

(19) Japan patent office (JP)

**(12) Patent laid-open
gazette (A)**(11) Patent application laid-open
No.Japanese patent application laid-
open No. 2008-294872
(P2008-294872A)(43) Laid-open date December 4,
2008 (4.12.2008)

(51) Int. Cl. HO4R 1/10(2006.01)	FI HO4R 1/10 101A	Subject code (for reference)
-------------------------------------	----------------------	------------------------------

Review request Yes Number of claims 5 OL (11 pages in total)

(21) Application number Patent application 2007-
139798 (P2007-139798)

(22) Application date May 26, 2007 (26.5.2007)

(71) Applicant A 000234937

Vertex Standard Co., Ltd.

8-8 Nakameguro 4-chome, Meguro-ku, Tokyo

(74) Agent 100089956

Patent agent Toshikazu Nagai

(72) Inventor Masaaki Numata

Vertex Standard Co., Ltd., 8-8 Nakameguro 4-
chome, Meguro-ku, Tokyo

(72) Inventor Toshito Matsumoto

Vertex Standard Co., Ltd., 8-8 Nakameguro 4-
chome, Meguro-ku, Tokyo

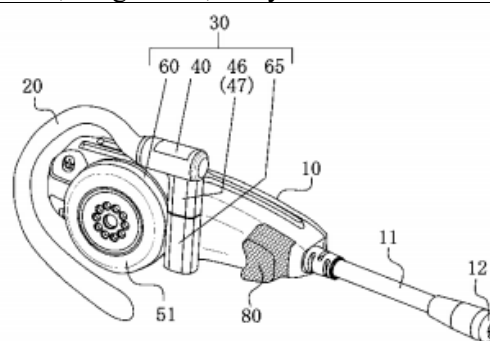
(54) [Title of invention] Headsets

(57) [Abstract]

[Topic] In a headset where an earhook part is hung and fixed to the auricle of a user, a receiver part is disposed at the position of the earhole, and a microphone part is disposed near the corner of the mouth for use, the objective is to simplify the operation of wearing it on the ear and improve the position adjustment and position retention functions of the microphone part.

[Solution] A connection shaft part at the end of the earhook part 20 is externally fitted and held in an externally fitted holding part 40 designed in a connection adapter 30 in a rotatable state, and this external fitting mechanism is equipped with a locking mechanism that elastically locks when the earhook part 20 is at the angle of use. Furthermore, an annular externally fitted holding part 60 designed in the connection adapter 30 externally fits and holds, in a rotatable state, the receiver part (51, etc.) protruding from the main unit part 10, and this external fitting mechanism is equipped with a locking mechanism that elastically locks the receiver part at a prescribed small angle of rotation. The assembly of the earhook part 20 and the externally fitted holding part 40 can be freely attached and detached and can also be inserted from below, making the headset suitable for both the left and right ears.

[Abstract figure] Figure 1



[Claims]

[Claim 1]

A headset with a wireless communication mode for communication functionality, which is worn on the user's ear by hanging a curved rod-shaped earhook part from above the auricle and along the back, with a receiver part disposed opposite the earhole and a microphone part disposed near the corner of the mouth for use,

characterized by comprising the following parts: a main unit part with the above communication functionality and necessary circuits and speaker elements for control built into a frame, while a short cylindrical protruding part forms the receiver part on the side of the above frame, and a tubular rod standing upright on the front end face of the above frame has a microphone part at its tip;

an earhook part that, in the state of being hung and fixed to the auricle, has an end located above and a connection shaft part continuously formed along the horizontal and front directions in the same hung and fixed state;

a connection adapter that connects the above main unit part and the above earhook part, with a first holding part that externally fits and holds the receiver part of the above body part in a rotatable state and a second holding part that externally fits and holds the connection shaft part of the above earhook part in a rotatable state;

a fitting mechanism of the above first holding part of the connection adapter and the receiver part of the above main unit part, including a first locking mechanism that elastically locks the above receiver part at a certain angle of rotation and a detachable mechanism for the above receiver part;

a fitting mechanism of the above second holding part of the connection adapter and the connection shaft part of the above earhook part, including a second locking mechanism that elastically locks the above connection shaft in the state where the above earhook part forms an angle for use with respect to the above main unit part and a detachable mechanism for the above connection shaft.

[Claim 2]

A headset as described in claim 1, characterized by the above first locking mechanism being a mechanism where wavy concavities and convexities are continuously formed at a prescribed pitch along the circumferential direction on the outer peripheral surface of the above receiver part, and a locking tongue that engages with the above wavy concavities and convexities is elastically attached along the inner direction on the inner peripheral surface of the above first holding part.

[Claim 3]

A headset as described in claim 1 or 2, characterized by the above second locking mechanism being a mechanism where a relevant partial section of the connection shaft part of the above earhook part is formed in a smaller diameter state than other sections, while the two side parts of this small-diameter section are formed as parallel flat surfaces, and in the above second holding part, a large diameter section axially supports the above connection shaft part, while a U-shaped cross-sectional elastic piece inserted from the outside sandwiches the two flat surface parts of the small-diameter section of the above connection shaft part.

[Claim 4]

A headset as described in claims 1, 2 to 3, characterized by a cushion composed of cushioning materials being attached in the vicinity of the front end of the side of the above frame of the above body part related to the above receiver part.

[Claim 5]

A headset as described in claims 1 to 4, characterized by the above connection adapter adopting a composition where the above second holding part can be attached and detached from the above first holding part.

