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(54) BELT DEVICE

RIEMENVORRICHTUNG

DISPOSITIF DE SANGLE

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Description

[0001] The invention is directed on a belt device. The system is especially usable for wearing ECG electrodes.

[0002] A portable ECG apparatus and method is described in EP 1 095 612 A1. The portable ECG apparatus comprises an electrode garment and a diagnostic system. The electrode garment is a vest having a plurality of electrodes attached at strategic locations. The electrode-garment can include means for manually placing each of the electrodes on a variety of customized positions and such positions can be marked, so that the electrodes can be changed. Then one coded garment can be shared by a number of individuals. It is contemplated that the electrode-garment can have a means to automatically control placement of each electrode, such as through use of a pair of motors, which move each electrode in plane. Further the vest consists of a torso portion and a pair of shoulder straps. The torso portion is preferable made of a material that is comfortable on the skin, such as nylon fabric. The torso portion is closable by a Velcro. The electrode garment is connected to the diagnostic system, wherein the diagnostic system presents diagnoses, which are understandable to a layperson.

[0003] The company Leidel & Kracht GmbH, Bremerhavenerstrasse 39, D-50735 Köln distributes to possible customer samples for advertising the professional skills of the company. These samples show a foamed material piece, comprising integrated slots, wherein a scale is arranged parallel to the slot. The bottom of the slots are covered with Velcro. The Velcro could be used as a part of a fastener.

[0004] EP0571040 describes a sling or jacket that is to be worn and that comprises a plurality of electrocardiographic recording electrodes. Other background information is found in US 6,551,252.

[0005] It is an object of the invention to provide a belt device that can be easy put on by the wearer on its own. It is further object of the invention to provide a belt device system, which could be adapted to a wearer in a comfortable way.

[0006] The problem of the invention is solved by the use of a belt device comprising a torso portion, a collar portion, sensor elements and at least a first and a second closure element, wherein the first closure element is part of the collar portion and arranged on the front side of the belt device. So it is easy for the wearer to open and to close the first closure element. A second closure element is part of the torso portion and is arranged on the front side also, wherein opening and closing of both closure elements could be handled by the wearer in a comfortable way. According to the invention, the collar portion is connected to the torso portion by at least one adjustable connection element and a further connection element. By the use of the adjustable connection element the collar portion can be adjusted to the height of the upper part of the wearers body.

[0007] In one embodiment at least two connection elements are arranged, wherein the collar portion is connectable and disconnectable to a torso portion. By choosing a range, wherein an adjustment is possible, the needed number of collar portions to cover a range of different sized people is determined. In one embodiment one of the front closure elements enables to connect the collar portion with the torso portion.

A belt device system is provided by a number of collar portions of different size, which are connectable to torso portions of different size. By choosing one of the collar portions and one of the torso portions and connecting of them a belt device is supplied. To reduce the number of needed collar portions a range is chosen between 5 and 25 cm. The collar portion will be well fitted to the body of the wearer to guarantee a good sensor skin contact. A good skin sensor contact is needed for generating reliable sensor signals.

In one possible embodiment the adjustable connection is arranged at the backside of the belt device. By the arrangement of the adjustable connection on the backside an unwanted readjustment by the wearer is avoided.

[0008] By the possibility of an adjustment the belt system is usable for different sized people.

[0009] Especially for ECG measurement it is very important that the sensors are in good skin contact. By the use of a soft and flexible material, wherein sensors are kept by that parts, the soft parts will snuggle against the skin, which have a positive effect on the sensor to skin contact. Further it is more comfortable to wear the belt device.

[0010] In one possible embodiment the belt device comprises one or more pressure elements, which are assigned to the sensors. By a pressure element a continuously contact of the sensor to the skin of the wearer is improved. Especially adjustable pressure elements could be used, for example gel pads. Therefore the pressure could be adjusted to guarantee a pre-given contact pressure of the sensor to the skin of the wearer independent of the bumpiness of the skin surface. Very often elderly or obesity people have a very bumpy skin surface, wherein these people belong to the risk group of heart diseases. By measuring the ECG over long periods or more often the risk to die of heart diseases will be reduced.

[0011] In one possible embodiment at least one of the closure elements comprises an electric connection for power and/or data transfer.

[0012] In one of the possible embodiments an adjustable torso portion is used. The length of the torso portion can be adjusted in pre-given range. By choosing a range of adjustability the number of needed torso portion is determined to be able to fit one of available torso portions to any patient or wearer. By choosing a small range of adjustability the number of needed torso portion is going up. By using a large range of adjustability it is less comfortable for the wearer.

[0013] In one possible embodiment a range of adjustability between 5cm to 25cm is chosen, especially steps around 20 cm results in a manageable amount of different sized torso portions.

[0014] In a possible embodiment the sensor elements held by the belt device in such a way that the positions of the sensor are adjustable. The sensor position can be changed in respect to the torso or collar portion. Especially a possibility to shift the sensor element in a range of 2 -7 cm is useful. Different sensor position could be linked with different ranges of adjustability.

[0015] A belt device system is build up by a number of collar portions of different size and a number of torso portion of different size, wherein all collar portions are connectable with all torso portions of the system. In dependence of the chosen adjustability of the collar portion and the torso portions the number of different sized torso and collar portions are determined to cover a pre-given range of different sized people. By a combination of a selected collar portion and a selected torso portion a suitable belt device for different sized people is provided.

