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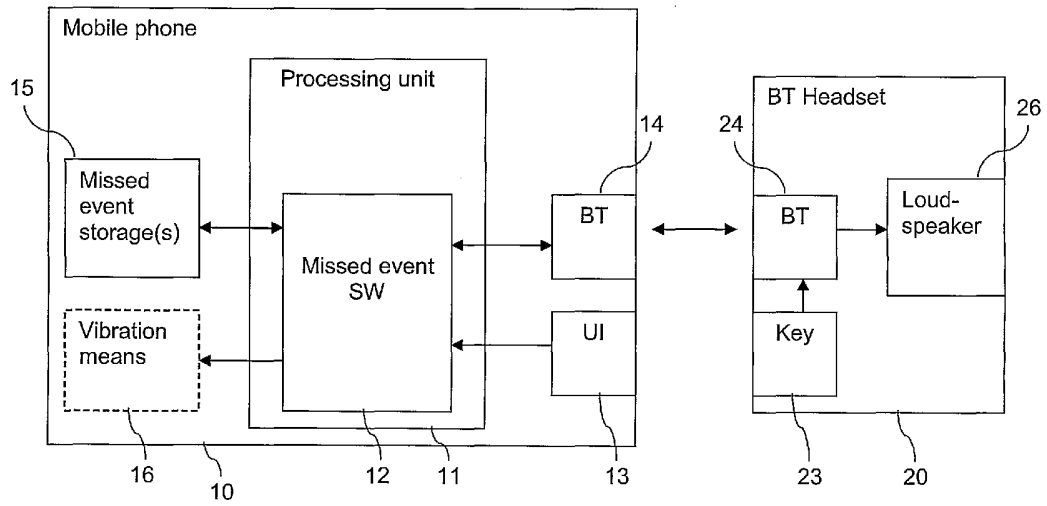
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(54) **Title:** ARRANGEMENT INCLUDING A MOBILE COMMUNICATION DEVICE



(57) **Abstract:** The invention relates to an arrangement including a mobile communication device 10, 30. The arrangement comprises a key 24, 34 for enabling a user to request exclusively a notification, notification means 16, 26, 36 and processing means 11, 12, 31, 32. The processing means 11, 12, 31, 32 are adapted to detect whether the key 24, 34 is pressed, adapted to check a status of the mobile communication device 10, 30 and adapted to cause a notification of a user via the notification means 16, 26, 36 in case the key 24, 34 is detected to be pressed depending on the checked status. The invention relates equally to a corresponding mobile communication device, to a corresponding accessory device, to a corresponding software program product and to a corresponding method.

WO 2006/085171 A1

Arrangement including a mobile communication device

FIELD OF THE INVENTION

The invention relates to an arrangement including a mobile communication device, to a mobile communication device and to an accessory device for a mobile communication device. The invention relates equally to a method and to a software program product for a mobile communication device.

BACKGROUND OF THE INVENTION

An arrangement including a mobile communication device may consist simply of this mobile communication device. Alternatively, the arrangement can comprise further components, in particular accessory devices for the mobile communication device. In case the mobile communication device is a mobile phone, for example, the arrangement could include in addition a headset as an accessory device.

A user might keep a mobile communication device in a pocket or at another place where it is not visible to the user. In such cases, the user might wish to be able to obtain information about the mobile communication device without having to retrieve it from its place.

For example, a user might employ a Bluetooth™ headset for a convenient use of a mobile phone. In this case, it may

be considered to be annoying by the user, if the phone has to be retrieved from a pocket, just in order to check whether any calls or messages have been missed. In some cases, a mobile communication device used with an accessory device may even be located in a different room than the user, which makes a direct access to the device particularly troublesome.

Some users might further prefer not to present their mobile communication devices in public places, even if the device is considered to be indispensable and has thus to be carried along. In Japan, for instance, such a trend can be observed. In these cases, users carrying for instance their mobile phone in a pocket of their trousers will want to be able to obtain information about missed events, such as missed calls, unread messages, a low battery level, etc., without having to take the phone out of their pockets.

In yet another example, a user may have misplaced a mobile communication device. In this case, the user might wish to obtain support in finding the mobile communication device.

SUMMARY OF THE INVENTION

It is an object of the invention to enable a user of a mobile communication device to initiate in an easy way a notification.

An arrangement including a mobile communication device is proposed. The arrangement comprises a key for enabling a user to request exclusively a notification. The

arrangement further comprises notification means. The arrangement further comprises processing means which are adapted to detect whether the key is pressed, adapted to check a status of the mobile communication device and adapted to cause a notification of a user via the notification means in case the key is detected to be pressed depending on the checked status. Requesting exclusively a notification means that the notification does not simply accompany or confirm another function that is activated by pressing a key. Rather, the notification is requested for its own sake.