A hollow cylinder forming a through-hole other than circular is attached at the side position of the above first holding part. The axial direction of this hollow cylinder is parallel to the cross-section of the above receiver part, while in the above second holding part, there is an insertion part perpendicular to the axis of the corresponding external fitting hole of the connection shaft part of the above earhook part, and in the locking state of the above second locking mechanism, the above insertion part is internally fitted into the through-hole of the above hollow cylinder along the angle direction formed by the above earhook part.

Between the above insertion part of the above second holding part and the through-hole of the above hollow cylinder, there is a detachable mechanism that elastically locks the above insertion part regardless of the direction from which the above insertion part is internally fitted into the above through-hole, and the locking state can be released through manual operation.

[Detailed description of invention]

[Technical field]

[0001]

The present invention relates to headsets (wireless communication terminals) worn on the ear for use, particularly concerning a composition that allows easy wearing on the ear and improves the position adjustment and maintained retention function of the microphone.

[Background art]

[0002]

In the past, headsets for telephone equipment and mobile phone terminals, etc., have been used not by holding them with the hand during a call, but rather by using headsets that enable hands-free calling. When using a headset, it is possible to operate a computer keyboard while talking, and it is also possible to talk in a natural posture, which is beneficial for health, and various applications can also be expected in the future.

[0003]

In such headsets, when using a wireless communication mode based on standards such as Bluetooth (registered trademark), at least a receiver and an amplifying circuit related to sound output, a microphone and an amplifying circuit related to sound input, an antenna and communication circuit, a battery and power circuits are included. Various methods are employed in terms of mechanism. The receiver part, microphone part, and earhook part are the main components, and the above circuits use IC chips and are built into the main unit part containing the receiver part and the earhook part.

[0004]

The composition of a headset shown in Figure 12 is disclosed in the following patent literature 1. In the same figure, 101 is a receiver part, 102 is a microphone part, and 103 is an earhook part curved along the human auricle. This headset has the following characteristics. (1) The microphone part 102 is mounted on an axis attached to the back of the receiver part 101 via the tube body 104 in a freely rotatable state. (2) The receiver part 101 is formed with a rod-shaped axial member 105 standing upright on its outer peripheral surface, which passes through a hollow cylinder 106 attached to the upper end of the earhook part 103. The earhook 101 can move up and down relative to the earhook part 103 and rotate around the axis of the hollow cylinder 106. Moreover, to prevent the axial member 105 from coming loose, a flange 105A is provided at the end of the axial member 105. (3) Circuits such as an amplifying circuit, a modulating circuit, a communication circuit and a power supply circuit, as well as a battery, are housed within the earhook part 103. Electrical connections to the receiver part 101, the microphone part 102 and the antenna (the tube body 104) are made by using the hollow member as the axial member 105, routing the wires 107 of each circuit on the side of the earhook part 103 into the axial member 105 to connect them to the receiver part 101 and the antenna (the tube body 104) and then routing them into the tube body 104 to connect to the microphone part 102.

[0005]

Thus, in this headset, the mechanism that supports the axial member 105 on the side of the receiver part 101 with the hollow cylinder 106 allows adjustment of the relative position of the earhook part 103 and the receiver part 101 to fit the shape of the user's ear. Furthermore, this headset has the advantage of being suitable for both left and right ears due to the free rotation of the receiver part 101 relative to the earhook part 103 based on the above characteristics (2) and the free rotation of the microphone part 102 relative to the receiver part 101 based on the above characteristics (1).

[Patent literature 1] Japanese patent application laid-open No. 10-313494

[Disclosure of invention]

[Topic to be solved by the invention]

[0006]

The headset of the above patent literature 1 is worn on the ear in the following steps (see Figure 5 of patent literature 1). First, adjust the position of the receiver 101 corresponding to the earhook part 103 according to the shape and size of the user's ear so that the surface of the receiver part 101 is basically positioned at the external earhole. Press the inner surface of the receiver part 101 with one hand's fingers to press the surface side into the external earhole and hold the lower end of the earhook part 103 with the other hand's fingers to widen the distance between the receiver part 101 and the earhook part 103 while positioning the earhook part 103 behind the auricle. Moreover, the outer diameter of the receiver part 101 is set to a size that can be inserted between the entrance of the external earhole and the surrounding protruding tragus and antitragus. After releasing the fingers while the earhook part 103 is positioned behind the auricle, the headset can be held on the ear by clamping the auricle between the receiver part 101 and the auricle part 103.

[0007]

Thus, the headset of the above patent literature 1 requires both hands to be worn on the ear, and the wearing process requires a certain degree of practice. In addition, as mentioned above, the earhook part 103 must undergo a certain degree of deformation during wearing, so flexible and elastic materials are used. However, when the earhook part 103 houses IC chips, wires and batteries containing various circuits, problems such as wire breaks and poor contact may easily occur.

[0008]

Secondly, in the above patent literature 1, the relationship between the hollow cylinder 106 and the axial member 105 is described as “the hollow cylinder 106 with an inner diameter slightly smaller than the outer diameter of the axial member 105 supports the axial member 105 with appropriate friction in a freely rotatable and vertically movable state”. The relationship between the two members 106 and 105 is a mechanism supported by friction. Moreover, the position of the microphone part 101 can be adjusted by the angle of the tube body 104, described as “the tube body 104 is centrally mounted with its axis supporting the inner surface of the receiver part (the speaker part) 101, and the central axis of the receiver part (the speaker part) 101 freely rotates as the center of rotation”. It is speculated that this is also an axis support mechanism where the angle setting is related to friction.

