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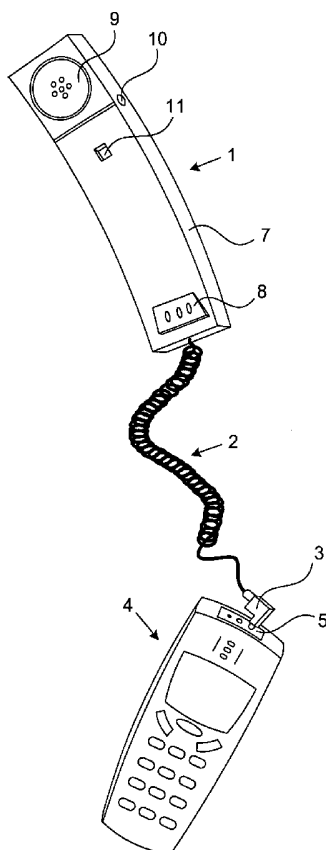
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(54) Title: DEVICE FOR FACILITATING VEHICULAR USE OF A MOBILE PHONE



(57) Abstract: The object of the invention is a device for facilitating the vehicular use of a mobile phone, which device comprises a handset part (1) that incorporates a microphone (8; 28) and a loudspeaker (9; 29) and which handset part (1; 21) incorporates a connecting device (2; 32) coupled to the handset part microphone (8; 28) and the loudspeaker (9; 29) for connecting the handset part to a mobile phone (4; 23). Characteristic to the device in accordance with the invention is that the connecting device (2; 23) is arranged to be connected directly to the external microphone and loudspeaker connector (5; 39) of a mobile phone (4; 23) and that the handset part (1; 21) incorporates a switching device (10; 34) to initiate and disconnect a call.



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DEVICE FOR FACILITATING VEHICULAR USE OF A MOBILE PHONE

The object of the invention is a device that facilitates vehicular use of a mobile phone, which device comprises a handset housing that includes a microphone and a loudspeaker, which handset housing includes a connecting device coupled to the microphone and the loudspeaker in the handset in order to connect the handset to a mobile phone.

At present there is a multitude of different hands-free devices, that is, so called HF-devices, intended to facilitate the vehicular use of mobile phones. Most commonly a HF-device comprises a button-earphone/earphones to be attached to the ear and a microphone to be attached in a suitable position on the neck or in front of the mouth, both attached to the HF-attachment jack of a mobile phone with a coupling cord. In some models there is also a separate phone holder that can be attached to the car to hold the mobile phone during driving. In such cases the earpiece- and microphone part coupling cord may be attached to the connector in the holder, and the phone holder includes a connector jack system that facilitates the connection between the microphone- and loudspeaker connector of the mobile phone and the holder, when the phone is placed in the phone holder. Furthermore, nowadays there are also such devices that facilitate the connection between the microphone- and loudspeaker housing and the phone holder in a wireless manner, e.g. with an LPRF-transmitter-receiver. The advantage of a wireless system is that the coupling cords between the mobile phone and the HF-device, which make the use of a HF-device inconvenient, can be eliminated. Presently known HF-devices are presented, for instance in Finnish patent specifications No. 107002 and No. 110296.

Since the beginning of 2003, talking on a mobile phone during driving a car is only allowed in Finland when using a HF-device that leaves the user hands free. In Europe HF-devices are mandatory during driving at least in Holland, Belgium, Austria, Latvia, Norway, Poland, Portugal, Rumania, Germany, Switzerland, Czech Republic, Hungary and Russia. In Estonia a HF-device is required in population centres, in Israel a fixed HF-device is mandatory and in Slovakia the use of a mobile phone during driving is altogether forbidden. The new regulation in Finland covers all engine-powered vehicles. In addition to cars, the use of a mobile phone without a HF-device while driving is also forbidden when operating a tractor, a work vehicle, motorcycle, moped or an all-terrain vehicle such as a snowmobile. The restriction of usage during driving applies to a whole telephone device, and the restriction to handle is not extended to a separate microphone and handset of a fixedly installed HF-device. The construction of an acceptable HF-device is not in

fact defined in any way, leaving it to the driver's discretion to choose whether to use the phone with an ear-attached speaker and a microphone attached in front of the mouth or to handle, for instance, a separate, so-called 'cold handset'.

5 The present HF-devices, while functional as they are, have often been regarded as uncomfortable and difficult to use. Especially the models fitted with an ear-attached speaker do not suit every user, and due to the unpleasantness of the earphone, people often do not want to use them. Wireless devices are, due to the lack of a coupling cord between the device and the mobile phone, more comfortable to use than cord-equipped devices. They still, however, employ the ear-attached speaker
10 that is regarded uncomfortable. In addition the wireless devices are clearly more expensive to acquire than cord-equipped devices.

