(12) UK Patent Application (19) GB (11) 2505641 (13) A

(43) Date of A Publication 12.03.2014

(21) Application No: 1215315.1

(22) Date of Filing: 29.08.2012

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(51) INT CL:
G08B 21/02 (2006.01)

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(58) Field of Search:
INT CL **G08B**
Other: **EPODOC,WPI**

(54) Title of the Invention: **A proximity monitor**
Abstract Title: **Proximity monitoring system for children or elderly people**

(57) The system comprises a base unit and a remote unit adapted to be worn or carried by a person. The base unit and the remote unit comprise an RF transmitter, and RF receiver respectively. A signal is communicated between the base unit transmitter and the remote unit receiver, the strength of which is compared to a threshold value. An alarm is output at the remote unit upon the signal strength falling below the threshold value. The base unit may comprise means to control the transmitted signal strength. The alarm output may comprise a speech message. Both units may comprise means for attachment to a person's body. An alarm may be activated upon removal of the remote unit from a person's body. The remote unit may additionally comprise a moisture sensor. In a further aspect, the base unit and the remote unit comprise an RF receiver, and RF transmitter respectively, whereby an RF signal is communicated from the remote unit transmitter to the base unit receiver, and the signal strength is compared to a threshold value whereby an alarm is output at the base unit upon the signal strength falling below a threshold value.