Fig.1 shows a belt device,
fig.2 shows the belt device of fig. 1 by displaying the single portions;
fig.3 shows a different design of the belt device in front view,
fig.4 shows the belt device of Fig.2 in back view,
fig.5 shows schematically different possibilities of the arrangement of the battery and the electronic module.

[0016] In figure 1 a belt device is shown. The electrodes held by this belt device. The number of the used electrodes and electrode positions is dependent on the used algorithm to generate results. In the shown example the sensor signals are used to generate an electrocardiogram (ECG).

[0017] The standard of a diagnostic clinical electrocardiogram (ECG) is a 12-lead (channel) ECG deduced from the readings of 10 electrodes placed at specific positions at the chest. Usually, trained professionals places glued electrodes at the required anatomical positions. Zymed Medical Instrumentation, now part of Philips Medical Systems, introduced a reduced electrode configuration for 12-lead ECG, which is named EASI LEAD and described in WO0160250, which is hereby incorporated by reference. By using EASI LEAD, five electrodes, placed at specific anatomic landmarks, provide 3 channels that contain sufficient information to calculate the 12 lead ECG.

[0018] The measurement of a 12-lead ECG both with a conventional and the EASI lead electrode configuration needs accurate electrode placement that is not feasible for a layman. A wearable belt device for electrodes and electronics that enables an easy and repeatable placement of the electrodes on the chest (EASI leads) by a layperson is proposed. The electrode positions within the belt device are adjustable to fit the individual anatomy. That adjustment should be done by a professional once and is not to be changed by the wearer. To put the wearable belt device on, the belt device can be opened without touching the electrode positions. Electrodes, cables and electronics are fastened to the belt device. Preferably the belt device comprises cable ducts that allow separate production of the electronic parts and the belt device, easy assembly and easy separation, e.g. for cleaning. It is also possible to integrate the cable inside of the body of belt device.

[0019] Below the belt system is described in principle on the basis of figure 1 and 2. The belt device 1 comprises of a collar portion 3 and a torso portion 5. The belt system 1 is used to arrange five sensors 7. In described embodiment dry active rubber electrodes 7 are used. Dry rubber electrodes are comfortable to wear. Dry, active rubber electrodes are reusable, have a short set-up time and do not cause skin irritation. Further dry electrodes generate signals of high reliability.

[0020] In the shown embodiment a top sensor 9 is arranged in a short distance under the larynx. A sternum sensor 11 is arranged in a distance under the top sensor. By the design of the collar portion the skin contact of the top sensor is maintained. Especially the ring around the neck with none plane structure assists a good skin contact of the top sensor 9.

[0021] Further a left side sensor 15 and a right side sensor 13 are arranged on the height of the sternum sensor 11 on both sides of the upper body of the wearer. A ground sensor 17 is arranged on the height of top sensor 9. As described above this sensor positions are only a possible arrangement, which is dependent of the intended use of the belt system. The position of the ground sensor is more flexible as the position of the other sensors.

[0022] The collar portion 3 comprises an opening 4 for the neck and a first closure 19, which is arrange on the front side 23. This first closure is part of the portion of the collar portion, which surrounds the neck. Because of the position of the top senor 9 and the sternum sensor 11 the first closure is arranged on the right or left side. The position can be adapted in dependence if the patient is right-handed or left-handed.

[0023] The top sensor 9 and the ground electrode 17 are arranged on the front side 23 too. The top sensor 9 is adjustable in respect to the collar portion 3 in a range of circa 4 cm. By an adjustment the sensor position can be fitted to the wearer to be well placed for generating reliable measurements.

[0024] Further the collar portion 3 comprises a connection 29 and an adjustable connection 27 to connect the collar portion 3 to the torso portion 5. In the shown example the adjustable connection 27 is arranged on the backside 25. This adjustable connection is used to fit the collar portion 3 to the height of the upper part of the wearer. The adjustment has to be done only one time before the first usage of the belt device by one individual. In the adjustment process also the sensors positions are adjusted to the body of the wearer. Normally a professional will execute the adjustment. After the

adjustment is done, the wearer could put on and off the belt device by opening/closing first closure element 19 and second closure element 21. Therefore the wearer needs no help by a third person. The wearer has not to pull the belt device over the head, which makes it more comfortable to put belt device 1 on or off.

[0025] The torso portion 5 also comprises sensors. The sternum sensor 11 and the right 13 and left side sensors 15 are arranged by the torso potion 5. The left side sensor and the right side sensor are adjustable 59 in a range of circa 5 cm. An electronic module 33 is arranged by torso portion 5. The electronic module comprises a digital/analog converter, a storage module 67, a wireless link 6 and a small battery 35. The electronic module 35 could be split up in separate parts. All of the sensors are connected to the electronic module 33. Electronic connections 61 are integrated in the second closure element 21 and the connection 29.

[0026] The part 71 of the collar portion 3 is made of foamed material, which is very soft and comfortable to wear on the skin. On the backside 23 a part of the collar portion straps 73, 75 are arranged. The strips are used for adjustment. By the upper strap 73 the length is adjustable in a range of 6,5 cm. Elastic straps could be used.

