

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
11 December 2008 (11.12.2008)

PCT

(10) International Publication Number
WO 2008/148433 A1

(51) International Patent Classification:
A61B 5/00 (2006.01) *A61M 21/00* (2006.01)

(74) Agent: VALEA AB; Lindholmspiren 5, S-417 56 Göteborg (SE).

(21) International Application Number:
PCT/EP2007/063146

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(22) International Filing Date:
3 December 2007 (03.12.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/760,420 8 June 2007 (08.06.2007) US

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

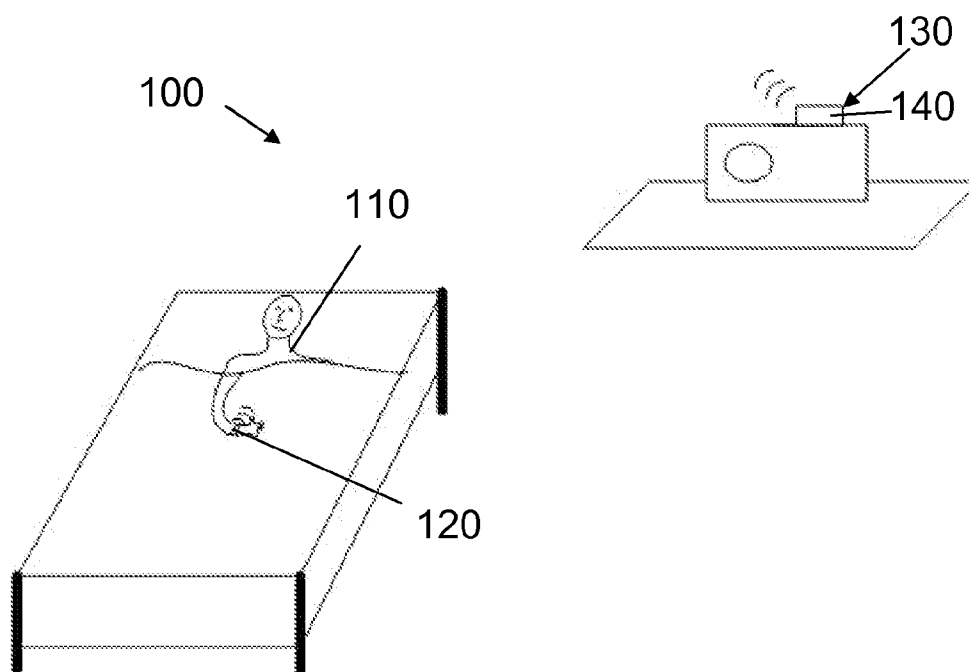
(71) Applicant (for all designated States except US): SONY ERICSSON MOBILE COMMUNICATIONS AB [SE/SE]; Nya Vattentornet, S-221 88 Lund (SE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): LINDBÄCK, Maria [SE/SE]; Basgränden 14, S-224 68 Lund (SE). PANTORP, Rikard [SE/SE]; Oshögavägen 42, S-238 32 Oxie (SE).

Published:
— with international search report

(54) Title: SLEEPING MODE ACCESSORY



(57) Abstract: A portable device, accessory unit, system, method and computer program for inducing a target physiological state in a user, where the current physiological state of the user is compared data indicative of well-known physiological states in a human being and where the audio output produced from the portable device or from the accessory unit is adjusted according to the target physiological stated to be induced in the user.

WO 2008/148433 A1

SLEEPING MODE ACCESSORY

The present invention is related to measurement accessories for portable units and in particular to the interaction between a measurement accessory and a main unit.

5

BACKGROUND OF THE INVENTION

Presently, several systems interacting with a user in order to aid the user in reaching a certain physiological state or aiding the user in order to achieve certain goals related to physical exercise are known.

As an example, biofeedback devices are on the market, which monitor the physiological state of the user via sensors and use music or sounds as feedback to the user in order to facilitate the user falling into the sleep state.

15 One drawback of such systems is that they are usually bulky and expensive and most of them are not portable either. One other drawback is that they are basically constructed to perform only function, i.e. the biofeedback.

Other feedback devices, such as the one disclosed in WO2006/050512 describe a method and a device for sonification of physiological data, where the heart rate, muscle tension, blood flow and other parameters are used to influence the tempo of the music or sound played or to spur the user to increase the physical training rate when performing a specific exercise, for example.

While this device provides the desired portability, the user is not able to influence the state of the portable feedback unit by means of his or her physiological state other than changing the tempo of the played music or sound.

Apart from biofeedback and portable feedback systems, portable measurement devices monitoring physiological parameters, such the already mentioned heart rate, muscle tension, pulse, temperature and other parameters also are known today.

As an example, the Japanese patent application JP2005034547 discloses a health care system for measuring and controlling health care data of a person, where the system consists of a watch comprising a sensing part for measuring physiological parameters, a

receiving part comprising a cell phone and a remote displaying part for displaying the measured data on a host computer received from the cell phone.

