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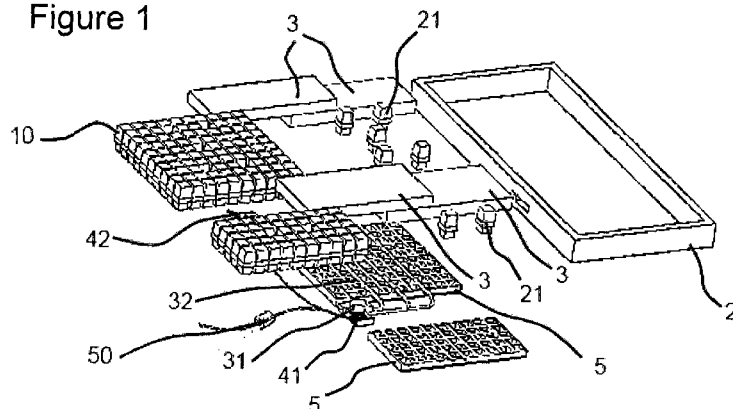
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(54) Title: MATTRESS WITH VENTILATION AND MASSAGE SYSTEM

Figure 1



(57) Abstract: The invention relates to mattresses which are used for the people who have health problems. The said invention is comprised of a mattress embodiment which comprises a framework (5) which has cells (6) on it, blocks (10) placed in the mentioned cells (6) in order to form the lying surface and/or a ventilation mechanism (30) which has ventilation canals (32) with holes (33) on them and/or a massage mechanism (20) which has at least one massage block (21) with the vibration motor (22) placed in it, to achieve the aforesaid aims.

DESCRIPTION

MATTRESS WITH VENTILATION AND MESSAGE SYSTEM

5 **Technical Field**

The invention relates to mattresses which are used for the people who have health problems. The said invention comprises a mattress embodiment which is formed to accelerate blood circulation and to prevent bruises from developing especially on the people who have to continue their lives bedridden.

10

State of the Art

Today medical products are also as effective as medications currently used in recovery and prevention of some health problems. Especially medical mattresses are of big importance for patient's body. Various health issues develop as a result of long duration of hospitalization
15 either during long period of admission to hospital for the purpose of treatment or for the people who have to continue their lives bedridden. Therefore, special mattresses need to be used for this type of patients.

There are sick mattresses and hospital bedsteads with different designs and features in the current embodiments. The importance of sick mattresses and hospital bedsteads which are
20 contributive to treatment processes is known by the most of people today. These mattresses and bedsteads offer great convenience as they help the patient to increase his mobility and to move on his own. Some of these mattresses relieve the person by taking the shape of his body without causing any pain or hardness. Also bedsteads with ABS coating or lifts or motors are among the products which can be used in hospitals and at homes and which
25 provide convenience to patients and nurses. Patient does not have to use any separate cushion or pillow for changing his lying or sitting position thanks to these bedsteads in use.

Use of medical mattresses is of big importance especially for the people who have to continue their lives bedridden or to lie for a long time. The reason is that special mattresses rather than regular mattresses need to be used to prevent possible health issues for these
30 people who cannot move as they desire and who have to spend their lives in bed. These bedridden patients are exposed to high pressure on the specific areas of their bodies as an effect of lying on the same ground continually. So the blood circulation slows down and redness occurs on the skin as a consequence of sweating. These redness turn into decubitus ulcers and bruises in the long run unless any measure is taken. Decubitus ulcers
35 are also colloquially known as pressure ulcers. Ventilation mattresses are used to prevent such ulcers from developing on the body. These mattresses comprise air pumping mechanisms. One part of the mattress is inflated with air while the other part is deflated by

means of these mechanisms. Changing surfaces are created for the in-patient, which provides application of pressure on different points of the body. Thus forming of pressure ulcers is avoided. The pressure applied to the body is not removed in full in this system because the place of pressure changes periodically depending on the inflation. This is why it falls insufficient both in prevention of ulcers from developing and in treatment of developed ulcers.

