

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
6 March 2003 (06.03.2003)

PCT

(10) International Publication Number
WO 03/019982 A3

(51) International Patent Classification⁷: **H04R 1/10**,
A61B 5/12, G01P 5/12

(21) International Application Number: PCT/US02/27111

(22) International Filing Date: 26 August 2002 (26.08.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/941,132 27 August 2001 (27.08.2001) US

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(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, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

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

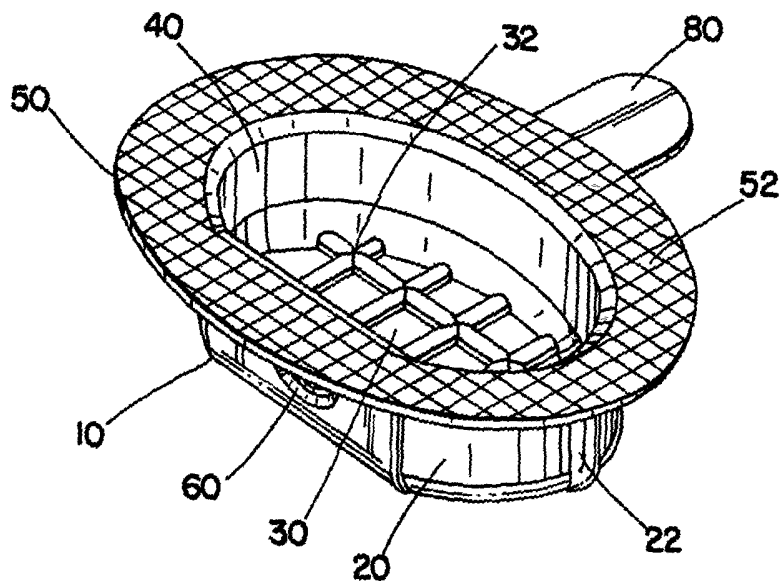
Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
25 September 2003

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

(54) Title: EAR COUPLER



(57) Abstract: A one-piece, transparent flexible ear coupler for use with hearing evaluation is disclosed. It includes an annular side wall and a bottom wall forming an acoustic chamber. A flexible adhesive-backed flange is disposed on the periphery of the ear coupler. The flange attaches to the subject's head, firmly holding the ear coupler in place over the ear. The annular side wall has a port for the placement of a transducer assembly, and also has ribs to help lock the transducer assembly in place. The transducer assembly can be placed in an up or down position, and can be switched between positions while the coupler is attached to the subject's head. The ear coupler advantageously conforms to the subject's head, thereby minimizing the likelihood that the ear coupler will become detached during testing. The coupler can be

inexpensively manufactured, since its one-piece design allows the use of relatively low-cost processes such as injection molding and thermoforming.



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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/27111

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04R1/10 A61B5/12 G01P5/12

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)

IPC 7 H04R A61B G01F G01P

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

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

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2001 087248 A (NATUS MEDICAL INC) 3 April 2001 (2001-04-03) cited in the application paragraphs '0035!-'0037!,'0057!-'0063!; claims 2,8; figures 1,2,28,30 ---	1,2,5,8, 9,13,24, 25
A	US 5 826 582 A (SHEEHAN NEIL J ET AL) 27 October 1998 (1998-10-27) column 3, line 58 -column 4, line 48 column 5, line 8 - line 25; figure 1 ---	2,8
A	US 4 930 520 A (LIVERANI MAURIZIO) 5 June 1990 (1990-06-05) abstract; figure 1 --- -/--	1



Further documents are listed in the continuation of box C.



Patent family members are listed in 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 document but published on or after the international filing date

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"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

8 May 2003

Date of mailing of the international search report

08.02.03

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/27111

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 010 640 A (CLEMENTS M) 27 June 1979 (1979-06-27) abstract page 2, line 14 - line 31; figures 1,3 ---	8,9,24
P,X	US 6 386 314 B1 (WAKAYAMA TOSHIBUMI ET AL) 14 May 2002 (2002-05-14) cited in the application column 7, line 62 -column 8, line 34; figures 1,2 column 12, line 58 -column 14, line 56; figures 24,26 claims 2,8 ---	1,2,5,8, 9,13,24, 25
A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 22, 9 March 2001 (2001-03-09) & JP 2001 124621 A (MATSUSHITA ELECTRIC IND CO LTD), 11 May 2001 (2001-05-11) abstract ---	19,23
A	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 05, 30 April 1998 (1998-04-30) & JP 10 023590 A (MATSUSHITA ELECTRIC IND CO LTD), 23 January 1998 (1998-01-23) abstract ---	1
A	STEPHAN C H ET AL: "A micromachined, silicon mass-air-flow sensor for automotive applications" TRANSDUCERS. SAN FRANCISCO, JUNE 24 - 27, 1991, PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON SOLID STATE SENSORS AND ACTUATORS, NEW YORK, IEEE, US, vol. CONF. 6, 24 June 1991 (1991-06-24), pages 30-33, XP010037348 ISBN: 0-87942-585-7 the whole document ---	1
A	US 5 883 310 A (LIU CHANG ET AL) 16 March 1999 (1999-03-16) the whole document -----	1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 02/27111

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-3, 5, 8-13, 24-26

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-3,5,8-13,24-26

The ear coupler comprises ribs in the annular side wall, and the acoustic transducer assembly mates with the ribs in an either up or down position (claims 3,10-12 and 26). Object: To help to ensure that the ear coupler is not tugged away from the subject's head, cf. page 2, lines 1-3 and page 6, lines 30-32 and to allow placing of the transducer either above or below the center of the transducer, cf. page 2, lines 31-32.

1.1. Claim : 2

The annular side wall and the bottom wall are transparent. Object: To allow a clinician to visualize the placement of the coupler over the center of the subject's ear.

1.2. Claim : 5

The bottom wall contains a target. Object: To facilitate proper placement of the coupler over the subject's ear.

1.3. Claims: 8,9,24

The ear coupler comprises an acoustic transducer assembly adapted to removably fit in said port wherein there is an interference fit between said acoustic transducer assembly and said port. Object: To allow simple placement and removal of the transducer.

1.4. Claim : 13

The ear coupler comprises a tab integral with the flexible flange. Object: To allow easy removal of the ear coupler from the infant's head.

2. Claims: 4,15,16

The bottom wall contains surface features. Object: To add rigidity and create desired acoustic characteristics of the chamber, cf. page 2, lines 18-19.

3. Claims: 6,7,14

The flexible flange includes a barrier for containment of the adhesive. Object: To prevent overflow when the flange is coated with adhesive during manufacture, cf. page 5, lines 30 to 33.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

4. Claims: 17-23,27-29

The ear coupler comprises a one-piece body having an internal chamber, a port and a means for removably attaching the ear coupler to a subject's head. Object: To allow inexpensive manufacturing by injection molding or other suitable processes, cf. page 2, lines 3-5.

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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/27111

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 2001087248	A	03-04-2001	US 6386314 B1	14-05-2002
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