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

(11) **EP 1 946 696 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
15.08.2012 Bulletin 2012/33

(21) Application number: **05792188.4**

(22) Date of filing: **21.09.2005**

(51) Int Cl.:
A61B 5/00 *(2006.01)* ***H01H 13/52*** *(2006.01)*

(86) International application number:
PCT/CN2005/001520

(87) International publication number:
WO 2007/033520 (29.03.2007 Gazette 2007/13)

(54) **AN ELECTRONIC DEVICE**

ELEKTRONISCHE EINRICHTUNG

DISPOSITIF ELECTRIQUE

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

(43) Date of publication of application:
23.07.2008 Bulletin 2008/30

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Printed by Jouve, 75001 PARIS (FR)

Description

Technological aspect:

[0001] This invention involves a human body-testing installation, especially designed to be carried around, and can test any of the following: breath sounds, heart rate, EKG, body fat, sweat wetness, O_2 saturation, pulse rate, blood pressure, body temperature, urine sugar, or change in pressure at a point where pressure is applied.

Technological background:

[0002] Well-known electronic devices have been widely used for human body testing purposes, for example, electronic thermometers, electronic blood pressure monitors, lung sound-sensing and heart rhythm-sensing devices. Yet, the aforementioned devices have 3 common disadvantages, namely:

1. The aforementioned devices are all external devices that are inconvenient to be carried around.
2. The aforementioned devices are all operated by an on-off switch, to be switched on before use and turned off immediately after. When repetitive and short-time monitoring is needed, as in mountain-climbing, wherein what is actually needed is to take the heart rate every 5 minutes for a duration of 10 seconds, turning the switch on and off repetitively is cumbersome.
3. In the process of using the aforementioned devices, the user needs to turn on the switch, and then apply pressure on the devices so that it presses on the part to be monitored or tested. For a patient or a busy operator, this is very inconvenient.

Content of invention:

[0003] Facing the above-mentioned problems, this invention aims to provide an electronic device that can be fixed to a user's worn articles, for example clothes, pants, hats, gloves, ties, socks, scarves, etc., so it can be carried around conveniently.

[0004] This invention also aims to provide an electronic device with an on-off switch that is designed to be easy to use in repetitive, short-time monitoring or testing.

[0005] This invention also aims to provide an electronic device that integrates the actions of switching on and applying pressure on the part to be tested or monitored, into one single action, thereby providing ease of use.

[0006] To achieve the above-mentioned aims, one aspect of this invention provides an electronic device that include: a resilient piece, a base plate and an electronic source. The resilient piece has an upper conductor; the base plate is connected to the resilient piece, with a space between the resilient piece and the base plate. The base plate is designed with a lower conductor, which is separated from the upper conductor with a crevice. An electronic source connects each of the upper conductor and the lower conductor electrically.

Explanation of illustrations:

[0007] After going through the following detailed description by integrated illustrations of a first example embodiment, you will understand more accurately the make-up and special features of this electronic device, which includes:

Illustration 1 shows a cut-away view of a first example embodiment of an electronic device of the present invention;
Illustration 2 shows a schematic diagram of this first example embodiment in actual use;
Illustration 3 shows a schematic diagram of the electronic device in illustration 1 in actual use;
Illustration 4 shows a cut-away view of a second example embodiment of an electronic device of the present invention;
Illustration 5 shows a cut-away view of a third example embodiment of an electronic device of the present invention;
Illustration 6 shows a schematic diagram of the electronic device's third example embodiment in actual use on the finger;
Illustration 7 shows a schematic diagram of the electronic device's third example embodiment in actual use on the adhesive tape;
Illustration 8 shows a schematic diagram of the electronic device's third example embodiment in actual use on the clothing;
Illustration 9 shows a cut-away view of a fourth example embodiment of an electronic device of the present invention;
Illustration 10 shows a schematic diagram of the electronic device in illustration 9 in actual use;
Illustration 11 shows a cut-away view of a fifth example embodiment of an electronic device of the present invention;
Illustration 12 shows a cut-away view of a sixth example embodiment of an electronic device of the present invention;

Illustration 13 shows a cut-away view of a seventh example embodiment of an electronic device of the present invention;

Explanation of the main parts with labels in the illustrations:

[0008]

Electronic device 10	11 resilient piece	112 Upper conductor
	12 Base plate	122 Lower conductor
	13 Sensor device	14 Monitor
	15 Transmission interface	16 Tested subject's coat
	17 Illustration of functions	18 Microphone
	19 Processor	
Electronic device 20	21 Resilient piece	212 Upper conductor
	213 Hole	22 Base plate
	222 Lower conductor	223 Hole
	23 Sensor device	24 Spring
	25 Tested subject's shirt	26 Tested subject's skin
Electronic device 30	31 Upper conducting plate	32 Lower conducting plate
	33 Nonconductive material	34 Cover ring
	35 Finger	36Clothes
	37 Adhesive tape	
Electronic device 40	41 Resilient piece	412 Upper conductor
	413Hole	42 Base plate
	422 Lower conductor	423 Hole
	43 Blade	44 Sensor device
Electronic device 50	51 Resilient piece	512 Upper conductor
	513 Hole	52 Base plate
	522 Lower conductor	523 Hole
	53 Nonconductive material	54 Blade
	55 Sensor device	
Electronic device 60	61 Resilient piece	612 Upper conductor
	62 Base plate	622 Lower conductor
	63 Separated lamina	64 Sensor device
Electronic device 70	71 Upper conducting plate	72 Lower conducting plate
	73 Nonconductive material	74 Separated lamina
	75 Sensor device	

Specific implementing pattern:

[0009] In the following reference illustrations 1 through 3, this invention's first example embodiment of the electronic device 10 includes resilient piece 11, base plate 12, sensor device 13, processor 19, monitor 14, transmission interface 15 and an electronic source (not shown). Among which, the resilient piece 11 is like a dome shape, it is facing down, and is made of resilient, nonconductive material. Applying pressure downwards will cause the resilient piece 11 to deform. Removal of the applied force allows the resilient piece 11 to return to its prior shape. The upper conductor 112 is located on the central portion of the lower surface of the resilient piece 11. The base plate 12 is like a dome shape, and is made of nonconductive material. The dome shape base plate utilizes a disc-to-disc linkage located below the resilient piece 11. There is a space between the resilient piece 11 and the base plate 12. The lower conductor 122 is located on the central portion of the upper surface of the base plate. There is a gap between the lower conductor 122 and the upper

conductor 112. The sensor device 13 is located at the lower surface of the base plate 12, and is electrically connected to the lower conductor 122.

[0010] Based on this example embodiment, the sensor device 13 is a heart rhythm sensor device which can be used to monitor heart rhythm and subsequently transmit the results to the processor 19. For example, the threshold value in the processor is set for 3 seconds. If the resilient piece 11 is pressed for only 2 seconds, then the processor will ignore and delete the results of this test since it is below the threshold value set in the processor. In other words, if the sensor device is pressed for more than 3 seconds, then the results of this test will be shown on the monitor 14; or the results can be send wirelessly via the transmission interface 15 to the outside world. From here, we can ignore the irrelevant data from tests that are done in too short a time, thereby preventing sensing by mistake. The electronic source provides the needed power to the sensor device 13, the monitor 14 and the transmission interface 15, and is electrically connected to the upper conductor 112 and the lower conductor 122.