Ventilation mattresses are manufactured in single-piece or multi-piece embodiment. But none of the two embodiments can provide the desired pressure reducing form. The ones in single-piece embodiment are available as diamond type or tube type ventilation mattresses in the market. The ones in multi-piece embodiment however are comprised of cells which are in tube form and which can operate independently from each other and can be pulled out if required. In single-piece embodiment, pressure reducing measures cannot be taken on a specific area where redness occurs on the body because of the stable operation systems. However in multi-piece embodiment, pressure reducing measures are tried to be taken on a specific area desired or where redness occurs on the body by the feature of detachable cells. However, the spaces in mattress result in an uncomfortable situation for the person lying thereon since air circulation keeps on in the other cells of the mattress. Even if there is not air circulation, the spaces between continue causing discomfort for the person on mattress because all the cells will be used as inflated with air. The sensitivity of the people who are bedridden for a long period is higher than the healthy people. These people are affected by the uncomfortable situations on the mattresses excessively. Also in these mattresses there is not a massage mechanism which will accelerate the blood circulation on the nerve endings and help the body to relax.

In ventilation mattresses, the motor system which provides air needs to be operated continually as the air circulation always continues periodically in the mattress. This fact also causes consumption of electric energy.

In ventilation mattresses, tears occur in the mattress in time either because of the material used in manufacture of the mattress or when the choice of mattress is wrong for the user. This fact prevents ventilation mattresses from being used for a long time.

In ventilation mattresses, ventilation motors are also used to prevent body sores from developing as a result of sweating. Air is transferred to inside through either one single canal or replaceable cells in the form of pieces by means of these motors. Thus, humidity can be removed. But, these ventilation systems operate so as to be effective on the whole mattress, not on the different areas desired. However in multi-piece embodiments, cells are replaced with each other so that the humidity in the desired area can be removed. But, this is not preferred as it requires configuration by lifting the patient off the bed each time.

Current developments known of this subject are given below.

Patent numbered **KR20110018603 (A)** relates to mattresses which prevent sores from occurring. The mattress, subject of the invention, comprises a cylinder body which is horizontally installed; a piston rod which is combined in the cylinder body and is ascended and descended. There is a contact unit of a plurality of air-cylinders which is installed in the upper part of the piston rod and is contacted with the patient. The air-cylinders are supplied with high pressure air by an air supply unit. The air-cylinders and the air supply unit are controlled by a controller.

Patent numbered **TR960222 (A2)** relates to ventilation mattresses. The ventilation mattress according to the invention is made from layers of airtight material such as plastics-coated fabric, plastics or rubber. In the inflator which is formed by a compartment, air flows into the compartment from the outside by means of an outer hole and a stopper. Inner holes allow air to penetrate into the mattress. Also, a hole closed by a stopper allows the air inside to be discharged.

The above-mentioned developments consist of the mattresses, of which working principle is based on air circulation. The pressure applied to the patient's body is not removed in full. Also, there is not a system which allows the desired area to be massaged and which prevents sweating.

Due to all of these negative sides, a need for novelty occurred regarding the patient mattresses.

Brief Description of the Invention

The invention having been created by being inspired from the present situations aims to solve the aforesaid problems.

The primary object of the invention is to prevent pressure ulcers from occurring for the people who have to continue their lives bedridden.

The invention aims to minimize the problems of the people who have pain in the back, waist and alike and who sweat at night.

An object of the invention is to accelerate the blood circulation in the body.

The invention also aims to accelerate the duration of treatment of the pressure ulcers.

Another object of the invention is to prevent the redness from developing on the body which is a result of sweating.

An object of the invention is to prevent the redness developing on the body from turning into sores.

Another object of the invention is to provide a lying and sitting surface which has the features
5 of easy to use and adjustability depending on the area (such as waist, back etc.).

Another object of the invention is to form a mattress embodiment of which functional features such as ventilation and massage can be adjusted according to the user.

10 The invention comprises a framework which has cells on it, blocks placed in the mentioned cells in order to form the lying surface and/or a ventilation mechanism which has ventilation canals with holes on them and/or a massage mechanism which has at least one massage block with the vibration motor placed in it, to achieve the aforesaid objects.