Moreover, a mobile communication device is proposed, which comprises processing means. The processing means are adapted to detect whether a key for enabling a user to request exclusively a notification is pressed. The processing means are further adapted to check a status of the mobile communication device. The processing means are further adapted to cause a notification of a user in case this key is detected to be pressed depending on the checked status. It has to be noted that the key may but does not have to be a part of the mobile communication device itself.

Moreover, an accessory device for a mobile communication device is proposed, which comprises a key for enabling a user to request exclusively a notification from the mobile communication device, which depends on a current status of the mobile communication device. The proposed accessory device further comprises transmission means arranged for signaling to the mobile communication device an indication of an activation of the key.

Finally, a software program product is proposed, in which a software code for causing a notification of a user of a mobile communication device is stored. When running in a processing unit of a mobile communication device, the software code detects whether a key for enabling a user to request exclusively a notification is pressed. Further, the software code checks a status of the mobile communication device. Further, the software code causes a notification of a user in case the key is detected to be pressed depending on the checked status.

It is to be understood that the invention is equally realized with a method for causing a notification of a user of a mobile communication device, comprising the steps of detecting whether a key for enabling a user to request exclusively a notification is pressed, checking a status of the mobile communication device and causing a notification of a user in case the key is detected to be pressed depending on the checked status. The invention is equally realized with a pure software code which is adapted to perform these steps.

The invention proceeds from the consideration that a notification function could be associated to a particular key of an arrangement comprising a mobile communication device. A user may then request some kind of notification about a status of the mobile communication device simply by pressing this key. Whether a notification is actually caused and/or the kind of the caused notification depends on the current status of the mobile communication device.

It is an advantage of the invention that an easy and discrete notification request is enabled, as the user has

to press only a single key for the request. The request can even be input in a simple manner when the display of the mobile communication device is not visible to the user.

The notification means may comprise, for example, vibration means of the mobile communication device for providing a vibration alert and/or a loudspeaker for providing a sound signal. It is to be understood that a loudspeaker includes, for instance, an earpiece of a headset. A notification can be realized in a particularly discrete manner by a vibration alert and by a sound signal output via an earpiece of a headset. A sound signal output for a notification may be a speech signal or another kind of sound signal.

The checked status of the mobile communication device can be for instance, though not exclusively, the existence or non-existence of at least one type of missed event. The expression "missed event" refers in particular to events that have been missed but not been checked so far by the user.

A missed event can be, for example, one or more missed calls, one or more missed messages, like short message service (SMS) messages or multimedia message service (MMS) messages, one or more missed time alerts, one or more missed calendar notes, and/or an information about a low battery status, etc.

The status of the mobile communication device may also be the current time of the mobile communication device, and

the notification could be used for signaling this time in some way.

A user interface can be provided for enabling a user to select at least one type of status that has to be checked by the processing means before causing a notification.

The processing means can be adapted to cause different types of notifications for different statuses. This enables particularly detailed information of a user upon pressing a single key. For instance, different vibration signals may be used for differentiating between different missed events and/or between different numbers of missed events. A speech output could even inform explicitly about the exact missed event or events or about another type of status of the mobile communication device.

The key can be a dedicated key provided only for the purpose of the proposed notification, or a key which is usually employed for another function. In the latter case, the notification function may be selected by a user or be assigned to the key automatically upon entry of a specific condition. A user may be enabled to enable and disable an automatic change of function which is associated to the key via a user interface. A user may also be enabled to assign the notification function to one of several available keys and/or to select one of several available keys, which is to be used for an automatic assignment of a notification function.

For the case the key is not a dedicated key, the mobile communication device may comprises for example a light sensor. The processing means may then be adapted to cause

a notification of a user in case the key is detected to be pressed only in case the light sensor detects a light intensity falling below a predetermined threshold value. This is the case, when the user has put the phone into his or her pocket. The normal function associated to the key is disabled. Once the phone is no longer in darkness, the normal function is assigned again to the key. With this embodiment of the invention, it is not required to add a dedicated key for causing a notification. This is of advantage from a perspective of product costs, product size and product simplicity.

Advantageously, such a multi-function key is a key which implies no risk of extra billing for the end user when being pressed once or more while the regular function is associated to this key. Such a key could be for example the power-on button of the mobile communication device.

The proposed arrangement may comprise only the mobile communication device, or in addition an accessory device for the mobile communication device. The accessory device can be any device which is able to exchange signals with the mobile communication device, for instance a Bluetooth™ enabled device. The accessory device can be in particular a mobile device itself. It can be for example a headset for the mobile communication device.

In case the arrangement comprises an accessory device, the accessory device may comprise the key, while the mobile communication device comprises the processing means. The notification means can be part of the accessory device and/or part of the mobile communication device. Such an arrangement enables a remote request for

a notification. It provides users with means for being informed about the status of the mobile communication device without having to fetch the mobile communication device from some storing place. It may even be used for locating the mobile communication device using the accessory device. For instance, in case it is provided that pressing the key results in a notification which includes a vibration of the mobile communication device, a locating of the mobile communication device is facilitated.