[0027] The front part 79, 77 of the torso portion 5 is made of foamed material. The torso portion 5 also comprises straps 81, 83, 85, which are arranged on the backside 25. The length of the straps can be adjusted to adjust the torso portion 5 to the size of the user. The length of the straps 81 and 85 are each adjustable in a range of 9 cm. The length of the straps is adjusted in such a way that skin contact of the electrodes is assured. By the adjustment of the length of the straps the contact pressure of the sensors can be adjusted.

[0028] In some cases pressure elements are used to make sure that the sensor element has a good skin contact. Especially if the person is in motion there is a high risk that the skin contact of the sensors is interrupted. Especially if the sensor is arranged in a recess of the bumpy skin surface it is difficult to generate a high contact pressure to the sensor. In that case pressure elements 31 could be used to support the generation of a contact pressure.

[0029] In figure 3 and 4 an alternative design of the collar portion 3 is shown. In this embodiment the electronic module 33 is arranged on the backside of the collar portion 3. In some cases parts of the electronic module could be used as a pressure module, wherein that part of the electronic module is arranged on the senor on the opposite side of the skin. By tighten the collar portion the sensor is pressed on the skin, wherein the module arranged on the sensor is pushed in direction of the skin.

[0030] In figure 5 different arrangement of the electronic module 33 are displayed. In this case the battery 35 is arranged separated from the electronic module 33.

[0031] To provide a belt device system a number of different sized collar portions 3 and a number of different sized torso portions 5 are provided. All of the collar portions 3 can be used in combination with each of the torso portions 5. Every collar portion 3 is assigned to a range of the height of the upper part of the body of the patient/wearer and every one of the torso portions 5 is assigned to a range of the thorax circumference size. In dependence of the size of the upper part of the wearer a torso portion 5 and a collar portion 3 is selected. Then the selected collar portion 3 is connected with the selected torso portion 5 by the connection 29 and the adjustable connection 27 to compose one possible belt device1.

[0032] In table 2 the steps of different sized torso portions 5 and collar portions 3 are listed. In that case one collar is assigned to five established clothing sizes. So by this relative low number of collar portions 3 and torso portions 5 a large range of people with different size are covered. In that case the collar portion 3 could be adjusted in a range of ca. 6,5 cm. One torso portion could be modified in a range of 19 cm. By making the range of adjustment smaller the belt device system could be fitted more precisely and the length of overlapping strips are reduced. Further by integrate more adjustment possibilities an adjustment could be done more precisely. The disadvantage is that then an adjustment becomes more complicate and higher prices are generated by the adjustable elements and adjustable connections. For a further reduction of the different sized collar portions and torso portions adapters could be used to avoid long surmounting straps in the case of the adjustment on the smallest position of the selected collar/torso portion.

[0033] Especially by interchange of connection 29 into a further adjustable connection it can make sure that the position of the neck is always placed in the middle of the opening 4 of the collar portion 3.

[0034] To adjust the belt system to a wearer, first the torso portion 5 is tighten up by the use of the adjustable straps 81, 85. Then the collar portion3 is tightened up by the use of the adjustable connection.

[0035] Fastening devices such as Velcro and snap fastening can be used for fastening of electrodes, cables and electronics. So separate production of wearable and electronics part, easy assembly and disassembly is enabled.

[0036] In table 1 concrete sensor positions are listed. In that example a 39 old person was the wearer. His body height is 184 cm and his weight is 75 kg. The sharp perimeter is 39 cm and the chest perimeter is 95cm. The waist perimeter is 86 cm. The height of the upper part of the body is circa 50cm. His established cloth size is 48 of the German cloth size. The height of the Sternum measured from the sharp is 30 cm. That location is the correct position for the sternum sensor 11. The chest perimeter is 93,5 cm at the height of the sensors held by the torso portion 5. These are the left side sensor 15, right side sensor 13 and the sternum sensor 11. The measured distance from lower side of the larynx down to sternum sensor position is 12,5 cm. The measured distance from the neck down to the top sensor 9 position is 17 cm. The distance between the top sensor 9 position and the sternum sensor 11 position is 7,5 cm.

[0037] In table 2 the established sizes are listed. Five established sizes are covered by one torso portion 5, which can be adjusted in a range of 15 cm.

LIST OF REFERENCE NUMBERS

		39	D/A converter
		41	conductive closure element
1	belt device	43	data line
3	collar portion	45	storage
4	opening (for the neck)	47	dry sensor
5	torso portion	53	foamed material
7	sensor element	55	elastic belt
9	top sensor	59	adjustment area of the sensors
11	sternum sensor	61	electronic connection
13	right side sensor	63	length
15	left side sensor	65	sensor position
17	ground electrode/sensor	67	storage module
19	first closure element	69	wireless link
21	second closure element	71	collar
23	front side	73	strap
25	back side	75	strap
27	adjustable connection	77	strap
29	connection	79	strap
31	pressure element	81	strap
33	electronic module	83	strap
35	battery	85	strap
37	transmitter		