Another example of a portable measuring device is the heart rate device described in
5 US2005/0256416, where a heart rate sensor is integrated into a wrist watch and where the status of the heart rate is displayed using different colors. Additionally, the wrist watch may also indicate incoming calls to the cell phone.

A drawback of both the system disclosed by JP2005034547 and the heart rate device in
US2005/0256416 is the lack of controlling function from the monitoring system to the user
10 of the monitoring system. Also, it is unclear whether the physiological data registered may have any effect on the state of the measurement system or device itself.

The present invention aims at obviating at least some of the disadvantages with known technology.

15

SUMMARY OF THE INVENTION

These disadvantages are obviated by a portable device for inducing a target physiological state in a user, where the device comprises at least one receiver for receiving measurement data indicative of the current physiological state of the user, a processing
20 unit for processing the received measurement data and at least one audio output unit and a memory, where the processing unit is arranged to detect the current physiological state of the user by comparing the processed received measurement data to predefined data in the memory indicative of well-defined physiological states, wherein the processing unit is arranged to output audio data through the audio output unit depending on the detected
25 actual physiological state and to adjust the output of the audio data according to the target physiological state to be induced in the user.

In this fashion a desired physiological state, such as relaxation, sleep, heightened concentration or other states can easily be induced in the user by a lightweight portable
30 device which the user can carry everywhere. At the same time the actual physiological state of the user also affects the state of the portable device.

According to another aspect of the present invention the disadvantages of prior art are overcome by a system for inducing a target physiological state in a user comprising a
35 portable main unit and an accessory unit, where the main unit comprises at least a

receiver for receiving measurement data from the accessory unit, wherein the measurement data is indicative of the current physiological state of the user, a processing unit for processing the received measurement data, at least one audio output unit and a memory, where the processing unit is arranged to determine the current physiological
5 state of the user by comparing the received measurement data to known data in the memory and to output audio data from the audio output unit depending on the detected physiological state, where the accessory unit comprises a sensing unit for measuring data indicative of the current physiological state of the user of the main unit and a transmitter for transmitting the measured data to the main unit.

10

According to yet another aspect of the present invention, the disadvantages of known technology are overcome by an accessory unit for inducing a target physiological state in a user using the accessory unit, where the accessory unit comprises a sensing unit for measuring data indicative of the current physiological state of the user, a transmitter for
15 transmitting the measured data via a wireless link and wherein the accessory unit further comprises a receiver for wirelessly receiving control signals controlling the time interval of the measurement.

It may be remarked here, that the accessory unit is especially suitable to be used together
20 with the portable device described earlier and in a system for inducing a target physiological state in a user described above..

According to yet another aspect of the present invention, the disadvantages of known technology are overcome by a method for inducing a target physiological state in a user
25 using a portable main unit comprising the steps:

- a) receiving measurement data indicative of the current physiological state of a user of the main unit;
- b) processing the received measurement data;
- c) detecting the current physiological state of the user by comparing the processed
30 received measurement data to predefined data in the memory indicative of well-defined physiological states;
- d) outputting audio data through an audio output unit;
- e) adjusting the output of the audio data according to the target physiological state to be induced in the user.

35

It should be mentioned here, that the portable device described earlier is especially suitable for implementing the method steps according to the present invention described above.

- 5 Finally and according to another aspect of the present invention, the disadvantages of known technology are overcome by a computer program for inducing a target physiological state in a user using a portable unit comprising instructions sets for:
- a) receiving measurement data indicative of the current physiological state of a user of the main unit;
 - 10 b) processing the received measurement data;
 - c) detecting the current physiological state of the user by comparing the processed received measurement data to predefined data in the memory indicative of well-defined physiological states;
 - d) outputting audio data through an audio output unit and,
 - 15 e) adjusting the output of the audio data according to the target physiological state to be induced in the user.

It should also be remarked here, that the computer program is especially suited to execute the method steps stated above and to be executed in a portable device according

20 to the invention described earlier.

These and other advantages will be understood more clearly by reading the following detailed description below.

BRIEF DESCRIPTION OF THE DRAWINGS (OPTIONAL)

- 25 Fig. 1 illustrates a system for relaxation and for inducing a sleep mode in the main unit and the accessory according to one embodiment of the present invention.

Fig. 2 illustrates a second embodiment of the relaxation apparatus and accessory.

- 30 Fig. 3 illustrates the steps of an embodiment of a method according to the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Fig. 1 illustrates a system 100 for relaxation and for inducing a sleep mode in a user 110 by means of a main unit 130 and an accessory unit 120 connected to the apparatus 130.

- 5 The user 110 in this example wears the accessory unit 120 in the form of a wristband on his or her wrist, where the sensor accessory registers the pulse rate of the user and sends the measurement data to the main unit 130. The accessory unit 120 may also be part of a wrist watch or comprise a Velcro band. The main point here is that the accessory unit 120 should have a firm contact with the user's wrist in order to be able to accurately measure
- 10 the user's pulse rate.