The object of the present invention is to create a device to facilitate the vehicular use of a mobile phone by removing aforementioned shortcomings related to presently known HF-devices. In particular the purpose of the invention is to
15 introduce a device which facilitates the use of a mobile phone in vehicles, the use of which device does not require the use of an ear-attached earphone and which is simple in construction and reasonably priced. In addition the object of the present invention is to introduce a wireless device to facilitate the use of a mobile phone by removing the need for the coupling cords between the phone and the HF-device that
20 make the usage of a HF device inconvenient, and which is simple in construction, easy to use and reasonably priced.

The purpose of the invention is accomplished with a device the characteristics of which are presented in the claims.

Characteristic to the device in accordance with the invention is that the connection
25 device can be directly attached to the external microphone and loudspeaker connector of a mobile phone and that the handset housing includes a switching device to facilitate starting and finishing a phone call. Such a device equipped with a control switch that can be directly coupled to the external microphone and loudspeaker connector of a mobile phone, makes the answering a call in a vehicle
30 easier, so that the driver's attention to driving is significantly better preserved, when comparing to answering a mobile phone directly. In addition such a device conforms to the law concerning mobile phones issued in Finland in 2003 and is, thus, a legal HF-device. This being so, the persons not willing to or not being able to use a traditional HD-device equipped, for instance, with a button earphone, can
35 answer a mobile phone during driving by using a separate handset directly coupled

to the mobile phone such as presented herein. Furthermore, the switching device related to such a device can be built so that the call can be answered e.g. with a thumb-operated press-button when the device is lifted in hand. Thus answering a call does not undermine the attention of the driver, because the eyes can be kept in the road at all times and there is no need to pay attention to pressing a certain button on the phone, which is the case when answering a mobile phone directly.

In an advantageous application of the device in accordance with the invention the connecting device is a coupling cord attached to the microphone and loudspeaker in a handset housing, including a connection plug for removably attaching and fixing the coupling cord to the external microphone and speaker connector jack of a mobile phone. Most of the presently marketed mobile phones include an attachment socket for an external microphone and a speaker (headphones), thus making it possible to use a device equipped with such a connection device as a HF-device with most of the presently marketed mobile phones. In addition a coupling cord as a connection device is static-free and dependable. Furthermore, due to the coupling cord, no separate amplifier and power source are required in the handset housing, because the sound signal heard from the loudspeaker/earphones can be acquired directly from a mobile phone. Thus a device equipped with such a connecting device can be built extremely simple and thus cheap to manufacture and affordable to acquire.

In the second advantageous application of a device in accordance with the invention the connecting device is a wireless transmitter/receiver fitted in a handset housing, which device can be connected wirelessly with a mobile phone equipped with a wireless connection device. The benefit of such a connecting device is that due to the wireless transmitter/receiver in the handset housing, there is no connection cord between the handset housing and the mobile phone which makes the use of the device inconvenient. In addition, because the handset part of the device is directly connected with the internal wireless transmitter/receiver in the mobile phone, there is no need for a separate holder installed in the vehicle and/or a separate transmitter/receiver device to be attached to the phone when entering the vehicle. Furthermore, a benefit over presently known HF-devices is that a mobile phone may be kept almost in any suitable place during driving, provided that the distance between the mobile phone and the receiver handset does not exceed the range of the wireless connecting devices.

In the third advantageous application of the device in accordance with the invention the wireless connecting device is a Bluetooth-technology based wireless connection

device installed inside the handset housing. Bluetooth is a system co-operatively created by most well known computer- software- and mobile phone manufacturers for creating wireless local area networks (WLAN). The system operates on license-free 2,45GHz ISM (Industry Science Medical) frequency. The frequency is free
5 everywhere and its usage requires no separate permit. Because of this, a wireless device conforming to Bluetooth-system is in all respects very simple and affordable. It is also extremely user-friendly and very compatible with all mobile phones incorporating a so called Bluetooth-chip, Bluetooth-card or equivalent as pre-installed.

10 In the fourth advantageous application of the device in accordance with the invention the device includes a holder installed in an easy-to reach location, for hanging a receiver handset in the vehicle between calls. This assures that the handset is always as easily available as possible when the phone rings. This makes the use of the device more comfortable as well as diminishes the traffic risks related
15 to answering a phone during driving.

In the fifth advantageous application of the device in accordance with the invention the handset part is powered by a re-chargeable battery and the handset holder includes a re-charging connector to re-charge the handset battery when the handset is seated in the holder. If the connecting device is wireless, the handset requires its
20 own power source. To achieve this, a re-chargeable battery or, for example, replaceable battery/batteries can be used. When using a re-chargeable battery, the charger coupling in the handset holder facilitates the charging of the battery during driving, when the handset is not being used. Due to this, the battery charge is usually kept high enough so that no special attention needs to be paid to the
25 charging of the battery. In addition, due to a charging coupling incorporated in the handset holder, the handset or the battery within does not need to be removed from the vehicle in order to re-charge the battery elsewhere.

