(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 653 850 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
22.12.2010 Bulletin 2010/51

(21) Application number: **04785430.2**

(22) Date of filing: **04.08.2004**

(51) Int Cl.:
A61B 5/00 *(2006.01)* ***A61B 5/0205*** *(2006.01)*

(86) International application number:
PCT/ZA2004/000091

(87) International publication number:
WO 2005/011491 (10.02.2005 Gazette 2005/06)

(54) **DEVICE FOR MONITORING THE CONDITION OF A HUMAN BEING**

VORRICHTUNG ZUR ÜBERWACHUNG DER BEFINDLICHKEIT EINES MENSCHEN

DISPOSITIF SERVANT A CONTROLER L'ETAT D'UN ETRE HUMAIN

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR

(30) Priority: **04.08.2003 ZA 200300949**
08.08.2003 ZA 200306138
24.10.2003 ZA 200308285

(43) Date of publication of application:
10.05.2006 Bulletin 2006/19

(73) Proprietor: **Pietersen, Johannes de Klerk**
0157 Centurion (ZA)

(72) Inventor: **Pietersen, Johannes de Klerk**
0157 Centurion (ZA)

(74) Representative: **Fichter, Robert Arno**
Dennemeyer & Associates S.A.
55, rue des Bruyères
1274 Howald (LU)

(56) References cited:
DE-A- 4 214 263
DE-A- 10 005 526
US-A- 5 749 365
US-A1- 2002 008 630
US-A1- 2002 124 295
US-B1- 6 450 168

EP 1 653 850 B1

Printed by Jouve, 75001 PARIS (FR)

Description

Field of the Invention

[0001] This invention relates to a device for monitoring one or more indicators relating to the health or comfort of a human being and for communicating the sensed information to a caretaker of the human being.

Background to the Invention

[0002] Monitors for sensing the heart rate, breathing or other vital functions of a hospitalized person are well-known in the art. Devices for home use have been developed to aid in the care of infants or elderly persons to monitor breathing, heart rate, and the like. These devices are however often too complicated to be operated by an unskilled person and/ or cause discomfort to the person being monitored.

[0003] In US 5,400,012, a breathing monitor is disclosed for detecting Sudden Infant Death Syndrome (SIDS) in infants caused by apnoea, which monitor includes an enclosure that is attached to the torso of an infant using a strap. The enclosure is supported by and isolated from the infant's torso by a fluid filled bladder coupler such that there is no direct contact between the enclosure and the torso of the infant. A monitor including a piezoelectric element is connected to the fluid coupler and a battery powered electronic circuit contained in the enclosure flashes an LED as the infant breathes and sounds and alarm should the infant fail to exhale for a predetermined period of time. An adjustable strap connector for the strap provides visual indication of the strap being correctly attached and a limited range of motion is permissible between the strap and the enclosure when the infant breathes.

[0004] In US 4,146,885 a hospital bed or mattress for infants including a respiration monitor and alarm to detect apnoea is disclosed. The infant's breathing causes slight displacements of portions of its body which in turn transmit dynamic recoil forces to the bed on which the infant is resting.

[0005] US2002/12429 discloses clothing provided with a fabric panel to retain a sensor unit. In an inner surface of the fabric pocket has an opening to enable die sensor unit deceived within the pocket to maintain direct contact with a skin surface of a patient over a thoracic heart region.

[0006] US2002/008630 discloses a system and method for detecting acceleration of a body. The system comprises a sensor and a controller that comprises a professor. The sensor includes a plurality of acceleration measuring devices located in a housing. The housing has a clip for locating the housing on a user.

[0007] The monitors disclosed in the prior art suffer from a number of drawbacks. A most basic disadvantage of known monitors is that securing the device to the body of an infant is a cumbetsome task which does not encourage use of the device. Known devices are in addition uncomfortable to wear, easily become displaced in use and require a skilled user.

[0008] The inventor therefore believes that a need exists for a device for monitoring various indicators relating to the health or comfort of an infant or grown person and for communicating information to a caretaker of rhe infant or grown person and which device overcomes at least some of the disadvantages of the prior art.

Summary of the Invention

[0009] According to the invention, there is provided a device for continuously monitoring one or more indicators relating to the health or comfort of a person, as defined by the appended claims.

[0010] The desired indicator may be selected from the group including: breathing, heartbeat, temperature, and humidity.

[0011] The sensing means may be located in a housing of the device.

[0012] The device may include a clip extending from the housing so that it is attachable to the waistband of an item of clothing worn by the person being monitored. In the case of an infant, the device may be attached to a waistband of a diaper worn by the infant. In the case of an adult, the device may be attached to a waistband of an undergarment worn by the adult.

[0013] The sensing means for sensing and measuring breathing of the person may be in the form of a pressure transducer which in use is located between the item of clothing and the skin of the person wearing the device. The pressure transducer may measure pressure exerted on it by the lifting and falling of the skin of the breathing person. When the pressure exerted on the pressure transducer occurs in irregular intervals or ceases for a predetermined period of time, this may activate the communicating means.

[0014] When the pressure transducer measures pressure that occurs in irregular intervals or ceases for a predetermined period of time, it may activate a stimulating means aimed at encouraging the person to breathe normally either prior to or simultaneously with activating the communicating means. The stimulating means may be in the form of a conventional vibrating mechanism that causes the housing of the device to vibrate.

[0015] The sensing means for sensing and measuring the breathing of a person may be sufficiently sensitive to additionally sense the heartbeat of a person. When an irregular heartbeat or a cessation in heartbeat is sensed, this may activate the communicating means.

[0016] The device may include a further sensing means for sensing temperature and which in use is located between the item of clothing and the skin of the person wearing the device. The temperature sensor may continuously sense and measure temperature and may activate the communicating means should the measured temperature be below or above a predetermined value

or value range.

[0017] Additionally, a sensing means for sensing temperature and which is in use located exterior the item of clothing of the person wearing the device, may be provided. The values measured by the two temperature sensors may be compared continuously so as to calculate the rate of heat loss of the person wearing the device. When the rate of heat loss falls below or rises above a predetermined value or range of values, this may activate the communicating means.

[0018] The device may include yet a further sensing means for sensing and measuring humidity and that is in use located between the item of clothing and the skin of the person wearing the device. When the value of the humidity rises above a certain predetermined value, this may activate the communicating means.