[0009]

In addition, under headset conditions, users are not limited to operating in a static state; they may also swing their necks left and right while operating a computer keyboard or experience vibrations or impacts while walking or running. At this point, if it is a support mechanism or axis support mechanism based on friction as mentioned above, the relative position of the earhook part 103 and the receiver part 101, and the angle formed by the microphone part 102 and the tube body 104 will change. That is, a support mechanism or axis support mechanism utilizing friction can be made of the simplest composition, which is beneficial for achieving miniaturization. However, due to the action of inertial force and inertial moment, there may be deviations from the proper installation state.

[0010]

Therefore, the present invention aims to simplify the process of wearing a headset with wireless communication capabilities on the ear while achieving a miniaturized mechanism that does not easily deviate the adjusted position of the microphone part even when the body moves. The present invention provides a headset composition that can be used for both left and right ears by simply changing the installation direction of the earhook part.

[Topic solution]

[0011]

The present invention is a headset with a wireless communication mode for communication functionality, which is worn on the user's ear by hanging a curved rod-shaped earhook part from above the auricle and along the back, with a receiver part disposed opposite the earhole and a microphone part disposed near the corner of the mouth for use, characterized by comprising the following parts: a main unit part with the above communication functionality and necessary circuits and speaker elements for control built into a frame, while a short cylindrical protruding part forms the receiver part on the side of the above frame, and a tubular rod standing upright on the front end face of the above frame has a microphone part at its tip; an earhook part that, in the state of being hung and fixed to the auricle, has an end located above and a connection shaft part continuously formed along the horizontal and front directions in the same hung and fixed state; a connection adapter that connects the above main unit part and the above earhook part, with a first holding part that externally fits and holds the receiver part of the above body part in a rotatable state and a second holding part that externally fits and holds the connection shaft part of the above earhook part in a rotatable state; a fitting mechanism of the above first holding part of the connection adapter and the receiver part of the above main unit part, including a first locking mechanism that elastically locks the above receiver part at a certain angle of rotation and a detachable mechanism for the above receiver part; a fitting mechanism of the above second holding part of the connection adapter and the connection shaft part of the above earhook part, including a second locking mechanism that elastically locks the above connection shaft in the state where the above earhook part forms an angle for use with respect to the above main unit part and a detachable mechanism for the above connection shaft.

[0012]

With the headset of the present invention, based on the function of the second holding part of the connection adapter, the locking state of the second locking mechanism can be released to enlarge the relative angle formed by the body part and the earhook part. Therefore, with the earhook part in an unfolded state from the main unit part (unlocking state), hang and fix the earhook part to the auricle, and then rotate the main unit part to the side of the earhole to position the receiver part opposite the earhole, and the second

locking mechanism will be in a locking state, completing the wearing of the headset on the ear. Moreover, based on the function of the first holding part of the connection adapter, if the rotation angle of the main unit part is changed in stages, a lock of a prescribed strength is achieved at each rotation angle through the action of the first locking mechanism. Therefore, the wearing process of the headset, the position adjustment of the microphone part, and the adjustment of the contact state of the receiver part around the earhole can all be performed with one hand, maintaining the installation and adjustment states with high accuracy.

[0013]

In the headset of the present invention, if the above first locking mechanism adopts a mechanism where wavy concavities and convexities are continuously formed along the circumferential direction at a prescribed pitch on the outer peripheral surface of the receiver part, and a locking tongue that engages with the wavy concavities and convexities is elastically attached along the inner direction on the inner peripheral surface of the first holding part, it can ensure the sound hole of the microphone element passing through the receiver part while obtaining relatively large torsional resistance.

[0014]

Furthermore, in the headset of the present invention, if the above second locking mechanism is designed such that a relevant partial section of the connection shaft part forming the earhook part is formed in a smaller diameter state compared to other sections, while the two side parts of this small-diameter section are formed as parallel planes, and in the above second holding part, a mechanism that supports the connection shaft part at a larger diameter section and clamps the two plane parts of the small-diameter section of the connection shaft part with a U-shaped cross-sectional elastic strip inserted from the outside can be realized. This allows for a simple and compact mechanism, and the assembly for attaching and detaching the connection shaft part can also be incorporated.

[0015]

In the headset of the present invention, if a cushion made of cushioning material is attached to the area near the front end on the side of the relevant said receiver part in the frame forming the body part, it can suppress the shaking of the main unit part caused by inertia forces and inertial torques, and prevent the main unit part and microphone part from hitting the face.

[0016]

In the headset of the present invention, if the above connection adapter is of a structure where the above second holding part is detachable from the first holding part, a hollow cylinder forming a through-hole other than circular is attached at the side position of the above first holding part. The axial direction of this hollow cylinder is parallel to the cross-section of the above receiver part, while in the above second holding part, there is an insertion part perpendicular to the axis of the corresponding external fitting hole of the connection shaft part of the above earhook part, and in the locking state of the above second locking mechanism, the above insertion part is internally fitted into the through-hole of the above hollow cylinder along the angle direction formed by the above earhook part. Between the above insertion part of the above second holding part and the through-hole of the above hollow cylinder, there is a detachable mechanism that elastically locks the above insertion part regardless of the direction from which the above insertion part is internally fitted into the above through-hole, and the locking state can be released through manual operation.

[Effects of the Invention]

[0017]

With the headset of the present invention, the user can easily perform the wearing operation and adjustment operation on the ear with one hand. Moreover, even if the inertial force or inertial moment acts on the main unit part due to the user's movements, a structure that prevents the installation and adjustment positions from easily shifting can be achieved. Furthermore, by simply changing the insertion direction of the earhook part corresponding to the connection adapter to be vertically symmetrical, a headset that can be worn on both the left and right ears can be realized.