In case the arrangement comprises only the mobile communication device and the key is thus a part of the mobile communication device, users may have a mobile communication device in the pocket of their trousers, and they may receive a notification without having to take the mobile communication device out of their pocket simply by pressing the key.

The invention can be implemented in hardware and/or in software. If a speech feedback is desired for the notification, a corresponding speech engine software may be employed.

BRIEF DESCRIPTION OF THE FIGURES

Other objects and features of the present invention will become apparent from the following detailed description considered in conjunction with the accompanying drawings.

Fig. 1 is a schematic block diagram of a first embodiment of an assembly according to the invention;

Fig. 2 is a flow chart illustrating an operation in the assembly of Figure 1;

Fig. 3 is a schematic block diagram of a second embodiment of an assembly according to the invention; and

Fig. 4 is a flow chart illustrating an operation in the assembly of Figure 3.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 is a schematic block diagram of a first embodiment of an assembly according to the invention, which enables a user to detect missed events.

The assembly comprises a mobile phone 10 and a headset 20 as an accessory device for the mobile phone 10.

The mobile phone 10 comprises a processing unit 11, which is able to run various software components, including an installed missed-event software 12. The processing unit 11 is connected within the mobile phone 10 to a user interface (UI) 13, to a Bluetooth™ transceiver 14, to at least one storage component 15 storing information about missed events, and optionally to vibration means 16. The mobile phone 10 further comprises other components of a conventional Bluetooth™ enabled mobile phone not shown in Figure 1.

The headset 20 comprises a Bluetooth™ transceiver 24 and, connected to the Bluetooth™ transceiver 24, loudspeakers 26 and a dedicated event indicator key 23. The headset 20 further comprises other components of a conventional Bluetooth™ enabled headset not shown in Figure 1.

In general, the mobile phone 10 and the headset 20 operate and interact in a conventional manner via the Bluetooth™ interface.

A particular operation of the assembly in accordance with the invention will now be explained in more detail with reference to Figure 2. Figure 2 is a flow chart which presents on the left hand side operations in the headset 20 and on the right hand side operations in the mobile phone 10.

In the mobile phone 10, a variety of events may occur, like incoming calls, incoming messages and generated alerts. These events may be missed by a user of the mobile phone 10, for example because of a noisy environment. Information about a missed event is stored in some storage component 15 by the respective processing component that is responsible for handling the event. For example, a missed calendar alert is caused to be stored by a calendar software, while a missed call is caused to be stored by a call software.

While using the headset 20, the user might want to be informed about such missed events without fetching the mobile phone itself for looking at a visual user interface indicating the missed event, for example a display or blinking light emitting diodes.

The user may press to this end the event indicator key 23 of the headset 20.

Whenever the event indicator key 23 is pressed (step 221), the headset 20 automatically transmits a key signal indicating this action via the Bluetooth™ transceiver 24 to the mobile phone 10 (step 222).

The mobile phone 10 receives the key signal via its own Bluetooth™ transceiver 14, and the missed-event software 12 detects the key signal (step 211).

The missed-event software 12 checks thereupon whether any missed events are stored in the at least one storage component 15 (step 212).

In case no missed events are currently stored, the missed-event software 12 continues waiting for further key signals (step 211).

In case at least one missed event is stored, the missed-event software 12 generates a speech signal that is suited to announce the type of the missed event or events (step 213). It may indicate, for example, "two messages missed" or "one call missed". Further information may be included in the speech signal as well, for example the time at which the missed event occurred.

The missed-event software 12 then causes a transmission of the speech signal via the Bluetooth™ transceiver 14 to the headset 20 (step 214).

The headset receives the speech signal via the Bluetooth™ transceiver and provides it for a presentation to the user to the loudspeakers 26 (step 203).

Thus, the user is informed in a very comfortable manner about missed events upon his own request.

Alternatively or in addition, the missed-event software 12 could also cause a vibration alert via the vibration means 16 (step 215), in case any missed events are detected at step 213. It might also be up to the user to specify beforehand via the user interface 13 whether a speech notification and/or a notification by a vibration alert are to be used.

As a further option, a user might be enabled to assign via the user interface 13 another function to the event indicator key 23. For example, instead of a function notifying about missed events, a "locating" function might be assigned to the event indicator key 23. In this case, a vibration alert is caused by the software 12 whenever the user presses the key event indicator 23. Such a locating function is suited to facilitate the search for a misplaced mobile phone 10.

Figure 3 is a schematic block diagram of a second embodiment of an assembly according to the invention, which enables a user to detect missed events.

In this case, the assembly includes only a mobile phone 30.