In the sixth advantageous application of the device in accordance with the invention the switching device is a magnetic switch that is arranged to facilitate the switching
30 of a call to the handset part when the handset is lifted off its holder. Due to such a switching device, no separate finger-operated switch is required in the handset housing that should be pressed, for instance, when answering a call. This further reduces the number of attention-diminishing operations required from the driver when answering a call. The magnetic switch may be a device that generates a
35 switching pulse, in which case the magnetic switch replaces the press-button that is

used to give the mobile phone a switching impulse when the handset is lifted off the holder.

Next the present invention will be explained in more detail with reference to the accompanying drawings in which:

- 5 Figure 1 is a schematic diagram showing an embodiment of the device in accordance with the present invention;
Figure 2 illustrates a holder forming a part of the device in accordance with Figure 1;
Figure 3 illustrates a handset part in accordance with Figure 1 attached to a holder;
10 Figure 4 illustrates a schematic diagram of a device in accordance with another invention;
Figure 5 illustrates a holder belonging to a device in accordance with Figure 4; and
Figure 6 illustrates a handset part in accordance with Figure 4 attached to a holder.

- Figures 1 – 3 illustrate the application in accordance with a device in accordance
15 with the invention, which device includes a handset housing 1, the coupling cord 2 between the handset housing and the mobile phone 4, complete with a connector end 3 to facilitate attaching the handset part with the HF-socket 5 in a mobile phone, and the holder 6 that can be attached to a vehicle in a desired location in such a manner that handset part 1 can be attached to the holder 6 within a hand's
20 reach so that it is easy to grab and answer the phone while operating a vehicle.

- Figures 1 and 2 illustrate the handset part 1, which comprises a housing frame 7 which resembles an in itself known phone receiver, inside of which is a microphone 8 at one end and a loudspeaker 9 at the other end. In addition, on the side of the housing frame, at receiver's end, there is a switching device 10, which facilitates
25 starting and ending a phone call. In this case, the switching device 10 is a push-button type micro-switch coupled with the microphone 8 in such a manner that it provides the mobile phone 4 with a pulse signal that connects the call into the handset microphone with a single click. When the push-button is pressed again during a call, the micro-switch ends the call. The frame of the handset housing 7 in
30 this case comprises a box-like structure formed from two shells attached to each other. Inside the frame, attaching elements have been formed from the frame material, which attaching elements can be used to fasten the microphone 8, the speaker 9, the switching device 10 and all other necessary parts within the frame. The frame of the handset housing also incorporates a recess 11, which enables the
35 attaching of the handset housing with the holder 6 that is a part of the device. Such a

handset housing can be manufactured in a conventional manner e.g. from suitable plastic material by injection molding.

In the device in accordance with Figures 1-3, the connection device is a coupling cord 2, which in Figure 1 is illustrated as a coiled cord that is attached to the microphone end of the handset housing, the coils of which facilitate the lengthening and the contraction of the cord the same way as the coiled cord of a conventional telephone. The handset housing 1 end of the cord is fastened with a strain reliever inside the frame of the handset part 7 which strain reliver attaches to the outer material of the cord and which is formed in the frame shells during the manufacturing process. In this application there are four wires in total inside the coupling cord, that is, one lead pair (+/- leads) for the microphone 8 and another lead pair for the loudspeaker 9. The switching device 10 is connected side by side with the microphone using separate wires, causing a press of the switching device push-button to create a switching pulse on the microphone line. The end of the coupling cord which is attached to a mobile phone includes an attachment jack 3, which facilitates the connection of the cord to the HF-device socket 5 in the mobile phone. The lead pair from the handset microphone 8 is attached to those attachment jack's 3 switching surfaces that connect to the mobile phone's 4 external microphone connector and the lead pair from the loudspeaker 9 are attached to those switching surfaces that connect to the mobile phone's external speaker/earphone connector.

In this case the attachment jack 3 is Nokia HDC-5, but in different applications the structure of the attachment jack and the number of switching surfaces in it and, thus, also the number of wires inside the coupling cord are dependant on the attachment socket of the mobile phone. The most common attachment jacks used in a device in accordance with the invention and fitting into Nokia mobile phones are the aforementioned HDC-5 and Pop-Port as well as, for example, HDC-9. Attachment jacks suitable for use with other mobile phones are, for instance, 2,5mm jack or HBP-10 used by Sony Ericsson. The aforementioned HDC-5 includes 4 wires, but for examole, Nokia Pop Port comprises 6, because there is a separate lead pair for the switching device in addition to the lead pairs for the microphone and the loudspeaker.

