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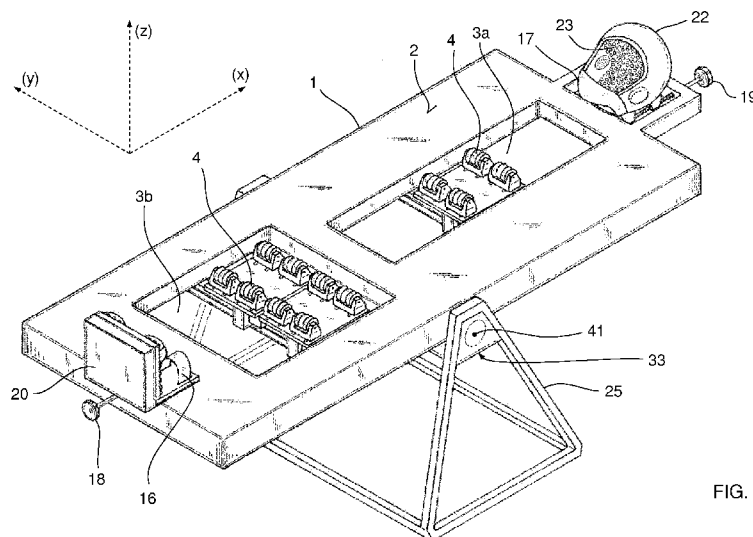


FIG. 2

(57) Abstract: The present invention relates to a therapeutic device, comprising a bed (1) providing a support surface (2) for receiving a person stretched out face-up, pressure-applying elements (4) emerging through an opening (3a, 3b) formed on the support surface (2) for being applied against the person's body, movement means (5) for moving, in a controlled manner, the pressure-applying elements (4) and maintaining them in a given position, and control means for controlling the movement means (5). The therapeutic device further comprises vibrating means (6) making the pressure-applying elements (4) vibrate with a variable- and controlled-frequency mechanical vibration. As a result of this configuration, the pressure-applying elements (4) are applied at points in chosen areas of the person's body, at the same time providing pressure and mechanical vibration the frequency of which can be adjusted to the person's needs.

THERAPEUTIC DEVICE

DESCRIPTION5 Field of the Invention

The invention is comprised in the field of therapeutic equipment for persons.

More specifically, the invention relates to a therapeutic device of the type comprising:

- 10 - a bed provided with a support surface for receiving a person stretched out face-up on said bed, said surface having at least one opening;
- pressure-applying elements for exerting point pressure on the person's body, said elements emerging through the opening of the bed for being applied against the body of a person who is stretched out face-up on the bed;
- 15 - movement means configured for moving, in a controlled manner, the pressure-applying elements at least in an orthogonal direction, perpendicular to the support surface of the bed, and for maintaining, in a controlled manner, the pressure-applying elements in a given position along the orthogonal direction;
- and control means for controlling said movement means.

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State of the Art

Therapeutic devices of this type in the form of a bed are known. These known devices are used for providing acupressure-type therapy to a person stretched out on the bed in the area of the spinal column of type combined with heat by means of movable pressure-applying elements emerging through an opening formed in the front face of the bed. Document EP2638889A2 describes a therapeutic device of this type.

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Description of the Invention

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The purpose of the invention is to provide a therapeutic device of the type indicated above which allows improving the effects obtained with acupressure-type therapy.

The device according to the invention, which consists of a therapeutic device of the type indicated above, characterized in that it comprises vibrating means making the pressure-applying elements vibrate with a variable-frequency mechanical vibration, and control means for controlling the frequency of said mechanical vibration, has been developed for this purpose.

As a result of this configuration according to the invention, the pressure-applying elements are applied at points in chosen areas of the body of the person stretched out on the bed, at the same time providing, in said chosen areas of the body, therapy similar to acupressure therapy, and mechanical vibration the of which frequency can be adjusted to each person's particular case. This local and simultaneous application of therapy similar to acupressure therapy and of therapy based on the application of mechanical vibration having a particular frequency in one and the same chosen area improves the effects of the just therapy similar to acupressure therapy. Acupressure is a technique that is part of conventional Chinese medicine which consists of applying pressure at chosen points of the body that are usually located in the palm of the hand, the sole of the foot and in the head, using the fingers or other pressure-applying elements. In the case of the present invention, this technique is applied in various chosen areas of the body of the person stretched out on the bed, particularly in the back, and more particularly in the spinal column, and it is accompanied by controlled-frequency mechanical vibration.

Based on the invention defined in the main claim, preferred embodiments, the features of which are described in the dependent claims, have been envisaged.

Preferably, the movement means are configured for moving, in a controlled manner, the pressure-applying elements also in a longitudinal direction of the bed. This allows precisely adjusting, for each different person who must receive treatment, the mentioned chosen areas of the body in which acupressure-type therapy and mechanical vibration are applied. Preferably, said movement means are configured for moving, in a controlled manner, said pressure-applying elements also in a transverse direction of the bed, such that the mentioned adjustment can be performed with greater precision. Particularly, this configuration allows correctly adjusting treatment for people suffering from scoliosis. In turn, the therapist can voluntarily apply therapy in laterally spaced areas of the spinal

column and precisely adjust the lateral separation distance with respect to the spinal column.

Preferably, the movement means consist of a Cartesian coordinate robot, i.e., a robot the main control axes of which are linear and form right angles with respect to the other axes. This type of robot can advantageously be integrated under the bed and offer high precision for the movements of the pressure-applying elements.

Preferably, said Cartesian coordinate robot is a gantry robot comprising a cross-member supported in a sliding manner at its two ends by longitudinal guides arranged on the bed and parallel to the longitudinal direction, such that said cross-member moves in a controlled manner along said longitudinal direction, and a base to which the pressure-applying elements are fixed, said base being mounted on said cross-member and moving in a controlled manner along said orthogonal direction. This configuration allows robustly integrating the vibration generating means.

Preferably, said base is mounted to slide along said cross-member, such that said base moves in a controlled manner also along the transverse direction. This configuration allows precisely locating the pressure-applying elements at coordinates chosen according to the longitudinal and transverse axes, maintaining significant robustness in the integration of the vibrating means.

Preferably, the vibrating means consist of a support housing a mechanical vibrator and supporting the pressure-applying elements. This configuration allows efficiently transmitting the mechanical vibration to the pressure-applying elements.

Preferably, the device according to the invention comprises heating means for heating the pressure-applying elements, and temperature control means, associated with said heating means, for controlling the temperature of said pressure-applying elements. This allows the pressure-applying means to simultaneously provide, in addition to providing acupuncture-type therapy and mechanical vibration, heat in a controlled manner in the chosen areas of the body.

Preferably, the device according to the invention comprises electromagnetic radiation generating means, suitable for generating a variable- and controlled-wavelength electromagnetic radiation, and emission means configured for emitting said electromagnetic radiation towards an area of application of said pressure-applying elements. Preferably, the electromagnetic radiation emitted by said generating means is a light with a wavelength adapted to the particular needs of each patient.

Preferably, the pressure-applying elements are configured and positioned with respect to the emission means such that the electromagnetic radiation emitted by said emission means passes through said pressure-applying elements towards an area of application of said elements. This allows effectively conducting the electromagnetic radiation, which is preferably a light having a controlled wavelength, towards the mentioned chosen areas of the body of the person stretched out on the bed.

Preferably, the pressure-applying elements are rotating rollers the axis of rotation of which extends in a transverse direction of the bed. This configuration is particularly suitable for moving the rotating elements during a therapy session along a longitudinal axis of the bed orthogonal to said transverse axis.

Preferably, the pressure-applying elements are made of jadeite, whereby the device according to the invention allows applying at the same time, to the mentioned chosen areas of the body of the person stretched out on the bed, the therapeutic effects attributed to jade by conventional Chinese medicine.

Preferably, at least a first of the openings on the support surface of the bed has an oblong shape extending in the longitudinal direction of said bed, suitable for covering at least one section of the spinal column, preferably the entire spinal column, of a person stretched out face-up on the bed, and the device according to the invention further comprises at least one group of pressure-applying elements emerging through said opening. This configuration allows easily moving the pressure-applying elements along the person's spinal column.