[0011] As shown in illustration 2, the electronic device 10 is directly fixed to the subject's coat 16. As shown in illustration 1, the coat 16 is fixed between the base plate 12 and resilient piece 11, causing the sensor device 13 to come into direct contact with the part to be sensed, such as the subject's left chest which is closest to the heart. As shown in illustration 3, during sensing, the subject only needs to apply light pressure on the resilient piece 11, causing it to be deformed, which then causes the upper conductor 112 and the lower conductor 122 to come in direct contact with each other, completing the electrical circuit. When the sensor device 13 is activated, it starts to sense and monitor the subject's heart rhythm, and through the processor 19, decide whether sensing time reaches the threshold of 3 seconds or not. If it does, then the results are shown on the monitor 14, or be transmitted wirelessly to the outside world through the transmission interface 15. On the coat 16 is a functional diagram 17 which indicates the functions of the electronic device 10, and the functional diagram 17 can be dyed or stitched on the resilient piece 11. For example, in this applied example where the sensor device 13 is a heart rhythm sensor, the functional diagram 17 can be in the shape of a heart.

[0012] Since this electronic device 10 is directly set to the subject's coat 16, it does away with the inconvenience of carrying a sensor device. And during sensing, the subject needs only to press on the resilient piece with one hand, and turns the switch on and simultaneously causes the sensor device 13 to make contact with the site to be sensed. Because of this, even for repetitive and short-interval testing, it seems very convenient. Also, as the circuit is only powered on when resilient piece 11 is pressed, the circuit is otherwise always open. It decreases the energy consumption and is good for a green policy. Aside from this, this electronic device is also provided with an anti-false sensing feature. In addition, this invention's electronic device improves the disadvantages of similar devices in the market, thereby achieving its goal of our invention.

[0013] Moreover, there are several variations to this electronic device 10. For example, the locations of the resilient piece 11 and the base plate 12 can be interchanged. And the elastic base plate 12 is placed on top of the elastic piece 11. Or, both the resilient piece 11 and the base plate 12 use the same resilient material. All these changes give the same results. Secondly, a different thickness or different modulus of elasticity of the resilient piece can change the sensitivity of the electronic device 10. Because of this, during design, we can choose different sensitivity material to be used for the resilient piece based on the practical demands for the sensitivity of the electronic device 10. Several exemplary resilient piece materials include chloroprene rubber (CR) (such as in wetsuits and related water accessories); styrene butadiene rubber (SBR) (for cell phone cases, coolers and the like); a 30%:70% ratio of CR to SBR for sports suits, medical supports, and the like; silicone rubber; nylon; polyester; polypropylene; polyurethane; spandex; Lycra®; and sponge. However, any material suitable for providing a resilient and sufficiently elastic construction can be used.

[0014] Furthermore, we can use other types of sensor devices instead of the above-mentioned sensor device 13, for example, those used in sensing lung sound, pulse rate, blood pressure, body temperature, urine sugar, body fat, sweating, ECG, O_2 saturation, or pressure sensors. We can also vary the detect portion of the body, change the functional diagram 17 and reset the threshold value in the processor 19 based on the monitor factors. For example, we can use a body temperature sensor device 13 and place it under the armpit, set a longer threshold value of time (for example, 1 minute), for it to have enough time to achieve heat equilibrium. As regards the sensor device for urine sugar, we can place the sensor device near a perineum of a diaper, or dye or stitch a functional diagram thereon, or freely adjust any aspect based on real demands.

[0015] In addition, the processor 19 can be equipped with a function to turn the sensor device on and off, change the sensor device's 13 sensing time, sensing frequency, and sensing mode, and/or other parameters based on the user's needs. Or these settings can be set to be activated based on the duration of time the user presses on the resilient piece 11, if it crosses the threshold value set in the processor 19, thereby preventing activation by accidental-touching. Moreover, the transmission interface 15 can be used to receive remote signals for the purpose of remote activation and inactivation of the sensor device, or to change the procedure of the test parameters. Regarding the monitor 14, it can be a cellular phone, PDA or a computer that shows the test results. Also, a light-emitting body can be used to emit a warning sign to the people around (such as in the form of a "red cross" or the number "119") whenever the sensor device 13 senses an abnormal result, such as an overly high blood pressure or sudden stop of the heartbeat. Or, signals can be sent via the transmission interface 15 to relatives far away, or directly call an ambulance. And also, the electronic

device 10 can be equipped with a microphone 18 in the resilient piece 11 and connected electrically with the upper conductor 112, to allow the user to directly communicate with or seek help from the outside world via the transmission interface 15. The place where resilient piece 11 is located on the coat 16 can be printed with a functional diagram 17 to differentiate between emergency articles and communication articles. Included in the functional diagram 17 are illustrations of a red cross, ambulance and relatives.

[0016] Aside from these, when the electronic device 10 is designed to be an EKG or blood pressure sensor, the time needed for testing needs to be at least 1-2 minutes. Because of this, the subject's coat 16 can be equipped with a self-inflatable airbag. When the subject presses on the resilient piece 11, the upper conductor 112 comes into contact with the lower conductor 122, causing the inflatable bag to self-inflate thereby pressing the sensor device 13 against the skin of the part to be tested. Or the subject's shirt can be designed to be tight-fitting, which can lessen inconvenience on the subject who needs to maintain a proper position. This increases the ease of use.

[0017] As shown in illustration 4, this invention's second example embodiment of the electronic device 20 includes a resilient piece 21, base plate 22, sensor device 23, 3-row spring 24, monitor (not shown), and electronic source (not shown). Among which, the resilient piece 21 is like a dome shape and made of resilient, nonconductive material. In the disk center of the resilient piece 21, the upper conductor 212 and a hole 213 are located, where the upper conductor 212 is mounted. The base plate 22 is also like a dome shape, is made of resilient, nonconductive material, and is connected to the resilient piece between which there is a space. In the disk center of the base plate 22, the lower conductor 222 and an hole 223 are located, where the lower conductor 222 is mounted. There is a crevice between the lower conductor 222 and the upper conductor 212. The applied example of the sensor device 23 is a lung sound sensor, which is electrically connected to the lower conductor 222. This sensor device 23 is used to test human lung sound, and shows the test results on the monitor. The 3-combined spring 24 and the sensor device 23 and the base plate 22 are joined together. The electronic source provides the needed power to the sensor device 23 and the monitor, and is electrically connected to the upper conductor 212 and the lower conductor 222.

[0018] Fixing the electronic device 20 directly on the subject's shirt 25, makes it so that the sensor device 23 is pressing down directly on the part to be tested 26. During testing, pressing lightly on the resilient piece 21 promotes contact between the upper conductor 212 and the lower conductor 222, thereby turning the electrical circuit on. As the sensor device 23 is activated, it starts to test the subject's lung sound. Utilizing this type of structure, even if the subject performs extreme exercise, thereby deviating the position of the resilient piece 21 and the base plate 22 from the area to be tested, the sensor device 23 can still remain fixed to the site to be tested. For this reason, not only can the electronic device 20 maintain its active test status at all times, but also cannot be affected by the subject doing exercise and thereby moving the sensor device 23 from the tested site 26, causing error. The electronic device 20 can also be carried around conveniently, and be operated by one hand even during repetitive, short-interval testing. This is extremely convenient.

[0019] Referring to illustrations 5 through 8, this invention's third example embodiment of the electronic device 30 includes an upper conducting plate 31, lower conducting plate 32, nonconductive material 33, processor (not shown), monitor (not shown), and electronic source (not shown). Among which, the upper conducting plate 31 and the lower conducting plate 32 is like a dome shape and are made of resilient conductive material. The nonconductive material 33 is ring-shaped. The edges of the disks of the upper conducting plate 31 and the lower conducting plate 32 are fixed separately to the upper and lower edges of the nonconductive material 33. The upper conducting plate 31 and lower conducting plate 32 are separated from the nonconductive material to form a space. The processor is electrically connected to the upper conducting plate 31 and the lower conducting plate 32 separately. It can distinguish whether the circuit is on or off between the upper conducting plate 31 and the lower conducting plate 32, and can process this mutual electrical conductance signal and show it on the monitor. The electronic source provides the power needed for the processor and the monitor, and is electrically connected to the upper conducting plate 31 and the lower conducting plate 32.

