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(56) Documents Cited:
CN 204334900 U
CN 105872886 A
CN 102395075 A
US 20070025579 A1
KR 20110031258
CN 202475747 U
CN 103533478 A
US 20100215186 A1

(58) Field of Search:
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(54) Title of the Invention: **An audio kit with earphones or headphones**
Abstract Title: **An audio kit with earphones or headphones**

(57) The audio kit consists of a pair of earphones or headphones 10 each connected by a two-core cable 12 to a miniature two-electrode plug 14, a portable battery-powered wireless device 20 that has two separate two-electrode output sockets 16 to which the miniature two-electrode plugs 14 can be connected and also a four-core input lead 30 that connects a conventional jack plug 36 to a Y-module 32 with two separate two-electrode output sockets 34. Consequently the user can readily change between listening to an audio stream using the wireless device 20 or listening to the audio stream using the jack 36 to connect 52 to the audio source 50.

Fig.1.

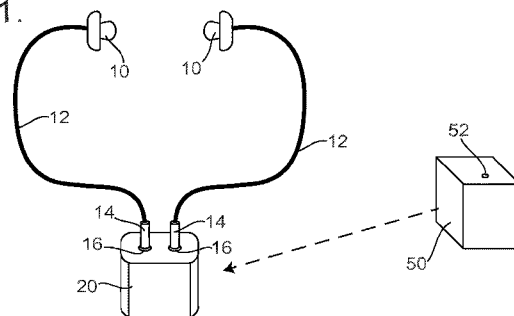


Fig.2.

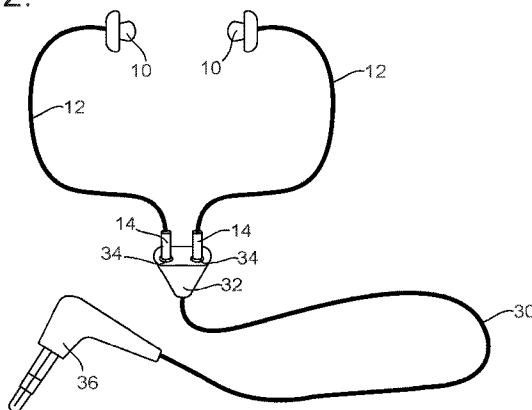


Fig.1.

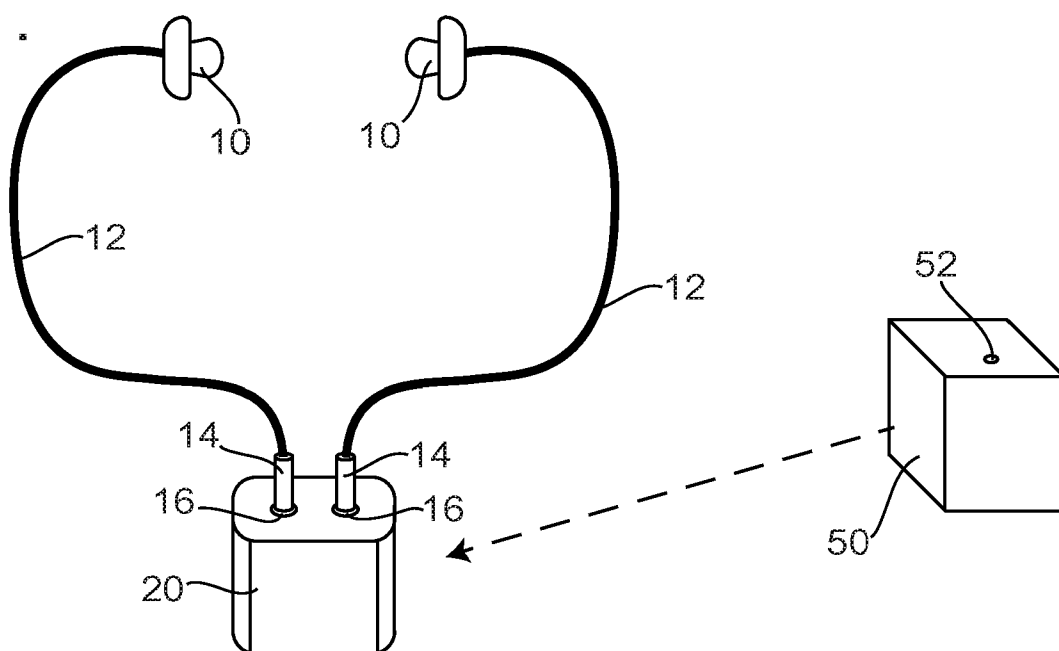
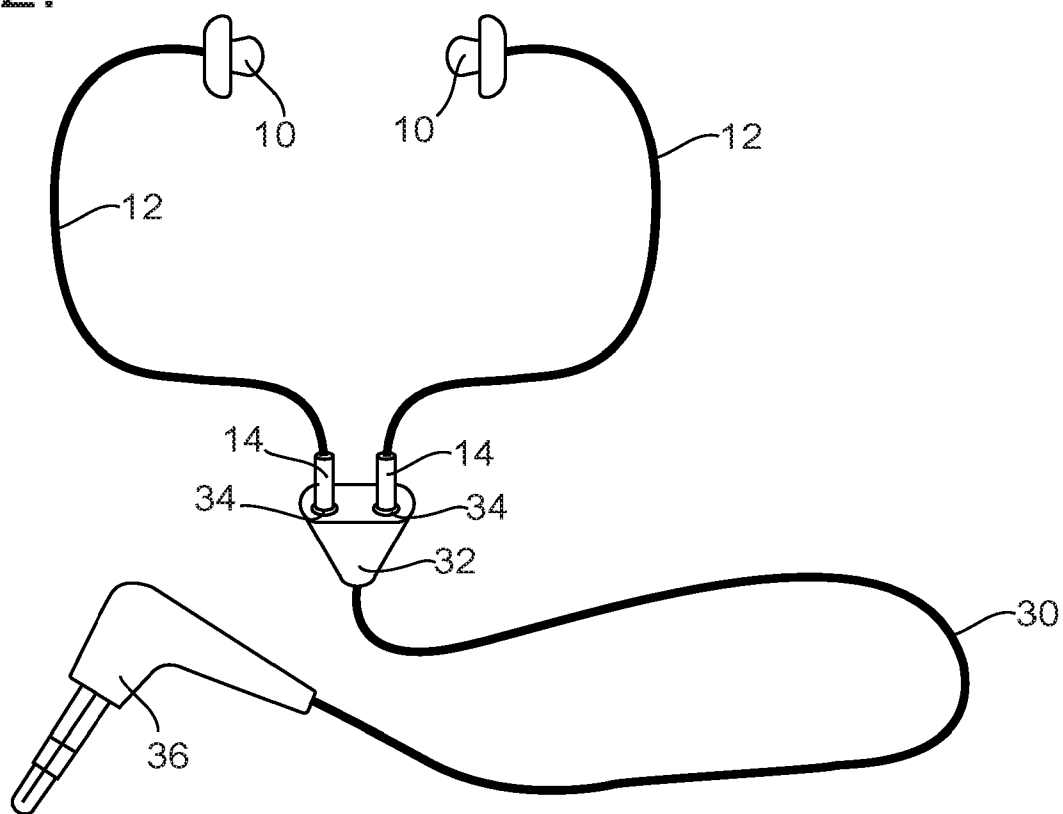