The mobile phone 30 comprises a processing unit 31, which is able to run various software components, including an installed missed-event software 32. The processing unit 31 is connected within the mobile phone 30 to a user interface (UI) 33, to a light sensor 37, to at least one

storage component 35 storing information about missed events, and to vibration means 36. The user interface 33 comprises for example a display, a loudspeaker, a microphone and a regular keypad, including a power-on button 34. Only the power-on button 34 is shown explicitly in Figure 3. The mobile phone 30 further comprises other components of a conventional mobile phone not shown in Figure 3.

In general, the mobile phone 30 operates in a conventional manner.

A particular operation of the mobile phone 30 in accordance with the invention will now be explained in more detail with reference to the flow chart of Figure 4.

Also in the mobile phone 30, a variety of events may occur, which may be missed by a user of the mobile phone 30. Information about a missed event is stored again in some storage component 35 by the respective component handling the missed event.

A user of the mobile phone 30 might keep the mobile phone 30 in a pocket. He or she might want to be informed about missed events, without fetching the mobile phone 30 from the pocket. To this end, the user activates in a preparatory step a "missed-event" functionality of the mobile phone 30 via the user interface 33 (step 430). The missed-event functionality is then realized by the missed-event software 32 in co-operation with the power-on button 34. In a modification of the embodiment, the user is able to select the key that is to support the missed-event functionality. In this case, it can be the

power-on button 34 or some other available key of the user interface 33.

In case of an activated missed event functionality, the light sensor 37 of the mobile phone 30 determines the intensity of the light surrounding the mobile phone 30 (step 431).

As long as the determined light intensity stays above a predetermined threshold value, the regular power-on and power-off function remains assigned to the power-on button 34 (step 433). In case the determined light intensity falls below a predetermined threshold value, however, for instance because the mobile phone 30 is put into a pocket, a new function is assigned to the power-on button 34. Instead of the power-on and power-off function, an event-indicator function is associated to the button 34, making it an event indicator key 34 (step 432). The threshold value may be selectable by the user via the user interface 33.

Whenever the user desires to be informed about the status of the mobile phone 30, he or she may now simply press the event indicator key 34, without having to remove the mobile phone 30 from the pocket.

If the event indicator key 34 is not detected to be pressed for a while (step 434), the missed-event software 32 continues monitoring the light intensity detected by the light sensor 37 (step 431).

If the event indicator key 34 is detected to be pressed (step 434), the missed-event software 32 checks whether

any missed events are stored in the at least one storage component 35 (step 435).

In case currently no missed events are stored, the missed-event software 32 continues monitoring the light intensity detected by the light sensor 37 (step 431).

In case at least one missed event is stored, the missed-event software 32 causes the vibration means 36 to output a vibration alert. The type of the vibration alert is selected depending on the type of the missed event. (step 436) Thus, the user may know even which kind of event has been missed from the kind of the provided vibration alert.

In case the determined light intensity is detected at some stage to rise again above the predetermined threshold value (step 431), for instance because the mobile phone 30 is retrieved from a pocket, the power-on and power-off function is assigned again to the power-on button 34 (step 433).

Thus, the user is enabled to check missed events in a very discrete manner.

It is to be noted that the described embodiments constitute only some of a variety of possible embodiments of the invention.

Claims

1. Arrangement including a mobile communication device (10;30), said arrangement comprising:
   - a key (24;34) for enabling a user to request exclusively a notification;
   - notification means (16,26;36); and
   - processing means (11,12;31,32) adapted to detect whether said key (24;34) is pressed, adapted to check a status of said mobile communication device (10;30) and adapted to cause a notification of a user via said notification means (16,26;36) in case said key (24;34) is detected to be pressed depending on said checked status.

2. Arrangement according to claim 1, wherein said notification means (16,26;36) comprise at least one of vibration means (16;36) as a part of said mobile communication device (10;30) for providing a vibration alert and a loudspeaker (26) for providing a sound signal.

3. Arrangement according to claim 1, wherein said status depends on an existence of at least one type of missed event, and wherein said processing means (11,12;31,32) are adapted to cause a notification only in case of a missed event.

4. Arrangement according to claim 3, wherein said missed events comprise at least one of

- one or more missed calls;
- one or more missed messages;
- one or more missed time alerts;
- one or more missed calendar entries; and
- an information about a low battery status.

5. Arrangement according to claim 1, further comprising a user interface (13;33) enabling a user to select at least one type of status that is to be checked by said processing means (11,12;31,32).

6. Arrangement according to claim 1, wherein said processing means (11,12;31,32) are adapted to cause different types of notifications for different statuses.

7. Arrangement according to claim 1, wherein said key (24;34) is a dedicated key (24) for enabling a user to request exclusively a notification.

8. Arrangement according to claim 1, wherein said arrangement comprises in addition an accessory device (20) for said mobile communication device (10), wherein said accessory device (20) comprises at least said key (24) and wherein said mobile communication device (10) comprises at least said processing means (11,12;31,32).