[0020] The electronic device 30 is installed to the ring 34 to be put on the subject's finger 35 near the joint. This can be used in deaf-mute persons as a means of communicating with each other, and similarly among medical personnel in the operating room. If the subject wishes to express a personal opinion, he only needs to bend his finger, forcing the upper conducting plate 31 and the lower conducting plate 32 to change shape, thereby coming into contact with each other, completing an electrical circuit. Afterwards, when the processor receives this electrical conducted signal, it processes it and shows it on the monitor. For example, it can be designed in such a way that bending the finger once means "Yes", and twice means "No", or three times or more or at different intervals to mean other different words, based on the needs of the user. Moreover, the monitor can be equipped with speakers, which can directly broadcast the user's opinion in spoken language for others to hear. Another thing is, as shown in illustration 7, we can use the adhesive tape 37 to fix the electronic device 30 on the eyelids, hence allowing a special group of patients (quadriplegics) to express their thoughts through blinking.

[0021] Besides, this invention's third example embodiment of the electronic device 30 can have other uses. For example, we can have several electronic devices 30 placed near the wrist joints, elbow joints, or the knee joints, and share a common processor to process different signals as a whole. Utilizing this arrangement, the electronic device 30

can be used as an exercise-assist equipment, helping beginners learn essential actions, just like learning to play golf, where the different electronic devices 30 on the different joints will help us determine if the user's posture is correct, and show it on the monitor. It can even show clearly the position of an incorrect posture, hence improving the user's learning results.

[0022] Again as shown in illustration 8, we can use several electronic devices 30 and arrange them in matrix array form, and place them between the fibers of the clothes 36, which critically ill, vegetative and chronically bed-ridden patients can wear. With the help of the test results, we can promptly know the condition of body areas that are subjected to pressure under prolonged time in these patients, and can alert nurses in advance to help the patients, thereby preventing bedsores or eczema. Moreover, we can install the electronic device 30 to a ring placed on a steering wheel as a tool to assist drivers. In this case, the electronic device will be used to test if the driver is grasping the steering wheel correctly. If not, the monitor will immediately show a warning signal to alert the driver, thereby preventing accidents.

[0023] As shown in illustrations 9 through 10, this invention's fourth example embodiment of the electronic device 40 includes a resilient piece 41, base plate 42, two blades 43, sensor device 44, monitor (not shown), and electronic source (not shown). Among which, the resilient piece 41 forms a dome shape and is made of resilient, nonconductive material. In the disk center of the resilient piece 41, the upper conductor 412 and an hole 413 are located, where the upper conductor 412 is mounted. The base plate 42 is also dome-shaped, is made of resilient, nonconductive material, and is connected to the resilient piece 41, between which there is a space. In the disk center of the base plate 42, the lower conductor 422 and a hole 423 are located, where the lower conductor 422 is mounted. The two blades 43 are each rectangular, board-like plates, and are made of flexible, nonconductive material. Its fixed end is fixed on the spot where the elastic piece 41 and the base plate 42 are joined, while its free end is located between the upper conductor 412 and the lower conductor 422. The distance between the two blades 43 and the upper conductor 412 is smaller than the distance between the two blades 43 and the lower conductor 422. The sensor device 44 is located on the lower surface of the base plate 42, and is electrically connected to the lower conductor 422. The sensor device is used to test the subject's physiological status, and the results are shown on the monitor. The electronic source provides the needed power to the sensor device 44 and the monitor, and is electrically connected to the upper conductor 412 and the lower conductor 422.

[0024] When the electronic device 40 is fixed to the subject's garment, he only needs to press lightly on the resilient piece 41, causing it to deform and change shape, leading to the upper conductor 412 to push apart the two blades 43 and coming into contact with the lower conductor 422, completing the electrical circuit on, as shown in illustration 10. When the sensor device 44 is activated, it starts to test. If the subject is in the process of moving, and unintentionally pulls tightly his shirt where the electronic device 40 is located, this will impel the base plate 42 to change shape. The lower conductor 422 will not be able to come into contact with the upper conductor 412 because it is separated by the two blades 43. Hence, this will prevent testing by mistake and power wastage. Based on this, the electronic device 40 not only allows the subject to be tested at any time based on his needs, but also can prevent testing by mistake due to the subject's exaggerated movements.

[0025] As shown in illustration 11, this invention's fifth example embodiment is electronic device 50, which includes a resilient piece 51, base plate 52, nonconductive material 53, two blades 54, sensor device 55, monitor (not shown), and electronic source(not shown). Among which, the resilient piece 51 is round, lamina-shaped and made of resilient nonconductive material. In the center of the resilient piece 51 are the upper conductor 512 and an opening 513 where the upper conductor 512 is mounted. The base plate 52 is like a dome shape and is made of resilient nonconductive material. In the disk center are located the lower conductor 522 and an hole 523 where the lower conductor 522 is mounted. The nonconductive material 53 is ring-shaped. The resilient piece 51 and the base plate 52 are fixed on the upper and lower edges of the nonconductive material 53 respectively. There is a space between the upper conductor 512, the lower conductor 522 and the nonconductive material 53. The two blades 54 are each rectangular, board-like plates, and are flexible, nonconductive material. Its fixed end is fixed on the nonconductive material 53, while its free end is located between the upper conductor 512 and the lower conductor 522. The distance between the two blades 54 and the upper conductor 512 is smaller than the distance between the two blades 54 and the lower conductor 522. The sensor device 55 is located on the lower surface of the base plate 52, and is electrically connected to the lower conductor 522. The sensor device is used to test the subject's physiological status, and the results are shown on the monitor. The electronic source provides the needed power to the sensor device 55 and the monitor, and is electrically connected to the upper conductor 512 and the lower conductor 522.

[0026] This application example has a similar effect as the fourth application example. The user simply has to press on the resilient piece 51, causing the upper conductor 512 to change the shape of the two blades 54, thereby coming into contact to the lower conductor 522 it is on. On the other hand, if the user mistakenly presses on the base plate 52, the lower conductor 522 will be obstructed by the two blades 54, preventing electrical connection with the upper conductor 512.

[0027] Referring to illustration 12, this invention's sixth example embodiment of the electronic device 60 includes an resilient piece 61, base plate 62, separated lamina 63, sensor device 64, monitor (not shown), processor (not shown)

and electronic source (not shown). Among which, the resilient piece 61 is like a dome shape and is made of resilient, nonconductive material. In the center portion of the underside of the resilient piece 61 is the upper conductor 612. The base plate 62 is like a dome shape and is made of resilient nonconductive material. In the disk center are located the lower conductor 622. The separated lamina 63 is designed to include conductible material, so it can be conductive at a fixed on the spot where the resilient piece 61 and the base plate 62 are joined. There is a crevice between the separator board 63 and both the upper conductor 612 and the lower conductor 622. The sensor device 64 is fixed on the lower surface of the base plate 62, and is electrically connected with the lower conductor 622. It is used to test the subject's physiological status and shows the results on the monitor. The processor is electrically connected to each of the following: upper conductor 612, the lower conductor 622, separated lamina 63 and sensor device 64, and is pre-installed with a deciding program. The contents of the program are as follows:

1. When the separated lamina 63 contacts first with the upper conductor 612, followed by the lower conductor 622, the sensor device 64 is activated, and starts to test;
2. When the separated lamina 63 contacts first with the lower conductor 622, followed by the upper conductor 612, no action is taken;
3. Under other circumstances, no action is taken without exception.

[0028] The electronic source provides the needed power to the sensor device 64, monitor and processor.