The accessory unit 120 in this example is connected to the main unit 130 via a wireless link, such as for example a radio link, bluetooth, infrared, an IEEE 802series connection (.11, .15, .16 with sub standards a, b, g or n, for example) or some other wireless connection standard as long as it is suitable for transferring digital or analog data.

- 15 However, the link between the wristband 120 and the main unit 130 may also be a wired link via a copper or an optical fiber cable or some other suitable wired connection.

It should be mentioned that when using the infrared link, a reasonable line of sight angle and distance should be maintained between the accessory unit 120 and the main unit 130 as is known to the person skilled in the area of infrared data communication.

20

A main unit 130 located a distance away from the sensor accessory is receiving the measurement signals or data from the accessory unit 120 via its receiver 140.

- As a reaction to the received measurement signals or data which indicate the current
- 25 physiological state of the user the main unit 130 either remains in the present mode of operation or changes to a sleep mode. The sleep mode is usually activated if the heart rate of the user 110 falls below a certain predefined value, where the main unit 130 for example may switch to an analog or digital radio station with soothing or relaxing music. The main music may also play music or sound(s) stored in its memory (not shown) in
- 30 case the main unit 130 is equipped with a memory.

- Besides being a radio unit, the main unit 130, may also comprise any other device capable of radio or data communication and producing sounds or music. Also, the main unit 130 may, instead of being equipped solely with a receiver 140, also comprise a
- 35 transmitter (not shown) for controlling the accessory unit 120 in order to control the

measurement interval or the measurement method. Also a transmitter may be of use if the user desires to reach a certain target physiological state, such as relaxation, sleep but also other states, such as concentration or creativity so that the main unit 130 may signal to the accessory unit when to start the measurement.

5

It should be also mentioned that other means of measuring the physiological state of the user are possible, besides the measuring of the pulse rate. These measurements, such as measurements of the heart rate, breathing rate or other physiological parameters related to relaxation of the body may lead to a somewhat different construction of the
10 accessory unit 120 and be provided as a torso band and/or be equipped with a microphone.

Apart from the variants above, the accessory unit 120 may be adapted to start measuring data indicative of the current physiological state of the user as soon as the user starts
15 wearing it.

Turning now to Fig. 2, a portable main unit 200 and an associated accessory unit 270 according to a second embodiment of the present invention are schematically illustrated in the figure.

20

The main unit 200 comprises a portable terminal 200 equipped with a transceiver 210, at least one audio output unit 220, at least one display 230, a processing unit 240, a memory 250 and a user interface 260.

25 The term "portable" should be interpreted here as having such a weight and size that it can be carried by a human hand.

Its accessory unit 270 comprises at least one measurement sensor 270 and a transmitter 280. Apart from these two elements, the accessory unit 270 also comprises a power
30 source (not shown) in case it is operating on a wireless link with the portable terminal 200.

In the following, the function of the portable terminal 200 and its accessory 270 will be explained in detail.

By means of the transceiver 210, the portable terminal 200 receives measurement data which indicates the current physiological state of the user, where the measurement data is registered by the measurement sensors 280 of the accessory unit 270. This data may either be analog or digital signals, as preferred. Measurement data, such as the pulse rate of the user 110 is transferred by means of the transmitter 290 to the receiver 210 of the portable terminal 200. However, the portable terminal 270 may also comprise a receiver, which may be integrated together with the transmitter 280 if, for example, changes of the sampling interval (if the registered pulse rate signals are to be digitized) need to be controlled by the terminal 200 or change to some other parameters is to be effectuated.

10 A receiver may also be used if the measurement is to be initiated by the main unit 200. The processing unit 240 in this example may perform a digital-to-analog conversion of the measurement signals received from the accessory unit 270 if they are received in analog form and some further processing on them, such as amplification and filtering in order to be able to obtain accurate processing results in later processing stages.

15 The processing unit 240 in Fig. 2 may also be connected to a memory 250, where data in the form of different music or sounds as well as certain graphical diagrams or threshold values related to known physiological states of a human being are stored. The memory 250 may be an internal ROM (Read-Only-Memory) such as a FLASH-ROM or non-

20 flashable ROM or a type of RAM (Random Access Memory), such as a memory card, hard disk, SIM-card or some built-in RAM-memory known to the skilled person. As far as the data, music and sounds in the memory 250 are concerned, it may either be pre-stored in the memory or downloaded and defined by the user of the portable terminal 200.

Comparison of the signals received at the receiver 210 and processed in the processing unit 240 with the threshold values in the memory will give clues about the actual physiological state of the user of the accessory unit. Thereafter, the processing unit 240 may take appropriate action, such as playing music from the memory 250 over the audio output unit 220 of the portable terminal 200 and/or visualizing the received measurement data registered by the accessory unit 270 on the display 230 of the portable terminal 200.

30 If the accessory unit 270 of the main unit 200 also comprises head phones, the music or sounds may be played via the head phones.