Fig.2.



An Audio Kit with Earphones or Headphones

The invention relates to earphones or headphones for listening to sound (such as music) from an electronic audio source, and provides an audio kit for this purpose.

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Conventionally, earphones are linked by wires to a jack, and the jack is a plug typically of 3.5 mm diameter, that can be plugged into a socket on an electronic audio source such as a mobile phone or a portable music player. The jack provides three electrical connections, and the wires that are connected to the earphones therefore usually consist of
10 a left signal wire, a right signal wire, and a common earth wire. A three-core wire therefore extends from the jack to a Y-junction, from which two 2-core wires extend to the earphones. It has been found that with this conventional arrangement there can be some cross-talk through the earth leads between the signals provided to the right ear and the signals provided to the left ear.

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Earphones or headphones are commonly used in combination with a portable battery-powered wireless device, for example a Bluetooth device, arranged to pick up audio signals from a separate electronic device such as a computer or a mobile phone. This enables a user to listen to an audio stream such as music recorded on the separate
20 electronic device, without the need for wires connecting the earphones or headphones to the separate electronic device. However, there is consequently a problem of how best to listen to the audio stream when the battery in the battery powered wireless device becomes flat and needs to be recharged.

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Accordingly, the present invention provides an audio kit consisting of:

- a pair of earphones or headphones, each connected by a two-core cable to a miniature two-electrode plug;
- a portable battery-powered wireless device that has two separate two-electrode output sockets, to which the miniature two-electrode plugs can be connected; and also
30 - a four-core input lead that connects a conventional jack to a Y-module with two separate two-electrode output sockets.

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Each two-electrode plug may for example be a micro-miniature coaxial plug of the sort referred to as an MMCX connector (i.e. complying with European CECC 22000 specification). Alternatively they may be a different design of coaxial push fit or screw fit

plug. An MMCX plug is of external diameter about 2.4 mm, whereas for example an MCX plug is of external diameter about 3.7 mm. In any event the two-electrode plug is less than 5 mm in external diameter.

5 Where the earphones or headphones are to be used in combination with the portable battery-powered wireless device that picks up the required audio signals from a base station, for example a portable battery-powered Bluetooth device that picks up audio signals from a computer, then the two miniature two-electrode plugs would be connected to the output sockets of the portable battery-powered wireless device.

10 So the user can plug his earphones or headphones into the portable wireless device to listen to music for example, and can listen while walking around or dancing as long as the wireless device is within reception range of the audio base station. However, if the battery of the portable wireless device becomes flat, the user can continue to listen to the music by
15 disconnecting the two-electrode plugs from the wireless device and connecting them to the two output sockets of the Y-module, and connecting the jack to the music source. The earphones or headphones are then connected by wires to the music source, so the user may not be able to move so freely, but nevertheless can continue to listen to the audio signals.