[0029] The electronic device 60 can be installed in the user's clothes. When the user lightly presses the resilient piece 61, it and the base plate 62 will change shape, causing the upper conductor 612 to come into contact first with the separated lamina 63, followed by the lower conductor 622. When the processor receives this information, it commands the sensor device 64 to start testing. On the contrary, when there is exaggerated movement from the user, causing the electronic device 60 to rub against the skin, there is an upward push from the skin, causing the lower conductor 622 to come into contact first with the separated lamina 63, followed by the upper conductor 612 contacted with the separated lamina 63. The processor will ignore this signal, thereby preventing the electronic device 30 to test by mistake.

[0030] Comparing illustration 13, this invention's seventh example embodiment of the electronic device 70 includes the upper conducting plate 71, the lower conducting plate 72, nonconductive material 73, separated lamina 74, sensor device 75, processor (not shown), output device (not shown), and a electronic source (not shown). Among which, the upper conducting plate 71 and the lower conducting plate 72 are dome-shaped, and are made of resilient, conductive material. The nonconductive material 73 forms a ring shape, and the upper conducting plate 71 and lower conducting plate 72 are fixed to the upper and lower edges of the nonconductive material 73 respectively. The separated lamina 74 is located inside the nonconductive material 73, and is separated from the upper conducting plate 71 and lower conducting plate 72 by a crevice. The sensor device 75 is fixed on the lower surface of the lower conducting plate 72, and is electrically connected to the lower conducting plate 72. The sensor device is used to test the subject's physiological status. The processor is electrically connected to each of the following: upper conducting plate 71, the lower conducting plate 72, separated lamina 74 and sensor device 75, and is pre-installed with a deciding program. The contents of the program are as follows:

1. When the separated lamina 74 contacts first with the upper conducting plate 71, followed by the lower conducting plate 72, the sensor device 75 is activated, and starts to test;
2. When the separated lamina 74 contacts first with the lower conducting plate 72, followed by the upper conducting plate 71, no action is taken;
3. Under other circumstances, no action is taken without exception. The electronic source provides the needed power to the sensor device 75, monitor and processor.

[0031] Based on the above, this application example has the same effect as the sixth application example. If the user presses on the upper conducting plate 71, causing it to come into contact first with the separated lamina 74, followed by the lower conducting plate 72 coming into contact with the separated lamina 74, the processor will receive this signal and activate the sensor device 75 to start testing. On the contrary, if the signal is first due to the lower conducting plate 72 pressed by mistake, the processor will ignore this signal. Hence, the electronic device 70 has both the advantageous features of testing at anytime and preventing testing by mistake.

Claims

1. An electronic device (10, 70) comprising:

an upper piece (11, 71) having an upper conductor (112, 71); and

a base plate (12, 72) having a lower conductor (122, 72), the base plate (12, 72) being spaced apart from the upper piece (11, 71) such that a gap is provided between the upper conductor (112, 71) and the lower conductor (122, 72),
wherein at least one of the upper piece (11, 71) and the base plate (12, 72) is made of a resilient material such that an applied force may deform the electronic device (10, 70) so that the upper and lower conductors electrically contact to switch a circuit on and removal of the applied force allows the electronic device (10, 70) to return its the original position thereby separating the upper and lower conductors to switch the circuit off,
a power source electronically connected with the upper conductor (112, 71) and the lower conductor (122, 72); and
a sensor device (13, 75) connected to the lower conductor (122, 72) and to a side of the base plate (12, 72) opposite the side where the upper conductor (112, 71) and the lower conductor (122, 72) may abut.

2. An electronic device according to claim 1 wherein the sensor device (13, 75) is a sensor for detecting breathing sounds, heart rhythms, EKG, body fat, perspiration, oxygen saturation, pulse rate, blood pressure, body temperature, pressure, and blood sugar in urine.

3. An electronic device according to claim 1 or claim 2 wherein the upper piece (11, 71) and the base plate (12, 72) are made from a nonconductive material.

4. An electronic device according to any one of the preceding claims wherein the resilient material is selected from spandex, chloroprene rubber (CR), styrene butadiene rubber (SBR), a composite having 30%:70% ratio of CR to SBR, silicone rubber, nylon, polyester, polypropylene, polyurethane, and sponge.

5. An electronic device according to claim 3 or claim 4 wherein the upper piece (11, 71) and the base plate (12, 72) are made from the same resilient material.

6. An electronic device (70) according to claim 1 or claim 2 wherein the upper piece (71) is made from a conductive material and the upper conductor (71) forms part of the upper piece (71),
the base plate (72) is made from a conductive material and the lower conductor (72) forms part of the base plate (72), and
the electronic device further comprises a nonconductive material (73) located between the upper piece (71) and the base plate (72), the upper piece (71) and the base plate (72) being fixed separately to the nonconductive material (73).

7. An electronic device according to any one of the preceding claims wherein the thickness or modulus of elasticity of the upper piece (11, 71) and/or the base plate (12, 72) is selected according to the desired sensitivity of the electronic device.

8. An electronic device according to any one of the preceding claims further comprising an intermediate layer located between the upper conductor and the lower conductor, the intermediate layer comprising at least one flexible blade (43), having a fixed end located between the upper piece (11, 71) and the base plate (12, 72) and a free end located between the upper conductor (112, 71) and the lower conductor (122, 72), the flexible blade (43) being made of a nonconductive material and the distance between the flexible blade (43) and the upper conductor (112, 71) being smaller than the distance between the flexible blade (43) and the lower conductor (122, 72).

9. An electronic device according to any one of claims 1 to 7 further comprising an intermediate layer located between the upper conductor and the lower conductor, the intermediate layer comprising a separator board (63) comprising a conductive material, the electronic device further comprising a processor, the processor electrically connected to the to the upper conductor (112, 71), the lower conductor (122, 72) and the separator board (63) and being programmed to activate the sensor (13, 75) only when a force applied to the electronic device te cause the upper conductor (112, 71) to contact the separator board (63) before the lower conductor (122, 72) contacts the separator board (63).

10. An electronic device according to any one of claims 1-8, further comprising a processor, wherein the processor functions to turn the sensor device (13, 75) on and off, or change sensing time, sensing frequency or sensing mode of the sensor device (13, 75).

11. An electronic device according to any one of the preceding claims, further comprising a wireless transmission interface for transmitting wirelessly to an outside world test results from the sensor device (13, 75), and for receiving

information from the outside world.

12. An electronic device according to any one of the preceding claims, further including a microphone connected with the processor.

13. An electronic device according to any one of the preceding claims, further including clothing (16) into which the base plate is fixed.

14. An electronic device according to claim 14 wherein the area on the clothing where the upper piece is located contains at least one type of functional diagram (17).

15. An electronic device according to any one of the preceding claims wherein the electronic device is one of several electronic devices arranged in an array.

16. An electronic device according to any one of the preceding claims further comprising a resilient piece (24) joined between the sensor device (13, 75) and the base plate (12, 72).

