

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
6 June 2002 (06.06.2002)

PCT

(10) International Publication Number
WO 02/45390 A1

(51) International Patent Classification⁷: H04M 1/05

(21) International Application Number: PCT/NO01/00430

(22) International Filing Date: 30 October 2001 (30.10.2001)

(25) Filing Language: Norwegian

(26) Publication Language: English

(30) Priority Data:
20005512 1 November 2000 (01.11.2000) NO

(71) Applicant (for all designated States except US): **HYPERTEC AS** [NO/NO]; Drammenveien 130, N-0277 Oslo (NO).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **BERG, Richard, Steinfeldt** [NO/NO]; P.O.Box 850 Sentrum, N-0104 Oslo (NO).

(74) Agent: **PROTECTOR INTELLECTUAL PROPERTY CONSULTANTS AS**; P.O.Box 5074 Majorstuen, N-0301 Oslo (NO).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

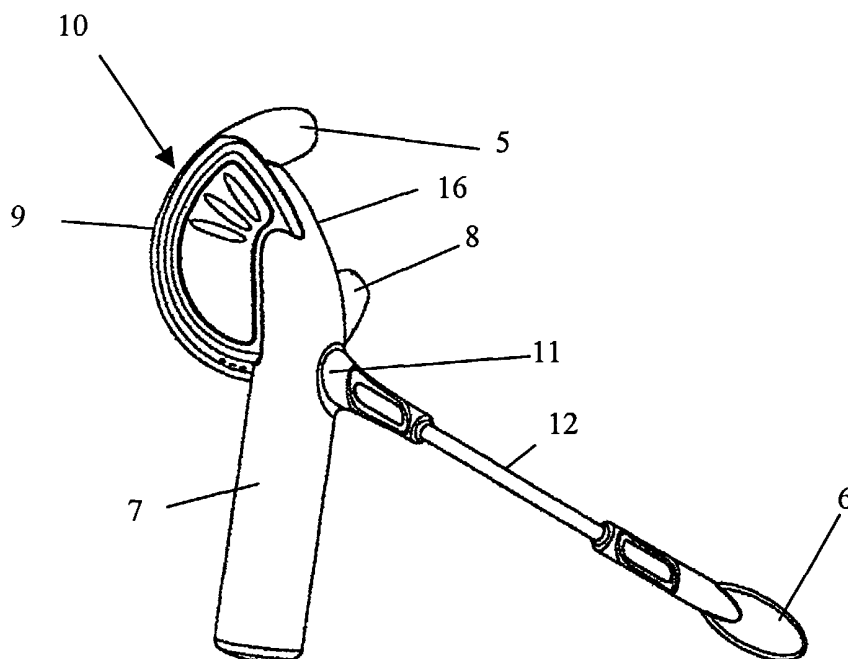
(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE,

[Continued on next page]

(54) Title: MICROPHONE/EARPIECE DEVICE FOR A MOBILE TELEPHONE, TELEPHONE, EXCHANGE OR THE LIKE



(57) Abstract: Device by remote wireless transmission between a microphone/earpiece and a mobile telephone, telephone, exchange or the like where the ear-piece (10) is formed as a large C and the distance between the ends of the C approximate equal the distance between a first cavity formed under the tragus (4) of the ear and a second cavity covered by the lower node (15) of the antihelix (13) of the ear, and as the upper part of the C is protruding into the second cavity under a lap (2) covering the lower part of the second cavity. The earpiece unit comprises a transmitter/receiver, antenna, microphone (6) and a battery (7). The microphone (6) is connected to the earpiece (10) via a microphone rod (12) that also contains the antenna of the transmitter/receiver.



WO 02/45390 A1



DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR),
OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG)

— before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

A MICROPHONE/EARPIECE AND A MOBILE TELEPHONE, TELEPHONE,
SWITCHBOARD OR SIMILAR

The present invention regards a device by wireless transmission between a
5 microphone/earpiece and a mobile telephone, telephone, switchboard or similar as
stated in the preamble of Claim 1.

Microphone/earpiece combinations that are in wireless communication with telephones,
switchboards etc. are known. However, such known devices are generally made with a
10 bow for the earpiece and a microphone connected to this bow. Such devices are
unsuitable for use with portable appliances, as the device, when not in use, should be
shaped so as to fit easily into a pocket, bag or similar storage space.

As such it will be practical for the earpiece and the microphone to be integrated into one
15 unit, to allow it to be placed in the ear in a simple manner, while fitting the ear in a
comfortable and stable manner. There are currently hearing aids in existence that are
carried on the ear, so-called earplug devices. However these do not favour mass
production, as they must be adapted to each user separately in order to be stable and
comfortable to use. This is due in particular to the fact that the ear opening into which
20 the plug is to be inserted, differs from person to person. The external ear also differs
from person to person, but these differences are not so great. This means that by using
the external shape of the ear to attach an ear piece, two to three different sizes would be
enough to cover these differences.

25 Furthermore, an ear plug will block the auditory canal and feel uncomfortable to the
user. In addition, the natural production of wax in the ear will not escape, thus
necessitating regular cleaning of the ear.