Table 1

Point of measurement	*Electrode/ Sensor*		
Body height		184 cm	
Body weight		75 kg	
Sharp perimeter		39 cm	
Chest measurement		95 cm	
Waist measurement		86 cm	
Height of the upper part of the body		Ca. 50cm	
size		48 (may be 98)	
Height of sternum ex neck	Sternum sensor	30 cm	
Chest measurement at height of points of measurement		93,5 cm	
Ca.1/2 perimeter	Right side sensor + Left side sensor	47,5 cm	
Lower side of Larynx down to sternum	Top sensor	12,5 cm	
	Ground sensor		
Neck down to top sensor		17 cm	
Top sensor to sternum sensor		7,5 cm	

Table 2:

Body height cm	Chest measurement cm	Waist measurement	Side length cm	size	No.	Maximum of difference of chest measurement
160-164	78-81	66-96	96-99	40	*1*	
162-166	82-85	70-73	98-100	42	2	
164-168	84-87	72-75	99-101	43	3	
166-170	86-89	74-77	100-103	44	4	
168-173	90-93	78-81	102-104	46	5	15 cm
171-176	94-97	82-85	103-106	48	6	
174-179	98-101	86-89	105-108	50	7	
177-182	102-105	90-94	107-109	52	8	
180-184	106-109	95-99	108-110	54	9	
182-186	110-113	100-104	109-112	56	10	19 cm
184-188	114-117	105-109	111-114	58	11	
185-189	118-121	110-114	112-115	60	12	
187-191	122-125	115-119	114-116	62	13	
189-193	126-129	120-124	115-117	64	14	
191-194	130-133	125-129	116-118	66	15	19 cm
	134-137			68	16	
	138-141			70	17	
	142-145			72	18	
	146-149			74	19	
	150-153			76	20	19 cm

Claims

1. Belt device (1) comprising a torso portion (5), a collar portion (3), sensor elements (7) and at least a first (19) and a second closure element (21), wherein the collar portion (3) is configured to surround the neck of a wearer when in use, wherein the first closure element (19) is part of the collar portion (3) on the front side (23) and a second closure element (21) is part of the torso portion (5) on the front side (23) of the belt device, wherein the first closure element (19) and the second closure element (21) are configured to close the collar portion (3) and the torso portion (5) respectively around the body of a wearer; wherein the collar portion (3) is connected to the torso portion (5) by at least one adjustable connection element (27) and a further connection (29), wherein the adjustable connection element (27) is configured to fit the collar portion (3) to the height of the upper part of the wearer.

2. Belt device of claim 1, wherein the adjustable connection element (27) is arranged at the backside (25) of the belt device (1).

3. Belt device of claim 1 or 2, wherein the adjustable connection element (27) enables a detachable connection of the collar portion (3) and the torso portion (5).

4. Belt device of claim 1, comprising a pressure element (31) to provide pressure to at least one of the sensors (7) to guarantee a continuously contact of a sensor element (7) with the skin of the wearer.

5. Belt device of claim 1, wherein the pressure element (31) is adjustable.

6. Belt device of claim 1 comprising an electronic module (33).

7. Belt device of claim 4, further comprising an electronic module (31) that is at least part of the pressure element (31).

8. Belt device of claim 6, wherein the second closure element (21) comprises an electric connection (61) for power and/or data transfer.

9. Belt device of claim 2, wherein the length (63) of the torso portion (5) is adjustable.

10. Belt device of claim 1, wherein the sensor positions (65) are adjustable.

11. Belt device of claim 6, wherein the electronic module comprises a storage module to collect and store ECG data.

12. Belt device of claim 6, wherein the electronic module comprises a wireless link for data transfer.

13. Belt device of claim 1, wherein parts of the torso portion and the collar portion are made from foamed material.

14. Belt device (1) system comprising a belt device as claimed in any preceding claim and at least one collar portion (3) of different size and at least one torso portion (5) of different size, wherein any one of the collar portions (3) are connectable with any one of the torso portions (5) of the belt device system.

15. Torso portion (5), connectable to a collar portion (3) that is configured to surround the neck of a wearer when in use, wherein the torso portion (5) comprises a second closure element (21) configured to close the torso portion (5) around the body of a wearer, wherein the torso portion (5) comprises a part of an adjustable connection (27) and a part of a further connection (29) to connect the torso portion (5) to a collar portion (3) to generate a belt device of claim 1, wherein the adjustable connection (27) is configured to fit the collar portion (3) to the height of the upper part of the wearer.

16. Collar portion (3), connectable to a torso portion, wherein the collar portion (3) is configured to surround the neck of a wearer when in use, wherein the collar portion (3) comprises a first closure element (19) configured to close the collar portion (3) around the body of a wearer, wherein the collar portion (3) comprises a part of an adjustable connection (27) and a part of a further connection (29) to connect the collar portion (3) to a torso portion (5) to generate a belt device of claim 1, wherein the adjustable connection (27) is configured to fit the collar portion (3) to the height of the upper part of the wearer.