Also, the state of the portable unit 200 may be altered if an altered state of the user is detected, such as decreasing pulse-, heart- or breathing rate. This altered state of the

portable unit 200 may express itself through decreasing the volume of the music or the sounds and/or slowing down of the speed with which they are played. It may also result in decreasing the background lighting to the display 220 of the portable unit 200.

5 Apart from the elements mentioned above, the main unit 200 also comprises a user interface 260 allowing the user to choose from different target physiological states he or she wishes to achieve, such as a station of relaxation, a sleeping state or states of concentration or heightened creativity to name a few examples. Using a display 230
Also the user may via the user interface 260 define the time interval for the measurements
10 of data indicating his or her current physiological state. This presupposes however, that the accessory unit 270 additionally comprises a receiver (not shown) which is able to receive control information from the main unit 200 about the length of the measurement interval. However, the user may also set the measurement method to intermittent instead of continuous, as desired.

15

In case the portable terminal 200 also performs the function of a mobile terminal, the portable terminal 200 may change into a sleep mode, where incoming calls or messages are registered but no audio- or visual indication of their reception is signalled to the user.

20 Additionally, the accessory unit 270 may besides the sensor unit 280 and the receiver 290 also comprise an audio output unit of its own (not shown) for outputting music or sound to the user. Such an accessory unit may for example comprise head phones in addition to a wristband described earlier. It also may comprise a headset, i.e. a headphone/microphone combination for measuring the breathing rate of the user. In this fashion, the accessory
25 unit 270 may receive control signals from the main unit 200 for outputting music or sound files from the memory 250 of the main unit 200 depending on the measurement data sent to the main unit 200.. The control signals from the main unit 200 may also comprise instructions to the accessory unit to adjust the music or sounds played to the user in order to reach a target physiological state described earlier.

30

Turning now to Fig. 3 the steps performed according to a first embodiment of the present invention are illustrated.

At step 300 an accessory unit, such as the accessory unit 260 in Fig. 2 performs

35 measurements of parameters which indicate the current physiological state of the user

using the accessory unit. These parameters may range from pulse-, heart- or breathing rate to blood pressure and other parameters indicative of the physiological state of the user.

- 5 Thereafter, at step 310, the measured data is transmitted to a portable unit, such as the portable unit 200 in Fig. 2 and received there. It should be mentioned there that the communication between the accessory unit 260 and the portable unit 200 may take place either via a wireless link, such as via Bluetooth, IEEE 802.series (.11, .15, .16, and sub standards a, b, g, n), Infrared or by wired communication, such as via cable or optical
10 fibers.

- At step 320 a processing unit in the portable unit, such as the processing unit 240, analyses the received measurement data, if necessary converts the data to digital form by analog-to-digital conversion, performs amplification and filtering of the signal and
15 compares the thus converted signal with a predefined first threshold value or a first graphical diagram. The predefined first threshold value or graphical diagram is related to a certain known physiological state of a human being, such as for example when he or she is relaxed or close to the sleeping state. It should be mentioned that the threshold value or graphical diagram may be predefined by the manufacturer of the portable terminal 200,
20 but also be altered or downloaded by the user.

- If the measurement signal received from the accessory unit 260 is above the predefined first threshold the processing unit may retrieve music or sounds from a memory of the portable unit at step 330, such as the memory 250 in Fig. 2 and instruct an audio output
25 unit, such as the loudspeaker 230 in Fig. 2 to output the music or sound audibly to the user.

- The music or sounds stored in the memory of the portable unit may be chosen so that they will have a relaxing and possibly sleep inducing effect on the user. However, in other embodiments of the method (not shown), the music may be chosen to induce a state of
30 heightened concentration or creativity in the individual.

- However, if the measurement signal received is determined to be below the predefined first threshold value the processing unit compares the measurement signal to a predefined second threshold value, where the predefined second threshold value may, for
35 example, indicate whether the user is asleep or not.

In the case that the received measurement value is above the predefined second threshold value, which may indicate that the user is relaxed but not sleeping, the processing unit 240, may at step 330 continue to play music or sounds from the memory 250 and additionally reduce the volume and/or speed at which the music or sounds are played (not shown). In this fashion a sleeping or an even more relaxed state in the user may be more easily induced.

If, however, the received measurement value through comparison with the predefined second threshold is determined to be below the predefined second threshold, the portable unit 350 switches off the audio output unit 350 either by fading out the music or sounds or switching it off immediately. Hereby it may be possible to give the user of the portable unit the choice to define the fade-out period in advance or to set it to immediate turn-off.

At step 360 the portable unit 200 changes to sleep mode, which for example may comprise turning off its display, such as the display 220 in Fig. 2 and other audio-visual functions.

Finally, if the portable terminal comprises functionality for receiving telephone calls or electronic messages, the portable terminal may at step 370 switch to a state where calls or messages are received and registered, but where no audible or visual indications of the receipt are presented to the user.