[0019] Additionally, a sensing means for sensing humidity and which is in use located exterior the item of clothing of the person wearing the device, may be provided. The values measured by the two humidity sensors may be compared continuously so as to be able to ascertain when the humidity level between the item of clothing and skin of the person rises above a desired value at which stage the communicating means may be activated.

[0020] The humidity sensor may be in the form of a conductivity sensor. As an increase in humidity leads to an increase in conductivity, when the conductivity rises above a predetermined value, the communicating means may be activated.

[0021] The sensing and measuring of humidity is particularly useful when the device is used to monitor an infant, in that an increase in humidity indicates a soiled diaper which can then be changed timeously by a caretaker of the infant before any discomfort is caused.

[0022] The communicating means may include one or more of the following: an audible alarm, a visual signal such as a flashing light, and a radio signal transmitted to a suitable remotely located receiver.

[0023] The housing and clip may be manufactured from any suitable synthetic plastics material.

[0024] The device may include a power source in the form of, for example, batteries located in the housing.

[0025] The device may include an interface on the housing to permit setting of the various values or value ranges at which the communicating means is to be activated and for switching the device on and off. The housing may be provided with a cover for covering the interface so as to inhibit the device from accidentally being turned off or reprogrammed during use.

[0026] The device may be provided with a data storage device for storing the information sensed by the sensing means. A user may retrieve the stored data at any time for the purpose of analysis.

[0027] The invention extends to an item of clothing which includes a device as described above.

Detailed Description of the Invention

[0028] The invention will now be described by way of the following non-limiting examples with reference to the accompanying drawings.

[0029] In the drawings:-

Figure 1 shows a first isometric view of a device in accordance with the present invention;

Figure 2 shows a second isometric view of the device of Figure 1;

Figure 3 shows an isometric view of the device of Figure 1 in use when attached to the diaper of an infant; and

Figures 4, 5, and 6 show cross sectioned side views showing details of three alternative constructions of a device in accordance with the present invention.

[0030] In the drawings, reference numeral 10 generally indicates a device for continuously monitoring one or more indicators relating to the health or comfort of a person 12 in accordance with the present invention. In the embodiment shown the person 12 is an infant.

[0031] The device 10 includes one or more sensing means for sensing and measuring a value of one or more desired indicators and a communicating means 13 communicating an alarm signal when the measured value is above or below a predetermined value or range of values, wherein the device 10 is adapted to be attached to an item of clothing 14 of the person 12.

[0032] The desired indicator includes breathing, temperature, and humidity.

[0033] The sensing means is located in a housing 16 of the device 10. The device 10 includes a clip 18 extending from the housing 16 so that it is attachable to the waistband 20 of an item of clothing 14 (in this case a diaper) worn by the person 12 being monitored.

[0034] The sensing means for sensing and measuring breathing of the person 12 is in the form of a pressure transducer which in use is located between the item of clothing 14 and the skin of the person 12 wearing the device 10. The pressure transducer measures pressure exerted on it by the lifting and falling of the skin of the breathing person 12. When the pressure exerted on the pressure transducer occurs in irregular intervals or ceases for a predetermined period of time, this activates the communicating means 13.

[0035] When the pressure transducer measures pressure that occurs in irregular intervals or ceases for a predetermined period of time, it activates a stimulating means aimed at encouraging the person 12 to breathe normally either prior to or simultaneously with activating the communicating means 13. The stimulating means is in the form of a conventional vibrating mechanism that causes the housing 16 of the device 10 to vibrate.

[0036] The device 10 includes a further sensing means for sensing temperature and which in use is located between the item of clothing 14 and the skin of the person 12 wearing the device 10. The temperature sensor continuously senses and measure temperature and activates the communicating means 13 should the measured temperature be below or above a predetermined value or value range.

[0037] The device 10 includes yet a further sensing means for sensing and measuring humidity that is in use located between the item of clothing 14 and the skin of the person 12 wearing the device 10. When the value of the humidity rises above a certain predetermined value, this activates the communicating means 13.

[0038] The humidity sensor is in the form of a humidity sensor that measures the percentage humidity present in the air. The humidity sensor is an electronic component. When the humidity rises above a predetermined value, the communicating means 13 is activated.

[0039] The sensing and measuring of humidity is particularly useful when the device 10 is used according to the embodiment shown, in that an increase in humidity indicates a soiled diaper which can be changed timeously by a caretaker of the infant before any discomfort is caused as soon as the communication means 13 is activated.

[0040] The communicating means 13 includes an audible alarm 22 as well as a flashing light 24.

[0041] The housing 16 and clip 18 are manufactured from any suitable synthetic plastics material.

[0042] The device 10 includes a power source in the form of batteries located in the housing 16.

[0043] The device 10 includes an interface (not shown) on the housing 16 to permit setting of the various values or value ranges at which the communicating means 13 is to be activated and for switching the device 10 on and off. The housing 16 is provided with a cover 26 for covering the interface so as to inhibit the device 10 from accidentally being turned off or reprogrammed during use.

Referring now to Figure 4:

[0044] The device 10 includes a housing 30 defining a chamber 31 for housing the electronic circuitry of the device 10. The housing 30 is manufactured from any suitable non-toxic, hypoallergenic, synthetic plastics material.

[0045] The device 10 includes a user interface panel 32 using known technology in electrical communication with the electronic circuitry. Detail of the user interface panel 32 (not shown) includes one or more push-button switches (of the type typically used in membrane keypads) for enabling and disabling the device, or for changing the settings of the device. The interface panel 32 further accommodates one or more light-emitting diodes, liquid crystal displays or other components for visual indications.

[0046] An electronic printed circuit board 33 is located in the housing 30. Various components, including a power source (typically a long-life or rechargeable battery) are affixed to the board 33. For safety reasons the housing 30 of the device 10 is permanently sealed to inhibit access to the components housed therein. However, it could also be manufactured in such a way that the user can gain access to the power source in order to replace it.

[0047] A sound transducer 34 for generating an audible alarm, such as a piezo-electric element is also included in the housing 30. An opening 35 in the housing 30 permits sound generated by the sound transducer 34 to escape from the chamber 31. Other methods of generating audible alarms and transmitting them through the housing 30 are possible and need not involve an opening.