FIGURE 6

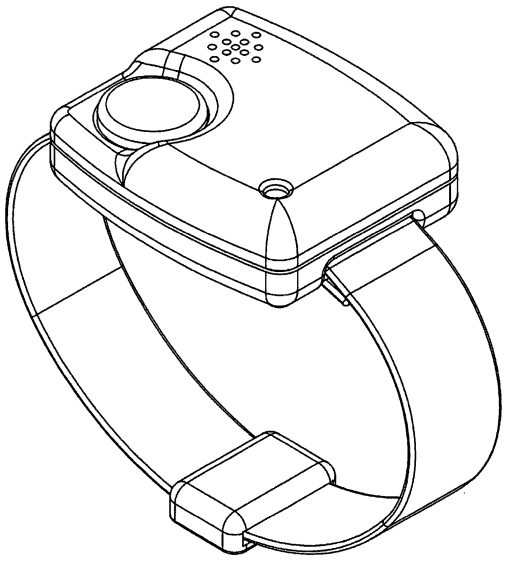

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FIGURE 1

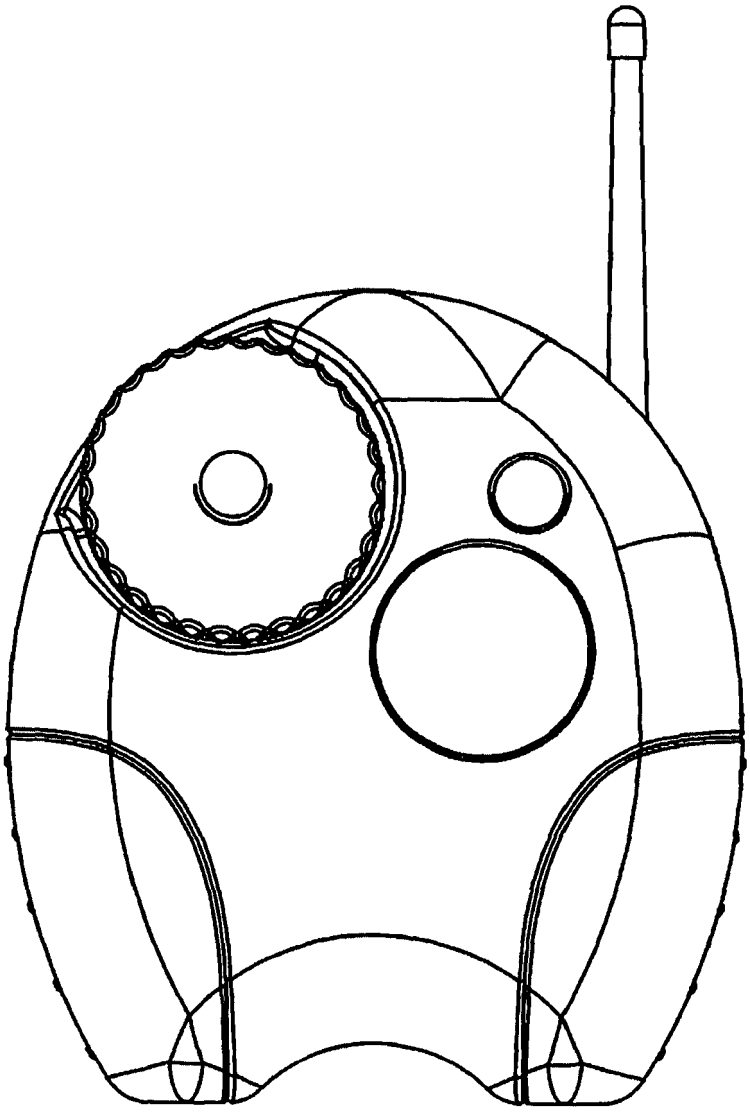


FIGURE 2

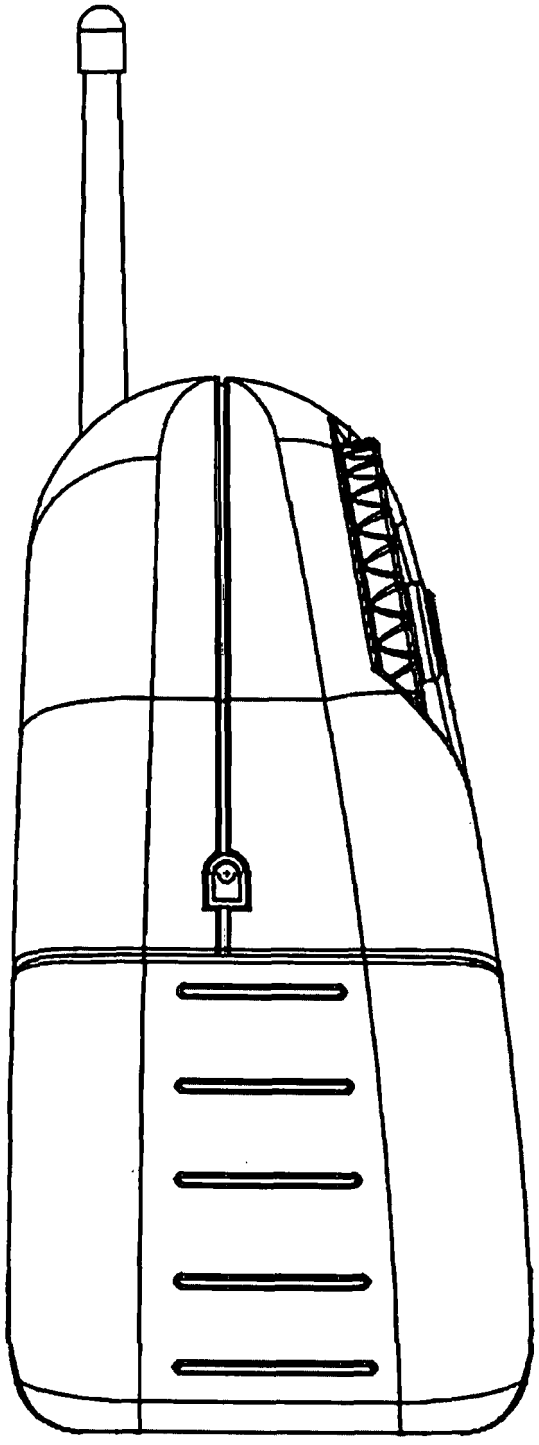


FIGURE 3

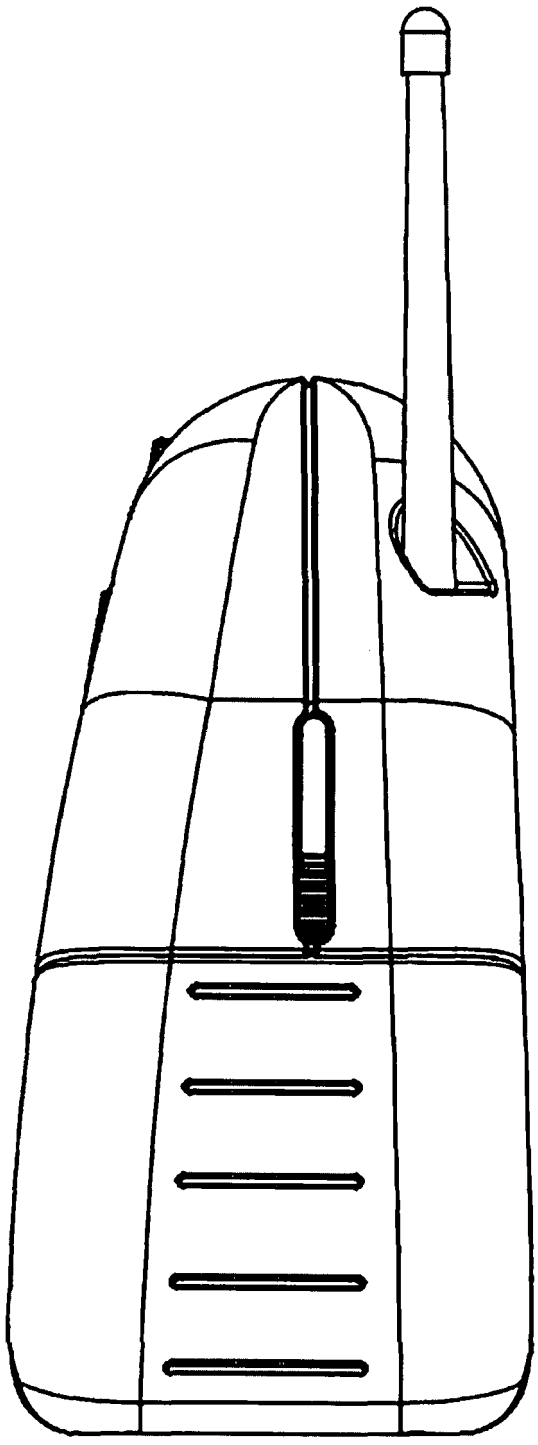


FIGURE 4

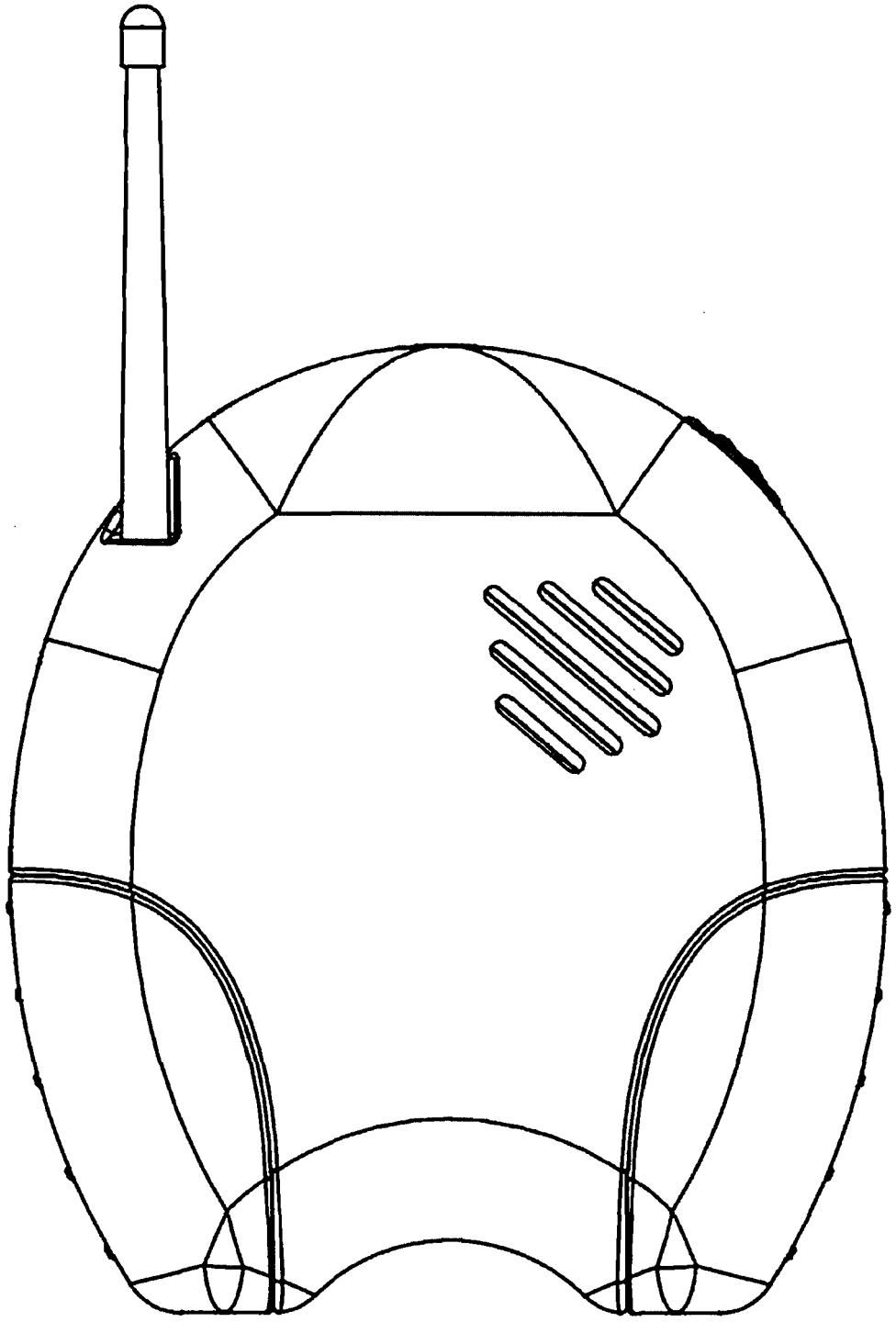


