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(54) **Title:** MULTI-MODE LISTENING APPARATUS

(57) **Abstract:** A headset apparatus including a headband having two end portions, each of the end portions comprising an angled hinge having two opposing ends. The apparatus further includes at least two speakers, each of the speakers rotatably attached to the two ends of the angled hinged to form two rotary joints, wherein rotation of the speaker about an axis of rotation between the two rotary joints transitions the apparatus between a first listening mode to a second listening mode.

MULTI-MODE LISTENING APPARATUS

TECHNICAL FIELD

[001] This disclosure relates to a music listening and playing apparatus and more specifically, music headphones with rotating speakers and multiple music listening and playing modes.

BACKGROUND ART

[002] There are various patents covering headphones and headsets.

SUMMARY OF THE DISCLOSURE

[003] The present disclosure provides for a headset that can be used as a listening device and can convert into a music playing device. In one embodiment, the present disclosure provides for a music playing and listening apparatus comprising: a headband having opposing ends; at least two connectors, each of the connectors having at least two arms, a first arm is shorter than a second arm; and at least two speakers, each of the speakers having opposing sides and comprising an audio output element on a first side and a compartment on a second side, the first and second arms of each of the connectors is pivotally attached to a portion of each of the speakers to thereby allow rotation of the speakers, each of the audio output elements of each of the speakers generally face one another during a first listening mode, each of the speakers being rotatable about the first and second arms of each of the connectors to thereby allow each of the audio output elements of each of the speakers to turn away from one another during a second listening mode; the rotation of the speakers allowing for changes in modes.

[004] In another embodiment, the length ratio of the first arm to the second arm of each of the connectors is from about 1: 1.1 to about 1:10. In yet another embodiment, the length ratio of the first arm to the second arm of each of the connectors is from about 1: 1.25 to about 1:5.

[005] In still another embodiment, each of the speakers rotates about an axis formed by the first and second arms of each of the connectors. In still yet another embodiment, each of the speakers is designed to rotate about the axes during the first listening mode at angles from about 0 degrees to about 100 degrees. In a further embodiment, each of the speakers is designed to rotate about the axes during the first listening mode at angles from about 0 degrees to about 30 degrees. In another further embodiment, each of the speakers is designed to rotate about the axes during the second listening mode at angles from about 20 degrees to greater than 180 degrees. In yet another further embodiment, the speakers are designed to rotate about the axes during the second listening mode at angles from about 30 degrees to about 170 degrees.

[006] In still another further embodiment, the headband is generally situated over a user's head and each of the audio output elements of each of the speakers generally faces the user's ears during the first listening mode.

[007] In still yet another further embodiment, the apparatus is situated around a user's neck and both of the speakers are designed to be rotated and allow each of the audio output elements of each of the speakers to generally face away from the user during the second listening mode.

[008] In another embodiment, the apparatus is set on a surface and the headband is generally parallel to the surface and the speakers are designed to be rotated about the first and second arms of each of the connectors to allow the audio output elements of each of the speaker to generally face away from the surface during the second listening mode.

[009] In yet another embodiment, the length of the second arm relative to the first arm creates an angle between the surface and at least one speaker, and the angle is greater than 1 degree and less than 90 degrees.

[0010] In still another embodiment, the length of the second arm relative to the first arm creates an angle between the surface and at least one speaker, and the angle is from about 10 degrees to about 80 degrees.

[0011] In still yet another embodiment, each of the connectors comprises a third arm rotatably attached to opposing ends of the headband.

[0012] In a further embodiment, the apparatus further comprises a safety interlocking device which is designed to limit the volume output of the speakers in the first listening mode and increases the volume output of the speakers during the second listening mode.

[0013] In yet a further embodiment, the speakers lock into place during the second listening mode.

[0014] In still a further embodiment, the apparatus further comprises at least two ear cushions, each of the cushions is attached to at least a portion of the audio output element.

[0015] In yet a further embodiment, the speakers lock into position when rotated 90 or 180 degrees, but allows for some small movement around 0 degrees (e.g. when the speaker cushion are against the ears) for better fit and comfort.

[0016] In still yet a further embodiment, the apparatus further comprises at least one amplifier, and the amplifier is connected to a portion of at least one of the speakers.

[0017] In another further embodiment, the apparatus further comprises at least one switching mechanism, and the switching mechanism is activated by rotating each of the speakers from said music listening mode to the second listening mode, and the rotation of the speakers activates the amplifier.

[0018] In yet another further embodiment, the apparatus further comprises at least one switching mechanism, and the switching mechanism is activated by rotating one of the speakers from the music playing mode to the second listening mode, and the rotation of one of the speakers deactivates the amplifier.

[0019] In still another further embodiment, at least one of the compartments of the speakers provides for storage of a power source. In still yet another further embodiment, the headband provides for storage of a power source. In another embodiment, the apparatus further comprises at least one power source, and the power source is a battery.

[0020] In yet another embodiment, the apparatus further comprises an on and off mechanism. In still another embodiment, the apparatus further comprises volume control mechanism, and the volume control mechanism controls audio output volume of the speakers. In yet another embodiment, the apparatus further comprises a cable and an adaptor. In still yet another embodiment, the headband is generally U shaped.

[0021] In a further embodiment, the apparatus further comprises a wireless receiver designed to accept audio signals from an external source.

[0022] In yet a further embodiment, the present disclosure relates to a listening apparatus comprising: a headband having opposing ends; at least two connectors, each of the connectors having at least two arms, a first arm is shorter than a second arm; at least two speakers, each of the speakers having opposing sides and comprising an audio output element on a first side and a compartment on a second side, the first and second arms of each of the connectors is pivotally attached to a portion of each of the speakers to thereby allow rotation of the speakers, each of the audio output elements of each of the speakers generally face one another during a first listening mode, each of the speakers is designed to be rotated to thereby allow each of the audio output elements of each of the speakers to turn away from one another during a second listening mode; and a safety interlocking device designed to limit the volume output of the speakers in the first listening mode and increases the volume output of said speakers during said second listening mode.

[0023] In still a further embodiment, each of the speakers rotates about an axis formed by the first and second arms of each of the connectors, each of the speakers is

designed to rotate about the axis during the first listening mode at angles from about 0 degrees to about 100 degrees.

[0024] In still yet a further embodiment, each of the speakers rotate about an axis formed by the first and second arms of each of the connectors, wherein each of the speakers is designed to rotate about the axis during the second listening mode at angles from about 20 degrees to greater than 180 degrees.

[0025] In another embodiment, the present disclosure provides for a listening apparatus comprising: a headband having opposing ends; at least two connectors, each of the connectors has at least two arms, a first arm is shorter than a second arm, and the first and second arms has a length ratio of from about 1: 1.1 to about 1:10; and at least two speakers, each of the speakers having opposing sides and comprising an audio output element on a first side, the first and second arms of each of the connectors is pivotally attached to a portion of each of the speakers to thereby allow rotation of the speakers, each of the audio output elements of each of the speakers generally face one another during a first listening mode, each of the speakers is designed to be rotated to thereby allow each of the audio output elements of each of the speakers to turn away from one another during a second listening mode.

[0026] In another embodiment, the present disclosure provides for a listening apparatus comprising a headband comprising two end portions, each of the end portions comprising an angled hinge having two opposing ends; and at least two speakers, each of the speakers rotatably coupled to the two ends of the angled hinged to form two rotary joints, wherein rotation of each of the speakers about a respective axis of rotation between the two rotary joints transitions the apparatus between a first listening mode and a second listening mode.

[0027] In an embodiment, the axis of rotation between the two rotary joints of a first speaker of at least two speakers extends at an angle of about 45 degrees relative to a midline axis of the first speaker. In an embodiment, the angled hinge extends at an angle of about 45 degrees relative to a midline axis of the first speaker. In an embodiment, the speakers are configured to rotate about the axis of rotation during the first listening mode in a range of about 0 degrees to about 100 degrees. In an embodiment, the angled hinge and each of the two rotary joints of a first speaker of the at least two speakers substantially limit rotational motion of the two rotary joints to pivot through a substantially circular arc around the respective axis of rotation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The accompanying drawings are included to provide a further understanding of the present disclosure. These drawings are incorporated in and constitute a part of this specification, illustrate one or more embodiments of the present disclosure and together with the description, serve to explain the principles of the present disclosure.

[0029] **FIGURE 1** is a perspective view of the apparatus of the present disclosure in a music listening mode on a user's head;

[0030] **FIGURE 2** is a perspective view of the apparatus of **FIG. 1** in a music playing mode around a user's neck;

[0031] **FIGURE 3** is a perspective view of the apparatus of **FIG. 1** in a music playing mode when the apparatus is place on a surface;

[0032] **FIGURE 4a-c** are perspective side view of the apparatus showing the rotation of the speakers;

[0033] **FIGURE 5a-b** are views of the apparatus showing the angles created by the rotation;

[0034] **FIGURE 6** is view of the apparatus in **FIG. 3** showing how the differing length of the arms create angles between the speaker and the surface;

[0035] **FIGURE 7a-b** are schematic view of one of the embodiments of the switch mechanism;

[0036] **FIGURE 8** is a perspective view of an exemplary apparatus including an angled hinge, according to aspects of the present disclosure;

[0037] **FIGURE 9a** is a perspective view of an exemplary apparatus including an angled hinge, according to aspects of the present disclosure;

[0038] **FIGURE 9b** is a perspective view of an exemplary apparatus including an angled hinge, according to aspects of the present disclosure;

[0039] **FIGURE 10** depicts perspective views of an exemplary apparatus including an angled hinge, according to aspects of the present disclosure;

[0040] **FIGURE 11** is a perspective view of an exemplary apparatus including a headband having arm portions coupled to a respective speaker at a coupling junction, according to aspects of the present disclosure; and

[0041] **FIGURE 12** depicts perspective views of an exemplary apparatus including a headband having arm portions coupled to a respective speaker at a coupling junction, according to aspects of the present disclosure; and

[0042] Among those benefits and improvements that have been disclosed, other objects and advantages of this disclosure will become apparent from the following description taken in conjunction with the accompanying drawings. The drawings constitute a part of this specification and include exemplary embodiments of the present disclosure and illustrate various objects and features thereof.