9. Arrangement according to claim 8, wherein said accessory device (20) is a headset.

10. Arrangement according to claim 1, wherein said function of enabling a user to request exclusively a

notification is associated to said key (34) only in case of a predetermined condition, and wherein said processing means (31,32) are adapted to cause a notification of a user in case said key (34) is detected to be pressed only in case said predetermined condition is given.

11. Arrangement according to claim 10, wherein said function of enabling a user to request exclusively a notification is automatically associated to said key (34) in case of said predetermined condition, said arrangement further comprising a user interface (33) enabling a user to enable and disable an automatic association of said function to said key (34).

12. Arrangement according to claim 10, further comprising a user interface (33) enabling a user to select one of several keys (34) of said arrangement to which said function of enabling a user to request exclusively a notification is to be associated.

13. Arrangement according to claim 10, wherein said mobile communication device (30) comprises a light sensor (37) and wherein said predetermined condition is given in case said light sensor (37) detects a light intensity falling below a predetermined threshold value.

14. Arrangement according to claim 13, wherein said key (34) is a power-on button of said mobile communication device (30).

15. Arrangement according to claim 1, wherein said arrangement is a mobile communication device (30).

16. Mobile communication device (10;30) comprising processing means (11,12;31,32) adapted to detect whether a key (24;34) for enabling a user to request exclusively a notification is pressed, adapted to check a status of said mobile communication device (10;30) and adapted to cause a notification of a user in case said key (24;34) is detected to be pressed depending on said checked status.

17. Accessory device (20) for a mobile communication device (10) comprising:
    - a key (24) for enabling a user to request exclusively a notification from a mobile communication device (10) depending on a current status of said mobile communication device; and
    - transmission means (24) arranged for signaling to said mobile communication device (10) an indication of an activation of said key (24).

18. A software program product in which a software code for causing exclusively a notification of a user of a mobile communication device (10;30) is stored, which software code realizes the following steps when running in a processing unit (11;31) of a mobile communication device (10;30):
    - detecting (211;434) whether a key (24;34) for enabling a user to request exclusively a notification is pressed;
    - checking (212;435) a status of said mobile communication device (10;30); and

- causing (213,214;436) a notification of a user in case said key (24;34) is detected to be pressed depending on said checked status.

19. A method for causing exclusively a notification of a user of a mobile communication device (10;30), said method comprising:
    - detecting (211;434) whether a key (24;34) for enabling a user to request exclusively a notification is pressed;
    - checking (212;435) a status of said mobile communication device (10;30); and
    - causing (213,214;436) a notification of a user in case said key (24;34) is detected to be pressed depending on said checked status.

