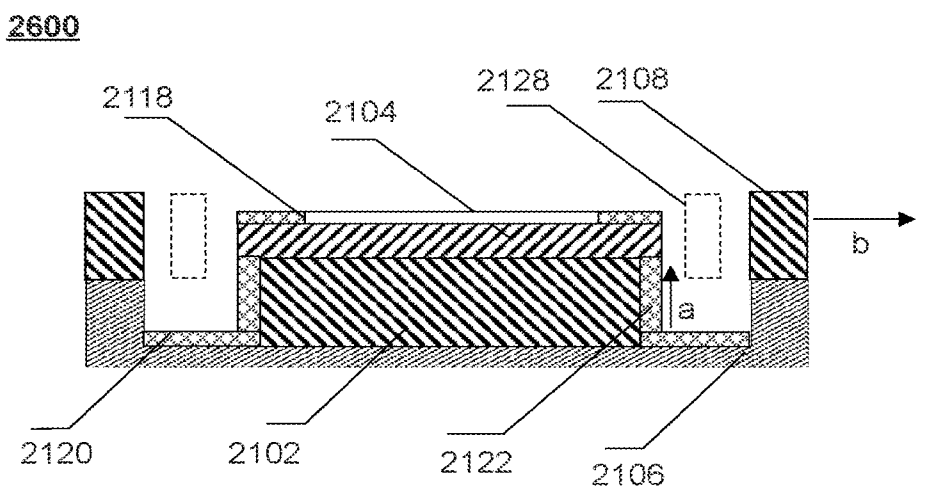

2600
2118
2104
2128
2108
b
a
2120
2102
2122
2106

FIG. 17

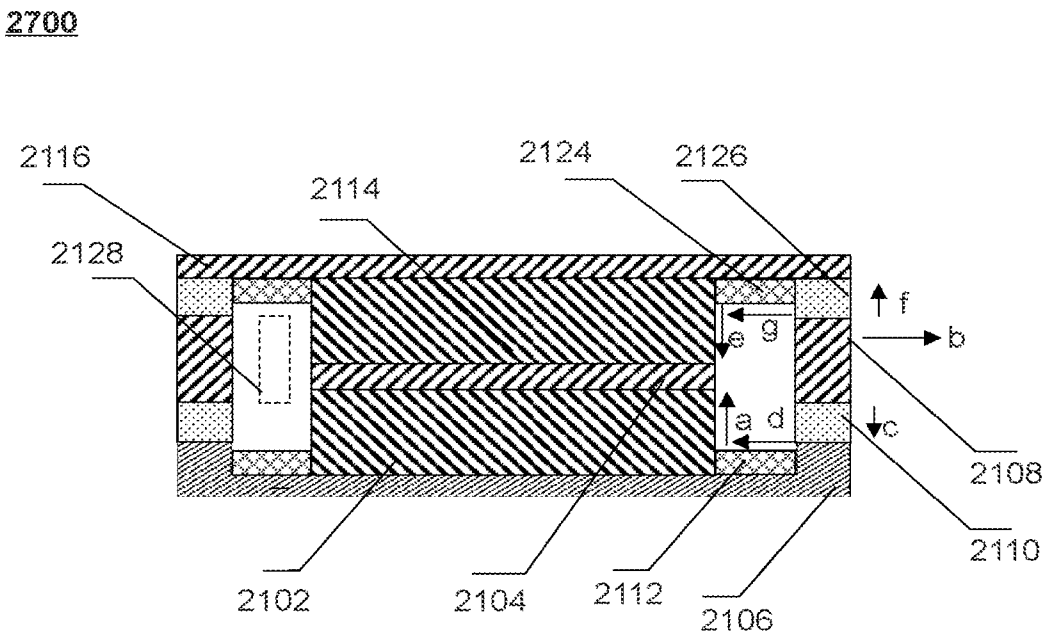

2700
2116
2114
2124
2126
2128
f
b
e
g
a
d
c
2108
2110
2102
2104
2112
2106

FIG. 18

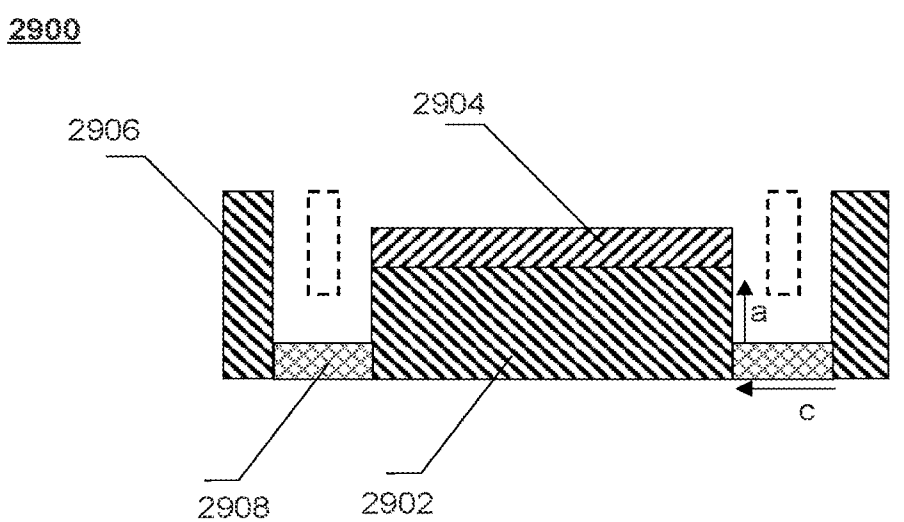

2900
2904
2906
a
c
2908
2902

FIG. 19

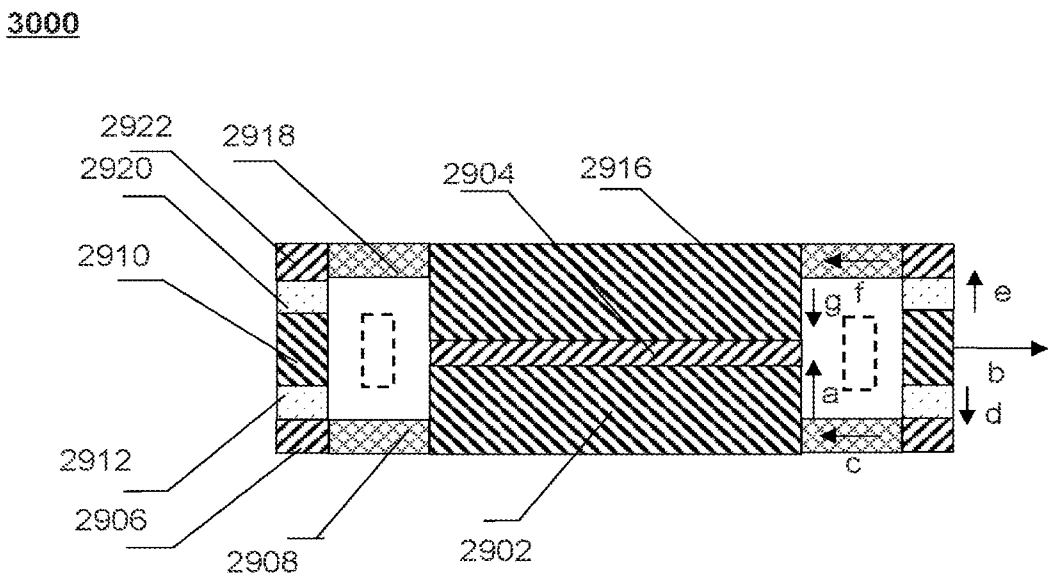

3000
2922
2918
2920
2904
2916
2910
g
f
e
b
a
d
2912
c
2906
2908
2902

FIG. 20

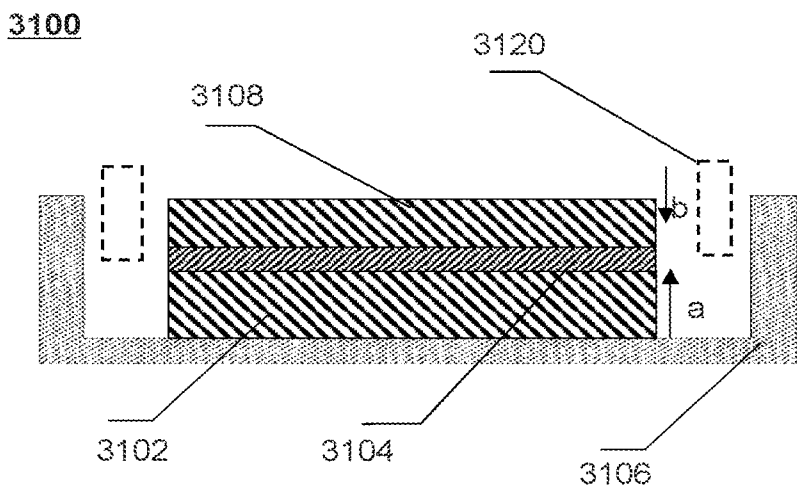

3100
3120
3108
b
a
3102
3104
3106

FIG. 21

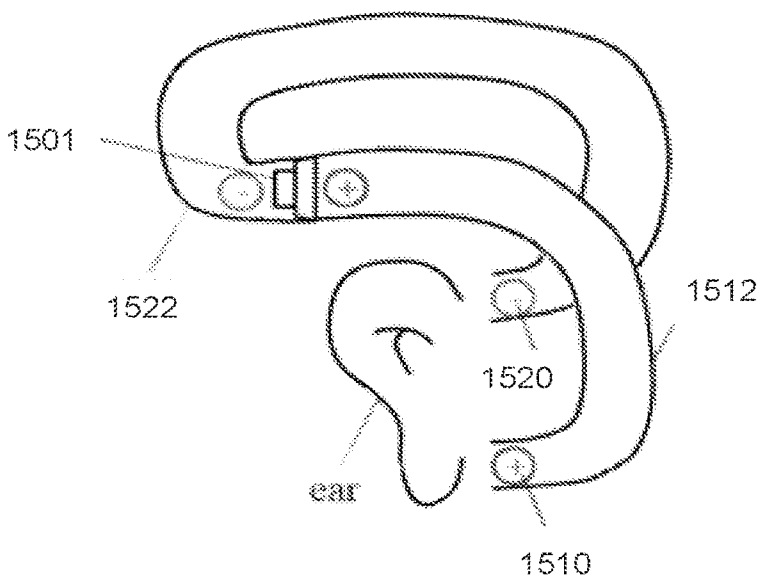


FIG. 22

SCORE Placeholder Sheet for IFW Content

Application Number: 17139076 Document Date: 12/31/2020

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via DAV or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: March 1, 2019

A kind of bone conduction earphone

Abstract

The embodiment of the present invention, which provides a kind of bone conduction earphone, includes two ear-hang components, the ear-hang component includes the first housing, the second housing and the connection member of connection first housing and the second housing, the bone conduction earphone further comprises rear hanging component, hanging component is provided at both ends with Plug Division after described, first housing of the Plug Division respectively with described two ear-hang components patches cooperation, and is fixedly connected.By the above-mentioned means, the present invention enables to bone conduction earphone structure easier.

CN107484054A

China

Other languages: Chinese

Inventor: 李永坚, 张浩锋, 游芬, 齐心

Worldwide applications

2017 CN

Application CN201710716454.2A events

2017-08-18 Application filed by 深圳市新音科技有限公司

2017-08-18 Priority to CN201710716454.2A

2017-12-15 Publication of CN107484054A

Info: Cited by (1), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, Discuss

Description

A kind of bone conduction earphone

Technical field

The present invention relates to earphone field, more particularly to a kind of bone conduction earphone.

Background technology

Osteoacusis is a kind of sound conduction mode, i.e., sound is converted into the mechanical oscillation of different frequency, passes through the cranium of people Bone, osseous labyrinth, inner ear lymph transmission, spiral organ, auditory nerve, auditory center transmit sound wave.Bone conduction earphone is passed using bone Waveguide technology is called, is close to bone, and sound wave directly reaches auditory nerve by bone.Therefore ears can be opened, does not injure eardrum, Therefore liked by consumers in general.But existing bone conduction earphone each several part is typically all to be fixed by screw etc. Connection, the rear extension of especially existing bone conduction earphone are needed by screw connection with ear-hang, due to depositing for screw and screw hole The overall

Claims (10)

Hide Dependent

1. a kind of bone conduction earphone, it is characterised in that the bone conduction earphone includes two ear-hang components, the ear-hang component bag The first housing, the second housing and the connection member of connection first housing and the second housing are included, the bone conduction earphone enters One step includes rear hanging component, it is described after hanging component be provided at both ends with Plug Division, the Plug Division respectively with described two ear-hang groups First housing of part patches cooperation, and is fixedly connected.

2. bone conduction earphone according to claim 1, it is characterised in that the end set of first housing has for permitting Perhaps the vertical direction of the jointing holes of Plug Division insertion and the direction of insertion in the Plug Division connect the jointing holes with Outside perforate, to allow into the jointing holes to apply from the outside through the perforate glue or installation stopper, to cause Plug

dimensions of earphone can not be reduced, assembling the problems such as inconvenient.

The content of the invention

The present invention solves the technical problem of a kind of bone conduction earphone is provided, existing osteoacusis ear can be effectively improved After machine hang with ear-hang by screw and screw hole be connected caused by earphone size can not reduce the problems such as.

In order to solve the above technical problems, the embodiment of the present invention, which provides a kind of bone conduction earphone, includes two ear-hang components, institute Stating ear-hang component includes the first housing, the second housing and the connection member of connection first housing and the second housing, described Bone conduction earphone further comprises rear hanging component, it is described after hanging component be provided at both ends with Plug Division, the Plug Division respectively with institute The first housing for stating two ear-hang components patches cooperation, and is fixedly connected.

Compared with prior art, the beneficial effects of the invention are as follows : The present invention by rear hanging component both ends set Plug Division, First housing of the Plug Division respectively with described two ear-hang components patches cooperation, eliminates the screw of existing bone conduction earphone Coordinate fixed mode, the rear extension of bone conduction earphone and the size of ear-hang link position can be effectively reduced, can be reduced with this Earphone size, and be easy to assemble.

Brief description of the drawings

Fig. 1 is the structural representation of bone conduction earphone embodiment middle ear hanging component of the present invention ;

Fig. 2 is that bone conduction earphone overall structure disassembles schematic diagram in bone conduction earphone embodiment of the present invention ;

Fig. 3 is another structural representation of bone conduction earphone embodiment middle ear hanging component of the present invention ;

Fig. 4 is the cross section structure schematic diagram of A-A in Fig. 3 ;

Fig. 5 is that bone conduction earphone part-structure disassembles schematic diagram in bone conduction earphone embodiment of the present invention ;

Fig. 6 is the cross section structure schematic diagram of C-C in Fig. 5 ;

Fig. 7 is circuit diagram in bone conduction earphone embodiment of the present invention ;

Division is stated to be fixed in the presence of the glue or stopper in the jointing holes.

3. bone conduction earphone according to claim 2, it is characterised in that fluting is provided with the side wall of the Plug Division, The fluting is exposed through the perforate, and for receiving the glue or stopper.

4. bone conduction earphone according to claim 3, it is characterised in that the connection member connects institute respectively including both ends State the first elastic metallic yarn of the first housing and second housing and be coated on first elastic metallic yarn first Resilient coating, the rear hanging component include the second elastic metallic yarn and the second bullet being coated on second elastic metallic yarn Property coating, the Plug Division is arranged on the second elastic metallic yarn both ends.

5. bone conduction earphone according to claim 4, it is characterised in that the Plug Division includes and the described second elasticity gold The first of category silk connection patches section and patches section with described first and be connected and away from the of second elastic metallic yarn setting Two patch section, and direction of insertion of the jointing holes along the Plug Division is divided into for receiving the described first the first hole for patching section Section and for receiving the described second the second hole section for patching section, wherein first hole section is sized to allow for described second Patch section to move freely in first hole section along the direction of insertion, and make it that described first patches section and first hole Tight fit between section.

6. bone conduction earphone according to claim 5, it is characterised in that second hole section is dimensioned so that institute State second and patch tight fit between section and first hole section ; And/or

Described first patches the shape difference for the contact surface that section both sides contact with first hole section.

7. bone conduction earphone according to claim 5, it is characterised in that the fluting is arranged at described second and patches section On.

8. bone conduction earphone according to claim 5, it is characterised in that described first, which patches section and described second, patches section The stepped setting in bottom

Fig. 8 is the structural representation of the 4th housing in bone conduction earphone embodiment of the present invention ;

Fig. 9 is bone conduction earphone Plug Division and jointing holes structure enlargement diagram in bone conduction earphone embodiment of the present invention ;

Figure 10 is Plug Division and jointing holes cross section structure schematic diagram in bone conduction earphone embodiment of the present invention ;

Figure 11 is jointing holes structural representation in bone conduction earphone embodiment of the present invention ;

Figure 12 is Plug Division structural representation in bone conduction earphone embodiment of the present invention ;

Figure 13 is Fig. 9 8-8 cross section structure schematic diagram ;

Figure 14 is that bone conduction earphone another part structure disassembles schematic diagram in bone conduction earphone embodiment of the present invention ;

Figure 15 is Figure 14 part-structure schematic cross-section ;

Figure 16 is control circuit component structure diagram in bone conduction earphone embodiment of the present invention ;

Figure 17 is another structural representation of control circuit component in bone conduction earphone embodiment of the present invention.

Embodiment

Refering to Fig. 1 and Fig. 2, bone conduction earphone embodiment of the present invention includes ear-hang component 11, and ear-hang component 11 includes first Housing 111, the second housing 112 and the connection member 113 of the first housing 111 of connection and the second housing 112, wherein connection member 113 including both ends connect the first elastic metallic yarn 1131 of the first housing 111 and the second housing 112 and are coated on first respectively The first resilient coating 1132 on elastic metallic yarn 1131.

Typically, bone conduction earphone also includes the elements such as bone-conduction speaker, battery, control circuit, such as osteoacusis is raised one's voice Device is used to export sound to user by vibration in a manner of osteoacusis.Battery is used to give bone conduction earphone each power elements.Control Circuit processed is used to control bone conduction earphone function such as realizing regulation volume, switching on

surface and patch section described first and second junction for patching section is provided with the first wedge-shaped mistake Section is crossed, and the junction of first hole section and second hole section is provided with corresponding with the described first wedge-shaped changeover portion Two wedge-shaped changeover portions.

9. bone conduction earphone according to claim 4, it is characterised in that hanging component further comprises by described the after described Second wire group of two resilient coatings cladding, wherein the both ends of the second wire group are exposed from second resilient coating, institute The top surface for stating Plug Division is provided with the groove of sunkening cord of the exposed parts for accommodating the second wire group.

10. bone conduction earphone according to claim 4, it is characterised in that first housing and the second housing respectively with Injection molding manner is fixedly connected with the both ends of first elastic metallic yarn, and first resilient coating is fixed with injection molding manner and coated in on first elastic metallic yarn, the Plug Division is fixed on the both ends of second elastic metallic yarn with injection molding manner.

and shutting down, play audio and bluetooth communication.

Ear-hang component 11 is generally used for user and is hung on its ear when wearing bone conduction earphone, can so make osteoacusis ear Machine is more firmly worn on the ear of user.Ear-hang component 11 needs to have good resistance to compression and non-deformability, so as to User is not easy to damage or cause its deformation by bone conduction earphone when in use.

In the present embodiment, connection member 113 can directly contact ear and support bone conduction earphone by people's the ear portion, even Relay part 113 includes the first elastic metallic yarn 1131 and the first resilient coating being coated on the first elastic metallic yarn 1131 1132, the first housing 111 and the second housing 112 are connected by the first elastic metallic yarn 1131, can effectively strengthen osteoacusis ear The bending performance and structural stability of machine, ear-hang component 11 is set effectively to carry out elastic recovery when being bent and extensive Shape is restored, is unlikely to deform.In addition traditional bone conductors earphone can be improved using the first elastic metallic yarn 1131 and uses plastics conduct The problems such as fragile caused by the material of ear-hang component.Optionally, connection member 113 can include more first elasticity gold Belong to silk 1131, such as more the first tiny elastic metallic yarns 1131 can be set further to improve the curved of ear-hang component 11 Folding reliability, such as 3 first elastic metallic yarns 1131 of setting, the diameter 0.3mm of every first elastic metallic yarn 1131, now The material of 3 first elastic metallic yarns can with it is identical can also part it is identical or all different, every first elasticity gold certainly Belong to silk 1131 diameter can also identical, part it is identical or all different.

In the present embodiment, optionally, the first elastic metallic yarn 1131 can be metal simple-substance, or including more The alloy material of kind metal material, such as spring steel, aluminium alloy, magnesium alloy, titanium alloy, nickel alloy, Ti-Ni alloy, magnesium lithium close Gold, chrome-molybdenum steel etc. or the composite including metal material and nonmetallic materials.Optionally, the first elastic metallic Silk 1131 is titanium alloy wire, or is at least made up of titanium alloy material, such as a diameter of 0.8-1.5mm titanium alloy wire, optional For 1.0-1.25mm.

In the present embodiment, the first resilient coating of outer cladding 1132 of the first elastic metallic yarn 1131, the first resilient coating 1132 directly contact with ear, because the elastic reaction of the first resilient coating 1132 enables to user cosily to wear bone Conduct earphone.In addition, the first resilient coating 1132 can more effectively coat the first elasticity gold due to the presence of its elastic reaction Belong to silk 1131, remain to effectively coat the first elastic metallic yarn 1131 even

in after repeatedly bending, ensure bone conduction earphone knot The validity of structure Optionally, the first resilient coating 1132 is layer of silica gel, certainly in other embodiments, the first resilient coating 1132 can also be emulsion layer either rubber layer or other flexible plastic layers, or be the composite comprising silica gel Layer.

Optionally, the first housing 111 and the second housing 112 are respectively with injection molding manner and the first elastic metallic yarn 1131 Both ends are fixedly connected, and the first resilient coating 1132 is fixed with injection molding manner and is coated on the first elastic metallic yarn 1131.Optionally it is that the first housing 111 and the second housing 112 are plastic casing, and the first elastic metallic yarn is fixed in a manner of injection molding 1131 both ends, and the first resilient coating 1132 are integrally formed on the first elastic metallic yarn 1131 of cladding, so that the Connection between one housing 111, the second housing 112 and the first elastic metallic yarn 1131 is more firm, and causes bone conduction earphone One body-sensing is stronger with texture, makes the more compact structure of bone conduction earphone lighter.In the present embodiment, injection molding manner can be note The one kind being moulded into type, thermoplastic shaping, compression molding etc., but not limited to this.

Refering to Fig. 3 and Fig. 4, optionally, the first resilient coating 1132 by different colours two sub- resilient coatings 1132a, 1132b are put together, and two of which elastic coating 1132a, 1132b split seam are located at connection member 113 respectively Be oppositely arranged two sides 113a, 113b on, wherein split is sewn on the throwing for example on lateral surface 113a on same side Shadow offsets one from another.Such as when carrying out injection molding, two bullets using at least two molds to the first resilient coating 1132 Property coating 1132a, 1132b are molded respectively, the two kinds of colors that thus can form different ratio be, for example, light gray with it is dark-grey The combination of color or other colors, and split seam is located on two sides 113a, 113b that connection member 113 is oppositely arranged, and Projection offsets one from another on same side so that the visual effect of bone conduction earphone more preferably, further as staggering coats the first bullet Property wire 1131 cause covered effect it is more preferable.Certain first resilient coating 1132 elastic can also be covered by two of same color Layer is put together.By injection molding twice, formation two is elastic on two sides 113a, 113b of connection member 113 respectively Coating 1132a, 1132b, due to the presence of injection pressure when can improve single injection-molded or be injected separately shaping up and down Easily causing element such as the first elastic metallic yarn 1131 in the first resilient coating 1132 to produce displacement reduces connection member 113 Forming Quality.Certainly, in other embodiments, the first resilient

coating 1132 can directly form a coating, or be formed The more than two elastic coating of quantity.

In the present embodiment, the two sides of connection member 113 include being oppositely arranged medial surface 113b and lateral surface 113a, are Refer to the ear-hang component 11 when wearing and be hung on human ear, connection member 113 towards the side of head part be medial surface 113b, towards human ear Side be lateral surface 113a.

With continued reference to Fig. 3 and Fig. 4, optionally, two sub- resilient coating 1132a, 1132b split seam are respectively positioned at company On the medial surface 113b and lateral surface 113a of relay part 113, and the split seam on the lateral surface 113a of connection member 113 The projection compared to the split seam on the medial surface 113b of connection member 113 is projected closer to connection member 113 and human ear Contact position.It can thus be appreciated that a split seam is located at the position of lateral surface 113a close contact human ear, and another is spelled Elastic coating 1132a that joint close is located at medial surface 113b almost to show same color on lateral surface 113a or 1132b, such as lateral surface 113a almost show light gray so that the body-sensing of bone conduction earphone one is stronger, more attractive in appearance.

Optionally, split seam is arranged so that two sub- resilient coating 1132a, 1132b in same side such as 113a Or the area on 113b is different from each other.In other embodiments, split seam may be arranged so that two sub-resilient coatings The area of 1132a, 1132b on same side is identical or is substantially the same.

Refering to Fig. 2 to Fig. 4, optionally, the color for being arranged so that two sub- resilient coating 1132a, 1132b is stitched in split Relatively shallower elastic coating 1132a footprint areas on lateral surface 113a are relatively large.That is, the elastic of light colour is covered Layer 1132a is more located at lateral surface 113a, and the elastic coating 1132b of dark colour is more located at medial surface 113b, so So that the surface of connector 113 has more harmony, strengthen the aesthetic properties of bone conduction earphone while structural behaviour is ensured.

With continued reference to Fig. 1, optionally, the both ends of the first elastic metallic yarn 1131 set in flat and are respectively embedded into One housing 111 and the second housing 112.Namely formed and be fixed in a manner of injection in the first housing 111 and the second housing 112 First elastic metallic yarn 1131 is in the both ends that flat is set, and can so increase the first elastic metallic yarn 1131 and the first housing 111st, the contact area of the second housing 112 so that the first elastic metallic yarn 1131 and the first housing 111, the second housing 112 are more steady Surely interfix.Optionally, it should be in flat that the first elastic metallic yarn 1131 is more than connection in the width at the both ends of flat

setting The width of the coupling part at the flat both ends set, so plays a spacing effect after shaping, prevents the first elasticity gold Category silk 1131 is pulled out or come off from the first housing 111, the second housing 112.Optionally, first elastic metallic yarn 1131 Both ends are set in shape of threads.In shaping, partial shell can be taken shape in screw thread, to play fixed effect.Certainly, first The both ends of elastic metallic yarn 1131 can be set in flat and shape of threads respectively.In other embodiments, the first elasticity gold Category silk 1131 both ends can partly be located at indent to form depressed part, the first housing 111 and the second housing 112 in shaping In depressed part, to play fixation.

Refering to Fig. 1 and Fig. 2, optionally, the first resilient coating 1132 further coats the first housing 111 and the second housing 112 at least part outer surface, such as whole outer surfaces.I.e. the first resilient coating 1132 coats first in a manner of injection molding Elastic metallic yarn 1131, at least part outer surface of the first housing 111, at least part outer surface of the second housing 112, so make It is stronger to obtain texture and the body-sensing of bone conduction earphone, and the presence of the first resilient coating 1132, can further containment vessel The element of body and enclosure interior so that bone conduction earphone is more resistant to abrasion.

Refering to Fig. 5 and Fig. 6, optionally, formed with through hole 1121 on the second housing 112.I.e. through hole 1121 runs through second The medial surface and lateral surface of housing 112.First resilient coating 1132 cover through hole 1121 and further above through hole 1121 and Side away from the second housing 112 (i.e. the medial surface away from the second housing 112) is formed with button holding part 1121a.Button holds The portion 1121a of putting is to be covered through hole 1121 in injection moulding process by the first resilient coating 1132 and formed, in button holding part 1121a Because the presence of the first resilient coating 1132 is can to completely cut off moisture content, dust etc. to enter 112 in second shell body.Ear-hang component 11 enters One step includes button 118 and switch module 119, and wherein button 118 is arranged in button holding part 1121a.Switch module 119 is set Be placed in the second housing 112 away from the first resilient coating 1132 side, i.e. the second housing 112 medial surface, and with button 118 First resilient coating 1132 of lower section abuts.Optionally, a boss 1121b, button are provided with button holding part 1121a 118 are fixed in a manner of for example pasting on boss 1121b.In the present embodiment, because the first resilient coating 1132 is with injection Mode, which is fixed, to be coated on second shell body 112, and covers through hole 1121, has more preferable waterproof effect.Optionally, boss 1121b is integrally formed when the first resilient coating 1132 covers through hole 1121 and formed by the first resilient coating 1132.

In the present embodiment, the switch module 119 on the second housing 112 is mainly used for controlling the

function of bone conduction earphone Switch, such as broadcasting and the pause of music, voice are answered with hanging up, connecting wireless signal to be connected mobile device such as bluetooth Communication, or the selection etc. of bone conduction earphone mode of operation, not limited to this.

Refering to Fig. 1, Fig. 2, Fig. 4 and Fig. 7, optionally, the inside of the first resilient coating 1132 is further provided with being used for The lead channels 1134 of the first housing 111 and the second housing 112 are connected, ear-hang component 11 further comprises from the first housing 111 The first wire group 1133 of the second housing 112 is extended to through lead channels 1134, the radial dimension of lead channels 1134 is arranged to The first wire group 1133 is allowed to be moved along lead channels 1134.

By setting lead channels 1134, such as first the one end of the first wire group 1133 can be connected when assembling in the later stage Element such as bone-conduction speaker in (such as in a manner of onboard) second housing 112, then the first wire group 1133 is another Hold through lead channels 1134 with connect the first housing 111 in element such as battery component 13, control circuit component 14 or Switching circuit board 15 etc., packaging technology can be so reduced, and existing bone conduction earphone can be improved in the first resilient coating 1132 that wiring is embedded to caused by the first wire group 1133 in injection molding is difficult and the problems such as be unfavorable for later period maintenance.When So, the one end of the first wire group 1133 first can also be connected into (such as in a manner of onboard) first housing 111 when assembling in the later stage Interior element such as battery component 13, control circuit component 14 or switching circuit board 15, then the first wire group 1133 is another Hold through lead channels 1134 to connect the element in the second housing 112 such as bone-conduction speaker.

In the present embodiment, 1134 specific molding mode of lead channels for example including providing one first elasticity gold first Belong to the first housing 111 of the connection of silk 1131 and the component of the second housing 112, further in the second housing 112 and the first housing 111 Between additional metal silk (not shown) is removably set, further in the first elastic metallic yarn 1131, additional gold Belong to silk and the partial outer face of the first housing 111 and the second housing 112 and first resilient coating 1132 is formed with injection molding manner, into Additional metal silk is extracted after type to form lead channels 1134.In other embodiments, such as the first resilient coating 1132 is molded During shaping, be embedded to easily melting property material, in the first 1132 injection molding of resilient coating, this easily melting property material melts and flow out, shape Into lead channels 1134.In another example lead channels 1134 can be after the shaping of the first resilient coating 1132, by way of threading a needle Passage is formed, then

expands passage by way of hot melt and forms lead channels 1134.

With continued reference to Fig. 1 and Fig. 4, in the present embodiment, optionally, lead channels 1134 are arranged at the first elastic metallic The downside of silk 1131, with when in use compared to contact of first elastic metallic yarn 1131 closer to connection member 113 with human ear Position.In the present embodiment, the first lead channels 1134 are independently arranged with the first elastic metallic yarn 1131 interval.In other implementations In example, the first lead channels 1134 can merge setting with the first elastic metallic yarn 1131, i.e., the first wire group 1133 is first The first elastic metallic yarn 1131 is can contact in lead channels 1134.In the present embodiment, lead channels 1134 are arranged at the first bullet The downside of property wire 1131, with when in use compared to the first elastic metallic yarn 1131 closer to connection member 113 and human ear Contact position, due to the presence of lead channels 1134, can make it that the first resilient coating 1132 close to human ear is more elastic It is softer, wear more comfortable.In other embodiments, certain first lead channels 1134 can also be arranged on the first elasticity The upside of wire 1131, the first elastic metallic yarn 1131 is closer to human ear when in use.