DETAILED DESCRIPTION

[0043] As required, detailed embodiments of the present disclosure are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the disclosure that may be embodied in various forms. The figures are not necessarily to scale, some features may be exaggerated to show details of particular components. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present disclosure.

[0044] **FIG. 1** illustrates the music listening and playing apparatus 1 of the present disclosure. The apparatus comprises a headband 2 having opposing ends, 2a and 2b respectively; at least two connectors, 3a and 3b respectively, each of the connectors has at least two arms, 4a and 4b respectively. The first arm 4a is shorter than a second arm 4b.

[0045] The apparatus 1 further comprises at least two speakers, 5a and 5b respectively, each of the speakers having opposing sides and comprising an audio output element 6 on a first side and a compartment 7 on a second side. The first and second arms, 4a and 4b, of each of the connectors is pivotally attached to a portion of each of the speakers, 5a or 5b, to thereby allow rotation of said speakers. Each of the audio output elements 6 of each of the speakers, 5a and 5b, generally face one another during a first listening mode. In the first listening mode, the headband 2 is situated around the user's head and the audio output element 6 of each of the speakers, 5a and 5b, are generally facing the user's ears.

[0046] **FIG. 2** depicts the second listening mode of the apparatus 1 of the present disclosure. The apparatus 1 may be placed around the user's neck. Each of the speakers, 5a and 5b, are rotatable about the first and second arms, 4a and 4b, of each of the connectors, 3a and 3b, to thereby allow each of the audio output elements 6 of each of the speakers, 5a and

5b, to turn away from one another during the second listening mode. The rotation of the speakers, 5a and 5b, allows for changes in modes.

[0047] **FIG. 3** shows another music playing mode where the apparatus 1 is set on a surface and the headband 2 is generally parallel to the surface 10 and the speakers, 5a and 5b, are designed to be rotated about the first and second arms, 4a and 4b, of each of the connectors, 3a and 3b, to allow the audio output elements 6 of each of the speakers, 5a and 5b, to generally face away from the surface 10 during the second listening mode.

[0048] **FIGS. 4a-c** illustrates the rotation of the speaker, 5a and 5b. During the music listening mode, the audio output element 6 of the speaker 5a is generally facing inward as shown in **FIG. 4a**. The speaker 5a is rotated outwardly to activate the music playing mode as shown in **FIG. 4b**. In the music playing mode, the speaker 5a may be adjusted for optimum sound as shown in **FIG. 4c**. The speaker 5 may then be rotated back to its original position as shown in **FIG. 4a** to return to the music listening mode.

[0049] Each of the speakers, 5a and 5b, rotates about an axis 8 formed by the first and second arms, 4a and 4b, of each of the connectors, 3a and 3b. Each of the speakers, 5a and 5b, is designed to rotate about the axis 8 during the first listening mode at angles from about 0 degrees to about 100 degrees as shown in **FIG. 5a**.

[0050] Each of the speakers, 5a and 5b, is designed to rotate about the axis 8 during the second listening mode at angles from about 20 degrees to greater than 180 degrees as shown in **FIG. 5b**.

[0051] **FIG. 6** shows that differing the length ratios of the arms, 4a and 4b, create different angles between the speaker 5a and surface 10. The length of the second arm 4b relative to the first arm 4a creates an angle between the surface 10 and at least one speaker 5, and the angle is greater than 1 degree and less than 90 degrees. **FIGS. 7a-b** are schematic diagrams of one of the embodiments of the circuitry of the present disclosure. In this

embodiment, the cam switch 712 (shown schematically) has three contacts on the input, and six on the output (a three pole double throw switch- 3PDT).

[0052] When the axle is not rotated and the product is worn as a headset, the switch connects the left audio channel directly to the left speaker, and the right audio channel to the right speaker, and does not route power to the amplifier. The music device powers the acoustic transducer directly. The cam's profile determines the angle at which the switch is activated, and thus the angle at which the mode is switched from headset mode to speaker mode. In this example, the cam is set at 30 degrees, but could be set anywhere from 20 to 110 degrees.

[0053] In this example, once the enclosures are rotated by more than 30 degrees, the two 3PDT switches 722 and 723 are thrown closed. This now routes the left audio signal to the left amplifier and the output of the left amplifier to the left speaker (and similarly for the right channel). It also provides power to the amplifier by running the power through the right enclosure switch in series- thus assuring both switches must be closed (and thus the speakers aimed safely away from the ears) before energizing the amplifier.

[0054] There are other variations and embodiments of the circuit. In another embodiment, the switch could contain one input and one output, used to trigger a solid state relay that provides all the aforementioned audio and power routing. In a further embodiment, the switch might be used to control the volume level, so it is low as a headset and high as a speaker. Embodiments of the present disclosure can be used with any applicable circuitry and is not limited to the circuitry shown in **FIG. 7**.

[0055] **FIG. 8** illustrates an exemplary listening apparatus 800 according to embodiments of the present disclosure. The apparatus 800 includes a headband 802 having two opposing end portions, each configured to couple with a respective speaker 820a, 820b. In an embodiment, the end portions of the headband 802 each include an angled hinge 804a

and 804b configured to rotatably couple to the respective speakers 820a, 820b. As shown in **FIG. 8**, angled hinge 804b is configured to couple to speaker 820b to form two rotary joints (e.g., a location of the rotary joints upon coupling of the angled hinge 804b and the speaker 820b is represented by identifiers 806b-1 and 806b-2 in **FIG. 8**). For purposes of illustration, the angled hinge 804b is shown as de-coupled from the corresponding speaker 820b, while the angled hinge 804a is shown as rotatably coupled to the speaker 820a.

In an embodiment, each angled hinge 804a, 804b includes two opposing ends (e.g., end 807) configured to couple with the respective speaker 820a, 820b. For example, as shown in **FIG. 8**, each of the opposing ends of the angled hinge 804a, 804b may include a male member (e.g., end 807) configured to couple with a corresponding female member of the speaker 820b. In an embodiment, the two rotary joints formed by the angled hinge 804b and the speaker 820b enable the rotation of the speaker 820b relative to the headband 802 to transition the apparatus 800 from the first listening mode to the second listening mode. The apparatus of claim 1, wherein the angled hinge and each of the two rotary joints of a first speaker of the at least two speakers substantially limit rotational motion of the two rotary joints to pivot through a substantially circular arc around the respective axis of rotation.

As shown in **FIG. 8**, the rotary joints 806b-1 and 806b-2 formed by the coupling of the angled hinge 804b to the speaker 820b are aligned along an axis of rotation between the two rotary joints. In operation, movement of the speaker 820b relative to the headband 802 results in the rotation of the speaker about the axis of rotation between the two rotary joints. For example, the coupling of the angled hinge 804a and the speaker 820a permits rotation of the speaker 820a about the axis of rotation 810a to enable transition of the apparatus 800 from a first position to a second position. For example, **FIG. 9a** illustrates a speaker 920a in a position corresponding to the first listening mode, and **FIG. 9b** illustrates a speaker 920b in a position corresponding to the second listening mode. In an embodiment, the angled hinge

804a and rotary joints of the speakers 820a, 820b substantially limit rotational motion of the two rotary joints to pivot through a substantially circular arc around the respective axis of rotation.

[0056] With reference to **FIG. 8**, in an embodiment, each speaker 820a, 820b includes a channel (e.g., channel 822b of speaker 820b) configured to accept and/or receive a corresponding end portion of the headband 802 upon fully rotation of the speaker 820b into its substantially outwardly facing position (e.g., wherein the two speakers 820a, 820b substantially face away from one another and the apparatus 800 is in the second listening mode). In operation, when the speakers 820a, 820b, are translated into the second listening mode, the corresponding end portions of the headband 802 mate with the corresponding channel (e.g., channel 822b of speaker 820b) of the speaker 820. In an embodiment, an inner surface 803 of the end portion of the headband 802 makes contact with the speaker 820 within the channel (e.g., channel 822b of speaker 820b) when the apparatus is in the first listening mode (see, e.g., **FIG. 9a** showing an exemplary apparatus 900 in the first listening mode wherein the inner surface of the end portion of the headband 902 is in contact with the speaker 920a within a channel).

[0057] In an embodiment, an outer surface 805 of the end portion of the headband 802 makes contact with the speaker 820 within the channel (e.g., channel 822b of speaker 820b) when the apparatus 800 is in the second listening mode. In an embodiment, transitioning the speakers 820a, 820b from a position corresponding to the first listening mode (wherein the inner surface 803 of the headband 802 is in contact with the speaker 820a, 820b within the channel) to a position corresponding to the second listening mode (wherein the outer surface 805 of the headband 802 is in contact with the speaker 820a, 820b within the channel) includes rotation of the speaker 820a, 820b about the axis of rotation (e.g., the axis of rotation 810a corresponding to speaker 820a) between the two rotary joints.