To facilitate the use of the device, it includes a holder 6, which is illustrated in Figure 2. To hang the handset part 1 onto the holder part there is a hook extension 12 in the holder, which enables attaching the handset part 1 by means of the recess 11 in the handset part as illustrated in Figure 3. The hook extension 12 is shaped in such a way that the handset part is easy to be removably attached, but is attached to

the holder part sufficiently tightly so that the handset does not fall during driving as a result from normal accelerations and jolts directed to a vehicle. The holder part may, depending on the shaping of the handset and holder, include in addition to the hook extension 12 or in place of it, other kinds of fastening extensions/recesses or
5 equivalents that enable fastening the handset part to the holder in an appropriate manner. In the application in accordance with Figure 2 the holder also includes cord fasteners 13 for the coupling cord between the handset part and the mobile phone. The purpose of the cord fasteners is to facilitate the handling of the coupling cord and prevent the tangling of the cords if, for example, there is a separate holder for a
10 mobile phone, which holder is attached in the vicinity of the holder part of the device.

When using a device in accordance with Figures 1 to 3, a holder part 6 which is a part of the device, is fastened at a suitable spot on the car instrument board, e.g. as described in Figure 3 in such a manner that the handset part 1 is easy to reach while
15 driving. When entering a vehicle, the coupling cord 2 of the handset is plugged into the mobile phone 4 HF-attachment jack 5 and the phone is placed in a convenient place for the duration of driving (e.g. in a pocket or holder in the car) in such a way, that the coupling cord of the handset is not stretched too far while talking on the phone of while the handset is attached to its holder. When the phone rings, the
20 handset is then lifted and the push-button of the switching device 10 is pressed, which connects the call from the phone to the handset. After the call, the push-button of the switching device is pressed again, which disconnects the call.

Figures 4 to 6 illustrate another application in accordance with the invention. It includes a handset part 21, which is wirelessly connected with the mobile phone 30.
25 In addition there is a holder 22 shown in Figure 5, equivalent by appearance and mechanical functions with the holder part presented in the application in Figures 1 to 3, which holder can be fastened in the vehicle to a desired place in such a manner that the handset part 21 can be attached to the holder 22 so that it is easy to reach. Because the handset part functions wirelessly, it requires its own power source. The
30 power source in this case is a re-chargeable battery 24 placed inside the handset part, which battery is re-charged when the handset part 21 is attached to the holder part 22. To achieve this, the holder part 22 includes a charging connector 25 and a power lead 26 that can be connected to the car cigarette lighter.

The handset part of the device application illustrated in Figure 4 comprises a
35 handset frame 27 equivalent to the application illustrated in Figures 1 to 3, which handset frame includes a microphone 28 at one end and a loudspeaker 29 at the

other end. A circuit board 30 has been attached inside the handset frame 21, which circuit board includes an integrated amplifier 31 to amplify the sound signals to be reproduced by the loudspeaker 29, a Bluetooth-chip 39 to facilitate wireless connection to, for example, a mobile phone equipped with a corresponding
5 Bluetooth-chip 39, a re-chargeable battery 24 acting as a power source, a charge controller 33, a switching device 34 located at the side and near the loudspeaker end of the handset to enable initiating and disconnecting calls, as well as a main power switch 35 that enables turning the power in the handset part on and off.

The amplifier 31 on the circuit board 30 is in itself known limited frequency
10 amplifier circuit, which amplifies the sound signal received via the Bluetooth connection in such a manner that the sound signal (speech) is audible from the loudspeaker 29. The switching device 34 is a push-button microswitch, coupled to the circuit board 30 in such a manner that it provides the mobile phone 23 with a pulse signal that connects the call to the handset part 21 when the push button is
15 pressed once. When the push-button is pressed a second time, the microswitch disconnects the call. The main power switch 35 is in itself known two-position switch that connects the battery 24 power to the circuit board 30 and other power-requiring devices. In this case, the battery is a re-chargeable battery pack comprising two 1,2 V NiCd re-chargeable batteries.

20 In the device application illustrated in Figures 4 to 6 the holder part 22 includes a charging connector 25 that attaches to the handset part in order to re-charge the battery 24. The charging connector comprises connecting surfaces 38a located in the hook extension 36 of the holder part 22 and the connecting surfaces 38b in the recess 37 within the handset housing. When the handset part is attached to the
25 holder 22 in a manner shown in Figure 6, the connecting surfaces 38a are in contact with the connecting surfaces 38b of the handset part, directing the holder part charging power to the handset part. The connecting surfaces 38b in the handset housing are connected via a charge controller 33, which is placed inside the handset housing, to a battery 24, enabling the charging of the battery when the handset is
30 attached to its holder and the holder power is switched on. The charge controller 33 is in itself known connection fitted on the circuit board 30, which charge controller facilitates voltage conversion to suit the requirements of re-charging the battery and keeps the battery from overloading. In this application the charging power and voltage required to the holder 22 comes from a car cigarette lighter. To facilitate
35 this, the holder includes an electric cord 26 and in itself known jack connector which fits a car cigarette lighter socket (not illustrated in Figures).

