

(19) AUSTRALIAN PATENT OFFICE

(54) Title
Hearing aid with automatic sound storage and corresponding method

(51)⁶ International Patent Classification(s)
H04R 25/00 (2006.01)20060101AFI2006030
H04R 25/00 8BHAU

(21) Application No: 2006200900 (22) Application Date: 2006 .03 .02

(30) Priority Data

(31) Number	(32) Date	(33) Country
10 2005 009 530.5	2005 .03 .02	DE

(43) Publication Date : 2006 .09 .21
(43) Publication Journal Date : 2006 .09 .21

(71) Applicant(s)
Siemens Audiologische Technik GmbH

(72) Inventor(s)
Rass, Uwe, Fischer, Eghart

(74) Agent/Attorney
Spruson & Ferguson, Level 35 St Martins Tower 31 Market Street, Sydney, NSW, 2000

(56) Related Art
US 6035050
US 2004/0213424
AU 2003281984

2006200900 02 Mar 2006

HEARING AID WITH AUTOMATIC SOUND STORAGE AND CORRESPONDING
METHOD

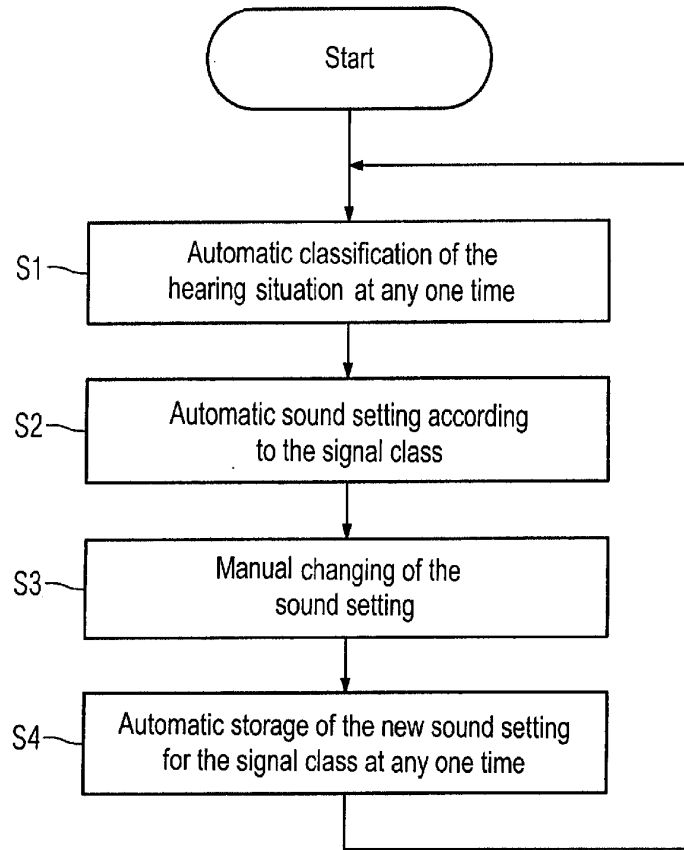
ABSTRACT

The adaptation of a hearing aid to the wearer is to be made more convenient. It is therefore envisaged to classify a hearing situation at any one time, set the sound of the hearing aid and subsequently store the sound setting with the assigned classification. In this case, the sound setting is to be automatically stored (S4) with the associated classification after each adjustment. The present disclosure provides a hearing aid comprising: a classification device for classifying (S1) a hearing situation at any one time; a setting device for setting (S3) the sound of the hearing aid; and a memory device, which is connected to the classification device and the setting device, for storing a sound setting with the assigned classification; wherein it is possible for a sound setting to be automatically stored (S4) in the storage device with the associated classification after each setting.

FIGURE 1

20

R:\PAL Specifications\754307\754307speci_au.doc



2006200900 02 Mar 2006

S&F Ref: 754307

AUSTRALIA

PATENTS ACT 1990

COMPLETE SPECIFICATION

FOR A STANDARD PATENT

Name and Address of Applicant :	Siemens Audiologische Technik GmbH, of Gebbertstrasse 125, 91058, Erlangen, Germany
Actual Inventor(s):	Eghart Fischer Uwe Rass
Address for Service:	Spruson & Ferguson St Martins Tower Level 35 31 Market Street Sydney NSW 2000 (CCN 3710000177)
Invention Title:	Hearing aid with automatic sound storage and corresponding method

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

5845c

2006200900 02 Mar 2006

**HEARING AID WITH AUTOMATIC SOUND STORAGE
AND CORRESPONDING METHOD**

5 The present invention relates to a hearing aid with a classification device for classifying a hearing situation at any one time, a setting device for setting the sound of the hearing aid and a memory device, which is connected to the classification device and the setting device, for storing a
10 sound setting with the assigned classification. In addition, the present invention relates to a corresponding method for operating a hearing aid.