FIGURE 5

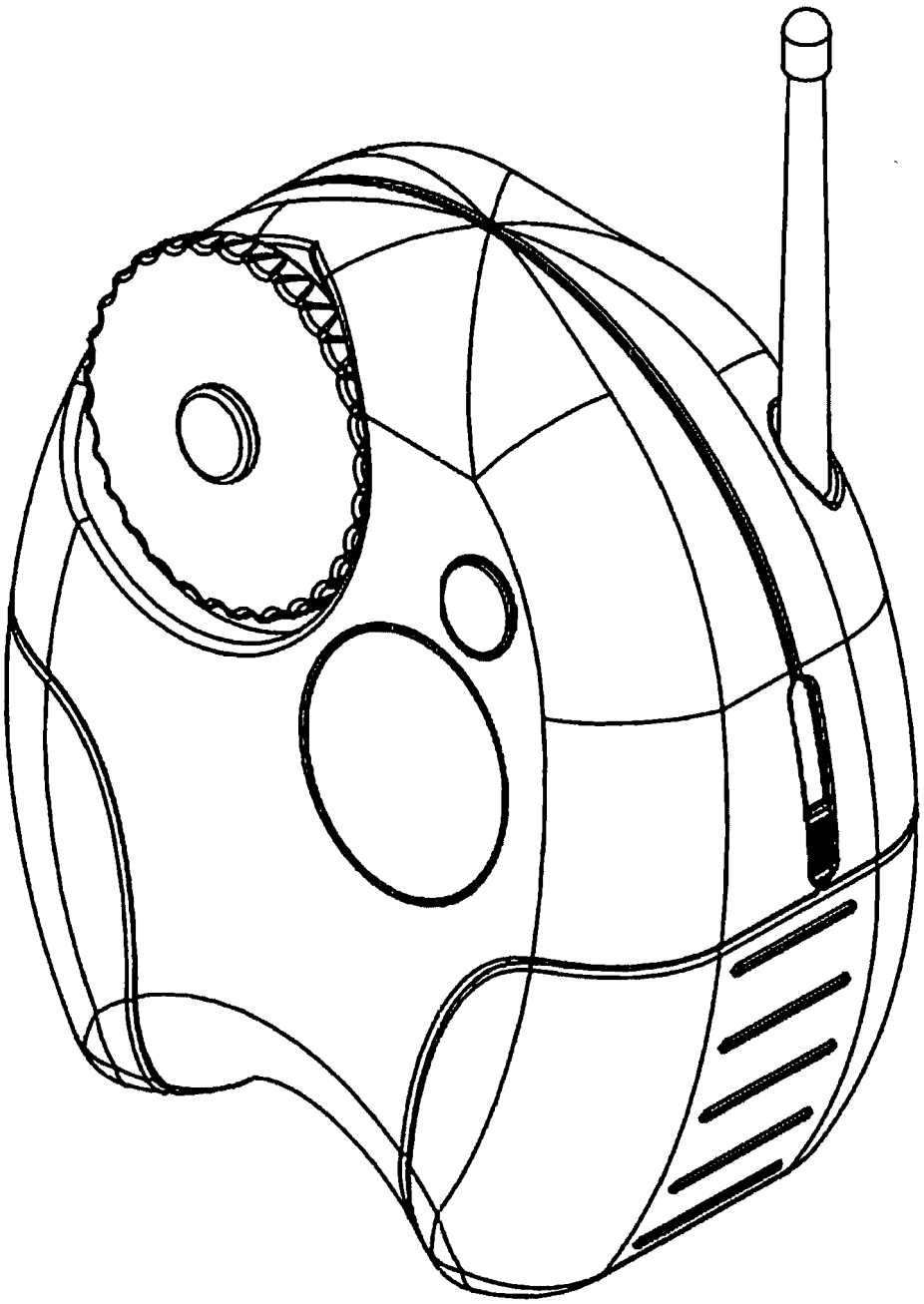


FIGURE 6

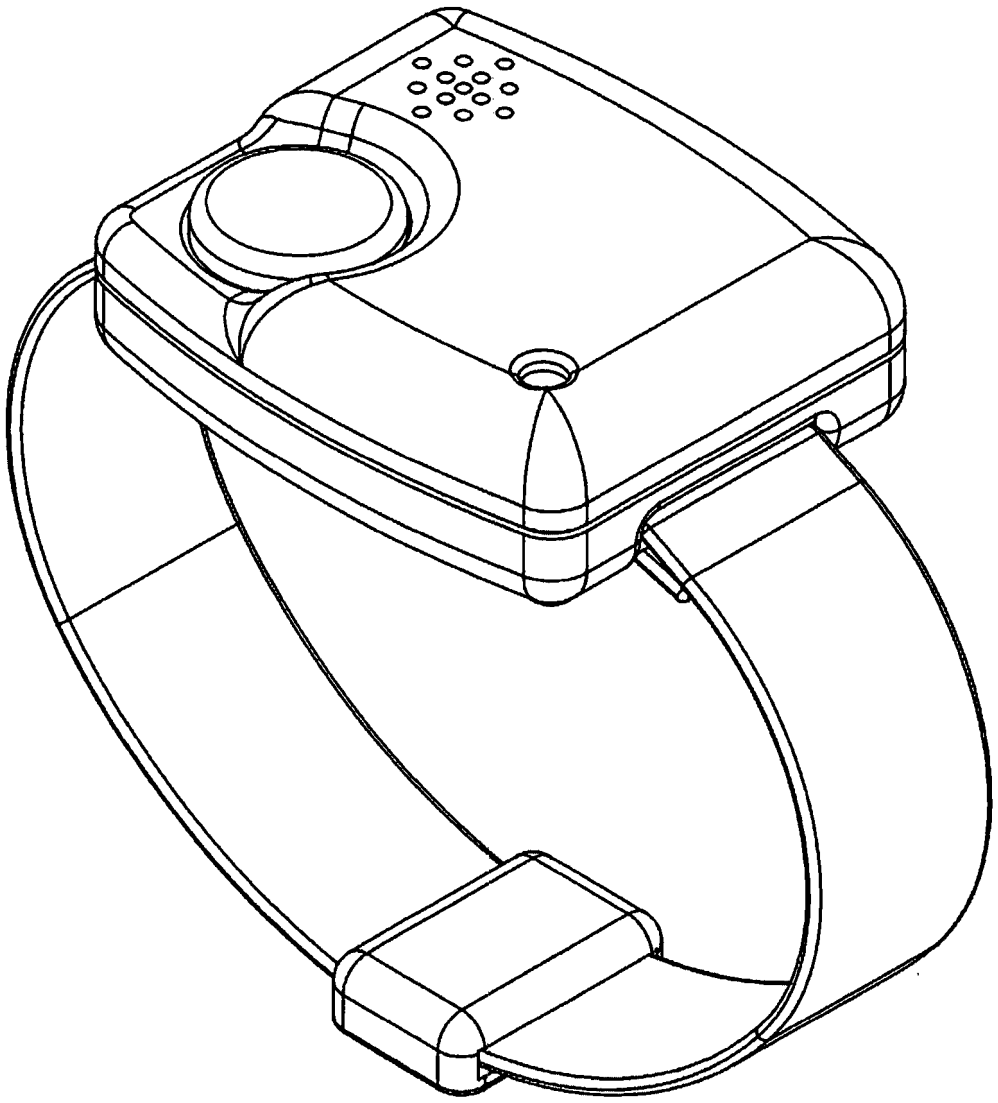


FIGURE 7

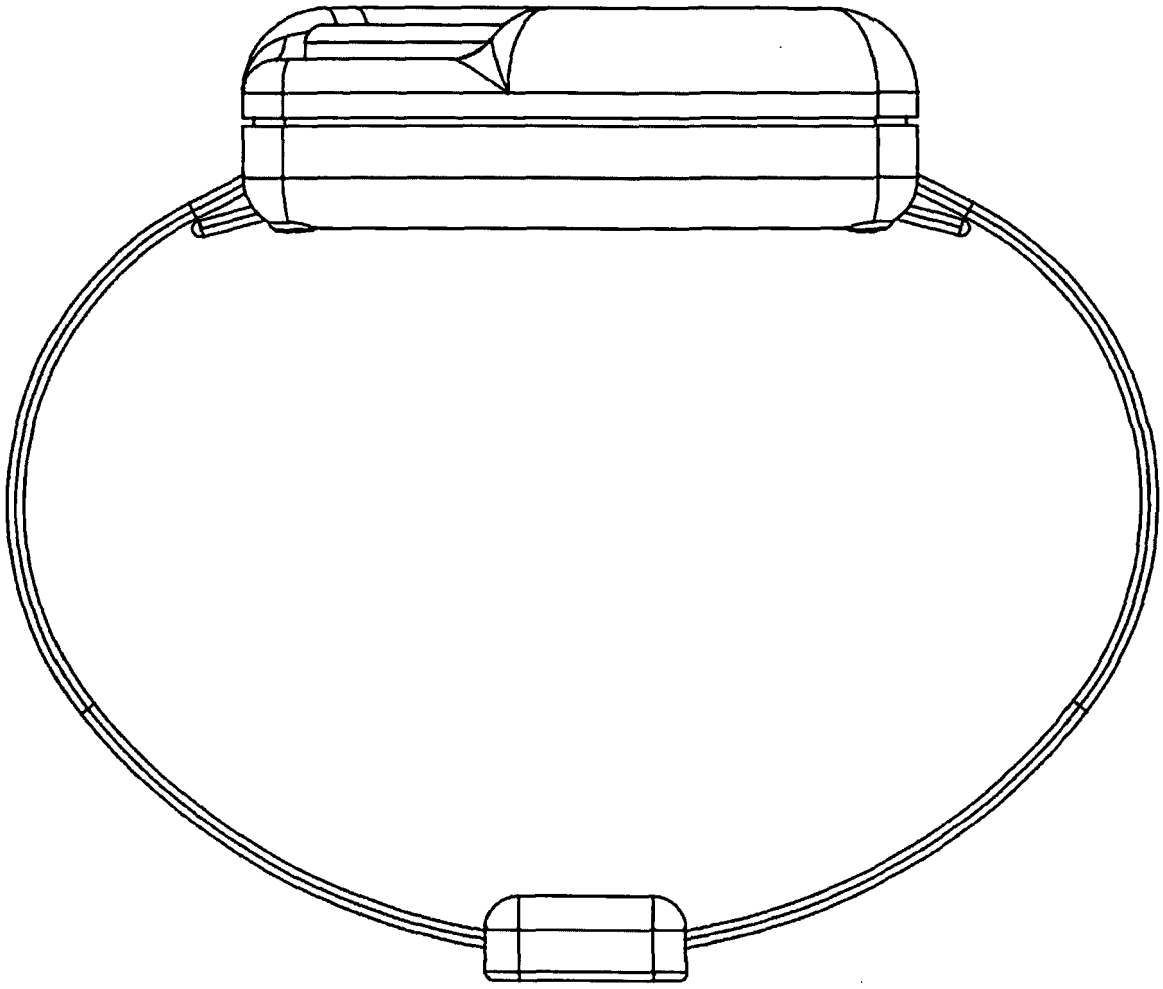


FIGURE 8

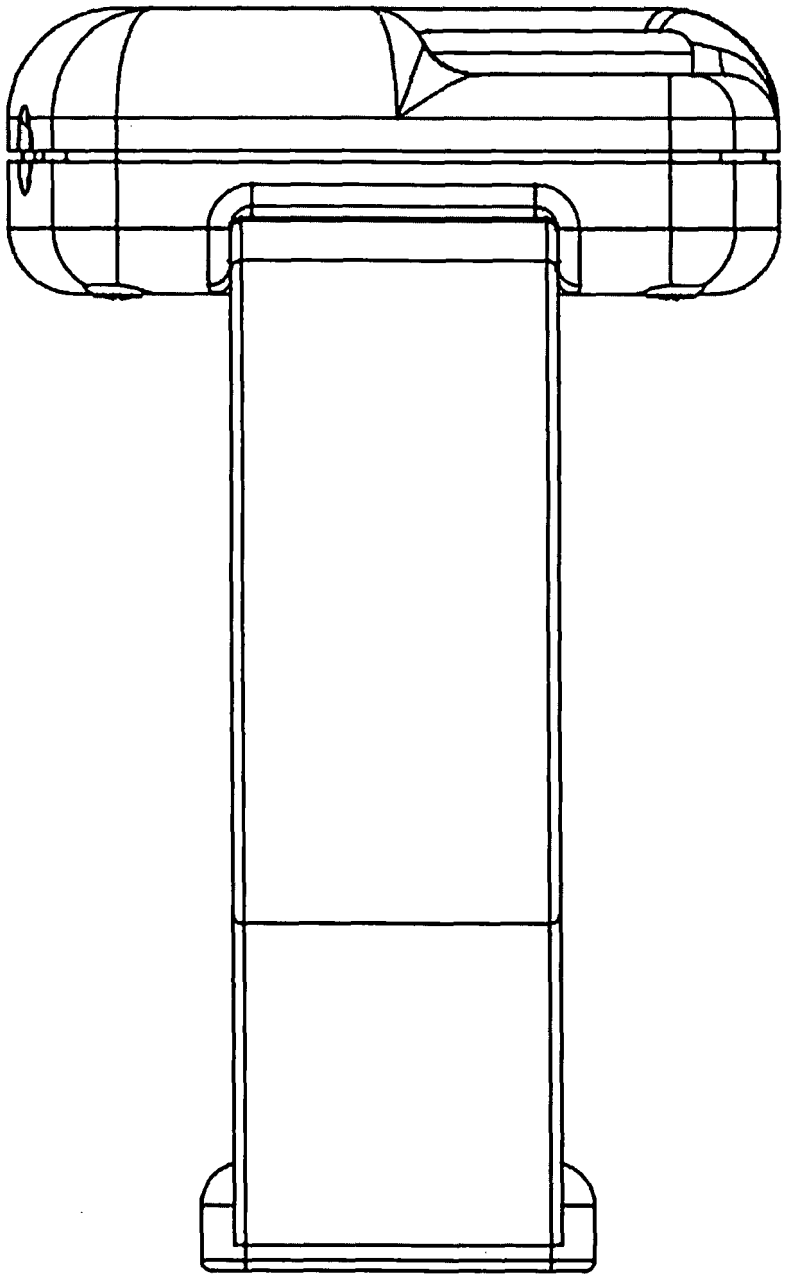


FIGURE 9

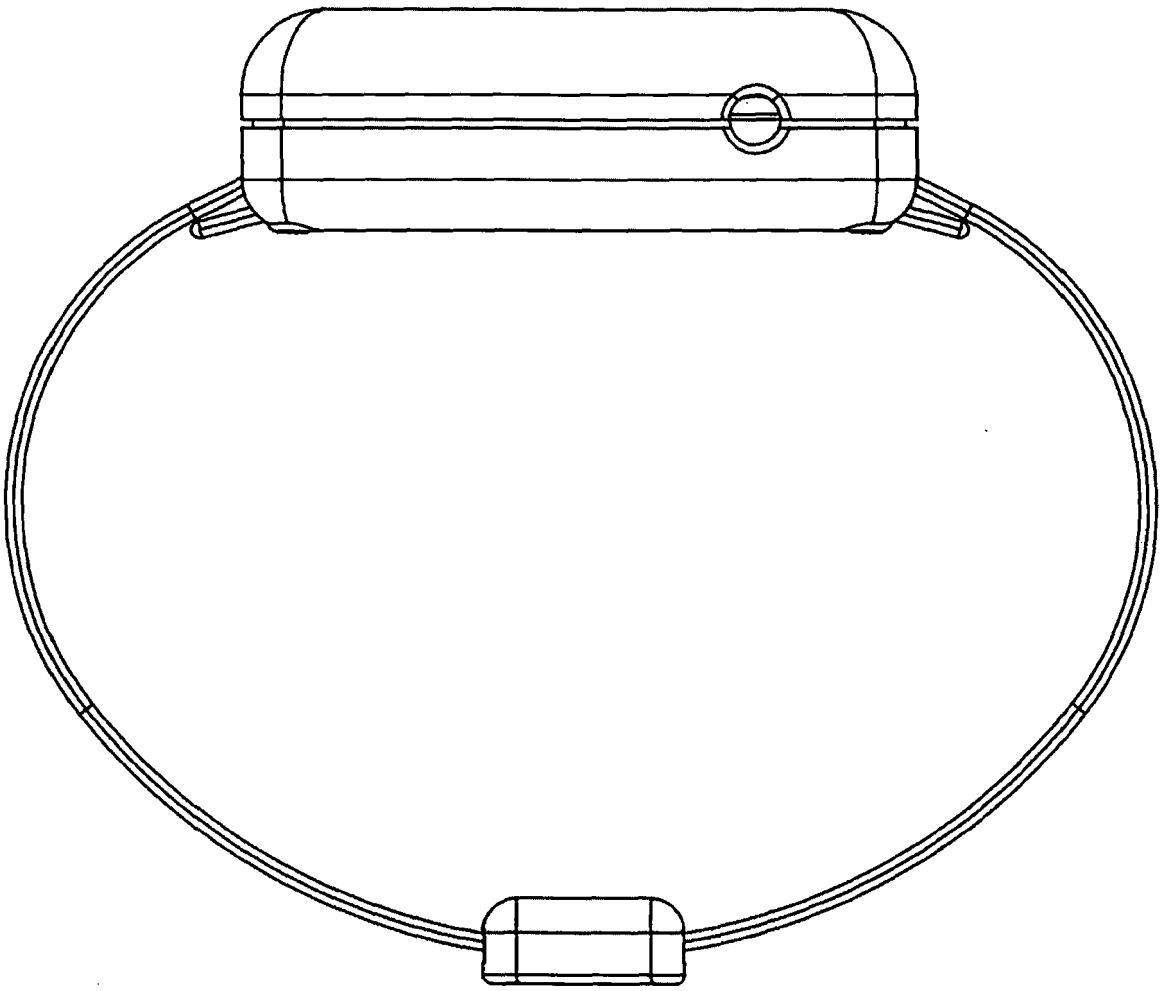


FIGURE 10