[Best Embodiment of the Invention]

[0018]

The embodiments of the headset of the present invention are described below with reference to the figures. Figures 1 and 2 are oblique views of the appearance of the headset related to the embodiments. Figure 1 is a side view of the headset worn on the ear when viewed diagonally from above, and Figure 2 is a side view of the outer side of the headset when viewed diagonally from above. In each figure, 10 is the main unit part where the IC chip of the circuit [communication circuit (including antenna module), amplification circuit, modulator circuit, transmission/reception switching control circuit, power circuit] required for communication and control of radio communication is built into the frame, and the speaker elements are also embedded in the corresponding positions of the battery holding part the aftermentioned receiver part.

[0019]

The tubular rod 11 is vertically installed and fixed at the front end of the frame of the main unit part 10, and the microphone part 12 is installed at the front end of the tubular rod 11. The tubular rod 11 is a component necessary to locate the microphone part 12 at the front. It serves as a passage for connecting the circuit inside the frame of the main unit part 10 and the wire of the microphone part 12. In Figure 2, the area marked as 13 on the outer side of the frame is a button switch. After pressing the switch, an initial communication protocol is executed with other wireless communication devices, followed by normal call communication.

[0020]

20 is the earhook part, which is formed in a curved planar shape that closely fits along the back from the top of the human ear, and is composed of rods with a certain degree of flexibility. The earhook part 20 and the main unit part 10 are connected through the connection adapter 30 (40, 46, 47, 60, 65). As shown in Figure 3, the earhook part 20 is hooked and fixed to the user's auricle 90. The headset is worn on the ear in a state where the auricle 90 is clamped between the receiver part (50, 50A, 51) arranged at a position opposite to the earhole and the earhook part 20. In the wearing state, the microphone part 12 can be adjusted to be located near the corner of the mouth by adjusting the angle of the main unit part 10.

[0021]

The earhook part 20 and the connection adapter 30 are connected in a rotatable state through the fitting mechanism shown in Figures 4 and 5. The earhook part 20 faces upward to the end part 21 in the state where it is hooked and fixed to the auricle 90, and formed to the connection shaft part 22 along the horizontal or front direction in the hooking and fixing state. The connection shaft part 22 consists of a small-diameter section 23 and large-diameter sections 24A and 24B. The small-diameter section 23 is the parallel plane parts 25A and 25B with notches on both sides. The large-diameter sections 24A and 24B have a large diameter for a central angle of 180°, with the remaining 180° part missing. When becoming the same diameter as the small-diameter section 23, the front end surface of the large-diameter section 24B protrudes to form the short shaft 26 with a smaller diameter than the small-diameter section 23.

[0022]

On the side of the connection adapter 30, the cylindrical externally fitted holding part 40 that houses the above connection shaft part 22 is set. In the externally fitted holding part 40, a hole 41 is formed with an inner diameter corresponding to the large-diameter section of the connection shaft part 22. At the bottom of the hole 41, a countersunk hole (no illustration is shown) is formed to house the short shaft 26 on the side of the connection shaft part 22. In the inner peripheral surface of the hole 41, the part of the area corresponding to the missing parts of the large-diameter sections 24A and 24B of the connection shaft part 22 is formed to the limit mechanisms 42 and 43.

[0023]

A square hole 44 is formed in the upper wall of the externally fitted holding part 40, into which a U-shaped cross-sectional elastic piece 45 can be inserted. The elastic piece 45 is inserted from the hole 44 in the state where the connection shaft part 22 on the side of the earhook part 20 is embedded in the hole 41 of the externally fitted holding part 40. By clamping the plane parts 25A and 25B of the connection shaft part 22 with the plate parts 45A and 45B, it not only can realize the elastic locking mechanism corresponding to the earhook part 20 as described later, but also can realize the detachable mechanism of the earhook part 20. In the state where the elastic piece 45 is fully inserted, the front end of the plate parts 45A and 45B engages with the small-diameter section 23 of the connection shaft 22, and the elastic piece 45 can also be assembled to form the detachable mechanism.

[0024]

Specifically, (A) and (B) of Figure 6 are the front view of the rotation state of the connection adapter 30 and the main unit part 10 corresponding to the earhook part 20, and the cross-section view of the externally fitted holding part 40, respectively. (A) shows the locking state that only rotates under strong rotation torque conditions by clamping the plane parts 25A and 25B of the connection shaft part 22 with the plate parts 45A and 45B of the elastic piece 45. (B) shows the state where the angle formed by the main unit 10 and the connection adapter 30 corresponding to the earhook part 20 is forcibly enlarged by hand. In the externally fitted holding part 40, the plate parts 45A and 45B of the elastic piece 45 elastically bend outward by rotating the small-diameter section 23 of the connection shaft section 22, forming an engagement relationship between the arc surface part of the connection shaft part 22 and the bending plane of the plate parts 45A and 45B. Therefore, a non-locking state where the rotation angle can be changed by a relatively small torque can be realized.