Refering to Fig. 1, Fig. 2 and Fig. 8, optionally, ear-hang component 11 includes the 3rd housing 114 and the 4th housing 115.Wherein 3rd housing 114 coordinates with the first housing 111, to form the first appearance for being used for housing battery component 13 or control circuit component 14 116 between being empty.4th housing 115 coordinates with the second housing 112, is used for the second accommodating sky for housing bone-conduction speaker to be formed Between 117.Optionally, the 4th housing 115 and the 3rd housing 114 are plastic casing.

Optionally, the second housing 112 is connected with the 4th housing 115 by the first snap component (not marking), the first card Seaming element includes the first holding section and the first buckling parts, and the first holding section is arranged on the 4th housing 115, and the first buckling parts is set It is placed on the second housing 112, when the second housing 112 and the 4th housing 115 coordinate, the first holding section card on the 4th housing 115 Enter the first buckling parts of the second housing 112, the second housing 112 is fixed together with the 4th housing 115.Optionally, Two housings 112 are attached with the 4th housing 115 by least one set of first snap component such as 4 group of first snap component.When Right second housing 112 can also be bonded with the 4th housing 115 by glue, or be made simultaneously with glue by the first engaging component It is connected with being fixed, or by fasteners such as screws.

Optionally, the 3rd housing 114 is connected with the first housing 111 by the second snap component (not marking), the second card Buckle assembly includes the second

holding section and the second buckling parts, and the second holding section is arranged on the 3rd housing 114, and the second buckling parts is set Put on the first housing 111, when the first housing 111 and the 3rd housing 114 coordinate, the second holding section card of the 3rd housing 114 Enter the second buckling parts of the first housing 111, the first housing 111 is fixed together with the 3rd housing 114.

In the present embodiment, the 3rd housing 114 of ear-hang component 11 coordinates with the first housing 111, is used to house to be formed First accommodation space 116 of battery component 13 or control circuit component 14, the 4th housing 115 coordinates with the second housing 112, with shape into the second accommodation space 117 for housing bone-conduction speaker, the first wire group 1133 can move through lead channels 1134 are used to electrically connect bone-conduction speaker and battery component 13 or control circuit component 14.In the present embodiment, battery component 13 for example including battery and battery management circuit, and battery is that bone conduction earphone miscellaneous part is supplied by battery management circuit Electricity, such as battery management circuit include charging circuit, current foldback circuit, over-discharge protection circuit, overvoltage crowbar etc..Such as Battery is rechargeable battery, for example, lithium battery.Refering to Fig. 7, optionally, bone conduction earphone, which still further comprises, for example transfers Circuit board 15, it is arranged in the first accommodation space 115, battery component 14 is divided into multiple wiring solder joints by switching circuit board 15, With two bone-conduction speakers, control circuit component 14, microphone and the switch module of corresponding connection bone conduction earphone 119 etc., said elements associated tracks are connected with above-mentioned wiring solder joint and turned on by Fig. 7 modes, are easy to wiring and assembling.Such as electricity Pond component 14 connects switching circuit board 15 by two wiring solder joints of both positive and negative polarity, and switching circuit board 15 separates 10 wiring welderings Point, to connect the miscellaneous part of bone conduction earphone.

Refering to Fig. 1 and Fig. 2, optionally, the first sub-accommodation space 115a, the 3rd housing are provided with the first housing 111 The second sub-accommodation space 115b is provided with 114, and it is accommodating with the first son when the 3rd housing 114 and the first housing 111 coordinate Space 116a is collectively forming the first accommodation space 116, such as is fixedly connected by the first snap component.Wherein second son holds The volume for being empty a 116b is more than the first sub-accommodation space 116a.Such as second sub-accommodation space 116b volume be first son hold It is empty 2-5 times of a 116a, for example, 3-4 times, for example, 3.2 times, or for example, 2.5 times.

In assembled battery component 13 or control circuit component 14, such as first by battery component 13 or control circuit component 14 are placed in the first sub-accommodation space 116a, for example, battery by glue material or sticking double faced adhesive tape in the first sub- accommodation space In 116a, or control circuit component 14 is fixed in the first sub- accommodation space 116a by snap-in structure so that battery component 13 or control circuit component 14 it is most of exposed, be easy to the techniques such as assembling and wiring, then the 3rd housing 114 is passed through into the second card Buckle assembly covers with the first housing 111, and the first sub- sub- accommodation space 116b of accommodation space 116a and second form the first accommodating sky Between 116, so improving traditional bone conductors earphone needs to assemble battery or control board and be contained in and ear-hang one In the housing of shaping and further battery control circuit plate exterior section is affixed on using silica gel strip to carry out coating caused assembling The problem of complex procedures, simplify structure and assembling procedure.

Refering to Fig. 2 and Fig. 8, optionally, the 4th housing 115 is set in prism-shaped, wherein in the 4th housing 115 at least Bar shaped is provided with one side and draws sound hole 1151, the length direction of sound hole 1151 and the bottom surface of the 4th housing 115 are drawn in wherein bar shaped It is parallel or be arranged substantially in parallel, and bar shaped draw sound hole 1151 length be not less than side where it width three/ Two.In the present embodiment, bar shaped draws the relatively parallel bottom surface 115e of sound hole and refers to that the 4th housing 115 is towards human body face when wearing Plane defined in the edge of opening of the one side in portion.

Typically, bone-conduction speaker peritropous environment of meeting during vibration transmits sound, in addition to wearer, ring Other people in border can also hear that the sound of loudspeaker, such as the vibration of bone-conduction speaker cause the second accommodation space 117 The vibration of interior air and the vibration for causing the grade of the 4th housing 115, so as to occur leaking sound phenomenon, the sound of bone conduction earphone can be influenceed Matter.It is to propagate to the sound wave guiding in the second accommodation space 117 outside space to draw sound hole 1151, with leakage speech ripple with atmosphere Propagation interferes, and so as to reduce the amplitude of Lou speech ripple, reduces leakage sound.

With continued reference to Fig. 8, in order to further improve leakage sound phenomenon, the present embodiment passes through at least the one of the 4th housing 115 Side sets bar shaped to draw sound hole 1151, and is appropriately arranged with its size and direction improves the leakage sound that traditional bone conductors earphone belt comes and showed As still than it is more serious the problem of.Further, bar shaped is

drawn the length direction of sound hole 1151 and parallel with the bottom surface of the 4th housing 115 set Put, can not only ensure attractive in appearance, and the uniformity of the intensity of acoustic wave through directed parallel, so as to ensure interference effect.In this reality Apply in example, bar shaped draw sound hole 1151 length be not less than side where it width 2/3rds, can effectively guide the Sound wave in two accommodation spaces 117.Be chosen as, bar shaped draw sound hole 1151 length be its where side width four/ Three.Certainly, in other embodiments, wherein being at least set side by side with least two articles of bar shapeds on one side in the 4th housing 115 Draw sound hole 1151, such as setting two parallel bar shapeds to draw sound hole 1151 at least on one side, and with the bottom of the 4th housing 115 Face 115e is parallel.

Optionally, the 4th housing 115 bone conduction earphone using when side 115d close to human ear on be not provided with bar shaped Draw sound hole 1151.Certainly, in other embodiments, can also the 4th housing 115 when bone conduction earphone uses close to human ear Side 115d on set draw sound hole, can be that point type draws sound hole, or sound hole 1151 is drawn in bar shaped.

With continued reference to Fig. 2 and Fig. 8, optionally, the 4th housing 115 is set in quadrangular shape, wherein in the 4th housing 115 Bar shaped, which is provided with, on two sides 115a, 115c being disposed adjacent with connection member 113 draws sound hole 1151, further remaining two in individual side 115b, 115d bone conduction earphone using when the side 115b away from human ear equally set bar shaped to draw sound hole 1151, and in remaining two sides 115b, 115d bone conduction earphone using when side 115b close to human ear on do not set Put bar shaped and draw sound hole 1151.Namely set three bar shapeds to draw sound hole 1151 on three sides 115a, 115b, 115c, passed in bone Guide lug machine using when be not provided with bar shaped close to the side 115d of human ear and draw sound hole 1151, so can further reduce Lou sound and show As ensureing the tonequality of bone conduction earphone.

In the present embodiment, the 4th housing 115 is set in quadrangular shape, such as including four-prism and class quadrangular Shape.Such as specifically, two sides 115a, 115c being disposed adjacent with connection member 113 of the 4th housing 115 any one side The length in face is all higher than the length of remaining two sides 115b, 115d any one side, further, the 4th housing 115 It is unequal or equal with two sides 115a, 115c that connection member 113 is disposed adjacent length.In other embodiment In, the 4th housing 115 is set in quadrangular shape, and the length of its four sides can be equal.

In the present embodiment, optionally, two sides being disposed adjacent with connection member 113 of the 4th

housing 115 Angle between 115a, 115c is 90 ° -150 °, is chosen as 100 ° -130 °, is chosen as 110 ° -120 °.

Optionally, it is further provided with covering the water proof and dust proof filter screen that sound hole 1151 is drawn in bar shaped, example in the 4th housing 115 Such as waterproof ventilated membrane (not shown).Water proof and dust proof filter screen is set, can prevent the dust outside bone conduction earphone and waterproof bone from passing The water inlet of guide lug machine enters damage bone-conduction speaker.

In the present embodiment, a microphone aperture (not shown) is respectively arranged with the second housing 112 and the 4th housing 115, Specifically, the first microphone aperture be arranged on the not direct remaining two sides 115b being connected with connection member 113 of the 4th housing 115, 115d junction, second microphone hole are arranged on the lateral surface of the second housing 112 and close to the 4th housing 115 and connection members 113 junction.By setting two microphones in the microphone aperture of two stagger settings, phonetic entry matter can be strengthened Amount, and effective Noise Reduction is played, thus improve the definition of phonetic entry.

Refering to Fig. 2 and Fig. 9, in the present embodiment, the quantity of ear-hang component 11 is two, and bone conduction earphone further wraps include rear hanging component 12.Hanging component 12 includes the second elastic metallic yarn 121, second be coated on the second elastic metallic yarn 121 afterwards Resilient coating 122 and the Plug Division 123 for being arranged at the both ends of the second elastic metallic yarn 121.Plug Division 123 respectively with two ear-hangs First housing 111 of component 11 patches cooperation, and is fixedly connected.Optionally, Plug Division 123 is fixed on second with injection molding manner The both ends of elastic metallic yarn 121, Plug Division 123 can be so set more securely to be fixed on the both ends of the second elastic metallic yarn 121. Optionally, the second elastic metallic yarn 121 can be metal simple-substance, or include the alloy material of various metals material, Such as spring steel, aluminium alloy, magnesium alloy, titanium alloy, nickel alloy, Ti-Ni alloy, magnesium lithium alloy, chrome-molybdenum steel etc. or bag include metal material and the composite of nonmetallic materials.In the present embodiment, the second elastic metallic yarn 121 is titanium alloy wire, or Person is at least made up of titanium alloy material.In the present embodiment, the second resilient coating 122 is layer of silica gel.In other embodiment mode In, the second resilient coating 122 can also be rubber layer or emulsion layer, or the composite layer including silica gel.

Carry out patching cooperation by the Plug Division 123 of rear hanging component 12 and the first housing 111 of two ear-hang components 11, change It has been apt to the problems such as earphone size that existing bone

conduction earphone is brought using the fixed form such as screw is larger, so as to simplify structure, Mitigate the weight of bone conduction earphone, facilitate later stage wiring and cost can be reduced.

Refering to Fig. 9 and Figure 10, optionally, the end set of the first housing 111 has what is inserted for allowing Plug Division 123 Jointing holes 1111 and the vertical direction connection jointing holes 1111 of direction of insertion in Plug Division 123 and the perforate 1112 of outside, To allow into jointing holes 1111 to apply from the outside through perforate 1112 glue or installation stopper (not shown), to cause Plug Division 123 are fixed in the presence of glue or stopper in jointing holes 1111.In this embodiment, perforate 1112 is positioned at the described first son In accommodation space 116a.In other embodiments, the end set of the first housing 111 has what is inserted for allowing Plug Division 123 Jointing holes 1111, there is a recess on Plug Division 123, there is a resilient projection in jointing holes 1111, Plug Division 123 is inserted and patched During hole 1111, resilient projection is caught in recess, and Plug Division 123 and jointing holes 1111 are coordinated into fixation.Such as Plug Division 123 is inserted During jointing holes 1111, resilient projection is first extruded, after be caught in the presence of elastic restoring force in recess.Optionally, patch The depth that portion 123 inserts jointing holes 1111 is 6-11mm, is chosen as 8-10mm.

With continued reference to Fig. 9 and Figure 10, optionally, fluting 1231 is provided with the side wall of Plug Division 123.The warp of fluting 1231 Perforate 1112 is exposed or part is exposed, and for receiving glue or stopper.Optionally, Plug Division 123 is at least one It is provided with side wall on fluting 1231, such as two side walls and is provided with fluting 1231.In other embodiments, can make simultaneously With glue and stopper, such as first fixed using stopper, then apply glue and further fix.In the present embodiment, stopper E.g. chock or pin or the fixture insertion fluting 1231 with certain elasticity is interference fitted.

Refering to Fig. 2, Fig. 9 and Figure 10, optionally, Plug Division 123 includes first be connected with the second elastic metallic yarn 121 Patch section 123a and patch section 123a with first and be connected and second patch section away from what the second elastic metallic yarn 121 was set 123b.Direction of insertion of the jointing holes 1111 along Plug Division 123 is divided into for receiving the first the first hole section for patching section 123a 1111a and the second hole section 1111b that section 123b is patched for reception second.Wherein the first hole section 1111a is sized to permit Perhaps second patch section 123b and moved freely along direction of insertion in the first hole section 1111a, and cause first to patch section 123a and the Tight fit between one hole section 1111a.Section and both ends hole section are patched by two sections to be respectively cooperating with fixing, and can cause Plug Division 123 are more

securely fixed in the first housing 111, strengthen the structural stability of bone conduction earphone.

With continued reference to Fig. 9 and Figure 10, optionally, fluting 1231 is further disposed at the second side wall for patching section 123b. Perforate 1112 connects the second hole section 1111b of jointing holes 1111.In the present embodiment, a section 123b is patched in Plug Division 123 second The first hole section 1111a and the second hole section 1111b is passed sequentially through, so that first patches section 123a and the first hole section 1111a close-fittings Close, second patch section 123b fluting 1231 it is exposed through perforate 1112, for receiving glue or stopper.Connect by first insert section 123a and the first hole section 1111a tight fit and the second jointing holes 1111 and the second hole section 1111b further cooperation It is fixed, effectively rear extension can be fixedly connected with ear-hang.In other embodiments, fluting 1231 can be arranged on first and patch In section 123a side wall.Perforate 1112 connects the second hole section 1111b of jointing holes 1111.

Optionally, the second hole section 1111b be dimensioned so that second patch section 123b and the second hole section 1111b it Between tight fit.Thus by the first tight fit, the second jointing holes 1111 and the second hole for patching section 123a and the first hole section 1111a Section 1111b tight fit and the glue of application or stopper are fixed, and effectively further hang by after and are fixed with ear-hang Connection, and structure can be simplified, make bone conduction earphone lighting.Certainly, in other embodiments, first section 123a and are patched Tight fit between one hole section 1111a, and second to patch section 123b and the second hole section 1111b can be other kinds of secure fit Such as it is clasped.

Refering to Figure 11, optionally, first patches the shape of section 123a both sides and the first hole section 1111a contact surfaces contacted It is different.First patches section 123a both sides shape difference, and accordingly the first hole section 1111a patches what section 123a was contacted with first 1111a1,1111a2 are also different for two sides.For example, the curved setting in the first hole section 1111a two sides, medial surface 1111a2 Radius of curvature be more than lateral surface 1111a1 radius of curvature, namely medial surface 1111a2 radian change is relatively slow, and outer Side 1111a1 radian change is relatively large, and first patches section corresponding setting in 123a two sides.Certainly, in other embodiment In, the first hole section 1111a curved setting in two sides, medial surface 1111a2 radius of curvature is less than lateral surface 1111a1's Radius of curvature, namely medial surface 1111a2 radian change are relatively large, and the change of lateral surface 1111a1 radian is relatively small. First hole section 1111a two sides are medial surface 1111a2 close to human body head when wearing, and are outer away from human body head Side 1111a1.First patches the shape difference of section 123a

both sides and the first hole section 1111a contact surfaces contacted so that first connects Insert section 123a and be unable to anti-plug, and two Plug Divisions 123 are hung from mixed insertion after also causing, play effective fool proof effect, facilitate group Dress.

Refering to Fig. 9 and Figure 10, optionally, first, which patches section 123a and second, patches section 123b bottom surface and stepped sets Put and patch section 123a first and the second junction for patching section 123b is provided with the first wedge-shaped changeover portion 123c, and the first hole Section 1111a and the second hole section 1111b junction is provided with the second wedge-shaped changeover portion corresponding with the first wedge-shaped changeover portion 123c 1111c。

In the present embodiment, first section 123a is patched and the second bottom surface for patching section 123b refers to when wearing close to human ear The one side of root.Top surface is then the one side away from people's the ear portion.

In the present embodiment, first patch section 123a thickness and be greater than the second thickness for patching section 123b and i.e. stepped set Put, there is thickness difference in both junctions, and set the first wedge-shaped changeover portion 123c, it is corresponding in the first hole section 1111a and Second hole section 1111b junction sets the second wedge-shaped changeover portion 1111c being adapted with the first wedge-shaped changeover portion 123c, the One patches section 123a and second when patching a section 123b and being sequentially inserted into the first hole section 1111a and the second hole section 1111b, the first wedge-shaped mistake Cross section 123c and the second wedge-shaped changeover portion 1111c to abut against, second can be facilitated to patch section 123b and first and patch section 123a's Insertion, and play a part of buffering transition, spacing and further fixation.

Refering to Fig. 9, Figure 12 and Figure 13, optionally, rear hanging component 12 further comprises being wrapped by the second resilient coating 122 The the second wire group 124 covered, wherein the both ends of the second wire group 124 are exposed from the second resilient coating 122, the top of Plug Division 123 Face is provided with the groove 1232 of sunkening cord of the exposed parts for accommodating the second wire group 124.In the present embodiment, the second wire group 124, for connecting the element in two ear-hang components 11 such as connecting battery and control circuit component 14.Setting is sunken cord groove 1232, the second wire group 124 on the one hand effectively can be arranged and fixed, on the other hand can reduce volume.In other embodiment In, groove 1232 of sunkening cord can also be not provided with, and by other means enter the second wire group 124 such as glue or double faced adhesive tape Row is fixed, or the top surface of Plug Division 123 is

provided with the projection (not shown) that two rows are set up in parallel, and can be held between two row's projections Receive the second wire group 124.

Refering to Fig. 2, optionally, bone conduction earphone further comprises battery component 13 and control circuit component 14, wherein Battery component 13 is arranged at the first accommodation space 116 of one of two ear-hang components 11, and control circuit component 14 is arranged at in first accommodation space 116 of the other of two ear-hang components 11.

Refering to Figure 14 and Figure 15, optionally, the 3rd housing of the ear-hang component 11 for accommodating control circuit component 14 Button perforate 1141 and the storage tank 1142 connected with button perforate 1141 are provided with 114, control circuit component 14 includes electricity Road plate 141, the switch 142 being fixed on circuit board 141, waterproof liner 143 and button 144, wherein button 144 be arranged at by in key perforate 1141 and exposed through button perforate 1141, waterproof liner 143 includes liner plate main body 143a and with injection molding manner bag The 3rd resilient coating 143b overlayed on liner plate main body 143a, waterproof liner 143 is arranged in storage tank 1142 and the 3rd elasticity Coating 143b abuts with the sidewall elastomer of storage tank 1142, and button 144 and switch 142 are respectively arranged at the two of waterproof liner 143 Side and abutted respectively with waterproof liner 143.In this embodiment, the 3rd resilient coating 143b coats liner plate main body 143a one side And liner plate main body 143a edge, at least covered section edge, can also coat whole edges certainly In other embodiment In, the 3rd resilient coating 143b can coat liner plate main body 143a completely, that is, coat liner plate main body 143a two sides.

In the present embodiment, the switch 142 on circuit board 141 be mainly used for switching on and shutting down, volume adjusting or other cut Change function etc..

With continued reference to Figure 14 and Figure 15, the 3rd resilient coating 143b is coated with injection molding manner in the main body of waterproof liner 143, So that the 3rd resilient coating 143b is not easy to come off from the main body of waterproof liner 143, and the 3rd resilient coating 143b and proof liner Compactness between plate main body 143a is more preferable, improves existing bone conduction earphone water resistance, ensures the validity of waterproof.At this In embodiment, liner plate main body 143a can be plastics, and the 3rd resilient coating 143b can be silica gel, latex, rubber or be conjunction into thing.

Optionally, waterproof liner 143 is provided with the locating slot for accommodating switch 142 close to the side of switch 142.1431,,

In the present embodiment, the method for assembly control circuit component 14 for example first by button 144, waterproof liner 143 according to It is secondary to be

placed on the 3rd housing 114, and button 144 set it is exposed through button perforate 1141, then circuit board 141 pass through switch 142 And the locating slot 1431 of waterproof liner 143 abuts with waterproof liner 143.By setting locating slot 1431, the essence of switch 142 can be made Location fit accurately is carried out with button 144, so as to pass through effectively Operation switch 142 of button 144.

Refering to Figure 16 and Figure 17, optionally, control circuit component 14 further comprises the day being arranged on circuit board 141 Line 145, antenna 145 include antenna body 145a spaced with circuit board 141 and are connected antenna body 145a and circuit The grounding parts 145b and current feed department 145c of plate 141, wherein when being looked up perpendicular to the side of circuit board 141, antenna body 145a is bent from grounding parts 145b to the side of circuit board 141 to be extended.In the present embodiment, antenna body 145a is to circuit board 141 side bending, the length of antenna 145, Enhanced Radiation Reduced Blast efficiency can be increased in the confined space.In the present embodiment, day Line 145 is generally used for what is communicated wirelessly, such as bluetooth communication.In other embodiments, WiFi communication, honeybee be can also be Nest data communication, NFC etc..

Optionally, antenna body 145a includes parallel portion 145a1 and kink 145a2, perpendicular to circuit board 141 Side looks up, and parallel portion 145a1 width is more than kink 145a2 width, parallel portion 145a1 one end connection grounding parts 145b and current feed department 145c, it is in rank that the other end, which connects kink 145a2, parallel portion 145a1 and kink 145a2 in junction, Scalariform is set, and kink 145a2 is bent from junction to the side of circuit board 141.

Optionally, control circuit component 14 further comprises the grounded parts 146 being arranged on circuit board 141, wherein Antenna body 145a bends extension to the side of the remote grounded parts 146 of circuit board 141.In the present embodiment, grounded parts 146 be the switch 142 on USB interface and/or circuit, or other grounded parts 146.Typically, such as USB of grounded parts 146 Interface, certain interference can be all caused to antenna 145, in the present embodiment, antenna body 145a connects to the remote of circuit board 141 The side bending extension of ground part 146, can improve interference of the grounded parts 146 to the signal of antenna 145 in the confined space, protect Demonstrate,prove signal quality.In the present embodiment, USB interface can be used in bone conduction earphone and external device such as mobile terminal transmission number According to, it can also be used to charged for battery component 13.

Optionally, bearing of trend of the antenna body 145a width along antenna body 145a tapers into.It is such as specific

Ground, the parallel portion 145a1 width width that passes through is constant, kink 145a2 width gradually along bearing of trend by Gradual change is small.Certainly in other embodiments, parallel portion 145a1 width passes through and can tapered into, but parallel Width of the width of portions 145a1 other ends still greater than kink 145a2.

Optionally, bearing of trend of the antenna body 145a bending angle along antenna body 145a becomes larger.Such as Bending angle becomes larger, usually in order to which remote grounded parts 146 is such as USB, so as to ensure that the radiation of antenna 145 is imitated Rate.Optionally, there is bending pin 145a3, bending angle herein in the one end of kink 145a2 away from parallel portion 145a1 Maximum, on the other hand it is to lift radiation efficiency on the one hand in order to meet the needs of the size of antenna 145.

Embodiments of the present invention are the foregoing is only, are not intended to limit the scope of the invention, it is every to utilize this The equivalent structure or equivalent flow conversion that description of the invention and accompanying drawing content are made, or directly or indirectly it is used in other correlations Technical field, it is included within the scope of the present invention.

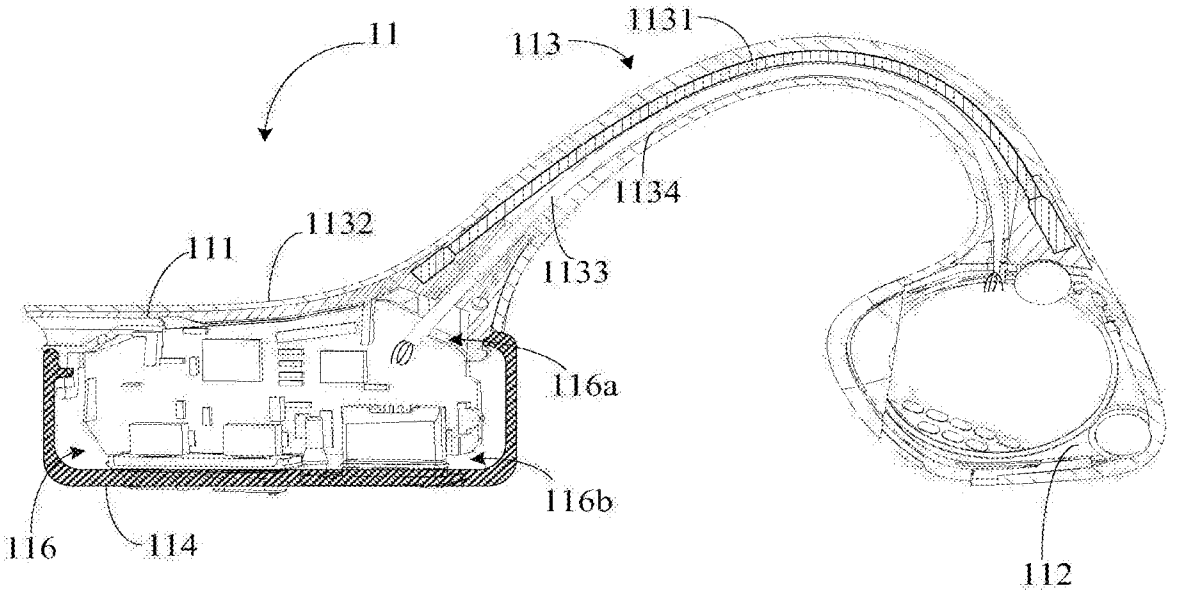


图1

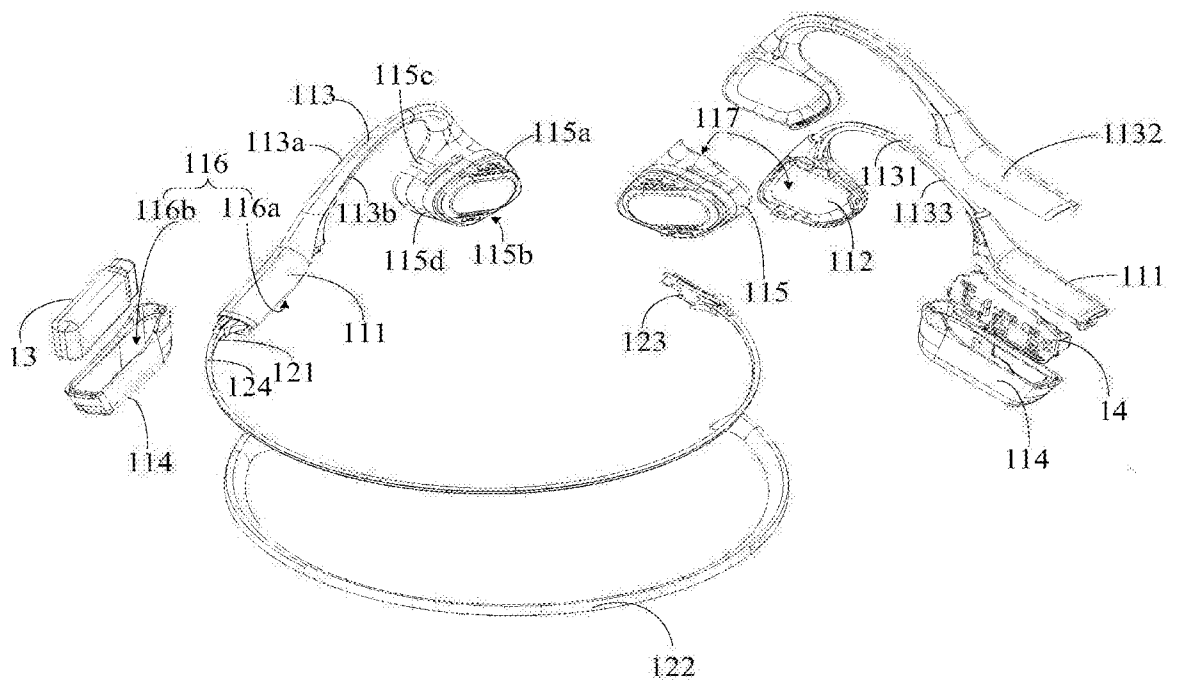


图2

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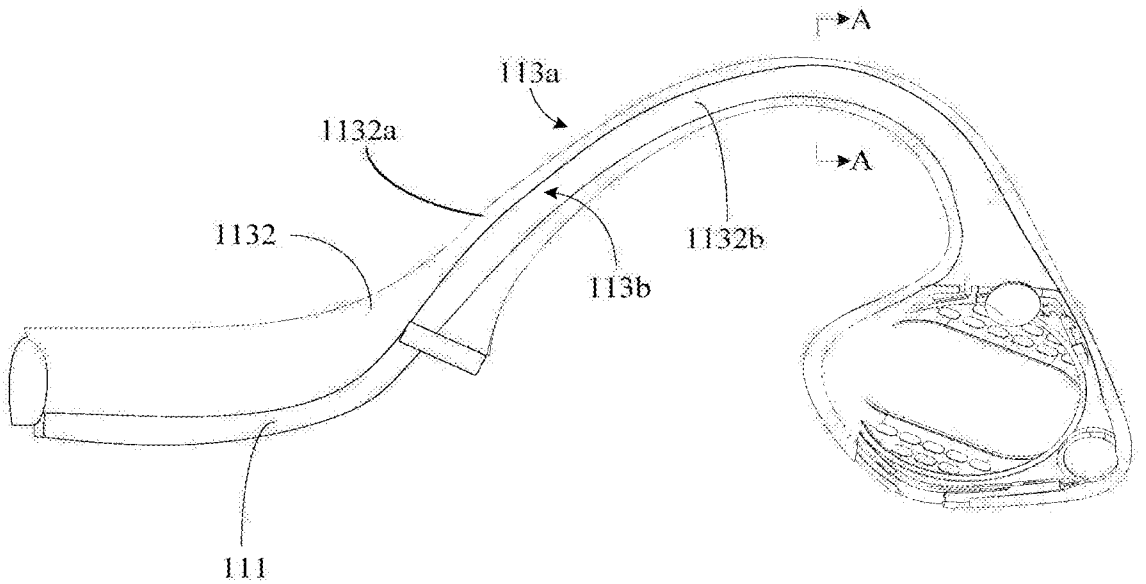