[0058] According to embodiments of the present disclosure, the angled hinges 804a and 804b rotatably couple to the respective speakers 820a and 820b according to any suitable coupling mechanism to enable the formation of the two rotary joints 806b-1 and 806-2 such that the coupling permits the transition of the apparatus 800 between the first listening mode and the second listening mode.

[0059] **FIG. 9a** illustrates a side view of an exemplary apparatus 900 including a headband 902 having an end portion including an angled hinge 904a rotatably coupled to a speaker 920a, according to embodiments of the present disclosure. The apparatus 900 in **FIG. 9a** is depicted in the first listening mode, wherein an inner surface of an end portion of the headband 902 is in contact with the speaker 920a within a channel. In an embodiment, the apparatus 900 two rotary joints formed at respective coupling points between the angled hinge 904a and the speaker 920a. In an embodiment, the axis of rotation 910a is formed between the rotary points about which the speaker 920a may be rotated relative to the headband 902. As shown in **FIG. 9a**, the axis of rotation 910a extends at an angle relative to a midline axis 924a of the speaker 920a. In an embodiment, the midline axis 924a represents a central axis which is perpendicular to a longitudinal axis 915 of the headband 902. In an embodiment, the axis of rotation 910a extends at an angle of about 45 degrees relative to the midline axis 924a. According to one or more embodiments of the present disclosure, the axis of rotation 910a extends at an angle corresponding to an angle of the angled hinge 904a relative to the midline axis 924a of the speaker 920a.

[0060] **FIG. 10** depicts a perspective views of an exemplary apparatus 1000 in the first listening mode at a first time (e.g., T1) as the speakers 1020a, 1020b are rotated to a position at a second time (e.g., T2). As shown in **FIG. 10**, speaker 1020a is rotated in a rotational direction 1001 and speaker 1020b is rotated in a rotational direction 1002 at T1. In

the example shown in **FIG. 10**, at T2, rotation of speaker 1020a continues in a rotational direction 1003 and rotation of speaker 1020b continues in a rotational direction 1004.

[0061] **FIG. 11** illustrates an exemplary music listening and playing apparatus 1100 according to embodiments of the present disclosure. The apparatus 1100 includes a headband 1102 having two arm portions 1104a, 1104b, each configured to couple with a respective speaker 1120a, 1120b. In an embodiment, each arm 1104a, 1104b of the headband 1102 is configured to rotatably couple with the corresponding speaker 1120a, 1120b at a coupling junction 1106a, 1106b. In an embodiment, each coupling junction 1106a, 1106b represents a position on the speaker 1120a, 1120b wherein the arm 1104a, 1104b rotatably connects.

[0062] According to embodiments of the present disclosure, the coupling junction 1106a, 1106b is located at a position relative to the speaker 1120a, 1120b such that a rotary joint is formed. In an embodiment, the rotary joint is configured to provide a single axis of rotation (e.g., axis of rotation 1110a for speaker 1120a, as shown in **FIG. 11**) about which the speakers 1120a, 1120b rotate relative to the corresponding arm 1104a, 1104b of the headband 1102. For example, in operation, movement of the speaker 1120a relative to arm 1104a of the headband 802 results in the rotation of the speaker about the axis of rotation 1110a to enable transition of the apparatus 1100 from a first position (corresponding to the first listening mode, as shown in **FIG. 11**) to a second position (corresponding to the second listening mode).

[0063] In an embodiment, the axis of rotation 1110a extends at an angle of about 45 degrees relative to a midline axis 1124a of the speaker 1120a. According to one or more embodiments of the present disclosure, the axis of rotation 1110a extends at an angle corresponding to an angle of a connector (e.g., pin 1150a) relative to the midline axis 1124a of the speaker 1120a. According to embodiments of the present disclosure, the coupling junction 1106a, 1106b may include any suitable mechanism for rotatably coupling the

speaker 1120a, 1120b and the respective arms 1104a, 1104b of the headband 1102 to enable transitioning the apparatus 1100 between the first listening mode and the second listening mode. For example, the coupling junction 1106a, 1106b may include a male member (e.g., pin 1150a in **FIG. 11**) extending from speaker 1120a, 1120b corresponding to a female portion or member (e.g., an opening, groove, channel, etc.) of the respective arm 1104a, 1104b. In another embodiment, the coupling junction 1106a, 1106b may include a male member extending from the arm 1106a, 1106b of the headband 1102 for coupling with a corresponding female portion or member of the speaker 1120a, 1120b.

[0064] As shown in **FIG. 12A**, in an embodiment, the axis of rotation (e.g., axis of rotation 1210a) extends at an angle of about 45 degrees relative to the midline axis 1224a. **FIG. 12A** depicts an exemplary apparatus 1200a in the first listening mode, wherein the apparatus 1200a is wearable as a headset by a user. As shown in **FIG. 12A**, in the first listening mode, the audio emitting portions of the speakers of the apparatus 1200a are generally facing toward one another (e.g., for directing sound into the ears of a user wearing the apparatus 1200a).

[0065] **FIG. 12B** depicts an exemplary apparatus 1200b as it is transitioned from the first listening mode to the second listening mode by rotating the speakers of the apparatus 1200b such that two speakers generally face away from one another for amplified playback.

[0066] Numerous modifications and variations of the present disclosure are possible in light of the above teachings. It is therefore to be understood that within the scope of the attendant claims attached hereto, embodiments of the present disclosure may be practiced otherwise than as specifically disclosed herein.

CLAIMS

What is claimed is:

1. An apparatus comprising:
a headband comprising two end portions, each of the end portions comprising an angled hinge having two opposing ends; and
at least two speakers, each of the speakers rotatably coupled to the two ends of the angled hinged to form two rotary joints, wherein rotation of each of the speakers about a respective axis of rotation between the two rotary joints transitions the apparatus between a first listening mode and a second listening mode.
2. The apparatus of claim 1, wherein the axis of rotation between the two rotary joints of a first speaker of at least two speakers extends at an angle of about 45 degrees relative to a midline axis of the first speaker.
3. The apparatus of claim 2, wherein the angled hinge extends at an angle of about 45 degrees relative to a midline axis of the first speaker.
4. The apparatus of claim 4, wherein each of the at least two speakers is configured to rotate about the axis of rotation during the first listening mode in a range of about 0 degrees to about 100 degrees.
5. The apparatus of claim 1, wherein each of the at least two speakers is configured to rotate about a respective axis of rotation during the first listening mode in a range of about 0 degrees to about 30 degrees.

6. The apparatus of claim 1, wherein each of the at least two speakers is configured to rotate about a respective axis of rotation during the second listening mode in a range of about 20 degrees to greater than 180 degrees.
7. The apparatus of claim 1 wherein each of the at least two speakers is configured to rotate about a respective axis of rotation during the second listening mode in a range of about 30 degrees to greater than 170 degrees.
8. The apparatus of claim 1, wherein the headband is configured for positioning on a user's head such that an audio output element of each of the at least two speakers substantially face toward the user's ears during the first listening mode.
9. The apparatus of claim 1, wherein the at least two speakers are configured for positioning such that audio output elements of each of the at least two speakers substantially face away from one another during the second listening mode.
10. The apparatus of claim 1, wherein each of the two rotary joints of a first speaker of the at least two speakers comprises a male member of the angled hinged coupled to a female portion of the first speaker.
11. The apparatus of claim 1, wherein the angled hinge and each of the two rotary joints of a first speaker of the at least two speakers substantially limit rotational motion of the two rotary joints to pivot through a substantially circular arc around the respective axis of rotation.