15 The invention comprises a system with a ventilation mechanism which has ventilation canals with holes on them and provides ventilation and/or a massage mechanism which has massage blocks with the vibration motors placed in it, to achieve the aforesaid objects.

Structural and characteristic features and all the advantages of the invention will be
20 understood more clearly thanks to the following figures and the explanation written by referring to these figures. Therefore, the assessment needs to be conducted taking into account these figures and the detailed explanation.

Figures to Help the Understanding of the Invention

25 Figure 1: Demounted view of the mattress embodiment according to the invention.

Figure 2: Another demounted perspective view of the mattress embodiment according to the invention.

Figure 3: Another demounted perspective view of the mattress embodiment according to the invention.

30 Figure 4: Mounted perspective view of the mattress according to the invention.

Figure 5: The view of the ventilation and control system.

The drawings do not have to be scaled necessarily and the details which are not necessary for understanding the invention may have been ignored. In addition, the elements which are
35 identical at least to a great extent or which have highly identical functions are referred with the same numerals.

Description of Part References

- 2. Frame
- 3. Filling material
- 4. Motor slot
- 5 5. Framework
- 6. Cell
- 10. Block
- 11. Contact body
- 12. Assembly protrusion
- 10 13. Cover
- 14. Block space
- 20. Massage mechanism
- 21. Massage block
- 22. Vibration motor
- 15 30. Ventilation mechanism
- 31. Fan motor
- 32. Ventilation canal
- 33. Hole
- 40. Controller mechanism
- 20 41. Electronic receiver circuit
- 42. Controller
- 50. Adapter

Detailed Description of the Invention

- 25 In this detailed description, the subject of the invention and its preferred embodiments are described without resulting in any limiting effect, only with the purpose of providing a better understanding of the subject.

30 The invention is comprised of a mattress embodiment which comprises a framework (5) which has cells (6) on it, blocks (10) placed in the mentioned cells (6) in order to form the lying surface and/or a ventilation mechanism (30) which has ventilation canals (32) with holes (33) on them and/or a massage mechanism (20) which has at least one massage block (21) with the vibration motor (22) placed in it, to achieve the aforesaid aims.

- 35 Figure 1 gives the demounted view of the mattress embodiment according to the invention. The mattress embodiment consists of a frame (2), a framework (5), a filling material (3) and

blocks (10) as seen from the figure. Also there are massage (20), ventilation (30) and controller (40) mechanisms.

5 The frame (2) is comprised of a hollow quadrangle structure. It covers the lateral surfaces of the mattress embodiment, thus allows the elements forming this embodiment to be located in the inner area of the embodiment.

10 The framework (5) section is comprised of a quadrangle structure which is located in the frame (2). There are cells (6) which are arranged consecutively on the framework (5). These cells (6) are comprised of slots which have cubical space. The bottom surface of this slot may be either closed or open. Geometric figure of these cells (6) vary in accordance with the figure of blocks (10) which are located in the cells. The framework (5) structure in the frame (2) is located in the areas which coincide with the back and feet areas of the body. The framework (5) structure may also be located so as to cover the whole inner area of the frame (2). In the inner area of the frame (2) there are filling materials (3) in the head and waist areas where the framework (5) structure is not situated. The filling materials (3) are in quadrangle form and are made of materials such as foam rubber, visco foam. In the mattress embodiment which is the subject of the invention, two filling materials (3) are used in each of the areas which coincide with the head and waist areas of the body. The filling materials situated on the bottom surface in the frame (2) are made from foam rubber. Visco foam is used as a filling material (3) on the top surface which the contacts. The filling materials (3) may also be used only on the head and waist areas. One filling material (3) may be used instead of two as well.

25 The block (10) structures forming the lying surface are comprised of contact body (11) and assembly protrusion (12) sections. On the outer surface of blocks (10) there is a cover (13) which provides liquid tight feature by lamination method. The blocks (10) are dressed with these covers (13) as a separate material such that the outer surfaces of blocks (10) are covered. Also the liquid tight cover (13) may be situated so as to cover only the lying surface in the mattress embodiment which is the subject of the invention. The contact body (11) is found in cubical shape having a cone shaped structure. On the cone shaped body (11), the top surface and the surface on which assembly protrusion (12) is situated are in a quadrangle shape as square in particular. The surface of the contact body (11) on which the assembly protrusion (12) is situated has a larger area than the body (11) top surface which the body contacts because of the cone shaped structure. Therefore, the lateral surface edges of the contact body (11) are in an angular form.