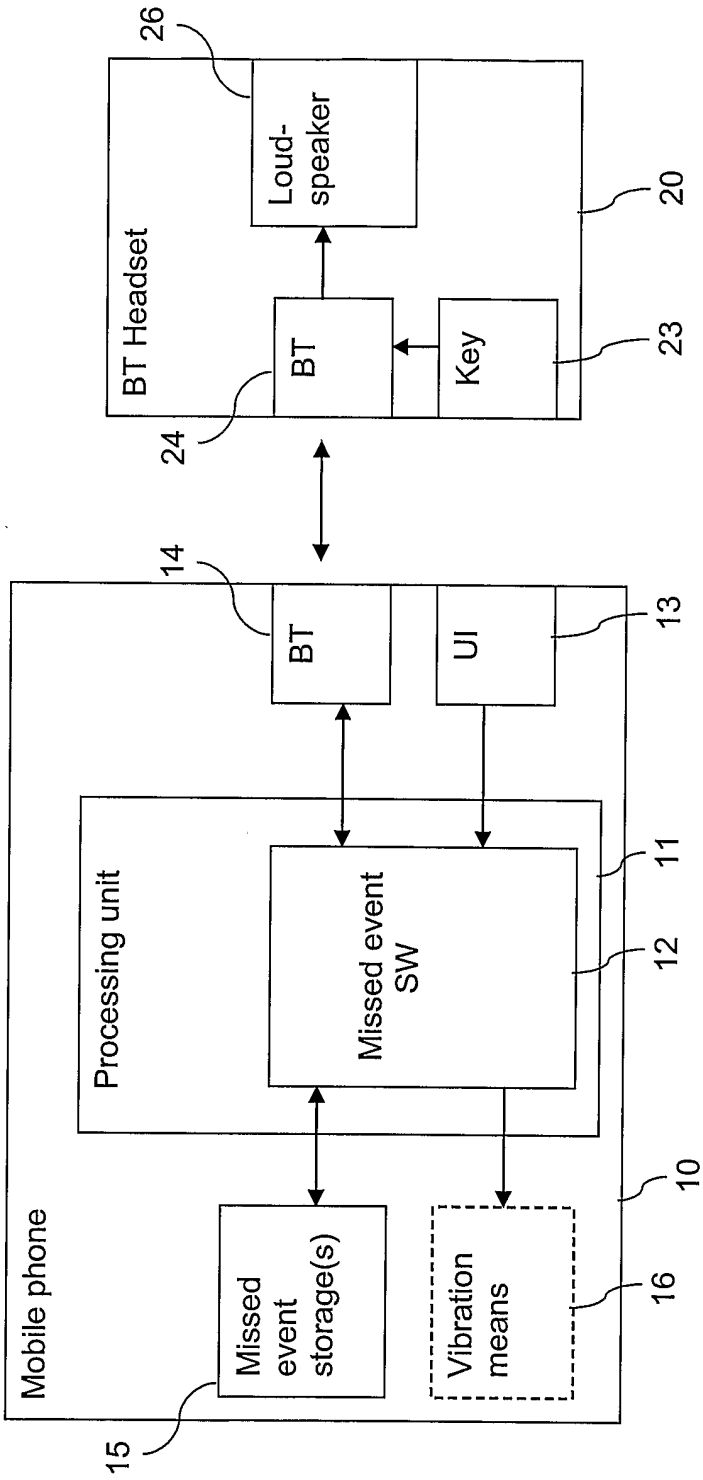

26
Loud-speaker
BT Headset
20
BT
Key
23
24
14
BT
UI
13
Processing unit
11
Missed event SW
12
10
Mobile phone
Missed event storage(s)
Vibration means
16
15

Fig. 1

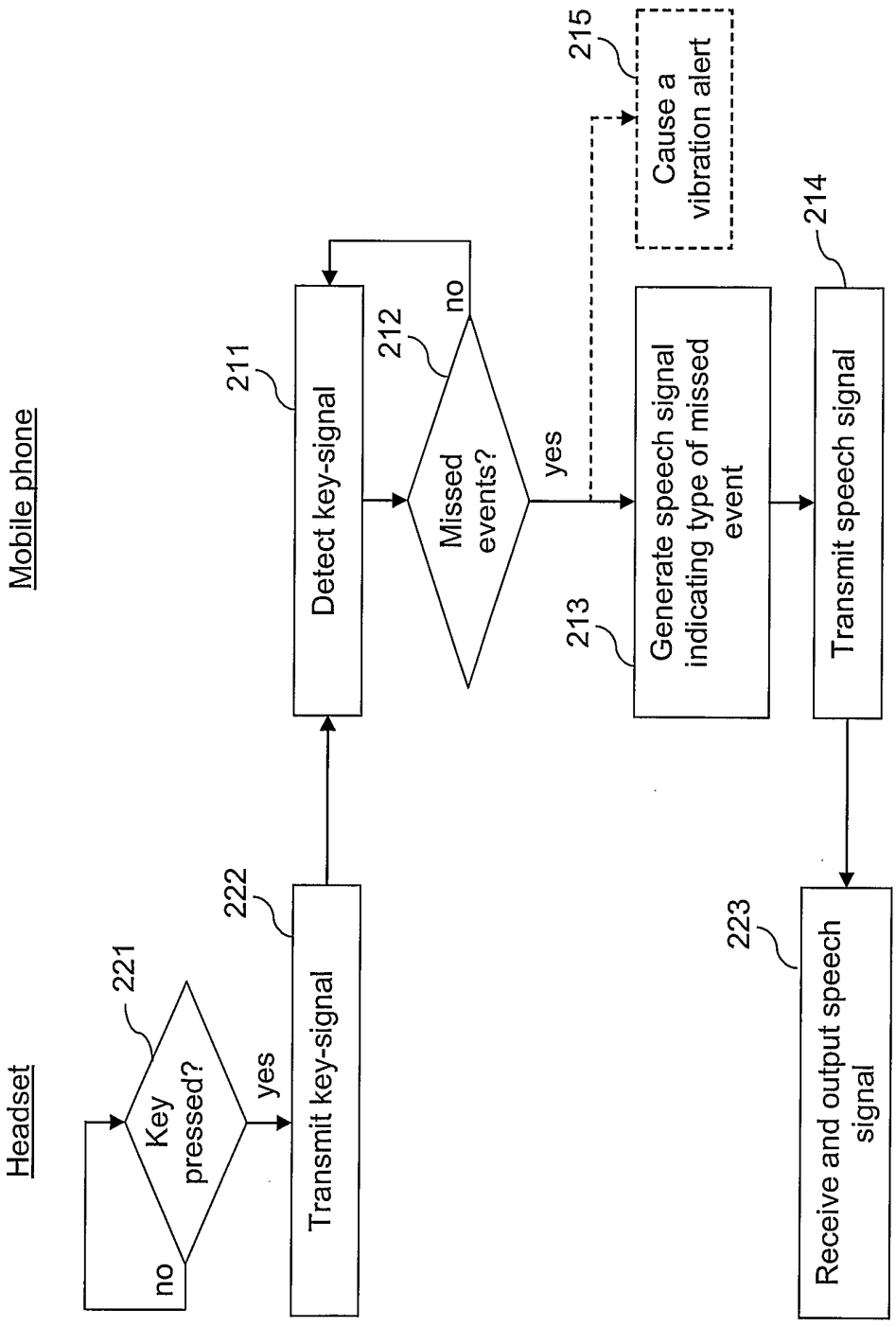

Mobile phone
Headset
Detect key-signal
211
Missed events?
212
no
yes
Generate speech signal indicating type of missed event
213
Cause a vibration alert
215
Transmit speech signal
214
Key pressed?
221
no
yes
Transmit key-signal
222
Receive and output speech signal
223