[0048] A suitable material 36 is used to affix piezo-electric element 37 to the device 10. The element 37 can also be used as a spacer to adapt the thickness of piezo-electric element 37 to the recess depth. Alternatively, the piezo-electric element 37 can also be glued directly to the device 10.

[0049] The piezo-electric element 37 is in electrical communication with the electronic circuitry of the device 10. Applying fluctuating pressure to such an element 37 generates a corresponding fluctuating electronic potential that can be measured by the circuitry.

[0050] A suitable spacer 38 between piezo-electric element 37 and an outer membrane can be incorporated.

[0051] Slot 39 is configured and dimensioned to accommodate a the top edge of a diaper, allowing the sensor to rest against the body of an infant in order to measure changes in pressure associated with, for example, breathing. Once fitted, a typical disposable diaper's "waistband" section creates a supple but snug structure around the infant's torso. As the infant breathes its abdomen will press more and less forcefully against this waistband section of the diaper, in unison with its breathing effort. Because the device 10 is secured to this waistband section, fluctuations of the pressure exerted by the infant's abdomen will cause fluctuations of pressure against the portion of the device 10 that is located on the inside of the diaper.

[0052] An outer flexible membrane 40 is manufactured from a suitable material such as polyester or polycarbon. Pressure applied to this membrane 40 is transmitted through 38 (if present) to 37, allowing measurement of such pressure by the device 10.

[0053] Cavity 41 accommodates a sensor assembly. Cavity 41 is smaller in area than outer membrane 40, to permit an overlap 42. Outer membrane 40 is affixed to this flange by suitable means such as waterproof glue, to preventing ingress of moisture into the device 10.

[0054] Motor 43 includes and offset weight attached to spindle, commonly used for "silent ring" of cellular telephones. The offset weight causes a vibration when the motor 43 is energized, said vibration being transferred to the housing 30 of the device. This vibration is used to provide tactile stimulation to the skin of the infant under

situations deemed necessary. Other means of causing tactile stimulation may be used.

Referring now to Figure 5:

[0055] In Figure 5, reference numerals 50 to 55, 59 and 63 represent the same elements as reference numerals 30 to 35, 39 and 43 in Figure 4 and will therefore not be described further.

[0056] A suitable substrate 56 for a sensor is provided and is typically a membrane as used in flexible electronic circuitry, i.e. polyester or polycarbonate, suitably affixed to the device 10.

[0057] A deposit of suitable electrically resistive material 57 such as graphite paint, typically used in electronic component manufacturing, is in electrical communication with the circuitry of the device 10. A deposit 58 of suitable electrically conductive material such as conductive silver paint, typically used in electronic component manufacturing, is located on element 60. The deposit 58 is of a suitable size and shape corresponding to and aligned with that of deposit 57 over an area preferably stretching from the center of cavity 61 towards the edges of said cavity 61.

[0058] A flexible membrane 60, typically polyester, polycarbonate or similar as used in flexible electronic circuit manufacturing, and preferably hypoallergenic to prevent contact dermatitis covers deposits 57 and 58.

[0059] Pressure exerted on the membrane 60 will cause it to flex towards membrane 56. If sufficient pressure is applied, the two membranes 56 and 60 will make contact. With even more pressure the contact area between the two membranes 56 and 60 will become larger. The electrical resistance of 57 can be measured. Forcing the two membranes 56 and 60 together will allow deposit 58 to make contact with 57. Because deposit 58 has a lower resistance than deposit 57, changing the contact area between deposits 57 and 58 will cause the measured resistance of deposit 57 to change accordingly, decreasing as more of deposit 58 makes contact with it and increasing as less of deposit 58 comes into contact with it. In practice a slight bulge (not shown) introduced below deposit 57 will cause it to remain in contact with deposit 58, allowing very slight pressures on deposit 58 to be measured.

[0060] Spacer 62 between flexible membranes 56 and 60 creates a cavity of suitable dimensions. Spacer 62 can be coated with adhesive on both sides to allow easy assembly of the sensor as a unit, and can be made of the same materials used for membranes 57 and 60.

Referring now to Figure 6:

[0061] A more complicated device 10 can be made by manufacturing a cavity 65 opposite the sensor, on the inside of the "clip" section. A third membrane 66 can then be affixed to that side so that it completely covers the cavity 65. A port 64 can also be made through the clip so that it connects the cavity between this membrane with the area behind membrane 57. If the port and cavity so described are then filled with fluid (and provided that portion of membrane 56 that is located underneath the graphite deposit is not permanently affixed to the housing 30 of the device 10), pressure exerted by the waistband of the diaper on membrane 66 will be transferred through the membrane by the fluid to the underside of membrane 57, pressing 57 towards 60 and allowing pressure from both sides of the clip to be measured. Such a sensor is expected to be more sensitive than those disclosed in the embodiments of Figures 4 and 5.

[0062] It is to be appreciated, that the invention is not limited to any specific embodiment or configuration as hereinbefore generally described or illustrated.

Claims

1. A device (10) for continuously monitoring one or more indicators relating to the health or comfort of a person (12), the device including: one or more sensing means for sensing and measuring a value of one or more desired indicators; and
a communicating means (13) for communicating an alarm signal when the measured value is above or below a predetermined value or range of values, wherein the device includes a housing (16, 30, 50) and a clip (18) adapted for attaching the housing to an item of clothing (14) of the person in use, and wherein said clip can be located between the item of clothing and the skin of the person in use,
characterised in that at least one pressure sensing means is incorporated in the clip.

2. A device as claimed in claim 1, wherein the indicator is selected from the group including: breathing, heartbeat, temperature and humidity.

3. A device as claimed in claim 1 wherein the item of clothing (14) is selected from the group including: a conventional diaper, and a conventional undergarment.

4. A device as claimed in claim 2 wherein the sensing means for sensing breathing of the person is in the form of a pressure transducer.

5. A device as claimed in claim 4, wherein the pressure transducer measures pressure exerted on it by the lifting and falling of the skin of the breathing person (12) and, when the pressure exerted on the pressure transducer occurs in irregular intervals or ceases for a predetermined period of time, the communicating means (13) are activated.

6. A device as claimed in claim 5 wherein, when the pressure transducer measures pressure that occurs

in Irregular intervals or ceases for a predetermined period of time, it activates a stimulating means aimed at encouraging the person (12) to breathe normally either prior to or simulataneously with activating the communicating means (13).