While the embodiment of the method according to the present invention has been described for the case where the measurements are performed automatically on the user, the user may also define on the main unit that he wishes to reach a target state of relaxation or sleep or some other physiological state, such as heightened concentration or creativity. The main unit 200 may then signal to the accessory unit 260 to initiate measurement of the parameters indicated above and use music or sounds to facilitate for the user to reach the desired target state.

It is also worthwhile mentioning that in the method described above, the measurements performed by the accessory unit may be continuous or intermittent, as preferred. The measurement interval may also be defined by the user.

Also, it should be pointed out that the operations performed in the method steps in Fig. 3 are well adapted to be executed by a computer program which is either stored in the memory of a portable terminal, such as the memory 250 of the portable terminal 200 or may be downloaded to the memory 250 from an external source, such as a communication
5 network.

It is understood that various modifications of the present invention may be performed by the skilled person who has studied the description and the accompanying drawings within the scope defined by the claims.

CLAIMS

1. A portable device for inducing a target physiological state in a user, the device comprising:
 - at least one receiver for receiving measurement data indicative of the current physiological state of the user,
 - a processing unit for processing the received measurement data,
 - at least one audio output unit and a memory,the processing unit being arranged to detect the current physiological state of the user by comparing the processed received measurement data to predefined data in the memory indicative of well-defined physiological states, wherein the processing unit is arranged to output audio data through the audio output unit depending on the detected actual physiological state and to adjust the output of the audio data according to the target physiological state to be induced in the user.
2. The device according to claim 1, further comprising a user interface via which a user can define the above well-defined physiological state and select a desired target physiological state.
3. The device according to claims 1-2, further comprising a display unit for displaying visual data indicative of the current physiological state of the user.
4. The device according to according to any of the claims 1-3, further comprising a transmitter such that the main unit may communicate in a wireless communication network.
5. The device according to according to any of the claims 1-4, arranged to switch to a predefined state when the target physiological state has been induced into the user.
6. The device according to according to any of the claims 1-5, wherein the device is portable.
7. The device according to according to any of the claims 1-6, wherein the measurement data received comprises analog data.

8. The device according to claim 7, wherein the processing unit is arranged to amplify and filter the analog physiological data before converting it into digital data.
- 5 9. The device according to according to any of the claima 1-6 wherein the measurement data received comprises digital data.
- 10 10. The device according to according to any of the claims 1-9 wherein the measurement data indicative of the current physiological state of the user comprises the pulse, heart rate, breathing rate, blood pressure or some other parameter suitable for indicating the physiological state of the user.
- 15 11. The device according to according to any of the claims 1-10, wherein the predefined data in the memory indicative of well-defined physiological states comprises at least one threshold value or at least one graphical diagram indicative of a known physiological state in a human being.
- 20 12. The device according to according to any of the claims 1-11, wherein the at least one audio output unit comprises a loudspeaker, headphones or some other unit suitable for audio output.
13. The device according to according to any of the claims 1-12, wherein the audio data from the memory comprises musical or audio files.
- 25 14. The device according to according to any of the claims 1-13, wherein the measurement data indicative of the physiological state of the user is received continuously.
- 30 15. The device according to according to any of the claims 1-13, wherein the measurement data indicative of the physiological state of the user is received intermittently.
- 35 16. A system for inducing a target physiological state in a user comprising a portable main unit and an accessory unit, the main unit comprising at least a receiver for receiving measurement data from the accessory unit, the measurement data being

indicative of the current physiological state of the user, a processing unit for processing the received measurement data, at least one audio output unit and a memory, the processing unit being arranged to determine the current physiological state of the user by comparing the received measurement data to known data in the memory and to output audio data from the audio output unit depending on the detected physiological state, the accessory unit comprising a sensing unit for measuring data indicative of the current physiological state of the user of the main unit and a transmitter for transmitting the measured data to the main unit.

17. The system according to claim 16, wherein the accessory unit is adapted to be worn by the user of the main unit.

18. The system according to claims 16-17, wherein the accessory unit is arranged to being measurements of data indicative of the current physiological state of the user as soon as it is being worn by the user.

19. The system according to according to any of the claims 16-18, wherein the accessory unit further comprises a receiver for receiving control information from the main unit.

20. The system according to claim 19, wherein the control information comprises information on the parameters to be measured by the accessory unit and/or information on the measurement interval.

21. An accessory unit for inducing a target physiological state in a user using the accessory unit, the accessory unit comprising a sensing unit for measuring data indicative of the current physiological state of the user a transmitter for transmitting the measured data via a wireless link wherein the accessory unit further comprises a receiver for wirelessly receiving control signals controlling the time interval of the measurement

22. Accessory unit according to claim 21, wherein the accessory unit further comprises an audio output unit for outputting wirelessly received music or sound to the user.

23. Accessory unit according to claim 22, wherein receiver is further arranged to wirelessly receive control signals controlling the output of the music or sound through the output unit depending on the measured current physiological state of the user and to adjust the output of the audio data according to the target physiological state to be induced in the user.

