

COMMUNICATION DEVICE WITH DETACHABLE EARPIECE

Field of Invention

The invention relates generally to communication devices. In particular, the invention
5 relates to a mobile phone with a corresponding detachable earpiece.

Background

Communication devices, for example mobile phones, are widely used by people for
communicating with one another. Typically an earpiece or a headset having data/signal
10 link with a communication device is used together with the communication device such
that a user does not need to position the communication device to the ear since the
earpiece can be easily attached adjacent to the ear for usage. This then allows the user to
perform other tasks such as driving and handling objects with both hands while
simultaneously engaging in a conversation using the communication device.

15

Conventionally, communication devices do not have dedicated earpieces. Earpieces are
usually procured or purchased separately and different types of earpieces with various
shapes and functions are usable with a single communication device. Therefore,
communication devices and earpieces are usually carried and handled as separate items.
20 This further complicates the usage of communication devices together with earpieces.
Moreover, due to their small sizes, the earpieces can be misplaced easily. Yet further,
recharging of communication devices and earpieces are performed separately, normally
using different types of incompatible chargers. Thus, it is troublesome for the user to
carry a few different chargers around. Additionally, the battery life of the earpieces is
25 often limited due to the battery size being used. Hence the battery needs to be frequently
recharged if the earpieces are constantly being used.

There is therefore a need for a system that addresses the foregoing problems of using
earpieces with communication devices.

30

Summary

Embodiments of the invention disclosed herein provide usage convenience of a detachable headset in conjunction with a communication device such as a mobile phone.

5 In accordance with a first aspect of the invention, there is disclosed an adaptor couplable to a communication device, the adaptor comprising a body, a barrier and a plurality of connectors. The body forms a recess in which the recess is adapted for receiving a wireless headset therein. Further, the adaptor has coupling means for removably coupling to the communication device. The barrier is movably coupled to the body and the barrier
10 is movable between a first position and a second position. The plurality of connectors is electrically connectable with the communication device when the adaptor is coupled thereto. Additionally, displacement of the wireless headset received within the recess is impeded by the barrier when the barrier is in the first position and unimpeded by the barrier when the barrier is in the second position. When the wireless headset is disposed
15 within the recess when the adaptor is coupled to the communication device, the wireless headset engages the plurality of connectors for electrically coupling the wireless headset to the communication device.

In accordance with a second aspect of the invention, there is disclosed an adaptor formed
20 in a communication device, the adaptor comprising a body, a barrier and a plurality of connectors. The body forms a recess in which the recess is adapted for receiving a wireless headset therein. The barrier is movably coupled to the body and the barrier is movable between a first position and a second position. The plurality of connectors is electrically connectable with the communication device. Additionally, displacement of
25 the wireless headset received within the recess is impeded by the barrier when the barrier is in the first position and unimpeded by the barrier when the barrier is in the second position. When the wireless headset is disposed within the recess, the wireless headset engages the plurality of connectors for electrically coupling the wireless headset to the communication device.

30

Brief Description Of The Drawings

Embodiments of the invention are disclosed hereinafter with reference to the drawings, in which:

FIG. 1 shows an isometric view illustrating retrieval of a wireless headset from an adaptor of a communication device, such as a mobile phone, according to an embodiment of the invention;

5

FIG. 2 shows an isometric view illustrating storage of the wireless headset in the adaptor of the communication device of FIG. 1;

FIG. 3 shows an isometric view of the communication device of FIG. 1;

10

FIG. 4 shows an isometric view of the wireless headset for use in conjunction with the communication device of FIG. 1;

FIG. 5 shows a side view of the wireless headset of FIG. 4 being retained within the adaptor of the communication device of FIG. 1; and

15

FIG. 6 shows a schematic representation of a communication transfer interface formed on the adaptor of the communication device of FIG. 1.

20 **Detailed Description**

A system for providing usage convenience of a detachable headset in conjunction with a communication device such as a mobile phone is described hereinafter for addressing the foregoing problems.