Ear pieces for walkmen etc. are known, which make use only of the outer part of the ear
30 for fastening; however these have a circular shape and make use only of the lower part
of the outer cavity of an ear for fastening, and small differences in ear size will cause
them not to fit particularly well.

The object of the present invention is to avoid these drawbacks while providing stable
35 and comfortable support of an earpiece with a microphone, this being provided by
means of a device of the type mentioned by way of introduction, the characteristics of

which appear from Claim 1. Further characteristics of the invention appear from the remaining, dependent claims.

The form of the earpiece allows the auditory canal to remain open to the surroundings to a certain degree, which provides better comfort than a unit that blocks or closes off the auditory canal.

In the following, the present invention will be described in greater detail with reference to the drawings, in which:

Fig. 1 shows an ear with a common, known earplug for hearing aids; and
Fig. 2 shows an earpiece according to the present invention with a microphone rod.

Figure 1 shows a known earplug 1 for a hearing aid. As is apparent from the figure, the outer periphery of the earplug is held in the ear by the outer parts of the ear such as the lower part of the antihelix 13, antitragus 3 and tragus 4 of the ear, abutting intertragic notch 14. The earplug 1 is further held by the hearing unit having a plug that extends into the interior of the ear, with the previously mentioned drawbacks.

By the present invention, a larger part of the external ear is utilised, thus achieving higher stability while providing more comfort to the user than the previously known solutions. The present invention also utilises the upper part of the antihelix 13 and the cavity covered by the lower node 15 of the antihelix and the flap 2 covering said cavity by the outer part of the ear adjacent to the head.

The earpiece 10 according to the present invention is shown schematically in Fig. 2, with a microphone 6 and a microphone rod 12 connected to the earpiece 10 at the junction point 11. The microphone rod contains the connection between the microphone 6 and the transmitter/receiver arranged in the earpiece 10. The power supply for the transmitter/receiver is also disposed in the earpiece, in the lower part 7 of the earpiece 10 in the form of a rechargeable battery, e.g. a miniature penlight cell that, by virtue of its shape and weight leads to a low centre of gravity relative to the rotational axis formed at the landing point in the lower part of the ear cavity (by intertragic notch 14). This helps increase the dynamic stability of the earpiece 10 when the user is in motion. If the centre of gravity is any higher, any centripetal forces caused by quick movements

on the user's behalf would cause the earpiece 10 to be pulled out of position from above. The antenna of the wireless part may be positioned e.g. in the microphone rod.

5 The earpiece 10 is C-shaped, the curve 9 of the outer C corresponding to the antihelix 13 of the ear and having a sloping surface, so that the C follows the inner part of the antihelix 13, with the lower part of the C being located partly underneath the antitragus 3 of the ear. The battery part 7, is laying, projects down from the C while providing a guide and a weight for the correct positioning of the earpiece 10 by more or less lying in the intertragic notch 14 of the ear, and the lower part 8 of the C projects into the cavity 10 formed below the tragus 4 of the ear. The upper part of the C projects into the cavity covered by the lower node 15 of the antihelix and underneath the flap 2 covering the lower part of said cavity.

15 By use of the earpiece 10, an opening is formed between the outer periphery 16 of the earpiece 10 and the wall of the ear. This means that the ends 5 and 8 of the C project out from the casing of the earpiece 10. Likewise, the part of the earpiece 10 containing the hearing element is retracted slightly relative to the C-shaped part, ensuring that the hearing element does not abut the auditory canal directly, allowing the formation of an opening between the auditory canal and the surroundings.

20

C l a i m s

1.

5 Device by wireless transmission between a microphone/earpiece and a mobile telephone, telephone, switchboard or similar, c h a r a c t e r i s e d i n that the earpiece (10) is shaped as a large C, and that the distance between the ends (5, 8) of the C is approximately equal to the distance between a first cavity formed under the tragus (4) of the ear and a second cavity covered by the lower node (15) of the antihelix of the ear, the upper part of the C projecting in underneath a flap (2) covering
10 the lower part of the second cavity.

2.

15 A device according to Claim 1, c h a r a c t e r i s e d i n that the ear piece (10) includes a casing part containing a transmitter/receiver, an antenna, a microphone (6) and a battery (7).

3.

20 A device according to Claims 1-2, c h a r a c t e r i s e d i n that the microphone (6) is connected to the earpiece (10) via a microphone rod (12) also containing the antenna for the transmitter/receiver.

4.

25 A device according to Claims 3-4, c h a r a c t e r i s e d i n that the ends (5, 8) of said C project from said casing part.