20 In each case this has the benefit that the electrical connection between the two earth leads from the two headphones or earphones is further away from the headphones or earphones: when the portable wireless device is in use, the earth connection (if there is one) is within the portable wireless device; when the Y-module is in use, the common earth
25 connection is at the jack. The increase in distance (and so increase in intervening cable resistance) has been found to reduce cross talk between the audio signals.

 The invention will now be further and more particularly described, by way of example only, and with reference to the accompanying drawings in which:

30 Figure 1 shows a pair of earphones and a wireless device of the invention; and
 Figure 2 shows the earphones of figure 1 along with a lead leading to a jack.

 It should be appreciated that the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the present invention. The present
35 invention provides an audio kit that includes three components: a pair of earphones 10; a

battery-powered portable wireless audio device 20; and a four-core lead 30. These three components are shown in the figures, which illustrate the two different ways in which the earphones 10 can be used.

5 Referring now to figure 1, each of the earphones 10 is connected by a two-core cable 12 which terminates in a micro-miniature coaxial plug (an MMCX plug) 14 represented schematically. In the arrangement of figure 1 the MMCX plugs 14 are plugged into corresponding MMCX sockets 16 of the wireless audio device 20, which is a Bluetooth device. The wireless audio device 20 can pick up an audio stream from an external
10 separate audio source 50 such as a mobile phone, a music storage device or a computer (represented schematically; this separate audio source 50 does not form part of the kit), transmitted using the Bluetooth system, and so the audio stream can be played through the earphones 10. This for example allows the user to listen to music tracks that are transmitted by the external audio device 50. The wireless audio device 20 is portable, for example fitting
15 into a breast pocket, so the user can move around freely as long as he remains within reception range from the external audio device 50. The wireless audio device 20 is battery-powered from an internal battery, and when the battery is flat the user would be expected to connect the device 20 to a charging unit to recharge the battery.

20 Within the wireless audio device 20 there may be a common earth connection to which one wire from each earphone 10 would be electrically connected, and if such a common earth connection is provided it is preferably next to the battery that powers the wireless audio device 20, to minimise cross talk. More preferably cross talk is avoided by using an electronic or integrated circuit that provides a balanced differential output to each of
25 the MMCX sockets 16 and so to each earphone 10 separately, so there is no common connection.

Referring now to figure 2, the kit also includes a 4-core lead 30. At one end the four-core lead 30 is connected to a Y-module 32 which includes two MMCX sockets 34. As
30 shown, the MMCX plugs 14 of the earphones 10 can be plugged into the MMCX sockets 34 of the Y-module 32. Each MMCX socket 34 has two terminals inside the Y-module 32 (not shown), and each of the four wires in the 4-core lead 30 is connected to a different one of these terminals. There is therefore no interconnection in the Y-module 32 between the wires from the left and right earphones 10. At the other end the 4-core lead 30 is connected to a

jack 36. This jack 36 provides three output contacts, and one wire from each of the sockets 34 is connected to a common or earth terminal within the jack 36.

5 In this case the electrical connection between the two earth leads from the two earphones 10 is as far as possible away from the earphones 10, so that cross talk is minimised. In a modification, the jack might instead provide four contacts, so the common earth connection (if there is one) is then in the device into which the jack is plugged.

10 Consequently if the battery is flat, or for another reason the user does not wish to use the wireless device 20, the user can continue to listen to the music by connecting the headphones 10 as shown in figure 2, and plugging the jack 36 into an output socket 52 of the external audio device 50. The earphones 10 are then connected by the cables 12 and the lead 30 to the external audio device 50, so the user cannot move around freely, but nevertheless can continue to listen to the music.

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Claims

1. An audio kit consisting of:

- a pair of earphones or headphones, each connected by a two-core cable to a miniature two-electrode plug;

- a portable battery-powered wireless device that has two separate two-electrode output sockets, to which the miniature two-electrode plugs can be connected; and also

- a four-core input lead that connects a conventional jack to a Y-module with two separate two-electrode output sockets.

2. A kit as claimed in claim 1 wherein each two-electrode plug is a micro-miniature coaxial (MMCX) plug.

3. A kit as claimed in claim 1 or claim 2 wherein each two-electrode plug is less than 5 mm in external diameter.



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Examiner: Peter Easterfield

Claims searched: 1 to 3

Date of search: 10 August 2017

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X,Y	1-3	CN 105872886 A (DENG SHUYUAN) see figs 8-11
X,Y	1-3	US 2007/025579 A1 (KOLTON) see figs 4 & 16
Y	1-3	CN 103533478 A (YIN WEIJIANG) see figs 1 & 2
Y	1-3	CN 102395075 A (XI AN JOYSSON TECHNOLOGY) see fig 1
Y	1-3	CN 204334900 U (CHE YONGLIANG) see fig 1
Y	1-3	CN 202475747 U (YE WANG) see fig 1
Y	1-3	KR 20110031258 A (KIM JU HYUN) see fig 1
Y	1-3	US 2010/215186 A1 (CHANG) see fig 1

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

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Worldwide search of patent documents classified in the following areas of the IPC

H04R

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
H04R	0001/10	01/01/2006