Preferably, at least a second of the openings on the support surface of the bed is spaced

from the first opening in the longitudinal direction of said bed, extends in said longitudinal direction of the bed and is suitable for covering at least one section of a leg of a person stretched out face-up on the bed, and the device according to the invention further comprises at least one group of pressure-applying elements emerging through said second opening. This configuration allows easily moving the pressure-applying elements along a leg of the person, and therefore allows applying therapy to chosen areas of the person's spinal column and legs at the same time. Preferably, the second opening is wide enough so as to cover the person's two legs in the transverse direction of the bed.

Preferably, the device according to the invention comprises first securing means for securing the feet of a person stretched out face-up on the bed, second securing means for securing the head of said person stretched out face-up on the bed, and pulling means for pulling said first securing means and/or said second securing means in a controlled manner in the longitudinal direction of the bed in order to stretch out said person's spinal column. The controlled stretching of the spinal column improves the therapeutic effect of the pressure-applying elements, i.e., the effect of the acupressure-type therapy and of the mechanical vibration in the mentioned chosen areas of the person's body.

Preferably, the device according to the invention comprises a foot support, configured for receiving, as a support, the sole of at least one foot of a person stretched out face-up on the bed, said foot support being provided with a plurality of first pushers arranged for being supported against the sole of said person's foot, each of said first pushers being individually movable in a controlled manner for applying point pushing to said sole of the foot. This configuration allows applying reflexotherapy-like therapy to the feet at the same time.

Preferably, the first securing means are incorporated in the foot support, thereby forming a compact assembly.

Preferably, the device according to the invention comprises a headgear arranged for housing the head of a person stretched out face-up on the bed, said headgear being provided with a plurality of second pushers arranged for being supported against said person's head housed in said headgear, each of said second pushers being individually

movable in a controlled manner for applying point pushing to said head. This configuration allows applying reflexotherapy-like therapy to the head at the same time.

Preferably, said second securing means are incorporated in said headgear, thereby forming a compact assembly.

Preferably, the headgear comprises earphones, and the device according to the invention further comprises sound wave generating means connected to said earphones and suitable for generating a controlled variable-frequency sound wave and emitting it through said earphones, and control means associated with said sound wave generating means for controlling said frequency of the sound waves. This configuration allows applying sound therapy at the same time with sounds having frequencies that are chosen and adapted with respect to the person's particular needs.

Preferably, the bed is mounted in a pivoting manner on a supporting structure comprising a transverse pivot shaft about which said bed can pivot, and the device according to the invention comprises locking means for locking said bed in various angular positions with respect to said transverse pivot shaft. This configuration allows arranging the person in a tilted position with a chosen tilt angle, for the purpose of increasing blood flow to a greater or lesser extent to an area of the body, and thereby improving the effect of treatment provided by the pressure-applying elements.

Preferably, the bed can pivot about the transverse pivot shaft in the two pivoting directions, preferably between a first end angular position in which the main plane of said bed forms with the horizontal an angle having an absolute value equal to or greater than 45° , and a second end angular position in which said main plane of the bed forms with the horizontal an angle having an absolute value equal to or greater than 45° . This allows selectively increasing the blood flow to a lower area of the person's body or to an upper area of said person.

Preferably, the pressure-applying elements are replaceable, and the device according to the invention is complemented with a set of different pressure-applying elements interchangeable with one another in said device. As a result, it is possible to adapt the type

of pressure-applying element to each person's particular case and to the type of treatment to be applied. Particularly, the interchangeable pressure-applying elements are made from different materials, and they advantageously have different shapes.

5 Preferably, the device according to the invention is provided with an applicator comprising a base in which there are mounted second pressure-applying elements and second mechanical vibration generating means suitable for imparting to said second pressure-applying elements a controlled variable-frequency mechanical vibration, said movable applicator being spaced from the support surface and suitable for being moved above the
10 person stretched out face-up on the bed. This applicator allows applying the combination of acupressure-type therapy and therapy based on the application of mechanical vibration also to a chosen area of the front face of the body of the person stretched out on the bed.

15 In some embodiments, the movable applicator is a manual applicator comprising a handle integral with the base.

In other improved embodiments, the movable applicator is a robotized applicator, comprising a robot arm integral with the base, and the device according to the invention further comprises control means for controlling the motion of said robot arm.

20 Preferably, the device according to the invention is provided with measuring means for measuring at least one vital parameter of a person stretched out on the bed, and the frequency control means of the mechanical vibration are configured for adjusting said frequency of the mechanical vibration depending on the measurement taken by said
25 measuring means. This configuration allows adjusting the frequency of the vibration depending on the effects it produces on the person to whom it is applied, which are observed through the measurement of said vital parameter.

30 Preferably, the control means for controlling the wavelength of the electromagnetic radiation are configured for adjusting the wavelength of the electromagnetic radiation depending on the measurement taken by said measuring means. This also allows adjusting this wavelength of the electromagnetic radiation depending on the effects it produces on the person to whom it is applied, which are observed through the measurement of said vital

parameter.

Preferably, the control means for controlling the frequency of the sound waves are configured for adjusting said frequency of the sound waves depending on the measurement taken by said measuring means. This also allows adjusting this frequency of the sound waves depending on the effects they produce on the person to whom they are applied, which are observed through the measurement of said vital parameter.

The invention also covers other detail-oriented features illustrated in the description detailed of the embodiments of the invention and in the attached drawings.

Brief Description of the Drawings

The advantages and features of the invention can be seen from the following description in which preferred embodiments of the invention are described in reference to the drawings in a non-limiting manner with respect to the scope of the main claim.

Figure 1 is a side view of an embodiment of the therapeutic device according to the invention, with a person stretched out on the bed.

Figure 2 is a top perspective view of the therapeutic device.

Figure 3 is a perspective view similar to Figure 2, in which the cushioned part of the bed has been omitted in order to show the frame thereof as well as the system for moving the pressure-applying elements integrated in said frame. Control computer equipment and a device for measuring a vital parameter are also shown.

Figures 4 and 5 are a perspective view and a partially sectioned front view, respectively, showing the system for supporting and moving the pressure-applying elements.

Figure 6 is a partially sectioned front view showing the headgear placed on the person's head, which incorporates the earphones and second pushers.

Figures 7 and 8 are a perspective view and a side view, respectively, of the securing means for the feet, which incorporate the support means and first pushers.

Figure 9 shows a possible embodiment of the first pushers, comprising a system for automatically moving same. It also optionally comprises a system for making the first pushers vibrate with a variable- and controlled-frequency mechanical vibration, as well as, optionally, a system for generating electromagnetic radiation and emitting it through the first pushers. These same systems can also be applied to the second pushers.

Figures 10 and 11 show another possible embodiment of the first pushers, comprising a system for manually moving same. This same system can also be applied to the second pushers.

Figure 12 is a front view showing the pressure-applying elements mounted in their support.

Figure 13 is a view similar to the preceding one, schematically showing the different elements integrated in the support, particularly the vibrating means, the heating means, the electromagnetic radiation generating means and the electromagnetic radiation emission means.

Figure 14 shows the bed in different inclination positions.

Figure 15 shows a replacement kit for the pressure-applying elements, as well as the demounting of the pressure-applying elements installed in the support.

Figures 16 and 17 are side and bottom perspective views, respectively, showing a possible embodiment of the movable applicator, formed by a manual applicator provided with a handle.

Figure 18 depicts another envisaged embodiment of the movable applicator, formed by a robotized applicator operated by a robot arm.

Detailed Description of Embodiments of the Invention

Figures 1 to 7 depict an embodiment of the device according to the invention.

As can be seen in Figures 1 to 3, the therapeutic device comprises a supporting structure 25, through which the device is supported on the ground, and a bed 1 which is mounted in a pivoting manner thereon. The bed 1 can pivot with respect to a transverse pivot shaft (41) provided in the supporting structure 25. The front face of the bed 1 has a support surface 2 intended for receiving the person stretched out face-up on said bed 1, and having two openings 3a, 3b. A first opening 3a has an oblong shape extending in the longitudinal direction (X) of the bed 1 and is arranged for covering the entire spinal column of a person stretched out on the bed 1. A second opening 3b, which is spaced from the first opening 3a in the longitudinal direction (X), extends in said longitudinal direction (X) and is arranged for covering at least the thighs of the two legs of said person stretched out on the bed.