Patentansprüche

1. Elektronische Vorrichtung (10, 70), die Folgendes umfasst:

ein oberes Teil (11, 71) mit einem oberen Leiter (112, 71) und
eine Basisplatte (12, 72) mit einem unteren Leiter (122, 72), wobei die Basisplatte (12, 72) von dem oberen Teil (11, 71) so beabstandet ist, dass zwischen dem oberen Leiter (112, 71) und dem unteren Leiter (122, 72) ein Abstand bereitgestellt ist,
wobei zumindest ein Element ausgewählt aus oberem Teil (11, 71) und Basisplatte (12, 72) aus einem elastischen Material besteht, so dass eine einwirkende Kraft, die elektronische Vorrichtung (10, 70) so verformen kann, dass der obere und der untere Leiter in elektrischen Kontakt gebracht werden, um eine Schaltung einzuschalten, und das Eliminieren der einwirkenden Kraft ermöglicht, dass die elektronische Vorrichtung (10, 70) in ihre ursprüngliche Position zurückkehrt, wodurch der obere und der untere Leiter getrennt werden, um die Schaltung auszuschalten,
eine Spannungsquelle, die elektronisch mit dem oberen Leiter (112, 71) und dem unteren Leiter (122, 71) verbunden ist, und
eine Sensorvorrichtung (13, 75), die mit dem unteren Leiter (112, 72) und einer Seite der Basisplatte (12, 72) verbunden ist, die jener Seite entgegengesetzt ist, an der der obere Leiter (112, 71) und der untere Leiter (122, 72) aneinander stoßen können.

2. Elektronische Vorrichtung nach Anspruch 1, worin die Sensorvorrichtung (13, 75) ein Sensor zur Detektion von Atemgeräuschen, Herzrhythmus, EKG, Körperfett, Perspiration, Sauerstoffsättigung, Puls, Blutdruck, Körpertemperatur, Druck und Blutzucker im Urin ist.

3. Elektronische Vorrichtung nach Anspruch 1 oder 2, worin das obere Teil (11, 71) und die Basisplatte (12, 72) aus einem nicht leitfähigen Material bestehen.

4. Elektronische Vorrichtung nach einem der vorangegangenen Ansprüche, worin das elastische Material aus folgenden ausgewählt ist: Chloroprenkautschuk (CR), Styrolbutadienkautschuk (SBR), einem Verbundmaterial mit einem Verhältnis von CR zu SBR von 30% zu 70 %, Silikonkautschuk, Nylon, Polyester, Polypropylen, Polyurethan und Schaumstoff.

5. Elektronische Vorrichtung nach Anspruch 3 oder 4, worin das obere Teil (11, 71) und die Basisplatte (12, 72) aus demselben elastischen Material bestehen.

6. Elektronische Vorrichtung nach Anspruch 1 oder 2, worin das obere Teil (71) aus einem leitfähigen Material besteht und der obere Leiter (71) Teil des oberen Teils (71) ist,
die Basisplatte (72) aus einem leitfähigen Material besteht und der untere Leiter (72) Teil der Basisplatte (72) ist,
die elektronische Vorrichtung ferner ein nicht leitfähiges Material (73) umfasst, das zwischen dem oberen Teil (71) und der Basisplatte (72) angeordnet ist, wobei das obere Teil (71) und die Basisplatte (72) separat an dem nicht

leitfähigen Material (73) befestigt sind.

7. Elektronische Vorrichtung nach einem der vorangegangenen Ansprüche, worin die Dicke und das Elastizitätsmodul des oberen Teils (11, 71) und/oder der Basisplatte (12, 72) in Abhängigkeit von der gewünschten Empfindlichkeit der elektronischen Vorrichtung ausgewählt sind.

8. Elektronische Vorrichtung nach einem der vorangegangenen Ansprüche, die ferner Folgendes umfasst: eine Zwischenschicht, die zwischen dem oberen Leiter und dem unteren Leiter angeordnet ist, wobei die Zwischenschicht zumindest eine flexible Lamelle (43) aufweist, die ein fixiertes Ende zwischen dem oberen Teil (11, 71) und der Basisplatte (12, 72) und ein freies Ende zwischen dem oberen Leiter (112, 71) und dem unteren Leiter (122, 72) aufweist, wobei die flexible Lamelle (43) aus einem nicht leitfähigen Material besteht und der Abstand zwischen der flexiblen Lamelle (43) und dem oberen Leiter (112, 71) geringer ist als der Abstand zwischen der flexiblen Lamelle (43) und dem unteren Leiter (112, 72).

9. Elektronische Vorrichtung nach einem der Ansprüche 1 bis 7, die ferner Folgendes umfasst: eine Zwischenschicht, die zwischen dem oberen Leiter und dem unteren Leiter angeordnet ist, wobei die Zwischenschicht eine Trennplatte (63) aufweist, die aus einem leitfähigen Material besteht, und die elektronische Vorrichtung ferner einen Prozessor umfasst, wobei der Prozessor elektrisch mit dem oberen Leiter (112, 71), dem unteren Leiter (122, 72) und der Trennplatte (63) verbunden ist und programmiert ist, um den Sensor (13, 75) nur dann zu aktivieren, wenn eine Kraft auf die elektronische Vorrichtung einwirkt, um zu bewirken, dass der obere Leiter (112, 71) die Trennplatte (63) kontaktiert, bevor der untere Leiter (122, 72) die Trennplatte (63) kontaktiert.

10. Elektronische Vorrichtung nach einem der Ansprüche 1 bis 8, die ferner einen Prozessor umfasst, wobei die Funktion des Prozessors darin besteht, die Sensorvorrichtung (13, 75) ein- und auszuschalten oder die Abfühldauer, Abfühlfrequenz oder den Abfühlmodus der Sensorvorrichtung (13, 75) zu ändern.

11. Elektronische Vorrichtung nach einem der vorangegangenen Ansprüche, die ferner eine drahtlose Übertragungsschnittstelle umfasst, um Ergebnisse von der Sensorvorrichtung (13, 75) drahtlos nach außen zu übertragen und Informationen von außen drahtlos zu empfangen.

12. Elektronische Vorrichtung nach einem der vorangegangenen Ansprüche, die ferner ein mit dem Prozessor verbundenes Mikrofon umfasst.

13. Elektronische Vorrichtung nach einem der vorangegangenen Ansprüche, die ferner ein Kleidungsstück (16) umfasst, in dem die Basisplatte befestigt ist.

14. Elektronische Vorrichtung nach Anspruch 14, worin der Bereich des Kleidungsstücks, an dem das obere Teil angeordnet ist, zumindest eine Art Funktionsdiagramm (17) enthält.

15. Elektronische Vorrichtung nach einem der vorangegangenen Ansprüche, worin die elektronische Vorrichtung nur eine von mehreren elektronischen Vorrichtungen ist, die in einem Array angeordnet sind.

16. Elektronische Vorrichtung nach einem der vorangegangenen Ansprüche, die ein elastisches Teil (24) umfasst, das zwischen der Sensorvorrichtung (13, 75) und der Basisplatte (12, 72) befestigt ist.

Revendications

1. Dispositif électronique (10, 70) comprenant:

une pièce supérieure (11, 71) ayant un conducteur supérieur (112, 71); et
une plaque de base (12, 72) ayant un conducteur inférieur (122, 72), la plaque de base (12, 72) étant espacée de la pièce supérieure (11, 71) de sorte qu'un espace est réalisé entre le conducteur supérieur (112, 71) et le conducteur inférieur (122, 72),
où au moins une parmi la pièce supérieure (11, 71) et la plaque de base (12, 72) est réalisée en un matériau résiliant de sorte qu'une force appliquée peut déformer le dispositif électronique (10, 70) de sorte que les conducteurs supérieur et inférieur viennent électriquement en contact pour mettre en service un circuit, et le retrait de la force appliquée permet au dispositif électronique (10, 70) de revenir à sa position initiale en séparant

les conducteurs supérieur et inférieur pour mettre le circuit hors service,
une source de puissance électroniquement connectée au conducteur supérieur (112, 71) et au conducteur inférieur (122, 72); et
un dispositif formant capteur (13, 75) connecté au conducteur inférieur (122, 72) et à un côté de la plaque de base (12, 72) opposée au côté où le conducteur supérieur (112, 71) et le conducteur inférieur (122, 72) peuvent venir en butée.