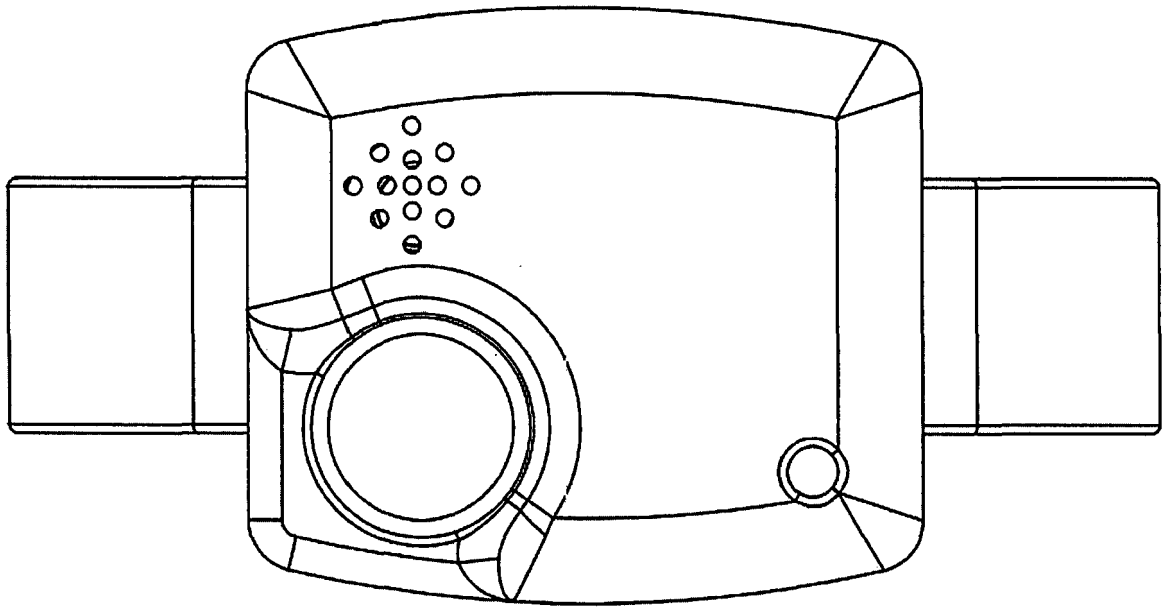


FIGURE 11

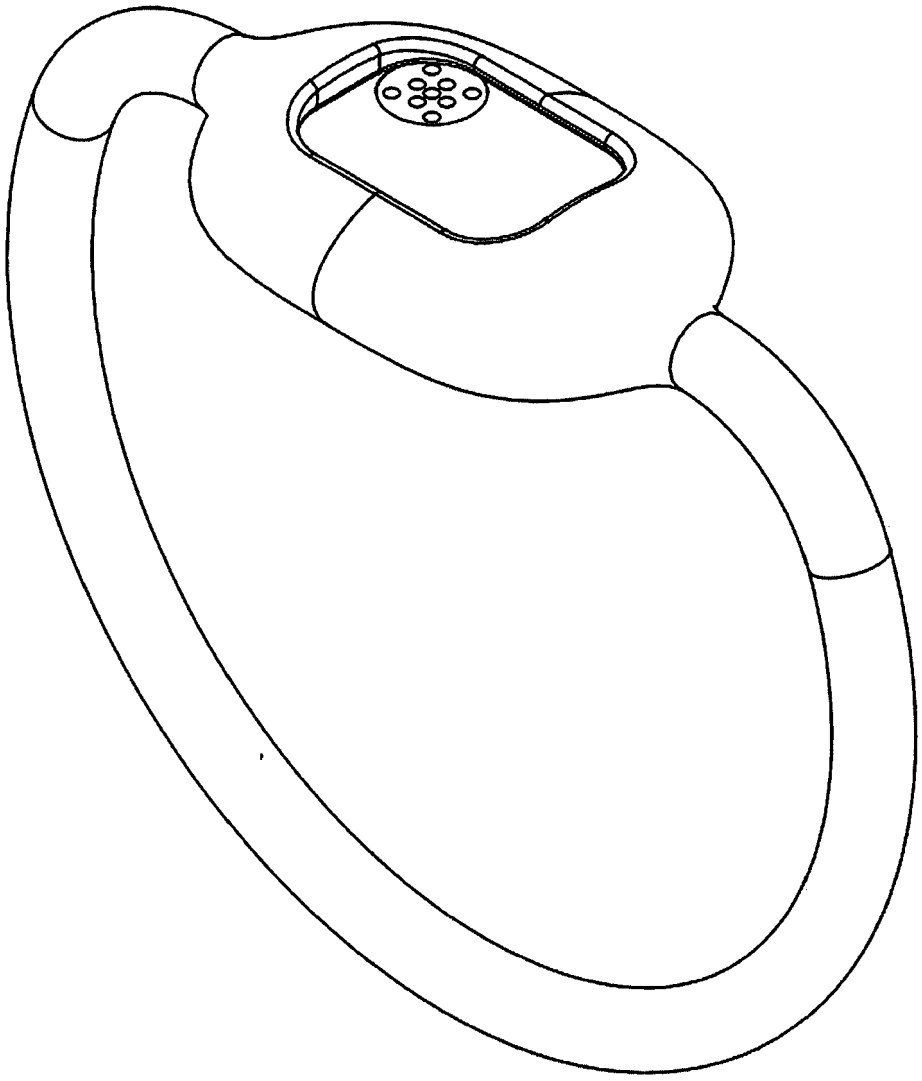


FIGURE 12

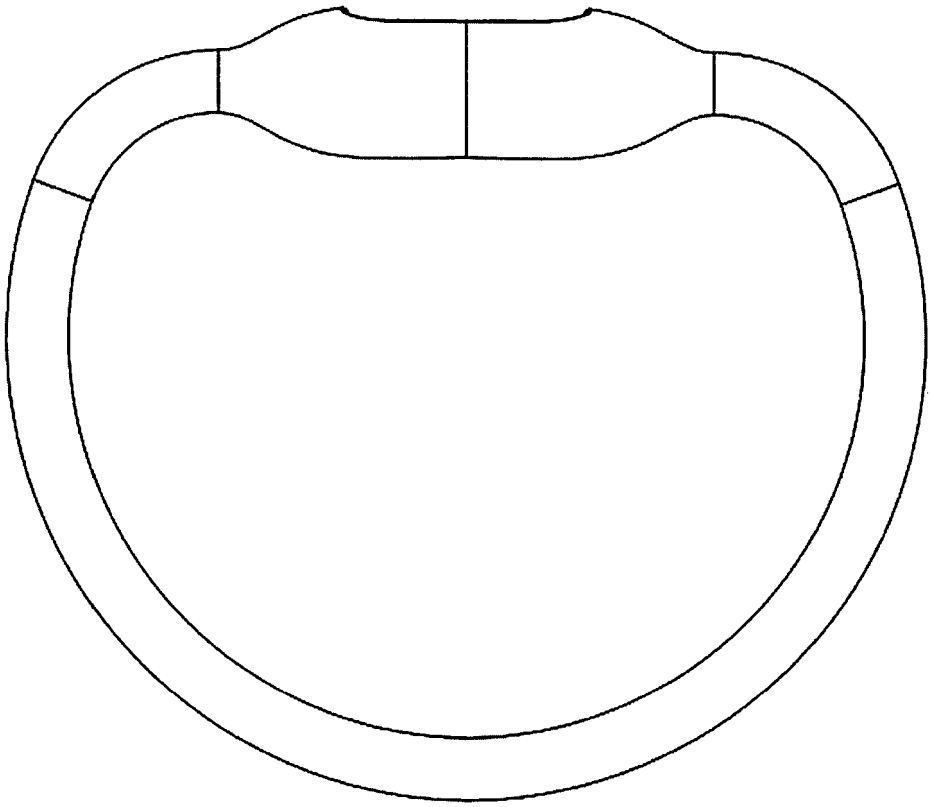
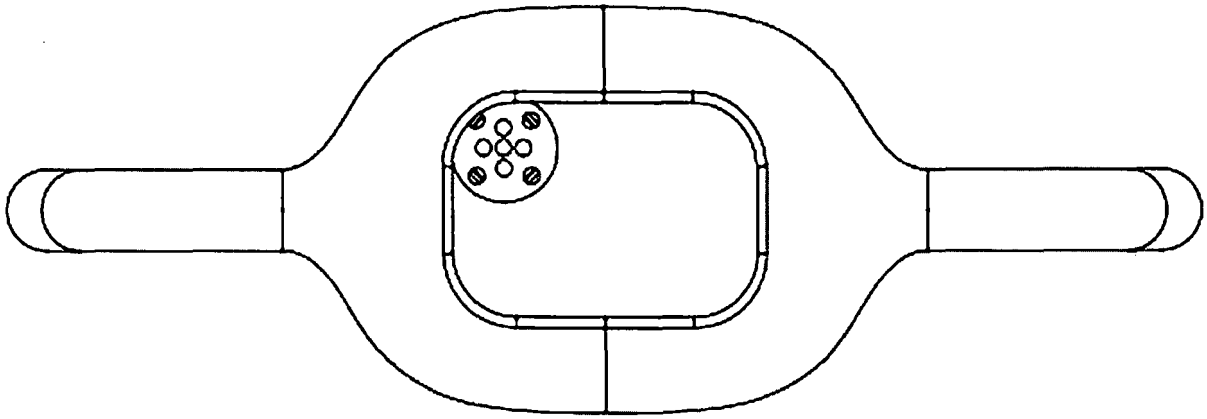


FIGURE 13



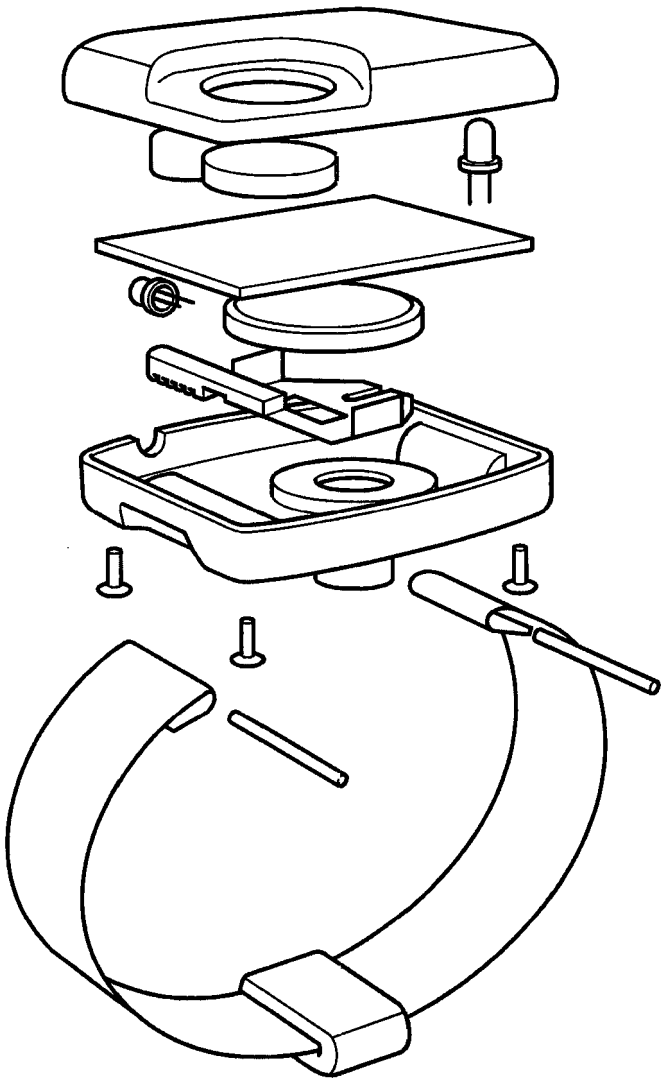


FIG. 14

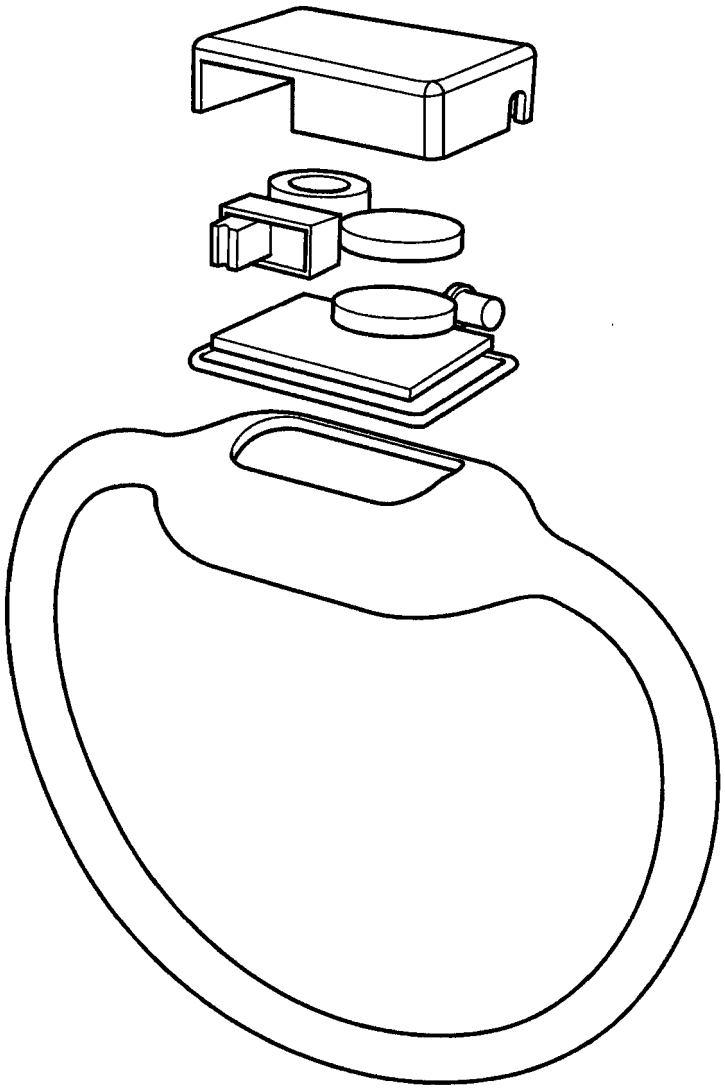


FIG. 15

A Proximity Monitor

Field of the Invention

The present invention relates to a proximity monitor for use in monitoring the position of people, for example children or others such as elderly people who may become confused or lost, and relates to safety monitors and alarm means for use in such circumstances.