图3

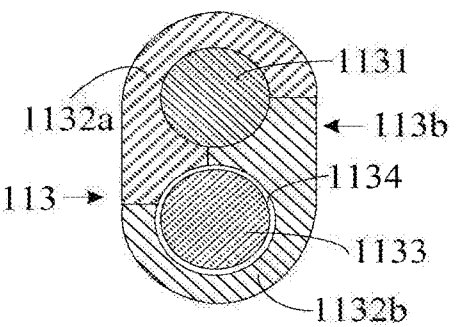


图4

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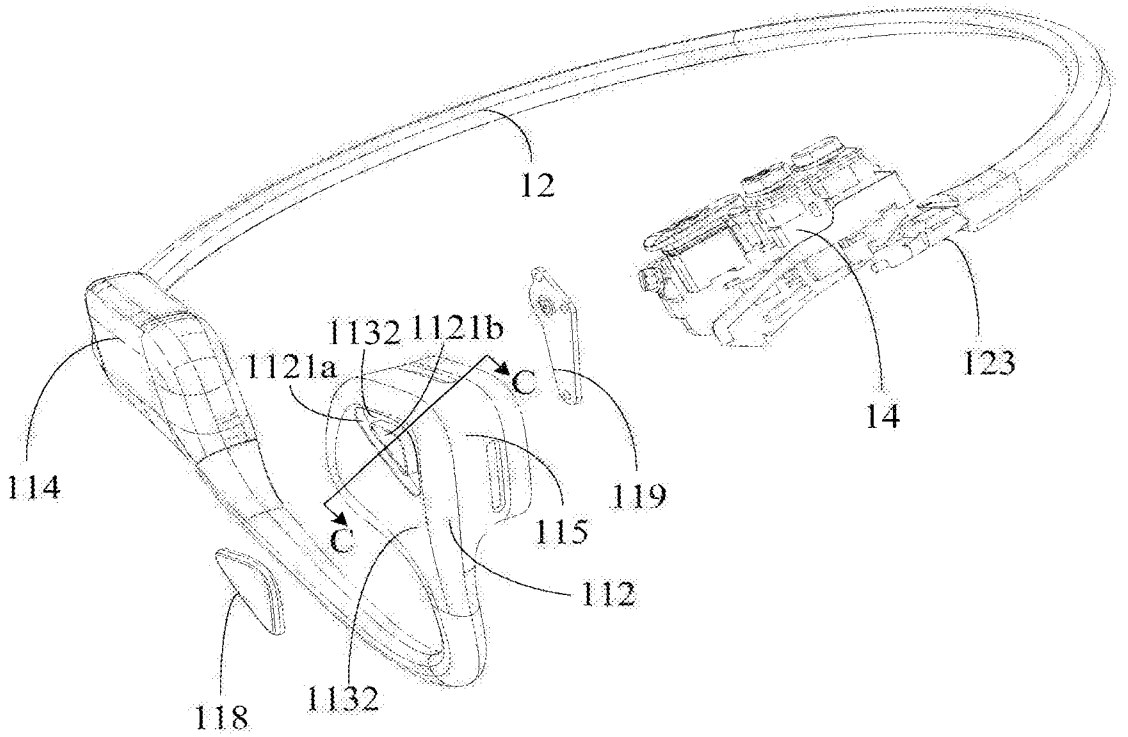


图5

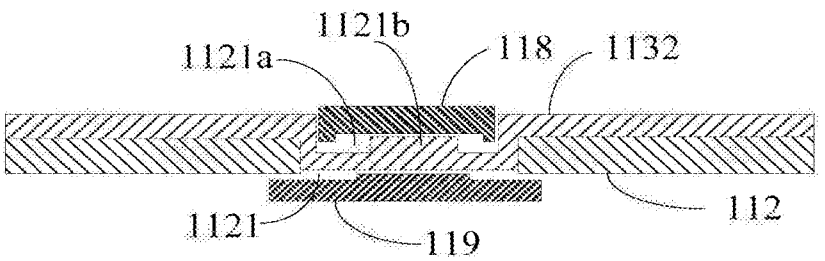


图6

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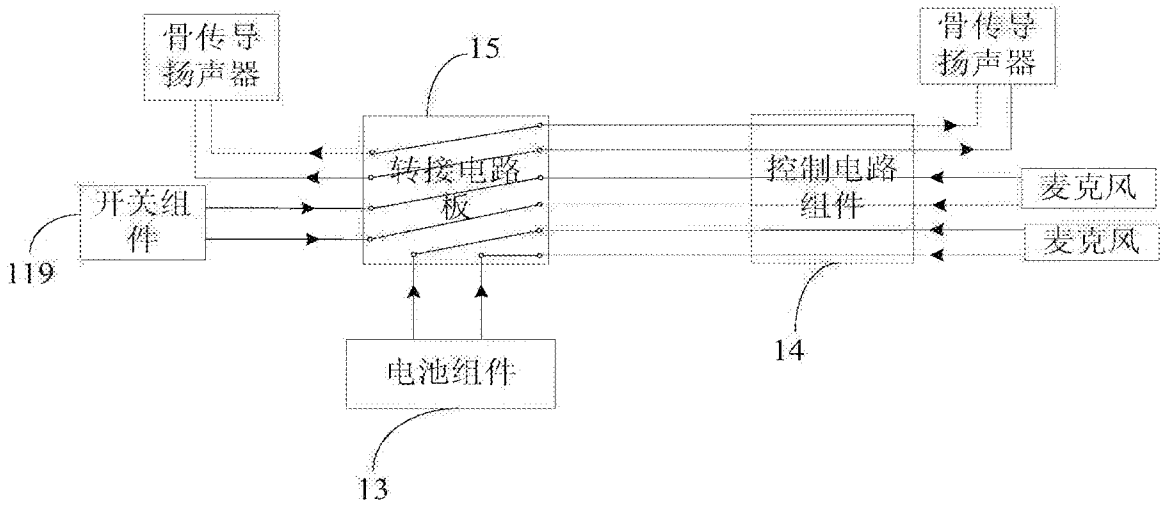


图7

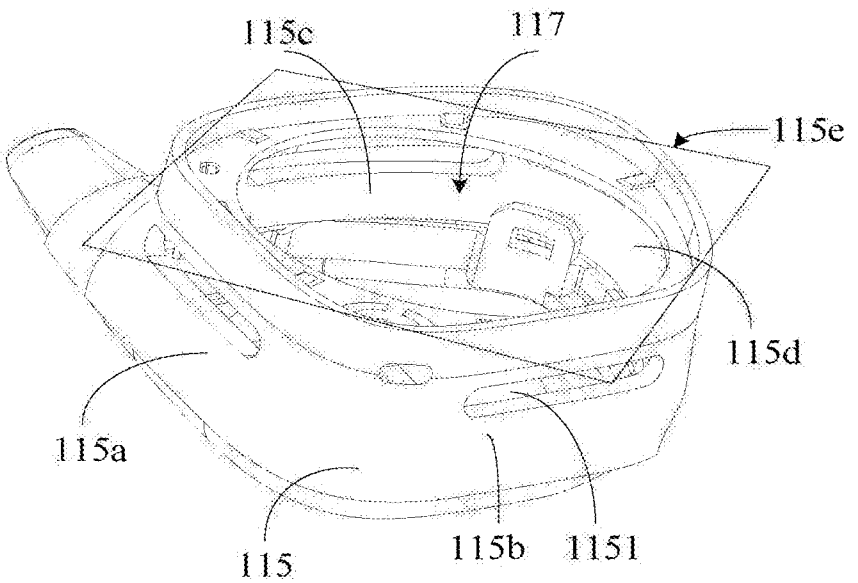


图8

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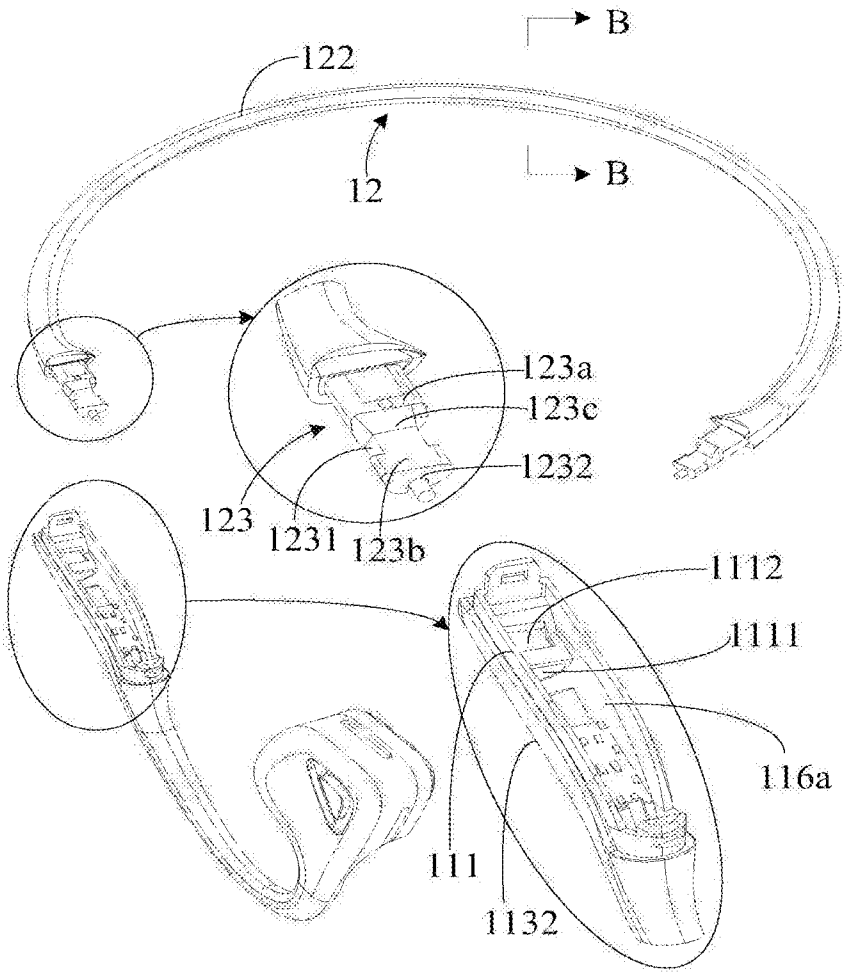


图9

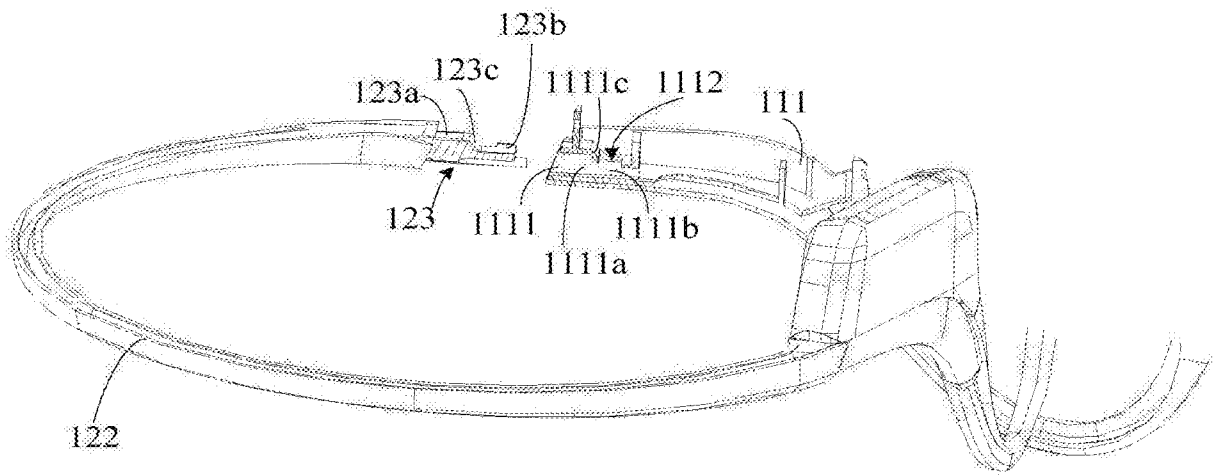


图10

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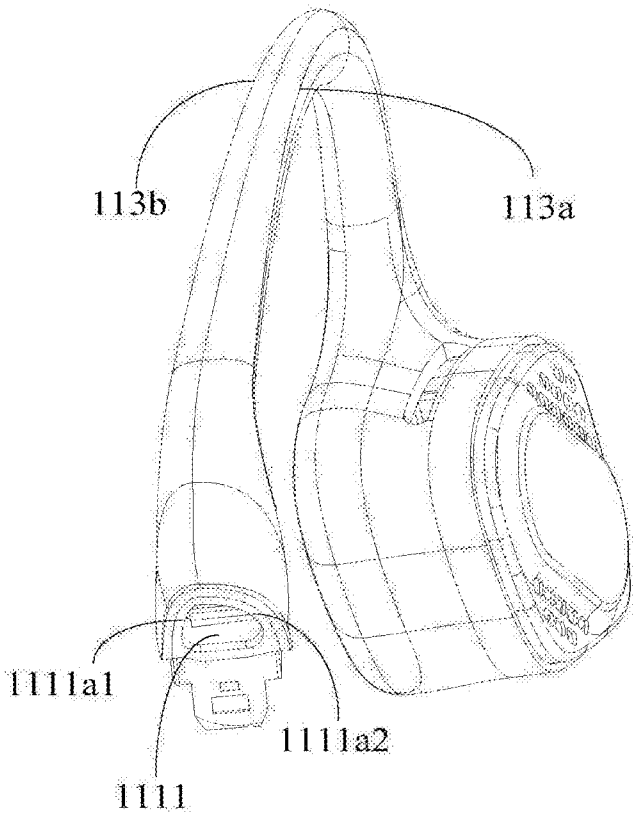


图11

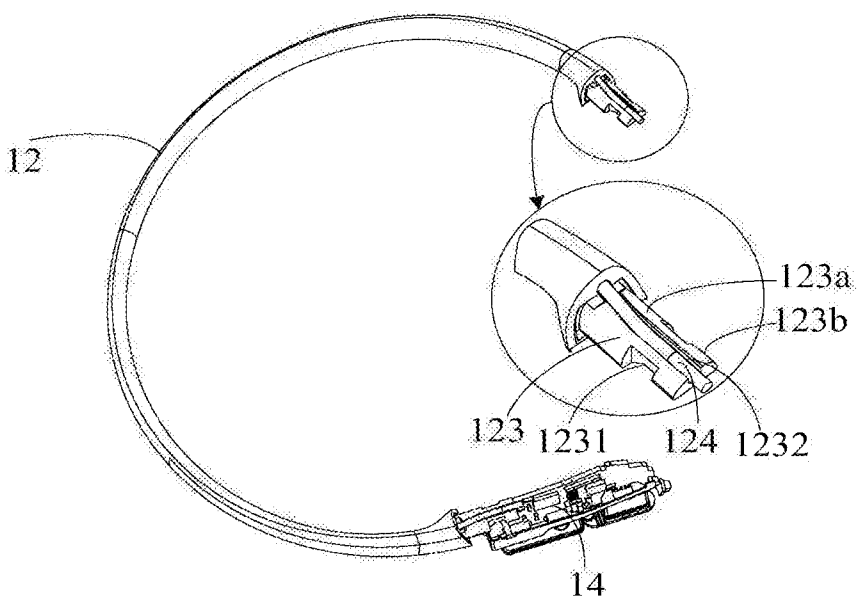


图12

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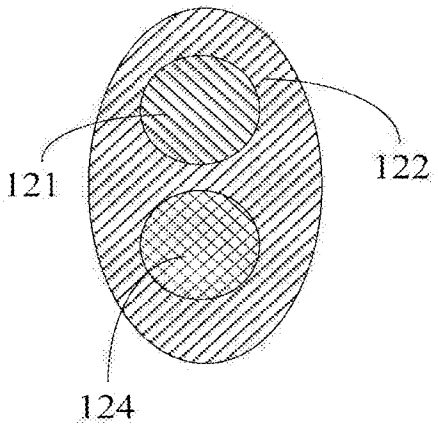


图13

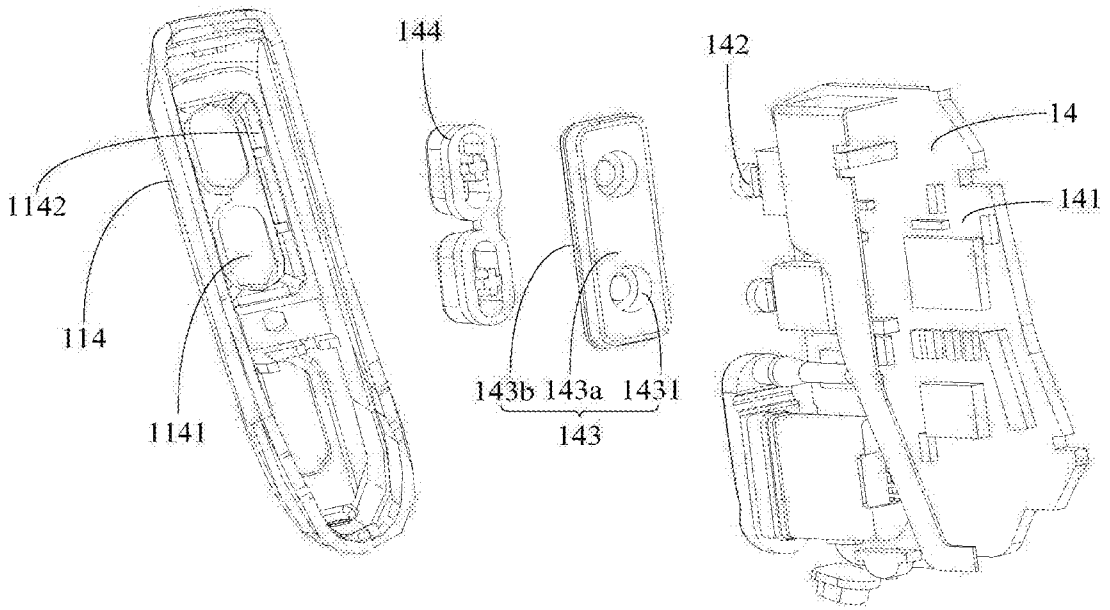


图14

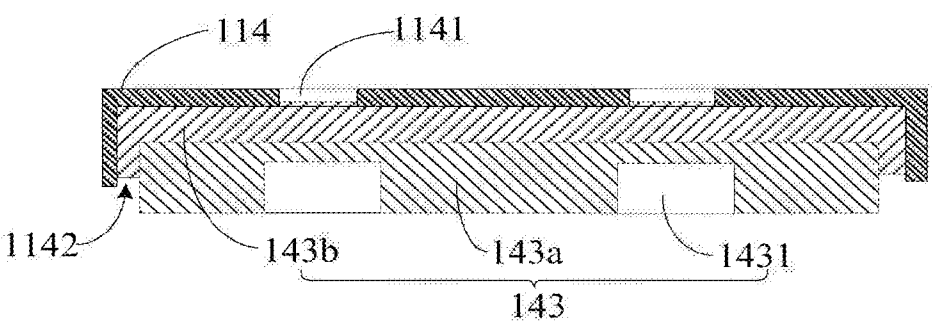


图15

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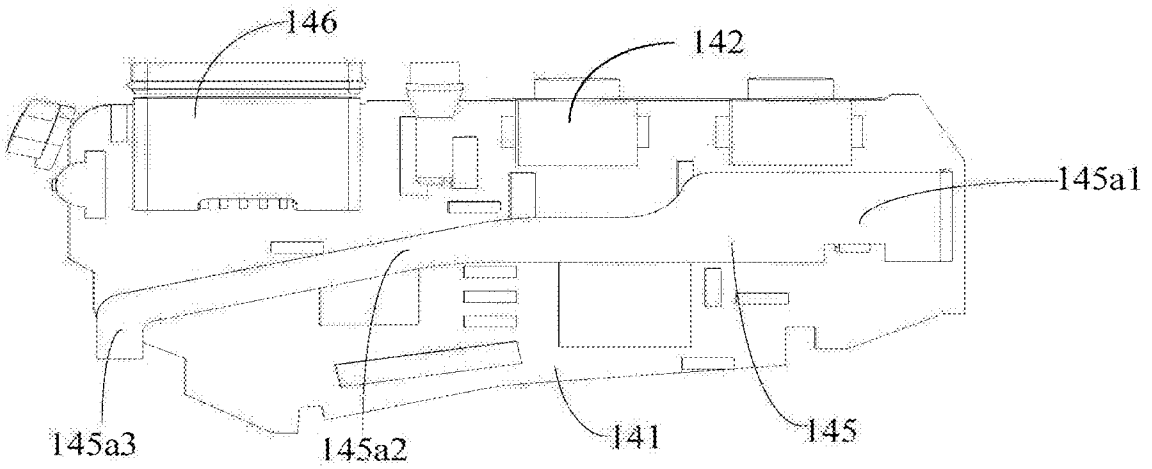


图16

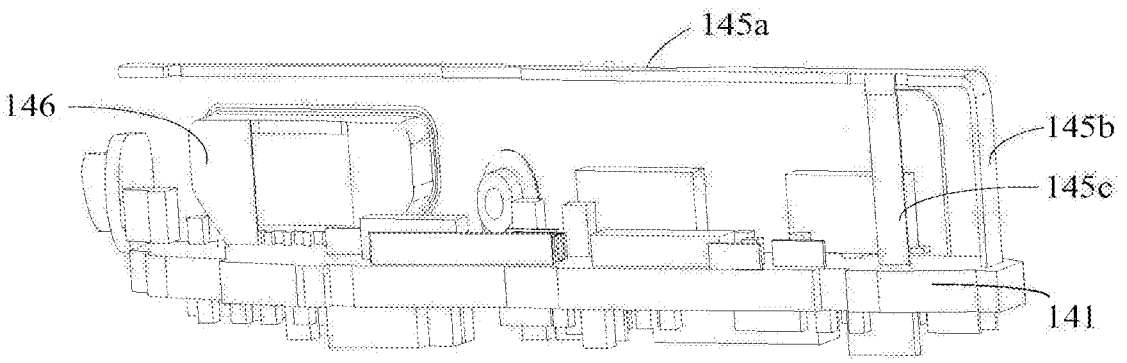


图17

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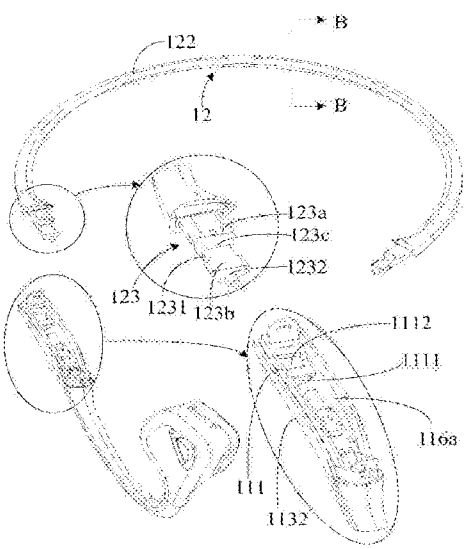
权利要求书1页 说明书10页 附图8页

(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。



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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依次安置在第三壳体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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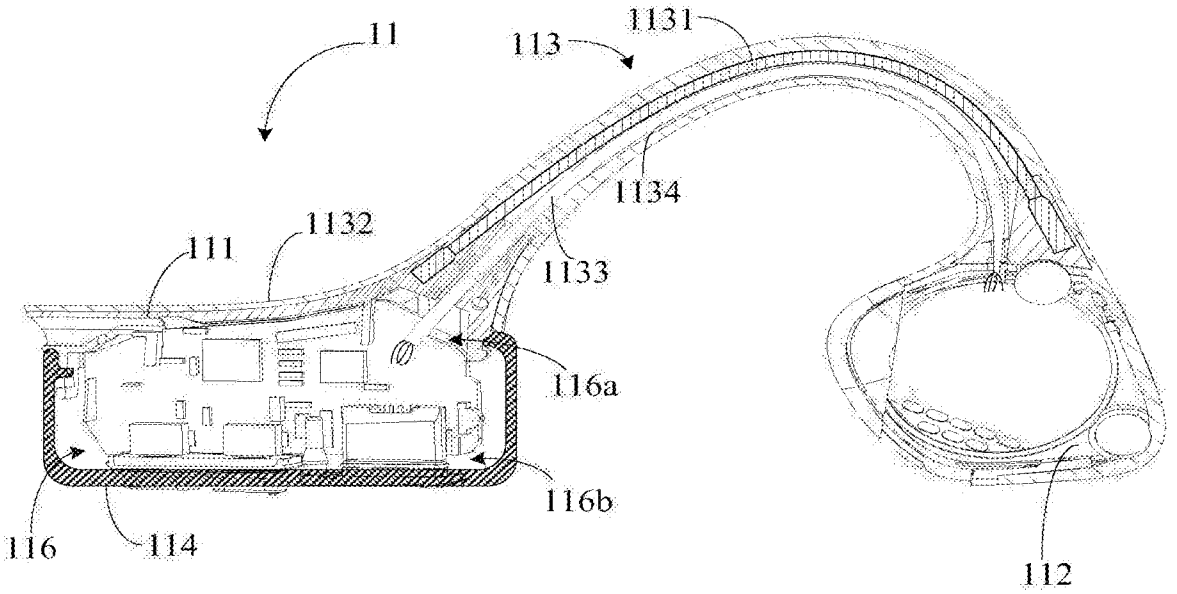


图1

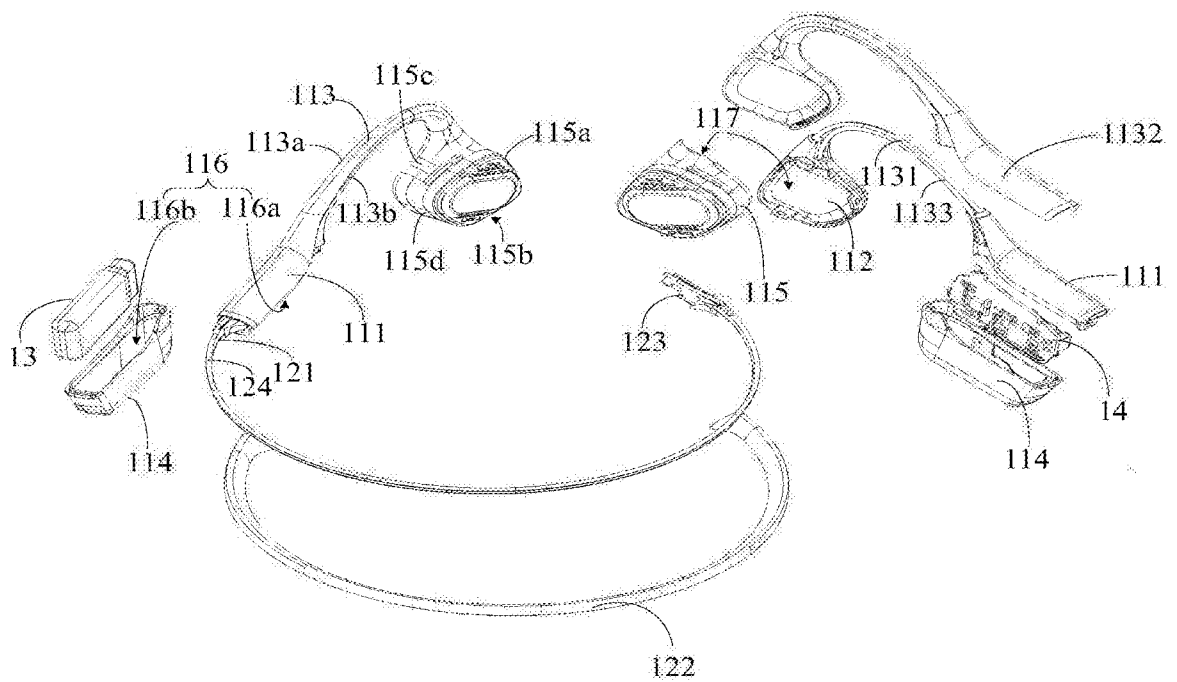


图2

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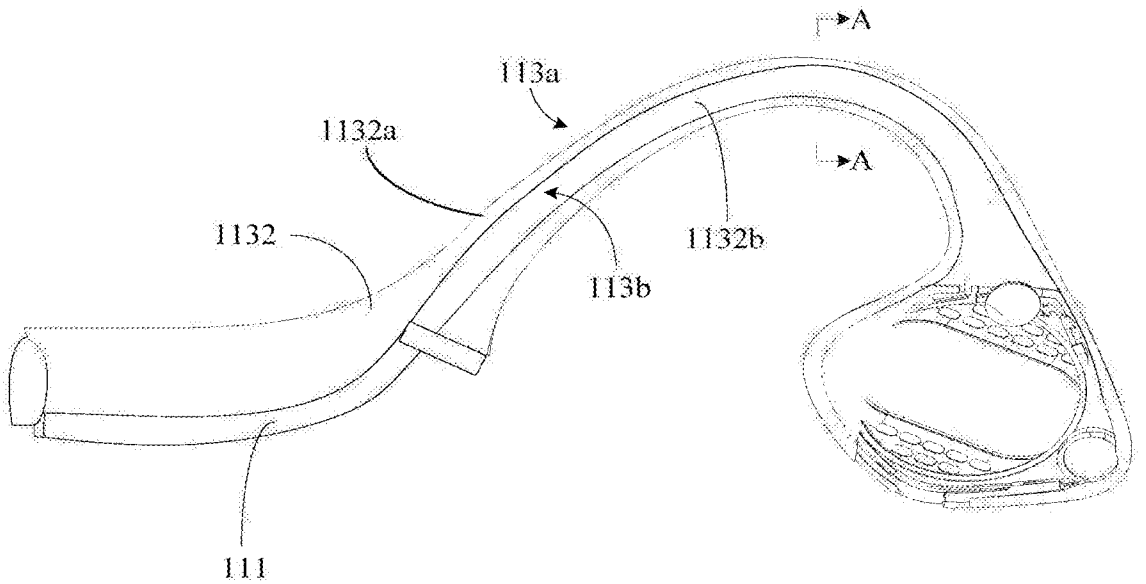


图3

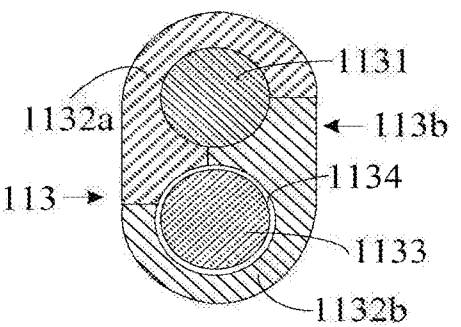


图4

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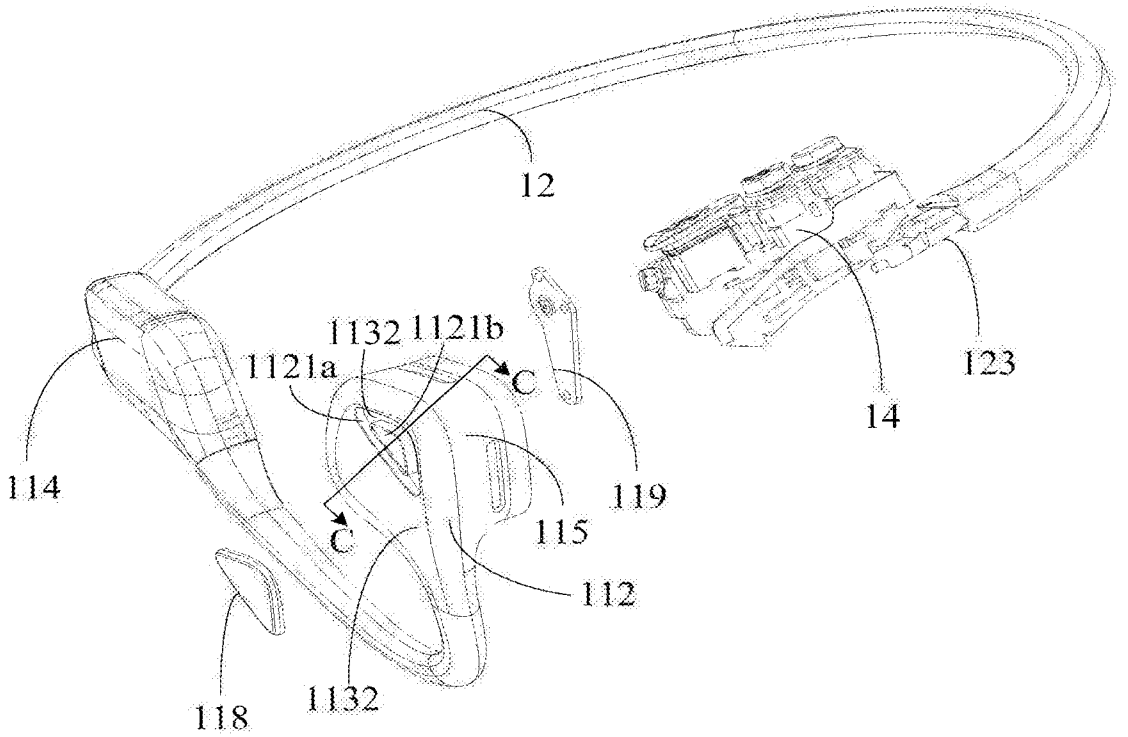