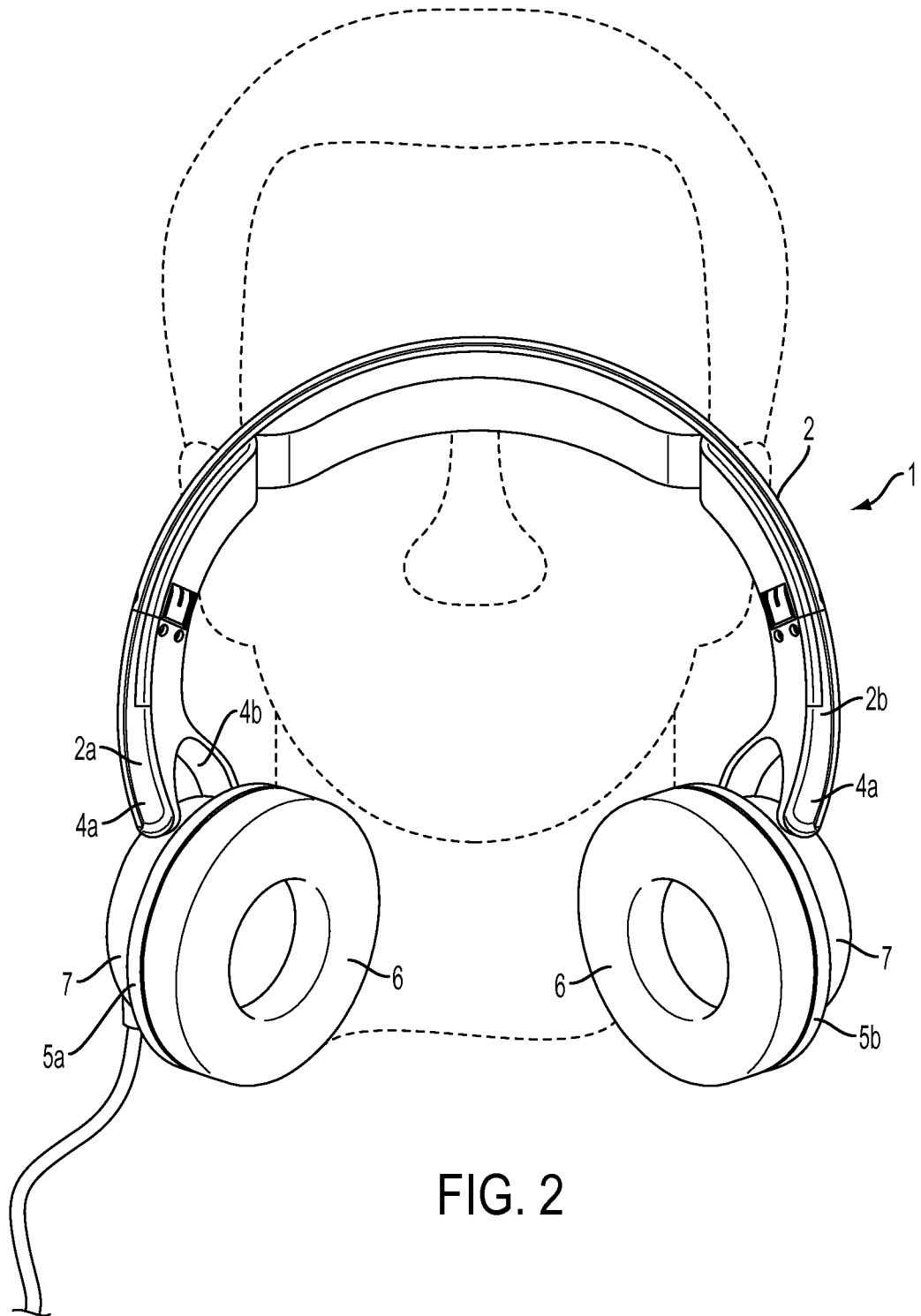
12. The apparatus of claim 1, wherein each of the at least two speakers comprises a channel configured to accept a corresponding portion of the headband when the apparatus is in the first listening mode.
13. The apparatus of claim 1, wherein each of the at least two speakers comprises a channel configured to accept a corresponding portion of the headband when the apparatus is in the second listening mode.
14. The apparatus of claim 1, further comprising a safety interlocking device configured to limit a volume output of the at least two speakers in the first listening mode and increase the volume output of the at least two speakers in the second listening mode.
15. The apparatus of claim 1, wherein the at least two speakers lock into place during the second listening mode.
16. An apparatus comprising:
 - a headband comprising two arm portions; and
 - at least two speakers, each of the at least two speakers rotatably coupled to one of the two arm portions of the headband to form a rotary joint, wherein rotation of each of the at least two speakers about an axis of rotation of the rotary joint transitions the apparatus between a first listening mode and a second listening mode, wherein the axis of rotation of the rotary joint extends at an angle of about 45 degrees relative to a midline axis of the speaker.

17. The apparatus of claim 16, wherein the rotary joint of a first speaker of the at least two speakers is formed by a single coupling junction between a respective one of the arm portions and the first speaker.

18. The apparatus of claim 17, wherein the single coupling junction comprises a male member of the respective one of the arm portions coupled to a female portion of the first speaker.

19. The apparatus of claim 18, wherein the male member couples to the female portion of the first speaker to form the axis of rotation of the rotary joint.

20. The apparatus of claim 17, wherein the single coupling junction is arranged at a position relative to the first speaker to establish the axis of rotation of the rotary joint at the angle of about 45 degrees relative to the midline axis of the speaker.



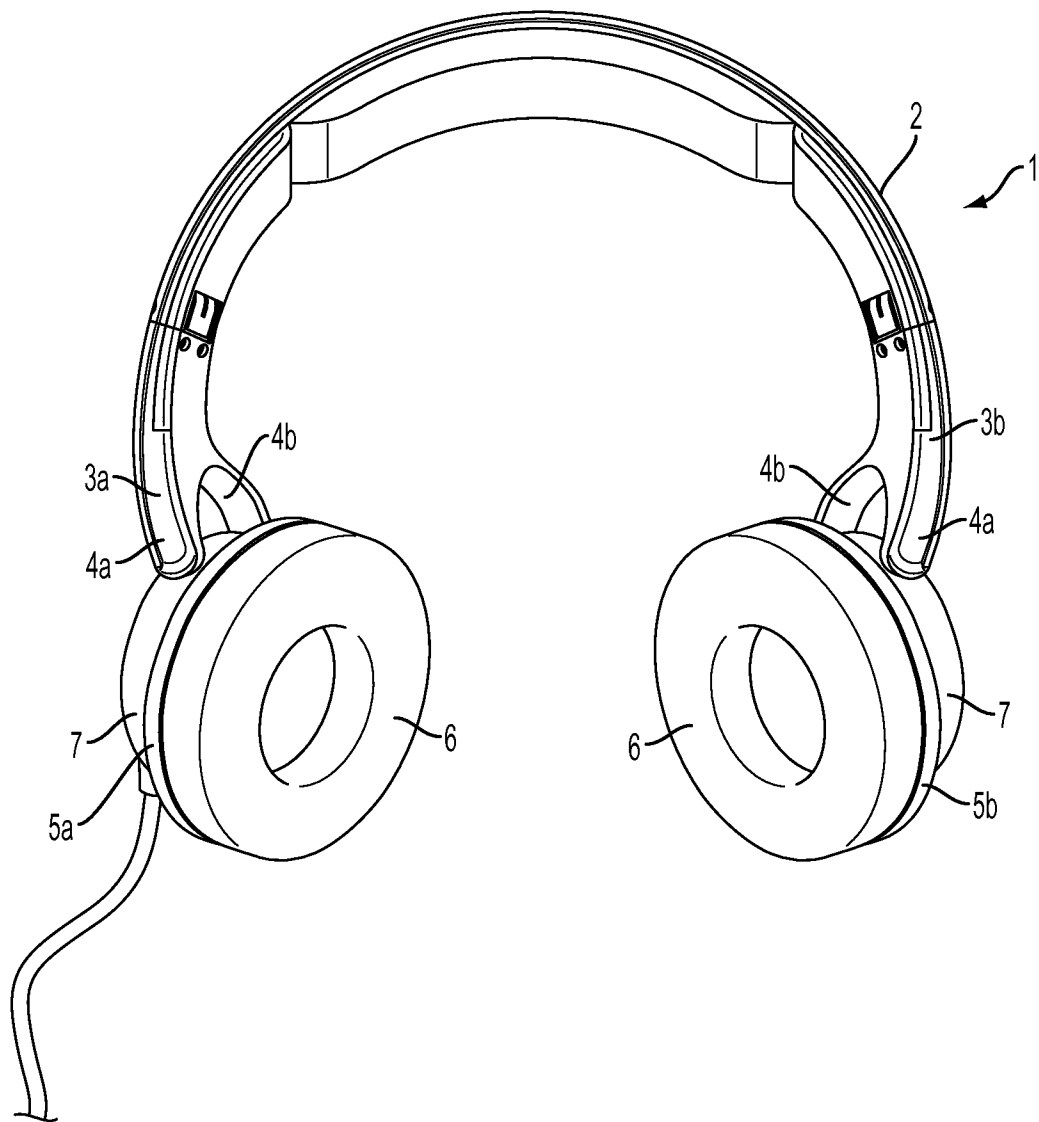
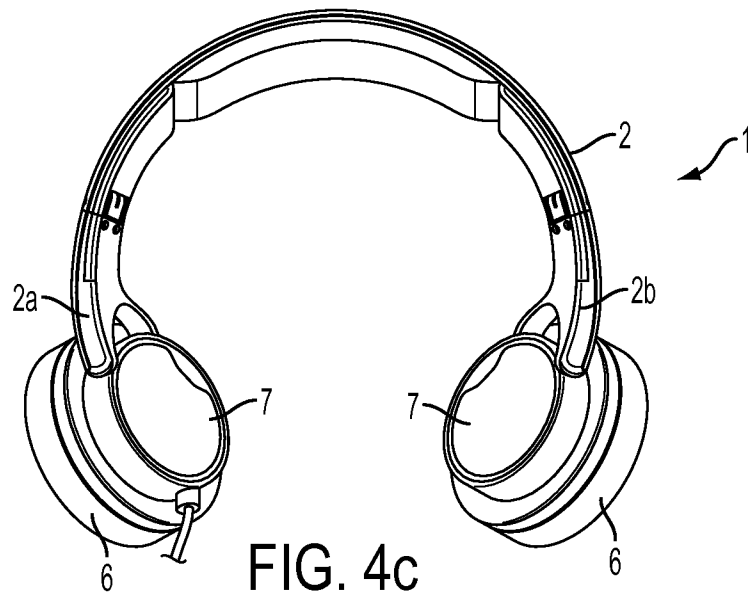
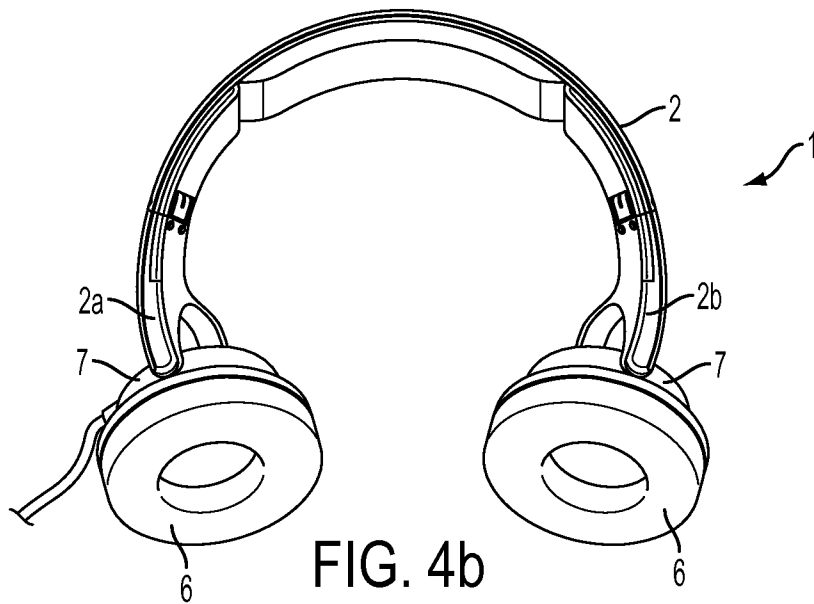
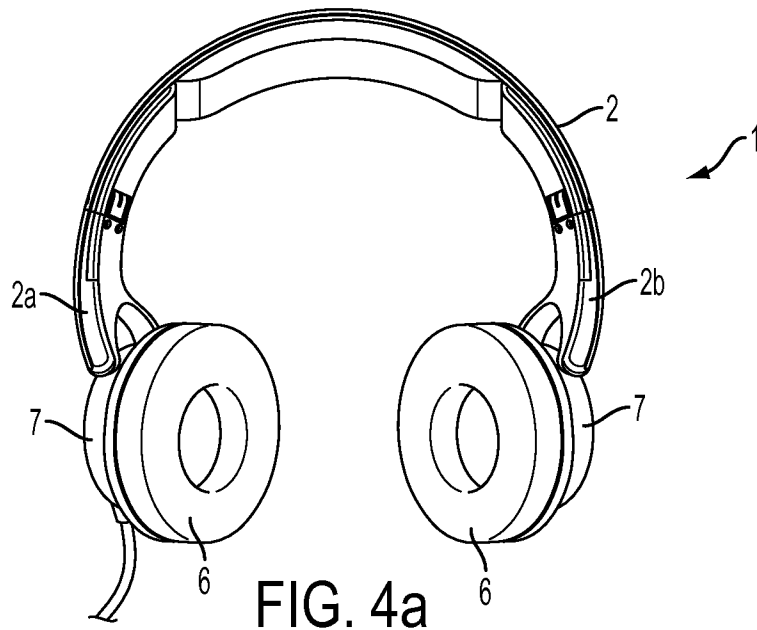