Background

Baby monitors based on short range RF communication are known, and allow voice communication between a remote station and a base unit by RF, either in a one-way or two way manner. Position monitoring by means of GPS is known, in which a base unit's location is found by means of triangulation between satellites. However, GPS position finding relies on costly sensitive RF receivers and is liable to loss of position and inaccuracy, particularly at a distance scale of less than 100m. The prior art does not disclose a device that is suitable for short range monitoring of proximity, using RF means and capable of being implemented at low cost. The present invention provides such a means, and according to embodiments is adapted to a variety of applications each having commercial and practical value.

Summary of the Invention

According to a first aspect of the present invention there is provided a proximity monitor comprising:

a base unit comprising an RF transmitter and a base unit control means; and

a first remote unit comprising an RF receiver adapted to receive signals from the RF transmitter and a first remote unit control means;

wherein the first remote unit control means comprises means to measure the strength of the RF signal received by the RF receiver and is adapted to provide an alarm output when the signal strength falls below a threshold value.

Preferably the base unit comprises transmitter power control means to control the transmitted signal strength. In a preferred embodiment the transmitter power control means comprises a user-operable control that may be used to set the range of the proximity detector.

Preferably the first remote unit comprises an alarm means actuated by the alarm output. The alarm means may provide a visual indication, an audible indication, a vibratory indication or a combination of any of these. In a preferred embodiment the alarm means comprises a sounder. In a preferred embodiment the alarm means comprises a light source, for example an LED (Light Emitting Diode).

In a preferred embodiment the alarm means comprises means to play a speech message. In one embodiment the speech message may comprise a pre-determined code stored in memory means associated with the first remote unit control means. In a preferred embodiment the first remote unit control means further comprises means to record a recorded speech message that may later be played as part of the alarm means in response to the alarm output. Preferably the recorded speech message is digitised and stored in said memory means.

In use, the base unit may be placed in a first location and the first remote unit may be worn or carried by a person, for example a child. The base unit transmitter may transmit an RF signal that is received by the first remote unit receiver. The first remote unit control means may measure the signal strength, which will in general decrease with distance from the base unit. When the signal strength falls below a pre-determined threshold, the first remote unit control means actuates the alarm means, giving warning to the person that they are at or beyond a distance limit from the base unit. The alarm means may comprise instructions, for example a voice warning that the person is out of range, and instructions to return closer to the base unit. In this way the proximity monitor of the invention may monitor and inform about the distance of the wearer of the first remote unit from a chosen location, i.e. that of the base unit.

In a preferred embodiment the first remote unit further comprises a first remote unit transmitter and the base unit comprises a base unit receiver adapted to receive signals from the first remote unit transmitter. Preferably the first remote unit is adapted to send a signal to the base unit in response to the alarm output from the first remote unit control means. In this way, the first remote unit may indicate to the base unit that it is out of range. Preferably the base unit comprises indication means to show a user that the first remote unit is out of range, or at or beyond a certain distance from the base unit. The base unit may comprise alarm means, actuated by the base unit control means, to warn that the first remote unit is out of range.

In preferred embodiments the proximity monitor comprises a range setting means usable by a user to control the out-of-range distance setting by controlling the transmitter power output.

In one embodiment the base unit may comprise a housing adapted to stand on a surface, for example adapted for use in a fixed location. In an alternative embodiment the base unit may be adapted to be mobile. Preferably the base unit is adapted to be portable, and in some embodiments may be adapted to be carried or worn on the person.

In one embodiment the first remote unit and/or the base unit comprise means to enable it to be worn, for example a strap to allow it to be worn on the wrist in the manner of a watch. In one embodiment the first remote unit and/or base unit may comprise a time indication, and may function as a watch in addition to as part of a proximity monitor.

In a preferred embodiment the proximity monitor further comprises a second remote unit comprising a receiver adapted to receive signals from the base unit transmitter and a second remote unit control means, and warning means that may be actuated in response to a signal from the base unit. Warning means may comprise visual and/or audible means as described above.

In use this embodiment may operate as follows: the base unit transmitter sends a signal to the first remote unit receiver. If the received signal strength is below a threshold the first remote unit control means sounds an alarm means and also actuates the first remote unit transmitter. This then sends a signal to the base unit that the first remote unit is out of the chosen proximity range. The base unit transmitter then sends a signal to the second remote unit receiver to indicate that the first remote unit is out of range. The second remote unit may then actuate an alarm means to warn the user of the second remote unit that the wearer or carrier of the first remote unit is out of range.

An example of use of this embodiment is where the carrier of the first remote unit is a child, the user of the second remote unit is a parent, and the base station is the reference location within a given range of which the child should stay. The adult may not be close to the base station, but can receive warning from the base station that the child is out of range.

This embodiment has the following advantages: (i) as the base station is used as a reference point, the adult knows how far the child is from the reference point at any given time, rather than how far they are from the adult themselves; (ii) the base station may be made larger as it does not have to be carried by the user, so may comprise a more powerful transmitter and power supply, and in some embodiments may be powered by a mains supply; (iii) as the base station acts in use to relay signals from the first remote unit to the second remote unit, the first and second units may be further from one another in use for a given transmitter power in the first remote unit.

According to a second aspect of the invention there is provided a proximity monitor comprising:

a first remote unit comprising an RF transmitter, an RF receiver, a first remote unit alarm means and a first remote unit control means; and

a base unit comprising an RF receiver adapted to receive signals from the first remote unit, an RF transmitter adapted to transmit signals to the first remote unit, and a base unit control means;

wherein the base unit control means comprises means to measure the strength of the RF signal received by the RF receiver and is adapted to provide an alarm output when the signal strength falls below a threshold value.

Preferably the base unit is adapted to send a signal to the first remote unit in response to the alarm output. Preferably the first remote unit is adapted to actuate the first remote unit alarm means in response to said signal.

Preferably the first remote unit comprises transmitter power control means to control the transmitted signal strength.

Preferably the base unit comprises alarm means actuated by the alarm output, comprising visual and/or audible alarm means as described previously.

Preferably the first remote unit alarm means comprises visual and/or audible alarm means. In a preferred embodiment the first remote unit alarm means comprises an audible voice message as described previously.

In use this embodiment may operate as follows: the first remote unit transmitter sends a signal to the base unit receiver. If the received signal strength is below a threshold the base unit control means sounds an alarm and also actuates the base unit transmitter. This then sends a signal to the first remote unit that the first remote

unit is out of the chosen proximity range. The first remote unit then sounds an alarm to alert the wearer that they are out of range.

It will be understood that the invention encompasses both modes of operation, in which the range finding is done by means of measurement of received RF signal strength: either the base station transmits and the first remote unit receives and measures RF signal strength; or the first remote unit transmits and the base unit receives and measures RF signal strength. In each case, an alarm is sounded at the first remote unit that the wearer is out of range of the base unit.

Similarly in this embodiment the proximity monitor may comprise a second remote unit, and the base unit transmitter may send a signal to the second remote unit receiver to indicate that the first remote unit is out of range. The second remote unit may then actuate an alarm to warn the user of the second remote unit that the wearer or carrier of the first remote unit is out of range.

In a further embodiment the first remote unit further comprises means to measure the strength of the RF signal received by the first remote unit receiver and is adapted to provide an alarm output when the signal strength falls below a threshold value.

Preferably the alarm output actuates the first remote unit alarm means, the alarm means comprising any form of alarm means described herein.

In this embodiment, in use the base unit and the first remote unit may both transmit signals to one another and both measure the signal strength. When the signal strength falls below a threshold, each of the base unit and the first remote unit sound their respective alarms. Preferably the threshold is set by the base unit control means and the first remote unit control means to give an alarm at the same distance of the two units from one another.

It will be understood from the above that the proximity monitor comprises one or more transmitter/receiver pairs, according to the embodiment.

Preferably a transmitter/receiver pair is adapted to use a single channel of communication as known in the art such that other RF communications from nearby equipment do not interfere with sending of signals. Preferably the transmitter/receiver pair operates at a chosen frequency. In embodiments with more than one transmitter/receiver pair, each may operate at a separate carrier frequency. In preferred embodiments the RF transmissions may be in digitally coded form,

allowing separate signals to be sent on a common carrier frequency as known in the art. In a preferred embodiment the channel of operation of a given transmitter/receiver pair may be set by a user from a number of choices, to allow more than one such proximity monitor to be operated within range of one another, as known in the art, for example in design of baby monitors. In embodiments comprising two or more transmitter/receiver pairs preferably each pair can have their coded channel set separately. Preferably the proximity monitor comprises means to prevent 'collision' of signals on the same channel, for example means to allocate or to block selection of a particular second channel automatically following choice of a first.

The proximity monitor of the invention has been described above as having a single first remote unit and in some embodiments, a single second remote unit. It will be understood that in some embodiments the proximity monitor of the invention may exist in the form of a system comprising multiple first remote units, together comprising a system for monitoring of the proximity of more than one person to a given location. In a further embodiment multiple base units are provided, allowing more than one user to monitor the position of those persons. In a further embodiment multiple second remote units may be provided, in order to allow more than one user to be warned of the position of said persons. In such embodiments as these, the proximity monitor system is adapted such that each transmitter/receiver may send and receive signals independently of the others, for example using digitally coded transmission as described previously.

In some embodiments one or more RF transmitter/receiver pairs are adapted to carry voice signals, so allowing voice communication between the base unit and the first and/or second remote units. For example, in use a child carrying a first remote unit may move out of range of an adult carrying a base unit. An alarm may sound, and the monitor may be adapted then to enable voice communication between the base unit and the first remote unit.

In some embodiments one or more RF transmitter/receiver channels may be encrypted as known in the art.