25 For purposes of brevity and clarity, the description of the invention is limited hereinafter to applications related to usage of communication devices with a detachable earpiece or headset. This however does not preclude various embodiments of the invention from other applications of similar nature. The fundamental inventive principles of the embodiments of the invention are common throughout the various embodiments.

30

Exemplary embodiments of the invention described hereinafter are in accordance with FIGs. 1 to 6 of the drawings, in which like elements are numbered with like reference numerals.

FIG. 1 and FIG. 2 show a communication device 100 with an adaptor 102 for receiving and storing a wireless headset 106 according to an embodiment of the invention. The adaptor 102 is preferably integrated with a housing 104 provided by the communication device 100. The adaptor 102 comprises an opening that is substantially flushed with the exterior of the communication device 100. Further, the opening of the adaptor 102 is formed on a surface of the housing 104, which outwardly opposes a keypad (not shown) located on the housing 104. However, the adaptor 102 may alternatively be integrated with the housing 104 on a surface of the housing 104 whereon the keypad is formed.

Alternatively, the adaptor 102 is an add-on component for the communication device 100. For example, the adaptor 102 is made available as a separate component that is couplable to the communication device 100 when required. When the adaptor 102 is made available as a separate component for the communication device 100, the adaptor 102 is attachable to a recess (not shown) provided in the housing 104 of the communication device 100 by means of screw threads (not shown) formed on the adaptor 102 and the recess or the like coupling means. The recess may be formed and located on one of a front and back surface of the housing 104. The adaptor 102 is preferably substantially cylindrically-shaped and the opening of the adaptor 102 is substantially wide for receiving the wireless headset 106.

In addition, with reference to Fig. 3, an isometric view of the communication device 100 is shown. The communication device 100 is preferably any mobile communication device such as a mobile phone, a Personal Digital Assistance (PDA), a conventional laptop and/or palmtop receiver, or any mobile device that includes a transceiver. The housing 104 is used for encasing electrical and mechanical components of the communication device 100. The electrical and mechanical components typically include user interface components such as a display screen 300, a keypad 302, and control buttons 304. A user operates the communication device 100 according to any conventional method well known in the art. For example, the user operates the communication device 100 via the user interface components. Alternatively, the user operates the communication device 100 via voice recognition circuitries integrated into the communication device 100. The voice recognition circuitries allow the user to operate the communication device 100 using voice commands.

The adaptor 102 comprises a barrier 108 movably coupled to the adaptor 102. The barrier 108 is preferably a cover, a mesh cover or a bar swivelled across the adaptor 102 for retaining the wireless headset 106 within the adaptor 102. Additionally, the barrier 108 is couplable to the adaptor 102 in many ways well known in the art to provide or restrict access to the adaptor 102 including coupling to allow flipping of the barrier 108 away from the opening of the adaptor 102, sliding sideways across the housing 104 and swivelling away from the opening of the adaptor 102. Within the adaptor 102, the adaptor 102 includes means for securely retaining the wireless headset 106 within the adaptor 102. The means for securely retaining the wireless headset 106 within the adaptor 102 include using holding stubs that mechanically grip onto the wireless headset 106 or providing a mechanism that couples the wireless headset 106 to the adaptor 102 via magnetic coupling. Alternatively, the wireless headset 106 is retainable in the adaptor 102 only by the barrier 108.

The barrier 108 is movable between a first position for exposing the opening of the adaptor 102 and a second position for covering the opening of the adaptor 102. The wireless headset 106 is retainable within the adaptor 102 by first moving the barrier 108 into the first position, disposing the wireless headset 106 into the adaptor 102 and subsequently moving the barrier 108 into the second position. When in the second position, the barrier 108 is preferably substantially flushed with the housing 104. To retrieve the wireless headset 106 from the adaptor 102, the barrier 108 is first moved into the first position to enable access to the opening to facilitate retrieval of the wireless headset 106 from the adaptor 102. The barrier 108 is subsequently moved into the second position to substantially cover the opening of the adaptor 102 once the headset has been retrieved from the adaptor 102. Both the adaptor 102 and the barrier 108 are designed such that the wireless headset 106 is securely retained within the adaptor 102 when the barrier 108 is in the second position.