7. A device as claimed in claim 6, wherein the stimulating means is in the form of a vibrating mechanism that causes the housing (16, 30, 50) of the device (10) to vibrate.

8. A device as claimed in any one of claims 4 to 7, wherein the sensing means for sensing and measuring the breathing of a person (12) is sufficiently sensitive to additionally sense the heartbeat of a person and wherein when an irregular heartbeat or a cessation of heartbeat is sensed, the communicating means (13) is activated.

9. A device as claimed in claim 1, wherein sensing means for sensing temperature, which can be in use located between the item of clothing and the skin of the person wearing the device and an additional temperature sensing means, which can be in use located to the exterior of the item of clothing (14) of the person (12) wearing the device, are provided so that the values measured by the two temperature sensing means can be compared continuously so as to calculate the rate of heat loss of the person wearing the device wherein, when the rate of heat loss falls below or rises above a predetermined value or range of values, the communicating means (13) is activated.

10. A device as claimed in claim 1, wherein sensing means for sensing humidity, which can be in use located between the item of clothing and the skin of the person wearing the device and an additional humidity sensing means, which can be in use located to the exterior of the item of clothing (14) of the person (12) wearing the device, are provided so that the values measured by the two humidity sensing means can be compared continuously so as to be able to ascertain when the humidity level between the item of clothing and skin of the person rises above a desired value at which stage the communicating means (13) is activated.

11. A device is claimed in any one of claim 1 or claim 10, wherein the humidity sensing means is in the form of a conductivity sensor so that when the conductivity measured rises above a predetermined value, the communicating means (13) is activated.

12. A device as claimed in any one of the preceding claims, wherein the communicating means (13) includes one or more of the following: an audible alarm, a visual signal and a radio signal transmitted to a suitable remotely located receiver.

13. A device as claimed In claim 1 wherein the housing (16, 30, 50) and clip (18) are manufactured from a synthetic plastics material.

14. A device as claimed in claim 1 wherein the device (10) includes a power source.

15. A device as claimed in claim 1 wherein the device (10) includes an interface on the housing (16, 30, 50) to permit setting of the predetermined value or range of values at which the communicating means (13) is activated and for switching the device on and off.

16. A device as claimed in claim 15 wherein the housing (16, 30, 50) is provided which a cover for covering the interface so as to inhibit the device (10) from accidentally being turned off or reprogrammed during use.

17. A device as claimed in claim 1 wherein the device (10) includes a data storage device for storing information sensed by the sensing means.

Patentansprüche

1. Vorrichtung (10) zum kontinuierlichen Überwachen eines oder mehrerer Indikatoren bezüglich Gesundheit oder Komfort einer Person (12), wobei die Vorrichtung umfasst: ein oder mehrere Abtastmittel zum Abtasten und Messen eines Wertes eines oder mehrerer gewünschter Indikatoren; und
ein Kommunikationsmittel (13) zum Mitteilen eines Alarmsignals, wenn der gemessene Wert unter oder über einem vorherbestimmten Wert oder Wertebereich liegt, wobei die Vorrichtung ein Gehäuse (16, 30, 50) und eine Klammer (18), die dazu geeignet ist, um im Gebrauch das Gehäuse an einem Kleidungsstück (14) der Person festzuklammern, umfasst, und wobei die Klammer sich im Gebrauch zwischen dem Kleidungsstück und der Haut der Person befinden kann,
dadurch gekennzeichnet, dass mindestens ein Druckabtastmittel in die Klammer integriert ist.

2. Vorrichtung nach Anspruch 1, wobei der Indikator aus der Gruppe ausgewählt wird, umfassend: Atmung, Herzschlag, Temperatur und Feuchtigkeit.

3. Vorrichtung nach Anspruch 1, wobei das Kleidungsstück (14) aus der Gruppe ausgewählt wird, umfassend: eine herkömmliche Windel und ein herkömmliches Unterwäscheteil.

4. Vorrichtung nach Anspruch 2, wobei die Abtastmittel zum Abtasten der Atmung der Person in Form eines Drucksensors vorliegen.

5. Vorrichtung nach Anspruch 4, wobei der Drucksensor den Druck misst, der darauf durch das Anheben und Absenken der Haut der atmenden Person (12) ausgeübt wird, und wenn der auf den Drucksensor ausgeübte Druck in unregelmäßigen Abständen erfolgt oder während einer vorherbestimmten Zeitspanne aufhört, die Kommunikationsmittel (13) aktiviert werden.

6. Vorrichtung nach Anspruch 5, wobei, wenn der Drucksensor einen Druck misst, der in unregelmäßigen Abständen vorkommt oder während einer vorherbestimmten Zeitspanne aufhört, er ein Stimulationsmittel aktiviert, das darauf abzielt, die Person (12) zum normalen Atmen zu bewegen, entweder, bevor die Kommunikationsmittel (13) aktiviert werden, oder gleichzeitig dazu.

7. Vorrichtung nach Anspruch 6, wobei das Stimulationsmittel in Form eines vibrierenden Mechanismus vorliegt, der das Gehäuse (16, 30, 60) der Vorrichtung (10) vibrieren lässt.

8. Vorrichtung nach einem der Ansprüche 4 bis 7, wobei das Abtastmittel zum Abtasten und Messen der Atmung einer Person (12) empfindlich genug ist, um zudem den Herzschlag einer Person abzutasten, und wobei, wenn ein unregelmäßiger Herzschlag oder ein Aufhören des Herzschlags abgefühlt wird, das Kommunikationsmittel (13) aktiviert wird.

9. Vorrichtung nach Anspruch 1, wobei ein Abtastmittel zum Abtasten einer Temperatur, das sich im Gebrauch zwischen dem Kleidungsstück und der Haut der Person, welche die Vorrichtung trägt, befinden kann, und ein zusätzliches Temperaturabtastmittel, das sich im Gebrauch außen an dem Kleidungsstück (14) der Person (12), welche die Vorrichtung trägt, befinden kann, bereitgestellt werden, so dass die Werte, die von den beiden Temperaturabtastmitteln gemessen werden, kontinuierlich verglichen werden können, um die Wärmeverlustrate der Person, welche die Vorrichtung trägt, zu berechnen, wobei, wenn die Wärmeverlustrate unter einen vorherbestimmten Wert oder einen Wertbereich sinkt oder darüber hinaus ansteigt, das Kommunikationsmittel (13) aktiviert wird.