There are assembly protrusions (12) on the bottom surfaces of the body (11) of the blocks (10) which do not contact the body. The blocks (10) are situated on the framework (5) as the assembly protrusions (12) are inserted into the cells (6). Thus the lying surface which contacts with the body is formed by the arrangement of blocks (10) on the framework (5) in a consecutive order. The assembly protrusions (12) are found in cubical form such that they can be situated in the slots which form the cells (6). The cells (6) and the assembly protrusions (12) may be created in consentaneous angular or circular geometric forms such as cylinder and rectangle prism. The assembly protrusion (12) has a smaller size compared to the contact body (11), thus occupies a smaller amount of space. That the bottom surface of the body (11), on which assembly protrusion (12) is situated, is larger prevents the blocks (10) from being fully mounted in the cell (6) with the body weight of the persons in the course of use. If the blocks (10) are fully mounted in the cell (6), an uncomfortable situation rises since the body of the person is to contact with the framework (5) structure.

The blocks (10) may also be made from a single-piece structure instead of assembly protrusion (12) and contact body (11). The block (10) to be made of such a single-piece structure may be formed in angular or circular geometric forms such as cylinder or rectangular prism. In addition, contact body (11) and assembly protrusions (12) may also be made in these forms.

In the mattress embodiment which is the subject of the invention, there is a massage mechanism (22) as well. This mechanism (22) is comprised of massage blocks (21) and vibration motors (22) which are integrated to these blocks (21). The massage blocks (21) are comprised of a contact body (11) and assembly protrusions (12) of which outer surface is coated with the cover (13) like the other blocks (10) which do not comprise motor (22). The vibration motors (22) are mounted inside the contact body (11) in the massage blocks (21). The body is massaged thanks to the vibration that these motors (22) provide. Massage blocks (21) are situated inside the cells (6) on the framework (5) such that it covers the block spaces (14) in the 7 points indicated in Figure 2. Thus massage can be applied to 7 separate points in 4 different areas as also seen from the figure. The massage blocks (21) may also be replaced with the blocks (10) without motors (22) in the points other than the said ones. The reason is that the blocks (10 and 21) are independent structures and they can be mounted in and dismounted from the cells (6) in the desired areas. In Figure 1, 2 and 3, the blocks (10) without vibration motors (22) are shown together although they are independent from each other so that they should not be confused with the massage blocks (21).

Ventilation mechanism (30) also constitutes another mechanism used in the mattress embodiment. This mechanism (30) is comprised of a fan motor (31), a ventilation canal (32) and holes (33) on these canals (32). The fan motor (31) is situated in the inner area of the frame (2) as seen from Figure 2. There are 3 ventilation canals (32) in this mechanism (30).

5 These canals (32) are situated separately and intermittently on the framework (5) in the area which coincides with the back area of the person. There are holes (33) arranged in a consecutive order on the ventilation canals (32). Air is blown through the holes (33) on the canals (32) to the inside by means of the fan motors (31). Providing ventilation through 3 different canals (32) makes the humidity occurring inside dries out fast. It is possible to
10 increase or decrease the number of the ventilation canals (32) and the holes (33) on these canals (32). Also the canals (32) may be situated in the different areas on the framework (5).

Beside, filling material (3) is placed in the area where the fan motor (31) is situated within the frame (2). This is why there is a motor slot (4) on the filling material (3), in which the fan
15 motor (31) can be placed fittingly with its current shape.