Figure 3 shows the inner framework 37 of the bed 1. This inner framework 37 is actually not visible because it is arranged inside a parallelepiped body made from a foam polymer material forming a cushion of the bed 1, as depicted in Figure 1.

Preferably, for the purpose of increasing the efficacy of the therapy, an electric heating mat (not depicted in the drawings) is provided, extending along the length and width of the support surface 2 of the bed 1, and is arranged below the upper cloth of the cushion forming said bed 1.

Pressure-applying elements 4 emerge through the first and second openings 3a, 3b for exerting point pressure on an area of the spinal column, as well as on an area of the rear portion of the thighs, of the person stretched out on the bed 1. Movement means 5 allow moving the pressure-applying elements 4 in a controlled manner in an orthogonal direction (Z), perpendicular to the support surface 2 of the bed 1, as well as in the longitudinal direction (X) and transverse direction (Y) of said bed (1). These movement means 5 also allow maintaining, in a controlled manner, the pressure-applying elements 4 in a given position along the orthogonal direction (Z), longitudinal direction (X) and transverse direction (Y). These movement means 5 are automatic, as will be seen in further detail below, and are connected to a computer 32 which controls the movements of the pressure-

applying elements 4 as well as the exact position thereof.

An essential feature of the device according to the invention consists of it being provided with vibrating means 6 making the pressure-applying elements 4 vibrate with a variable-
5 and controlled-frequency mechanical vibration. The vibrating means 6 are connected to the computer 32, which controls the frequency of the mechanical vibration that these vibrating means 6 impart to the pressure-applying elements 4.

As shown in further detail in Figures 3 to 5, the movement means 5 consist of a Cartesian
10 coordinate robot, particularly a gantry robot comprising a cross-member 7 supported in a sliding manner at its two ends by longitudinal guides 8 arranged on the bed 1 and parallel to the longitudinal direction (X). The guides 8 are formed on the longitudinal bars of the inner framework 37 of the bed 1. The cross-member 7 moves, in a manner controlled by the computer 32, along the longitudinal direction (X). The pressure-applying elements 4 are
15 fixed at a base 9 which is mounted on said cross-member 7 and which moves, in a manner also controlled by the computer 32, along the orthogonal direction (Z). Furthermore, the base 9 is mounted to slide along the cross-member 7, such that it moves, in a manner also controlled by the computer 32, also along the transverse direction (Y). Therefore, the gantry robot making up the movement means 5 is capable of moving the pressure-applying
20 elements 4, in a manner controlled by the computer 32, in the three directions, i.e., the longitudinal direction (X), transverse direction (Y) and orthogonal direction (Z). The gantry robot is also capable of maintaining, in a manner also controlled by the computer 32, a stationary position of the pressure-applying elements 4 defined by coordinates according to the axes formed by these three directions.

As shown in Figures 12 and 13, the vibrating means 6 consist of a support 10 which is fixed
25 to the base 9. The support 10 houses a mechanical vibrator 11 and supports the pressure-applying elements 4. These elements are rollers which are mounted such that they rotate on a shaft 38 arranged in the support 10. The shaft 38 extends in the transverse direction (Y). These pressure-applying elements 4 in the form of rollers are preferably made of jadeite, but they can be made of other materials. In turn, the surface of these rollers can be
30 smooth, as shown in Figure 12, or can have a relief. Advantageously, these rollers are replaceable, and a kit with different rollers having different shapes and made from different

materials can be provided, as depicted in Figure 15, which can be mounted individually as desired in the support 10 according to the needs of the person who must receive therapy.

As schematically shown in Figure 13, the support 10 also has heating means 12, 13 integrated therein for heating the pressure-applying elements 4, formed in this case by an electric resistance 13 arranged on the surface of the support 10 located under the pressure-applying elements 4 and a current generator 12 having a controlled intensity. The support 10 also has temperature control means (not shown in detail in the drawing) integrated therein associated with the heating means 12, 13 for controlling the temperature of the pressure-applying elements 4. These temperature control means are, for example, an infrared thermometer arranged on the surface of the support 10 located under the pressure-applying elements 4, which allows the contactless measurement of the surface temperature of said elements. Furthermore, the support 10 has electromagnetic radiation generating means 14 integrated therein, which in the preferred embodiments generate a light having variable and controlled wavelength. This light is carried by an optical fiber 39 to lugs 40 supporting the two ends of the shaft 38 and at the same time constituting emission means 15 for emitting the light towards an area of application of the pressure-applying elements 4. Specifically, when the pressure-applying elements 4 are rollers made from jadeite or from another light-transmitting material, the light emitted by the emission means 15 is diffused through these rollers and emitted on the entire surface thereof, whereby it directly reaches the area of application of the rollers on the person's body. All these devices are connected to the computer 32 and are controlled by same.

As can be seen in Figures 1 to 3, and in further detail in Figures 6 to 8, at one end of the bed 1 there are arranged first securing means 16 for securing the person's feet, and at the other end of the bed 1 there are arranged second securing means 17 for securing the person's head. Furthermore, at the two ends of the bed 1 there are arranged pulling means 18, 19 for pulling the first and second securing means 16, 17 in a controlled manner in the longitudinal direction (X) of the bed 1, for the purpose of stretching the person's spinal column. In the example depicted in the drawings, these pulling means 18, 19 consist of threaded rods guided in housings of the bed 1 and going through, with a threaded coupling, parts that are integral with the first and with the second securing means 16, 17, respectively. In an improved embodiment, these pulling means are replaced with pulling

means incorporating an automatic movement mechanism (not depicted), for example a movement piston, controlled by the computer 32.

5 The first securing means 16 are incorporated in a foot support 20 receiving, as a support, the soles of the person's feet. A plurality of first pushers 21 is provided in this foot support 20 which are intended for being supported at one end against the soles of the person's feet. These first pushers 21 are individually movable in a controlled manner, so that the end of each of them can apply point pushing on the soles of the feet. In the depicted
10 embodiments, the first pushers 21 are in the form of bosses, the free end thereof being rounded. The controlled movement of the first pushers 21 can be automated, like in the embodiment depicted in Figures 7 to 9, where the foot support 20 is in the form of a case housing movement means 34 consisting, for example, of an electromechanical actuator coupled to each of the first pushers 21. Furthermore, preferably, the foot support 20 also houses a vibrator 35 to provide a controlled-frequency mechanical vibration to the first
15 pushers 21, and optionally an electromagnetic wave generator 36, particularly a light having a controlled wavelength, which is transmitted to the soles of the person's feet, preferably through the first pushers 21, which are therefore made from a material suitable for transmitting said wave. All these devices are connected to the computer 32 and are controlled by same.

20 Alternatively, the movement means of the first pushers 21 can be manually operated, like in the embodiment depicted in Figures 10 and 11, in which these first pushers 21 are formed by threaded bosses going through, with a threaded coupling, the wall of the foot support 20. The free end of these bosses which is applied on the sole of the foot has a rounded
25 shape, whereas the other end forms a head of screw for receiving a screwing tool.

30 The second securing means 17 are incorporated in a headgear 22 housing the person's head. A plurality of second pushers 23 which are supported at one end against the person's head housed in the headgear 22 is envisaged in this headgear 22. These second pushers 23 are individually movable in a controlled manner, so that the end of each of them can apply point pushing on the head. In the depicted embodiments, the second pushers 23 are in the form of bosses, the free end thereof being rounded. The controlled movement of the second pushers 23 can be automated. In a manner similar to the system described for

the first pushers 21, the headgear 22 can house movement means consisting, for example, of an electromechanical actuator coupled to each of the second pushers 23. Furthermore, preferably, the headgear 22 can also house a vibrator to provide a controlled-frequency mechanical vibration to the second pushers 23, and optionally an electromagnetic wave generator, particularly a light wave having a controlled wavelength, which is transmitted to the person's head, preferably through the second pushers 23, which are therefore made from a material suitable for transmitting said wave. All these devices are connected to the computer 32 and are controlled by same. Furthermore, it has been envisaged that the headgear 22 comprises earphones 24 emitting variable-frequency sound waves which are generated by the computer 32 connected to said earphones 24, which also controls the frequency of said sound waves.