图5

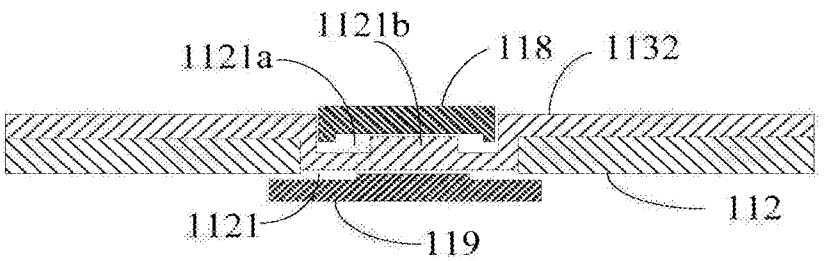


图6

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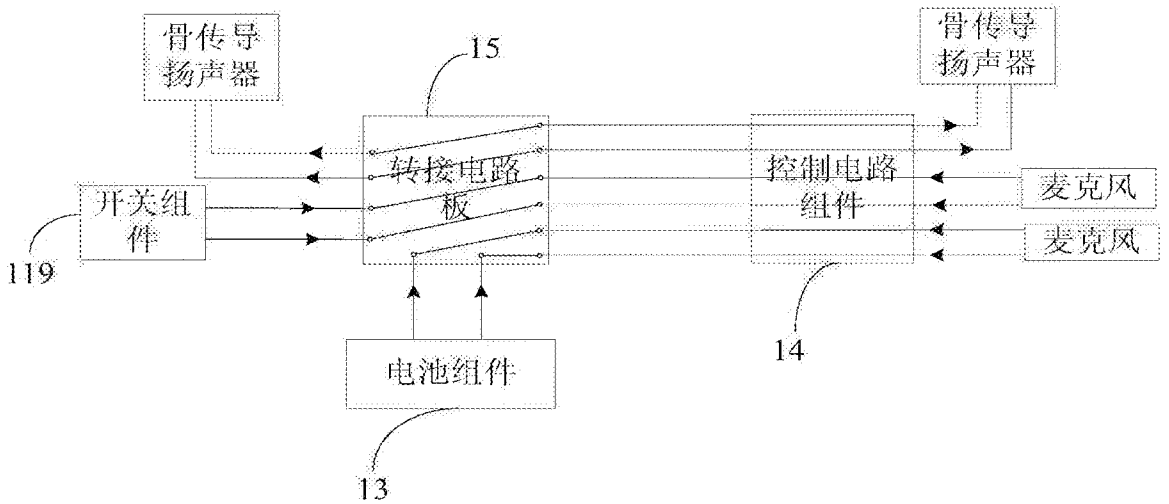


图7

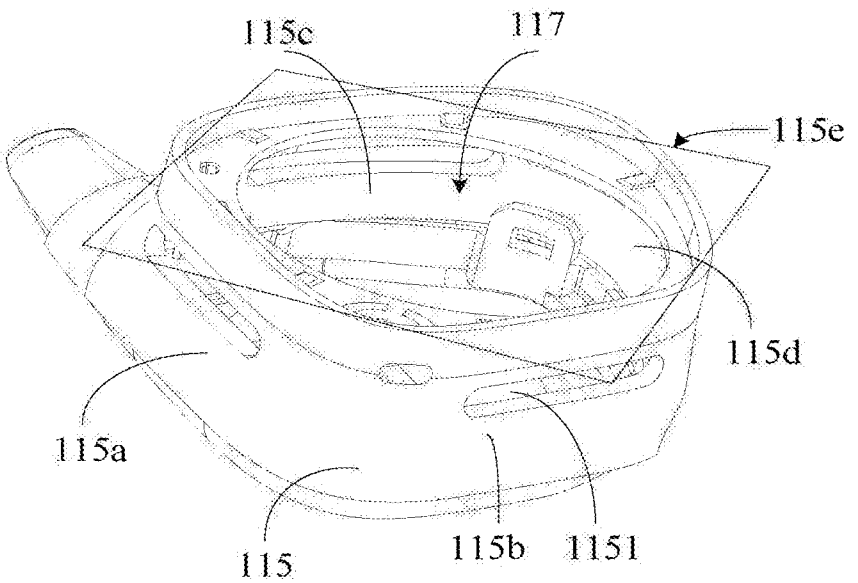


图8

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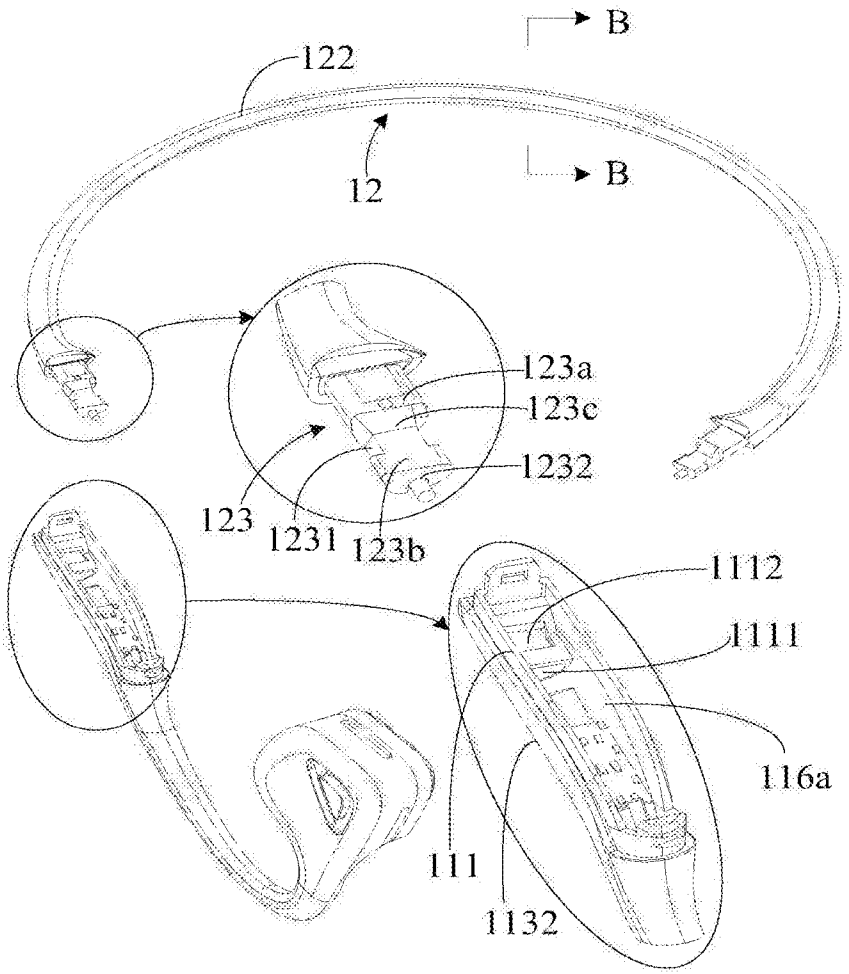


图9

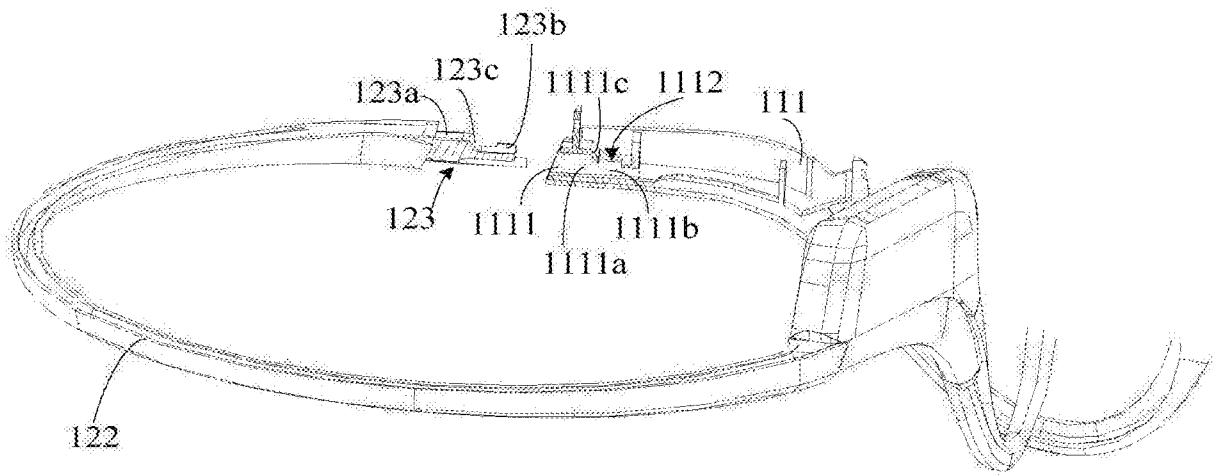


图10

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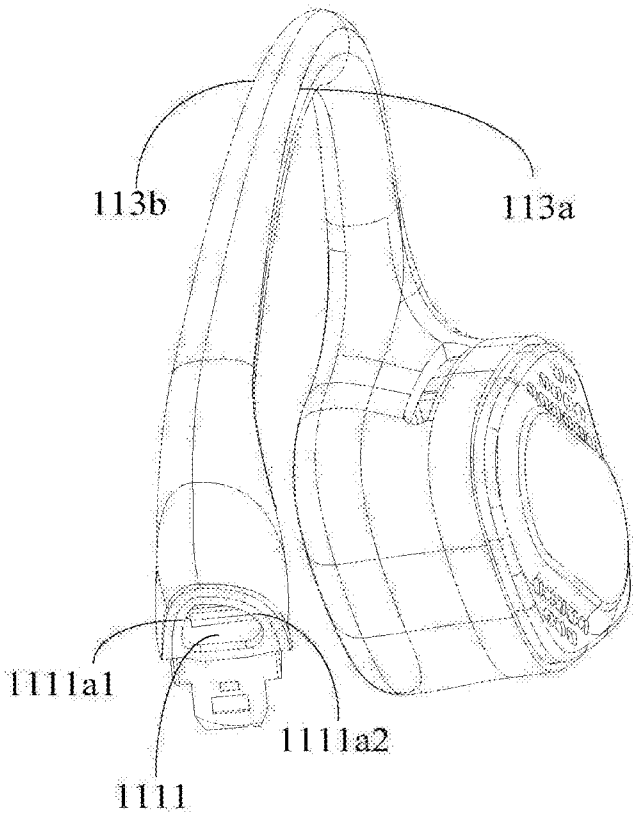


图11

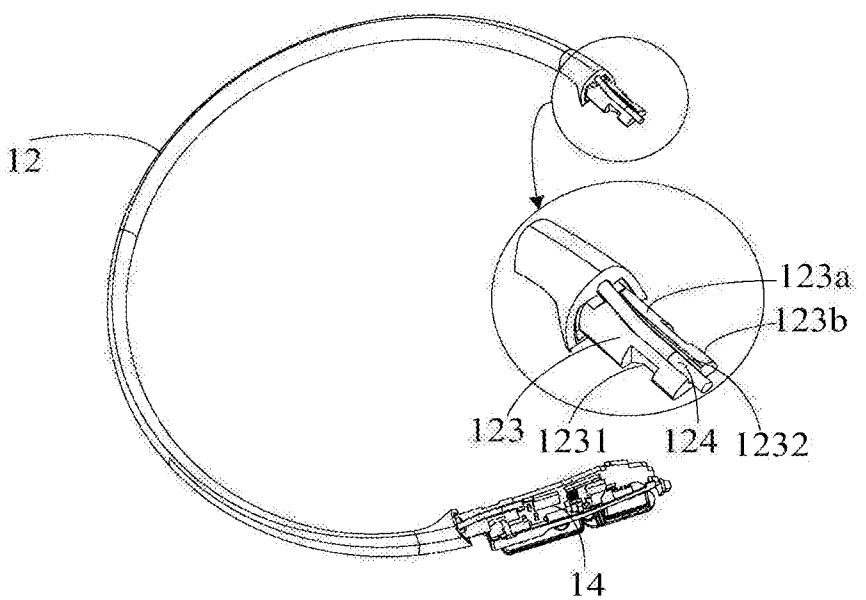


图12

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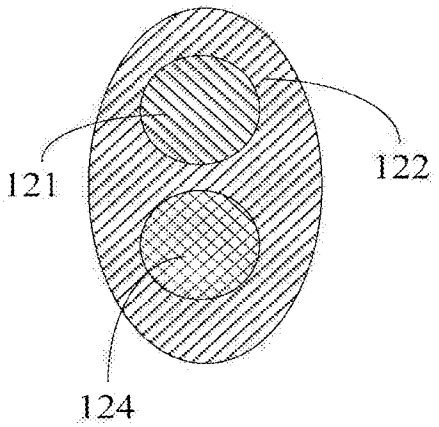


图13

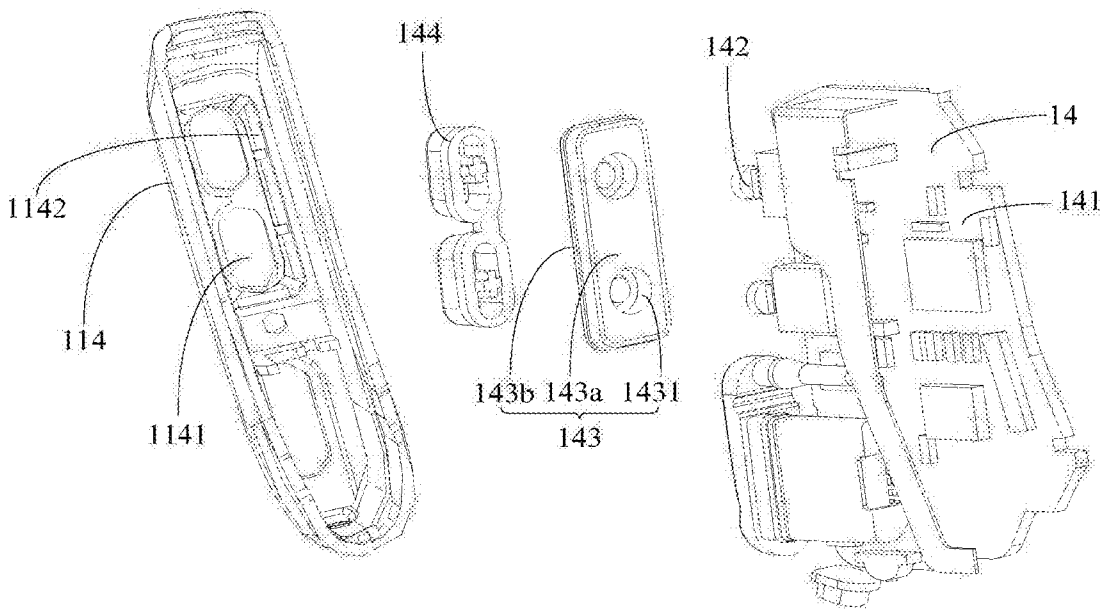


图14

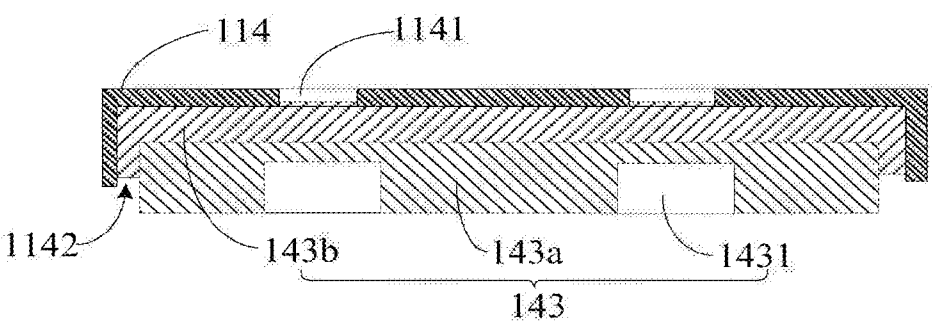


图15

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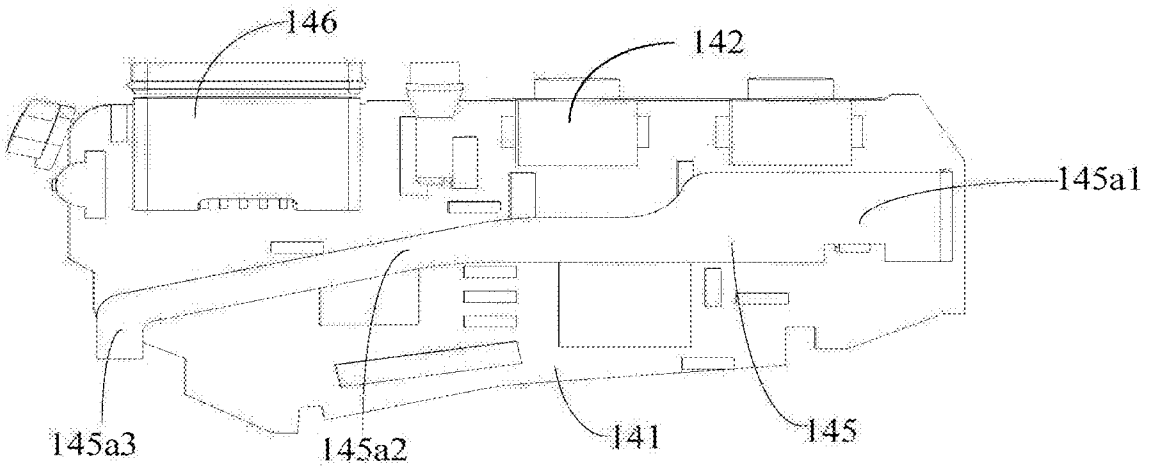


图16

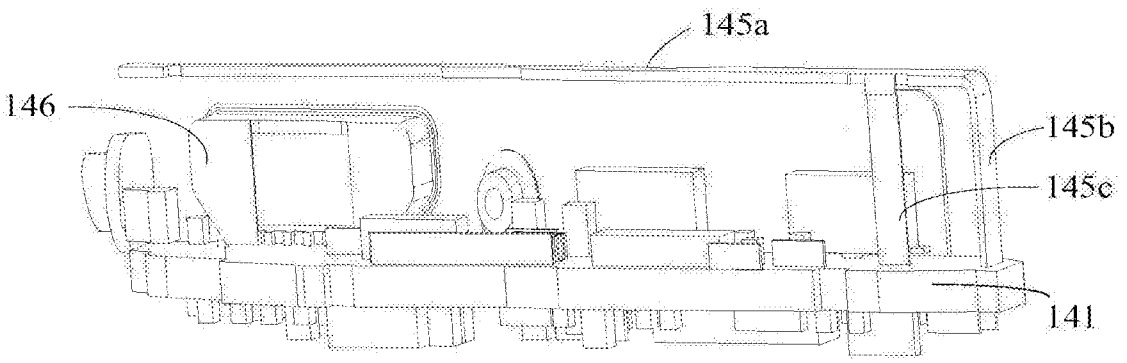


图17

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Osteoacusis loudspeaker arrangement

Abstract

This application discloses a kind of osteoacusis loudspeaker arrangements, comprising: ear-hang and circuit shell ; The circuit shell is connect for accommodating control circuit or battery with ear-hang ; Shell sheath is wherein molded on ear-hang, shell sheath is coated on the periphery of circuit shell in a manner of being set with.By the above-mentioned means, the application can reduce formative stage to control circuit or battery adverse effect.

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Worldwide applications

2019 CN WO WO WO

Application CN201910009874.6A events

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Info: Patent citations (23), Cited by (5), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, Discuss

Description

Osteoacusis loudspeaker arrangement

Technical field

This application involves bone conduction technology fields, more particularly to a kind of osteoacusis loudspeaker arrangement.

Background technique

Osteoacusis is a kind of sound conduction mode, and osteoacusis loudspeaker arrangement receives sound using bone conduction technology, due to it Ears can be opened, do not injure the advantages that eardrum and the favor by the majority of consumers.

Osteoacusis loudspeaker arrangement is in formative stage, for accommodating the circuit shell of control circuit or battery and being arranged in circuit The protection sleeve pipe of closure periphery can be integrally formed.However, since circuit shell inner containment has control circuit or battery, if by two Person is integrally

Claims (12)

Hide Dependent

1. a kind of osteoacusis loudspeaker arrangement characterized by comprising

Ear-hang ;

Circuit shell is connect for accommodating control circuit or battery, and with the ear-hang ;

Shell sheath is wherein molded on the ear-hang, the shell sheath is coated on the outer of the circuit shell in a manner of being set with it encloses.

2. osteoacusis loudspeaker arrangement according to claim 1, which is characterized in that the shell sheath is bag open at one end Shape structure, so that the circuit shell enters the inside of the shell sheath via the open end of the shell sheath.

3. osteoacusis loudspeaker arrangement according to claim 2, which is characterized in

formed, then hot environment is easy to bring damage to control circuit or battery, to influence the matter of osteoacusis loudspeaker arrangement Amount.

Summary of the invention

The application can be reduced in formative stage pair mainly solving the technical problems that provide a kind of osteoacusis loudspeaker arrangement Control circuit or battery adverse effect.

In order to solve the above technical problems, the technical solution that the application uses is: a kind of osteoacusis loudspeaker arrangement is provided, It include: ear-hang ; Circuit shell is connect for accommodating control circuit or battery, and with the ear-hang ; Wherein it is molded on the ear-hang There is shell sheath, the shell sheath is coated on the periphery of the circuit shell in a manner of being set with.

The beneficial effect of the application is: being in contrast to the prior art, molding of the application in osteoacusis loudspeaker arrangement And assembling stage, circuit shell and shell sheath are separately formed, are then set in together again, so as to avoid the two one When molding, hot environment is damaged to brought by control circuit or battery, to reduce formative stage to control circuit or battery Adverse effect.

Detailed description of the invention

In order to more clearly explain the technical solutions in the embodiments of the present application, make required in being described below to embodiment Attached drawing is briefly described, it should be apparent that, the drawings in the following description are only some examples of the present application, for For those of ordinary skill in the art, without creative efforts, it can also be obtained according to these attached drawings other Attached drawing.Wherein:

Fig. 1 is the configuration schematic diagram of one embodiment of the application osteoacusis loudspeaker arrangement ;

Fig. 2 is the partial structure diagram of ear-hang in one embodiment of the application osteoacusis loudspeaker arrangement ;

Fig. 3 is the partial enlarged view of part A in Fig. 2 ;

Fig. 4 is the partial cross-sectional view of one embodiment of the application osteoacusis loudspeaker arrangement ;

Fig. 5 is the partial enlarged view of part B in Fig. 4 ;

Fig. 6 is the partial structurtes sectional view of one embodiment of the application osteoacusis loudspeaker arrangement ;

Fig. 7 is the partial enlarged view of C portion in Fig. 6 ;

that the open end of the shell sheath is provided with Inwardly projecting collar flange, the stepped setting in end of the circuit shell far from the ear-hang, and then form the first ring Shape table top, when the shell sheath is coated on the periphery of the circuit shell, the collar flange is connected to first ring On shape table top.

4. osteoacusis loudspeaker arrangement according to claim 3, which is characterized in that in the collar flange and first ring The engaging zones of shape table top are applied with sealant, the shell sheath and circuit shell to be connected and sealed.

5. osteoacusis loudspeaker arrangement according to claim 3, which is characterized in that be provided with edge on the first annular table top The locating piece that the circuit shell extends away from the direction of the ear-hang, is provided at the collar flange of the shell sheath and institute The corresponding locating slot of locating piece is stated, the locating slot is covered on the periphery of at least partly described locating piece, to protect to the shell Set is positioned.

6. osteoacusis loudspeaker arrangement according to claim 3, which is characterized in that the circuit shell includes fastening each other Two sub- shells, wherein the first annular table top is formed on the sub- shell, the shell sheath is to described two The joint close of sub- shell carries out all standing.

7. osteoacusis loudspeaker arrangement according to claim 6, which is characterized in that two sub- shells abutted each other connects Conjunction face is the stairstepping mutually agreed with.

8. osteoacusis loudspeaker arrangement according to claim 3, which is characterized in that be provided with multiple peaces in the circuit shell Hole is filled, and the outer surface depressions of the circuit shell are provided with the first glue groove, the multiple mounting hole is located at first glue In slot, the osteoacusis loudspeaker arrangement further comprises the conductive column being inserted in the mounting hole respectively, the shell sheath It further comprise the exposed hole for allowing the conductive column exposed, wherein sealant is applied in first glue groove, in institute The shell sheath and the circuit shell is stated connected and sealed in the periphery for stating mounting hole.

Fig. 8 is the partial structure diagram of the machine core shell of one embodiment of the application osteoacusis loudspeaker arrangement ;

Fig. 9 is the partial enlarged view of the part D in Fig. 8 ;

Figure 10 is the partial cross-sectional view of the machine core shell of one embodiment of the application osteoacusis loudspeaker arrangement ;

Figure 11 is the part explosive view of circuit shell and ear-hang in one embodiment of the application osteoacusis loudspeaker arrangement ;

Figure 12 is the partial cross-sectional view of the part-structure of one embodiment of the application osteoacusis loudspeaker arrangement ;

Figure 13 is the partial enlarged view of the part E in Fig. 1 ;

Figure 14 is the sectional view of circuit shell in one embodiment of the application osteoacusis loudspeaker arrangement ;

Figure 15 is the partial enlarged view of the part F in Figure 14 ;

Figure 16 is the explosive view of circuit shell and press-key structure in one embodiment of the application osteoacusis loudspeaker arrangement ;

Figure 17 is the partial enlarged view of the part G in Fig. 6 ;

Figure 18 is the structural schematic diagram of conductive column in one embodiment of the application osteoacusis loudspeaker arrangement ;

Figure 19 is cutting for circuit shell in one embodiment of the application osteoacusis loudspeaker arrangement, conductive column and main control board Face figure ;

Figure 20 is the partial enlarged view of the part H in Figure 19 ;

Figure 21 is that the partial structurtes of circuit shell and auxiliary piece are exploded in one embodiment of the application osteoacusis loudspeaker arrangement Figure ;

Figure 22 is that the partial structurtes of circuit shell and auxiliary piece are illustrated in one embodiment of the application osteoacusis loudspeaker arrangement Figure ;

Figure 23 is circuit shell and the partial structurtes explosive view hung afterwards in one embodiment of the application osteoacusis loudspeaker arrangement ;

Figure 24 is circuit shell and the partial structurtes sectional view hung afterwards in one embodiment of the application osteoacusis loudspeaker arrangement ;

Figure 25 is the rear partial structural diagram hung in one embodiment of the application osteoacusis loudspeaker

9. osteoacusis loudspeaker arrangement according to claim 8, which is characterized in that the osteoacusis loudspeaker arrangement further wraps Auxiliary piece is included, the auxiliary piece includes plate body, vacancy section is provided on the plate body, wherein the plate body is set to the circuit On the inner surface of shell, and the mounting hole is located inside the vacancy section, and then forms the second glue in the conductive column periphery Slot, wherein it is applied with sealant in second glue groove, it is close to be carried out in the inside of the circuit shell to the mounting hole Envelope.

10. osteoacusis loudspeaker arrangement according to claim 1, which is characterized in that the osteoacusis loudspeaker arrangement is further including machine core shell, the machine core shell is provided with and is connected to the outer end face of the machine core shell for accommodating earphone core Jointing holes are provided with stop block on the inner sidewall of the jointing holes,

The ear-hang includes elastic metallic yarn and the end that patches for being set to described elastic metallic yarn one end, and the end that patches is wrapped It includes:

Insertion section is at least partially inserted into the jointing holes and being connected on the lateral surface of the stop block ;

Two elastic clamping hooks are set to the insertion section towards the side of the machine core enclosure interior, and two elastic clamping hooks can Close up each other under the action of external thrust and the stop block, and after the stop block elastic recovery at being placed in State on the medial surface of stop block, so realize the machine core shell and it is described patch end patch fixation.

11. osteoacusis loudspeaker arrangement according to claim 10, which is characterized in that the insertion section partial insertion is in described The stepped setting of exposed parts in jointing holes, and in the insertion section, and then form the outer end face with the machine core shell Spaced second circular table, the ear-hang further include being molded to hold periphery in the elastic metallic yarn and described patch Protection sleeve pipe, the protection sleeve pipe further extend to second circular table towards the machine core shell outer end face one Side, and abutted when termination inserts fixed with the machine core

arrangement.

Specific embodiment

Below in conjunction with the attached drawing in the embodiment of the present application, technical solutions in the embodiments of the present application carries out clear, complete Site preparation description, it is clear that described embodiments are only a part of embodiments of the present application, rather than whole embodiments.Based on this Embodiment in application, those of ordinary skill in the art are obtained every other under the premise of not making creative labor Embodiment shall fall in the protection scope of this application.

Also referring to Fig. 1 to Figure 25, Fig. 1 to Figure 25 depicts the application osteoacusis loudspeaker arrangement.Bone in the application Conducting loudspeaker arrangement can be earphone, MP3 or other devices with loud-speaking function based on osteoacusis.Specifically, bone passes Lead loudspeaker arrangement can include: ear-hang 10, machine core shell 20, circuit shell 30, hang afterwards 40 and earphone core 50, control circuit 60, Battery 70.Wherein, machine core shell 20 and circuit shell 30 are respectively arranged at the both ends of ear-hang 10, and rear extension 40 is then further disposed upon The one end of circuit shell 30 far from ear-hang 10.Wherein, the quantity of machine core shell 20 is two, is respectively used to accommodate earphone core 50, The quantity of circuit shell 30 is also two, is respectively intended to accommodate control circuit 60 and battery 70, the both ends of rear extension 40 are separately connected Corresponding circuit shell 30.

Wherein, ear-hang 10 refers to when user wears osteoacusis loudspeaker arrangement, for surrounding and supporting the basal part of the ear in user Position, and then machine core shell 20 and earphone core 50 are hung and are fixed on the structure in user's ear predetermined position.

Specifically, ear-hang 10 includes elastic metallic yarn 11, conducting wire 12, fixed sleeving 13 and is set to elastic metallic yarn 11 The end that patches at both ends 14 and patches end 15, still further comprise protection sleeve pipe 16 and with the integrally formed shell of protection sleeve pipe 16 Sheath 17.

Wherein, elastic metallic yarn 11 be mainly used for making ear-hang 10 remain with the matched shape of user's ear, and have one Fixed elasticity generates certain elastic deformation so as to the ear type and head dummy when user wears according to user to be adapted to not With the user of ear type and head dummy.In present embodiment, elastic metallic yarn 11 can be made of memorial alloy, have good change Shape recovery capability, in external force removal, still is able to restore to original so that even ear-hang 10 is by external force generation deformation The shape come is can continue to shell body elasticity in the machine core shell with described patch, and then realize sealing.

12. osteoacusis loudspeaker arrangement according to claim 11, which is characterized in that the protection sleeve pipe is in second ring The side of shape table top towards the outer end face of the machine core shell forms an annular abutment face and is located in the annular abutment face Portion and the annular convex platform being arranged relative to annular abutment face protrusion ;

The machine core shell further comprises the inner sidewall of the outer end face and the jointing holes for connecting the machine core shell Connect inclined-plane ;

Wherein, the machine core shell and it is described patch termination and insert fixed when, the annular abutment face and the annular convex platform point It is not abutted with the outer end face of the machine core shell and connection inclined-plane elasticity.

be used by user, to extend the service life of osteoacusis loudspeaker arrangement.Certainly, in other realities It applies in mode, elastic metallic yarn 11 can also be made of non-memory alloy.

Conducting wire 12 can be used for being electrically connected with earphone core 50 and control circuit 60, battery 70 etc., for earphone core 50 Work carry out electricity supply and data transmission.

Fixed sleeving 13 is used to conducting wire 12 being fixed on elastic metallic yarn 11.Specifically, the quantity of fixed sleeving 13 can Think one or more, specifically depending on actual needs.In present embodiment, fixed sleeving 13 is at least two, until Few two fixed sleevings 13 can be spaced setting along the trend of elastic metallic yarn 11 and conducting wire 12, and led by wrapping up setting The periphery of line 12 and elastic metallic yarn 11 and conducting wire 12 is fixed on elastic metallic yarn 11.