[0025]

Therefore, when wearing the headset on the ear, widen the angle formed between the connection adapter 30 and the main unit part 10 corresponding to the earhook part 20 with hand as shown in (B) of Figure 6 first, and then hang and fix the earhook part 20 on the ear in the open state, rotate the connection adapter 30 and the main unit part 10 downward to reach the state shown in (A) of Figure 6, and finally wear the headset on the auricle 90 after they automatically enter the above locking state. The wearing steps of the headset will not cause any operation that leads to the bending of the earhook part 20 or the deformation of the auricle, and can be easily completed with one hand. The open angle θ in (B) of Figure 6 is not unlimitedly enlarged. According to the angle of the missing parts adopted in the large-diameter sections 24A and 24B on the side of the connection shaft part 22 of the earhook part 20, and the engagement relationship with the limit mechanisms 42 and 43 protruding inside the hole 41 of the externally fitted holding part 40 on the side of the connection adapter 30, it is only allowed to open at a certain angle (45° in this embodiment). The detachable mechanism of the connection shaft part 22 can also be formed through the engagement relationship between the large-diameter section 24B on the front end and the elastic piece 45. In this embodiment, it is necessary to limit the open angle θ as described above. In the mechanism without limitation, there are no missing parts in the large-diameter sections 24A and 24B, and there are no limit mechanisms 42 and 43.

[0026]

The above description has explained the fitting mechanism between the earhook part 20 and the connection adapter 30. The fitting mechanism for connecting the main unit part 10 and the connection adapter 30 will be explained below. The fitting mechanism, as shown in the oblique view of the overall appearance of the above headset (Figures 1 and 2) and the exploded oblique view of the component parts (Figures 7 (A) and (B)), consists of the receiver part (50, 50A, 51) protruding from the side of the frame of the main unit part 10 and the annular externally fitted holding part 60 provided on the side of the connection adapter 30.

[0027]

For the receiver part, 50 is the speaker element, which is embedded and fixed in the hollow cylinder part 50A protruding from the side of the frame of the main unit part 10. 51 is the speaker housing, which consists of a flange part 52 on the side facing the earhole and a hollow cylinder part 53 integrally formed behind it. Many small holes (sound holes) 54 communicating from the front to the inside of the hollow cylinder part 53 are formed in the flange part 52. Continuous rake teeth 55 are formed along the circumference at a specified pitch on the outer peripheral surface of the hollow cylinder part 53, and groove 56 is formed along the axial parallel direction at 120° intervals from the central angle on the inner peripheral surface. The groove 56 is in fitting with the protrusion part 50B formed on the outer peripheral surface of the hollow cylinder part 50A.

[0028]

For the externally fitted holding part 60 on the side of the connection adapter 30, rake tooth-shaped locking tongues 61 that elastically displace under pressure from the outside are provided at 120° intervals from the central angle on the inner peripheral surface. Specifically, by forming a slit 62 in the annular plate part on the inner peripheral side of the externally fitted holding part 60, forming a circumferentially elongated locking rod 63 with the locking tongue 61 as the front end part, and using the locking rod 63 as a leaf spring (through material elasticity), the elasticity of the above locking tongue 61 can be obtained.

[0029]

After the inner side of the externally fitted holding part 60 is inserted into the hollow cylinder part 53 of the speaker housing 51, each locking tongue 61 of the externally fitted holding part 60 engages with the recess part formed by the rake teeth 55 of the hollow cylinder part 53. In the embedded state, the hollow cylinder part 50A on the side of the main unit part 10 is inserted into the inner side of the hollow cylinder part 53 of the speaker housing 51. After inserting the protrusion part 50B on the side of the hollow cylinder part 50A into the groove 56 on the side of the hollow cylinder part 53, the externally fitted holding part 60 is engaged with the receiver part (50, 50A, 51) via the fitting mechanism including the elastic locking mechanism and the detachable mechanism. As a result, the connection adapter 30 connected to the earhook part 20 is also connected to the main unit part 10.

[0030]

Therefore, when the headset is worn on the ear, after rotating and adjusting the angle of the main unit part 10, each locking tongue 61 on the side of the externally fitted holding part 60 elastically engages with the recess part between the corresponding rake teeth 55 on the side of the receiver part (50, 50A, 51), and moves along the circumference. The angle is easy to adjust in the elastic locking state. Due to the anti-torque characteristics of the locking mechanism, even if the headset is subjected to inertial force or inertial moment, the adjusted angle is not easily rotated back. Based on the engagement relationship between the engagement

protrusion 64 and the angle-limiting reinforcing rib of the circumferential groove 57 designed on the opposing surfaces of the externally fitted holding part 60 and the speaker housing 51, the rotation angle of the receiver part (50, 50A, 51) corresponding to the externally fitted holding part 60 on the side of the connection adapter 30 is limited to the required maximum angle range (within the maximum sway angle range required for the position adjustment of the microphone part 12).

[0031]

The above description is on condition of integral connection of adapter 30 to make the connection shaft part 22 of the earhook part 20 corresponding to the externally fitted holding part 40, and the receiver part (50, 50A, 51) corresponding to the externally fitted holding part 60. In the headset of this embodiment, as shown in Figures 8 (A) and (B), parts can be freely attached and detached. That is, relative to the main unit part 10, the assembly on the side of the earhook part 20, including the externally fitted holding part 40, can be attached and detached. Furthermore, as shown in Figures 8 (A) and 9, the assembly on the side of the earhook part 20 has a vertically symmetrical relationship, and is installed in the main unit part 10.

[0032]

Therefore, in the side of the externally fitted holding part 60 on the side of the main unit part 10, as shown in Figures 1 and 7-9, the axial direction of the hollow cylinder 65 forming a through-hole 65A with a slightly rectangular cross section is parallel to the cross section of the receiver part (50, 50A, 51). Besides, on the side of the externally fitted holding part 40 on the side of the earhook part 20, the connecting rod part 46 embedded to a specified length and the insertion part 47 of the through-hole 65A on the side of the above hollow cylinder 65 are continuously provided for the axis perpendicular to the external fitting hole 41 corresponding to this connection shaft part 22, in the state of elastic locking as shown in Figure 6 (A), along the angle direction formed by the earhook part 20.