2. Dispositif électronique selon la revendication 1, dans lequel le dispositif formant capteur (13, 75) est un capteur pour détecter des sons de respiration, des rythmes cardiaques, EKG, la graisse corporelle, la transpiration, la saturation d'oxygène, la fréquence du pouls, la pression sanguine, la température corporelle, la pression et la glycémie dans l'urine.

3. Dispositif électronique selon la revendication 1 ou la revendication 2, où la pièce supérieure (11, 71) et la plaque de base (12, 72) sont réalisées en un matériau non conducteur.

4. Dispositif électronique selon l'une quelconque des revendications précédentes, où le matériau résiliant est sélectionné parmi le spandex, le caoutchouc de chloroprène (CR), un caoutchouc styrène butadiène (SBR), un composite ayant un rapport de 30%: 70% de CR à SBR, le caoutchouc silicone, nylon, polyester, polypropylène, polyuréthane et l'éponge.

5. Dispositif électronique selon la revendication 3 ou la revendication 4, où la pièce supérieure (11, 71) et la plaque de base (12, 72) sont réalisées dans le même matériau résiliant.

6. Dispositif électronique (70) selon la revendication 1 ou la revendication 2, où la pièce supérieure (71) est réalisée en un matériau conducteur, et le conducteur supérieur (71) fait partie de la pièce supérieure (71),
la plaque de base (72) est réalisée en un matériau conducteur, et le conducteur inférieur (72) fait partie de la plaque de base (72), et
le dispositif électronique comprend en outre un matériau non conducteur (73) situé entre la pièce supérieure (71) et la plaque de base (72), la pièce supérieure (71) et la plaque de base (72) étant fixées séparément au matériau non conducteur (73).

7. Dispositif électronique selon l'une quelconque des revendications précédentes, où l'épaisseur ou le module d'élasticité de la pièce supérieure (11, 71) et/ou de la plaque de base (12, 72) est sélectionné en accord avec la sensibilité recherchée du dispositif électronique.

8. Dispositif électronique selon l'une quelconque des revendications précédentes, comprenant en outre une couche intermédiaire située entre le conducteur supérieur et le conducteur inférieur, la couche intermédiaire comprenant au moins une lame flexible (43), ayant une extrémité fixe située entre la pièce supérieure (11, 71) et la plaque de base (12, 72) et une extrémité libre située entre le conducteur supérieur (112, 71) et le conducteur inférieur (122, 72), la lame flexible (43) étant réalisée en un matériau non conducteur, et la distance entre la lame flexible (43) et le conducteur supérieur (112, 71) étant plus petite que la distance entre la lame flexible (43) et le conducteur inférieur (122, 72).

9. Dispositif électronique selon l'une quelconque des revendications 1 à 7, comprenant en outre une couche intermédiaire située entre le conducteur supérieur et le conducteur inférieur, la couche intermédiaire comprenant une carte de séparation (63) comprenant un matériau conducteur, le dispositif électronique comprenant en outre un processeur, le processeur étant électriquement connecté au conducteur supérieur (112, 71), au conducteur inférieur (122, 72) et à la carte de séparation (63) et étant programmé pour activer le capteur (13, 75) seulement lorsqu'une force est appliquée au dispositif électronique pour amener le conducteur supérieur (112, 71) à venir en contact avec la carte de séparation (63) avant que le conducteur inférieur (122, 72) ne vienne en contact avec la carte de séparation (63).

10. Dispositif électronique selon l'une quelconque des revendications 1 à 8, comprenant en outre un processeur, où le processeur fonctionne pour mettre en et hors service le dispositif formant capteur (13, 75) ou pour changer le temps de détection, la fréquence de détection ou le mode de détection du dispositif formant capteur (13, 75).

11. Dispositif électronique selon l'une quelconque des revendications précédentes, comprenant en outre une interface de transmission sans fil pour transmettre sans fil au monde extérieur des résultats de test du dispositif formant capteur (13, 75) et pour recevoir des informations du monde extérieur.

12. Dispositif électronique selon l'une quelconque des revendications précédentes, comprenant en outre un microphone connecté au processeur.

13. Dispositif électronique selon l'une quelconque des revendications précédentes, comprenant en outre un habillage (16) dans lequel la plaque de base est fixée.

14. Dispositif électronique selon la revendication 14, où la zone sur l'habillage où la pièce supérieure se situe, contient au moins un type de diagramme fonctionnel (17).

15. Dispositif électronique selon l'une quelconque des revendications précédentes, où le dispositif électronique est un de plusieurs dispositifs électroniques disposés selon une rangée.

16. Dispositif électronique selon l'une quelconque des revendications précédentes, comprenant en outre une pièce résiliante (24) jointe entre le dispositif formant capteur (13, 75) et la plaque de base (12, 72).