FIG. 3



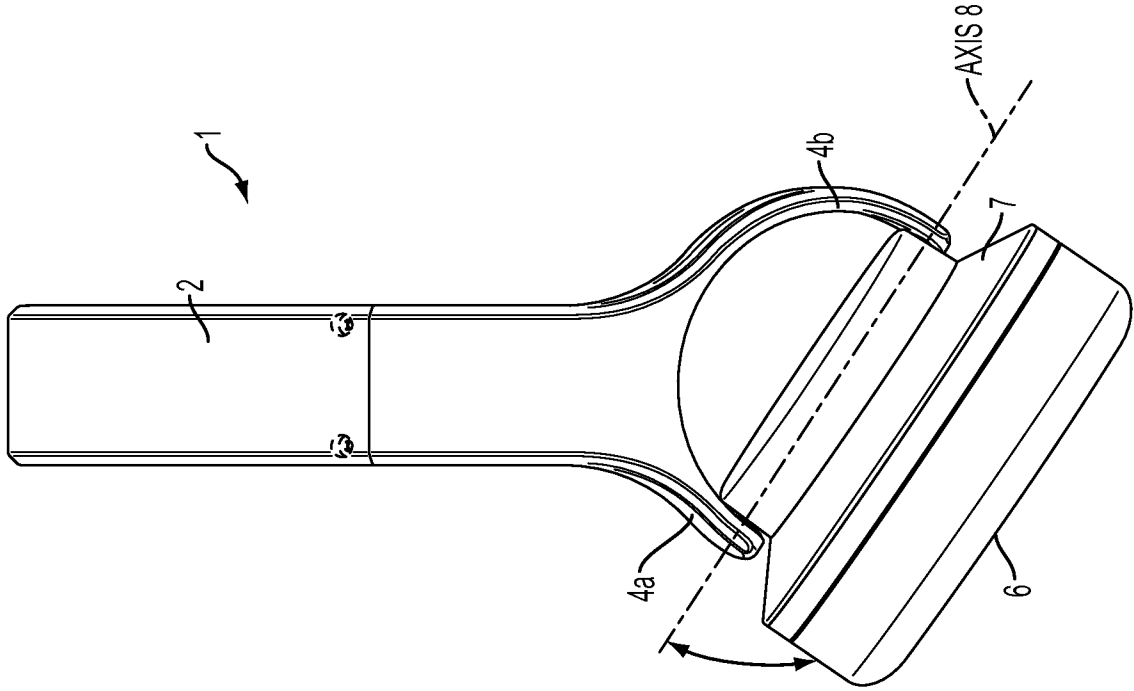


FIG. 5b

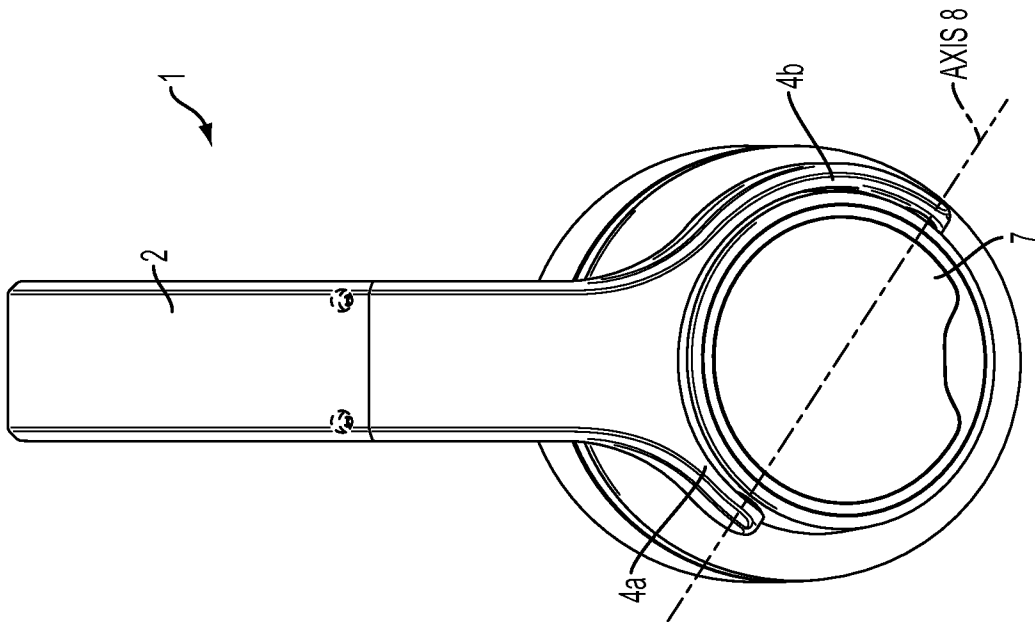


FIG. 5a

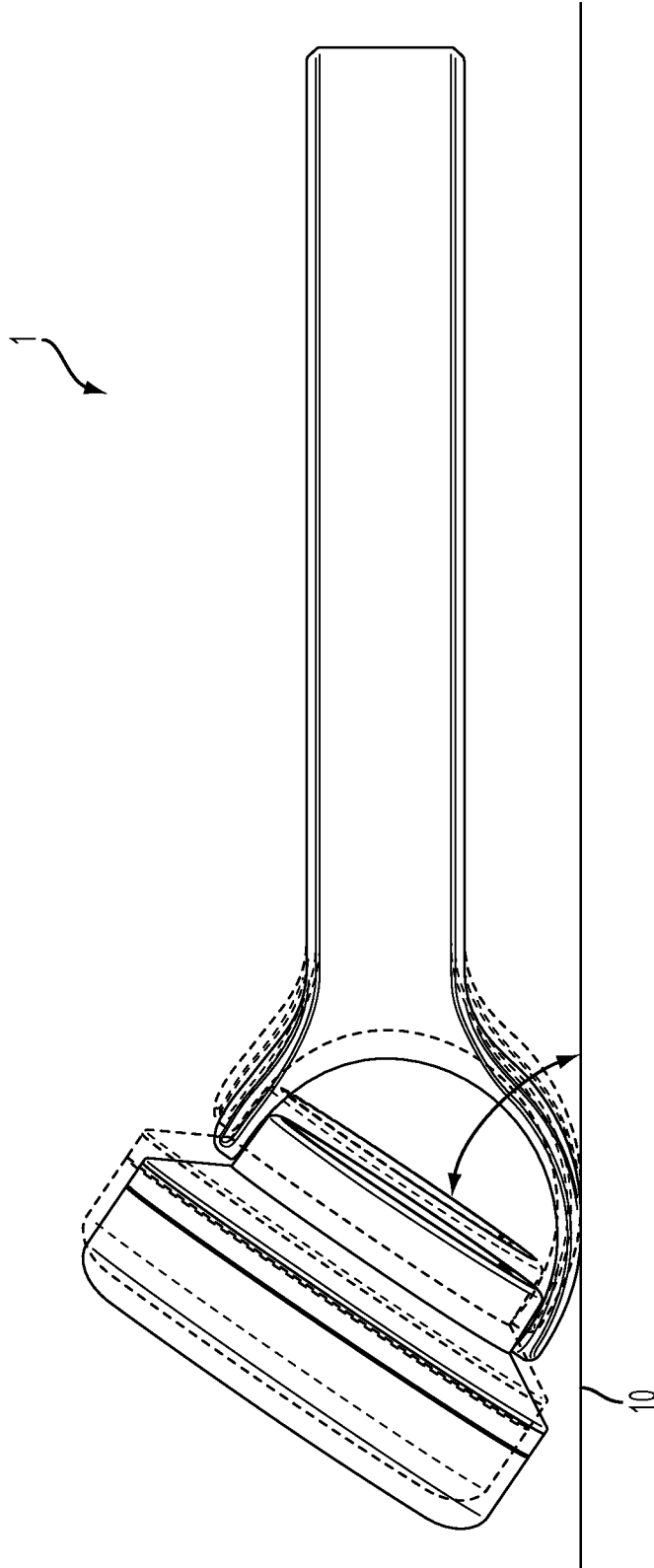