In the mattress embodiment which is the subject of the invention, there is a controller mechanism (40) as well. This mechanism (40) is comprised of an electronic receiver circuit (41) and a controller (42). The electronic receiver circuit (41) is situated besides the fan
20 motor (31) in the inner area of the frame (2). The controller (42) is situated at a location on the lateral surface of the frame (2) which can be reached easily by the person using his own hand. The commands which are given by the controller (42) are sent to the mechanism (20 or 30) through the medium of the electronic receiver circuit (41). The massage (20) and ventilation mechanisms (30) can be controlled by the Dr. Mattress ® brand controller
25 mechanism (40). Thus the strength of the massage (20) and ventilation mechanisms (30), the areas where they will be applied and the operation periods can be adjusted. A representation of the ventilation (30) and controller mechanism (40) is given in Figure 5. Also the line voltage is adjusted by means of the adapter (50) to be compatible with the operation of the mechanisms (20, 30, 40) in the mattress embodiment.

30 Redness which afterwards turns into pressure ulcers called decubitus develops in the people who have to lie for a long time or to spend their lives bedridden as they are lying on the same surface continually. As the blocks (10) in the mattress embodiment which is the subject of the invention are placed independently, the blocks (10) in the area where redness occurs are
35 detached easily. Hence the pressure on that area is removed and the redness is prevented from turning into ulcer. This redness also occurs on the body depending on the sweating rather than the pressure. Humidity which occurs as a result of sweating is dried in a short

time thanks to the ventilation mechanism (30) in use. Additionally, 3 ventilation canals (32) are used so that the mechanism (30) becomes effective in more than one area. Special fabrics are used to avoid the redness, which occurs as a result of sweating in the prior art. The ventilation mechanism (30) in the embodiment which is the subject of the invention provides that the person's sweating is minimized by slight air blow and the sweat occurring is dried without damaging the body.

A massage mechanism (20) is also used to accelerate the blood circulation in the nerve endings in the mattress embodiment which is the subject of the invention. There are massage blocks (21) in 7 separate points in 4 different areas in the mechanism (20). Thus massage is enabled to be applied to the many areas of the body. Since the locations of the massage blocks (21) on the framework (5) can be changed, it is possible to accelerate the blood circulation by applying the massage to a desired area of the body.

The ventilation (30) and massage mechanisms (20) can be controlled with the controller mechanism (40). These mechanisms (30 and 20) are possible to be operated in 3 different modes namely morning, normal and night by the programming of the controller (42). The operation and standby periods and strength of the massage blocks (21) can be adjusted independently by means of the controller (42). Ventilation periods can also be defined with the controller (42). The commands which are given by the controller (42) are sent to the mechanisms (30,20) in the mattress embodiment through the medium of the electronic receiver circuit (41) and their performance is provided. As a consequence of this, the fan motor (31) generates air flow and blows it through ventilation canals (32) either to prevent humidity from occurring or to dry the humidity which already occurred. Vibration motors (22) also start to operate in line with the commands given by the controller (42) and accelerate the blood circulation of the person. As a consequence, prevention of pressure ulcers or recovery from pressure ulcers in a short time is provided thanks to the mattress embodiment which is the subject of the invention. It is also useful in minimizing the problems of the people who have pain in the back, waist and alike and who sweats at night.

The invention comprises a system with a ventilation mechanism (30) which has ventilation canals (32) with holes (33) on them and provides ventilation and/or a massage mechanism (20) which has massage blocks (21) with the vibration motors (22) placed in it. It is possible for the system, comprising a massage (20), ventilation (30) and/or a controller mechanism (40) which is used in the mattress embodiment, to be also used in mattresses, armchairs, chairs or cushions or other products alike apart from the medical mattresses.

CLAIMS

1. The invention is a mattress embodiment, characterized in that it comprises;

- a framework (5) with cells (6) on it,

5 - blocks (10) which form the lying surface by being situated in the said cells (6) and/or

- a ventilation mechanism (30) which has ventilation canals (32) with holes (33) on them and/or

- a massage mechanism (20) which has at least one massage block (21) with the vibration motor (22) placed in it.

10

2. A mattress embodiment according to claim 1, characterized in that the said blocks (10) comprise liquid tight cover (13).