Patentansprüche

1. Gürtelvorrichtung (1), umfassend einen Rumpfteil (5), einen Kragenteil (3), Sensorelemente (7) und wenigstens ein erstes (19) und ein zweites Verschlusselement (21), wobei der Kragenteil (3) konfiguriert ist, um den Nacken eines Trägers beim Gebrauch zu umgeben, wobei das erste Verschlusselement (19) Teil des Kragenteils (3) an der Vorderseite (23) ist und ein zweites Verschlusselement (21) Teil des Rumpfteils (5) an der Vorderseite (23) der Gürtelvorrichtung ist, wobei das erste Verschlusselement (19) und das zweite Verschlusselement (21) konfiguriert sind, um den Kragenteil (3) und den Rumpfteil (5) jeweils um den Körper eines Trägers verschlossen zu werden; wobei der Kragenteil (3) durch wenigstens ein verstellbares Verbindungselement (27) und einer weiteren Verbindung (29) mit dem Rumpfteil (5) verbunden ist, wobei das verstellbare Verbindungselement (27) konfiguriert ist, um den Kragenteil (3) der Höhe des oberen Körperteils des Trägers anzupassen.

2. Gürtelvorrichtung nach Anspruch 1, wobei das verstellbare Verbindungselement (27) an der Rückseite (25) der Gürtelvorrichtung (1) angeordnet ist.

3. Gürtelvorrichtung nach Anspruch 1 oder 2, wobei das verstellbare Verbindungselement (27) eine lösbare Verbindung des Kragenteils (3) und des Rumpfteils (5) ermöglicht.

4. Gürtelvorrichtung nach Anspruch 1, umfassend ein Druckelement (31), um Druck auf wenigstens einen der Sensoren (7) anzulegen, um einen kontinuierlichen Kontakt eines Sensorelements (7) mit der Haut des Trägers zu gewährleisten.

5. Gürtelvorrichtung nach Anspruch 1, wobei das Druckelement (31) verstellbar ist.

6. Gürtelvorrichtung nach Anspruch 1, umfassend ein elektronisches Modul (33).

7. Gürtelvorrichtung nach Anspruch 4, ferner umfassend ein elektronisches Modul (31) das wenigstens Teil des Druckelements (31) ist.

8. Gürtelvorrichtung nach Anspruch 6, wobei das zweite Verschlusselement (21) eine elektrische Verbindung (61) für Strom und/oder eine Datenübertragung umfasst.

9. Gürtelvorrichtung nach Anspruch 2, wobei die Länge (63) des Rumpfteils (5) verstellbar ist.

10. Gürtelvorrichtung nach Anspruch 1, wobei die Sensorteile (65) verstellbar sind.

11. Gürtelvorrichtung nach Anspruch 6, wobei das elektronische Modul ein Speichermodul zum Sammeln und Speichern von EKG-Daten umfasst.

12. Gürtelvorrichtung nach Anspruch 6, wobei das elektronische Modul eine drahtlose Verknüpfung für eine Datenübertragung umfasst.

13. Gürtelvorrichtung nach Anspruch 1, wobei Teile des Rumpfteils und des Kragenteils aus einem geschäumten Material bestehen.

14. Gürtelvorrichtungssystem (1), umfassend eine Gürtelvorrichtung nach einem der vorstehenden Ansprüche, und wenigstens einen Kragenteil (3) unterschiedlichen Größe, und mindestens einen Rumpfteil (5) unterschiedlicher Größe, wobei ein beliebiger der Kragenteile (3) mit einem beliebigen der Rumpfteile (5) des Gürtelvorrichtungssystems verbunden werden kann.

15. Rumpfteil (5), der mit einem Kragenteil (3) verbunden werden kann, der konfiguriert ist, um den Nacken eines Trägers beim Gebrauch zu umgeben, wobei der Rumpfteil (5) ein zweites Verschlusselement (21) umfasst, das konfiguriert ist, um den Rumpfteil (5) um den Körper eines Trägers zu verschließen, wobei der Rumpfteil (5) einen Teil einer verstellbaren Verbindung (27) und einen Teil einer weiteren Verbindung (29) umfasst, um den Rumpfteil (5) mit einem Kragenteil (3) zu verbinden, um eine Gürtelvorrichtung nach Anspruch 1 zu erzeugen, wobei die verstellbare Verbindung (27) konfiguriert ist, den Kragenteil (3) der Höhe des oberen Körperteils des Trägers anzupassen.

16. Kragenteil (3), der mit einem Rumpfteil verbunden werden kann, wobei der Kragenteil (3) konfiguriert ist, um den Nacken eines Trägers beim Gebrauch zu umgeben, wobei der Kragenteil (3) ein erstes Verschlusselement (19) umfasst, das konfiguriert ist, um den Kragenteil (3) um den Körper eines Trägers zu verschließen, wobei der Kragenteil (3) einen Teil einer verstellbaren Verbindung (27) und einen Teil einer weiteren Verbindung (29) umfasst, um den Kragenteil (3) mit einem Rumpfteil (5) zu verbinden, um eine Gürtelvorrichtung nach Anspruch 1 zu erzeugen, wobei die verstellbare Verbindung (27) konfiguriert ist, um den Kragenteil (3) der Höhe des oberen Körperteils des Trägers anzupassen.

Revendications

1. Dispositif de sangle (1) comprenant une portion de torse (5), une portion de collier (3), des éléments capteurs (7) et au moins un premier (19) et un second élément de fermeture (21), dans lequel la portion de collier (3) est configurée pour entourer le cou d'un porteur lorsqu'il est en utilisation, dans lequel le premier élément de fermeture (19) fait partie de la portion de collier (3) sur le premier côté (23) et un second élément de fermeture (21) fait partie de la portion de torse (5) sur le côté avant (23) du dispositif de sangle, dans lequel le premier élément de fermeture (19) et le second élément de fermeture (21) sont configurés pour fermer la portion de collier (3) et la portion de torse (5) respectivement autour du corps d'un porteur ; dans lequel la portion de collier (3) est raccordée à la portion de torse (5) par au moins un élément de raccordement ajustable (27) et un autre raccordement (29), dans lequel l'élément de raccordement ajustable (27) est configuré pour adapter la portion de collier (3) à la hauteur de la partie supérieure du porteur.

