EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent: 13.06.2012 Bulletin 2012/24

(21) Application number: 06792667.5

(22) Date of filing: 03.08.2006

(12) DEVICE FOR COOPERATING WITH AN EARPHONE WITH LEAKAGE CONTROL

EINRICHTUNG ZUM ZUSAMMENWIRKEN MIT EINEM OHRHÖRER MIT LECKKONTROLLE

DISPOSITIF POUR COOPÉRER AVEC UNE OREILLETTE AYANT UNE COMMANDE DE LA FUITE DU SON

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR

(30) Priority: 30.01.2006 US 307255

(43) Date of publication of application: 15.10.2008 Bulletin 2008/42

(60) Divisional application:
10195434.5 / 2 309 773

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**Description**

**Field of the invention**

[0001] The present invention relates to a device cooperating with an earphone with leakage control, which can be switched between states with and without leakage to adapt the earphone to different listening situations; such as a mobile telephone.

**State of the art**

[0002] Earphones are commonly used today e.g. together with mobile telephones and audio players. One type of earphone, that is often referred to as an earbud, is a small speaker-like device that is designed to fit within the outer ear of a user so that he can listen to sound being transmitted from a sound source. When properly positioned in the ear, the earphone can provide the listener with sound transmission directly to the ear canal, the external auditory meatus. The earphone enables the user to listen more closely and avoids holding the device to the ear in case of a telephone.

[0003] The earphone blocks out external sounds and surrounding noise to a varying extent. In some situations blocking is desired, typically referred to music or because the surrounding noise is disturbing the listener. In other situations there needs to be some leakage of surrounding noise, typically to enable a good voice audio quality when speaking on a phone, and when the user wants to hear the surrounding noise, e.g. in a traffic situation.

[0004] Today’s earphones are static, i.e. either the earphone permits some leakage or not.

[0005] US 6,549,635 discloses a user interface for cooperating with a hearing device that can be inserted in the ear of a user, the hearing device having an adjustment element for adjusting the ventilation channel. The adjustment element may be positioned by electrical and/or magnetic miniature drives, initiated by corresponding operation elements or by a signal processing unit of the hearing aid device. The remote control is adapted for operating the adjustment element by using said control unit.

[0006] WO 2004/098238 discloses a remote control device provided for a hearing device equipped with an input interface for reception of input information. Settings of the hearing device can be changed via the remote control device. In particular, the hearing device may be transferred into a telephone operating mode in which the hearing device is less susceptible to interference with electromagnetic radiation specific for mobile stations.

**Summary of the invention**

[0007] An object of the present invention is to provide a device cooperating with an earphone with controllable leakage. The leakage of the earphone is enabled and disabled automatically in dependence of the sound source.

[0008] The invention provides a device according to claim 1.

[0009] Suitably, the control unit is adapted to switch the earphone in dependence of commands from a user entered through the user interface, said commands overriding the automatic switching.

[0010] The device may be a portable telephone, a communicator, or a smart phone.

**Brief description of the drawings**

[0011] The invention will be described in detail below with reference to the attached drawings, in which:

Fig. 1 is a side view of an earphone suitable for use with the device according to the invention, Figs. 2A and 2B are schematic views of an earphone suitable for use with the device according to the invention in an open and closed state, respectively, and Fig. 3 is a schematic view of an embodiment device according to the invention.

**Detailed description of preferred embodiments**

[0012] The invention will be described in the context of mobile telephones and similar devices, such as communicators and smart phones. As is known, a mobile telephone may be used with an earphone to improve the hearing and freeing the hands for driving etc. Also, modern telephones often incorporate players for audio and video. Then stereo earphones are normally used, i.e. one earphone each for the left and the right ear.

[0013] A typical earphone model suitable for use with the device according to the invention is shown in fig. 1. The earphone 1 has a part fitting as a plug in the outer ear of a listener. For comfort, the earphone has a padding 10 towards the ear and has an opening with close openings (not shown) letting sound pass from the loudspeaker element 3. The housing 2 to accommodate the loudspeaker element 3. The housing has openings (not shown) letting sound pass from the loudspeaker element 3 into the ear of the user.

[0014] For best audio quality when listening to music and other audio sources no leakage of surrounding sound is desired. On the other hand, when using the connected device as a telephone and in other situations, leakage may be preferred.

