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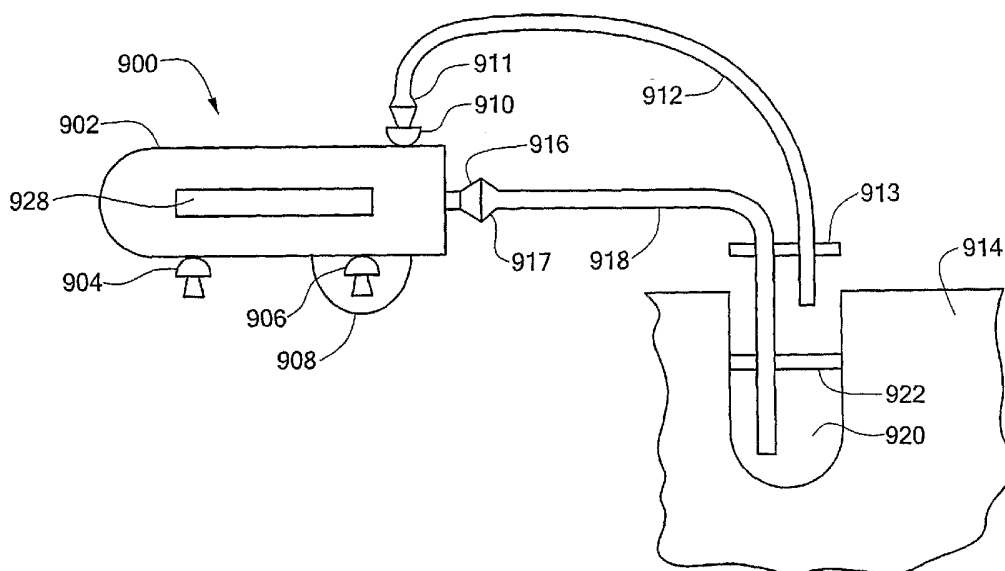
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(54) Title: HEARING AID HAVING ACOUSTICAL FEEDBACK PROTECTION



(57) Abstract: A hearing aid (900) of the behind-the-ear type (BTE) coupling sound from the hearing aid loudspeaker (916) through a hollow tube (918) to an inner portion of the ear (920). A second hollow tube (912) is coupled to a second microphone (910) on the hearing aid case (902) and an outer portion of ear (914). Some sound emanating from the tube (918) disposed in the inner ear (920), exits the ear and is picked up by the second tube (912) and directed to the second microphone (910). The signal from the second microphone (910) is nulled out by the electronic circuitry (928) of the hearing aid (900). The gain and phase of the signals picked up by the second tube are automatically adjusted to provide the intended nulling and resulting minimization of acoustical feedback.



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*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

International application No.

PCT/US04/13768

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04R 25/00; A61F 11/06

US CL : 381/23.1,71.1,71.2,71.6,71.7,72,151,312,313,317,318,322,330,331

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. : 381/23.1,71.1,71.2,71.6,71.7,72,151,312,313,317,318,322,330,331

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

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,438,245 B1 (TAENZER et al) 20 August 2002 (20.08.2002), figures 1-3 and col. 3, line 47 to col. 4, line 56	1-5, 7, 11-14
A	US 4,291,203 (BELLAFIORE) 22 September 1981 (22.09.1981) figures 1 and 3 and col. 2, line 39 to col. 4, line 46	1-3 and 12
A	US 6,647,123 B2 (KANDEL et al) 11 November 2003 (11.11.2003) figure 4 and col. 9, lines 3-62	1, 3, 4



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	
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## INTERNATIONAL SEARCH REPORT

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### Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 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 No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

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 additional fees, this Authority did not invite payment of any additional fees.
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.: 1-15

- Remark on Protest**
- |                          |   |
|--------------------------|---|
| <input type="checkbox"/> | The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.   |
| <input type="checkbox"/> | The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation. |
| <input type="checkbox"/> | No protest accompanied the payment of additional search fees.   |