10. Vorrichtung nach Anspruch 1, wobei ein Abtastmittel zum Abtasten von Feuchtigkeit, das sich im Gebrauch zwischen dem Kleidungsstück und der Haut der Person, welche die Vorrichtung trägt, befinden kann, und ein zusätzliches Feuchtigkeitsabtastmittel, das sich im Gebrauch außen an dem Kleidungsstück (14) der Person (12), welche die Vorrichtung trägt, befinden kann, bereitgestellt werden, so dass die Werte, die von den beiden Feuchtigkeitsabtastmitteln gemessen werden, kontinuierlich verglichen werden können, um festzustellen, wann der Feuchtigkeitspegel zwischen dem Kleidungsstück und der Haut der Person über einen gewünschten Wert hinausgeht, wobei das Kommunikationsmittel (13) zu diesem Zeitpunkt aktiviert wird.

11. Vorrichtung nach einem der Ansprüche 1 oder 10, wobei das Feuchtigkeitsabtastmittel in Form eines Leitfähigkeitssensors vorliegt, so dass, wenn die gemessene Leitfähigkeit über einen vorherbestimmten Wert ansteigt, das Kommunikationsmittel (13) aktiviert wird.

12. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei das Kommunikationsmittel (13) ein oder mehrere der folgenden Elemente umfasst: einen hörbaren Alarm, ein optisches Signal und ein Funksignal, das an einen geeigneten, entfernt aufgestellten Empfänger übertragen wird.

13. Vorrichtung nach Anspruch 1, wobei das Gehäuse (16, 30, 50) und die Klammer (18) aus einem synthetischen Kunststoff hergestellt sind.

14. Vorrichtung nach Anspruch 1, wobei die Vorrichtung (10) eine Energiequelle umfasst.

15. Vorrichtung nach Anspruch 1, wobei die Vorrichtung (10) eine Schnittstelle auf dem Gehäuse (16, 30, 50) umfasst, um die Einstellung des vorherbestimmten Wertes oder Wertbereichs zu ermöglichen, bis das Kommunikationsmittel (13) aktiviert wird, und um die Vorrichtung ein- und auszuschalten.

16. Vorrichtung nach Anspruch 15, wobei das Gehäuse (16, 30, 50) mit einem Deckel versehen ist, um die Schnittstelle zu bedecken, um ein Ausschalten oder ein versehentliches Umprogrammieren der Vorrichtung (10) im Gebrauch zu verhindern.

17. Vorrichtung nach Anspruch 1, wobei die Vorrichtung (10) eine Datenspeichervorrichtung zum Speichern von Informationen, die von den Abtastmitteln erfasst werden, umfasst.

Revendications

1. Dispositif (10) pour surveiller en continu un ou plusieurs indicateurs concernant la santé ou le confort d'une personne (12), le dispositif comprenant : un ou plusieurs moyens de détection pour détecter et mesurer une valeur d'un ou de plusieurs indicateurs souhaités ; et
un moyen de communication (13) pour communiquer un signal d'alarme lorsque la valeur mesurée est au-dessus ou au-dessous d'une valeur ou d'une plage de valeurs prédéterminée, dans lequel le dis-

positif comprend un boîtier (16, 30, 50) et une attache (18) adaptée pour attacher le boîtier à un vêtement (14) de la personne en cours d'utilisation, et dans lequel ladite attache peut en cours d'utilisation être située entre le vêtement et la peau de la personne, **caractérisé en ce qu'**au moins un moyen de détection de pression est intégré dans l'attache.

2. Dispositif selon la revendication 1, dans lequel l'indicateur est sélectionné dans le groupe comprenant : la respiration, le battement du cour, la température et l'humidité.

3. Dispositif selon la revendication 1, dans lequel le vêtement (14) est sélectionné dans le groupe comprenant : une couche conventionnelle et un sous-vêtement conventionnel.

4. Dispositif selon la revendication 2, dans lequel le moyen de détection pour détecter la respiration de la personne se présente sous la forme d'un transducteur de pression.

5. Dispositif selon la revendication 4, dans lequel le transducteur de pression mesure la pression exercée sur celui-ci par le soulèvement et l'abaissement de la peau de la personne (12) qui respire, et lorsque la pression exercée sur le transducteur de pression survient à des intervalles irréguliers ou cesse pendant une période de temps prédéterminée, les moyens de communication (13) activés.

6. Dispositif selon la revendication 5, dans lequel, lorsque le transducteur de pression mesure une pression qui survient à intervalles irréguliers ou cesse pendant une période de temps prédéterminée, il active un moyen de stimulation visant à encourager la personne (12) à respirer normalement, soit avant d'activer les moyens de communication (13), soit en même temps que l'activation.

7. Dispositif selon la revendication 6, dans lequel le moyen de stimulation se présente sous la forme d'un mécanisme vibreur qui amène le boîtier (16, 30, 50) du dispositif (10) à vibrer.

8. Dispositif selon l'une quelconque des revendications 4 à 7, dans lequel le moyen de détection pour détecter et mesurer la respiration d'une personne (12) est suffisamment sensible pour détecter en plus le battement du coeur d'une personne, et dans lequel, lorsqu'un battement du coeur irrégulier ou une cessation du battement du coeur est détecté(e), le moyen de communication (13) est activé.

9. Dispositif selon la revendication 1, dans lequel un moyen de détection pour détecter une température, qui peut en cours d'utilisation être situés entre le vêtement et la peau de la personne portant le dispositif, et un moyen de détection de température supplémentaire, qui peut en cours d'utilisation être situé à l'extérieur du vêtement (14) de la personne (12) portant le dispositif, sont fournis de sorte que les valeurs mesurées par les deux moyens de détection de température puissent être comparées en continu de façon à calculer le taux de perte de chaleur de la personne portant le dispositif, dans lequel, lorsque le taux de perte de chaleur descend au-dessous ou monte au-dessus d'une valeur ou d'une plage de valeurs prédéterminée, le moyen de communication (13) est activé.