As can be seen in Figures 2 and 14, the bed 1 is mounted in a pivoting manner on a supporting structure 25 comprising a transverse pivot shaft 41 about which said bed 1 can pivot. Motorized means 33 are housed in the upper part of the supporting structure 25 for pivoting the bed 1 about shaft 41 and taking it to a desired angular position. These motorized means also constitute locking means capable of locking the bed 1 in any desired angular position with respect to shaft 41. Furthermore, these motorized means are connected to the computer 32 and are controlled by same. As shown in the two images on the left side of Figure 14, this pivoting system allows the bed 1 to pivot about shaft 41 in the two pivoting directions, between a first end angular position in which the main plane of the bed 1 forms with the horizontal an angle having an absolute value exceeding 45° , and a second end angular position in which said main plane of said bed 1 also forms with the horizontal an angle exceeding 45° .

Figures 16 and 17 depict a movable manual applicator 26 which is provided as a complement forming part of the therapeutic device according to the invention. The manual applicator 26 comprises a handle 27 and a base 28 in which there are mounted second pressure-applying elements 29 and second vibrating means 30 imparting to said second pressure-applying elements 29 a controlled variable-frequency mechanical vibration. This manual applicator 26 has the same constitution as the assembly formed by the vibrating means 6 and the pressure-applying elements 4, with the difference in this case being that there are no movement means, rather the assembly is moved manually to apply therapy in

any part of the front face of the body of the person stretched out on the bed 1. The base 28, the second vibrating means 30 and the second pressure-applying elements 29 can have the same constitution as the base 9, the vibrating means 6 and the pressure-applying elements 4. All the devices integrated in the manual applicator 26 are connected to the computer 32 and are controlled by same. The user can hold the manual applicator 26 by the handle 27 and apply it to any area of the front surface of the body of the person stretched out face-up on the bed 1.

Figure 18 shows a variant of the movable applicator which in this case is a robotized applicator 42 comprising a robot arm 43 which is integral with said base 28, and the motions of which are controlled by the computer 32. The only difference with respect to the manual applicator described above is that the handle has been replaced with the robot arm 43. In said drawing, the robot arm 43 has been depicted partially and schematically. It is a robot arm suitable for precisely placing the base 28 in any position of the space above the bed 1, orienting said base 28 at any angle. A robot arm of such type can be selected from the many models available on the market.

In the advantageous embodiments, the device according to the invention is provided with measuring means 31 for measuring at least one vital parameter of the person stretched out on the bed 1. These measuring means 31 are connected to the computer 32 which, depending on this measurement, adjusts and controls the frequency of the mechanical vibration imparted to the pressure-applying elements 4, the wavelength of the electromagnetic radiation transmitted through said pressure-applying elements 4 and the frequency of the sound waves emitted by the earphones 24. Measuring means 31 can advantageously be a bioelectrography device that allows measuring parameters related to a person's bioenergy.

Likewise, the device according to the invention allows advantageously applying bioresonance-type therapy, which consists of measuring a person's particular pathogenic biological frequencies and transmitting to said person's body therapeutic frequencies that cancel out or compensate said pathological frequencies. In the device according to the invention, these therapeutic frequencies are the frequencies of the mechanical vibration transmitted by the pressure-applying elements 4, and optionally the frequencies of the

electromagnetic radiation transmitted through same, as well as the frequencies of the sound waves emitted by the earphones 24.

5 The computer 32 runs a computer program that allows controlling all the mentioned devices in a manner that is adapted to each person's specific needs, particularly depending on the person's personal data stored in a memory, and furthermore preferred depending on the person's vital parameters that are measured by measuring means 31. The computer program comprises menus and applications so that the therapist can actively intervene in controlling the devices.

10 In Figure 3, the computer 32 has been depicted schematically as a laptop computer for the purpose of simplifying the drawings. However, in the envisaged embodiments of the invention the computer can be a computer integrated in a general control console of the therapeutic device.

15

CLAIMS

1. A therapeutic device, comprising:

- a bed (1) provided with a support surface (2) for receiving a person stretched out face-up on said bed (1), said support surface (2) having at least one opening (3a, 3b);

- pressure-applying elements (4) for exerting point pressure on a person's body, said pressure-applying elements (4) emerging through said opening (3a, 3b) of the bed (1) for being applied against the body of a person who is stretched out face-up on said bed (1);

- movement means (5) configured for moving, in a controlled manner, said pressure-applying elements (4) at least in an orthogonal direction (Z), perpendicular to said support surface (2) of the bed (1), and for maintaining, in a controlled manner, said pressure-applying elements (4) in a given position along said orthogonal direction (Z);

- control means (32) for controlling said movement means (5);

characterized in that it further comprises:

- vibrating means (6) making said pressure-applying elements (4) vibrate with a variable-frequency mechanical vibration;

- control means (32) for controlling the frequency of said mechanical vibration.

2. The device according to claim 1, characterized in that said movement means (5) are configured for moving, in a controlled manner, said pressure-applying elements (4) also in a longitudinal direction (X) of said bed (1).

3. The device according to claim 1 or 2, characterized in that said movement means (5) are configured for moving, in a controlled manner, said pressure-applying elements (4) also in a transverse direction (Y) of said bed (1).

4. The device according to any of claims 1 to 3, characterized in that said movement means (5) consist of a Cartesian coordinate robot.

5. The device according to claims 4 and 2, characterized in that said Cartesian coordinate robot is a gantry robot comprising a cross-member (7) supported in a sliding manner at its two ends by longitudinal guides (8) arranged in said bed (1) and parallel to said longitudinal direction (X), such that said cross-member (7) moves in a controlled manner along said

longitudinal direction (X), and a base (9) to which said pressure-applying elements (4) are fixed, said base (9) being mounted on said cross-member (7) and moving in a controlled manner along said orthogonal direction (Z).

5 6. The device according to claims 5 and 3, characterized in that said base (9) is mounted to slide along said cross-member (7), such that said base (9) moves in a controlled manner also along said transverse direction (Y).

10 7. The device according to any of claims 1 to 6, characterized in that said vibrating means (6) consist of a support (10) housing a mechanical vibrator (11) and supporting said pressure-applying elements (4).

15 8. The device according to any of claims 1 to 7, characterized in that it comprises heating means (12, 13) for heating said pressure-applying elements (4), and temperature control means, associated with said heating means (12, 13), for controlling the temperature of said pressure-applying elements (4).

20 9. The device according to any of claims 1 to 8, characterized in that it comprises electromagnetic radiation generating means (14), suitable for generating a variable- and controlled-wavelength electromagnetic radiation, and emission means (15) configured for emitting said electromagnetic radiation towards an area of application of said pressure-applying elements (4).

25 10. The device according to claim 9, characterized in that said pressure-applying elements (4) are configured and positioned with respect to said emission means (15) such that the electromagnetic radiation emitted by said emission means (15) passes through said pressure-applying elements (4) towards an area of application of said elements.

30 11. The device according to any of claims 1 to 10, characterized in that said pressure-applying elements (4) are rotating rollers the axis of rotation of which extends in a transverse direction (Y) of said bed (1).

12. The device according to any of claims 1 to 11, characterized in that said pressure-

applying elements (4) are made of jadeite.

13. The device according to any of claims 1 to 12, characterized in that at least a first opening (3a) of said openings on the support surface (2) of the bed (1) has an oblong shape extending in the longitudinal direction (X) of said bed (1), suitable for covering at least one section of the spinal column, preferably the entire spinal column, of a person stretched out face-up on said bed (1), and in that said device comprises at least one group of said pressure-applying elements (4) emerging through said opening (3a).

14. The device according to claim 13, characterized in that at least a second opening (2b) of said openings on the support surface (2) of the bed (1) is spaced from said first opening (3a) in the longitudinal direction (X) of said bed (1), extends in said longitudinal direction (X) of the bed (1) and is suitable for covering at least one section of a leg of said person stretched out face-up on said bed (1), and in that said device comprises at least one group of said pressure-applying elements (4) emerging through said second opening (2b).