FIG. 6

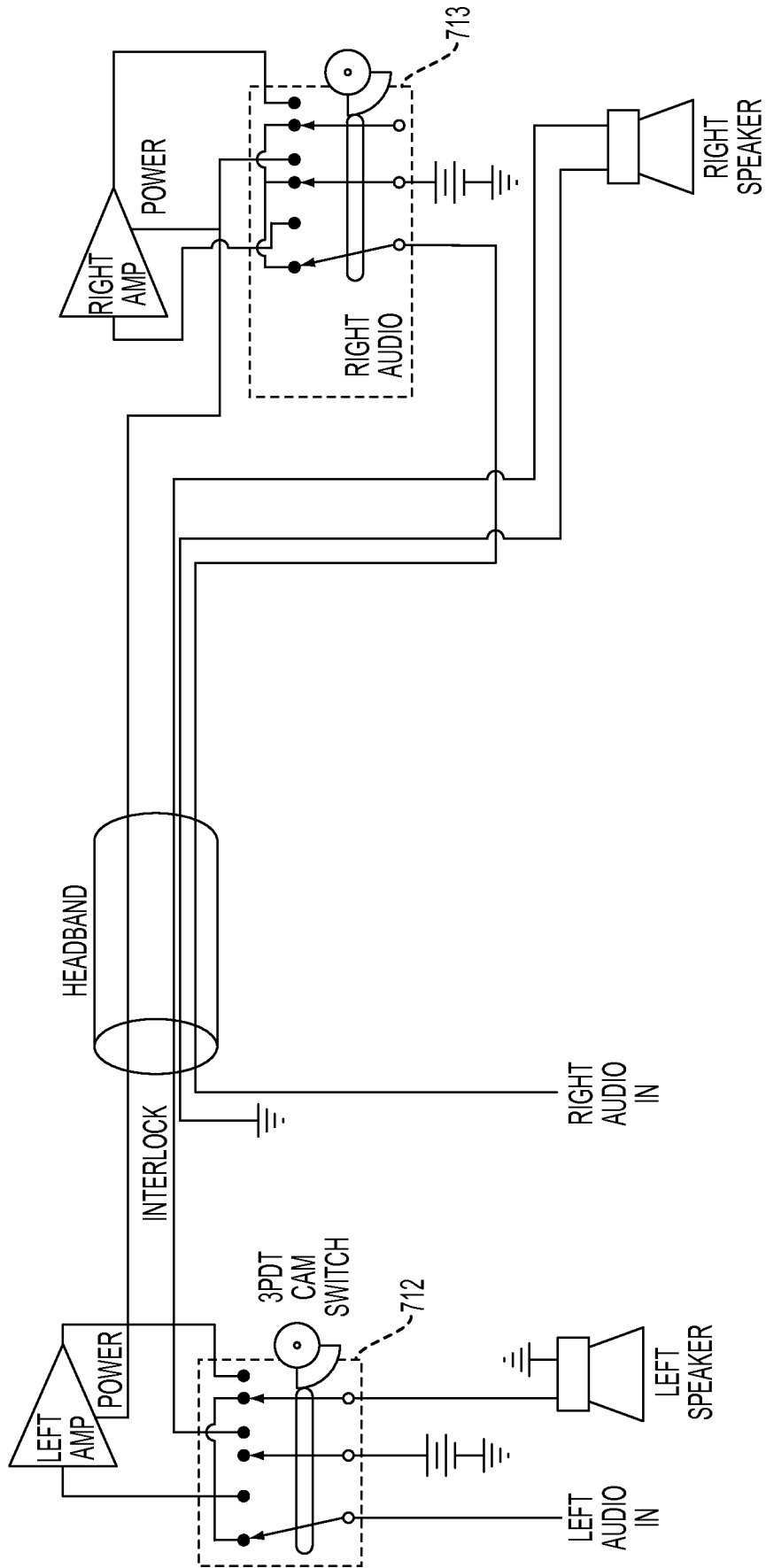


FIG. 7a

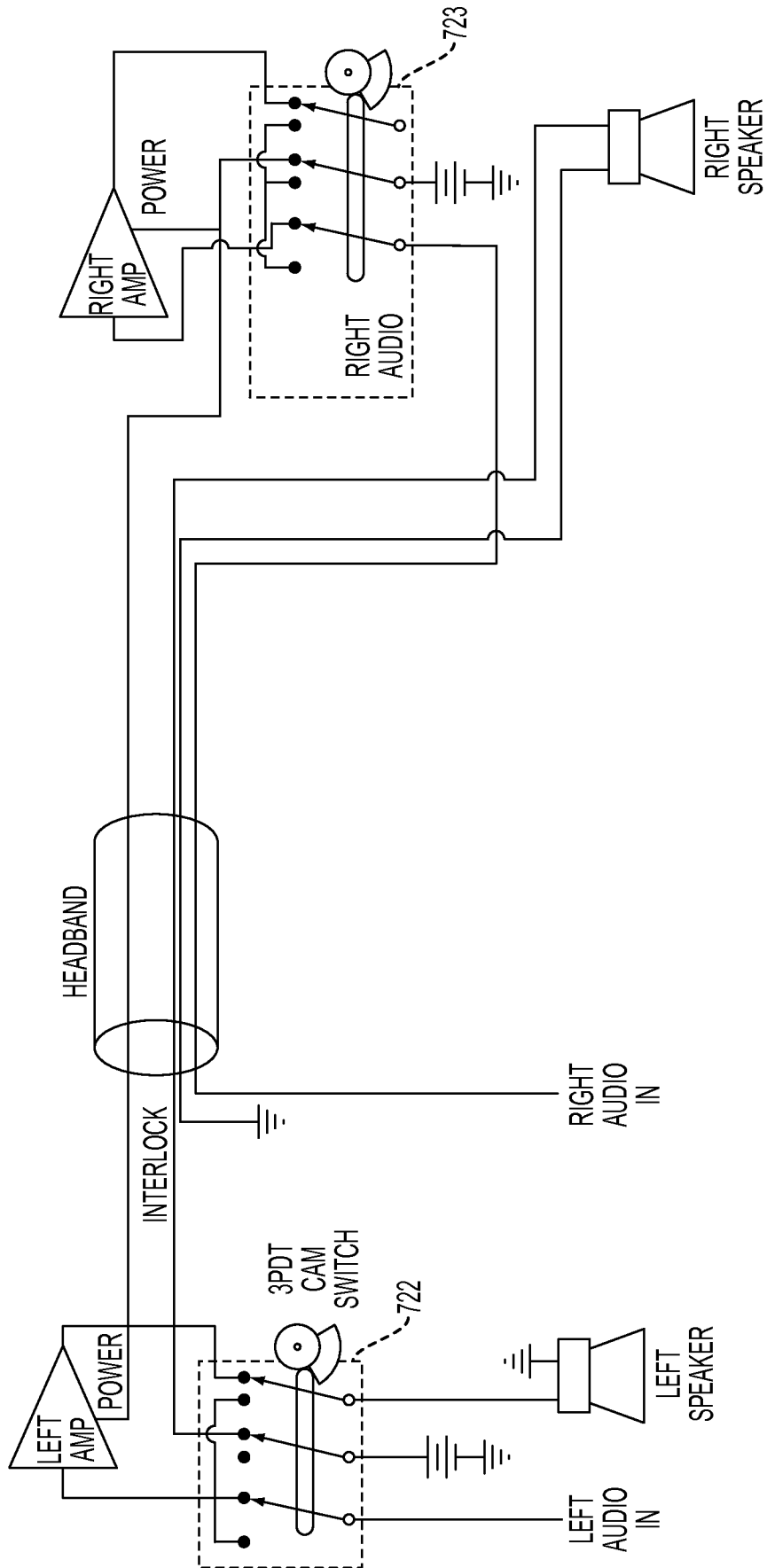


FIG. 7b

FIGURE 8