10. Dispositif selon la revendication 1, dans lequel un moyen de détection pour détecter de l'humidité qui peut en cours d'utilisation être situé entre le vêtement et la peau de la personne portant le dispositif, et un moyen de détection d'humidité supplémentaire, qui peut en cours d'utilisation être situé à l'extérieur du vêtement (14) de la personne (12) portant le dispositif, sont fournis de sorte que les valeurs mesurées par les deux moyens de détection d'humidité puissent être comparées en continu de façon à pouvoir établir quand le niveau d'humidité entre le vêtement et la peau de la personne monte au-dessus d'une valeur souhaitée, à quel stade le moyen de communication (13) est activé.

11. Dispositif selon l'une quelconque des revendications 1 ou 10, dans lequel le moyen de détection d'humidité se présente sous la forme d'un capteur de conductivité de sorte que quand la conductivité mesurée monte au-dessus d'une valeur prédéterminée, le moyen de communication (13) est activé.

12. Dispositif selon l'une quelconque des revendications précédentes, dans lequel le moyen de communication (13) comprend un ou plusieurs des éléments suivants : une alarme audible, un signal visuel et un signal radio transmis à un récepteur adéquat, situé à distance.

13. Dispositif selon la revendication 1, dans lequel le boîtier (16, 30, 50) et l'attache (18) sont fabriqués à partir d'une matière plastique synthétique.

14. Dispositif selon la revendication 1, dans lequel le dispositif (10) comprend une source d'énergie.

15. Dispositif selon la revendication 1, dans lequel le dispositif (10) comprend une interface sur le boîtier (16, 30, 50) pour permettre le réglage de la valeur ou de la plage de valeurs prédéterminée à laquelle le moyen de communication (13) est activé et pour mettre le dispositif en et hors service.

16. Dispositif selon la revendication 15, dans lequel le

boîtier (16, 30, 50) est muni d'un couvercle pour couvrir l'interface de façon à empêcher une mise hors service ou une reprogrammation accidentelle du dispositif (10) en cours d'utilisation.

17. Dispositif selon la revendication 1, dans lequel le dispositif (10) comprend un dispositif de stockage de données pour stocker des informations détectées par les moyens de détection.