Patching end 14 and patching end 15 can be made of hard material, such as plastic cement.In present embodiment, patched making this When end 14 is with end 15 is patched, the two can be formed in the both ends of elastic metallic yarn 11 in a manner of injection molding respectively.In other realities It applies in mode, can also first dock spigot 14 and patch and hold 15 to be molded respectively, and be reserved respectively and elasticity gold in injection molding Belong to the connecting hole of 11 end of silk, to patch end 14 by this by connecting hole after the completion of injection molding and patch end 15 and insert respectively It connects in the corresponding end of elastic metallic yarn 11, or and is fixed by way of bonding.

It should be pointed out that patching end 14 and patching end 15 can not directly be molded and be formed in conducting wire in present embodiment 12 periphery, but conducting wire 12 is avoided in injection molding.It specifically, can be when injection molding patches end 14 and patches end 15, to being located at The conducting wire 12 at 11 both ends of elastic metallic yarn is fixed, and with the separate position for patching end 14 and patching end 15, and is further connecing It spigot 14 and patches the first cable tray 141 and the second cable tray 151 is respectively set on end 15, it, will with after the completion of injection molding Conducting wire 12 is extended along the first cable tray 141 and the second cable tray 151.Specifically, the first cable tray 141 is being formed After the second cable tray 151, conducting wire 12 can be penetrated to first cable tray 141 and the second cable tray in a manner of threading 151。

Certainly, in other embodiments, it will can also patch end 14 according to the actual situation and patch the directly injection molding of end 15 in the periphery of conducting wire 12, it is not specifically limited herein.

Specifically, in one embodiment, the first cable tray 141 may include that the first cabling channel 1411 is walked

with being connected to first First cable hole 1412 of wire casing 1411.Wherein, the connection of the first cabling channel 1411 patches the side wall surface setting at end 14, the first cabling The one end in hole 1412 is connected to one end of the first cabling channel 1411, and the other end is connected to the outer end face for patching end 14.Patch end 14 The conducting wire 12 at place extends along the first cabling channel 1411 and the first cable hole 1412 and exposes to the outer end face for patching end 14, with into one Step is connect with other structures.

Correspondingly, the second cable tray 151 may include the second cabling channel 1511 and be connected to the second of the second cabling channel 1511 Cable hole 1512.Wherein, the second cabling channel 1511 connection patches end 15 side wall surface setting, one end of the second cable hole 1512 with One end of second cabling channel 1511 is connected to, and the other end is connected to the outer end face for patching end 15.The conducting wire 12 at end 15 is patched along the Two cabling channels 1511 and the second cable hole 1512 extend and expose to the outer end face for patching end 15, further to connect with other structures It connects.

Wherein, the outer end face for patching end 14, which refers to, patches end face of the end 14 far from the one end for patching end 15 ; Correspondingly, it patches The outer end face at end 15, which refers to, patches end face of the end 15 far from the one end for patching end 14.

Further, protection sleeve pipe 16, which can be molded, is formed in elastic metallic yarn 11, conducting wire 12, fixed sleeving 13, patches end 14 and patch end 15 periphery, thus by protection sleeve pipe 16 respectively with elastic metallic yarn 11, conducting wire 12, fixed sleeving 13, patch End 14 is fixedly connected with end 15 is patched, without protection sleeve pipe 16 is individually further sleeved on elastic metallic after injection molding is formed Silk 11 and the periphery for patching end 14, patching end 15, so as to simplify production and assembly process, and in this way, energy Enough so that the fixation of protection sleeve pipe 16 is more firm, stablizes.

Further, in overmold pipe 16, while with the protection sleeve pipe 16 integrally formed with being disposed in proximity to connect The shell sheath 17 of 15 side of spigot.

Wherein, shell sheath 17 can be made of one piece with protection sleeve pipe 16 and be integral, circuit shell 30 can by with Patch patching fixed and connecting one end that ear-hang 10 is set for end 15, shell sheath 17 then can the further packet in a manner of suit It is overlying in the periphery of circuit shell 30.

Wherein, protection sleeve pipe 16 and shell sheath 17 can be made of the soft material with certain elasticity, such as soft Silica gel, rubber etc..

Specifically, it when manufacturing the ear-hang 10 of osteoacusis loudspeaker arrangement, can be achieved by the steps of:

Step S101: conducting wire 12 is fixed on elastic metallic yarn 11 using fixed sleeving 13, wherein in elastic metallic yarn 11 both ends reserve injection molding position ;

Specifically, can by first by elastic metallic yarn 11 and conducting wire 12 according in a manner of preset, such as it is placed side by side together; so Afterwards, fixed sleeving 13 is further set in the periphery of conducting wire 12 Yu elastic metallic yarn 11, so that conducting wire 12 is fixed on elasticity On wire 11.

Wherein, since the both ends of elastic metallic yarn 11 also need injection molding to patch end 14 and patch end 15, in fixation When, it is fully wrapped around that the both ends of elastic metallic yarn 11 cannot be fixed casing 13, and need to reserve corresponding injection molding position, for patching End 14 is occupied with 15 injection molding of end is patched.

Step S102: injection molding patches end 14 and patches end 15 respectively on the injection molding position at the both ends of elastic metallic yarn 11, In patch end 14 and patch end and 15 be respectively arranged with the first cable tray 141 and the second cable tray 151 ;

Step S103: conducting wire 12 is arranged to extend along the first cable tray 141 and the second cable tray 151 ;

It specifically, herein can be after the completion of patching end 14 and patching 15 molding of end, further by either manually or by machine The both ends of conducting wire 12 are respectively penetrated the first cable tray 141 and the second cable tray 151 by device.Wherein, conducting wire 12 is located at first Part between cable tray 141 and the second cable tray 151 is fixed on elastic metallic yarn 11 by fixed sleeving 13.

Step S104: it in elastic metallic yarn 11, conducting wire 12, fixed sleeving 13, patches end 14 and patches the peripheral of end 15 and infuse Moulding is at protection sleeve pipe 16.

In one embodiment, when executing step S104,15 periphery of end is further formed and patched in a manner of injection molding The integrally formed shell sheath 17 of protection sleeve pipe 16.

It should be pointed out that in other embodiments, conducting wire 12 can also be first not provided with when installing fixed sleeving 13, And it is patching end 14 and is patching 15 injection molding of end and then further setting conducting wire 12, the specific steps are as follows:

Step S201: fixed sleeving 13 is sheathed on elastic metallic yarn 11, wherein pre- at the both ends of elastic metallic yarn 11 Reserve injection molding position ;

Step S202: injection molding patches end 14 and patches end 15 respectively on the injection molding position at the both ends of elastic metallic yarn 11, In patch end 14 and patch end and 15 be respectively arranged with the first cable tray 141 and the second cable tray 151 ;

Conducting wire 12: being arranged in the inside of fixed sleeving 13 by step S203, with using fixed sleeving 13 that conducting wire 12 is fixed In on elastic metallic yarn 11, and further conducting wire 12 is arranged to prolong along the first cable tray 141 and the second cable tray 151 It stretches.

It should be pointed out that in this way, can be avoided and led when docking spigot 14 and patching 15 injection molding of end The interference of line 12, to be conducive to molding go on smoothly.

Wherein, elastic metallic yarn 11 involved by method in present embodiment and above embodiment, conducting wire 12, Fixed sleeving 13, patch end 14, patch end 15 and structure, effect and the generation type of protection sleeve pipe 16 etc. with above-mentioned implementation Identical in mode, related detailed content refers to above embodiment, and details are not described herein again.

In one embodiment, machine core shell 20 can be used for accommodating earphone core 50, and patch fixation with end 14 is patched.Its In, the quantity of earphone core 50 and machine core shell 20 is two, respectively corresponds the left and right ear of user.

Specifically, machine core shell 20 can be connect with end 14 is patched by modes such as grafting, clampings, by machine core shell 20 It is fixed together with ear-hang 10.That is, ear-hang 10 can be first separately formed with machine core shell 20, then in present embodiment Further it is assembled together, rather than by the two one straight forming.

In this way, ear-hang 10 and machine core shell 20 can be separately formed using corresponding mold, and nothing The two need to be integrally formed using the mold of the same larger size, so as to reduce the size of mold, to reduce adding for mold Work difficulty, and molding difficulty ; In addition, being produced since different mold processing is respectively adopted in ear-hang 10 and machine core shell 20 in manufacturing process, need in ear-hang 10 or machine core shell 20 the shape of some or construction be adjusted when, only adjust The corresponding mold of the whole structure, is adjusted without the mold to another structure, is produced into so as to reduce This.

Certainly, in other embodiment, according to circumstances ear-hang 10 and machine core shell 20 can also be made to pass through one Molding obtains.

In one embodiment, machine core shell 20 is provided with the jointing holes 22 being connected to the outer end face

21 of machine core shell 20, Stop block 23 is provided on the inner sidewall of jointing holes 22.

Wherein, the outer end face 21 of machine core shell 20 refers to machine core shell 20 towards the end face of ear-hang 10.Jointing holes 22 are used for Accommodating space is provided for the 14 insertion machine core shell 20 of end that patches of ear-hang 10, patches end 14 and machine core shell to further realize 20 patch fixation.

Stop block 23, which can be protruded by the inner sidewall of jointing holes 22 along the direction perpendicular to the inner sidewall, to be formed.Specifically, Stop block 23 can be multiple spaced block-shaped protrusions, or may be the annular projection along 22 inner sidewall of jointing holes, It is not specifically limited herein.

Wherein, patching end 14 includes insertion section 142 and two elastic clamping hooks 143.

Specifically, insertion section 142 is at least partially inserted into jointing holes 22 and being connected to the lateral surface 231 of stop block 23 On.Wherein, the shape of the inner sidewall of the shape with jointing holes 22 of the lateral wall of insertion section 142 matches so that insertion section 142 to When small part is inserted in jointing holes 22, so that the lateral wall of insertion section 142 is abutted with the inner sidewall of jointing holes 22.

The lateral surface 231 of stop block 23 refers to the one side that stop block 23 is arranged towards ear-hang 10.It insertion section 142 can be into one Step includes one towards the end face of machine core shell 20 1421, which can match with the lateral surface 231 of stop block 23, thus Insertion section 142 is at least partially inserted into when in jointing holes 22, the end face 1421 of insertion section 142 and the lateral surface 231 of stop block 23 it abuts.

Specifically, the edge of the jointing holes 22 of machine core shell 20 is perpendicular to patching 14 insertion side relative to machine core shell 20 of end Upward cross sectional shape can be oval ring or nearly oval ring, and accordingly, the cross section of insertion section 142 can be and jointing holes 22 matched nearly ellipses, certainly, the shape of the two can also be it is other, can specifically be configured according to actual needs.

Further, two elastic clamping hooks 143 can be along being perpendicularly to the insertion direction side by side and be spaced and be symmetrically disposed on insertion Portion 142 is towards the side inside machine core shell 20.Wherein, each elastic clamping hook 143 can respectively include beam portion 1431 and hook part 1432, beam portion 1431 is connect with the side of insertion section 142 towards machine core shell 20, and the setting of hook part 1432 is in beam portion 1431 far from slotting Enter the one end in portion 142, and edge is perpendicularly to the insertion direction extension.Further, each hook part 1432 be provided with connection be

parallel to it is slotting Enter the side in direction and the intermediate incline 14321 of the end face far from insertion section 142.

In the installation process of ear-hang 10 and machine core shell 20, patches end 14 and progress into machine core shell by jointing holes 22 Inside 20, when reaching the position of stop block 23, the hook part 1432 of two elastic clamping hooks 143 will receive the blocking of stop block 23. Under the action of external thrust, stop block 23 gradually squeezes the intermediate incline 14321 of hook part 1432 and makes two elastic clamping hooks 143 occur elastic deformations and close up each other, reach stop block 23 close to machine core shell by stop block 23 in intermediate incline 14321 When side inside body 20, elastic clamping hook 143 is placed in 23 court of stop block because losing the blocking of stop block 23 due to elastic recovery To on the medial surface inside machine core shell 20, so that stop block 23 to be placed in the insertion section 142 and hook part 1432 for patching end 14 Between, and then realize that machine core shell 20 patches fixation with end 14 is patched.

Wherein, in one embodiment, machine core shell 20 and patch end 14 patch it is fixed after, 142 part of insertion section is inserted Enter in jointing holes 22, and the stepped setting of the exposed parts in insertion section 142, and then forms the outer end with machine core shell 20 The spaced circular table 1422 in face 21.

It should be pointed out that the exposed parts of insertion section 142 refer to that insertion section 142 exposes to the part of machine core shell 20, Specifically, it can refer to and expose to machine core shell 20 and the part close to 20 outer end face of machine core shell.

Wherein, circular table 1422 can be oppositely arranged with the outer end face 21 of machine core shell 20, and interval between the two it can refer to that edge patches direction interval and along perpendicular to the interval for patching direction.

Further, protection sleeve pipe 16 extend to circular table 1422 towards machine core shell 20 outer end face 21 side, And in the jointing holes of machine core shell 20 22 and when patching end 14 and patching fixed, it is filled in circular table 1422 and machine core shell 20 In interval between outer end face 21, and is abutted with the elasticity of machine core shell 20 so that outside liquid be difficult to from patch end 14 and Joint between machine core shell 20 enters inside machine core shell 20, so realize patch end 14 and jointing holes 22 between it is close Envelope, to protect the earphone core 50 etc. inside machine core shell 20, so as to improve the waterproof effect to osteoacusis loudspeaker arrangement.

Specifically, in an embodiment, protection sleeve pipe 16 is in circular table 1422 towards the outer end of machine core shell 20 21 sides in face form an annular abutment

face 161.Wherein, which is protection sleeve pipe 16 towards machine core shell 20 The end face of side.

Further, protection sleeve pipe 16 further includes being located at 161 inside of annular abutment face and relative to annular abutment face 161 Protrude the annular convex platform 162 of setting.Specifically, which is specifically formed in annular abutment face 161 towards patching end 14 Side, and relative to the annular abutment face 161 along towards the direction of machine core shell 20 protrude be arranged, further, the annular Boss 162 is also formed directly in the periphery of circular table 1422, and covers the circular table 1422.

Further, machine core shell 20 includes the inner sidewall of the outer end face 21 for connecting machine core shell 20 and jointing holes 22 Connection inclined-plane 24.Wherein, the connection inclined-plane 24 be specially machine core shell 20 outer end face 21 and jointing holes 22 inner sidewall it Between transition face, the outer end face 21 of the connection inclined-plane 24 and machine core shell 20 and the inner sidewall of jointing holes 22 be not in same plane On.Wherein, which can be plane, perhaps can also be arranged to curved surface or other shapes according to actual needs Shape is not specifically limited herein.

Specifically, machine core shell 20 and patch end 14 patch fixed when, annular abutment face 161 and annular convex platform 162 divide Not with the outer end face of machine core shell 20 and connect the elasticity of inclined-plane 24 and abut.

It should be pointed out that due to machine core shell 20 outer end face 21 and connection inclined-plane 24 not in the same plane, thus So that the elastic place of abutting between protection sleeve pipe 16 and machine core shell 20 is not in the same plane, so that outside liquid is difficult By entering machine core shell 20 between protection sleeve pipe 16 and machine core shell 20 to travel further into earphone core 50, so as to improve The waterproof effect of osteoacusis loudspeaker arrangement to play a protective role to internal functional architecture, and then extends osteoacusis loudspeaker arrangement Service life.

Wherein, in one embodiment, insertion section 142 is in circular table 1422 towards the outer end face 21 of machine core shell 20 Side is formed further with the annular groove 1423 adjacent with circular table 1422, wherein annular convex platform 162 can be formed in annular In groove 1423.

In present embodiment, annular groove 1423 can be formed in circular table 1422 towards the side of machine core shell 20.? In one application scenarios, circular table 1422 is the side wall surface towards 20 side of machine core shell of annular groove 1423, at this point, ring Shape boss 162 is formed in annular groove 1423 along the side wall surface.

In one embodiment, one end of the outside positioned at machine core shell 20 of the conducting wire 12 of ear-hang 10 may pass through second and walk Line passage 151 and further connect outer outside the machine cores shells 20 such as control circuit 60, battery 70 that circuit shell 30 is accommodated Portion's circuit, the other end are then exposed to the outer end face for patching end 14 along the first cable tray 141, and further with insertion section 142 And entered inside machine core shell 20 by jointing holes 22.

In one embodiment, machine core shell 20 may include main casing 25 and baffle assembly 26, wherein baffle assembly 26 It is connect inside main casing 25, and with main casing 25, and then the inner space of main casing 25 27 is separated into the first accommodating sky Between 271 and close to 22 side of jointing holes the second accommodating space 272.

Specifically, main casing 25 includes all side walls 251 and the base end wall 252 connecting with an end face of all side walls 251, week Side wall 251 and base end wall 252 are jointly around the inner space 27 for forming a main casing 25.

Baffle assembly 26 is located at the side of the close jointing holes 22 of main casing 25, and including side partition 261 and base spacer 262.Wherein, side partition 261 can along perpendicular to base end wall 252 direction be arranged, and the both ends of side partition 261 with all side walls 251 connections, so that the inner space 27 to main casing 25 is separated.Base spacer 262 can be parallel or close with base end wall 252 Parallel and interval setting, and further connect respectively with all side walls 251 and side partition 261, so that main casing 25 is formed by inner space 27 is divided into two and is formed by side partition 261, base spacer 262 and all side walls 251 far from jointing holes 22, base end wall 252 the first accommodating spaces 271 surrounded jointly, and by base spacer 262 and side partition 261 and close to all side walls of jointing holes 22 251 the second accommodating spaces 272 surrounded jointly.Wherein, the second accommodating space 272 is smaller than the first accommodating space 271.

Certainly, baffle assembly 26 can also be drawn by inner space 27 of other set-up modes to main casing 25 Point, it is not specifically limited herein.

Further, earphone core 50 includes functional unit 51, which is set in the first accommodating space 271, It can be used for vibration sounding.Osteoacusis loudspeaker arrangement can further comprise the conducting wire 80 that one end is connect with functional unit 51, the conducting wire 80 other end can be extended in the second accommodating space 272 by the first accommodating space 271.

Specifically, cabling channel 2611, the cabling channel can be arranged in the top edge far from base end wall 252 in

side partition 261 2611 can be connected to the first accommodating space 271 and the second accommodating space 272.Further, the one of the separate functional unit of conducting wire 12 End extends in the second accommodating space 272 via the cabling channel.

In addition, one end of the separate circuit shell 30 of the conducting wire 12 of ear-hang 10 enters in machine core shell 20 with insertion section 142 It behind portion, may be further extended in the second accommodating space 272, and be electrically connected in the second accommodating space 272 with conducting wire 80, with shape At the conductive paths for being connected to external circuit via the second accommodating space 272 from the first accommodating space 271, to be led by this Functional unit 51 is electrically connected by line access with the external circuit being located at outside machine core shell 20.

Specifically, it may be provided with cable hole 2621 on base spacer 262, which accommodates jointing holes 22 and second Space 272 is connected to, so that can be prolonged via the cable hole 2621 by the conducting wire 12 that jointing holes 22 enter machine core shell 20 Extend to the second accommodating space 272.

Wherein, after conducting wire 12 and conducting wire 80 connect in the second accommodating space 272, coiling is set to the second accommodating space In 272.Specifically conducting wire 12 and conducting wire 80 can be connected together by welding, and then by functional unit 51 and external electrical Road electrical connection, to provide electricity as the normal work of functional unit 51 by external circuit or be that earphone core 50 transmits data.

It should be pointed out that conducting wire is often longer than actual demand, when assembling to osteoacusis loudspeaker arrangement in order to fill Match.If however conducting wire extra at earphone core 50 can not be placed reasonably, and the production when functional unit 51 works is easy Life is vibrated and issues abnormal sound, so that the sound quality of osteoacusis loudspeaker arrangement is reduced, to influence the audition impression of user.This reality Apply in mode, the main casing 25 of machine core shell 20 be formed by inner space 27 isolate the second accommodating space 272 with For accommodating extra conducting wire 12 and conducting wire 80, thus avoid or reduce extra conducting wire to due to vibration to osteoacusis loudspeaking The influence for the sound that device is issued, to improve sound quality.

In one embodiment, baffle assembly 26 further comprises internal partition 263, and internal partition 263 further holds second 272 are separated into two sub-accommodating spaces 2721 between emptying.Specifically, base end wall 252 of the internal partition 263 perpendicular to main casing 25 Setting connect with side partition 261 and all side walls 251

respectively, and further extends at cable hole 2621, to hold by second 272 while be divided into two sub-accommodating space 2721 between emptying, and cable hole 2621 is further also divided into two, two are walked String holes 2621 can be connected to corresponding sub-accommodating space 2721 respectively.

In present embodiment, conducting wire 12 and conducting wire 80 may respectively be two, wherein two conducting wires 12 respectively along it is corresponding walk String holes 2621 and separately extend in respective sub-accommodating space 2721, and two conducting wires 80 then still together pass through cabling channel 2611 And enter the second accommodating space 272, and separate after entering the second accommodating space 272, and respectively in corresponding sub- accommodating space It is welded in together in 2721 with corresponding conducting wire 12, and further coiling is set in corresponding sub- accommodating space 2721.

Further, in one embodiment, the second accommodating space 272 can be further filled by sealant.Pass through This mode can further fix the conducting wire 12 accommodated in the second accommodating space 272 and conducting wire 80, to further decrease The adverse effect caused by sound quality as conductor vibration, to improve the sound quality of osteoacusis loudspeaker arrangement, simultaneously it can play a protective role to the pad between conducting wire 12 and conducting wire 80, in addition, also by 272 sealed set of the second accommodating space it can achieve the purpose that water proof and dust proof.

In one embodiment, circuit shell 30 patches fixation with end 15 is patched, so that circuit shell 30 is fixed on ear Hang 10 one end far from machine core shell 20.Wherein, it is worn in user in use, accommodating the circuit shell 30 of battery 70 and accommodating control The circuit shell 30 of circuit 60 processed can respectively correspond the left and right side of user, the two with the corresponding side of patching for patching end 15 it can be different in formula.

Specifically, circuit shell 30 can be connect with end 15 is patched by modes such as grafting, clampings.That is, this reality It applies in mode, ear-hang 10 first can be formed independently with circuit shell 30, then and after the completion of molding be further assembled in Together, rather than directly the two is integrally formed.

In this way, ear-hang 10 and circuit shell 30 can be separately formed using corresponding mold, and nothing The two need to be integrally formed using the mold of the same larger size, so as to reduce the size of molding die, to reduce mold Difficulty of processing, and molding difficulty ; In addition, since different mold processing is respectively adopted in ear-hang 10 and circuit shell 30, During the manufacturing, need in ear-hang 10 or circuit shell 30 the shape of some or construction be adjusted when, The corresponding mold of the structure is only

adjusted, is adjusted without the mold to another structure, so as to reduce life Produce cost.

Further, in one embodiment, circuit shell 30 is provided with jointing holes 31, the inner surface of the jointing holes 31 Shape can match with the shape of at least partly outer surface for patching end 15 so that patch hold 15 can be at least partially inserted into In jointing holes 31.

Further, insertion of the end 15 relative to jointing holes 31 is respectively arranged with and patched in the opposite sides for patching end 15 The vertically disposed fluting 152 in direction.Specifically, two flutings 152 are symmetrical and are arranged at intervals at the opposite sides for patching end 15, and Connection patches the side wall at end 15 in the vertical direction along direction of insertion.

Correspondingly, be provided on the first side wall 30a of circuit shell 30 it is corresponding with two 152 positions of fluting through this Two through-holes 32 of one side wall 30a.

Wherein, circuit shell 30 can be in flat setting, for example, circuit shell 30 is transversal at the second jointing holes 31 Face can be ellipse, or be capable of forming the other shapes of flat setting.In present embodiment, the area of circuit shell 30 Biggish two side walls being oppositely arranged be major side wall 33, connect two major side walls 33 area it is lesser and be oppositely arranged two To sidewall 34 supplemented by side wall.In present embodiment, the first side wall 30a of circuit shell 30 both can be the master of the circuit shell 30 The auxiliary sidewall 34 of side wall 33 or circuit shell 30, can specifically be set according to actual needs.

Certainly, in other embodiments, cross section of the circuit shell 30 at jointing holes 31 can also wait it to be round Its shape can be specifically configured according to actual needs.

Further, osteoacusis loudspeaker arrangement can also include fixing piece 81, and fixing piece 81 includes two disposed in parallel Pin 811 and interconnecting piece 812 for connecting pin 811.Specifically, interconnecting piece 812 can vertically be connected in two pins 811 towards unidirectional one end, to form U-shaped fixing piece 81.

Wherein, two one end of pin 811 far from interconnecting piece 812 are inserted into out from the outside via through holes 32 of circuit shell 30 Slot 152, and interconnecting piece 812 is barred to the outside of circuit shell 30, and then realize circuit shell 30 and patch patching for end 15 It is fixed.

Further, in one embodiment, it is formed further on the first side wall 30a of circuit shell 30 for connecting The strip groove 35 of two through-holes 32, when patching fixed using fixing piece 81, interconnecting piece 812 can be further partially or complete Portion is heavy to be set in strip groove 35.To on the one hand enable to osteoacusis

loudspeaker arrangement whole more unified, so that set Groove corresponding with interconnecting piece 812 is set without special molding on the shell sheath 17 of 30 periphery of circuit shell, simplifies shell The mold of body sheath 17 ; On the other hand, additionally it is possible to reduce osteoacusis loudspeaker arrangement integrally occupied space to a certain extent.

It wherein, can be some or all of heavy in strip groove 35 by interconnecting piece 812 in an application scenarios Afterwards, further in 35 internal sizing of strip groove, in this way, on the one hand fixing piece 81 can be fixed on circuit shell 30 On, it is more consolidated so that patching patching between end 15 and jointing holes 31 ; On the other hand, heavy set on item in interconnecting piece 812 After shape groove 35, further groove 35 is filled and led up by sizing, is consistent with the first side wall 30a with circuit shell 30, from And after being arranged shell sheath 17, so that more smooth coherent between the groove 35 and peripheral structure.

Wherein, in one embodiment, second side of the circuit shell 30 opposite with the first side wall 30a of circuit shell 30 The through-hole 36 opposite with through-hole 32 is further provided on wall 30b, pin 811 is further inserted into through-hole 36 through fluting 152.

Specifically, the first side wall 30a of the circuit shell 30 and second sidewall 30b of circuit shell 30 can be circuit shell 30 major side wall 33 or auxiliary sidewall 34.In the present embodiment, the first side wall 30a and second sidewall 30b of circuit shell 30 The respectively major side wall 33 that is oppositely arranged of two of circuit shell 30.That is, two through-holes 32 and two through-holes 36 divide Be not set on the biggish side wall of area of circuit shell 30, so can be set between two pins 811 of fixing piece 81 compared with Big interval, to increase the span of fixing piece 81, so as to improve the stability for patching and patching between end 15 and jointing holes 31.

In present embodiment, 811 via through holes 32 of pin be inserted into fluting 152 in, and further through fluting 152 be inserted into it is logical In hole 36, that is to say, that pin 811 by two opposing major side walls 33 of circuit shell 30 and can patch end 15 completely through simultaneously Be fixed together so that patch end 15 and circuit shell 30 between patch it is stronger.

Further, as described in above embodiment, protection sleeve pipe 16 form when, while with the protection sleeve pipe 16 1 It is body formed to have the shell sheath 17 for being disposed in proximity to patch 15 sides of end.

Wherein, which is separately formed with circuit shell 30, and makes the shape of the inner sidewall of the shell sheath 17 Shape is matched with the lateral wall of circuit shell 30, and then after the two is separately formed completion, by shell sheath 17 with the side of suit Formula is coated on the periphery of circuit shell 30.

It should be pointed out that since the environment temperature when shell sheath 17 forms is higher, and hot environment may be right The control circuit 60 or battery 70 that circuit shell 30 is accommodated cause certain damage, therefore, in formative stage, by circuit shell 30 and shell sheath 17 be separately formed, be then set in together again, so as to avoid shell sheath 17 at the time of molding, high temperature pair Damage brought by control circuit 60 or battery 70, to reduce molding to unfavorable shadow brought by control circuit 60 or battery 70 It rings.

Further, shell sheath 17 can be bag shaped structure open at one end, so that circuit shell 30 is via shell The open end of sheath 17 enters the inside of shell sheath 17.

In present embodiment, shell sheath 17 be integrally formed with protection sleeve pipe 16 and after being formed, can be by from opening Mouth end carries out turnup to shell sheath 17 and is removed from the mold ; Visual examination and silk-screen are being carried out to shell sheath 17 When Deng being surface-treated, further shell sheath 17 can be set in preset structure by opening and be operated, and operated After the completion, further it is removed from the preset structure and carrying out turnup to shell sheath 17 from opening ; It is checking And after the completion of the operations such as processing, shell sheath 17 can be further sleeved on to the periphery of circuit shell 30 by being open.It is above-mentioned in operation, shell sheath 17 is being removed to the mode for being not limited to above-mentioned turnup, can not also done herein by modes such as inflations It is specific to limit.

Specifically, the open end of shell sheath 17 is one end that shell sheath 17 deviates from protection sleeve pipe 16, thus the circuit Shell 30 enters the inside of shell sheath 17 from shell sheath 17 far from one end of protection sleeve pipe 16, for 17 institute of shell sheath Cladding.

In one embodiment, the open end of shell sheath 17 is provided with inwardly projecting collar flange 171.Further Ground, the stepped setting in end of the circuit shell 30 far from ear-hang 10, and then form circular table 37 When shell sheath 17 coats When the periphery of circuit shell 30, collar flange 171 is connected on circular table 37.

Specifically, collar flange 171 by shell sheath 17 open end inner wall towards protruding inside shell sheath 17 Certain thickness is formed, and including one towards ear-hang 10 flange surface 172.

Wherein, circular table 37 and flange surface 172 are opposite, and deviate from the direction of ear-hang 10 towards circuit shell 30.

The height of the flange surface 172 of the collar flange 171 is not more than the height of circular table 37, so that cyclic annular convex When the flange surface 172 and circular table 37 of edge 171 abut against, the inner wall of shell sheath 17 can be with the side wall of circuit shell 30

Face sufficiently abuts, so that shell sheath 17 can closely be coated on the periphery of circuit shell 30.

It further, in one embodiment, can be into one in the engaging zones on collar flange 171 and circular table 37 Step is applied with sealant.Specifically, when being set with to shell sheath 17, sealant can be coated on circular table 37, To which shell sheath 17 and circuit shell 30 are connected and sealed.

Wherein, in one embodiment, it is additionally provided with locating piece 38 in circuit shell 30, which is set to annular On table top 37, and extend along circuit shell 30 away from the direction of ear-hang 10.Specifically, which may be disposed at circuit shell In 30 auxiliary sidewall 34, and the thickness that the locating piece 38 is protruded above in auxiliary sidewall 34 is consistent with the height of circular table 37.Wherein, One or more can be arranged in the quantity of locating piece 38 according to demand.

Correspondingly, it is provided with locating slot 173 corresponding with locating piece 38 at the collar flange 171 of shell sheath 17, thus When shell sheath 17 is coated on the periphery of circuit shell 30, which is covered at least partly locating piece 38.

It in this way, can be according to the position of locating piece 38 and locating slot 173 when being set with to shell sheath 17 It sets and shell sheath 17 is positioned, it is quick to facilitate operation personnel, accurate to install.Certainly, in other embodiments, It can be not provided with locating piece according to actual needs.

In one embodiment, circuit shell 30 includes the two sub-shells fastened each other, the respectively first sub- shell 301 With the second sub- shell 302.Specifically, two sub-shells can along circuit shell 30 middle line and symmetrically fasten, or can also be with It is fastened by other means according to actual needs.In addition, two sons of the circuit shell 30 for accommodating control circuit 60 The manner of shell can be identical with the manner of two sub- shells of the circuit shell 30 for accommodating battery 70, It can also be different.