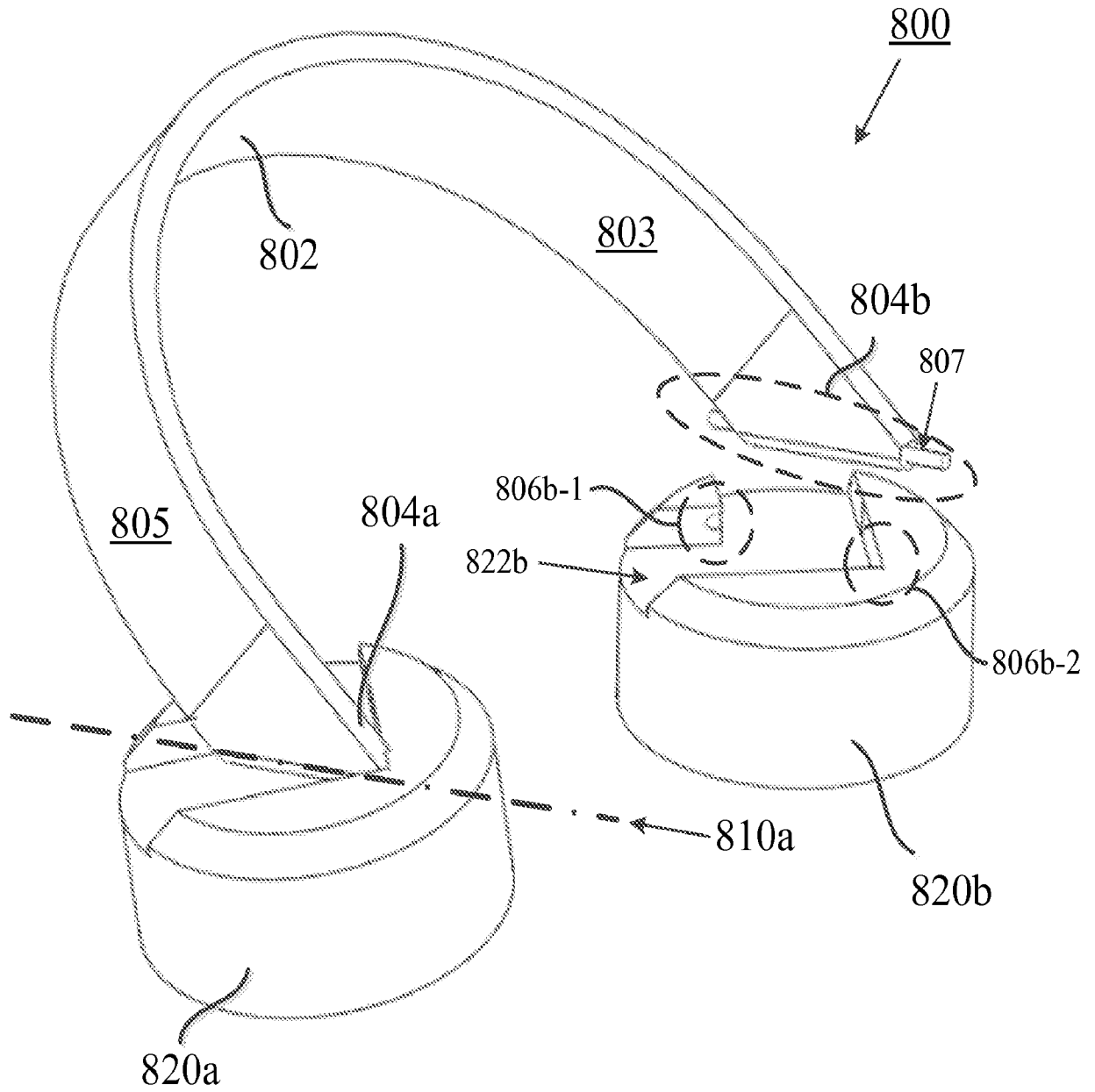


FIGURE 9A

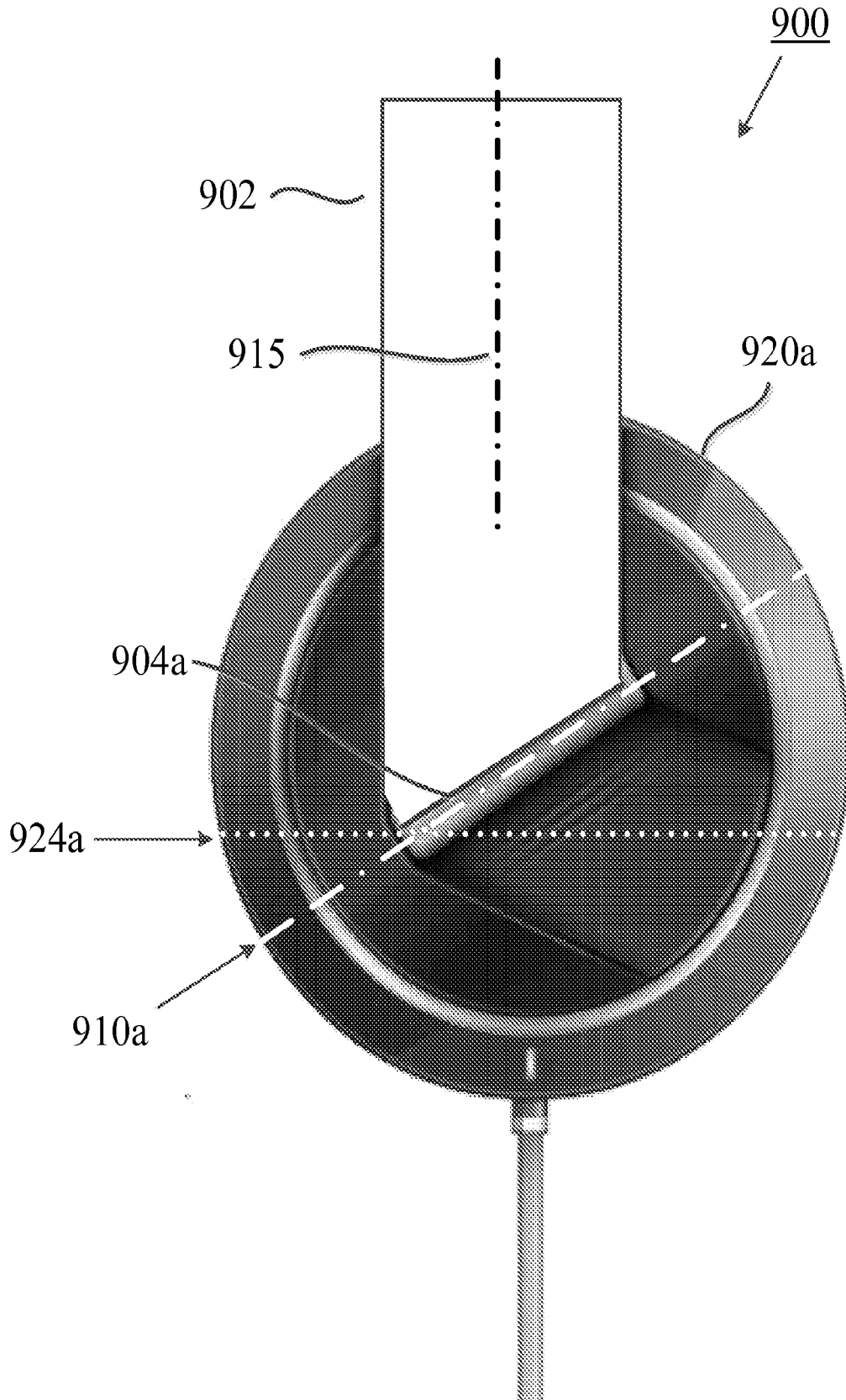


FIGURE 9B

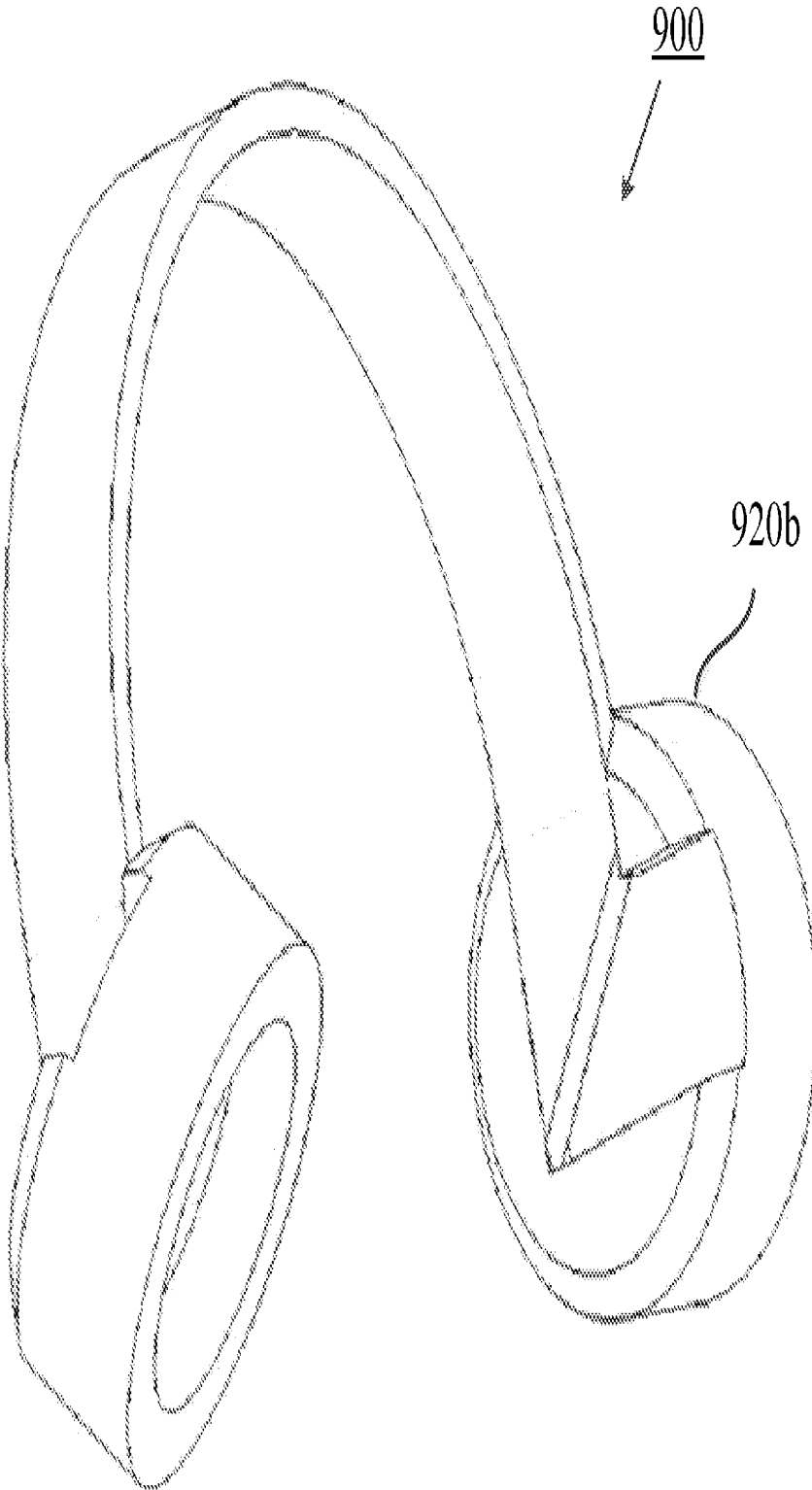