In preferred embodiments the first remote unit comprises means to attach the unit to a person's body, for example a strap means for attachment to an arm, leg, wrist or ankle. Preferably the unit is in the form of a bracelet or watch, and is preferably waterproof, shockproof or both. In some embodiments the base unit is adapted to be portable and may comprise attachment means and may be in the forms above. In

embodiments comprising a second remote unit the second remote unit may also comprise attachment means and be in the forms above.

In preferred embodiments the first remote unit further comprises alarm means that alarms if the first remote unit is removed from the body, for example if in the form of a bracelet or watch, the unit is taken off from the wrist or ankle. Preferably the first remote unit comprises sensing means to detect that it has been taken off the body or a strap holding it onto the body has been undone. In a preferred embodiment the sensing means comprises a button actuating a switch means, the button adapted to be pressed while the unit is being worn. In a preferred embodiment the button projects from the first remote unit and is pressed inwards towards the first remote unit while being worn, for example, in an embodiment in which the first remote unit has a form similar to a watch or bracelet, pressed inwards by contact with the wrist while being worn. In a further embodiment said sensor means comprise a skin proximity sensor, for example acting by capacitance sensing, or a temperature sensor, acting to sense the temperature of nearby skin, or a light sensor, acting to sense an increase in illumination if the unit is taken off from the wrist.

Preferably the first remote unit comprises a tamper-proof bracelet or strap, such that once put on, a person or child is hindered or prevented from taking it off. In one embodiment the bracelet comprises lock means, releasable using a key. In a further embodiment the bracelet is adapted to require physical force to release it, or a complex series of motions, such that a child is hindered from removing it.

Preferably the bracelet or strap is adapted to be resistant to cutting, for example formed from a high resilience material, or comprising a material such as a cut-resistant polymer, or metal strands.

In preferred embodiments the first remote unit further comprises alarm disable means to disable the first unit alarm when proximity monitoring is not required, so that in use the first remote unit need not be taken off from the person wearing it. In preferred embodiments the proximity monitoring function remains operational while the first unit alarm is disabled. Preferably control means is provided to disable or modify the base unit alarm means and/or a second remote unit alarm means (where present). For example, a loud audible alarm may be switched to a quieter audible alarm or a visual alarm. In a preferred embodiment the alarm disable means comprises a control on the first remote unit, such as a switch. In one embodiment said control is positioned such that a person wearing the first remote unit cannot access it readily, for example on a surface of the first remote unit facing the person's skin in embodiments where

the first remote unit is in the form of a bracelet or watch. In a further preferred embodiment the alarm disable means may comprise remote disable means, for example in a command signal sent from the base unit to the first remote unit, or when present, from the second remote unit to the first via the base unit.

In a further embodiment the proximity monitor further comprises an SOS alarm means comprising a SOS button on the first remote unit, a command routine in the first remote unit control means adapted to send a signal to the base unit in response to the SOS button, a command routine in the base unit control means that provides an SOS alarm output. Preferably the SOS alarm output then actuates SOS alarm means, comprising one or more or an audible, visual and speech-based alarm signal. In a preferred embodiment the base unit is adapted then to communicate with the second remote unit and the second remote unit is adapted to provide an SOS alarm to a user. Such SOS alarm means has utility in cases where a child wearing or carrying the first remote unit wishes to signal for help, for example if they have moved too far from the base unit location and have become lost.

In a preferred embodiment the proximity monitor comprises indicator means to indicate the status of the first remote unit, the base unit and a second remote unit, and when the proximity monitor comprises a system having multiple remote units, the status of some or all of them. Preferably such indicator means comprise one or more of: indication that a remote unit is in radio communication with the base unit; which channel it is using; whether a remote unit is in range of the base unit; whether an alarm has been given; whether an alarm function is on or turned off; whether the first remote unit is being worn or whether it has been taken off; battery status for a base unit or remote unit.

In preferred embodiments the remote unit(s), and the base unit when it comprises a battery, comprise battery charging means, preferably comprising a plug and socket connection or a remote charging means, for example a magnetic induction charging means, as known in the art. Preferably a system comprises a base unit, one or more remote units, and battery charging means connectable to a mains supply.

In preferred embodiments the proximity monitor is adapted to have an operating range of up to 500m, more preferably up to 200m. Preferably the proximity alarm range is controllable by the user, for example from the base unit or if present, the second remote unit. Preferably the proximity alarm range is controllable in the range up to 500m, more preferably up to 200m, and most preferably up to 100m. The monitor is preferably adapted to allow one of a number of preset ranges to be

selected by the user. Preferably the operating range of the transmitters and receivers is greater than the maximum proximity detection range.

In a further embodiment the first remote means further comprises moisture sensor means, adapted to sense moisture in contact with the first remote means, and comprising a moisture sensor and means of moisture access to the sensor from the external environment. In a preferred embodiment the moisture sensor is adapted to respond to the presence of liquid water and to be less responsive to water vapour or dampness in the vicinity of the first remote unit. Preferably the first remote unit control means comprises a routine adapted to send an alarm signal to the base unit and where present a second remote unit, preferably actuating alarm means similar to those described previously to indicate water in the immediate environment of the first remote unit. In use such a feature allows the proximity monitor also to monitor an event such as a child falling into water and to give an alarm to a remote user.

The invention has been described by way of examples only and it will be appreciated that variation may be made to the above-mentioned embodiments without departing from the scope of invention.

With respect to the above description then, it is to be realised that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

Brief Description of Figures

Figure 1 shows a front view of a base unit forming part of a first embodiment of the invention;

Figure 2 shows a side view of a base unit forming part of a first embodiment of the invention;

Figure 3 shows an opposite side view of the base unit in figure 2;

Figure 4 shows a rear view of a base unit forming part of a first embodiment of the invention;

Figure 5 shows a front three-quarter view of a base unit forming part of a first embodiment of the invention;

Figure 6 shows a front three-quarter view of a first remote unit forming part of a first embodiment of the invention;

Figure 7 shows a side view of a first remote unit as shown in figure 6;

Figure 8 shows an end view of a first remote unit as shown in figure 6;

Figure 9 shows a second side view of a first remote unit as shown in figure 6;

Figure 10 shows a top view of a first remote unit as shown in figure 6;

Figure 11 shows a front three-quarter view of a second remote unit forming part of an embodiment of the invention;

Figure 12 shows a side view of a second remote unit forming part of an embodiment of the invention;

Figure 13 shows a top view of a second remote unit forming part of an embodiment of the invention;

Figure 14 shows an exploded view of a first remote unit forming part of an embodiment of the invention; and

Figure 15 shows an exploded view of a second remote unit forming part of an embodiment of the invention.

Detailed Description of Figures

Figures 1 to 5 show a base unit forming part of a first embodiment of the invention. The base unit comprises a housing and an RF transmitter, receiver and control means as described above, a power supply, an aerial and controls and indicators on the outside of the housing. In figure 1 is shown at top left a control to set the range of alarm, in the form of a wheel, preferably with indications on the wheel or surround to indicate the range that is set. An alarm light is provided centre right, and a reset button above it. Preferably the housing is formed from an impact-resistant polymer. In figure 2 the housing is shown as formed from two parts, a front and rear part, and having over-moulded protective feet in the lower portion of the housing. A power inlet for example from a mains power supply is shown as a socket at mid-height. Figure 3 shows the aerial and an on/off switch in the form of a slider. In figure 4 is shown slots for an alarm sounder to give an alarm, plus the pattern of the overmoulded feet in this embodiment. Figure 5 shows an overall front three-quarter view of the base unit.

Figures 6 to 10 show an embodiment of a first remote unit in the form of a watch or bracelet, adapted to be worn by the person to be monitored, for example a child. Figure 6 shows the first remote unit in a housing mounted on a wrist strap having a closure, the housing being formed from two parts, and having controls and indicators on its upper surface away from the wearer's wrist. In this embodiment an SOS or panic button is provided at top left, and openings for an alarm sounder or loudspeaker are provided at top right. An alarm light is provided at bottom left. Figures 7 and 9 show side views of the first remote unit and figure 8 shows an end view of the unit. In figure 9 a low battery alarm indicator is shown at the side of the housing. Preferably the housing parts are formed from impact resistant polymer and comprise seal means between them in order to make the unit splashproof or waterproof.

Figures 11 to 13 show an embodiment of a second remote unit of an embodiment of the invention. Figure 11 shows the unit in the form of a bracelet, in this embodiment formed from a moulded polymer such as an engineering elastomer. The strap is preferably formed as one with the housing. The housing preferably is adapted to stretch to allow components to be inserted into it, and then to re-seal around the components. The components in some embodiments are enclosed in a sub-unit having a rigid case, in preferably sealed to protect the components from water. Apertures for an alarm sounder are shown.

Figure 14 shows an exploded view of a first remote unit forming part of an embodiment of the invention. The unit comprises first and second housing portions, sealable together, a circuit board comprising one or more of the control means, receiver, and optionally a transmitter (where present), aerial, alarm sounder or loudspeaker and light. The unit further comprises a battery and on/off switch and a panic/SOS button. The on-off switch may be adapted to be accessible from the underside of the housing so being inaccessible by the wearer. This embodiment is shown as comprising means to record a voice message for example to be used as an alarm signal when the wearer moves out of range of the base unit, and optionally to be played in response to the wearer pressing the SOS button. Preferably control means is provided to allow a user to record the message, preferably mounted on the underside of the unit out of access to the wearer as shown. The strap is shown as being closed by a child-proof strap release button. The tamper-proof strap may have a push button that requires a firm force and prevents accidental release, or a locking buckle and key. Preferably the strap is sever-proof, for example using lines of high-tensile stainless steel within the fabric strap, or a PVC strip that prevents scissor cuts.