In an application scenarios, the circular table 37 of circuit shell 30 can be formed on the first sub- shell 301, two sons Shell is engaged in circular table 37 towards the side of ear-hang 10, so that shell sheath 17 can be to the engagement of two sub- shells Seam carries out all standing, is sealed so as to the inner space to a certain extent to circuit shell 30, to improve osteoacusis The waterproof effect of loudspeaker arrangement.

In another application scene, the circular table 37 of circuit shell 30 can also be collectively formed by two sub- shells, from And the two at least partly position is combined in circular table 37 away from the side of ear-hang 10.At this point, shell sheath 17 can not The joint close for being located at circular table 37 and deviating from 10 side of ear-hang of two sub- shells of covering.It, can be further in

this application scene The joint close of the part is covered otherwise.

Further, in one embodiment, the joint surface that two sub-shells abut each other is the stairstepping agreed with mutually Shape.

Specifically, the end face of the second sub- shell 302 of direction of the first sub- shell 301 is stair-stepping first cascaded surface 3011, the end face of the first sub- shell 301 of direction of the second sub- shell 302 is stair-stepping second cascaded surface 3021.First ladder The shape and size uniformity of face 3011 and the second cascaded surface 3021 cause, and abut together so as to work in coordination.

In this way, the faying face that two sub- shells of circuit shell 30 mutually abut against is into a ladder without same In plane, so as to stop the liquid outside circuit shell 30 to be entered in circuit shell 30 by the periphery of circuit shell 30 Portion, and then further increase the waterproof effect of osteoacusis loudspeaker arrangement, with to inside circuit shell 30 control circuit 60 or Battery 70 etc. is protected.

Further, the peace towards the first sub- shell 30a is provided on the second cascaded surface 3021 of the second sub- shell 302 Be loaded hook 3022, and accordingly, being internally provided with for the first sub-shell 301 hooks slot with the matched installation of the installation hook 3022 3012.When installing to the first sub-shell 301 and the second sub- shell 302, installation hook 3022 can be got in external thrust It crosses installation to hook the lateral wall of slot 3012 and enter the installation and hook slot 3012, and the hook part hook joint installation for installing hook 3022 is hooked The inner sidewall of slot 3012, to realize the fastening of the first sub- shell 301 and the second sub- shell 302.

In one embodiment, osteoacusis loudspeaker arrangement is further provided with press button mechanism.

Specifically, it is provided with the first depressed area 341 on the outer surface of the auxiliary sidewall 34 of circuit shell 30, first depressed area Key hole 342 is further provided in 341, which is connected to outer surface and the inner surface of auxiliary sidewall 34.

Wherein, the auxiliary sidewall 34 of circuit shell 30 may include that, when user wears the osteoacusis loudspeaker arrangement, direction is used The auxiliary sidewall 34 of family back head, also may include user wear when, towards user's head on the downside of auxiliary sidewall 34.

The quantity of first depressed area 341 can be one or more, and can be set one in each first depressed area 341 A or multiple key holes 342, can specifically be arranged according to actual needs, be not specifically limited herein.

In present embodiment, osteoacusis loudspeaker arrangement still further comprises elastic backing 82, key 83, and control circuit 60 is wrapped include button circuit board 61.

Wherein, elastic backing 82 is set to the first depressed area 341, is specifically fixed on the corresponding auxiliary side in the first depressed area 341 On the outer surface of wall 34, to be covered in the outside of key hole 342 to avoid outside liquid from entering circuit by key hole 342 The inside of shell 30, to play the role of sealing waterproof.

Further, second depressed area 821 corresponding with key hole 342 is provided on the elastic backing 82, this is second recessed Fall into the inside that area 821 extends to key hole 342.

Specifically, which can be made of soft materials, such as soft silica gel, rubber etc..And the elasticity Pad it is 82 relatively thin, when directly Nian Jie with the outer surface of auxiliary sidewall 34, it is difficult to which it is firm to be bonded.

Therefore, in one embodiment, rigid liner further can be set between elastic backing 82 and circuit shell 30 84, rigidity liner 84 is fixed against each other with elastic backing 82, specifically can be real by way of fitting, bonding, injection molding etc. It is existing, and further carry out with auxiliary sidewall 34 rigidity liner 84 be bonded, can be specifically bonded by using double-sided adhesive, with An adhesive-layer is formed between rigidity liner 84 and auxiliary sidewall 34, so that elastic backing 82 can be clamped securely to auxiliary side wall 34 outer surface.Moreover, because 82 matter of elastic backing is soft and thin, therefore it is difficult to keep flat in the process of user's pressing keys Whole state, and by the fixation that reclines with rigidity liner 84, elastic backing 82 can be made to keep smooth.

Further, it is provided with the through-hole 841 for allowing the second depressed area 821 to pass through on rigidity liner 84, so that bullet Property liner 82 the second depressed area 821 inside of key hole 342 can be further extended to by through-hole 841.

Specifically, rigidity liner 84 can be made of stainless steel or other rigid materials, such as plastic cement hard material. And it can be sticked together by integrated molding and elastic backing 82.

In addition, key 83 includes keying body 831, and the key touching of 831 side of keying body protrusion setting is set First 832.Wherein, keying body 831 is set to side of the elastic backing 82 far from circuit shell 30, and key contact 832 extends To the second depressed area 821, to be extended to inside key hole 342 with the second depressed area 821.

Further, due in present embodiment osteoacusis loudspeaker arrangement it is more frivolous, the pressing

stroke of key 83 is shorter, User can be then reduced according to soft key to press feel and bring bad experience.In present embodiment, key 83 can be by The plastic material of hard is made, so that user can have good feel when pressing.

Further, button circuit board 61 is set to the inside of circuit shell 30, is provided with corresponding with key hole 342 Key switch 611.To which in user's pressing keys, key contact 832 contacts and triggers key switch 611, with further Realize corresponding function.

In present embodiment, by the way that the second depressed area 821 is arranged on elastic backing 82, on the one hand, the second depressed area 821 Setting can cover entire key hole 342, so as to improve waterproof effect simultaneously ; On the other hand, in its natural state, press Key contact 832 just can be extended into inside key hole 342 by the second depressed area 821, so as to shorten key press Stroke to reduce the occupied space of press-key structure, and then the waterproof performance that have osteoacusis loudspeaker arrangement can either, and accounts for With leas space.

In one embodiment, key 83 may include key monomer 833, the quantity of key monomer 833 can for one or Person is multiple.

In an application scenarios, key 83 may include at least two key monomers 833 being intervally installed and use In the interconnecting piece 834 of connection key monomer 833.Wherein, multiple key monomers 833 and interconnecting piece 834 can be integrally formed.It is corresponding Ground, each key monomer 833 are correspondingly arranged on a key contact 832, and correspond to a key hole 342 and one in turn and press Key switch 611.

That is, multiple key monomers 833 can be set corresponding to first depressed area 341 in present embodiment, User can trigger different key switches 611 by pressing different key monomers 833, and realize multiple functions in turn.

Further, the settable elastic projection 822 for being used to support interconnecting piece 834 on elastic backing 82.Due to key 83 Multiple key monomers 833 including connection setting, the setting of elastic projection 822 is so that user is pressing one of key monomer When 833, the key monomer 833 is enabled to individually to be pressed, and avoid passing through linkage and by other key monomers 833 The case where pressing together must trigger corresponding key switch 611 so as to accurate.It is noted that the elastic projection 822 are not necessary, such as are also possible to the projective structure without elasticity, or can also be not provided with projective structure, have Body can be configured according to the actual situation.

In one embodiment, groove 174 corresponding with key is provided on the inner wall of shell sheath 17, so as to Suit mode is coated on the periphery of circuit shell 30 and key.

In one embodiment, osteoacusis loudspeaker arrangement further comprises at least one conductive column 85, is contained in electricity Control circuit 60 inside road shell 30 further includes main control board 62, which can be used for connecting inside circuit shell 30 Main control board 62 and circuit shell 30 outside charging circuit and/or data transmission link etc., to osteoacusis loudspeaking Device carries out charging and/or data transmission etc..

Correspondingly, at least one mounting hole 331 is set in the major side wall 33 of circuit shell 30, and conductive column 85 can be inserted in pair In the mounting hole 331 answered.Wherein, conductive column 85 and mounting hole 331 can correspond, in present embodiment, conductive column 85 and peace The quantity for filling hole 331 is four, and four conductive columns 85 are inserted in respectively in corresponding mounting hole 331, is side by side in straight line And uniform intervals are arranged.Wherein, two conductive columns 85 positioned at outside can be used as charging interface, and be located in the middle two conductions Column 85 can be used as data transmission interface.Certainly, conductive column 85 and mounting hole 331 can also be carried out according to other arrangement modes Setting, is not specifically limited herein.

Wherein, conductive column 85 may include the cylindrical body 851 being inserted in mounting hole 331.Wherein cylindrical body 851 is outer Positioning convex platform 852 is provided on circumferential surface, which can be used for being clamped with the inner surface of major side wall 33, and then will be conductive Column 85 is fixed on mounting hole 331.

Specifically, positioning convex platform 852 can be arranged in a ring around the circumferential direction of cylindrical body 851, further, in annular Positioning convex platform 852 is provided with connection 851 outer peripheral surface of cylindrical body and positioning convex platform 852 towards the side inside circuit shell 30 Extension inclined-plane 853.When installing conductive column 85, by the conductive column 85 by the outside of circuit shell 30, along extending inclined-plane 853 It is gradually inserted the inside of mounting hole 331 and entrance circuit shell 30, and in turn by positioning convex platform 852, it is complete in positioning convex platform 852 After mounting hole 331, inner surface card of the positioning convex platform 852 towards table top and major side wall 33 outside circuit shell 30 It connects, and then conductive column 85 is fixed in mounting hole 331.

In aforesaid way, so that in assembling process, conductive column 85 can be from circuit shell 30 for the setting of positioning convex platform 852 Major side wall 33 outer surface insertion mounting hole 331 after, and positioning convex platform 852 can be pressed into peace

by way of pressing It fills in hole 331, to be connected and fixed with the inner surface of the major side wall 33 of circuit shell 30, without from the inside of circuit shell 30 It is installed, so that the assembly of osteoacusis loudspeaker arrangement is more convenient, improves production assembly efficiency further, extend So that in assembling process, positioning convex platform 852 can more be smoothly through mounting hole 331 for the setting on inclined-plane 853.Positioning convex platform 852 setting then enables to conductive column 85 to be clamped when entering in mounting hole 331 with the inner surface of major side wall 33 and is not easy from leading It is marked in electric hole, so as to which conductive column 85 to be stably attached in mounting hole 331.

Specifically, in one embodiment, insertion side of the cylindrical body 851 along cylindrical body 851 relative to mounting hole 331 To being divided into the first cylindrical body 8511 and the second cylindrical body 8512, the two can by conductive metal material, as copper, silver or Alloy etc. is integrally formed and is integral structure.Wherein, it is being inserted into the direction of insertion of mounting hole 331 perpendicular to conductive column 85, The cross section of first cylindrical body 8511 can be greater than the cross section of the second cylindrical body 8512.Wherein, positioning convex platform 852 is settable In in the second cylindrical body 8512.

Correspondingly, mounting hole 331 is divided into cross section and the first cylindrical body 851 and the second cylindrical body along direction of insertion 851 corresponding first hole sections 3311 and the second hole section 3312, and then in the junction of the first hole section 3311 and the second hole section 3312 Form a circular table 3313, wherein the circular table 3313 is connected to the outer surface of major side wall 33.

Further, when cylindrical body 851 is inserted in mounting hole 331, the first cylindrical body 8511 is towards the second column The side of shape ontology 8512 is supported on circular table 3313, meanwhile, the positioning on 8512 outer peripheral surface of the second cylindrical body The side of boss 852 towards the first cylindrical body 8511 is connected on the inner surface of major side wall 33, and then by conductive column 85 from peace Face is clamped simultaneously inside and outside major side wall 33 around dress hole 331, so that conductive column 85 is fixed in mounting hole 331.

In one embodiment, cylindrical body 851 is axially disposed an accommodating cavity 8513, the open end of accommodating cavity 8513 in Second cylindrical body 8512 is towards on the end face inside circuit shell 30.Specifically, which can be inserted into along being parallel to Direction and penetrate through to the part positioned at 30 interior side of circuit shell of the second cylindrical body 8512, and reach positioning convex platform It is terminated before 852.Certainly, in other embodiment, the specific location of accommodating

cavity 8513 can be set according to demand, herein Without limitation.

Further, conductive column 85 includes the spring 854 and conductive contact 855 being set in accommodating cavity 8513, conductive One end of contact 855 can be abutted in 8513 inside of accommodating cavity with spring 854, and the other end is exposed to from the open end of accommodating cavity 8513 The inside of circuit shell 30.Wherein, the material of conductive contact 855 can be identical as the material of cylindrical body 851, and spring 854 can be with it is such as bonded by certain means, welds mode and connect with the second cylindrical body 851 and conductive contact 855, or may be used also To be placed directly in accommodating cavity 8513, and passes through the clamping of cylindrical body 851 and the major side wall 33 of circuit shell 30 and lead The abutting of electrical contact 855 and main control board 62 and resilient clamp are inside accommodating cavity 8513.

Further, contact corresponding with 85 position of conductive column is provided on the main control board 62 inside circuit shell 30 621, it is specific as shown in Figure 7.Specifically, main control board 62 includes the biggish main surface 622 of area and connection main surface 622 The lesser side surface 623 of area, wherein the main surface 622 of main control board 62 can be parallel or be approximately parallel to circuit shell The major side wall 33 of body 30, wherein contact 621 is correspondingly arranged in the main surface 622 of main control board 62.

Wherein, the direction of insertion of the insertion of conductive column 85 mounting hole 331 is axial parallel with conductive column 85, and perpendicular to main side Wall 33, and then perpendicular to the main surface of main control board 62 622.After conductive column 85 is installed in mounting hole 331, spring 854 by conductive contact 855 and cylindrical body 851 clamping and generate elastic deformation, the elasticity of conductive contact 855 is pressed In on corresponding contact 621, to realize being electrically connected for conductive column 85 and main control board 62.

In one embodiment, osteoacusis loudspeaker arrangement still further comprises an auxiliary piece being located inside circuit shell 30 86。

The auxiliary piece 86 includes a plate body 861, is provided with vacancy section 8611 on the plate body 861, which can pass through heat The modes such as molten or hot pressing, bonding are set on the inner surface of major side wall 33, and make the mounting hole being set in major side wall 33 331 are located inside vacancy section 8611.Specifically, the plate face of plate body 861 can be posted by parallel on the inner surface of major side wall 33.

Wherein, the auxiliary piece 86 have certain thickness, on the inner surface that it is set to major side wall 33 after, with the auxiliary The inner sidewall and major side wall 33

of the vacancy section 8611 of piece 86 collectively form one and are located at outside the conductive column 85 being inserted in mounting hole 331 The glue groove 87 enclosed.

Further, sealant can be applied in glue groove 87, to carry out from the inside of circuit shell 30 to mounting hole 331 Sealing to improve the airtightness of circuit shell 30, and then improves the waterproof performance of osteoacusis loudspeaker arrangement.

Wherein, the material of the auxiliary piece 86 can be identical as the material of circuit shell 30, and is separately formed with circuit shell 30. It should be pointed out that mounting hole 331 nearby has other structures toward contact, such as needs into 30 formative stage of circuit shell Type key hole 342 etc., corresponding mold may need the inside from circuit shell 30 to exit to these structures at the time of molding, and this If when directly inside circuit shell 30 be integrally formed correspond to mounting hole 331 glue groove 87, the protrusion of glue groove 87 may Interfere smoothly exiting for the mold of these structures, to make troubles for production.In present embodiment, auxiliary piece 86 and circuit shell Body 30 is independent structure respectively, can be by the way that auxiliary piece 86 to be installed on to the inside of circuit shell 30 after the two is separately formed And glue groove 87 is collectively formed with the major side wall of circuit shell 30 33, so that the formative stage in circuit shell 30 will not stop portions The mold of structure is exited from the inside of circuit shell 30, to be conducive to going on smoothly for production.

In one embodiment, when forming to circuit shell 30, exiting for mold is only taken up occupied by glue groove 87 Space segment space, it is thus possible to be integrally formed glue on the inner surface of major side wall 33 in the case where not influencing to move back mould A part of slot 87, and another part of glue groove 87 still can be assisted constituting by auxiliary piece 86.

Specifically, integrally formed with the first strip fin 332, the first strip fin 332 on the inner surface of major side wall 33 The mold that the position at place does not influence circuit shell 30 moves back mould.The vacancy section 8611 of auxiliary piece 86 is provided with a notch 8612.Its In, the first strip fin 332 is corresponding with the notch 8612.It, can should after circuit shell 30 and auxiliary piece 86 are separately formed Auxiliary piece 86 is in the inner surface of major side wall 33, so that the first strip fin 332 is at least partly embedded at notch 8612, in turn Cooperated using the first strip fin 332 and auxiliary piece 86 so that glue groove 87 is in closure setting.

In present embodiment, since the first strip fin 332 will not exit generation blocking to mold, glue groove 87 Side wall can be collectively formed by the first strip fin 332 for being shaped in 33 inner surface of major side wall with auxiliary piece 86.

Further, in one embodiment, the first strip fin 332 also further extends into the side with plate body 861 Edge 8613 abuts, and then positions to plate body 861.

Specifically, which includes fin main body 3321 and registration arm 3322, wherein fin main body 3321 for the notch 8612 of vacancy section 8611 matching and chimeric with its, so that the side wall of glue groove 87 be collectively formed ; And it positions Arm 3322 is then further extended by one end of fin main body 3321, and extend at the one side edge 8613 of plate body 861 with The side edge 8613 abuts, to position at the side edge 8613 to the plate body 861.

Wherein, the first strip fin 332 can be greater than the thickness of auxiliary piece 86 in the height that the inner surface of major side wall 33 protrudes above Degree, it is of course also possible to be less than or equal to, as long as glue groove 87 can be collectively formed with auxiliary piece 86, and can be to auxiliary piece 86 plate body 861 plays positioning action, is not specifically limited herein.

In one embodiment, location hole 8614 is further provided on plate body 861, wherein 8614 run-through board of location hole The mainboard face of body 861 is arranged.Further, integrally formed with positioning corresponding with location hole 8614 on the inner surface of major side wall 33 Column 333, after the inner surface of major side wall 33 is arranged in auxiliary piece 86, which is inserted in location hole 8614, thus Further auxiliary piece is positioned.

Wherein, location hole 8614 is consistent with the quantity of positioning column 333, and in present embodiment, the quantity of the two is two.

In an application scenarios, the side edge 8613 of plate body 861 is formed at least two luge 8615, two location holes 8614 can be respectively arranged on corresponding lug 8615.

Further, integrally formed with one second strip fin 334, the second strip fin on the inner surface of major side wall 33 334 can be extended along towards the direction of auxiliary sidewall 34, and can be with the extending direction of the registration arm 3322 of the first strip fin 332 It is orthogonal.

Accordingly, strip locating slot 8616 corresponding with the second strip fin 334, the positioning are additionally provided on plate body 861 Slot 8616 is recessed setting along the direction far from the major side wall 33, and one end is connect and can be with the side edge 8613 of plate body 861 The side edge 8613 is vertically arranged.

In an application scenarios, locating slot 8616 can be only by the surface indentation shape of the fitting major side wall 33 of plate body 861 At the depth of locating slot 8615 is less than the thickness of plate body 861, at this point, the face of plate body 861 being arranged with the surface opposite of recess is not It is influenced by locating slot

8616 ：In another application scenarios, the depth of locating slot 8616 is greater than the depth of plate body 861, thus So that another apparent surface is towards the direction of recess protrusion, to match in the surface indentation of the close major side wall 33 of plate body 861 Conjunction forms locating slot 8616.

Specifically, after the inner surface of major side wall 33 is arranged in auxiliary piece 86, the second strip fin 334 is embedded in strip in locating slot 8616, further to be positioned to plate body 861.

In one embodiment, button circuit board 61 perpendicular to main control board 62 the auxiliary sidewall 34 with circuit shell 30 Parallel interval setting.Specifically, as described above, auxiliary sidewall 34 corresponding to press button mechanism may include two kinds, one is in user When wearing the osteoacusis loudspeaker arrangement, towards user's head on rear side of auxiliary sidewall 34, another kind be user wear when towards use The auxiliary sidewall 34 of account subordinate side.In present embodiment, button circuit board 61 can be two, and auxiliary with corresponding two kinds respectively The setting of sidewall 34 parallel interval.

Wherein, button circuit board 61 may be disposed at the side towards auxiliary sidewall 34 of the plate body 861 of auxiliary piece 86.Further Ground, auxiliary piece 86 include the pressure holding foot 862 relative to the protrusion setting of plate body 861.Specifically, pressure holding foot 862 is along perpendicular to plate body The direction protrusion of 861 main surface is set at the side edge towards auxiliary sidewall 34 of plate body 861, and presses the quantity of foot 862 It can be one or more.In present embodiment, pressure holding foot 862 can be electric by key towards the side of auxiliary sidewall 34 by it The pressure holding of road plate 61 is on the inner surface of auxiliary sidewall 34, to play fixed effect to button circuit board 61.

In one embodiment, main control board 62 and the interval of major side wall 33 are arranged, and the master of the plate body 861 of auxiliary piece 86 Surface is parallel with major side wall 33 and is further spaced and is arranged with main control board 62.

Wherein, pressure holding foot 862 is specifically by plate body 861 along the major side wall 33 away from the close circuit shell 30 of auxiliary piece 86 And it is protruded towards the direction of main control board 62, and extend at the plate face of main control board 62 to be played to main control board 62 Chip hold down at least partly presses on foot 862 so that main control board 62 is supported in.

In one embodiment, exposed hole 175 corresponding with the conductive column 85 is provided on shell sheath 17, by shell After body sheath 17 is sleeved on 30 periphery of circuit shell, it is outer that one end that conductive column 85 is located at outside circuit shell 30 further passes

through this Reveal hole 175 it is exposed, and then with the circuit connection outside osteoacusis loudspeaker arrangement so that the osteoacusis loudspeaker arrangement passes through conduction Column carries out electricity supply or data transmission.

Further, the outer surface depressions of circuit shell 30 are provided with the glue groove 39 around multiple mounting holes 331.Specifically Ground, glue groove 39 can be oval ring, and multiple mounting holes 331 are respectively arranged at the circular circuit shell of glue groove 39 of oval ring On 30.

In present embodiment, sealant is applied in the glue groove 39, and then shell sheath 17 has been assembled with circuit shell 30 Cheng Hou, shell sheath 17 can be tightly connected in the periphery of mounting hole 331 with circuit shell 30 by the sealant, to avoid When outside liquid enters 17 inside of shell sheath by exposed hole 175, shell sheath 17 generates cunning in 30 periphery of circuit shell It is dynamic, and further mounting hole 331 can be sealed from the outside of circuit shell 30, to further increase circuit shell 30 Airtightness, and then further increase the waterproof performance of osteoacusis loudspeaker arrangement.

In one embodiment, circuit shell 30 is further provided in one end far from ear-hang 10 and patches end 3a, rear to hang 40 include elastic metallic yarn 41 and are set to the both ends of elastic metallic yarn 41 and patch end 42, wherein patching end 3a and patching end 42 patch fixation each other.

Wherein, since the earphone core 50 of osteoacusis loudspeaker arrangement is respectively left and right two, corresponding machine core shell 20, ear-hang 10 and circuit shell 30 be also configured as left and right two, it is rear to hang 40 by patching fixed mode with two circuit shells 30 respectively The machine core shell 20, ear-hang 10 and the circuit shell 30 that are located at two sides are linked together, and the suspension setting when user wears On rear side of user's head.

Specifically, material with performance of elastic metallic yarn 41 etc. can be identical as elastic metallic yarn 11, related detailed content The aforementioned associated description to elastic metallic yarn 11 is referred to, details are not described herein again.

Patch the both ends that end 42 can be formed in elastic metallic yarn 41 by way of injection molding.Specifically, patching end 42 can To be made of materials such as plastic cement.

In one embodiment, it patches end 42 and is provided with jointing holes 421, this patches end 3a and is at least partially inserted into jointing holes In 421, in present embodiment, the side that circular table 37 deviates from ear-hang 10 can be specifically located at by patching end 3a.Patch end 3a with Plugging mode between jointing

holes 421 and the plugging mode patched between end 15 and jointing holes 31 may be the same or different.

Wherein, insertion side of the end 3a relative to jointing holes 421 is respectively arranged with and patched in the opposite sides for patching end 3a To vertically disposed fluting 3a1.Two fluting 3a1 can be spaced and be symmetrically disposed on the two sides for patching end 3a.Further, this two A fluting 3a1 can be connected in the corresponding side wall for being perpendicularly to the insertion direction with patching end 3a.

Correspondingly, it patches and is provided with through-hole 423 corresponding with two fluting positions 3a1 on the first side wall 422 at end 42 Its In, patching end 42 includes the side wall around setting for defining jointing holes 421, and the first side wall 422 for patching end 42 can be Patch end 3a and patch end 42 patch fixed when, patch end 42 can be with the side wall that intersect of extending direction of fluting 3a1.

Wherein, osteoacusis loudspeaker arrangement further comprises fixing piece 88, and fixing piece 88 includes two pins disposed in parallel 881 and the interconnecting piece 882 for connecting pin 881.In present embodiment, two pins 881 are arranged in parallel, and interconnecting piece 882 can It is vertically connected in the same side of two pins 881, to form U-shaped fixing piece 88 similar with 81 shape of fixing piece.

It should be pointed out that fixing piece 88 can be similar to the shape of fixing piece 81, but specific dimensional parameters can fit Should be different in peripheral structure, in present embodiment, the length of pin 881 is greater than the length of pin 811,812 length of interconnecting piece Less than the length etc. of interconnecting piece 882, it is not specifically limited herein.

Further, pin 881 can be inserted into fluting 3a1 from the outside via through holes 423 for patching end 42, and by interconnecting piece 882 are barred from the outside for patching end 3a, and then realize to patch end 42 and patch and hold 3a's to patch fixation.

By the above-mentioned means, the fixing piece 88 of osteoacusis loudspeaker arrangement includes two pins 881 disposed in parallel and is used for The interconnecting piece 882 of pin 881 is connected, is patched so that fixing piece 88 docks spigot 3a in certain span and patches end 42 It is fixed, so that circuit shell 30 and the rear fixation hung between 40 are more stable, firm ; And 88 structure of fixing piece is simple, It is inserted and removed from conveniently, is fixed as detachably so that patching end 3a and patching patching between end 42, and enable to bone The assembly for conducting loudspeaker arrangement is more convenient.

Further, in one embodiment, the second sidewall 424 opposite with the first side wall 422 for patching end 42 is

enterprising One step is provided with the through-hole 425 opposite with through-hole 423, and pin 881 is further inserted into through-hole 425 through fluting 3a1.

In the present embodiment, 881 via through holes 423 of pin are inserted into fluting 3a1, and further through fluting 3a1 insertion To through-hole 425, that is to say, that pin 881 can by it is rear hang 40 patch end 42 two lateral walls and patch end 3a it is complete Run through and be connected together, so that being patched between circuit shell 30 and rear extension 40 stronger.

Specifically, in one embodiment, patch end 3a along patch end 3a relative to jointing holes 421 direction of insertion into one Step, which is divided into first and patches section 3a2 and second, patches a section 3a3.

Wherein, patching end 3a may be provided at a close auxiliary sidewall 34 side for end for circuit shell 30, the auxiliary sidewall 34 It specifically can be another auxiliary sidewall 34 opposite with the auxiliary sidewall 34 where the locating piece 38 in above embodiment.

Further, first patch section 3a2 and second patch section 3a3 can close to locating piece 38 a lateral edge patch end 3a Relative to jointing holes 421 direction of insertion and stepped setting so that in the cross-wise direction being perpendicularly to the insertion direction, First section for patching section 3a2 is greater than the second section for patching section 3a3.

Correspondingly, jointing holes 421 are further divided into shape point relative to the direction of insertion of jointing holes 421 along patching end 3a Section 3a2 and second is not patched with first and patches the first hole section 4211 and the second hole section 4212 that section 3a3 matches, so that End 3a is patched when being inserted into jointing holes 421, first, which patches section 3a2 and second, patches section 3a3 and be inserted in the first hole section respectively 4211 and second 4212 in hole section.

Further, fluting 3a1 may be disposed at first and patch on section 3a2, and specifically, fluting 3a1 can be arrived along end 3a is patched The direction of locating piece 38, the i.e. opposite direction of the auxiliary sidewall 34 of the two of circuit shell 30 and be extended, so that perforation first connects The two sidewalls vertical with the major side wall 33 of circuit shell 30 of section 3a2 are inserted, and are further connect through first along being inserted perpendicularly into direction Insert the two sidewalls of the major side wall 33 for being parallel to circuit shell 30 of section 3a2.

Wherein, patching the through-hole 423 being arranged on end 42 can be corresponding with the fluting side towards locating piece 38 of 3a1, and leads to It hole 425 then can be corresponding with fluting remotely located piece 38 of the side of 3a1.

Further, in one embodiment, it first patches section 3a2 and second and patches the top side of section 3a3 and coplanar with each other set It sets.Wherein, the first top side for patching that section 3a2 and second patches section 3a3 refers to when user normally wears osteoacusis loudspeaker arrangement, First patches the side that section 3a2 and second patches the headward top side of section 3a3, namely patches section 3a2 and second with first and connect It inserts section 3a3 and is formed by ladder-like opposite side.

Further, first patch section 3a2 and second patch section 3a3 top side it is coplanar and be formed with for accommodating conducting wire Cabling channel 3a4.Cabling channel 3a4 can extend along the direction that patches for patching end 3a and jointing holes 421, can be used for accommodating passing through and hang later 40 and be connected to the conducting wire of control circuit 60 and battery 70.

In present embodiment, it will can first patch end 3a and be inserted in jointing holes 421, the court for then patching section 3a2 from first Fluting 3a1 is inserted into the side of locating piece 38.Specifically, in present embodiment, the court that end 3a is set to circuit shell 30 is patched Remotely located piece 38 of side of 40 end face is hung backward, therefore, also has one in the side for patching end 3a towards locating piece 38 Fixed space, thus to circuit shell 30 and it is rear hang 40 and carry out grafting installation when, can be by fixing piece 88 from patching end 3a2 Bottom side, i.e., first patch section 3a2 towards the side of locating piece 38 by through-hole 423 is inserted into fluting 3a1 and in turn be inserted into it is logical In hole 425, to realize that circuit shell 30 is hung 40 and be plugged and fixed with rear.It in this way, can be completely hidden by fixing piece 88 It is hidden in circuit shell 30 to be formed by inner space with rear extension 40 without exposed, without occupying additional space.

Further, in one embodiment, rear extension 40 further includes injection molding in elastic metallic yarn 41 and patches outside end 42 The second protection sleeve pipe 43 for enclosing and with the integrally formed end protection cap 44 of the second protection sleeve pipe 43.

Wherein, the material of the second protection sleeve pipe 43 and end protection cap 44 can be with protection sleeve pipe 16 and shell sheath 17 material is identical, such as all can be have the soft material, such as soft silica gel, rubber etc. of certain elasticity.

End protection cap 44 can specifically be formed in the both ends of elastic metallic yarn 41, can be located at elastic metallic yarn 41 two The end 42 that patches at end is shaped in the periphery for patching end 42.

It should be pointed out that shell sheath 17 is only wrapped up by one end towards ear-hang 10 of circuit shell 30 to circuit shell At 30 circular table 37, therefore, the part that 40 are hung after the direction of the circular table 37

of circuit shell 30 then exposes to shell shield The periphery of set 17.Further, in present embodiment, end protection cap 44 and the shape for patching the inner sidewall that end 42 is collectively formed The shape of the shape end exposed with the circuit shell 30 matches, to be further covered in the end of the exposed circuit shell 30 Periphery, and hung after the direction of the end face towards circuit shell 30 of the end protection cap 44 and shell sheath 17 40 end face bullet Property abut, to further provide for sealing.

Further, in one embodiment, the end of the exposed circuit shell 30 of shell sheath 17 be additionally provided with by Keyhole 342 is accordingly provided with key 83, end protection cap 44 covers the key 83, and is provided with and is used in key hole 342 Accommodate the key accommodation groove 441 of key 83.