FIGURE 10

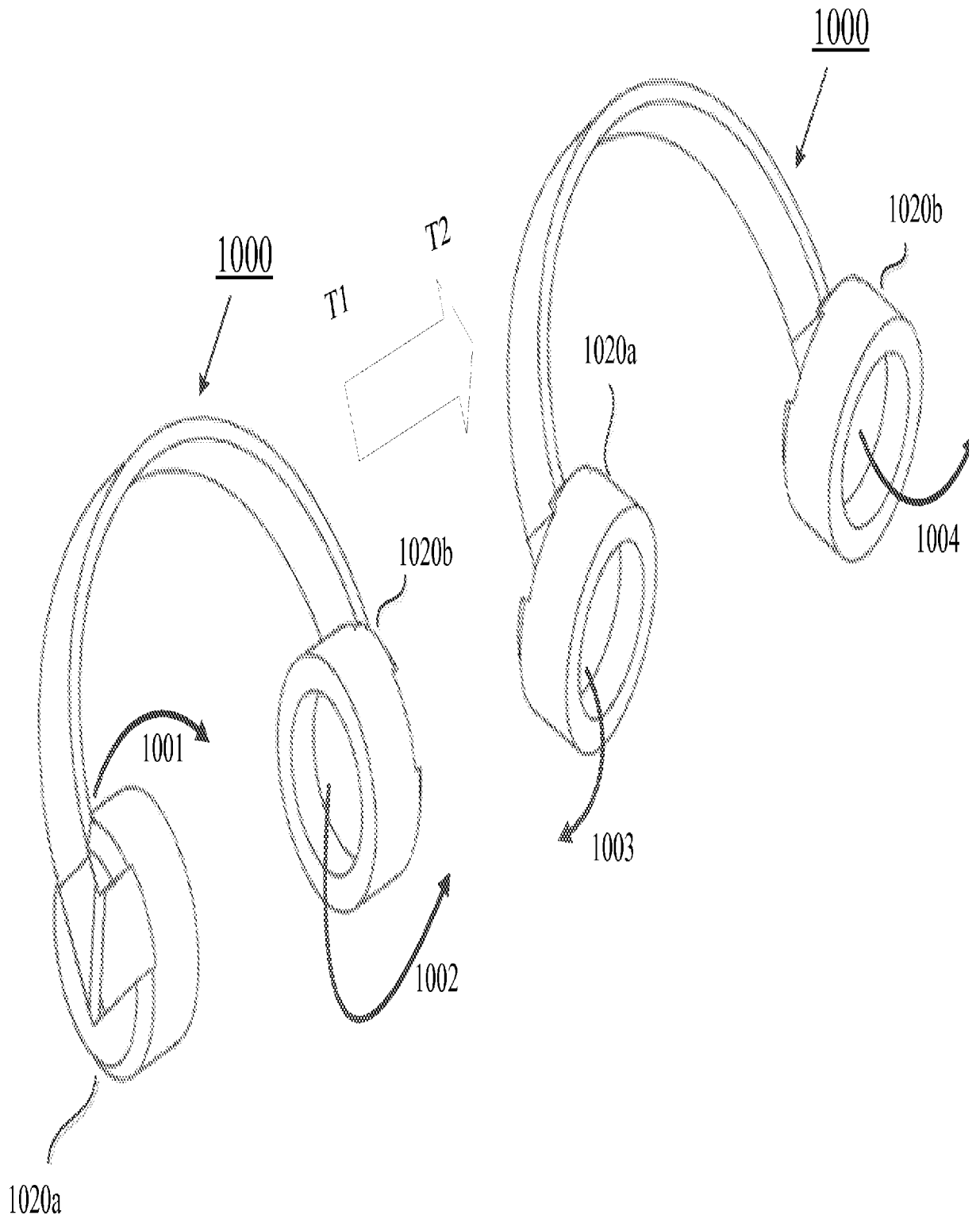


FIGURE 11

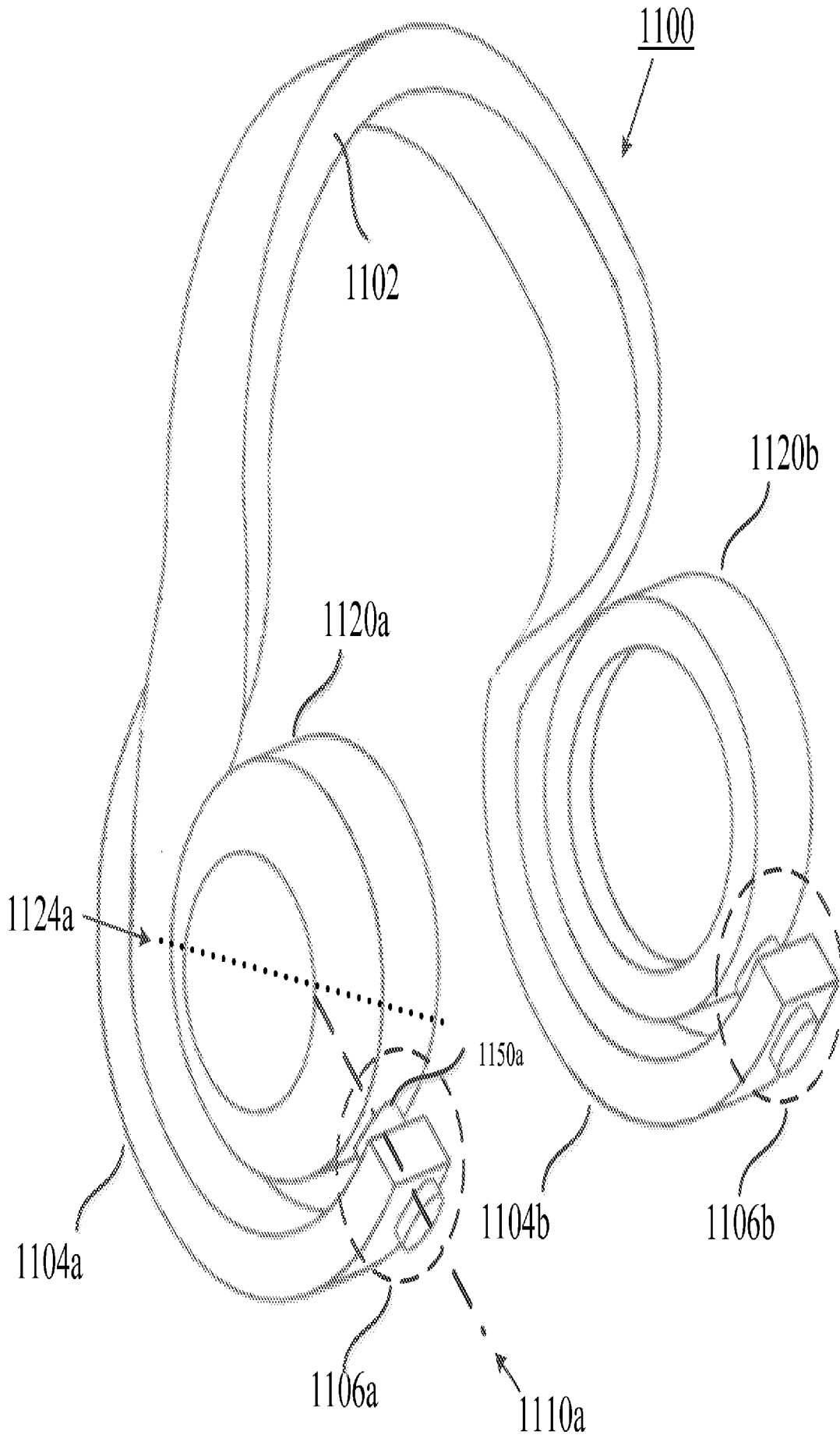


FIGURE 12A

FIGURE 12B