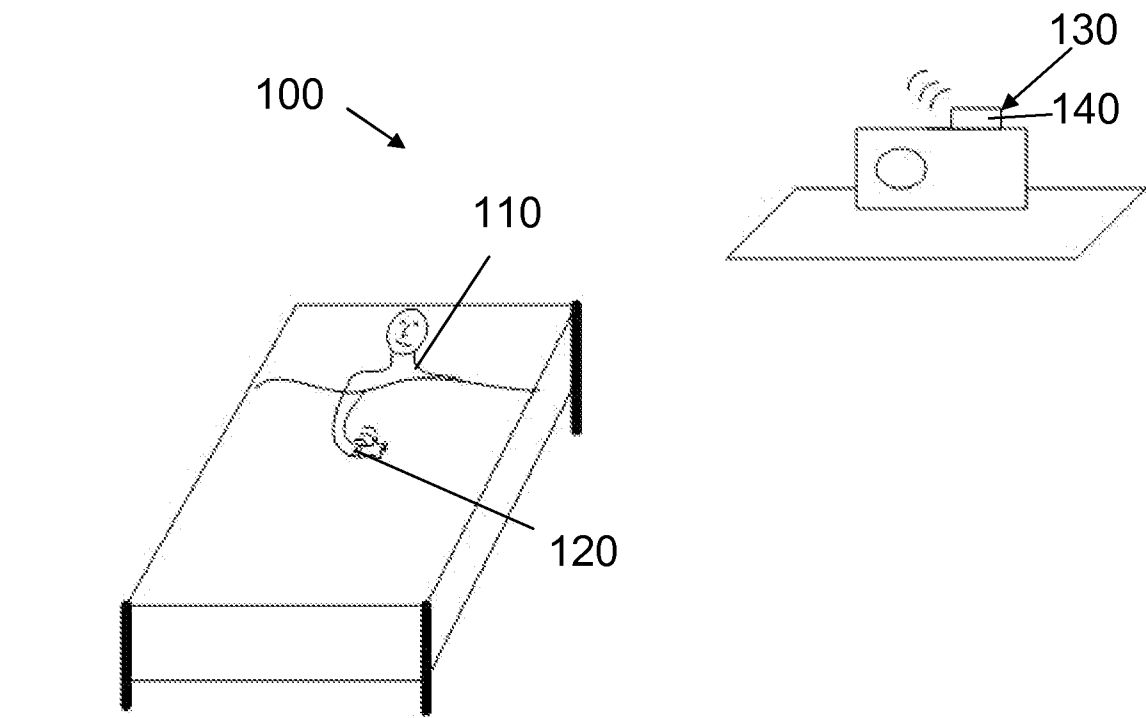
24. A method for inducing a target physiological state in a user using a portable main unit comprising the steps:

- a) receiving measurement data indicative of the current physiological state of a user of the main unit;
- b) processing the received measurement data;
- c) detecting the current physiological state of the user by comparing the processed received measurement data to predefined data in the memory indicative of well-defined physiological states;
- d) outputting audio data through an audio output unit;
- e) adjusting the output of the audio data according to the target physiological state to be induced in the user.

25. A computer program for inducing a target physiological state in a user using a portable unit comprising instructions sets for:

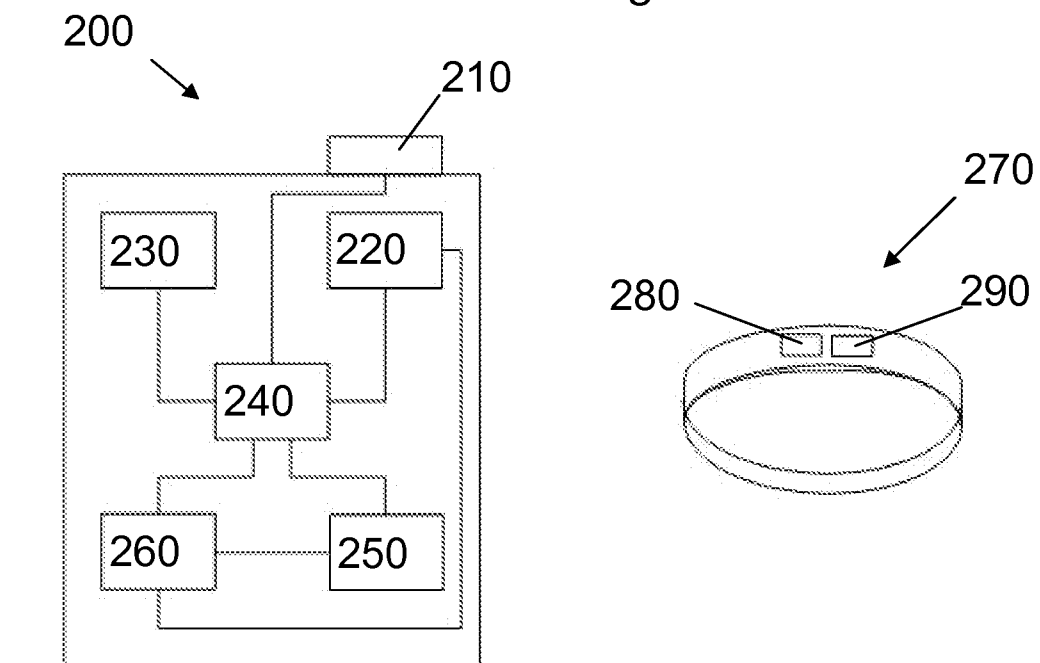
- a) receiving measurement data indicative of the current physiological state of a user of the main unit;
- b) processing the received measurement data;
- c) detecting the current physiological state of the user by comparing the processed received measurement data to predefined data in the memory indicative of well-defined physiological states;
- d) outputting audio data through an audio output unit and,
- e) adjusting the output of the audio data according to the target physiological state to be induced in the user.