Specifically, 342 space set of key hole is in patching end 3a towards the side of locating piece 38, and key hole 342 Quantity can be one or more, specifically can be according to the specific structure and electricity of the control circuit 60 inside circuit shell 30 The structure of road shell 30 itself determines, is not specifically limited herein.

The foregoing is merely presently filed embodiments, are not intended to limit the scope of the patents of the application, all to utilize this Equivalent structure or equivalent flow shift made by application specification and accompanying drawing content, it is relevant to be applied directly or indirectly in other Technical field similarly includes in the scope of patent protection of the application.

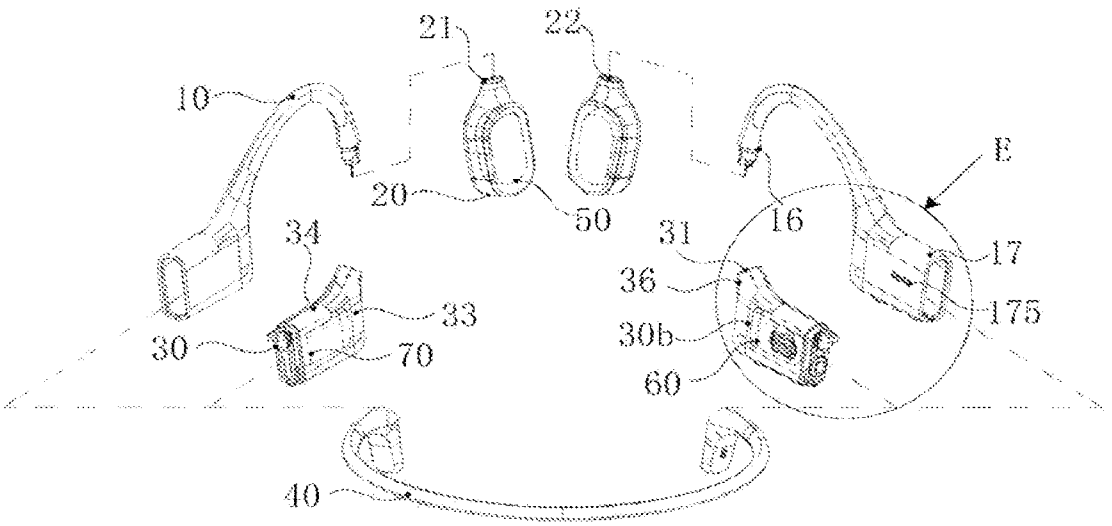


图1

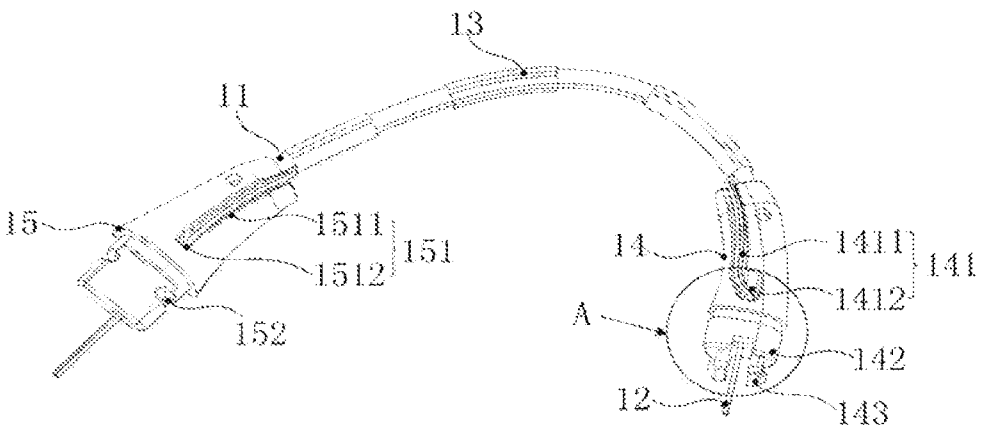


图2

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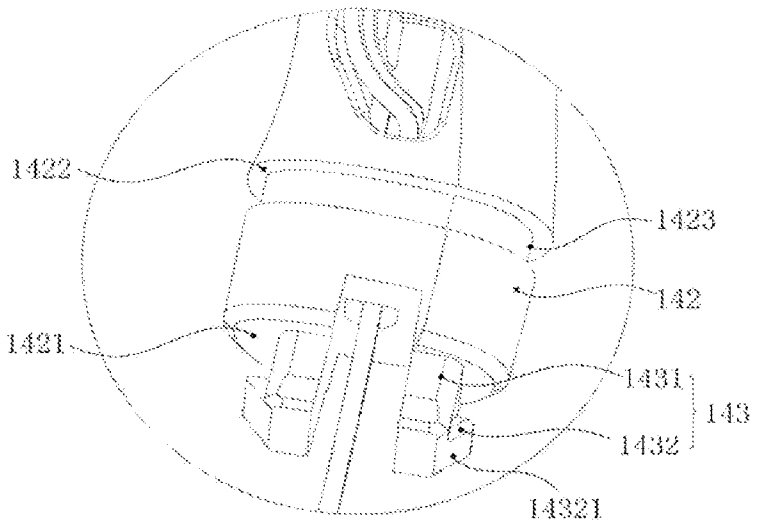


图3

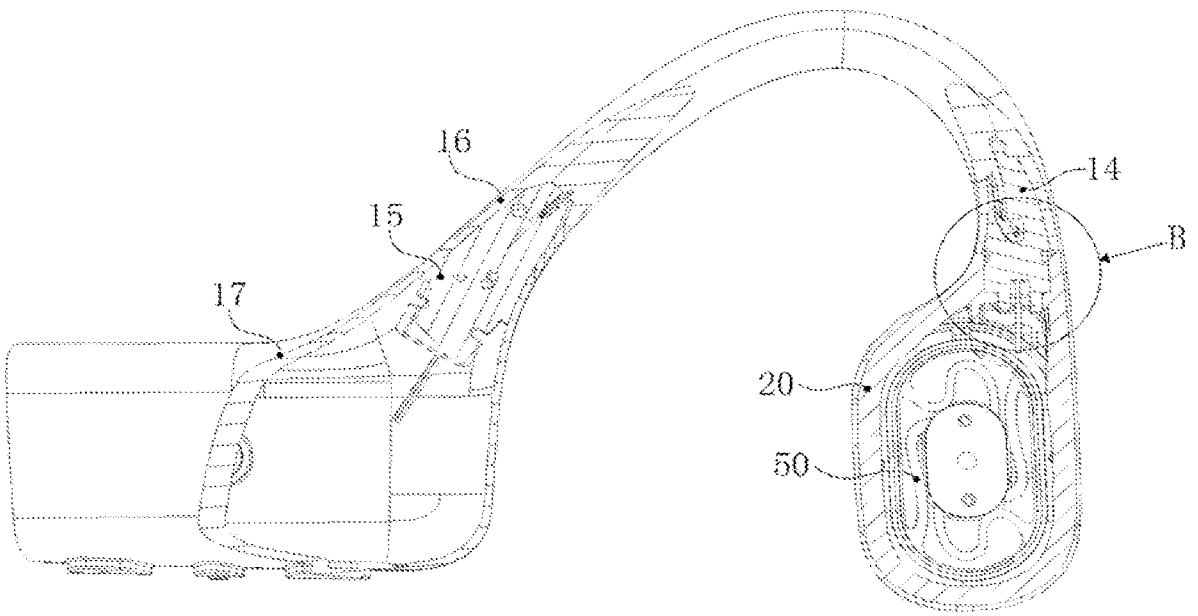


图4

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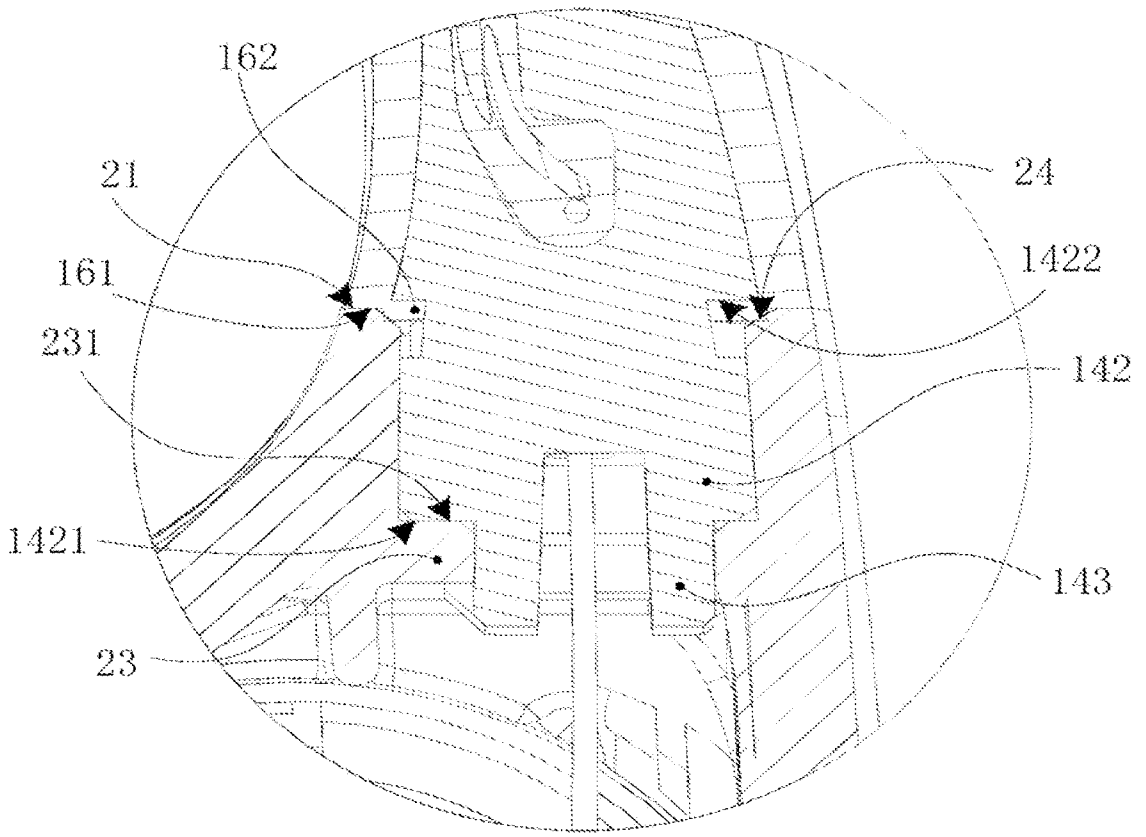


图5

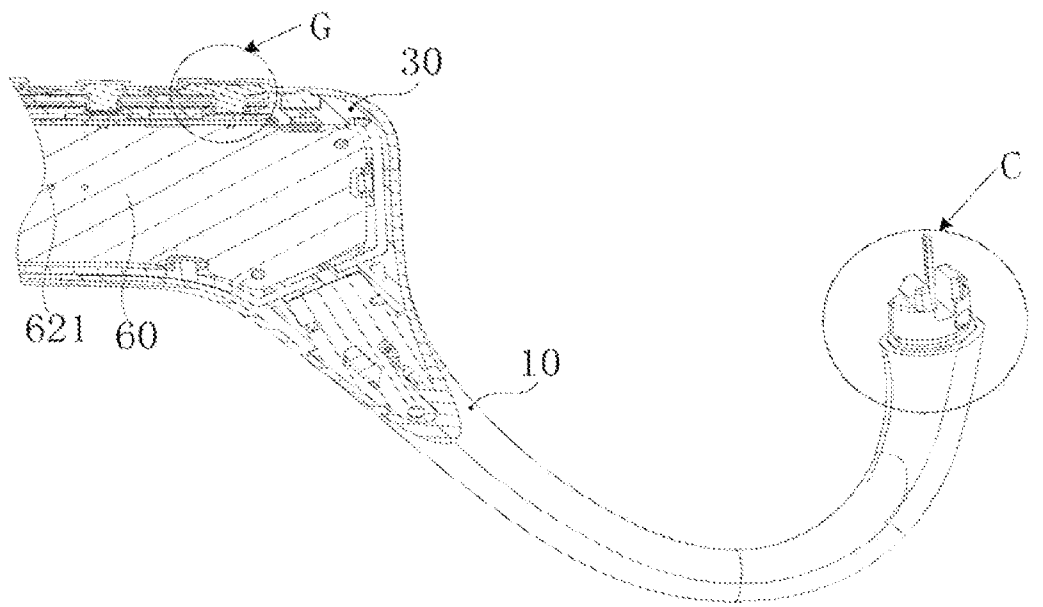


图6

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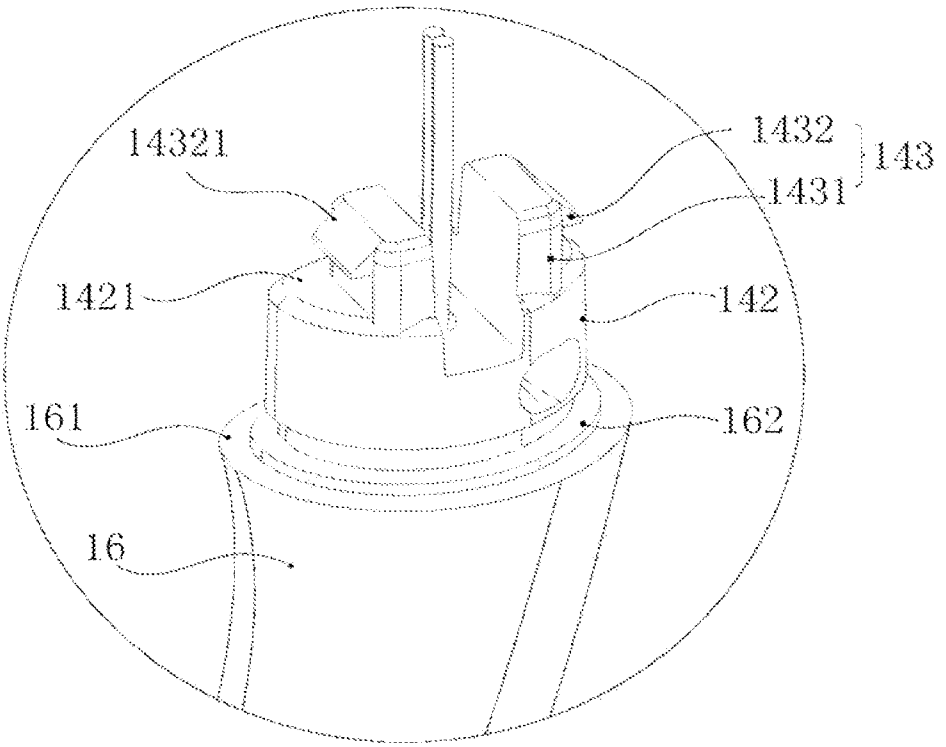


图7

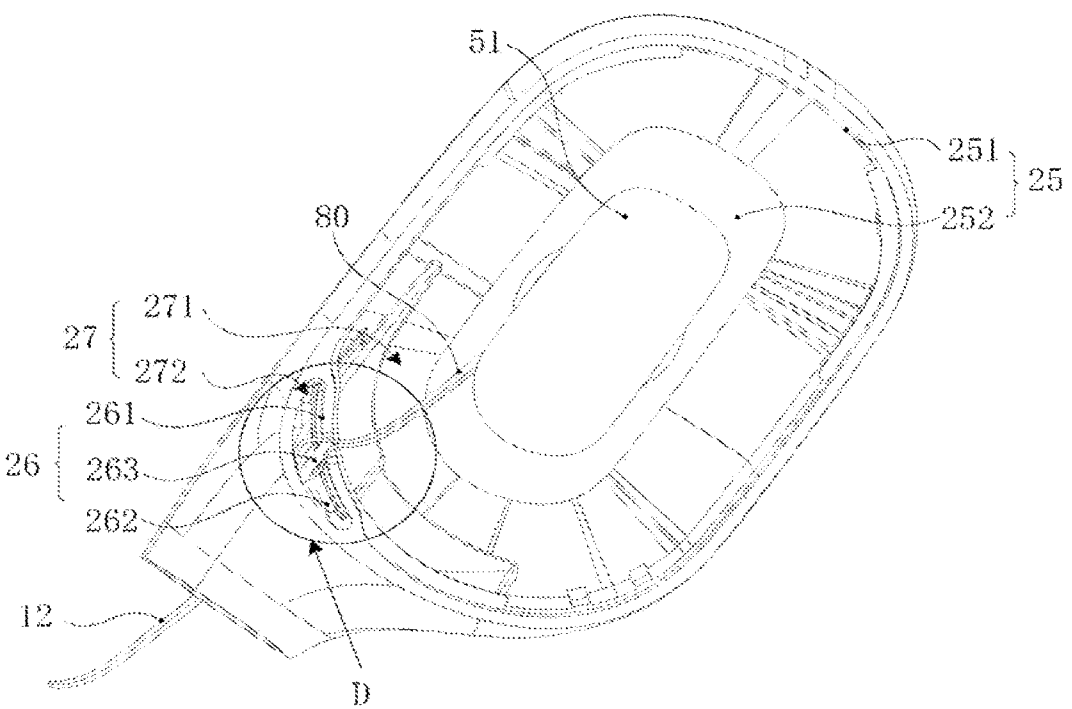


图8

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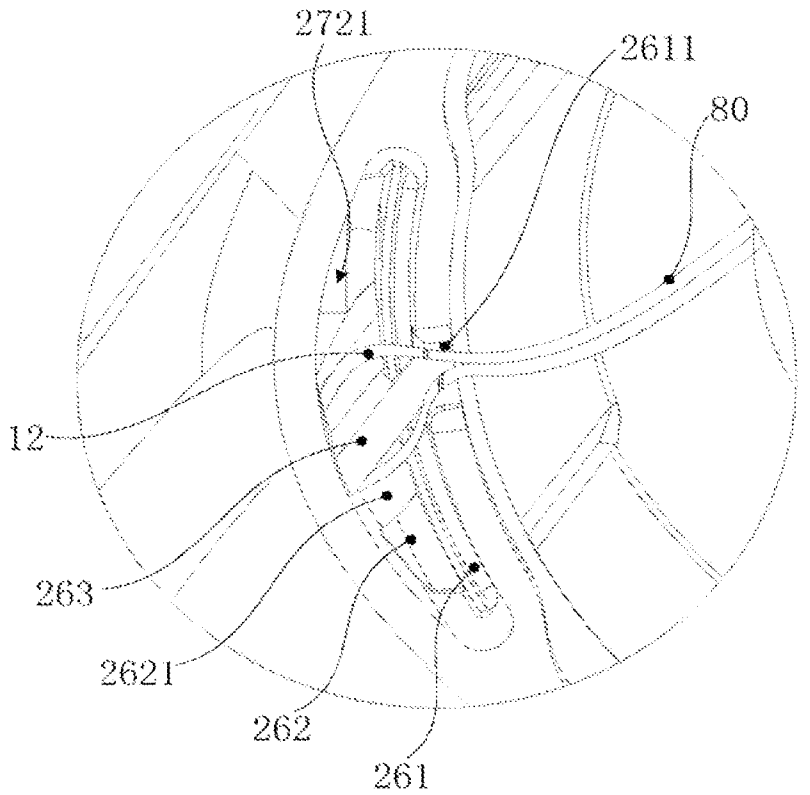


图9

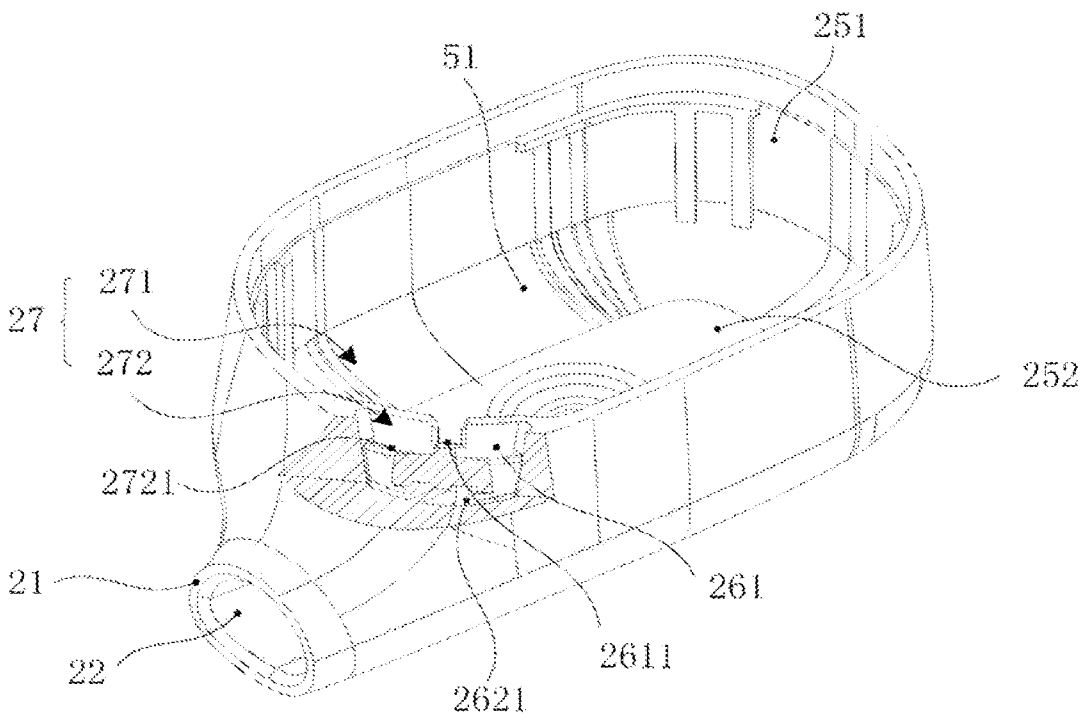


图10

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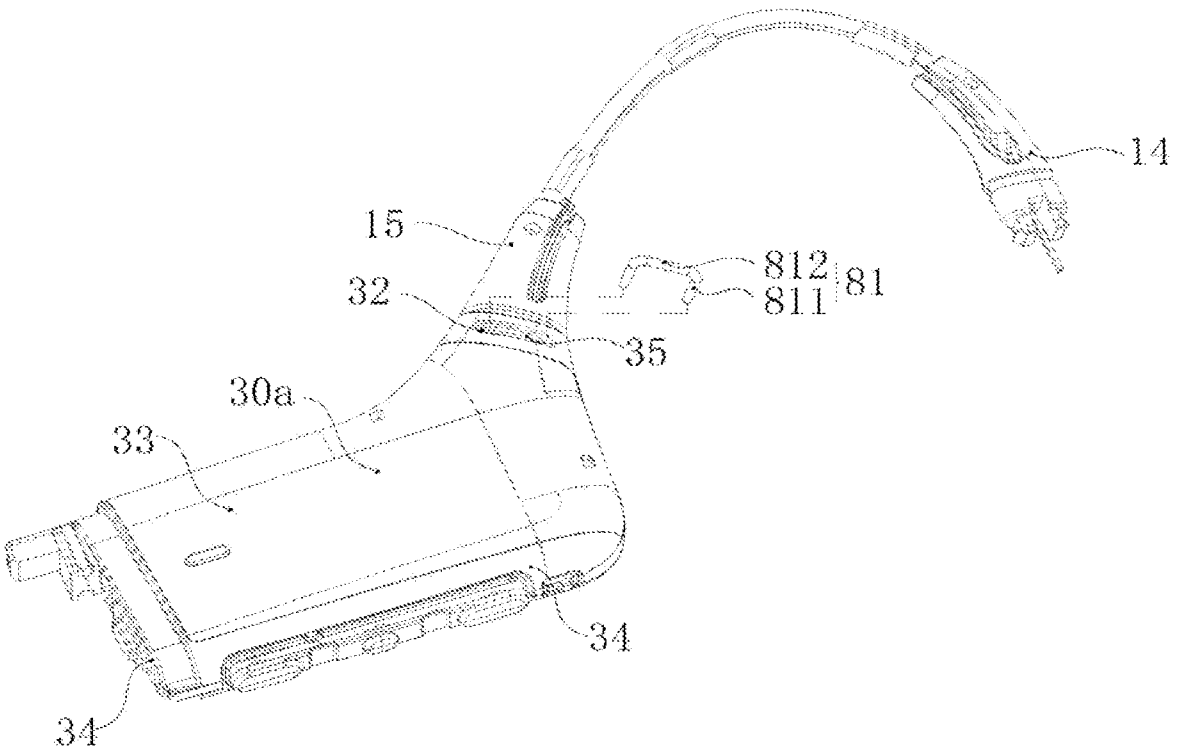


图11

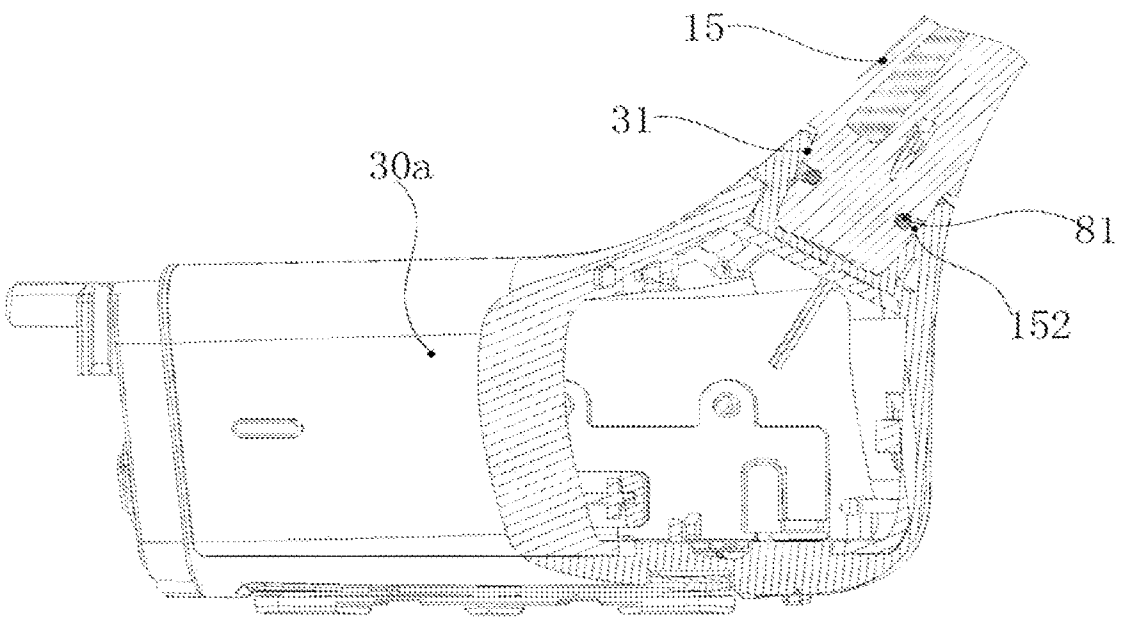


图12

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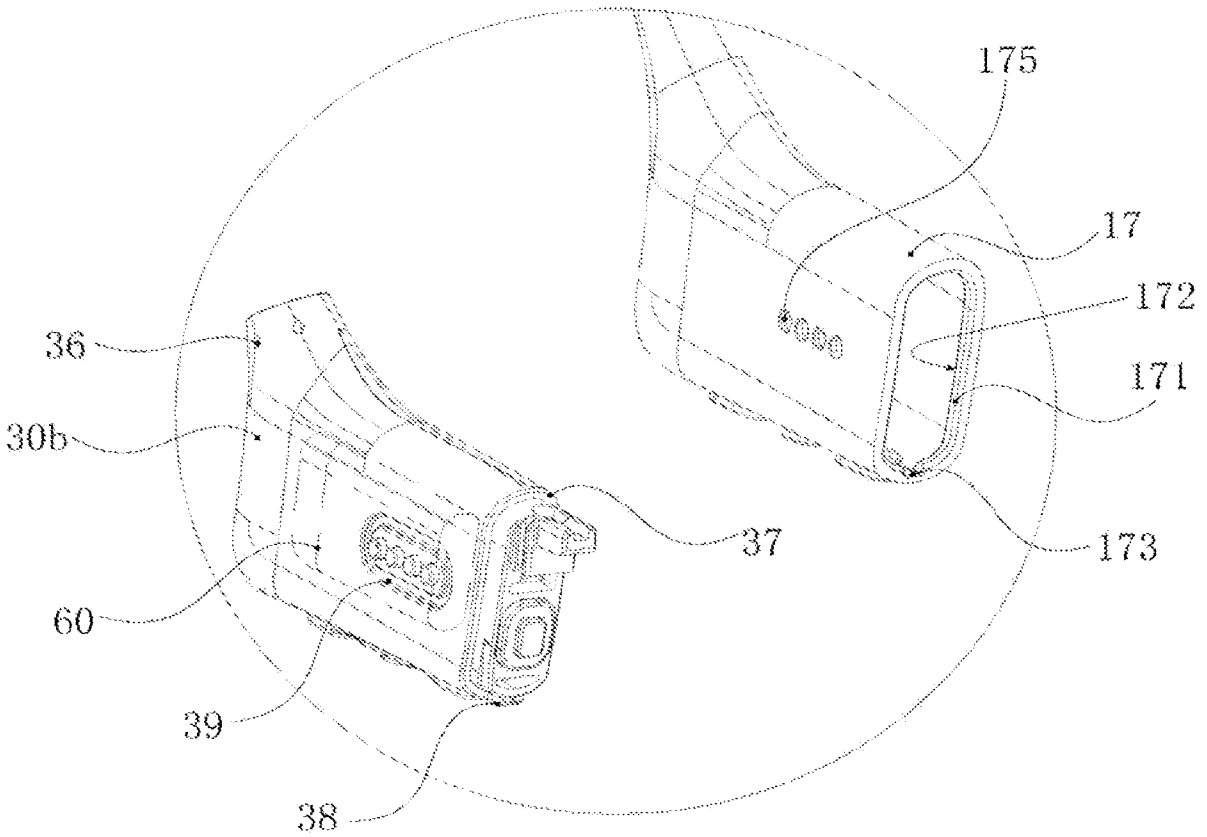


图13

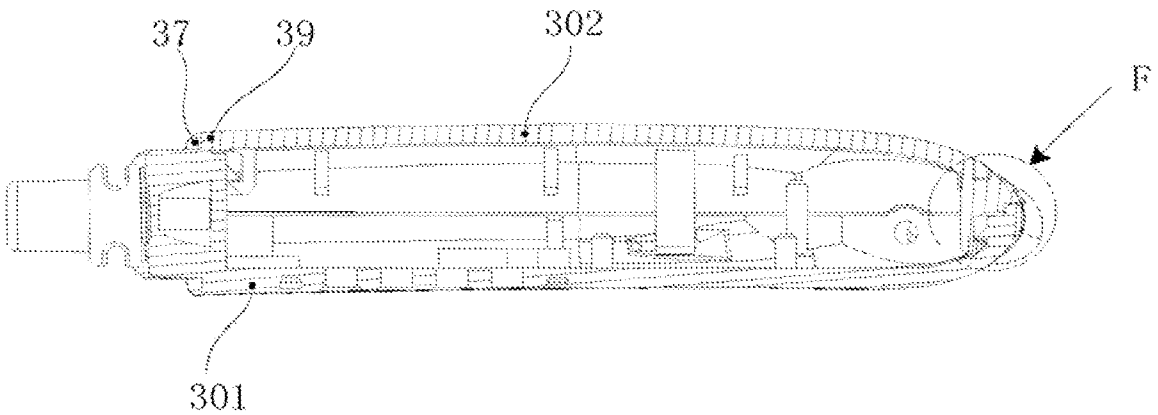


图14

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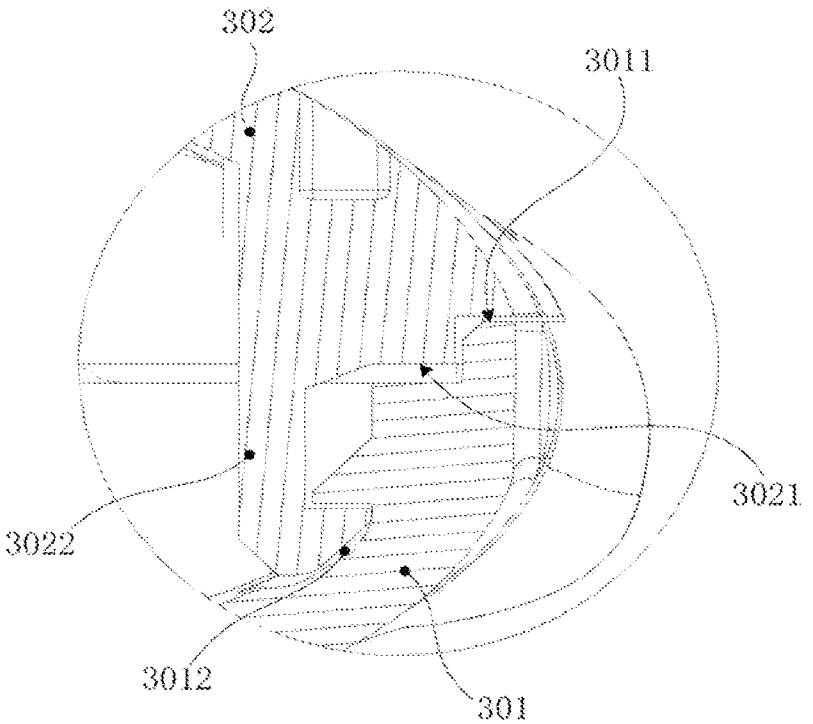