3. A mattress embodiment according to claim 1 to 2, characterized in that the said blocks

15 (10) comprise a cone shaped body (11) in cubical form which contacts with the body and assembly protrusions (12) in cubical form which are situated in the cells (6).

4. A mattress embodiment according to claim 3, characterized in that the said contact body (11) and/or assembly protrusions (12) are in angular and circular geometric forms such as

20 tetragonal prism and cylinder.

5. A mattress embodiment according to claim 1, characterized in that the said blocks (10) are comprised of a single-piece structure in angular and circular geometric forms such as tetragonal prism and cylinder.

25

6. A mattress embodiment according to claim 1 to 5, characterized in that the said ventilation mechanism (30) comprises an air generating fan motor (31).

7. A mattress embodiment according to claim 1 to 6, characterized in that it comprises a controller mechanism (40) which provides controlling of the ventilation (30) and/or massage mechanisms (20).

30

8. The invention is characterized by a system which comprises a ventilation mechanism (30) which has ventilation canals (32) with holes (33) on them and provides ventilation and/or

35

a massage mechanism (20) which has massage blocks (21) with the vibration motors (22) placed in it.

9. A system according to claim 8, characterized in that it is used in embodiments such as mattresses, cushions, chairs and/or armchairs.
10. A system according to claim 8 to 9, characterized in that it is controlled with a controller
5 mechanism (40).
11. A system according to claim 8, characterized in that the ventilation mechanism (30) comprises an air generating fan motor (31).

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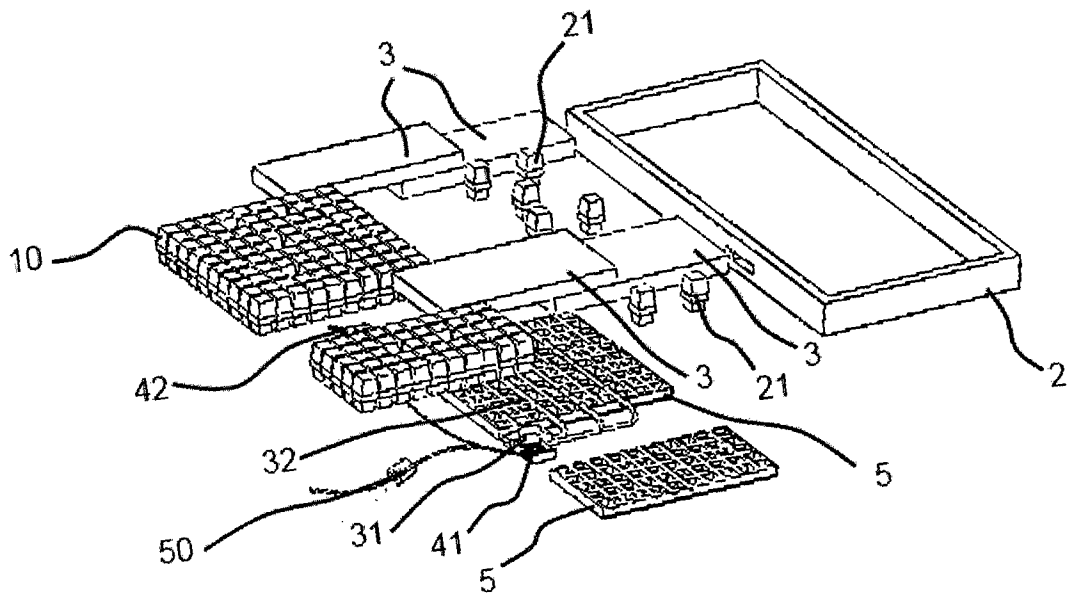