FIG. 4 shows the wireless headset 106, which is typically a hands-free device that allows the user to communicate with the communication device 100 within a pre-determined range using a pre-defined wireless interface. The wireless interface is preferably implemented using wireless personal area network (WPAN) technologies such as Infrared

(IR), Bluetooth or Ultra-Wide-Band (UWB). WPAN technologies allow computer networks to be formed between devices that are located in close proximity to or around the user's body. The communication range between the devices in the formed computer networks is typically a few meters. The wireless headset 106 also includes a speaker unit (not shown) for projecting audio signals to the user, a microphone unit (not shown) for receiving audio signals from the user and a fastener, such as an ear support 400, for allowing the wireless headset 106 to be secured to the head or the ear of the user. Particularly, the ear support 400 latches onto or wedges between contours of the outer ear cartilage.

10

When the wireless headset 106 detects that it is received within the adaptor 102, the wireless headset 106 then switches to function as a speaker and a microphone for the communication device 100. FIG. 5 shows a side view of the wireless headset 106 being retained in the adaptor 102 of the communication device 100. Audio signals from the communication device 100 are preferably communicated to the wireless headset 106 via a communication transfer interface 502. The communication transfer interface 502 is coupled to outputs of audio processing circuitries (not shown) integrated into the communication device 100. The audio processing circuitries are for processing audio information and generating audio signals therefrom. Any audio signals generated by the communication device 100 are then transmittable to the wireless headset 106 through the communication transfer interface 502. However, the wireless headset 106 needs to be recalibrated or synchronized with the communication device 100 when the wireless headset 106 is retained within the adaptor 102 before the wireless headset 106 is able to communicate with the communication device 100 for receiving the audio signals. The received audio signals are then broadcast through the speaker unit of the wireless headset 106.

The communication transfer interface 502 comprises electrical contacts 602 formed in the adaptor 102 of the communication device 100 as shown in FIG. 6. When the wireless headset 106 is disposed in the adaptor 102, the wireless headset 106 engages the electrical contacts 602 to enable signal communication therevia with the communication device 100. Preferably, microphone signals are communicated from the wireless headset 106 to the communication device 100 via the electrical contacts 602. Furthermore, data for

configuration and control of the wireless headset 106 and speaker signals are also communicated from the communication device 100 to the wireless headset 106 via the electrical contacts 602. The electrical contacts 602 also enable power supply to and electrical grounding of the wireless headset therevia. In addition, the electrical contacts
5 602 are used on a “when-required” basis. For example, if a microphone installation within the communication device 100 is used, there is then no need for communicating microphone signals to the communication device 100.

Additionally, battery charging of a headset battery (not shown) of the wireless headset 106
10 is automatically initiated when the wireless headset 106 is retained within the adaptor 102. Preferably, the wireless headset 106 includes a charging interface that enables the headset battery to be charged using either an external dedicated battery charger or through the communication transfer interface 502 of the communication device 100. The communication device 100 also includes a power management circuit (not shown) for
15 monitoring and regulating the power level of the headset battery of the wireless headset 106 during charging in accordance with known power management techniques. In particular, the power management circuit prevents the headset battery of the wireless headset 106 from being overcharged when the wireless headset 106 is retained within the adaptor 102. The power management circuit is also preferably coupled to the
20 communication transfer interface 502. Additionally, the communication device 100 also provides a mechanism for disabling the auto-charging function when the wireless headset 106 is retained within the adaptor 102.

Further, the communication device 100 also includes a detection circuit (not shown) that
25 detects the retention of the wireless headset 106 within the adaptor 102 in order to initiate charging of the headset battery. When the wireless headset 106 is retained within the adaptor 102, the power management circuit is electrically connected to the headset battery of the wireless headset 106. The power management circuit also preferably manages the power of a mobile battery (not shown) of the communication device 100 through
30 monitoring the power level of the mobile battery, regulating a power dissipation rate of the mobile battery and controlling the charging of the mobile battery. Additionally, the power management circuit also enables simultaneous charging of both the mobile battery

and the headset battery if the wireless headset 106 is retained within the adaptor 102 during when the communication device 100 is being charged.