When using a device in accordance with Figures 4 to 6, a holder 22 which is a part of the device, is fastened at a convenient spot on the car instrument board e.g. as described in Figure 6 in such a manner that the handset part 21 is easy to reach while driving. When entering the vehicle the power to the handset part is switched
5 on with the main power switch 35. After this, the Bluetooth-connection of the mobile phone is activated, at which time there appears a message on the phone display reporting that a Bluetooth-device has been found and quering whether the user wishes to establish a connection to such device. By answering yes (by pressing the equivalent key on the phone for this answer), the mobile phone 23 and the
10 handset part 21 establish a Bluetooth-connection between each other. After this, an incoming call to the mobile phone can be picked up by the handset part by pressing the push-button on the switching device 34 included in the handset part. When the phone rings, an alerting sound (e.g. a beep) is audible from the handset loudspeaker. The handset is lifted and the switching device 34 push-button is pressed, which
15 connects the call to the handset. After the call, the push-button of the switching device is pressed again, which disconnects the call just as it would by pressing the button assigned to this function on the mobile phone.

Both applications of a device in accordance with the invention presented above also enable initiating a call without using the mobile phone keypad, provided that the
20 mobile phone is equipped with voice dialing. In this case the push-button of the switching device 10 or 34 is held down long enough so that the mobile phone switches into voice dialing mode. When the phone is in voice dialing mode, the name of the person that the user wants to call is uttered, at which time the mobile phone dials a call to that person. After finishing the conversation, the call is
25 disconnected in a normal manner by pressing the push-button on the switching device 10 or 34 for a second time. If the call continues when leaving the vehicle, in an application illustrated in Figures 1 to 3, the coupling cord of the handset part is disconnected from the connector socket of the mobile phone without pressing the push-button on the switching device, in which case the call is transferred to the
30 mobile phone's integrated microphone and loudspeaker. Accordingly, in the application in accordance with Figures 4 to 6, when leaving the vehicle, the equivalent keypad button on the phone is pressed (e.g. lift the receiver), which transfers the call from the handset back to the mobile phone. After the call is transferred, the call can be continued normally with the mobile phone.
35 Alternatively, the call transfer to the mobile phone may be facilitated by pressing the handset part push-button 34 for approximately 3 seconds, which disconnects the

Bluetooth-connection to the handset part and the call is transferred back to the mobile phone.

A device in accordance with the invention can be realized in many aspects in a different manner than what has been presented in the exemplary applications illustrated in Figures 1 to 6. The handset part that is a part of the device may vary in size and appearance if necessary. Instead of a handset part that is reminiscent of a traditional telephone receiver, for instance, a more modern shape of handset housing may be employed. In some applications the handset part may also incorporate a receiver support bracket at the loudspeaker end of the handset, e.g. placed behind the ear such as in eyeglasses, to facilitate speaking on the phone while driving in such a manner that also the other hand is free at least momentarily, e.g. in a car for the duration of changing gear. The switching device may, instead of a push-button switch, employ e.g. a magnetic switch that transfers the call to the handset part upon lifting the handset from the holder and disconnects the call upon placing the handset back in the holder. The coupling cord between the handset part and the mobile phone, which coupling cord is a part of the application in accordance with Figures 1 to 3, may, instead of a coiled cord, be a straight coupling cord, or the coupling cord may extract and contract by means of a spring-loaded reel placed inside the handset housing. In such case the coupling cord stays always tight enough and does not tangle and hinder the operator of the device. Furthermore, among other things, the way in which the coupling cord is connected to the handset part may vary. In an application also the handset part incorporates a connector socket, into which the coupling cord can be removably attached with a connector end, which is at the handset end. In this case there is no need to replace the handset and holder parts of the device in case of acquiring a new mobile phone that has different HF-connector sockets, but instead it is sufficient to get a new coupling cord that fits the HF-connector of the new phone.

The wireless connection device included in the application in accordance with Figures 4 to 6 may also be other wireless device than one based on Bluetooth-system. It is essential for the wireless connection device that the handset part is directly connected to the mobile phone, in which case there is an integrated transmitter-receiver in the mobile phone that directly communicates with the transmitter-receiver of the handset part. When using a wireless connection device complying to Bluetooth-system, a different Bluetooth-compliant device than a Bluetooth-chip integrated directly to the circuit board of the handset housing may be used. In some application, e.g. a Bluetooth-card fitted inside the handset housing

may be used. This, however, requires more room than a chip, which must be taken into consideration when designing the handset housing. Also, for instance, the controlling of the handset part functions and the devices used for that purpose may vary between different applications. In some application the handset part's

5 loudspeaker emits a sound signal when the connection between the mobile phone and the handset is established. Furthermore, some application may include various accessories placed in the handset part which add user comfort of the device, such as, e.g., volume control, an indicator light to denote the functioning of the connection between the handset and the mobile phone, or a display that transmits information

10 related to the calls and the handset part.