1/2



5

Fig. 1



10

Fig. 2

2/2

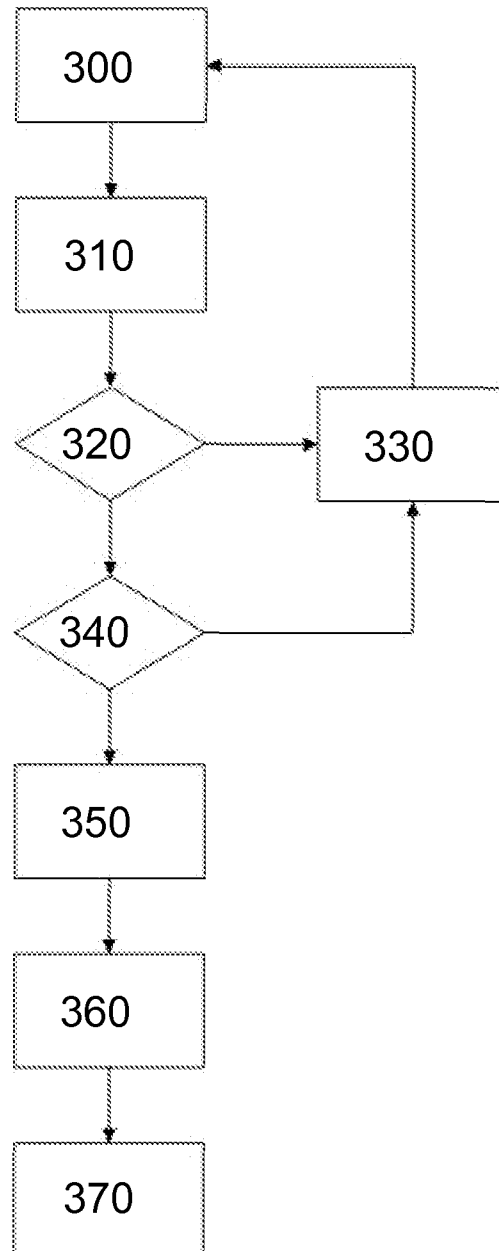


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2007/063146

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B5/00 A61M21/00

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)

A61B A61M

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	US 2007/113725 A1 (OLIVER NURIA M [US] ET AL) 24 May 2007 (2007-05-24)	1-6, 10-14, 16-20,25
Y	paragraphs [0009] - [0011] paragraphs [0026] - [0051] paragraphs [0074] - [0079] paragraphs [0087] - [0096] claims 1-22; figures 1-5,7,9-11	7-9
X	EP 0 872 255 A (SEIKO EPSON CORP [JP]) 21 October 1998 (1998-10-21) abstract page 4, line 34 - page 6, line 52 page 7, line 31 - page 8, line 40 page 9, line 47 - page 10, line 24 claim 7; figures 1,2,6,7,10,16,17 ----- -/--	1-7, 10-13, 16-18

☒ 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
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *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
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

20 June 2008

Date of mailing of the international search report

04/08/2008

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Doyle, Aidan

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2007/063146

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 655 051 A (SAMSUNG ELECTRONICS CO LTD [KR]) 10 May 2006 (2006-05-10) abstract paragraph [0014] - paragraph [0020] paragraph [0024] paragraph [0027] - paragraph [0033] paragraph [0042] - paragraph [0043] claim 1; figures 1,2 -----	1,2,4-8, 10-12, 15,16, 19,20
X	US 2006/224046 A1 (RAMADAS PADMAJA [US] ET AL) 5 October 2006 (2006-10-05) abstract paragraph [0005] - paragraph [0007] paragraph [0012] - paragraph [0016] paragraph [0019] - paragraph [0023] claims 13-20; figures 1,2 -----	1-6, 10-13, 16,17 21-23
X	US 5 740 812 A (COWAN JONATHAN D [US]) 21 April 1998 (1998-04-21) abstract column 3, line 1 - column 6, line 61 claims 1,2,11-16; figure 1 -----	1,6, 10-13, 16,17
Y	WO 01/37914 A (LIPO MORDECHAI [IL]) 31 May 2001 (2001-05-31) abstract page 9, line 21 - page 10, line 10 figure 1 -----	7,8
Y	WO 2006/105085 A (THETA TECHNOLOGIES LLC [US]; ROSE JOHN [US]; SCHACHTER ROBERT S [US]) 5 October 2006 (2006-10-05) paragraph [0018] claim 23; figure 1 -----	9
X	US 2005/070815 A1 (SHAHRESTANI NASIR [US] ET AL) 31 March 2005 (2005-03-31) paragraphs [0004] - [0006] paragraph [0155] - paragraph [0158] figures 7-1 -----	21-23
X	WO 2006/090371 A (SOFTWARE SOLUTIONS LTD [GB]; ORBACH TUVI [GB]) 31 August 2006 (2006-08-31) page 13, line 14 - line 27 page 17, line 19 - line 20; figure 1 -----	21,22
Y	----- -/--	23