Figure 15 shows an exploded view of a second remote unit forming part of an embodiment of the invention. The second remote unit comprises a circuit board comprising one or more of a receiver, and transmitter (where present), a second unit control means, an alarm sounder or loudspeaker, an alarm light, an on/off switch, and a battery. The unit is shown as comprising a main casing mounted inside a moulded silicone band.

In use, the proximity monitor of the invention may act as a proximity alarm for safeguarding children that alerts a parent or guardian to a child wandering too far away. Should the child leave the pre-programmed safe vicinity, they are alerted by way of a pre-recorded message and a flashing light alert. The guardian is notified by an audio alarm and flashing light. The proximity is determined by a dial on the base unit that ranges from 5 to 100 metres, and uses radio waves to communicate.
Key features include, according to the embodiment, a panic button, anti-bacterial and waterproof strap, tamper-proof buckle and low battery indicator on the child's bracelet, as well as an audio and visual alarm on the splashproof guardian's receiver and a battery charger, rubber overmoulded feet and alarm light on the base unit.

Claims

1. A proximity monitor comprising:
   a base unit comprising an RF transmitter and a base unit control means; and
   a first remote unit comprising an RF receiver adapted to receive signals from the RF transmitter and a first remote unit control means;
   wherein the first remote unit control means comprises means to measure the strength of the RF signal received by the RF receiver and is adapted to provide an alarm output when the RF signal strength falls below a threshold value.

2. A proximity monitor as claimed in claim 1, in which the base unit further comprises transmitter power control means to control the transmitted signal strength.

3. A proximity monitor as claimed in either of claims 1 and 2, wherein the first remote unit further comprises alarm means actuated by the alarm output.

4. A proximity monitor as claimed in claim 3, wherein the alarm means comprises means to play a speech message.

5. A proximity monitor as claimed in claim 4, wherein the first remote unit control means further comprises means to record a speech message.

6. A proximity monitor as claimed in any preceding claim, wherein the first remote unit further comprises a first remote unit transmitter, and wherein the base unit further comprises a base unit receiver adapted to receive signals from the first remote unit transmitter.

7. A proximity monitor as claimed in any preceding claim, wherein the proximity monitor further comprises a second remote unit comprising a receiver adapted to receive RF signals from the base unit transmitter and a second remote unit control means, and warning means that may be actuated in response to a signal from the base unit.

8. A proximity monitor comprising:
   a first remote unit comprising an RF transmitter, an RF receiver, a first remote unit alarm means and a first remote unit control means; and

a base unit comprising an RF receiver adapted to receive signals from the first remote unit, an RF transmitter adapted to transmit signals to the first remote unit, and a base unit control means;

wherein the base unit control means comprises means to measure the strength of the RF signal received by the receiver and is adapted to provide an alarm output when the signal strength falls below a threshold value.

9. A proximity monitor as claimed in claim 8, wherein the base unit is adapted to send a signal to the first remote unit in response to the alarm output.

10. A proximity monitor as claimed in either of claims 8 and 9, wherein the first remote unit comprises transmitter power control means to control the transmitted signal strength.

11. A proximity monitor as claimed in any of claims 8 to 10, wherein the base unit comprises alarm means actuated by the alarm output, comprising visual and/or audible alarm means.

12. A proximity monitor as claimed in any of claims 8 to 11 wherein the first remote unit alarm means comprises visual and/or audible alarm means.

13. A proximity monitor as claimed in any of claims 8 to 12 wherein the first remote unit comprises means to measure the strength of the RF signal received by the first remote unit receiver and is adapted to provide an alarm output when the signal strength falls below a threshold value.

14. A proximity monitor as claimed in any of claim above wherein the first remote unit comprises means to attach the unit to a person's body.

15. A proximity monitor as claimed in any of claim above wherein the base unit is adapted to be portable and comprises attachment means to attach the unit to a person's body.

16. A proximity monitor as claimed in any of claim above wherein the first remote unit further comprises alarm means that alarms if the first remote unit is removed from the body.

17. A proximity monitor as claimed in any of claim above wherein the first remote unit further comprises alarm disable means to disable the first unit alarm when proximity monitoring is not required.

18. A proximity monitor as claimed in any of claim above wherein the proximity monitor further comprises an SOS alarm means comprising a control button on the first remote unit, a command routine in the first remote unit control means that in use sends a signal to the base unit, a command routine in the base unit control means that provides an SOS alarm output.

19. A proximity monitor as claimed in any of claim above wherein the first remote means further comprises moisture sensor means adapted to sense moisture in contact with the first remote means.

Claims

Amendments to the claims have been made as follows:

1. A proximity monitoring system comprising: a base unit comprising an RF transmitter and a base unit control means; and a first remote unit comprises an RF receiver adapted to receive signals from the RF transmitter, wherein the first remote unit has a first remote unit control means which measures the strength of the RF signal received and provides an alarm output when the RF signal strength falls below a threshold value; and a second remote unit comprises an RF receiver adapted to receive signals concerning the location and/or status of the first remote unit with respect to the base unit.

2. A proximity monitoring system according to claim 1 wherein the base unit comprises amplification means to relay signals about the first remote unit to the second remote unit.

3. A proximity monitor as claimed in any of the preceding claims wherein the first remote unit comprises transmitter power control means to control signal strength

4. A proximity monitoring system as claimed in any preceding claim comprising more than one second unit

5. A proximity monitor as claimed in any of the preceding claims comprises an alarm means actuated by the alarm output comprises visual and/or audible alarm means.

6. A proximity monitoring system as claimed in any preceding claim wherein the first remote unit comprises an alarm means actuated by the alarm output comprises means to play a speech message.

7. A proximity monitoring as claimed in any preceding claim wherein the first remote unit control means further comprises means to record a speech message.

8. .A proximity monitor as claimed in any of the preceding claims wherein the base unit comprises alarm means actuated by the alarm output, comprising visual and/or audible alarm means

9. A proximity monitor as claimed in any of claim above wherein the first remote unit comprises means to attach the unit to a person's body.

10. A proximity monitor as claimed in any of claim above wherein the first remote unit further comprises alarm means that alarms if the first remote unit is removed from a body.

11. A proximity monitor as claimed in any of claim above wherein the first remote unit further comprises alarm disable means to disable the first unit alarm when proximity monitoring is not required.

12. A proximity monitor as claimed in any of claim above wherein the proximity monitor further comprises an SOS alarm means comprising a control button on the first remote unit, a command routine in the first remote unit control means that in use sends a signal to the base unit, a command routine in the base unit control means that provides an SOS alarm output.

13. A proximity monitor as claimed in any of claim above wherein the first remote means further comprises moisture sensor means adapted to sense moisture in contact with the first remote means.

14. A proximity monitoring system comprising: a base unit includes an RF transmitter and a base unit control means; and a first remote unit, adapted to be worn or carried by a wearer, includes an RF receiver adapted to receive signals from the RF transmitter and a first remote unit control means; the first remote unit control means measures the strength of the RF signal received by the RF receiver and is adapted to provide an alarm output when the RF signal strength falls below a threshold value, the alarm output alarm means comprises means to play a speech message

15. A proximity monitor system comprising: a base unit comprising an RF transceiver and a base unit control means adapted to send an alarm signal in response to an alarm output; a first remote unit with means to attach the first remote unit to a vulnerable person's body, an RF transceiver and a first remote unit control means comprising means to measure the strength of the RF signal received from the base unit RF transceiver and adapted to provide an alarm output when the RF signal strength falls below a threshold value; and a second remote unit comprising an RF receiver adapted to receive RF

signals from the base unit transceiver, a second remote unit control means, and an alarm means; wherein the base station acts in use to relay an alarm output from the first remote unit to the second remote unit..

Application No:	GB1215315.1	**Examiner:**	Richard Kerslake
Claims searched:	1-7 & 14-19	**Date of search:**	7 December 2012

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-3,6,7,14 & 15	US4593273 A (NARCISSE) See whole document, especially figure 1; column 1, lines 31-48 and column 2, lines 28-48
X	1-3,14,15 & 17	CA2084571 A1 (PANFOUND) See page 2, line 14 - page 3, line 15
X	1-3,6,14,15, 17 & 18	US5841352 A (PRAKASH) See whole document, especially column 1, lines 27-48 and column 2, lines 18-67
X	1,3,6,14,15 & 19	US2001/0050613 A1 (CLARK) See paragraphs 2,3,12,15 & 16
X	1-3,6 & 14-16	GB2391674 A (RAE et al.) See page 2, line 21 - page 3, line 6; page 4, lines 11-28; page 7, lines 7-11; page 7, line 26 - page 8, line 5
X	1 & 3-5	WO94/12956 A1 (ROSENTHAL et al.) See whole document, especially page 4, lines 11-19 and page 7, lines 1-4 & 19-29
X	1,3 & 15	DE4333285 A1 (ECKERT) See WPI abstract
X	1 & 3	GB2243479 A (KRAMARNEKO) See figure 1 and page 1, lines 15-26

Categories:

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

Field of Search:

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

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

G08B

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

EPODOC,WPI

International Classification:

Subclass	Subgroup	Valid From
G08B	0021/02	01/01/2006