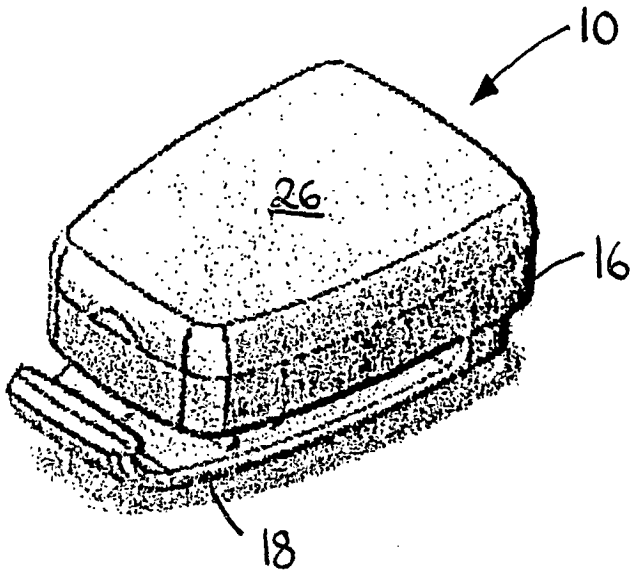

Figure 1

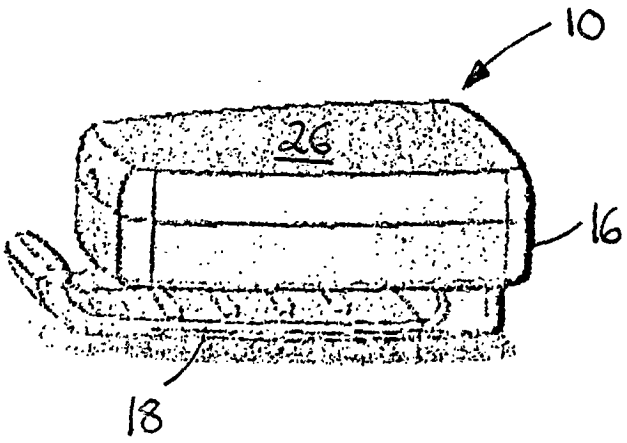

Figure 2

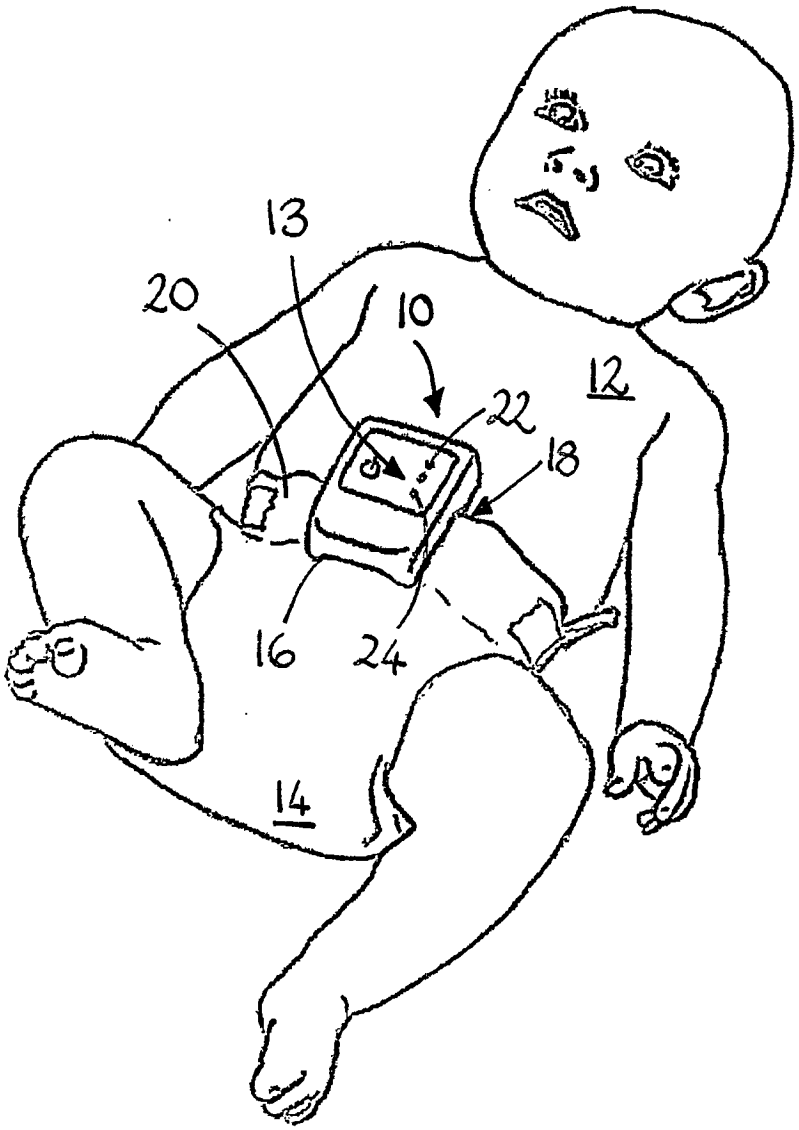

Figure 3

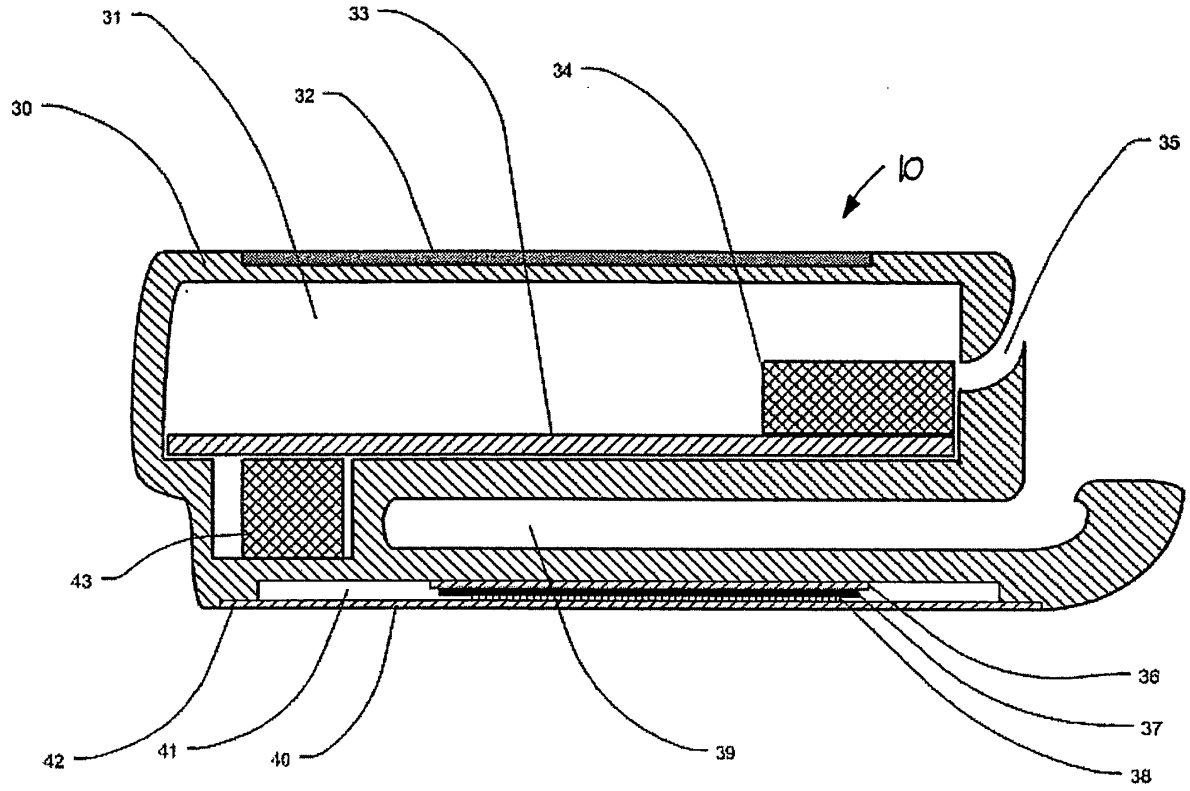

Figure 4

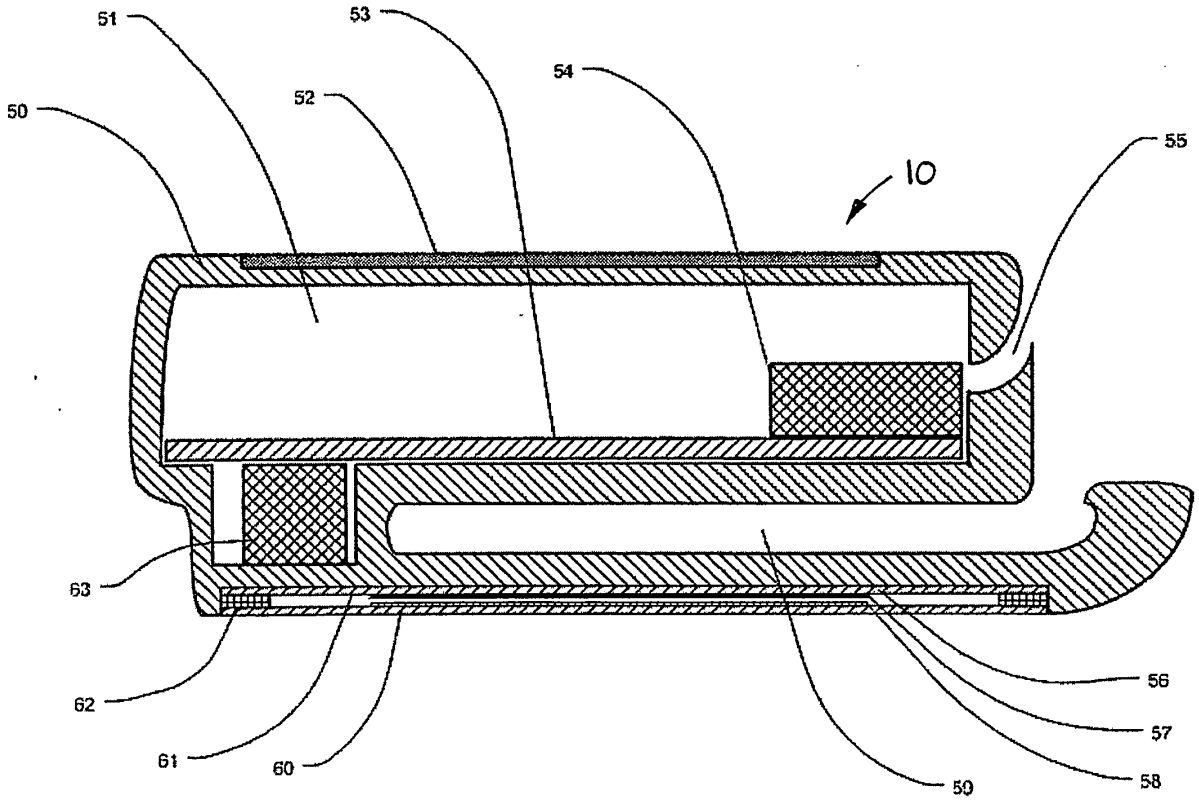

Figure 5

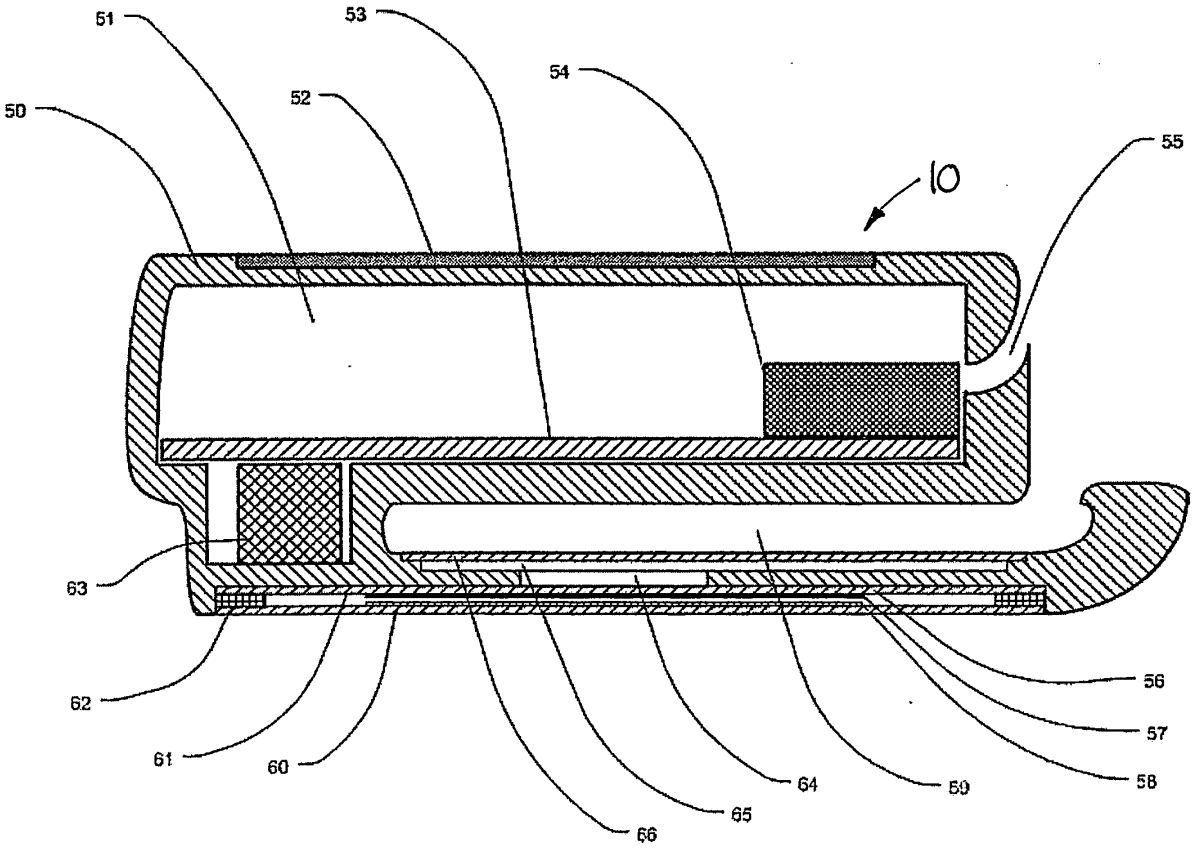

Figure 6

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 5400012 A **[0003]**
- US 4146885 A **[0004]**
- US 200212429 B **[0005]**
- US 2002008630 A **[0006]**

专利名称(译)	用于监测人类状况的装置		
公开(公告)号	EP1653850B1	公开(公告)日	2010-12-22
申请号	EP2004785430	申请日	2004-08-04
[标]申请(专利权)人(译)	彼得森JOHANNES德克勒克		