Figure 1

2 / 4

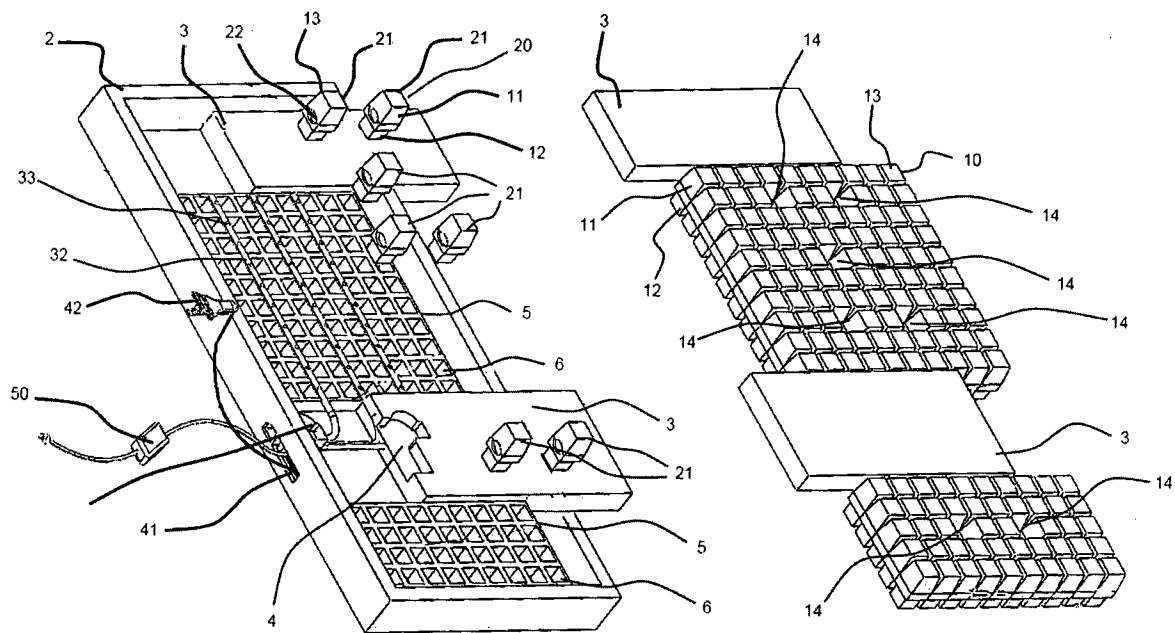


Figure 2

3 / 4

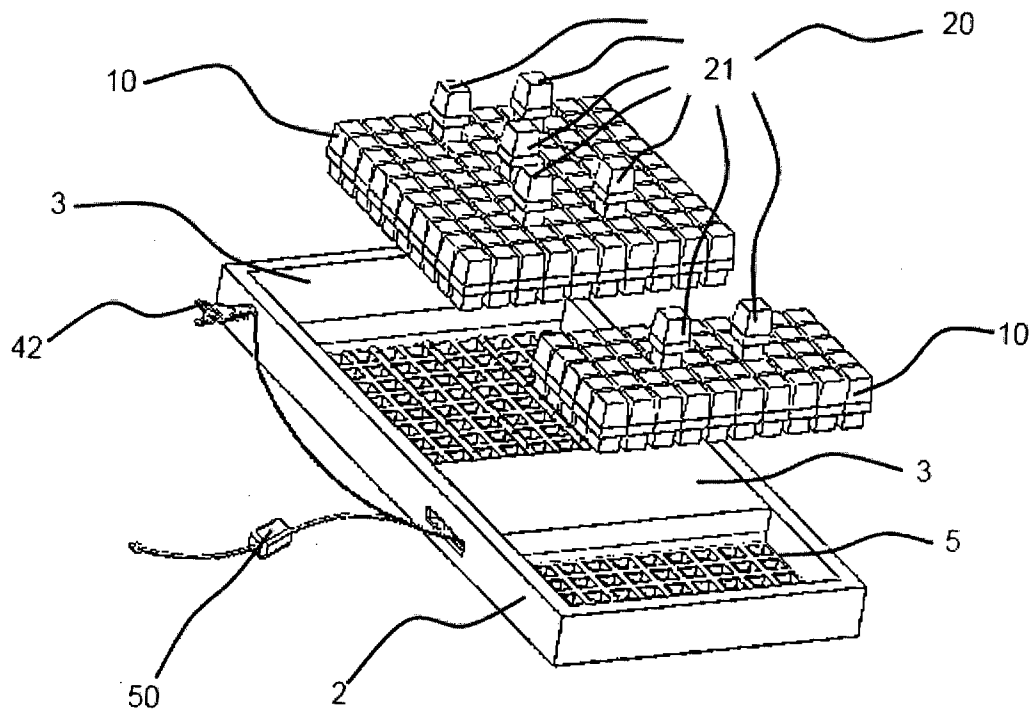


Figure 3

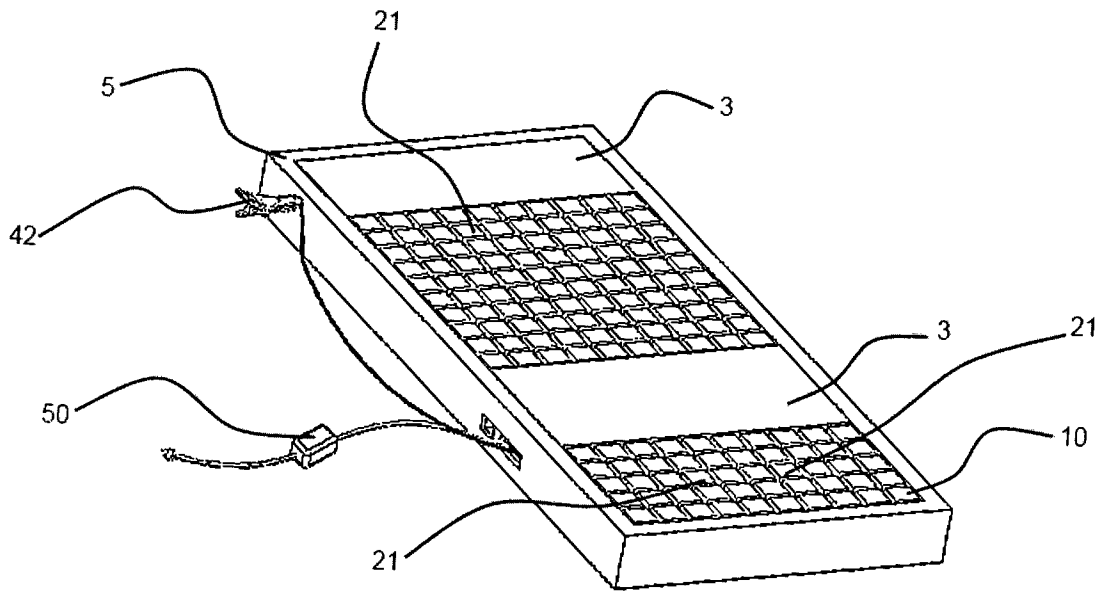


Figure 4

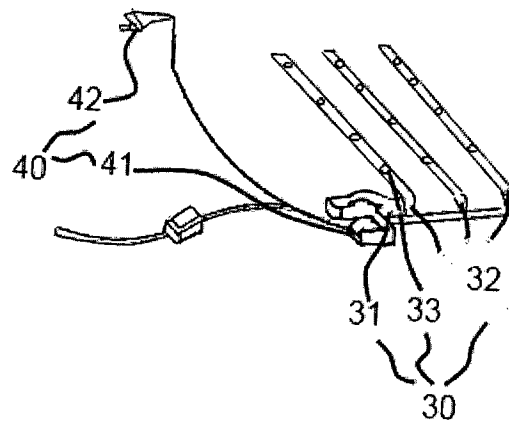


Figure 5

INTERNATIONAL SEARCH REPORT

International application No

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A. CLASSIFICATION OF SUBJECT MATTER

INV. A47C27/08

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 095 745 A1 (TECHNOGEL ITALIA S R L [IT]) 2 September 2009 (2009-09-02) abstract paragraph [0024] - paragraph [0028] figures	1-5,7,8
X	US 3 529 310 A (OLMO GIUSEPPE) 22 September 1970 (1970-09-22) column 3 - column 4	1,6-11
X	EP 1 952 727 A2 (JOKA WERKE JOHANN KAPSAMER GMB [AT] JOKA WERKE JOHANN KAPSAMER GMBH &) 6 August 2008 (2008-08-06) abstract; figures	1-5
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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