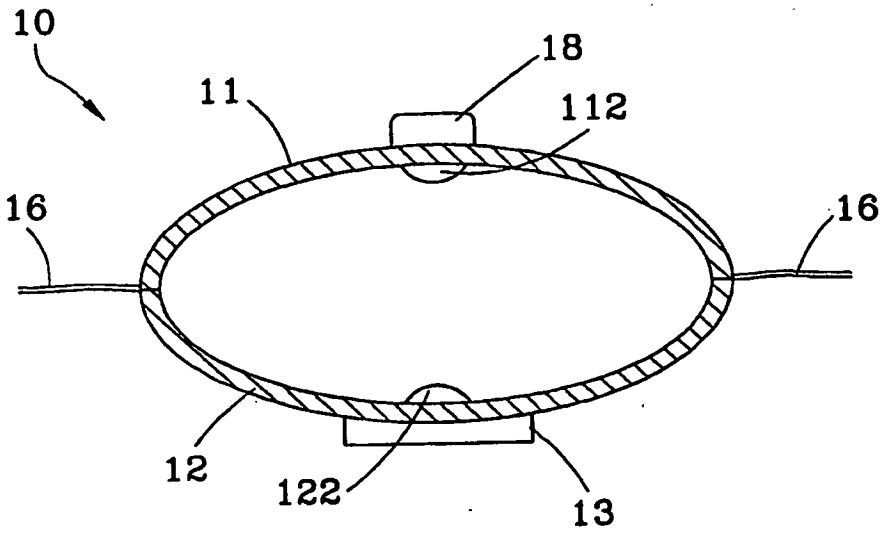

FIGURE 1

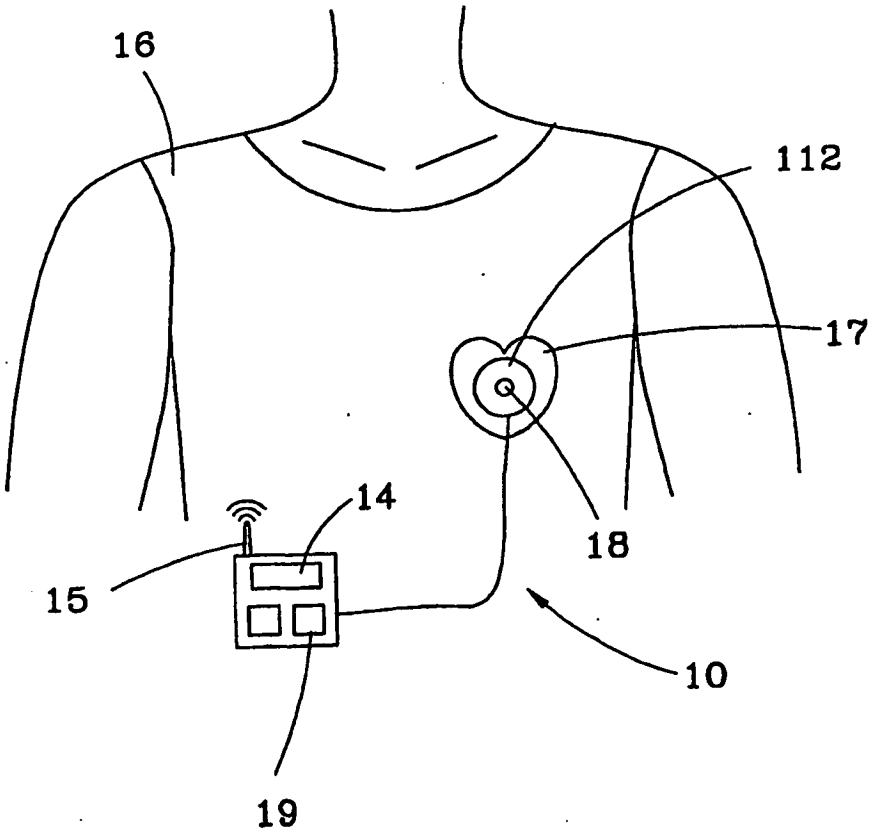

FIGURE 2

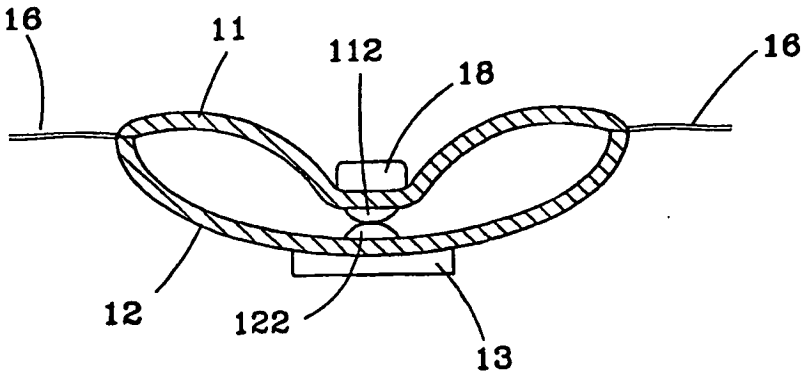

FIGURE 3

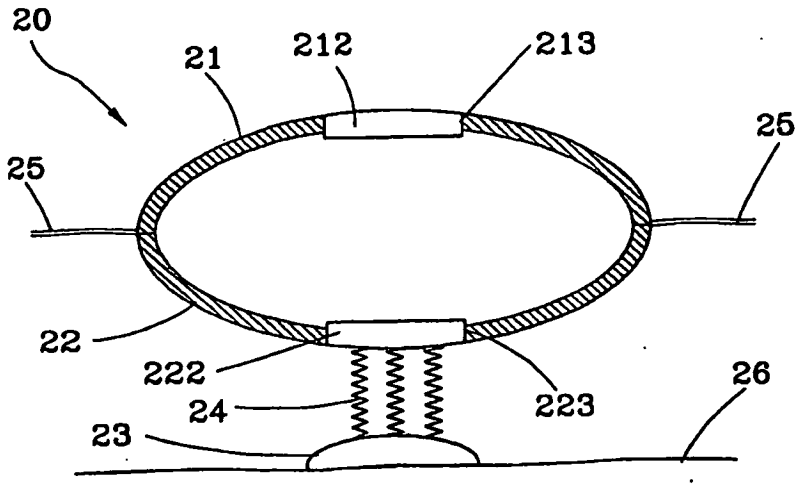

FIGURE 4

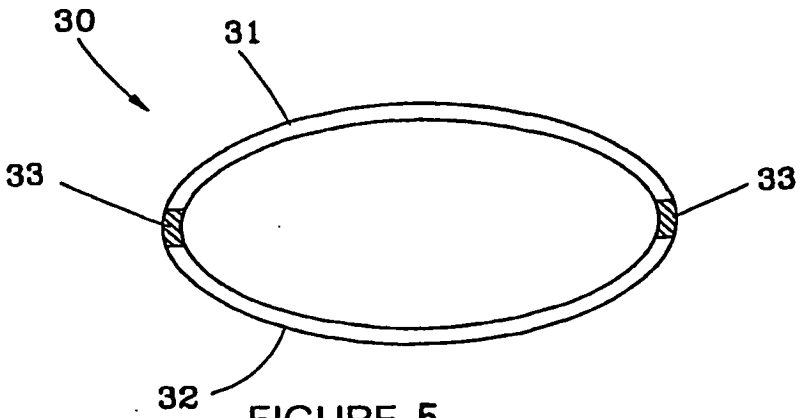

FIGURE 5

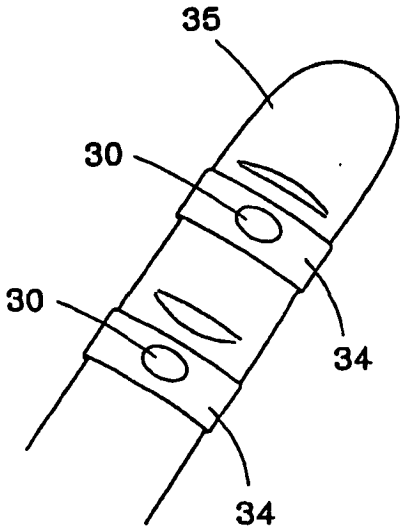

FIGURE 6

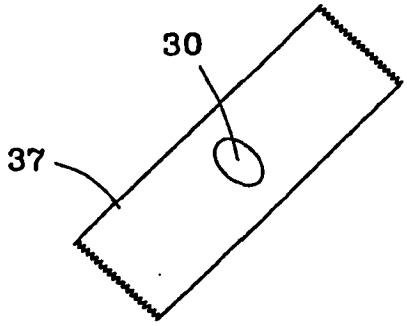

FIGURE 7

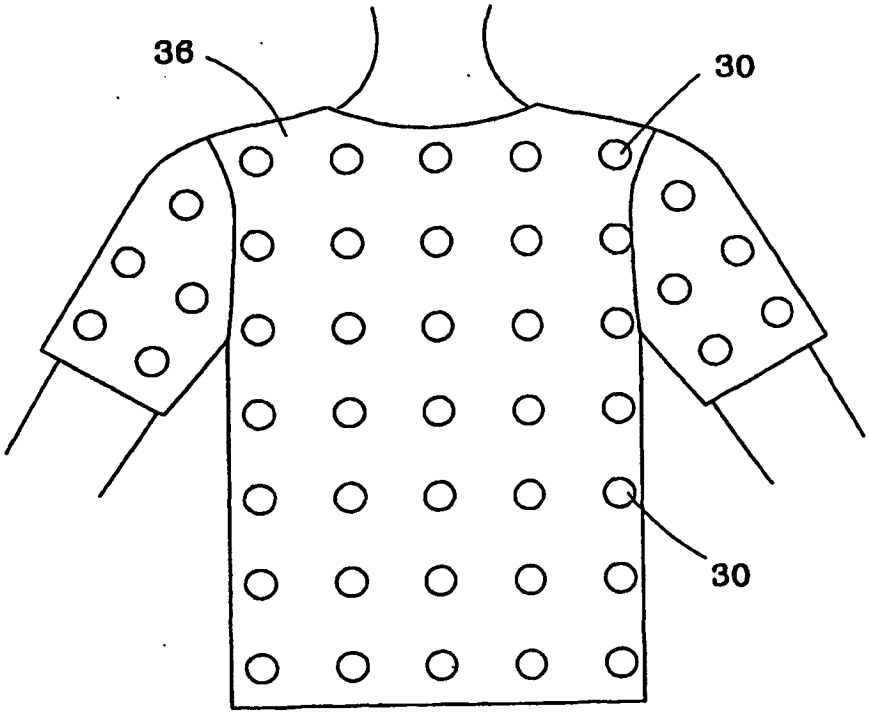

FIGURE 8

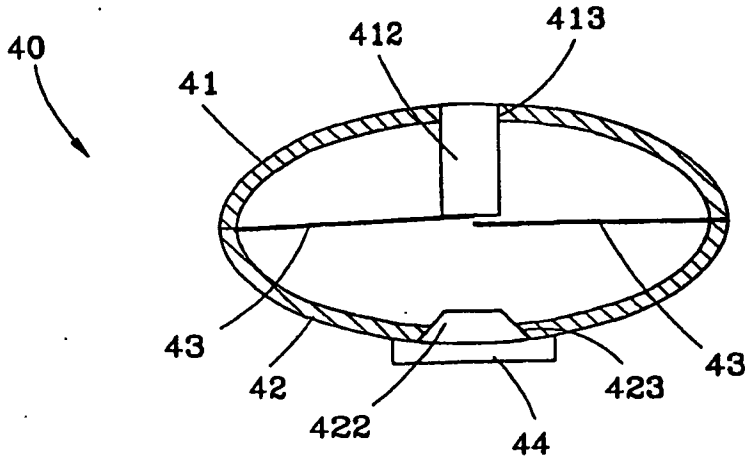

FIGURE 9

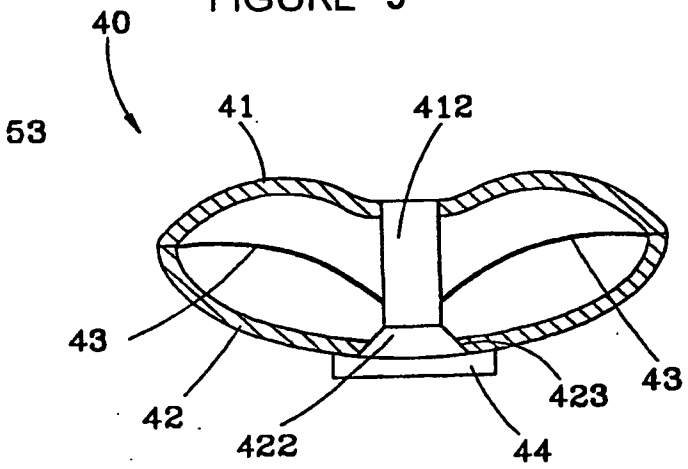

FIGURE 10

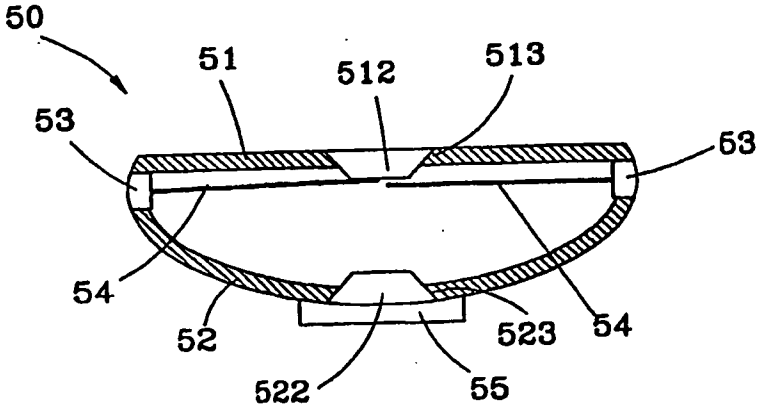

FIGURE 11

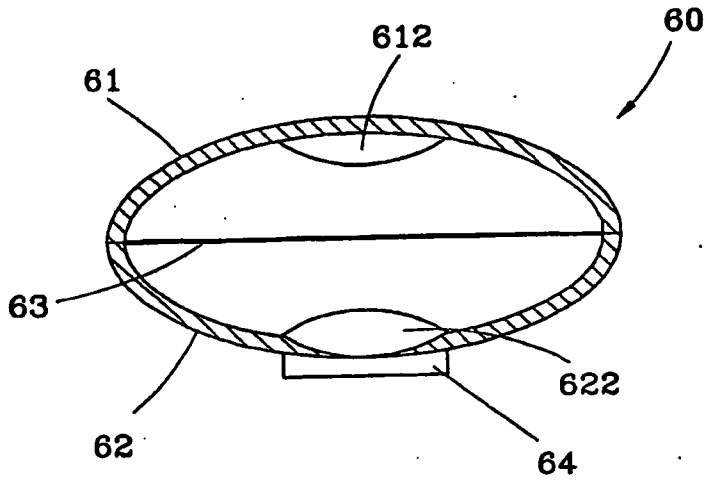

FIGURE 12

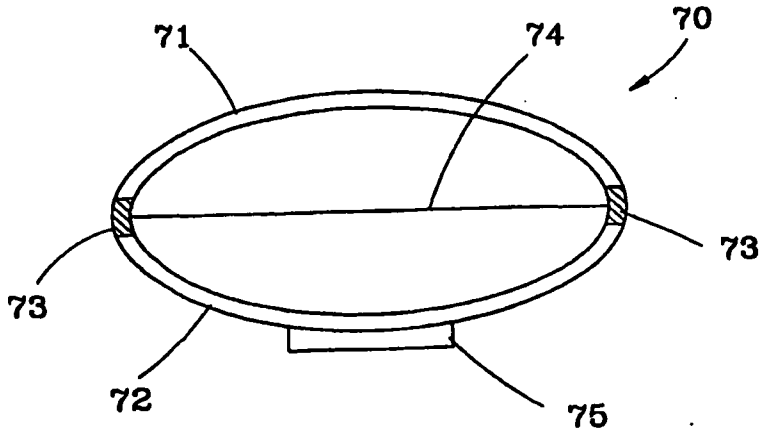