2. Dispositif de sangle selon la revendication 1, dans lequel l'élément de raccordement ajustable (27) est agencé sur le côté envers (25) du dispositif de sangle (1).

3. Dispositif de sangle selon la revendication 1 ou 2, dans lequel l'élément de raccordement ajustable (27) permet un raccordement détachable de la portion de collier (3) et de la portion de torse (5).

4. Dispositif de sangle selon la revendication 1, comprenant un élément de pression (31) pour fournir la pression à au moins un des capteurs (7) pour garantir un contact continu d'un élément capteur (7) avec la peau du porteur.

5. Dispositif de sangle selon la revendication 1, dans lequel l'élément de pression (31) est ajustable.

6. Dispositif de sangle selon la revendication 1, comprenant un module électronique (33).

7. Dispositif de sangle selon la revendication 4, comprenant en outre un module électronique (31) qui fait au moins partie de l'élément de pression (31).

8. Dispositif de sangle selon la revendication 6, dans lequel le second élément de fermeture (21) comprend un raccordement électrique (61) pour le transfert de puissance et/ou de données.

9. Dispositif de sangle selon la revendication 2, dans lequel la longueur (63) de la portion de torse (5) est ajustable.

10. Dispositif de sangle selon la revendication 1, dans lequel les positions des capteurs (65) sont ajustables.

11. Dispositif de sangle selon la revendication 6, dans lequel le module électronique comprend un module de stockage pour collecter et enregistrer des données d'ECG.

12. Dispositif de sangle selon la revendication 6, dans lequel le module électronique comprend un lien sans fil pour le transfert de données.

13. Dispositif de sangle selon la revendication 1, dans lequel des parties de la portion de torse et la portion de collier sont fabriquées en matériau expansé.

14. Système de dispositif de sangle (1) comprenant un dispositif de sangle selon une quelconque revendication précédente et au moins une portion de collier (3) de différente taille et au moins une portion de torse (5) de différente taille, dans lequel l'une quelconque des portions de collier (3) est raccordable à l'une quelconque des portions de torse (5) du système de dispositif de sangle.

15. Portion de torse (5) raccordable à une portion de collier (3) qui est configurée pour entourer le cou d'un porteur lorsqu'elle est en utilisation, dans laquelle la portion de torse (5) comprend un second élément de fermeture (21) configuré pour fermer la portion de torse (5) autour du corps d'un porteur, dans laquelle la portion de torse (5) comprend une partie d'un raccordement ajustable (27) et une partie d'un autre raccordement (29) pour raccorder la portion de torse (5) à une portion de collier (3) afin de générer un dispositif de sangle selon la revendication 1, dans laquelle le raccordement ajustable (27) est configuré pour adapter la portion de collier (3) à la hauteur de la partie supérieure du porteur.

16. Portion de collier (3) raccordable à une portion de torse, dans laquelle la portion de collier (3) est configurée pour entourer le cou d'un porteur lorsqu'elle est en utilisation, dans laquelle la portion de collier (3) comprend un premier élément de fermeture (19) configuré pour fermer la portion de collier (3) autour du corps d'un porteur, dans laquelle la portion de collier (3) comprend une partie d'un raccordement ajustable (27) et une partie d'un autre raccordement (29) pour raccorder la portion de collier (3) à une portion de torse (5) afin de générer un dispositif de sangle selon la revendication 1, dans laquelle le raccordement ajustable (27) est configuré pour adapter la portion de collier (3) à la hauteur de la partie supérieure du porteur.

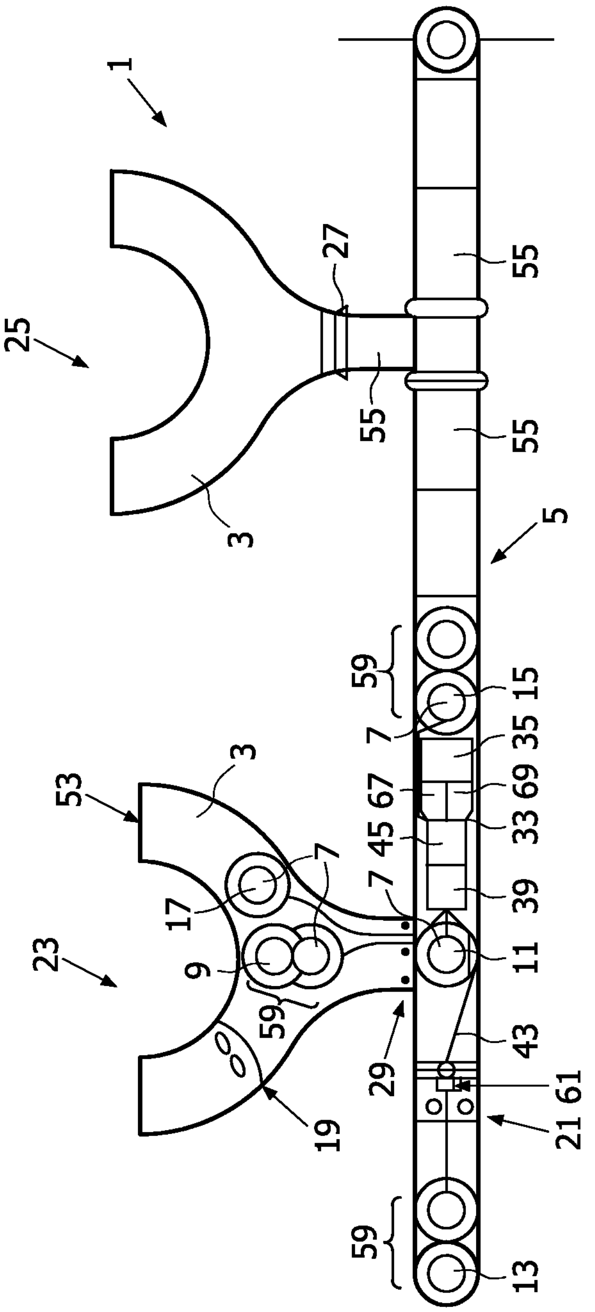
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FIG. 1