[0015] Figs. 2A and 2B illustrate schematically an earphone. The earphone 1 comprises a housing 2 to accommodating the loudspeaker element 3. The housing has openings (not shown) letting sound pass from the loudspeaker element 3 into the ear of the user.

[0016] The housing has a channel 4, which is open at one end 5 towards the ear and has an opening with clo-
A device comprising:

- a user interface for entering commands from a user;
- an audio player;
- a telephone part; and
- a control unit for receiving the entered commands from the user interface,

wherein the device being adapted to cooperate with an earphone having a closed state and an open state in which states the earphone is closed and opened, respectively, to sound from the environment, the earphone being switchable by means of an actuator for switching between the open and closed states, characterized in that the control unit is adapted to control the actuator to switch the earphone automatically to any of the open or closed state when the device is in a telephone operation mode, and to switch the earphone to any of the open or closed state when the device is in an audio player operation mode.

2. The device according to claim 1, wherein the control unit is adapted to switch the earphone in dependence of commands from a user entered through the user interface, said commands overriding the automatic switching.

3. The device according to any of claims 1 to 2, wherein
the device is a portable telephone, a communicator, or a smart phone.

**Patentansprüche**

1. Vorrichtung, umfassend:
   
   eine Anwenderschnittstelle zur Eingabe von Befehlen von einem Anwender; einen Audio-Abspieler; einen Telefonteil; und eine Steuereinheit zum Empfangen der aus der Anwenderschnittstelle eingegebenen Befehle, wobei die Vorrichtung ausgelegt ist, mit einem Ohrhörer zu kooperieren, der einen geschlossenen Zustand und einen offenen Zustand hat, in welchen Zuständen der Ohrhörer gegenüber Lärm aus der Umgebung geschlossen bzw. offen ist, wobei der Ohrhörer mittels eines Aktuators zum Umschalten zwischen offenem und geschlossenem Zustand umschaltbar ist, dadurch gekennzeichnet, dass die Steuereinheit ausgelegt ist, den Aktuator zu steuern, den Ohrhörer automatisch zum offenen oder geschlossenen Zustand umzuschalten, wenn die Vorrichtung in einem Telefonbetriebsmodus ist, und den Ohrhörer zum offenen oder geschlossenen Zustand umzuschalten, wenn die Vorrichtung in einem Audio-Abspielbetriebsmodus ist.

2. Vorrichtung gemäß Anspruch 1, wobei die Steuereinheit ausgelegt ist, den Ohrhörer abhängig von Befehlen von einem Anwender, die über die Anwenderschnittstelle eingegeben sind, umzuschalten, wobei die Befehle die automatische Umschaltung überschreiben.

3. Vorrichtung gemäß Anspruch 2, wobei die Vorrichtung ein tragbares Telefon, ein Kommunikator oder ein "Smart-Phone" ist.

**Revendications**

1. Dispositif comprenant :
   
   une interface utilisateur pour qu’un utilisateur entre ses instructions ; un lecteur audio ; une partie téléphone ; et une unité de commande destinée à recevoir les instructions entrées depuis l’interface utilisateur, le dispositif étant apte à coopérer avec un écouteur présentant un état fermé et un état ouvert dans lesquels l’écouteur est fermé et ouvert, respectivement, sur le son de l’environnement, l’écouteur pouvant être commuté au moyen d’un actionneur pour commutation entre les états ouvert et fermé, caractérisé en ce que l’unité de commande est apte à commander l’actionneur pour commuter automatiquement l’écouteur dans l’état ouvert ou fermé lorsque le dispositif se trouve dans un mode de fonctionnement du téléphone, et pour commuter l’écouteur dans l’état ouvert ou fermé lorsque le dispositif se trouve dans un mode de fonctionnement du lecteur audio.

2. Dispositif selon la revendication 1, dans lequel l’unité de commande est apte à commuter l’écouteur en fonction des instructions entrées par l’utilisateur depuis l’interface utilisateur, lesdites instructions ayant la priorité sur le basculement automatique.

3. Dispositif selon l’une quelconque des revendications 1 et 2, le dispositif étant un téléphone portable, un dispositif de communication, ou un téléphone intelligent.
REFERENCES CITED IN THE DESCRIPTION

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