15 The individually preferred sound settings of a hearing aid are dependent on the acoustic surroundings. For example, higher levels are desired for music at low frequencies than when holding a conversation in noisy surroundings. This means that the sound setting is generally carried out
20 according to the signal class.

Modern hearing aids have classification systems which sense the hearing situation at any one time and perform corresponding settings in the hearing aid. These settings
25 are determined during an adapting session with an acoustician and entered in the hearing aid as a fixed setting. From this fixed setting, the wearer of the hearing aid can then manually perform changes of the sound settings corresponding to changed acoustic requirements in each case from the fixed
30 setting for the respective hearing situation. To avoid constant resetting, readjustment with the acoustician is necessary.

European Patent EP 0 814 634 B1 discloses a programmable
35 hearing aid system. In this case, the set of parameters of a programmable hearing aid assigned to each hearing situation

is not already established during adaptation with the hearing aid acoustician, but instead a number of test parameter sets are provided at the beginning for each hearing situation. In an optimizing phase, the wearer of the hearing aid can then
5 determine which set of parameters is individually best suited for him in the individual hearing situations. The set of parameters is finally permanently assigned to the hearing situation. This constitutes adaptation to actual acoustic surrounding conditions, which can largely be performed by the
10 wearer of the hearing aid himself.

In addition, the document DE 101 52 197 A1 describes a method for programming a hearing aid with the aid of a remote control. The wearer of the hearing aid can switch his
15 hearing aid to a receiving mode, in which absolute or relative parameter changes concerning the volume, high- or low-frequency boosting, activation of a noise filter etc. are recorded. Recording is ended by actuating a memory button and stored in the hearing aid or the remote control. If the
20 hearing aid then detects the same hearing situation once again, not only the setting for the hearing program provided for this but also the previously recorded operating steps become effective, so that an individual adaptation of the hearing program to the respective surrounding situation takes
25 place.

The document EP 1 453 356 A2 also discloses a method for setting a hearing system, it being possible for interactive adaptation to be performed during operation. A classifier
30 detects different hearing situations and starts interactive adapting procedures, within which various settings must be assessed. In this case, only settings which match the hearing situation are offered.

35 Thus, a need exists to make the individual adaptation of a hearing aid more convenient.

The present disclosure provides a hearing aid with a classification device for classifying a hearing situation at any one time, a setting device for manually setting a parameter of the hearing aid to a non-pregiven value and a storage device, which is connected to the classification device and the setting device, for storing the non-pregiven value with the assigned classification, it being possible for a manual sound setting to be automatically stored in the storage device with the associated classification after each manual setting of the parameter to the non-pregiven value.

Also provided according to the present disclosure is a method for operating a hearing aid by classifying a hearing situation at any one time, manually setting a parameter of the hearing aid to a non-pregiven value and storing the non-pregiven value with the assigned classification, a manual sound setting being automatically stored with the associated classification after each manual adjustment of the parameter to the non-pregiven value.

The hearing aid according to an embodiment of the present disclosure is therefore constantly in a learning mode, the last changes/settings performed by the user always being stored in the latest hearing program. The settings are then taken over once again when the hearing aid is switched again into this program.

The setting device preferably comprises a remote control. This ensures more convenient operation of the hearing aid. With the remote control, the sound of the hearing aid can preferably also be set for the hearing situation at any one time.

According to a preferred embodiment, the classification device can be used to switch automatically into a signal class corresponding to the hearing situation at any one time, with the associated sound setting. With the automatic storage of the sound setting, it is not only retained in the

2006200900 02 Mar 2006

- 4 -

last chosen state when the hearing aid is switched on and off but also when there is an automatic change of the hearing program according to the respective signal class.

5 With the automatic switching-over of the hearing program, it is favorable if there is cross-fading from a first sound setting into a second sound setting. This has the advantage that the wearer of the hearing aid is not surprised by a high volume if a specific frequency band in the newly switched-on
10 hearing program is amplified to a much higher level than in the old hearing program.

The present invention is now explained in more detail on the basis of the accompanying drawing, Fig. 1, which shows a
15 block diagram of the way in which the hearing aid is set according to the invention.

The exemplary embodiment described below represents a preferred embodiment of the present invention. According to
20 the block diagram represented in the figure, Fig. 1, after switching on the hearing aid or starting, an automatic classification of the hearing situation at any one time takes place, corresponding to step S1, with the classification device of the hearing aid. The hearing aid uses this
25 classification information to load the sound setting corresponding to the classification information automatically from a memory, as indicated in step S2.