In an alternative embodiment, the adaptor 102 is preferably integrated with a housing of an in-car multimedia entertainment system (not shown) installed on an automobile in
5 which the adaptor 102 is shaped for receiving the wireless headset 106. In addition, the adaptor 102 is connected to the electrical system of the automobile to thereby enable recharging of the wireless headset 106 when the wireless headset is disposed within the adaptor 102.

10 In the foregoing manner, a system for providing usage convenience of a detachable headset in conjunction with a communication device such as a mobile phone is described according to embodiments of the invention for addressing the foregoing disadvantages. Although a few embodiments of the invention are disclosed, it will be apparent to one skilled in the art in view of this disclosure that numerous changes and/or modification can
15 be made without departing from the scope and spirit of the invention.

Claims

1. An adaptor couplable to a communication device, the adaptor comprising:
 - a body forming a recess, the recess being adapted for receiving a wireless headset therein, the adaptor having coupling means for removably coupling to the communication device;
 - a barrier movably coupled to the body, the barrier being movable between a first position and a second position; and
 - a plurality of connectors electrically connectable with the communication device when the adaptor is coupled thereto,
 wherein displacement of the wireless headset received within the recess is impeded by the barrier when the barrier is in the first position and unimpeded by the barrier when the barrier is in the second position,
 wherein when the wireless headset is disposed within the recess when the adaptor is coupled to the communication device, the wireless headset engages the plurality of connectors for electrically coupling the wireless headset to the communication device.
2. The adaptor of claim 1, wherein the first position impedes access to the recess.
3. The adaptor of claim 1, wherein the second position enables access to the recess.
4. The adaptor of claim 1, wherein the barrier is rotatable between the first position and the second position.
5. The adaptor of claim 1, wherein the barrier is adapted for substantially covering the recess in the first position.
6. The adaptor of claim 1, wherein the wireless headset comprises a speaker and a microphone.
7. The adaptor of claim 1, wherein the wireless headset interfaces with the communication device via a wireless interface when the wireless headset is dislodged from the recess.

8. The adaptor of claim 7, wherein the wireless interface uses one of Infrared (IR), Bluetooth and Ultra-Wide-Band (UWB).
9. The adaptor of claim 1, wherein a battery unit of the wireless headset is electrically charged via the plurality of connectors when the wireless headset is disposed within the recess.
10. The adaptor of claim 1, wherein the plurality of connectors transmits audio signals to the wireless headset for audio amplification when the wireless headset is disposed within the recess.
11. An adaptor formed in a communication device, the adaptor comprising:
 - a body forming a recess, the recess being adapted for receiving a wireless headset therein;
 - a barrier movably coupled to the body, the barrier being movable between a first position and a second position; and
 - a plurality of connectors electrically connectable with the communication device,wherein displacement of the wireless headset received within the recess is impeded by the barrier when the barrier is in the first position and unimpeded by the barrier when the barrier is in the second position,
 - wherein when the wireless headset is disposed within the recess, the wireless headset engages the plurality of connectors for electrically coupling the wireless headset to the communication device.
12. The adaptor of claim 11, wherein the first position impedes access to the recess.
13. The adaptor of claim 11, wherein the second position enables access to the recess.
14. The adaptor of claim 11, wherein the barrier is rotatable between the first position and the second position.

15. The adaptor of claim 11, wherein the barrier is adapted for substantially covering the recess in the first position.

5 16. The adaptor of claim 11, wherein the wireless headset comprises a speaker and a microphone.

17. The adaptor of claim 11, wherein the wireless headset interfaces with the communication device via a wireless interface when the wireless headset is dislodged from the recess.

10 18. The adaptor of claim 17, wherein the wireless interface uses one of Infrared (IR), Bluetooth and Ultra-Wide-Band (UWB).

15 19. The adaptor of claim 11, wherein a battery unit of the wireless headset is electrically charged via the plurality of connectors when the wireless headset is disposed within the recess.

20 20. The adaptor of claim 11, wherein the plurality of connectors transmits audio signals to the wireless headset for audio amplification when the wireless headset is disposed within the recess.