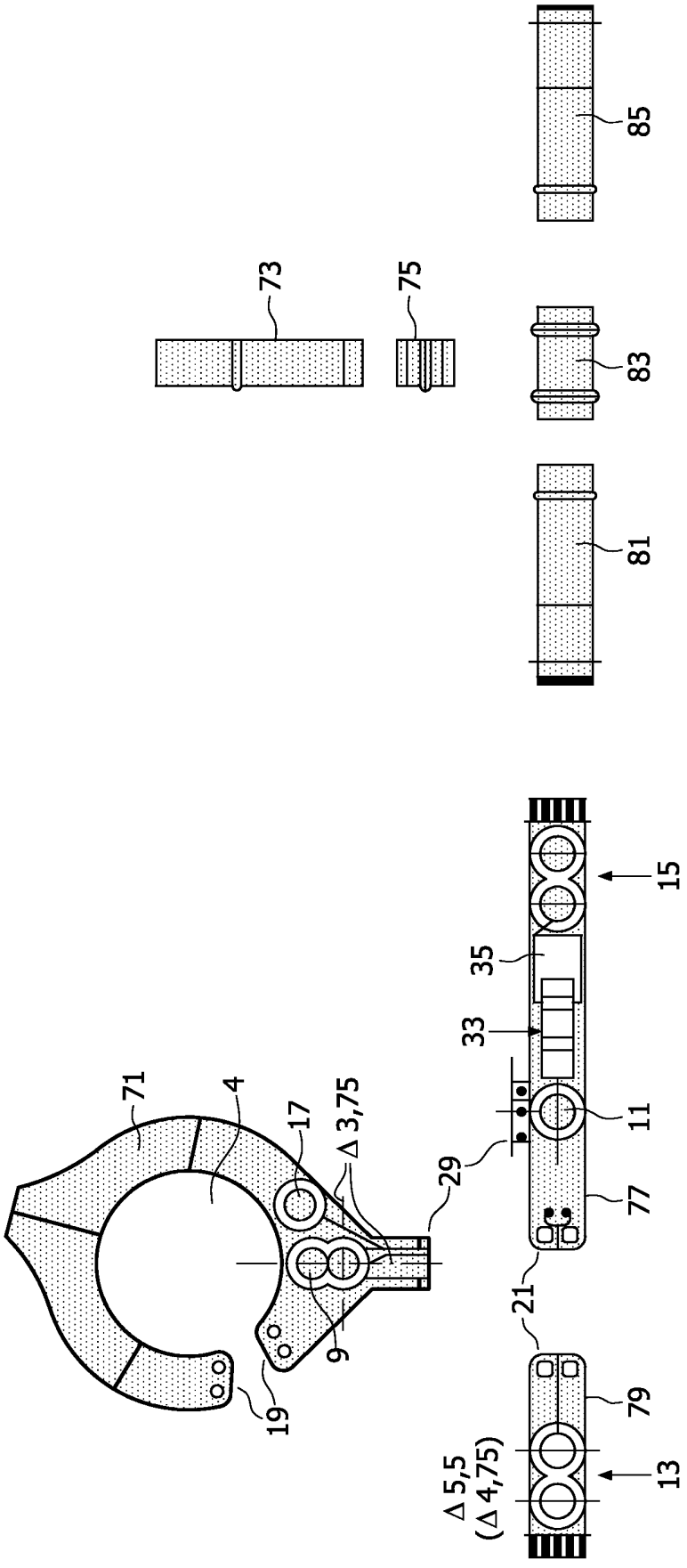

FIG. 2

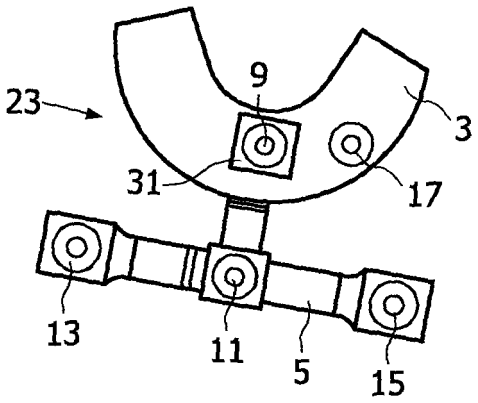

FIG. 3

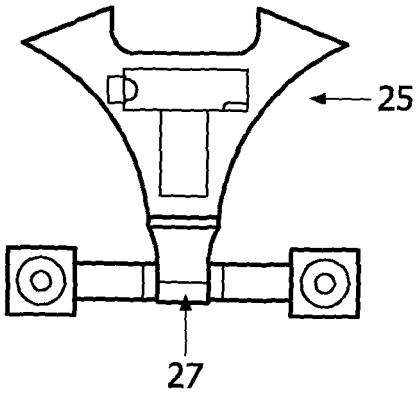

FIG. 4

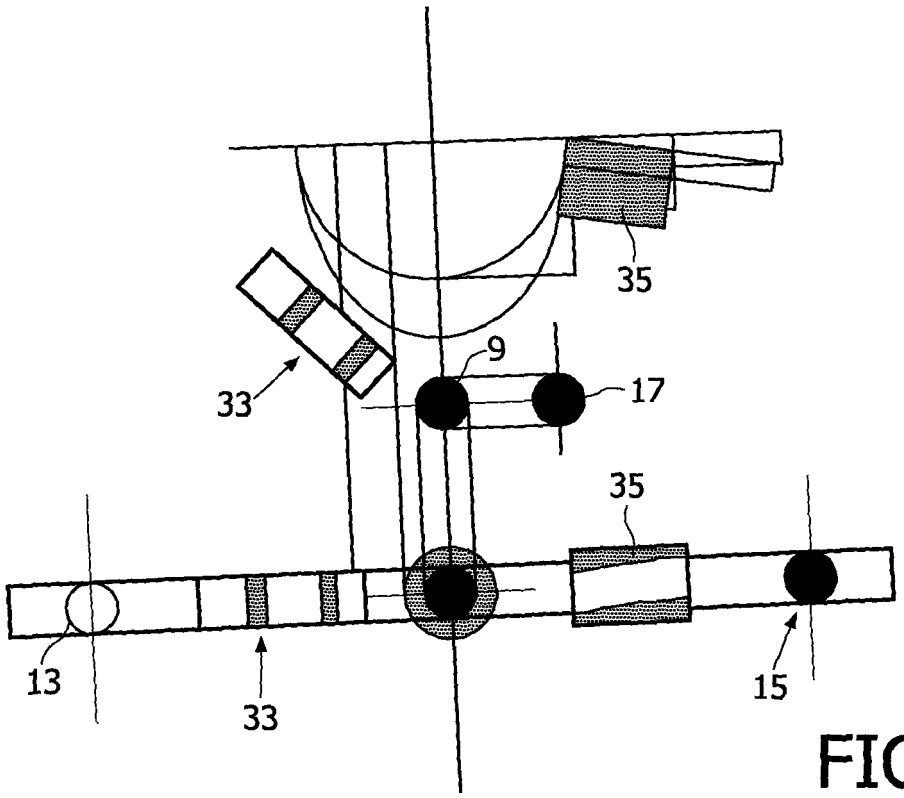

FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1095612 A1 **[0002]**
- EP 0571040 A **[0004]**
- US 6551252 B **[0004]**
- WO 0160250 A **[0017]**

专利名称(译)	皮带装置		
公开(公告)号	EP1890593B1	公开(公告)日	2018-06-13
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[标]申请(专利权)人(译)	皇家飞利浦电子股份有限公司		
