(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 819 190 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
12.12.2007 Bulletin 2007/50

(43) Date of publication A2:
15.08.2007 Bulletin 2007/33

(21) Application number: **07102183.6**

(22) Date of filing: **12.02.2007**

(51) Int Cl.:
H04R 1/10 *(2006.01)*

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **13.02.2006 NL 1031138**

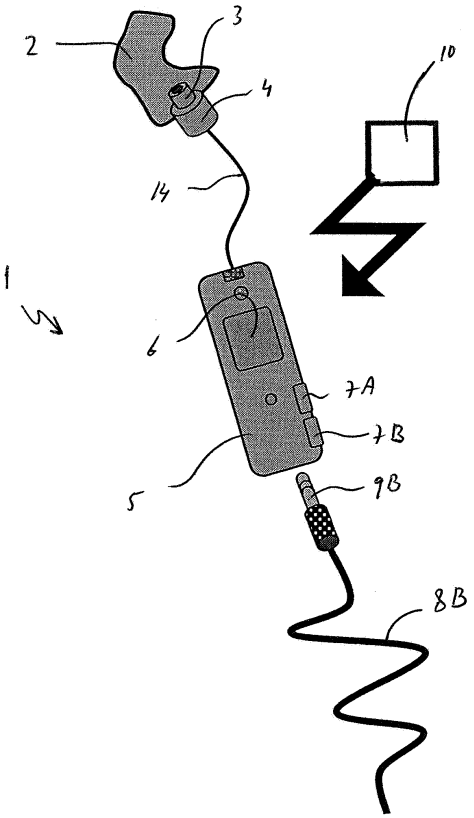
(71) Applicant: **Groeneveld Elcea B.V.**
5107 RG Dongen (NL)

(72) Inventors:
- **Collée, Ronald**
  3039 LG, Rotterdam (NL)
- **Schilderman, Martinus Ronaldus**
  2671 NW, Naaldwijk (NL)

(74) Representative: **van Loon, C.J.J.**
VEREENIGDE
Johan de Wittlaan 7
2517 JR Den Haag (NL)

(54) **Hearing protector, transmitter, method, processor and computer program product**

(57) The invention relates to a hearing protector, comprising a sealing body placeable in an auditory canal of a person, which is manufactured from flexible material so as to fit in the auditory canal of a specific person. The hearing protector is further provided with a sound source for generating sound waves to be propagated in the auditory canal. In addition, the hearing protector comprises a control unit connectable to the sound source, which is designed for recording ambient sound. The control unit is also designed for feeding electronic signals representing the recorded ambient sound for reproduction to the sound source.



Figuur 2

EP 1 819 190 A3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 10 2183

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	EP 1 071 307 A (GROENEVELD ELCEA B V [NL]) 24 January 2001 (2001-01-24) * paragraph [0001] - paragraph [0035] *	1,5,6 2-4, 9-11, 24-27, 32,36,40	INV. H04R1/10
Y	US 6 112 103 A (PUTHUFF STEVEN H [US]) 29 August 2000 (2000-08-29) * column 1, line 9 - column 4, line 59 *	2,11, 24-27	
Y	WO 97/46050 A (MULTITECH PRODUCTS PTE LTD [SG]; TONG YIT CHOW [SG]; CHANG JOSEPH SYLV) 4 December 1997 (1997-12-04) * page 1, line 5 - page 6, line 11 *	2,11, 24-27	
Y	JP 57 173206 A (SONY CORP) 25 October 1982 (1982-10-25) * abstract *	3,4	
Y	US 2004/151336 A1 (HAN TOM [TW] ET AL) 5 August 2004 (2004-08-05) * paragraph [0003] - paragraph [0022] *	3,4	TECHNICAL FIELDS SEARCHED (IPC) H04R
Y	EP 0 529 158 A (LOVEJOY CONTROLS CORP [US]) 3 March 1993 (1993-03-03) * column 1, line 1 - column 4, line 6 * * column 8, line 30 - column 11, line 40 *	4,9,10, 32,36,40	
Y	US 2003/223612 A1 (KNORR JON P [US] ET AL) 4 December 2003 (2003-12-04) * paragraphs [0003], [0014] *	4,10	
A	WO 00/42798 A (QUALCOMM INC [US]) 20 July 2000 (2000-07-20) * page 1, line 5 - page 3, line 14 * * page 3, line 25 - page 10, line 10 *	3	

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	2 November 2007	Peirs, Karel

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

European Patent Office

Application Number
EP 07 10 2183

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

3,4,9,10,32, 36, 40

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 07 10 2183

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1,2,5,6,11,24-27

connection of the hearing protector to peripheral devices

1.1. claims: 1-2, (5-6)

a universal connector is used to connect the hearing protector to a multitude of portable sound devices. Object: make it easier to switch between input devices (see also description p. 5, l. 4-10)

1.2. claims: 11,24-27

the connection between the hearing protector and an external transmitter is wireless. Object: allow for more mobility of the user.

---

2. claims: 3,4,9,10,32,36,40

the volume of the sound can be set independently of the type of connected peripheral device. Object: provide for a universal hearing protection (see also description p. 3, l. 6-19 and p. 18, l. 3-11).

---

3. claims: 7,28,33,37

Compression is applied to the audio signals. Object: minimise the differences in sound intensity between frequency components (see also description p. 16, l. 4-20)

---

4. claims: 8,29,34,38

the frequency characteristic of the audio signals is changed. Object: compensate for the transfer function of the ear canal and/or the sound source (see also description p. 17, l. 9-14).

---

5. claims: 12-15,30-31,35,39

two microphones are present in the hearing protector. Object: allow for voice reception with active noise cancellation (see also description p. 9, l. 23-30).

---

6. claims: 16-23

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 07 10 2183

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

the filter module of the hearing protector is detachably connected to the housing of the hearing protector. Object: allow for an easier repair (see also description p. 11, l. 14-21).

Please note that all inventions mentioned under item 1, although not necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 10 2183

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

02-11-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1071307 A	24-01-2001	NL 1012664 C2	23-01-2001
US 6112103 A	29-08-2000	NONE	
WO 9746050 A	04-12-1997	US 6157728 A	05-12-2000
JP 57173206 A	25-10-1982	NONE	
US 2004151336 A1	05-08-2004	TW 591965 B	11-06-2004
EP 0529158 A	03-03-1993	CA 2048234 C JP 5335858 A US 5046101 A	14-02-1995 17-12-1993 03-09-1991
US 2003223612 A1	04-12-2003	US 2006078150 A1	13-04-2006
WO 0042798 A	20-07-2000	AU 2502000 A	01-08-2000

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82