Fig. 2

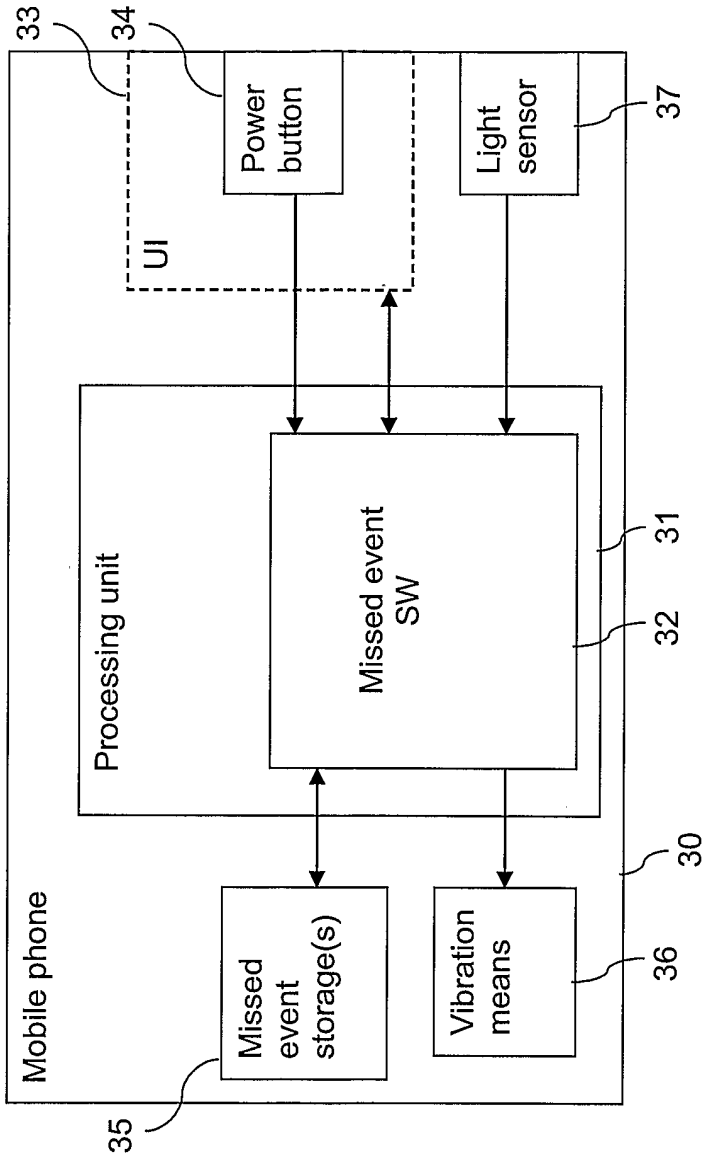

33
34
Power button
Light sensor
37
UI
Processing unit
Missed event SW
31
32
30
Mobile phone
Missed event storage(s)
Vibration means
36
35