申请(专利权)人(译)	飞利浦知识产权及标准部GMBH 皇家飞利浦电子N.V.		
当前申请(专利权)人(译)	飞利浦知识产权及标准部GMBH 皇家飞利浦N.V.		
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优先权	2005103131 2005-04-19 EP		
其他公开文献	EP1890593A1		
外部链接	Espacenet		

摘要(译)

带装置包括躯干部分，套环部分，传感器元件和至少第一和第二封闭元件。第一封闭元件是前侧上的套环部分的一部分，第二封闭元件是前侧上的躯干部分的一部分。封闭元件以这样的方式布置，使得它们可以由穿着者以舒适的方式打开。用户可以在没有第三人帮助的情况下穿上和脱下腰带系统。通过将不同尺寸的套环部分与不同尺寸的躯干部分组合的能力，提供了一种带装置系统。

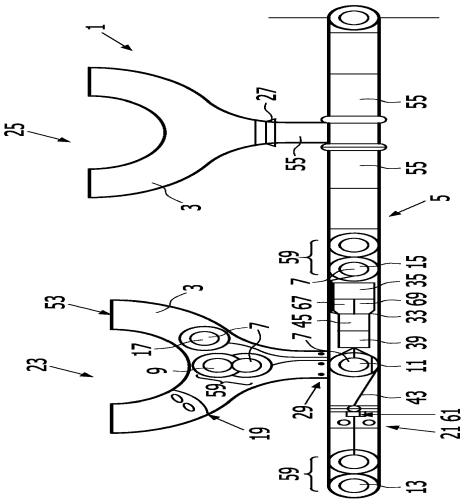

FIG. 1