15. The device according to any of claims 1 to 14, characterized in that it comprises first securing means (16) for securing the feet of a person stretched out face-up on said bed (1), second securing means (17) for securing the head of said person stretched out face-up on said bed (1), and pulling means (18, 19) for pulling said first securing means (16) and/or said second securing means (17) in a controlled manner in the longitudinal direction (X) of said bed (1) in order to stretch out said person's spinal column.

16. The device according to any of claims 1 to 15, characterized in that it comprises a foot support (20), configured for receiving, as a support, the sole of at least one foot of a person stretched out face-up on said bed (1), said foot support (20) being provided with a plurality of first pushers (21) arranged for being supported against the sole of said person's foot, each of said first pushers (21) being individually movable in a controlled manner for applying point pushing to said sole of the foot.

17. The device according to claims 15 and 16, characterized in that said first securing means (16) are incorporated in said foot support (20).

18. The device according to any of claims 1 to 17, characterized in that it comprises a headgear (22) arranged for housing the head of a person stretched out face-up on said bed (1), said headgear (22) being provided with a plurality of second pushers (23) arranged for being supported against the said person's head housed in said headgear (22), each of said second pushers (23) being individually movable in a controlled manner for applying point pushing on said head.

19. The device according to claims 15 and 18, characterized in that said second securing means (17) are incorporated in said headgear (22).

20. The device according to claim 19, characterized in that said headgear (22) comprises earphones (24), and said device comprises sound wave generating means connected to said earphones (24) and suitable for generating a controlled variable-frequency sound wave and emitting it through said earphones (24), and control means associated with said sound wave generating means for controlling said frequency of the sound waves.

21. The device according to any of claims 1 to 20, characterized in that said bed (1) is mounted in a pivoting manner on a supporting structure (25) comprising a transverse pivot shaft (41), about which said bed (1) can pivot, and said device comprises locking means for locking said bed (1) in various angular positions with respect to said transverse pivot shaft (41).

22. The device according to claim 21, characterized in that said bed (1) can pivot about said transverse pivot shaft (41) in the two pivoting directions, preferably between a first end angular position in which the main plane of said bed (1) forms with the horizontal an angle having an absolute value equal to or greater than 45° , and a second end angular position in which said main plane of said bed (1) forms with the horizontal an angle having an absolute value equal to or greater than 45° .

23. The device according to any of claims 1 to 22, characterized in that said pressure-applying elements (4) are replaceable, and in that said device is complemented with a set of different pressure-applying elements (4) interchangeable with one another in said device.

24. The device according to any of claims 1 to 23, characterized in that it is provided with a movable applicator (26, 42) comprising a base (28) in which there are mounted second pressure-applying elements (29) and second vibrating means (30) suitable for imparting to
5 said second pressure-applying elements (29) a controlled variable-frequency mechanical vibration, said movable applicator (26, 42) being spaced from said support surface (2) and suitable for being moved above said person stretched out face-up on said bed (1).

25. The device according to claim 24, characterized in that said movable applicator is a
10 manual applicator (26) comprising a handle (27) integral with said base (28).

26. The device according to claim 24, characterized in that said movable applicator is a
robotized applicator (42), comprising a robot arm (43) integral with said base (28), said
15 device further comprising control means (32) for controlling the motion of said robot arm (43).

27. The device according to any of claims 1 to 26, characterized in that it is provided with
measuring means (31) for measuring at least one vital parameter of a person stretched out
on said bed (1), and in that said control means for controlling the frequency of the
20 mechanical vibration are configured for adjusting said frequency of the mechanical
vibration depending on the measurement taken by said measuring means (31).

28. The device according to claims 27 and 9, characterized in that said control means for
controlling the wavelength of the electromagnetic radiation are configured for adjusting said
25 wavelength of the electromagnetic radiation depending on the measurement taken by said
measuring means (31).

29. The device according to claims 27 and 20, characterized in that said control means for
controlling the frequency of the sound waves are configured for adjusting said frequency of
30 the sound waves depending on the measurement taken by said measuring means (31).