申请(专利权)人(译)	彼得森，JOHANNES德克勒克		
当前申请(专利权)人(译)	彼得森，JOHANNES德克勒克		
[标]发明人	PIETERSEN JOHANNES DE KLERK		
发明人	PIETERSEN, JOHANNES DE KLERK		
IPC分类号	A61B5/00 A61B5/0205 A61F13/15		
CPC分类号	A61B5/02055 A61B5/0002 A61B5/01 A61B5/0205 A61B5/6804 A61F13/84		
优先权	200308285 2003-10-24 ZA 200306138 2003-08-08 ZA 200300949 2003-08-04 ZA		
其他公开文献	EP1653850A1		
外部链接	Espacenet		

摘要(译)

一种用于连续监测与人的健康或舒适度相关的一个或多个指示器的装置12包括一个或多个用于测量一个或多个所需指示器的值的传感装置和一个在测量值高于时传达警报信号的通信装置13或者低于预定值或值范围的范围，其中装置10适于附接到人12的衣服14。

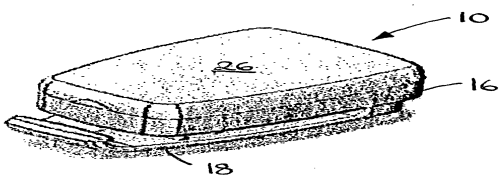

Figure 1

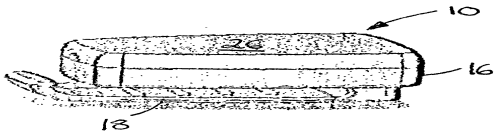

Figure 2