

(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

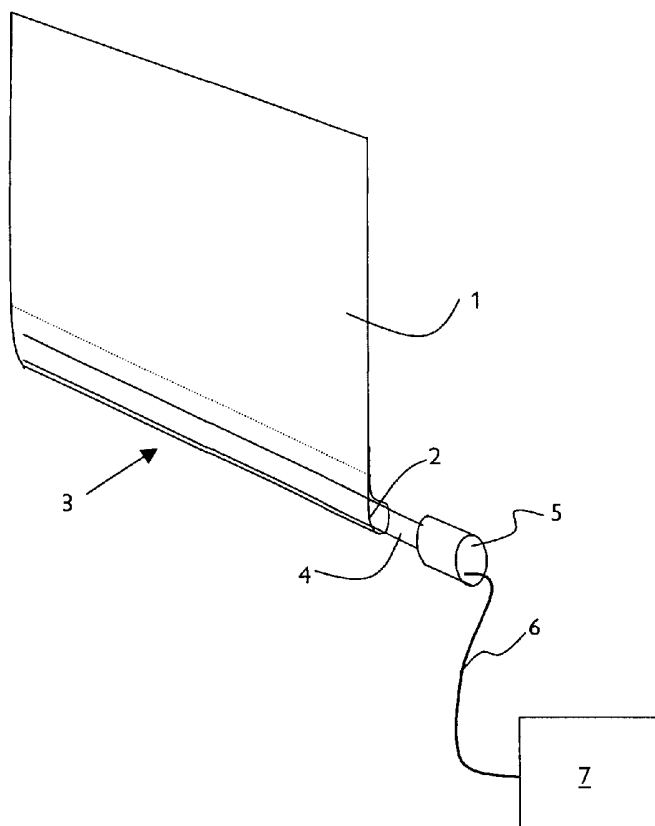
(10) International Publication Number  
**WO 03/019976 A3**

- (51) International Patent Classification<sup>7</sup>: H04R 7/04, 1/02
- (21) International Application Number: PCT/GB02/03851
- (22) International Filing Date: 21 August 2002 (21.08.2002)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
0120282.9 21 August 2001 (21.08.2001) GB  
0200315.0 8 January 2002 (08.01.2002) GB
- (71) Applicant (for all designated States except US): **NEWLANDS TECHNOLOGY LIMITED** [GB/GB]; Unit 3F, Newlands Science Park, Inglemire Lane, Hull, Yorkshire HU6 7TQ (GB).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **JOHNSON, David,**

- Anthony** [GB/GB]; 2 Main Street, Kilnwick, Driffield, Yorkshire YO25 9JD (GB). **METHERINGHAM, William, John** [GB/GB]; Carr Farm, Hilston Road, Roos, Yorkshire HU12 0JB (GB).
- (74) Agent: **LOVEN, Keith, James**; Loven & Co., Quantum House, 30 Tentercroft Street, Lincoln, Lincolnshire LN5 7DB (GB).
- (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, US, UZ, 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),

[Continued on next page]

(54) Title: ACOUSTIC DEVICE



(57) Abstract: An acoustic device comprises a suspended sheet (1) of a thin flexible material having a rigid elongate member (4) secured thereto, for example along an edge thereof, an audio frequency actuator (5) acoustically coupled to an end of the elongate member, and means (6) for supplying the audio frequency actuator with an audio signal.



WO 03/019976 A3



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).

**(88) Date of publication of the international search report:**  
16 October 2003

**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*

*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.*

## INTERNATIONAL SEARCH REPORT

 Internationa l application No  
 PCT/GB 02/03851

 A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 H04R7/04 H04R1/02

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 H01L

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

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|------------|---|-----------------------|
| A          | US 6 215 882 B1 (HERON KENNETH H)<br>10 April 2001 (2001-04-10)<br>the whole document<br>---  | 1                     |
| A          | US 5 025 474 A (TANAKA TSUNEO ET AL)<br>18 June 1991 (1991-06-18)<br>column 2, line 20 - line 55<br>column 4, line 61 -column 8, line 30;<br>figures 1,3,7-10<br>---                                      | 1                     |
| A          | WO 96 28949 A (TRANSDUCER VALLEY INC<br>;NOPONEN SEPPO VAEINAEMOE (FI))<br>19 September 1996 (1996-09-19)<br>page 3, line 12 -page 4, line 2<br>page 5, line 11 -page 8, line 17; figures<br>1-3<br>----- | 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
- \*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

30 July 2003

Date of mailing of the international search report

06/08/2003

Name and mailing address of the ISA

 European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
 Fax: (+31-70) 340-3016

Authorized officer

Tsapelis, A

## INTERNATIONAL SEARCH REPORT

Internat Application No

PCT/GB 02/03851

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date        |
|---|---------------------|----------------------------|----------------------------|
| US 6215882                                | B1                  | 10-04-2001                 | GB 2320393 A 17-06-1998    |
|   |                     |                            | AT 200949 T 15-05-2001     |
|   |                     |                            | AU 728609 B2 11-01-2001    |
|   |                     |                            | AU 5404198 A 03-07-1998    |
|   |                     |                            | BR 9713919 A 21-03-2000    |
|   |                     |                            | CN 1245628 A 23-02-2000    |
|   |                     |                            | CZ 9902053 A3 13-10-1999   |
|   |                     |                            | DE 69704715 D1 07-06-2001  |
|   |                     |                            | DE 69704715 T2 20-09-2001  |
|   |                     |                            | DK 945042 T3 28-05-2001    |
|   |                     |                            | EP 0945042 A1 29-09-1999   |
|   |                     |                            | ES 2156406 T3 16-06-2001   |
|   |                     |                            | WO 9826630 A1 18-06-1998   |
|   |                     |                            | GB 2334402 A ,B 18-08-1999 |
|   |                     |                            | GR 3035828 T3 31-08-2001   |
|   |                     |                            | HU 0003105 A2 29-01-2001   |
|   |                     |                            | JP 2001506080 T 08-05-2001 |
|   |                     |                            | NZ 336136 A 23-02-2001     |
|   |                     |                            | PT 945042 T 31-10-2001     |
|   |                     |                            | RU 2150180 C1 27-05-2000   |
| US 5025474                                | A                   | 18-06-1991                 | JP 1086798 A 31-03-1989    |
|   |                     |                            | JP 2568582 B2 08-01-1997   |
|   |                     |                            | JP 1135291 A 26-05-1989    |
|   |                     |                            | JP 1144891 A 07-06-1989    |
| WO 9628949                                | A                   | 19-09-1996                 | WO 9628949 A1 19-09-1996   |