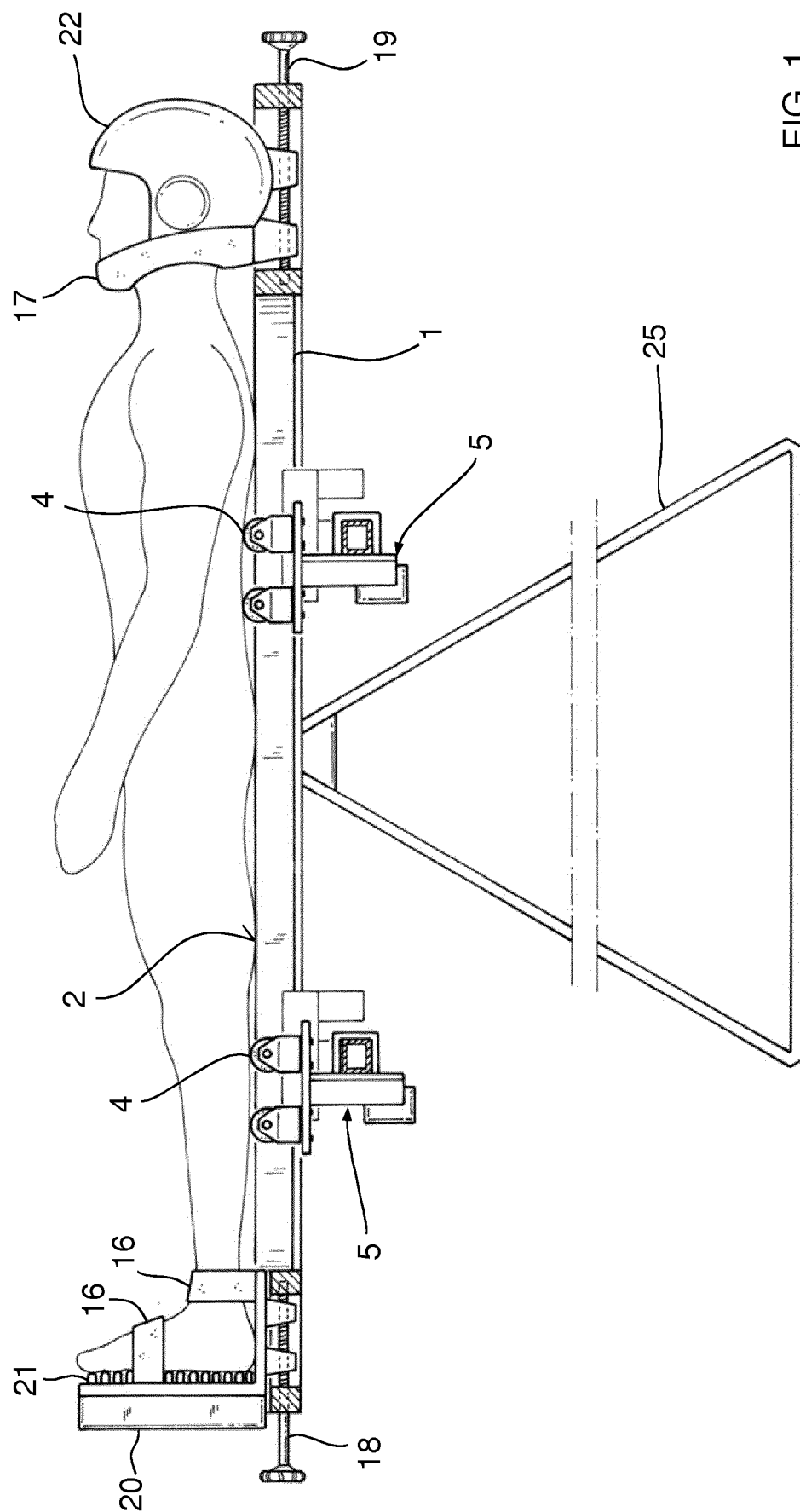
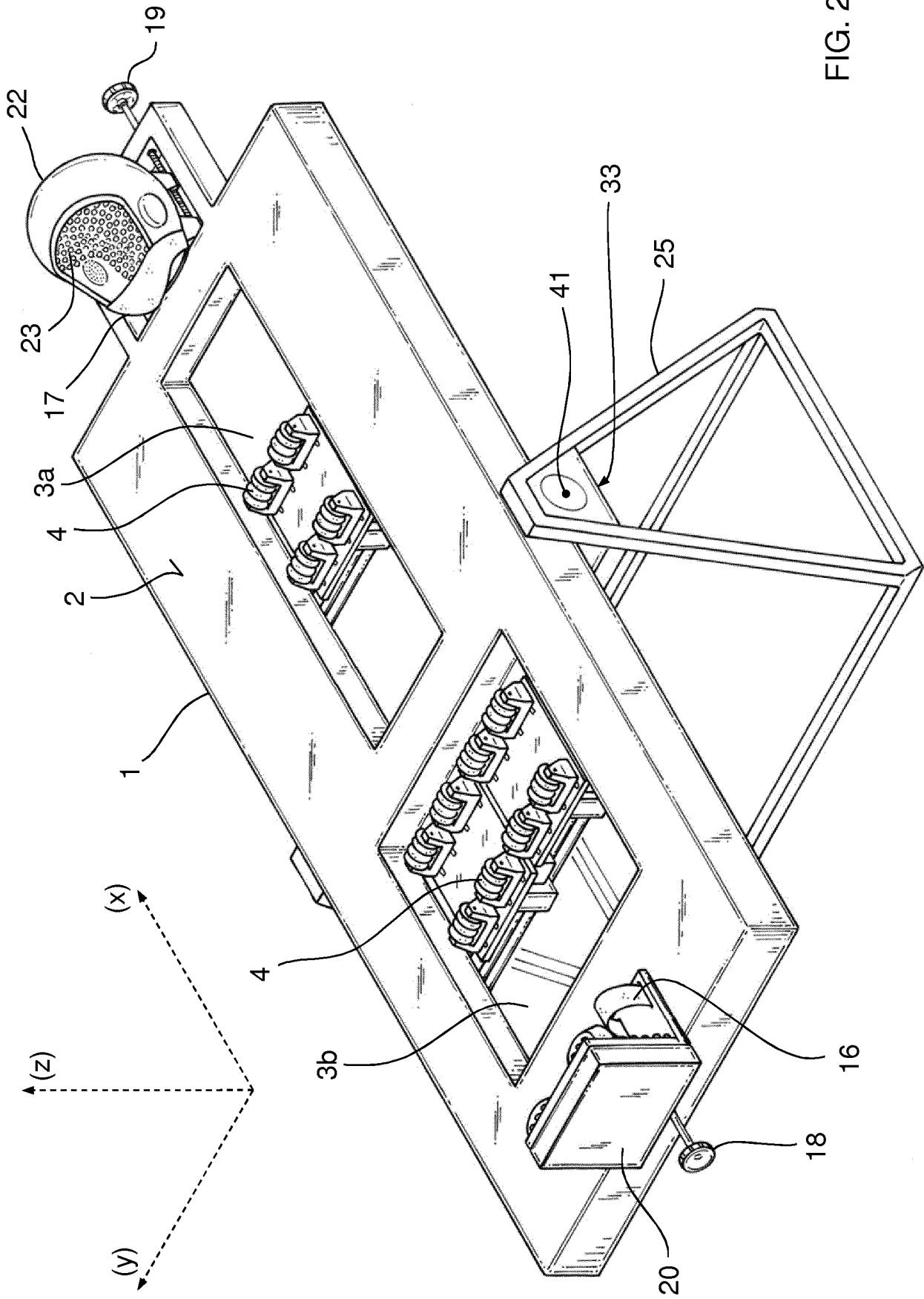
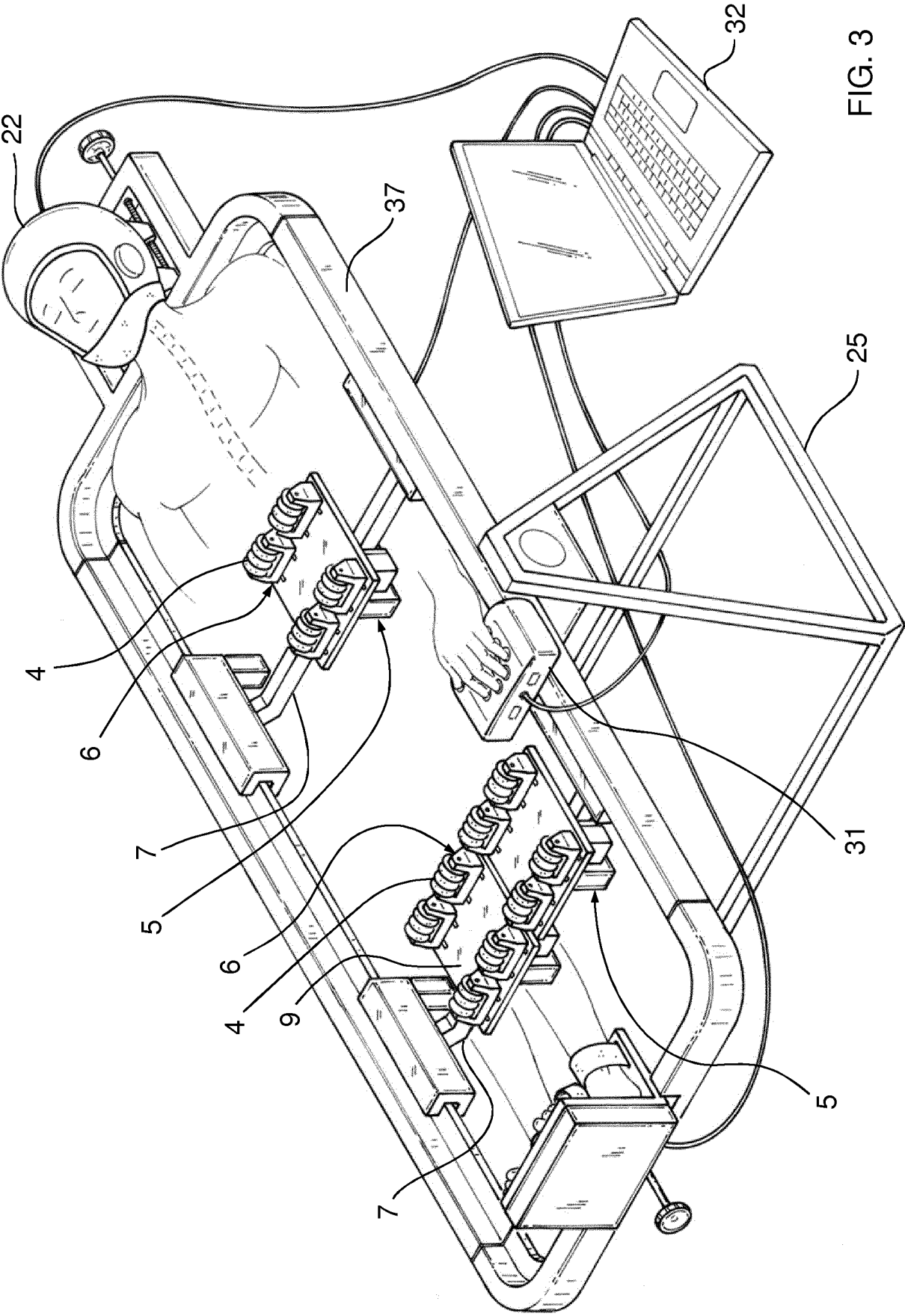
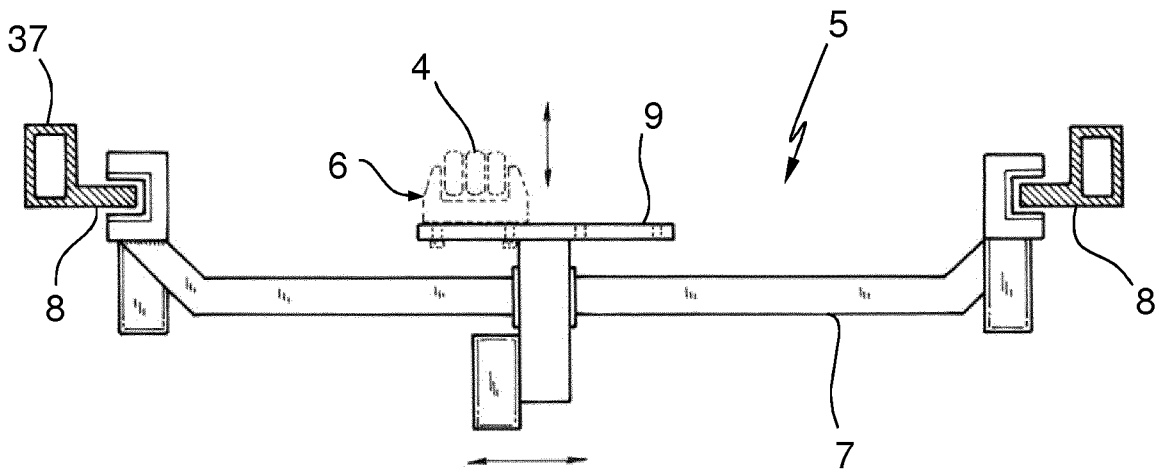
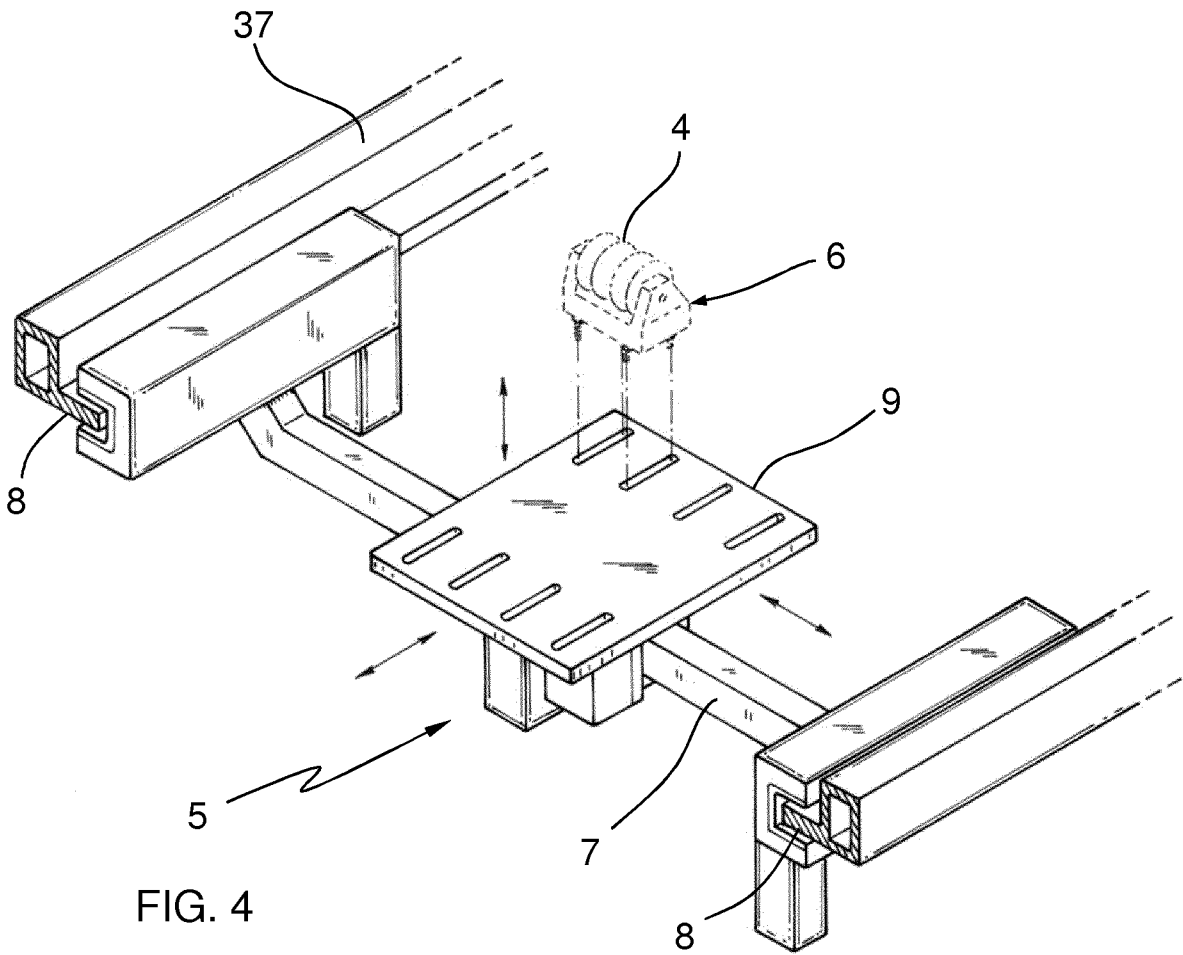