[0033]

By this composition, as shown in Figure 8 (A), when the insertion part 47 is inserted into the through-hole 65A of the hollow cylinder 65 from above to fix the earhook part 20, the headset is worn on the left ear, as shown in Figures 1 and 2; on the contrary, as shown in Figure 9, when the insertion part 47 is inserted from below to fix the earhook part 20, the headset is worn on the right ear, as shown in Figure 10. Therefore, the headset of this embodiment can be worn on both the left and right ears only by changing the assembly of the earhook part 20 and the externally fitted holding part 40.

[0034]

Furthermore, as shown in Figures 8 (A) and 9, at the same time the insertion part 47 forms a slit 47A from the front end to the axis, the parts divided into two sides by the slit 47A become the locking tongue connecting rod of the leaf spring. In addition, the through-hole 65A of the hollow cylinder 65, as shown in Figure 8 (B), can be engaged with the locking tongue connecting rod no matter in which direction is the insertion part 47 inserted. Besides, this engagement relationship can be easily released by inserting a tool from the opening in the opposite direction of the relevant insertion part 47 of the through-hole 65A to reduce the slit 47A, so the above assembly is easy to attach and detach and change.

[0035]

Furthermore, the above assembly can be freely attached and detached in the through-hole 65A of the hollow cylinder 65. As shown in Figure 11, the headset can also be worn on the ear by using a headband 70 instead of the earhook part 20, which has the advantage that it is suitable in the case that it is difficult to fully hold the main unit part 10 in the earhook method when the user exercises vigorously.

[0036]

Furthermore, in this embodiment, as shown in figures other than Figures 4, 5 and 7, a cushion 80 composed of cushioning materials is provided in the area near the front end of the side of the relevant receiver part (50, 50A, 51) forming the frame of the main unit part 10. As shown in Figure 3, when the headset is worn on the user's ear, the cushion 80 is located near the face. When the main unit part 10 is inclined to the ear in wearing operation, or when the main unit part 10 is shaken by a large inertial force or inertia moment in use, the cushion 80 gently sticks close to the face, preventing the main unit part 10 or microphone part 12 from slapping the face.

[Commercial applications]

[0037]

The present invention is a headset suitable for wearing on the users ear, with its receiver part arranged in the opposite position of the earhole and its microphone arranged near the corner of the mouth, to realize communication in a wireless manner.

[Simple description of figures]

[0038]

[Figure 1] Oblique view of the appearance of the headset related to the embodiments of the present invention (side view of the headset worn on the ear when viewed diagonally from above).

[Figure 2] Oblique view of the appearance of the headset related to the embodiments of the present invention (side view of the headset worn on the opposite side of the ear when viewed diagonally from above).

[Figure 3] Use state of the headset.

[Figure 4] Exploded oblique view of the earhook part and the fitting mechanism of the externally fitted holding part of the connection adapter (view of the externally fitted holding part when viewed diagonally from above).

[Figure 5] Exploded oblique view of the earhook part and the fitting mechanism of the externally fitted holding part of the connection adapter (view of the earhook part when viewed diagonally from above).

[Figure 6] Front view of the rotation state of the connection adapter and the main unit part corresponding to the earhook part, and the cross-section view of the externally fitted holding part. (A) shows the wearing state (locking state), and (B) shows the pre-wearing state (non-locking state).

[Figure 7] Exploded oblique view of the receiver part of the main unit part and the fitting mechanism of the externally fitted holding part of the connection adapter. (A) shows the view of the main unit part when viewed diagonally from above, and (B) shows the view when viewed diagonally from above of the opposite side.

[Figure 8] (A) shows the oblique view of the appearance of the assembly of the earhook part, including the externally fitted holding part, attached to and detached from the main unit part (headset for the left ear), and (B) shows the section view where the insertion part is inserted into the through-hole of the hollow cylinder.

[Figure 9] Oblique view of the appearance of the assembly of the earhook part, including the externally fitted holding part, attached to and detached from the main unit part (headset for the right ear)

[Figure 10] Oblique view of the appearance of the headset for the right ear (side view of the headset worn on the ear when viewed diagonally from above).

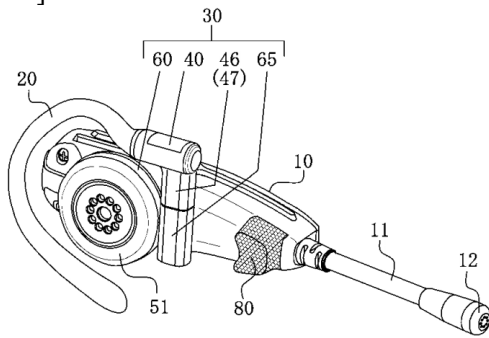
[Figure 11] Oblique view of the appearance of the headset where the earhook part is replaced with a headband (side view of the headset worn on the opposite side of the ear when viewed diagonally from above)

[Figure 12] Composition of the headset related to existing technologies.