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2007/063146

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 2006/050512 A (PLAIN SIGHT SYSTEMS INC [US]; COPPI ANDREAS C [US]; COIFMAN RONALD R []) 11 May 2006 (2006-05-11) abstract paragraph [0010] - paragraph [0013] paragraph [0020] - paragraph [0059] figures 1,2 -----	23
Y	WO 2006/054210 A (KONINKL PHILIPS ELECTRONICS NV [NL]; ULLMANN PAUL [AT]) 26 May 2006 (2006-05-26) the whole document -----	23

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2007/063146

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 24
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy and/or diagnostic method practised on the human or animal body.
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search reportcovers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☒ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-20,25

A portable device comprising a receiver for receiving measurement data pertaining to the physiological state of a user, a processing unit, an audio output unit and a memory, wherein the processing unit is arranged to detect the physiological state of the user by comparing the received data to predefined data stored in the memory and output audio data through the output audio unit according to a target physiological state to be induced in the user.

2. claims: 21-23

An accessory unit comprising a sensing unit for measuring data indicative of the current physiological state of a user, a transmitter for transmitting said data via a wireless link and a receiver for wirelessly receiving control signals controlling the time interval of the measurement.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2007/063146

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007113725 A1	24-05-2007	NONE	
EP 0872255 A	21-10-1998	CN 1199347 A DE 69734704 D1 DE 69734704 T2 WO 9801177 A1 JP 10076012 A US 6554763 B1	18-11-1998 29-12-2005 22-06-2006 15-01-1998 24-03-1998 29-04-2003
EP 1655051 A	10-05-2006	CN 1773563 A JP 2006133226 A KR 20060041003 A US 2006097884 A1	17-05-2006 25-05-2006 11-05-2006 11-05-2006
US 2006224046 A1	05-10-2006	US 2007167689 A1 WO 2006107799 A1	19-07-2007 12-10-2006
US 5740812 A	21-04-1998	NONE	
WO 0137914 A	31-05-2001	AU 1546401 A EP 1409056 A1 US 7207935 B1	04-06-2001 21-04-2004 24-04-2007
WO 2006105085 A	05-10-2006	CA 2603001 A1 US 2008071137 A1	05-10-2006 20-03-2008
US 2005070815 A1	31-03-2005	NONE	
WO 2006090371 A	31-08-2006	AU 2006217448 A1 CA 2599148 A1 EP 1871219 A2	31-08-2006 31-08-2006 02-01-2008
WO 2006050512 A	11-05-2006	US 2006111621 A1	25-05-2006
WO 2006054210 A	26-05-2006	CN 101060879 A KR 20070086293 A	24-10-2007 27-08-2007

专利名称(译)	睡眠模式配件		
公开(公告)号	EP2155049A1	公开(公告)日	2010-02-24
申请号	EP2007847657	申请日	2007-12-03
[标]申请(专利权)人(译)	索尼移动通讯有限公司		
申请(专利权)人(译)	索尼爱立信移动通信AB		
当前申请(专利权)人(译)	索尼爱立信移动通信AB		
[标]发明人	LINDBACK MARIA PANTORP RIKARD		
发明人	LINDBÄCK, MARIA PANTORP, RIKARD		
IPC分类号	A61B5/00 A61M21/00		
CPC分类号	A61B5/4809 A61B5/486 A61M21/00 A61M2021/0027 A61M2205/3569 A61M2205/3592 A61M2205/502 A61M2205/52 A61M2230/04 A61M2230/42 A61M2230/50 A61M2230/60		
代理机构(译)	AB的Valea		
优先权	11/760420 2007-06-08 US		
其他公开文献	EP2155049B1		
外部链接	Espacenet		

摘要(译)

一种用于在用户中诱导目标生理状态的便携式设备，附件单元，系统，方法和计算机程序，其中比较用户的当前生理状态的数据，该数据指示人类中的众所周知的生理状态以及音频输出的位置根据在用户中引起的目标生理状态来调整从便携式设备或从附件单元产生的。