FIG. 1







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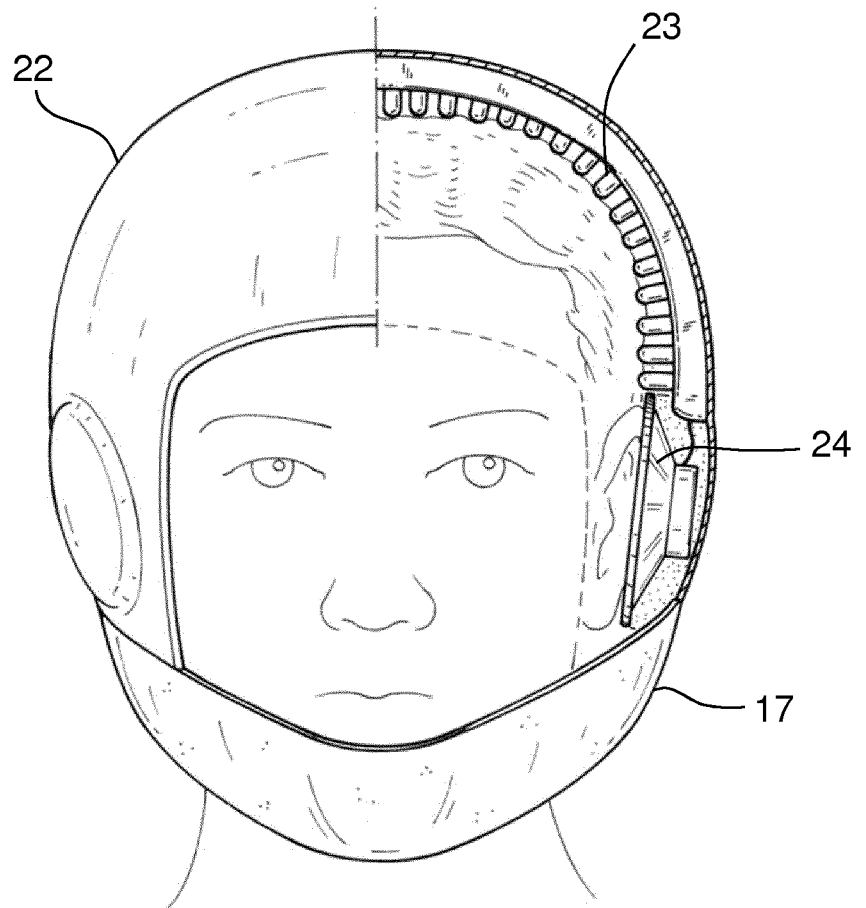


