(51) International Patent Classification: H04R 25/00 (3/00)

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(71) Applicant: GN RESOUND CORPORATION [US/US]; 220 Saginaw Drive, Seaport Centre, Redwood City, CA 94063 (US).


(54) Title: IMPROVED DIRECTIONAL MICROPHONE SYSTEM

(57) Abstract: A second-order microphone system (50) is constructed of two null-less first-order microphone elements (52, 54). The null-less first-order microphone elements (52, 54) prevent the degradations that occur in performance when a second-order microphone system is used at the side of a person's head.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : H04R 25/00, 3/00
US CL : 381/92, 312, 313

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)
U.S. : 381/92, 312, 313

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 practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 5,473,684 A (BARTLETT et al) 05 December 1995 (05.12.1995), abstract, figure 1</td>
<td>1-27</td>
</tr>
<tr>
<td>X</td>
<td>US 5,524,056 A (KILLION et al) 04 June 1996 (04.06.1996), figure 6, columns 6 and 7</td>
<td>1-27</td>
</tr>
<tr>
<td>X</td>
<td>US 5,029,215 A (MILLER, II) 02 July 1991 (02.07.1991), figures 3, 4; columns 4 and 5</td>
<td>1-35</td>
</tr>
<tr>
<td>X</td>
<td>US 5,757,933 A (PREVES et al) 26 May 1998 (26.05.1998), figures 4 and 5</td>
<td>1-27</td>
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</tbody>
</table>

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

Date of the actual completion of the international search: 06 September 2001 (06.09.2001)

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Form PCT/ISA/210 (second sheet) (July 1998)
INTERNATIONAL SEARCH REPORT

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

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

1. ☐ Claim Nos.:
   because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim 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. ☐ Claim 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:
Please See Continuation 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.:

Remark on Protest ☐ The additional search fees were accompanied by the applicant’s protest.

☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet(1)) (July 1998)
BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-27, drawn to a microphone system having two first-order microphone elements.

Group II, claim(s) 28-35, drawn to a method of matching the outputs of two microphone elements for use in a microphone system.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: One invention is an apparatus, the other invention is calibrating the same apparatus.