图15

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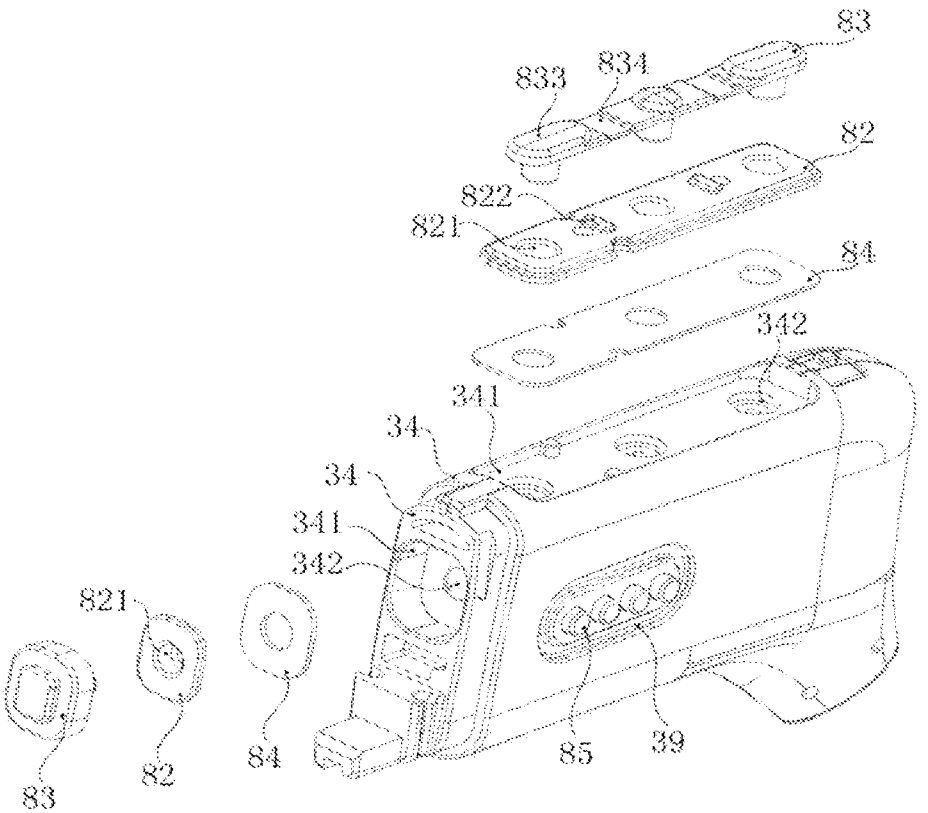


图16

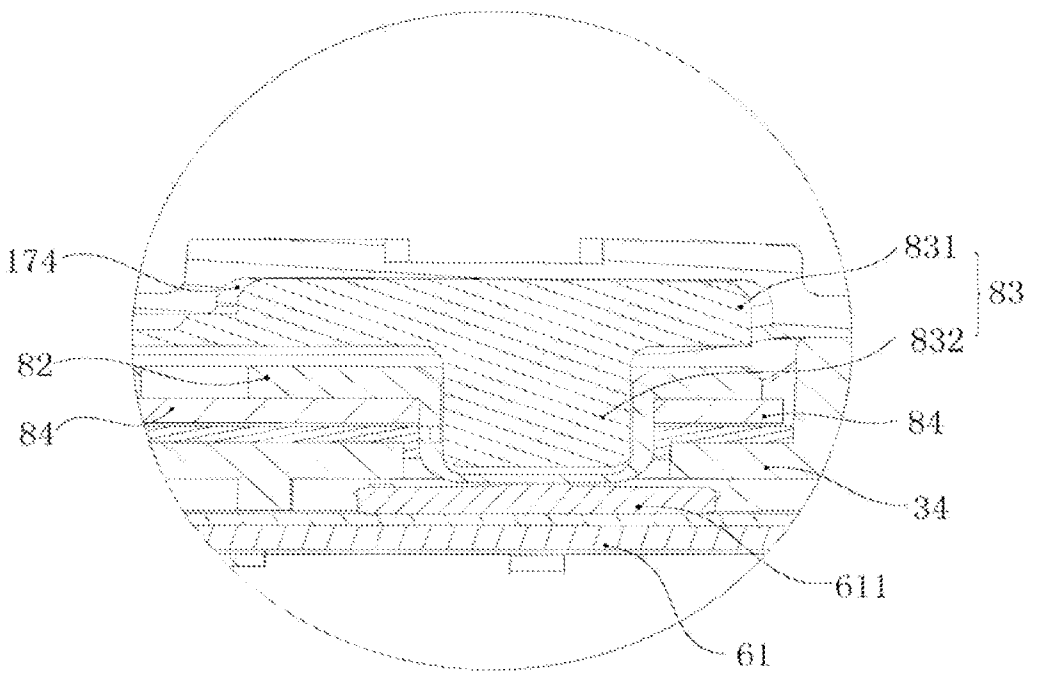


图17

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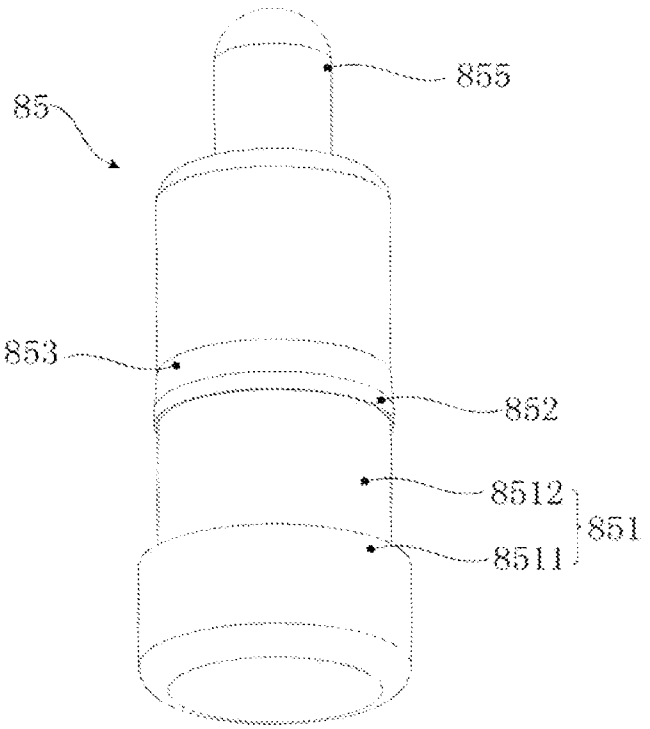


图18

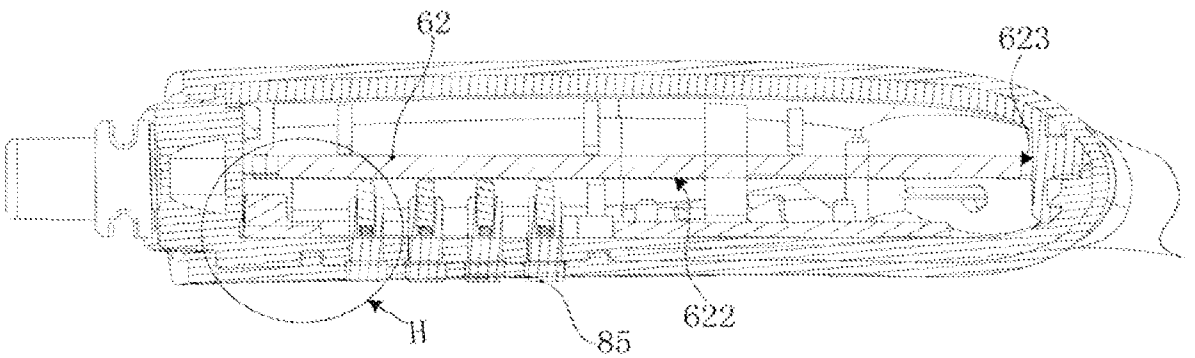


图19

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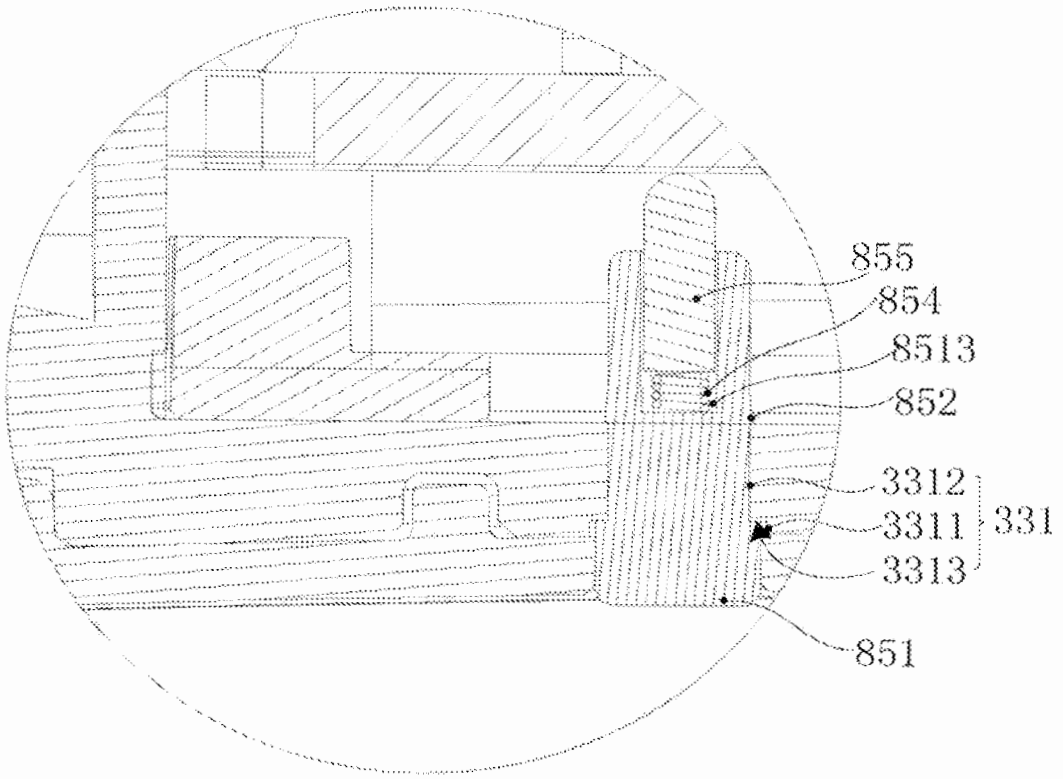


图20

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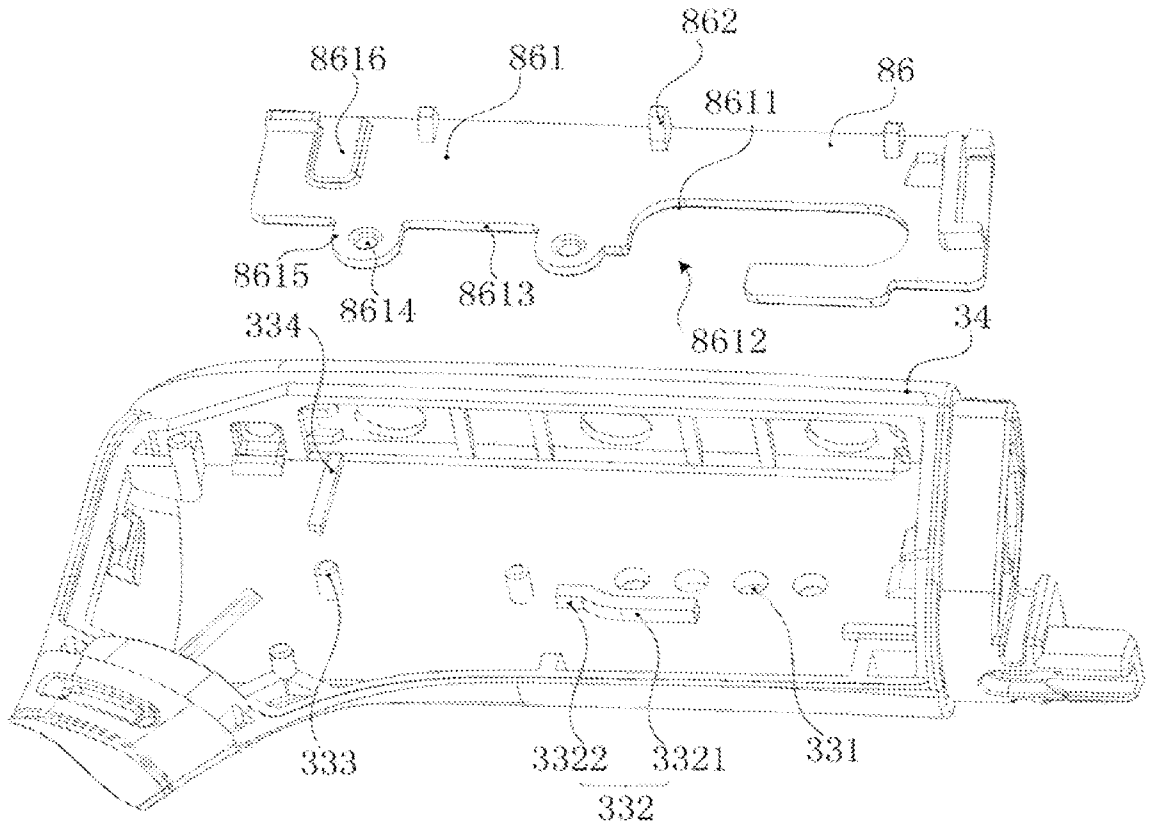


图21

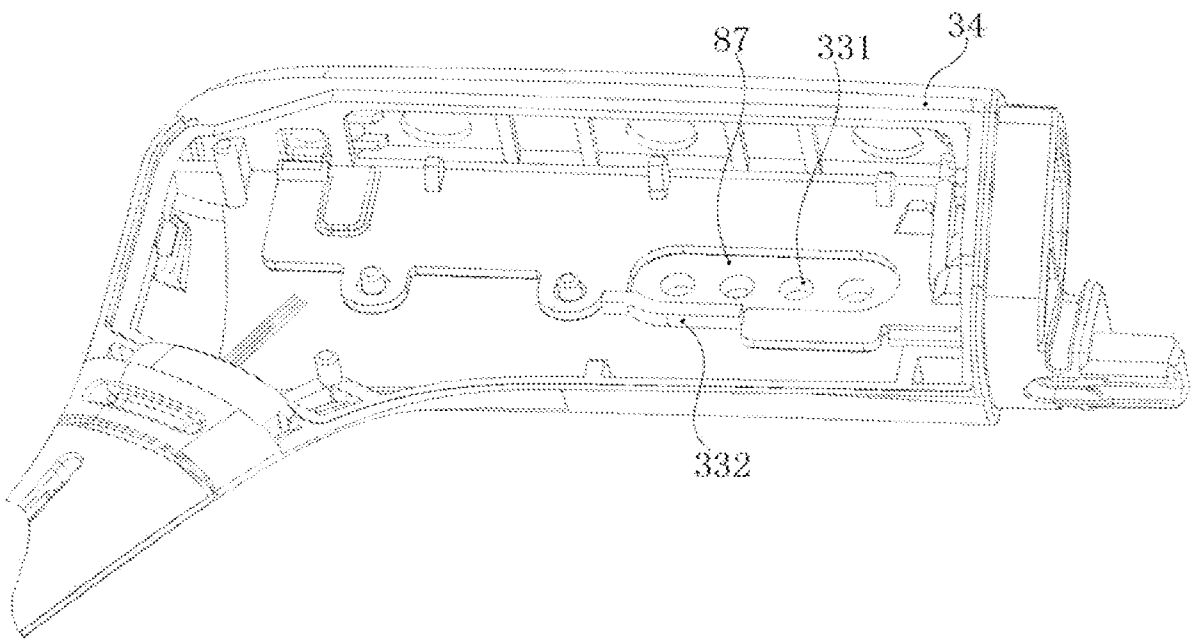


图22

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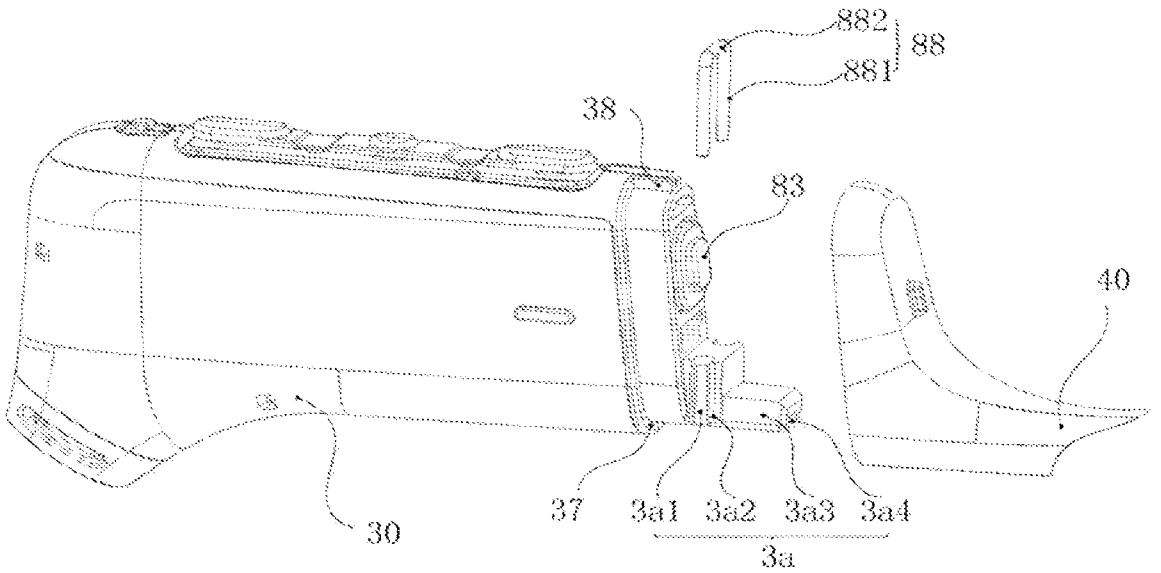


图23

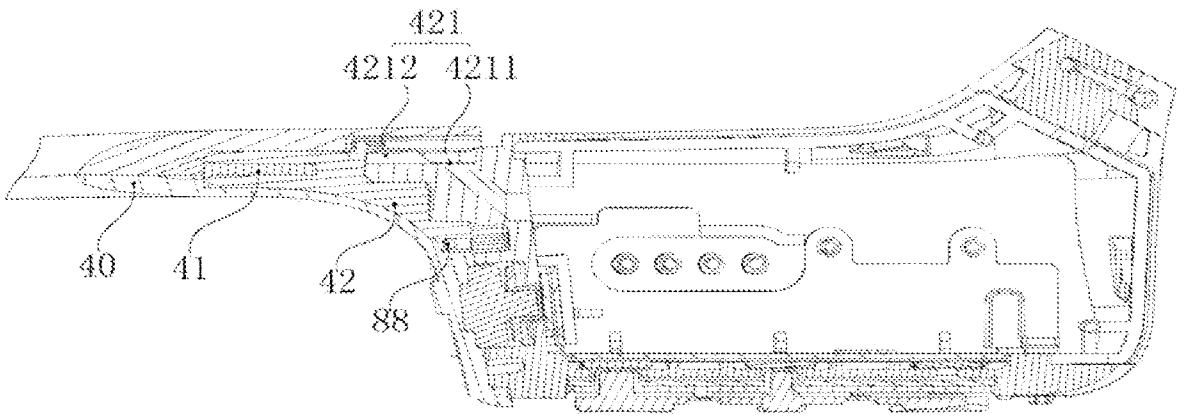


图24

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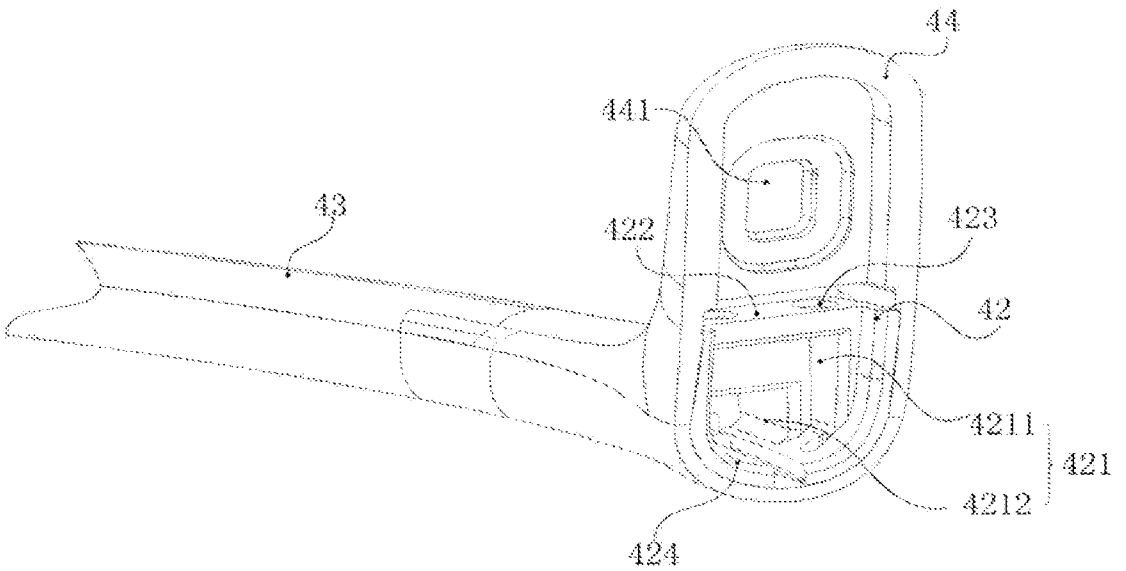


图25

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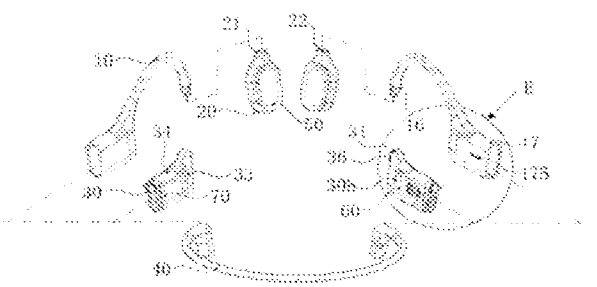
权利要求书2页 说明书19页 附图14页

(54)发明名称

骨传导扬声装置

(57)摘要

本申请公开了一种骨传导扬声装置，包括：耳挂及电路壳体；该电路壳体用于容纳控制电路或电池，并与耳挂连接；其中耳挂上注塑有壳体护套，壳体护套以套装方式包覆于电路壳体的外围。通过上述方式，本申请能够减少成型阶段对控制电路或电池所带来的不利影响。



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1.一种骨传导扬声装置，其特征在于，包括：

耳挂；

电路壳体，用于容纳控制电路或电池，并与所述耳挂连接；

其中所述耳挂上注塑有壳体护套，所述壳体护套以套装方式包覆于所述电路壳体的外围。

2.根据权利要求1所述的骨传导扬声装置，其特征在于，所述壳体护套为一端开口的袋状结构，以使得所述电路壳体经由所述壳体护套的开口端进入所述壳体护套的内部。

3.根据权利要求2所述的骨传导扬声装置，其特征在于，所述壳体护套的开口端设置有向内凸出的环状凸缘，所述电路壳体远离所述耳挂的端部呈阶梯状设置，进而形成第一环形台面，当所述壳体护套包覆于所述电路壳体的外围时，所述环状凸缘抵接于所述第一环形台面上。

4.根据权利要求3所述的骨传导扬声装置，其特征在于，在所述环状凸缘与所述第一环形台面的接合区域施加有密封胶，以对所述壳体护套和电路壳体进行密封连接。

5.根据权利要求3所述的骨传导扬声装置，其特征在于，所述第一环形台面上设置有沿所述电路壳体背离所述耳挂的方向延伸的定位块，所述壳体护套的环状凸缘处设置有与所述定位块对应的定位槽，所述定位槽覆盖在至少部分所述定位块的外围，以对所述壳体护套进行定位。

6.根据权利要求3所述的骨传导扬声装置，其特征在于，所述电路壳体包括彼此扣合的两个子壳体，其中所述第一环形台面形成于一个所述子壳体上，所述壳体护套对所述两个子壳体的接合缝进行全覆盖。

7.根据权利要求6所述的骨传导扬声装置，其特征在于，两个所述子壳体彼此对接的接合面为相互契合的阶梯形状。

8.根据权利要求3所述的骨传导扬声装置，其特征在于，所述电路壳体上设置有多个安装孔，并在所述电路壳体的外表面凹陷设置有第一胶槽，所述多个安装孔位于所述第一胶槽内，所述骨传导扬声装置进一步包括分别插置于所述安装孔内的导电柱，所述壳体护套进一步包括允许所述导电柱外露的外露孔，其中在所述第一胶槽内施加有密封胶，以在所述安装孔的外围对所述壳体护套和所述电路壳体进行密封连接。

9.根据权利要求8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辅助片，所述辅助片包括板体，所述板体上设置有镂空区，其中所述板体设置于所述电路壳体的内表面上，且所述安装孔位于所述镂空区内部，进而在所述导电柱外围形成第二胶槽，其中在所述第二胶槽内施加有密封胶，以在所述电路壳体的内部对所述安装孔进行密封。

10.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，所述机芯壳体用于容纳耳机芯，并设置有与所述机芯壳体的外端面连通的接插孔，所述接插孔的内侧壁上设置有止挡块，

所述耳挂包括弹性金属丝以及设置于所述弹性金属丝一端的接插端，所述接插端包括：

插入部，至少部分插入于所述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

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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接插端的接插固定。

11.根据权利要求10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第二环形台面，所述耳挂还包括注塑于所述弹性金属丝以及所述接插端外围的保护套管，所述保护套管进一步延伸至所述第二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接插端接插固定时与所述机芯壳体弹性抵接，进而实现密封。

12.根据权利要求11所述的骨传导扬声装置，其特征在于，所述保护套管在所述第二环形台面朝向所述机芯壳体的外端面的一侧形成一环形抵接面以及位于所述环形抵接面内部且相对于所述环形抵接面凸出设置的环形凸台；

所述机芯壳体进一步包括用于连接所述机芯壳体的外端面和所述接插孔的内侧壁的连接斜面；

其中，在所述机芯壳体与所述接插端接插固定时，所述环形抵接面和所述环形凸台分别与所述机芯壳体的外端面和所述连接斜面弹性抵接。

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骨传导扬声装置

技术领域

[0001] 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。

背景技术

[0002] 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。

[0003] 骨传导扬声装置在成型阶段，用于容纳控制电路或电池的电路壳体和设置在电路壳体外围的保护套管可一体成型。然而，由于电路壳体内部容纳有控制电路或电池，若将二者一体成型，则高温环境容易对控制电路或电池带来损伤，从而影响骨传导扬声装置的质量。

发明内容

[0004] 本申请主要解决的技术问题是提供一种骨传导扬声装置，能够减少在成型阶段对控制电路或电池所带来的不利影响。

[0005] 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，包括：耳挂；电路壳体，用于容纳控制电路或电池，并与所述耳挂连接；其中所述耳挂上注塑有壳体护套，所述壳体护套以套装方式包覆于所述电路壳体的外围。

[0006] 本申请的有益效果是：区别于现有技术的情况，本申请在骨传导扬声装置的成型和装配阶段，将电路壳体和壳体护套分别成型，然后再套装在一起，从而能够避免二者一体成型时，高温环境对控制电路或电池所带来的损伤，从而减少成型阶段对控制电路或电池所带来的不利影响。

附图说明

[0007] 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：

[0008] 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；

[0009] 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；

[0010] 图3是图2中A部分的局部放大图；

[0011] 图4是本申请骨传导扬声装置一实施方式的局部截面图；

[0012] 图5是图4中B部分的局部放大图；

[0013] 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；

[0014] 图7是图6中C部分的局部放大图；

[0015] 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；

[0016] 图9是图8中D部分的局部放大图；

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[0017] 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；

[0018] 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；

[0019] 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；

[0020] 图13是图1中E部分的局部放大图；

[0021] 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；

[0022] 图15是图14中F部分的局部放大图；

[0023] 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；

[0024] 图17是图6中G部分的局部放大图；

[0025] 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；

[0026] 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；

[0027] 图20是图19中H部分的局部放大图；

[0028] 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；

[0029] 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；

[0030] 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；

[0031] 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；

[0032] 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

[0033] 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、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。

[0034] 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。

[0035] 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。

[0036] 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。

[0037] 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

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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。

[0038] 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。

[0039] 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。

[0040] 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。

[0041] 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。

[0042] 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。

[0043] 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。

[0044] 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。

[0045] 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。

[0046] 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

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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。

[0047] 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。

[0048] 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。

[0049] 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。

[0050] 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：

[0051] 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；

[0052] 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。

[0053] 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。

[0054] 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；

[0055] 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；

[0056] 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。

[0057] 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。

[0058] 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。

[0059] 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：

[0060] 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；

[0061] 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；

[0062] 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。

[0063] 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。

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[0064] 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。

[0065] 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。

[0066] 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。

[0067] 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。

[0068] 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。

[0069] 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22，接插孔22的内侧壁上设置有止挡块23。

[0070] 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。

[0071] 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。

[0072] 其中，接插端14包括插入部142和两个弹性卡勾143。

[0073] 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。

[0074] 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。

[0075] 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。

[0076] 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

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入方向的侧面与远离插入部142的端面的过渡斜面14321。

[0077] 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。

[0078] 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。

[0079] 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。

[0080] 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。

[0081] 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。

[0082] 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。

[0083] 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。

[0084] 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。

[0085] 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。

[0086] 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。

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[0087] 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。

[0088] 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。

[0089] 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。

[0090] 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。

[0091] 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。

[0092] 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。

[0093] 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。

[0094] 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。

[0095] 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。

[0096] 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。

[0097] 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。

[0098] 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

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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。

[0099] 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。

[0100] 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。

[0101] 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。

[0102] 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。

[0103] 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。

[0104] 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。

[0105] 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。

[0106] 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。

[0107] 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

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均在沿插入方向的垂直方向上连通接插端15的侧壁。

[0108] 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。

[0109] 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。

[0110] 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。

[0111] 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。

[0112] 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。

[0113] 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。

[0114] 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。

[0115] 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。

[0116] 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。

[0117] 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。

[0118] 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。

[0119] 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的内侧壁的形

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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。

[0120] 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。

[0121] 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。

[0122] 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。

[0123] 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。

[0124] 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。

[0125] 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。

[0126] 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。

[0127] 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。

[0128] 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。

[0129] 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。

[0130] 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覆盖在至少部分定位块38上。

[0131] 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

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可以根据实际需求不设置定位块。

[0132] 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。

[0133] 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。

[0134] 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。

[0135] 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。

[0136] 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。

[0137] 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。

[0138] 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。

[0139] 在一实施方式中，骨传导扬声装置进一步设置有按键机构。

[0140] 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。

[0141] 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侧壁34。

[0142] 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。

[0143] 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。

[0144] 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

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