The hearing aid system therefore has a setting device which
30 makes it possible to set the sound during day-to-day operation. In the present example, the setting device is realized by a remote control. The wearer of the hearing aid therefore uses the buttons on the remote control for the sound setting. This sends information on the adjustment of
35 the sound controller wirelessly to the hearing aid. In the hearing aid, the hearing situation at any one time has

R:\PAL Specifications\754307\754307speci_au.doc

2006200900 02 Mar 2006

- 5 -

5 already been sensed with the aid of the classifier, corresponding to step S1, so that the change in sound can be assigned to the detected class. The new sound setting is then stored in the memory, corresponding to step S4, for the signal class at any one time.

10 The memory of the hearing aid contains a number of sound settings for each signal class and for each hearing aid program. If the hearing situation changes, the corresponding sound setting is automatically called up from the memory and set, corresponding to S1 to S4. The transition of the sound setting takes place by slow cross-fading.

15 To make the setting of a multi-program hearing aid even more convenient, the sound settings are synchronized in a suitable way between the hearing programs. In other words, a setting for speech in quiet conditions, for example, is transferred into a fixed program for quiet surroundings in an automatic program. Consequently, the wearer of the hearing aid does
20 not have to carry out the same sound setting in all hearing programs for similar hearing situations.

25 It is consequently ensured according to the invention that the wearer of the hearing aid can conveniently adjust the sound of his aid and adapt it to the hearing situation at any one time. The hearing aid then stores the settings automatically, so that the wearer of the hearing aid does not have to perform the settings again after switching over or switching off the aid. The hearing aid therefore always
30 remembers the respective setting and is virtually always in a learning mode. It goes without saying that the hearing aid may also be provided with the option of switching off the learning mode.

35 According to an embodiment of the invention, it is consequently possible for long-term acclimatization effects,

R:\PAL.Specifications\754307\754307speci_ru.doc

2006200900 02 Mar 2006

- 6 -

changing typical acoustic surroundings and changing hearing loss of the user to be allowed for in the settings by the user himself, without having to visit the acoustician.

5 The foregoing describes only some embodiments of the present invention, and modifications and/or changes can be made thereto without departing from the scope and spirit of the invention, the embodiments being illustrative and not restrictive.

10 In the context of this specification, the word "comprising" means "including principally but not necessarily solely" or "having" or "including", and not "consisting only of". Variations of the word "comprising", such as "comprise" and
15 "comprises" have correspondingly varied meanings.

R:\PAL Specifications\754307\754307speci_eu.doc

The claims defining the invention are as follows:

1. A hearing aid comprising:
 - a classification device for classifying a hearing situation at any one time;
 - 5 - a setting device for manually setting a parameter of the hearing aid to a non-pregiven value; and
 - a memory device, which is connected to the classification device and the setting device, for storing the non-pregiven value with the assigned classification; wherein
 - 10 - it is possible for a manual sound setting to be automatically stored in the storage device with the associated classification after each manual setting of the parameter to the non-pregiven value.

2. The hearing aid as claimed in claim 1, the setting device comprising a remote
15 control.

3. The hearing aid as claimed in claim 2, it being possible with the remote control to set the sound of the hearing aid for the hearing aid situation at any one time.

- 20 4. The hearing aid as claimed in any one of the preceding claims, it being possible to use the classification device to switch automatically into a signal class corresponding to the hearing situation at any one time, with the associated sound setting.

5. The hearing aid as claimed in claim 4, it being possible to cross-fade from a first
25 sound setting into a second sound setting.

6. A method for operating a hearing aid, said method comprising the steps of:
 - classifying a hearing situation at any one time;
 - manually setting a parameter of the hearing aid to a non-pregiven value; and
 - 30 - storing the non-pregiven value with the assigned classification; wherein
 - a manual sound setting is automatically stored with the associated classification after each manual adjustment of the parameter to the non-pregiven value.

35

2006200900 06 Mar 2008

- 8 -

7. The method as claimed in claim 6, comprising the further step of:
automatically switching into a signal class corresponding to the hearing
situation at any one time, with the associated sound setting.
- 5 8. The method as claimed in claim 7, comprising the further step of:
cross-fading from a first sound setting into a second sound setting.
9. The method as claimed in any one of claims 6 to 8, comprising the further step
of:
10 automatically storing a sound setting for a first hearing program for the
hearing situation at any one time in a similar way for a second hearing program.
10. A hearing aid substantially as described herein with reference to the
accompanying drawing.
- 15 11. A method for operating a hearing aid, said method being substantially as
described herein with reference to the accompanying drawing.

20 DATED this fourth Day of March, 2008
Siemens Audiologische Technik GmbH
Patent Attorneys for the Applicant
SPRUSON & FERGUSON