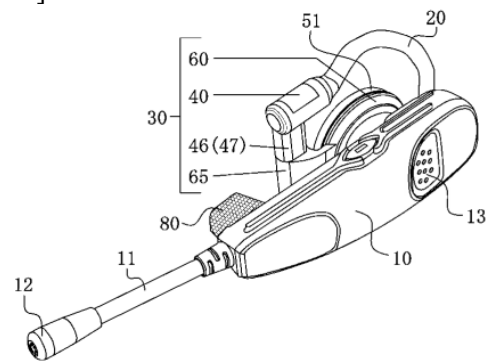
[Description of symbols]

[0039] 10 - main unit part, 11 - tubular rod, 12 - microphone part, 13 - button switch, 20 - earhook part, 21 - end part, 22 - connection shaft part, 23 - small-diameter section, 24A and 24B - large-diameter section, 25A and 25B - plane part, 26 - short shaft, 30 - connection adapter, 40 - externally fitted holding part, 41 - hole, 42 and 43 - limit mechanism, 44 - hole, 45 - elastic piece, 45A and 45B - plate part, 46 - connecting rod part, 47 - insertion part, 47A - slit, 50 - speaker element, 50A - hollow cylinder part, 50B - protrusion part, 51 - speaker housing, 52 - flange part, 53 - hollow cylinder part, 54 - small hole, 55 - rake teeth, 56 - groove, 57 - circumferential groove, 60 - externally fitted holding part, 61 - locking tongue, 62 - slit, 63 - locking rod, 64 - protrusion, 65 - hollow cylinder, 65A - through-hole, 70 - headband, 80 - cushion, 90 - auricle.

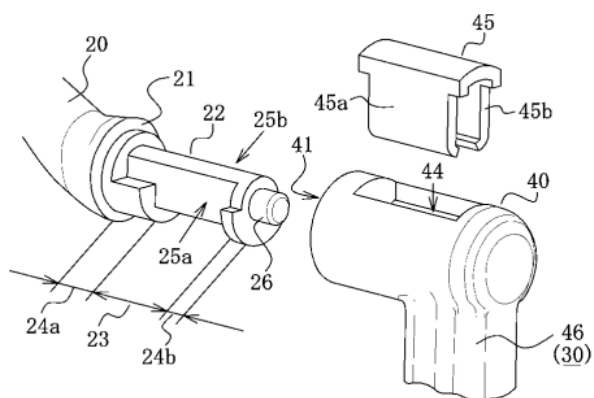
[Figure 1]



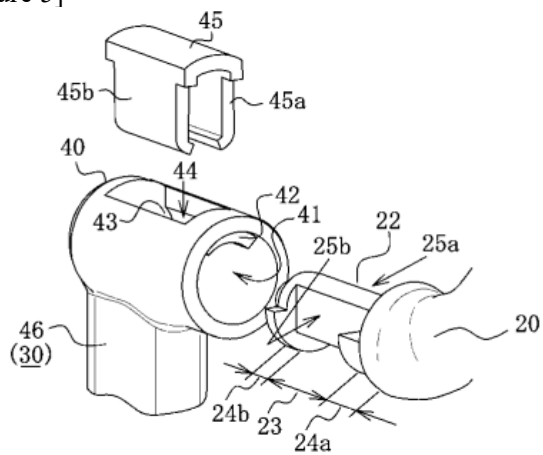
[Figure 2]



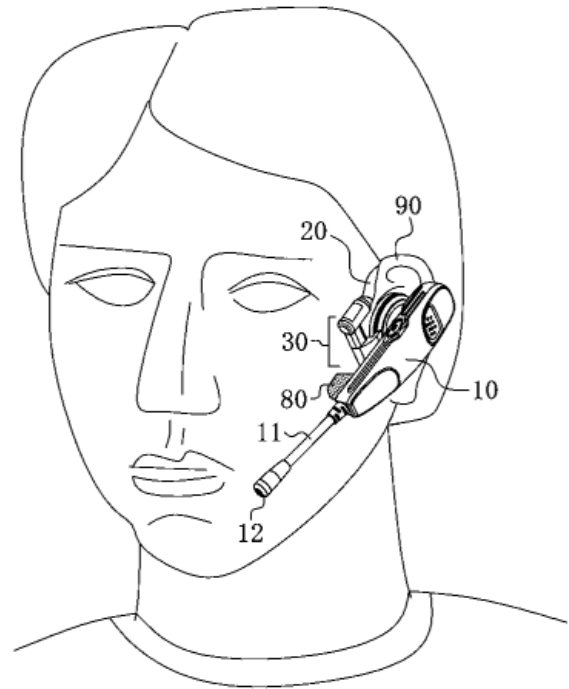
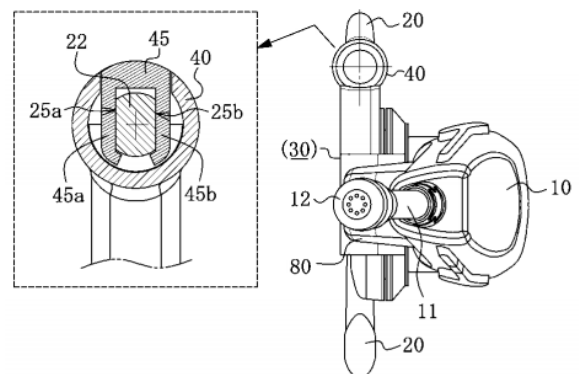
[Figure 4]



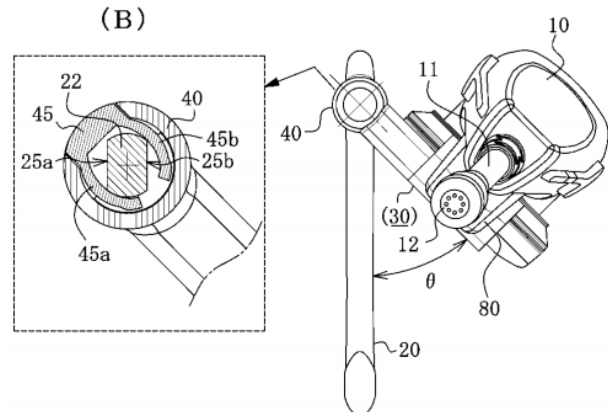
[Figure 5]