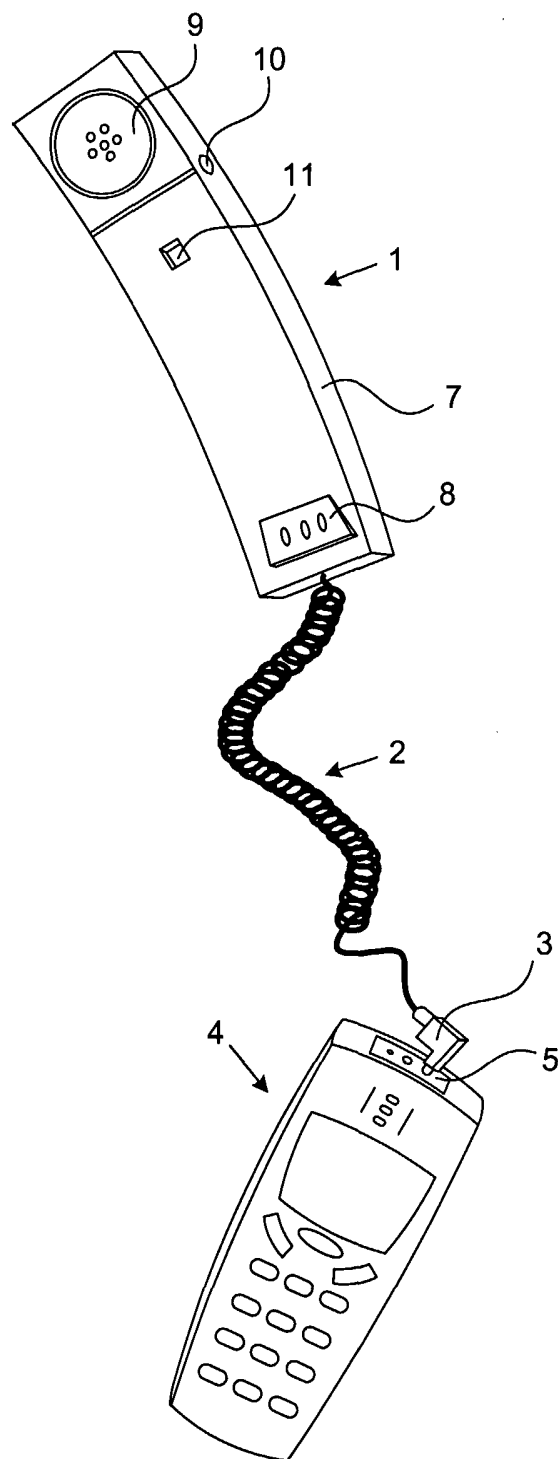
The invention is not limited to the advantageous applications presented above but it can vary within the frames of the idea of the invention formed in the claims.

CLAIMS

1. Device for facilitating vehicular use of a mobile phone, which device comprises a handset part (1) accommodating a microphone (8; 28) and a loudspeaker (9; 29),
5 which handset part housing (1; 21) incorporates a connecting device (2; 32) coupled to the handset part's microphone (8; 28) and the loudspeaker (9; 29) in order to connect the handset part with a mobile phone (4; 23) c h a r a c t e r i z e d in that the connecting device (2; 32) is arranged to be directly attached to the external microphone- and loudspeaker connector (5; 39) on the mobile phone (4; 23) and that the handset part (1; 21) incorporates a switching device (10; 34) to initiate and disconnect a call.
2. Device in accordance with claim 1, c h a r a c t e r i z e d in that the connecting device (2; 32) is a coupling cord (2) connected to the handset part (1),
15 microphone (8) and loudspeaker (9) and equipped with a connector end (3) to connect the coupling cord (2) removably to the external microphone and loudspeaker connector socket in a mobile phone (5).
3. Device in accordance with claim 1, which device incorporates a power source (24) placed in the handset part (21) and an amplifier (31) to amplify the sound signal produced by a microphone (28) and reproduced by a loudspeaker (29),
20 c h a r a c t e r i z e d in that the connecting device (2; 32) is a wireless connecting device (32) placed in the handset part (21) and can be wirelessly connected to a mobile phone (23) equipped with a wireless connection device (39).
- 25 4. Device in accordance with claim 3, c h a r a c t e r i z e d in that the wireless connecting device (32) is a Bluetooth-system based wireless connecting device installed in the handset housing.
- 30 5. Device in accordance with any of claims 1 – 4, c h a r a c t e r i z e d in that the device incorporates a holder part (6; 22) to hang the handset part (1; 21) in a vehicle within easy reach for the duration of time between calls.
- 35 6. Device in accordance with claim 5, c h a r a c t e r i z e d in that the handset part (21) power source (24) is a re-chargeable battery and that the holder part (22) incorporates a re-charging connector (25) to facilitate the re-charging of the battery (24) in the handset part (21) while the handset part is attached to the holder part.

7. Device in accordance with any of claims 1 – 6, c h a r a c t e r i z e d in that the switching device (10; 34) is a magnetic switch that is arranged to connect a call to the handset part (1; 21) when the handset part (1; 21) is lifted off the holder
5 part (6; 22).