1/1

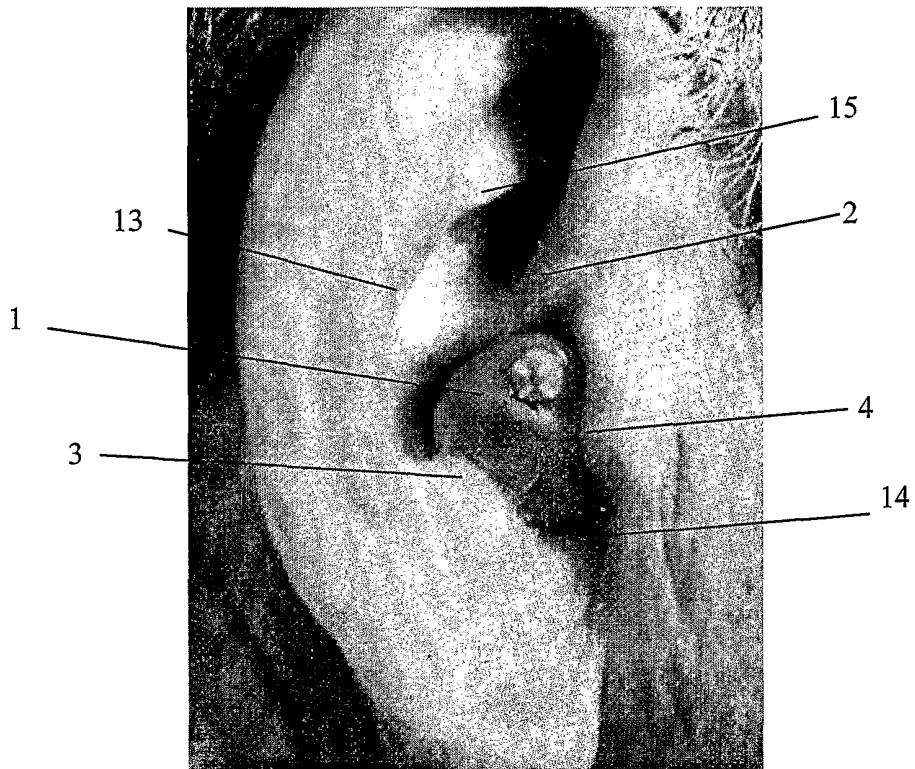


Fig. 1

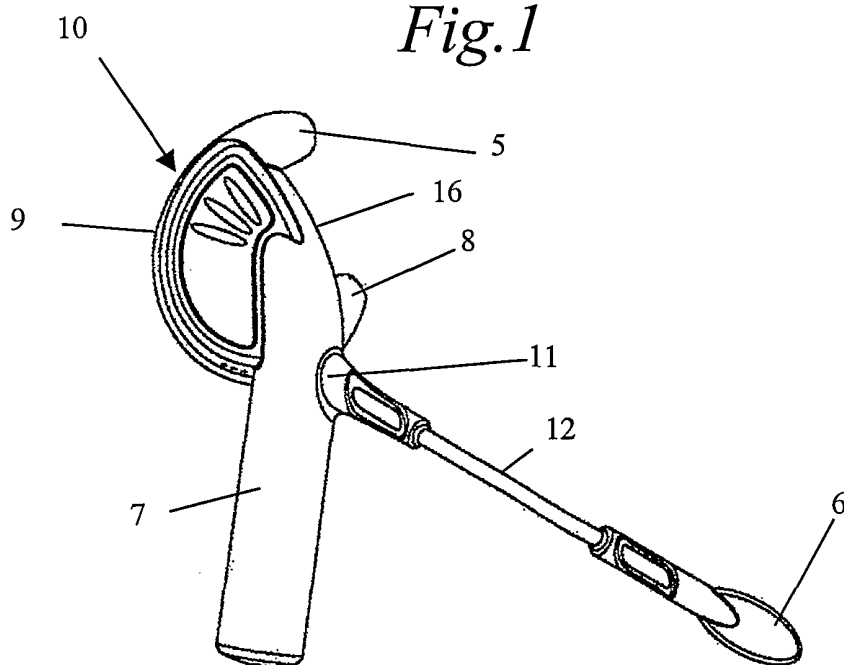


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO 01/00430

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04M 1/05

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04M, H04R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6122388 A (FELDMAN), 19 Sept 2000 (19.09.00), column 1, line 55 - column 3, line 8, figures 1-6, abstract --	1-4
Y	US 5659156 A (MAUNEY ET AL), 19 August 1997 (19.08.97), column 2, line 1 - line 12; column 2, line 15 - column 5, line 40, figures 1a-4c --	1-4
Y	US 5943627 A (KIM ET AL), 24 August 1999 (24.08.99), column 1, line 9 - column 5, line 37, figures 1A-8, abstract -- -----	1-4

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

2 April 2002

Date of mailing of the international search report

05-04-2002

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Roland Landström/js

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/01/02

International application No.

PCT/NO 01/00430

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6122388 A	19/09/00	NONE	
US 5659156 A	19/08/97	AU 4908496 A BR 9606873 A CA 2212139 A CN 1173810 A EP 0806909 A JP 10513080 T KR 231873 B WO 9623443 A	21/08/96 23/12/97 08/08/96 18/02/98 19/11/97 15/12/98 01/12/99 08/08/96
US 5943627 A	24/08/99	CN 1176569 A DE 19706335 A GB 2317301 A,B GB 9703480 D JP 2918510 B JP 10107881 A KR 212686 B KR 153636 Y KR 198356 B	18/03/98 02/04/98 18/03/98 00/00/00 12/07/99 24/04/98 02/08/99 02/08/99 15/06/99