Fig. 3

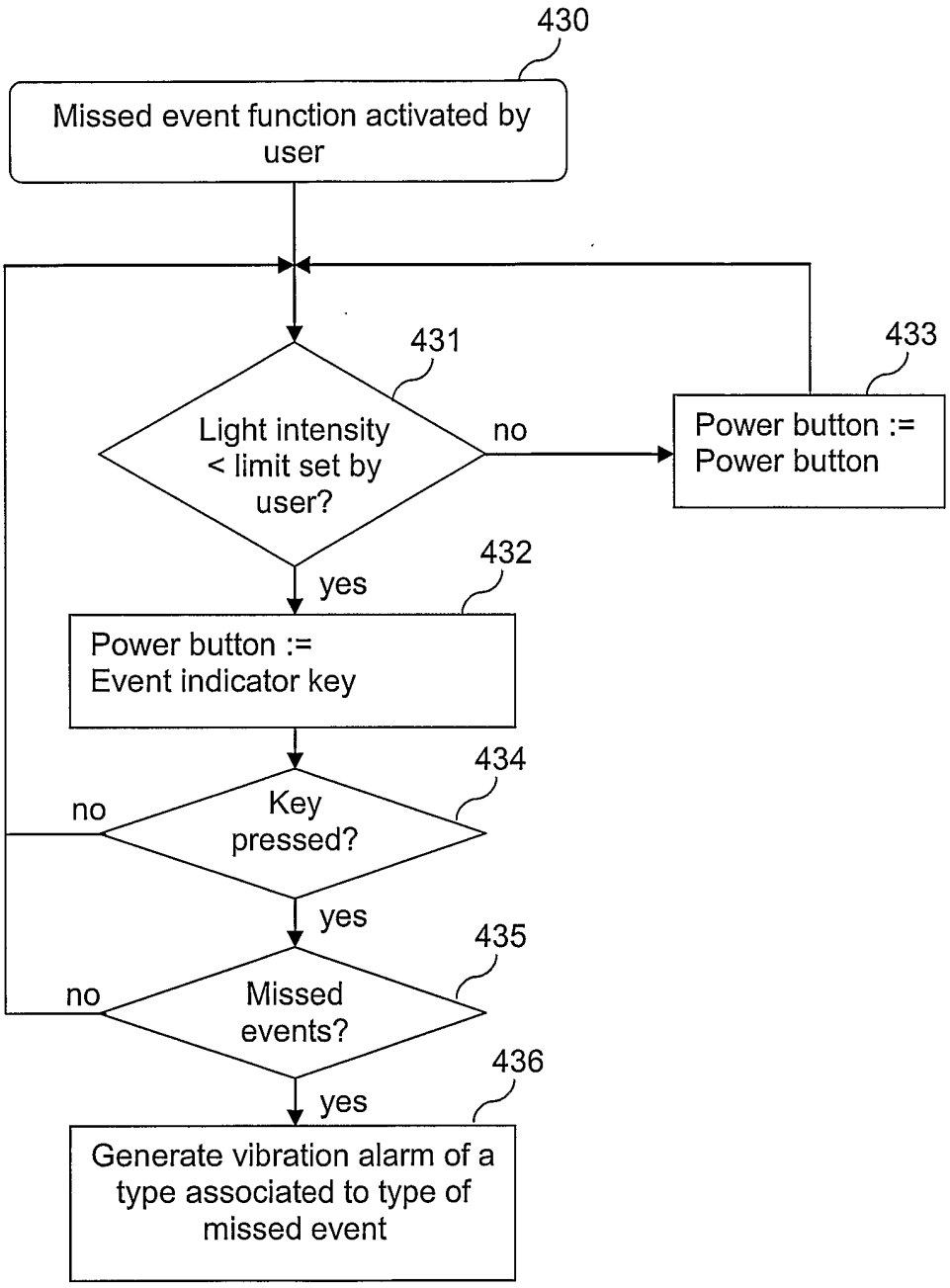

430
Missed event function activated by user
431
Light intensity < limit set by user?
no
433
Power button := Power button
yes
432
Power button := Event indicator key
434
Key pressed?
no
yes
435
Missed events?
no
yes
436
Generate vibration alarm of a type associated to type of missed event

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2006/000075

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04M1/725

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)
H04M

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 6 181 956 B1 (KOSKAN PATRICK D) 30 January 2001 (2001-01-30) column 2, line 7 - column 3, line 50; claim 14; figures 1-4	1-4,7, 15,16,19 8-11,17, 18
X A	WO 2004/071113 A (NOKIA CORPORATION; HILTUNEN, MISKA) 19 August 2004 (2004-08-19) page 3, line 5 - page 7, line 13 page 8, line 30 - page 13, line 25; figures 1-4	1-7,15, 16,18,19 8-14,17
X	US 2004/203651 A1 (QU HAI ET AL) 14 October 2004 (2004-10-14) paragraph [0019] - paragraph [0032]; figures 1-3 paragraph [0039] - paragraph [0044]; claims 1-19	1,3-5, 16,18,19

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/209658 A1 (LIU CHUAN-WEI ET AL) 21 October 2004 (2004-10-21) paragraph [0017] - paragraph [0026]; figures 2,3	1,2, 7-10,16, 17,19
A	US 2002/127998 A1 (KATAYANAGI MASANORI) 12 September 2002 (2002-09-12) paragraph [0027] - paragraph [0072]; figures 1-6	1-4,7, 16,19
A	US 2004/127198 A1 (ROSKIND JAMES A ET AL) 1 July 2004 (2004-07-01) paragraph [0032] - paragraph [0046]; figures 1,2	1,2, 10-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2006/000075

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6181956 B1	30-01-2001	NONE	
WO 2004071113 A	19-08-2004	AU 2003202117 A1	30-08-2004
US 2004203651 A1	14-10-2004	AU 2003259824 A1	25-02-2004
		WO 2004015967 A1	19-02-2004
US 2004209658 A1	21-10-2004	NONE	
US 2002127998 A1	12-09-2002	JP 3703726 B2	05-10-2005
		JP 2002261882 A	13-09-2002
US 2004127198 A1	01-07-2004	NONE	