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*Fig. 1*

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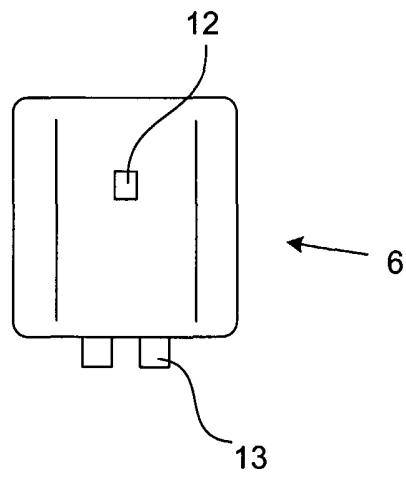


Fig. 2

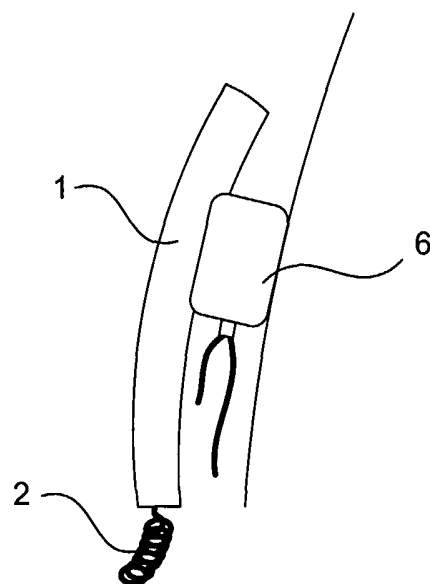
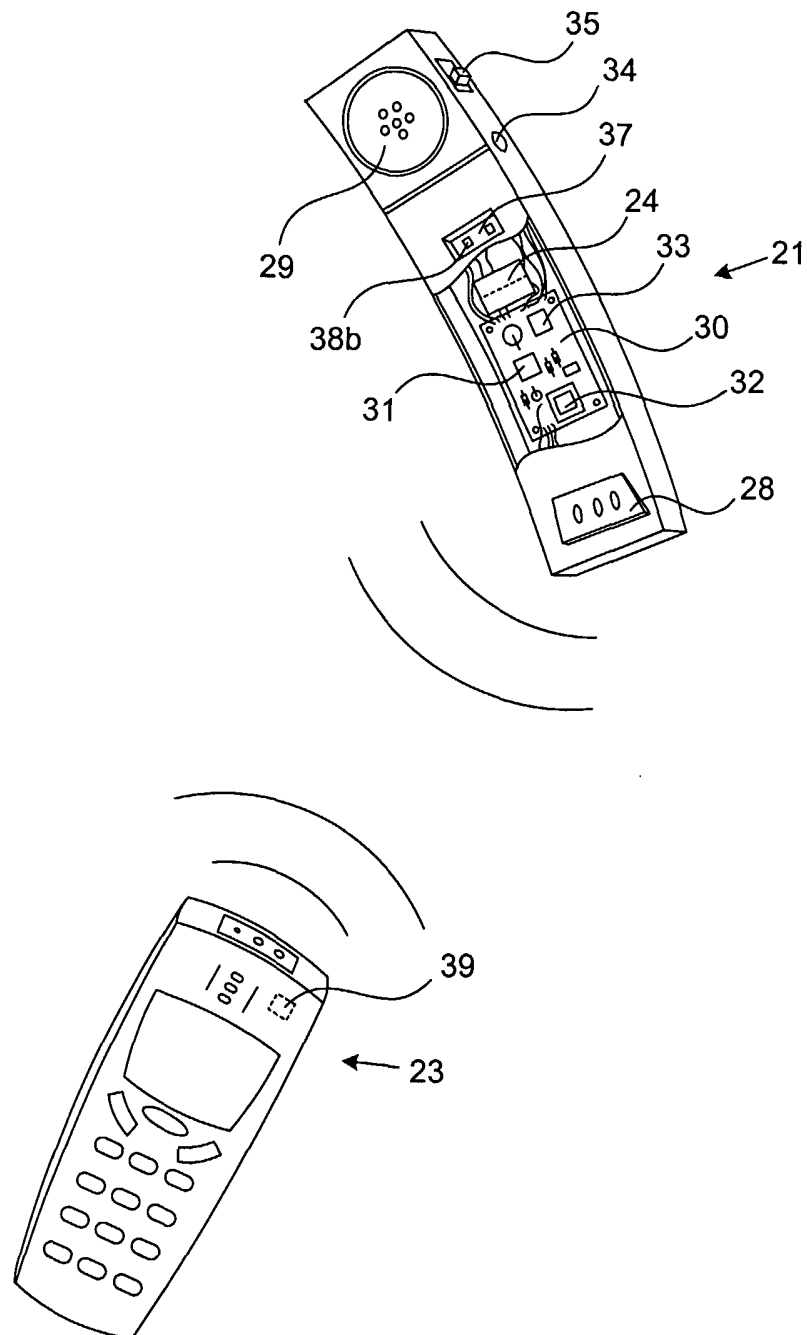