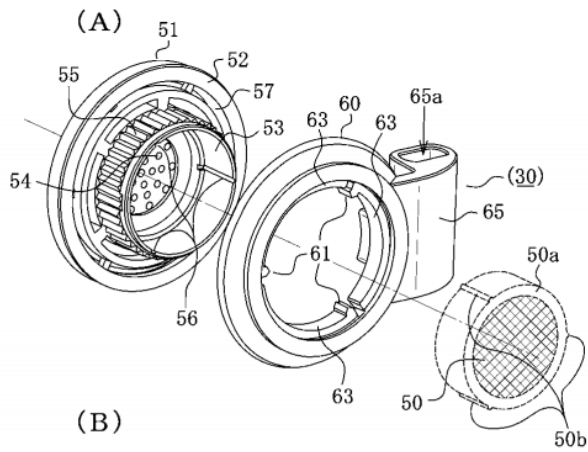
[Figure 3]

[Figure 6]
(A)

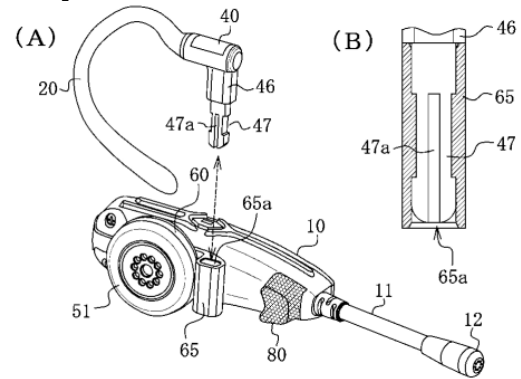
(B)



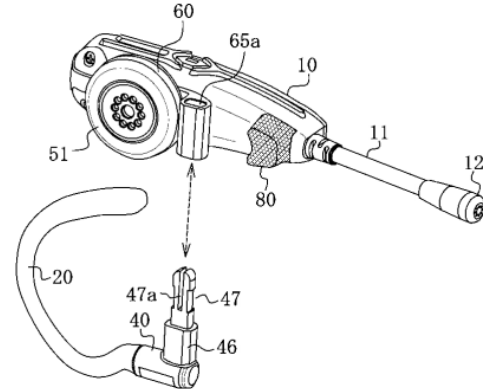
[Figure 7]



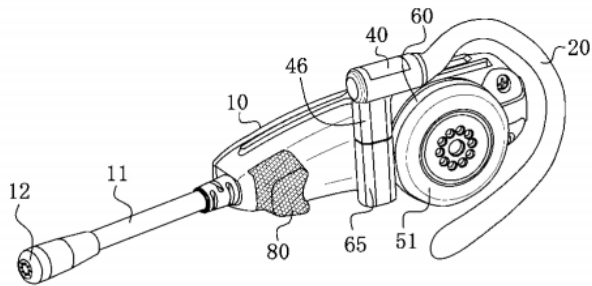
[Figure 8]



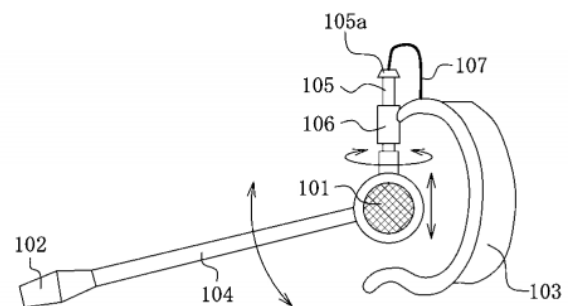
[Figure 9]



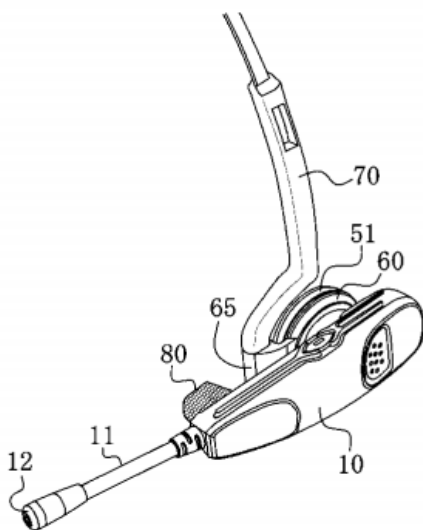
[Figure 10]



[Figure 12]



[Figure 11]



TRANSLATION CERTIFICATION

Date: 2025/01/26

To whom it may concern:

This is to certify that the attached translation is an accurate representation of the documents received by this company. The translation was completed from:

- Chinese (PRC)

To:

- English (USA)

The documents are designated as:

- ' D3 - CN104023288A '
- ' D26 - CN205356672U '
- ' D27 - CN205017577U '

- Japanese (JAP)

To:

- English (USA)

The documents are designated as:

- ' D10 - WO2008007666A1 '
- ' D24 - JP2008294872A '

Beijing Harmonylink Translation Co.,Ltd., attests to the following:

“To the best of my knowledge, the aforementioned documents are a true, full and accurate translation of the specified documents.”

Beijing Harmonylink Translation Co.,Ltd. (seal)