FIGURE 13

专利名称(译)	电子设备		
公开(公告)号	EP1946696B1	公开(公告)日	2012-08-15
申请号	EP2005792188	申请日	2005-09-21
申请(专利权)人(译)	杨，长明		
当前申请(专利权)人(译)	杨，长明		
[标]发明人	YANG CHANG MING		
发明人	YANG, CHANG-MING		
IPC分类号	A61B5/00 H01H13/52		
CPC分类号	H01H3/14 A61B5/00 A61B5/0002 A61B5/024 A61B5/6804 A61B5/6805 H01H13/702 H01H2203/0085 H01H2205/004		
其他公开文献	EP1946696A4 EP1946696A1		
外部链接	Espacenet		

摘要(译)

一种电子设备，包括弹性件，底板和电子源。上导体位于弹性件上;底板连接到弹性件上，两者之间有一个空间。下导体位于基板上，下导体和上导体之间有缝隙。电子源电连接到上导体和下导体。传感器装置位于底板上。利用这种结构，电子设备可以根据用户的需要，对受试者的生理状态进行测试或测试被按压的特定部位，用作医疗设备，健身设备或通信设施的辅助。

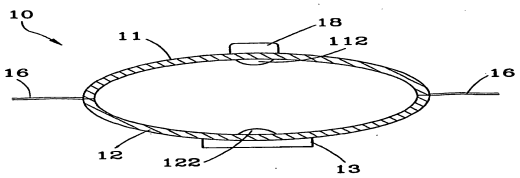

FIGURE 1

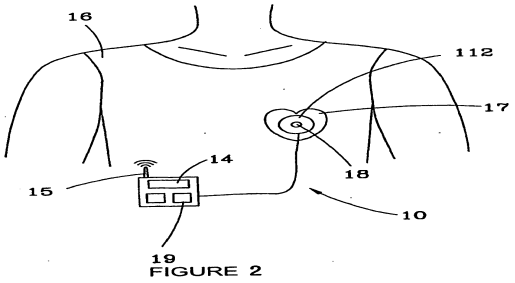

FIGURE 2