Fig. 3



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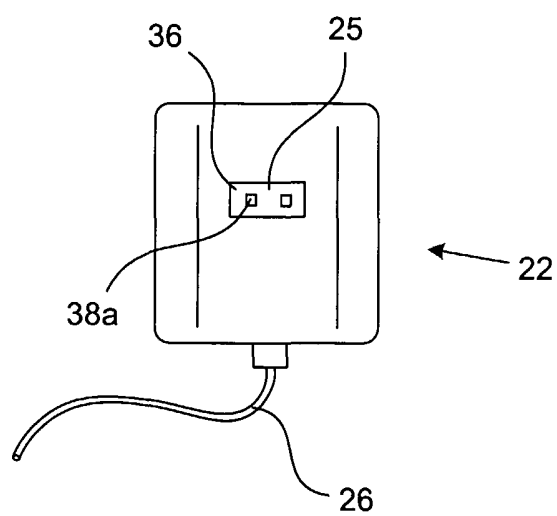


Fig. 5

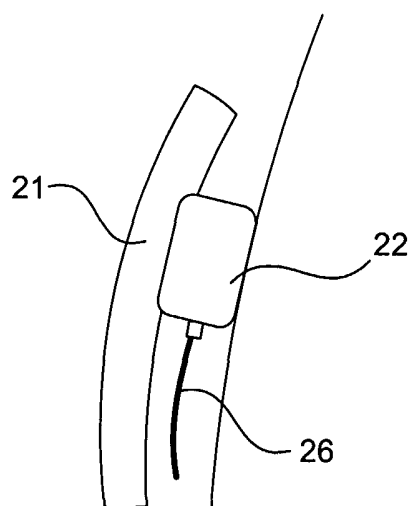


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 2004/000259

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04M 1/00

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)

IPC7: H04B, H04M, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 4208290 A1 (AEG MOBILE COMMUNICATION GMBH), 23 Sept 1993 (23.09.1993), whole document	1,3
Y	--	2,4-7
Y	GB 2336966 A (DAVID TOOTH), 3 November 1999 (03.11.1999), page 1, line 33 - page 4, line 33, figures 1-3, abstract	2
Y	US 5504812 A (L.A.VANGARDE), 2 April 1996 (02.04.1996), column 1, line 53 - column 3, line 9, figures 1-6, abstract	2

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
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"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

18 August 2004

Date of mailing of the international search report

20-08-2004

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 2004/000259

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 0065803 A1 (DELALAT,HAMID), 2 November 2000 (02.11.2000), page 5, line 20 - page 10, line 22, figures 1-4, abstract --	4
Y	US 4747136 A (R.KIESWETTER), 24 May 1988 (24.05.1988), column 1, line 63 - column 2, line 37, figures 1-4, abstract --	5-7
Y	US 5943627 A (S.KIM ET AL), 24 August 1999 (24.08.1999), column 7, line 48 - line 61, figures 1-16, abstract -- -----	6

INTERNATIONAL SEARCH REPORT

Information on patent family members

03/07/2004

International application No.

PCT/FI 2004/000259

DE	4208290	A1	23/09/1993	NONE		
GB	2336966	A	03/11/1999	GB	9808887 D	00/00/0000
US	5504812	A	02/04/1996	AU	702461 B	25/02/1999
				AU	3307895 A	26/04/1996
				BR	9504373 A	08/04/1997
				CA	2159676 A,C	12/04/1996
				CN	1089975 B	28/08/2002
				CN	1129877 A	28/08/1996
				FR	2725580 A,B	12/04/1996
				GB	2294177 A,B	17/04/1996
				GB	9520331 D	00/00/0000
				JP	8214050 A	20/08/1996
				KR	149949 B	15/05/1999
				SG	33542 A	18/10/1996
				TW	399384 B	00/00/0000
WO	0065803	A1	02/11/2000	AU	4635500 A	10/11/2000
				EP	1115816 A	18/07/2001
				SE	9901520 D	00/00/0000
				SE	9904102 A	27/10/2000
				US	6432890 B	13/08/2002
US	4747136	A	24/05/1988	DE	3584611 A	12/12/1991
				DE	8435049 U	22/05/1986
				DK	550985 A	30/05/1986
				EP	0183268 A,B	04/06/1986
				FI	80178 B,C	29/12/1989
				FI	854713 A	30/05/1986
				NO	164749 B,C	30/07/1990
				NO	854707 A	30/05/1986
				ZA	8509108 A	30/07/1986
US	5943627	A	24/08/1999	CN	1176569 A	18/03/1998
				DE	19706335 A	02/04/1998
				GB	2317301 A,B	18/03/1998
				GB	9703480 D	00/00/0000
				JP	2918510 B	12/07/1999
				JP	10107881 A	24/04/1998
				KR	212686 B	02/08/1999
				KR	153636 Y	02/08/1999
				KR	198356 B	15/06/1999