FIG. 6

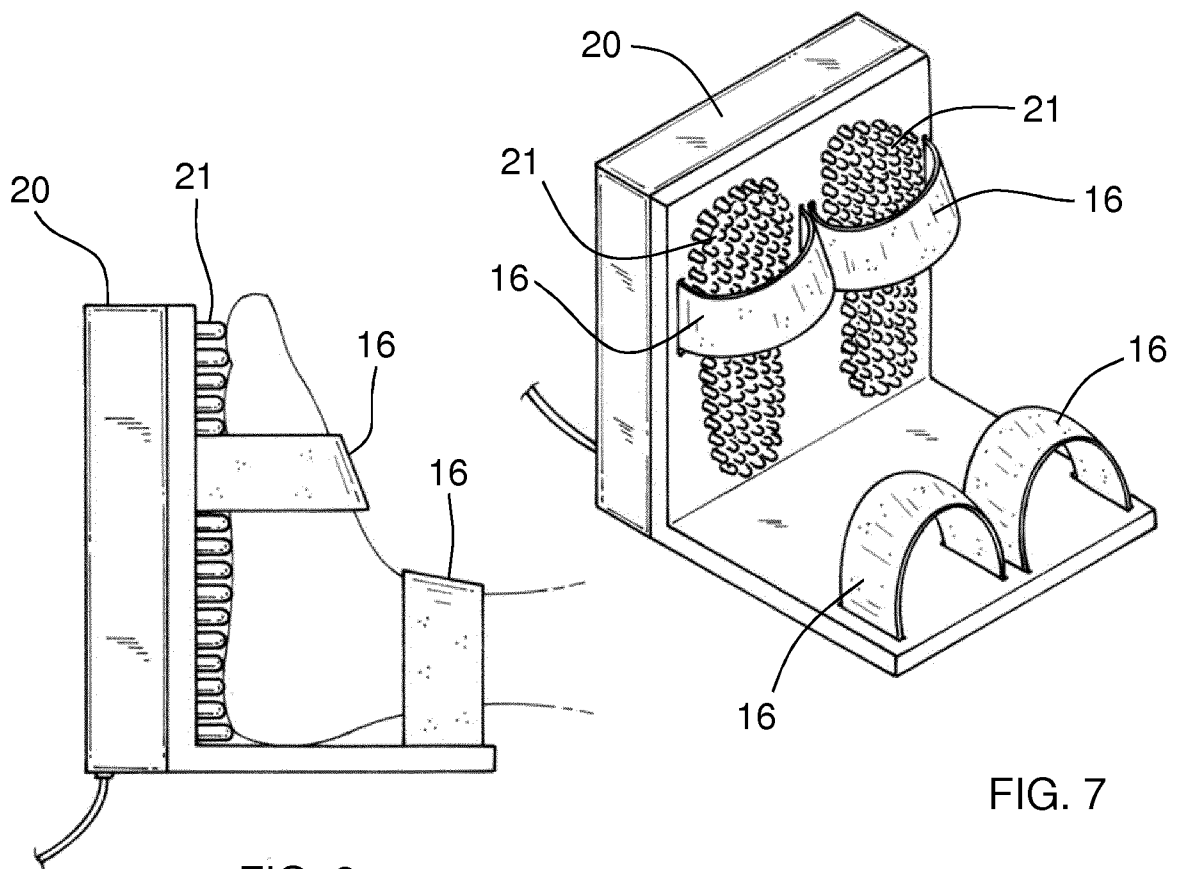


FIG. 7

FIG. 8

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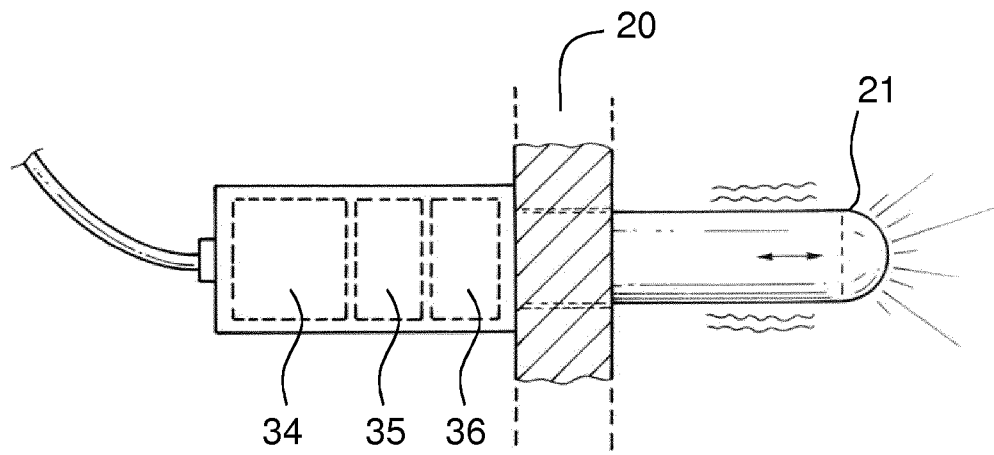


FIG. 9

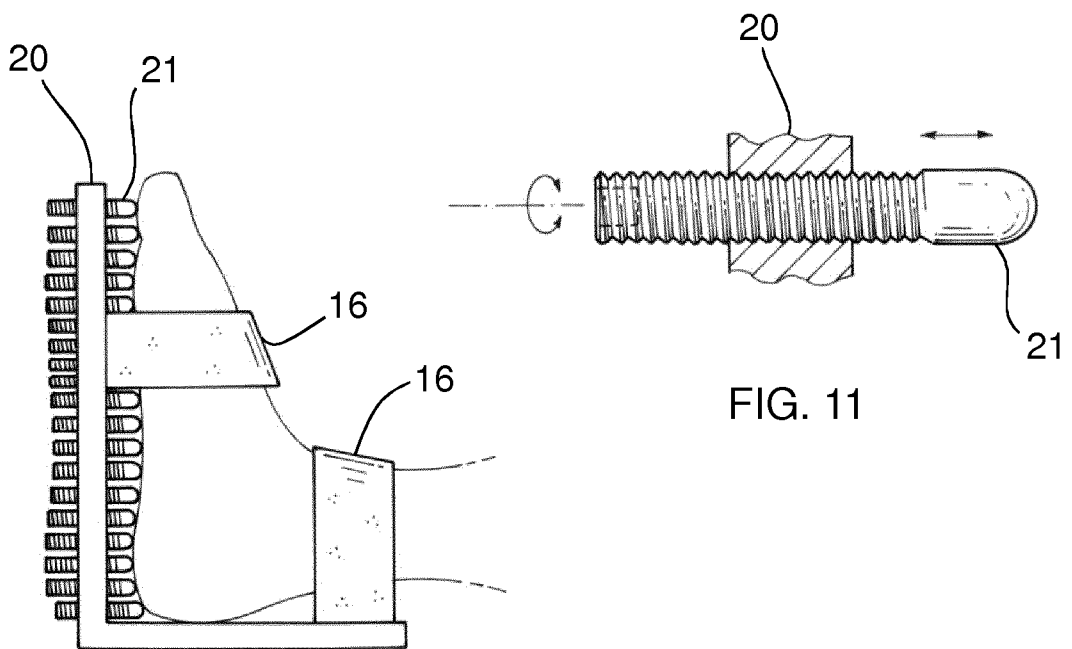


FIG. 10

FIG. 11

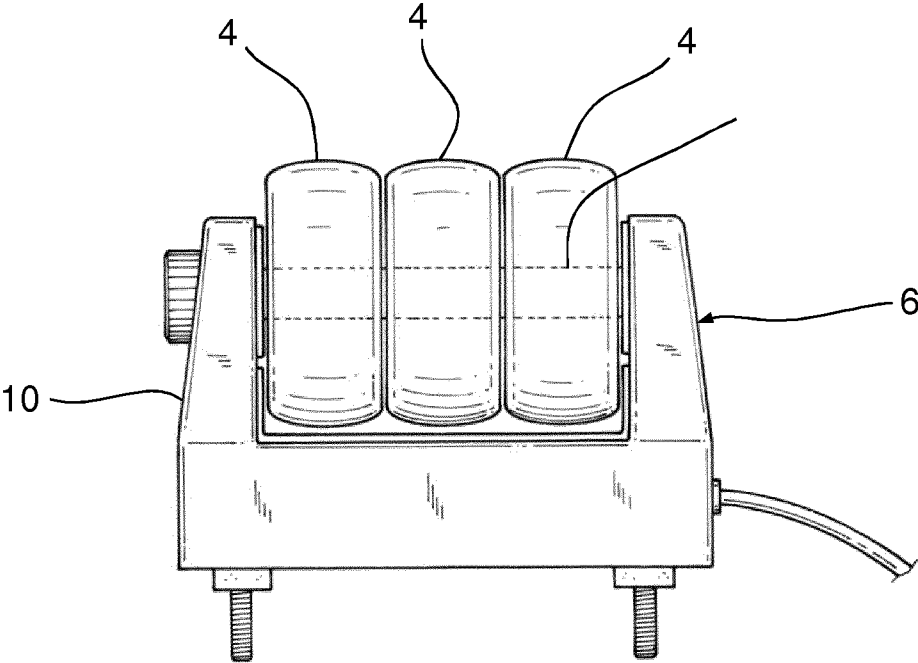


FIG. 12

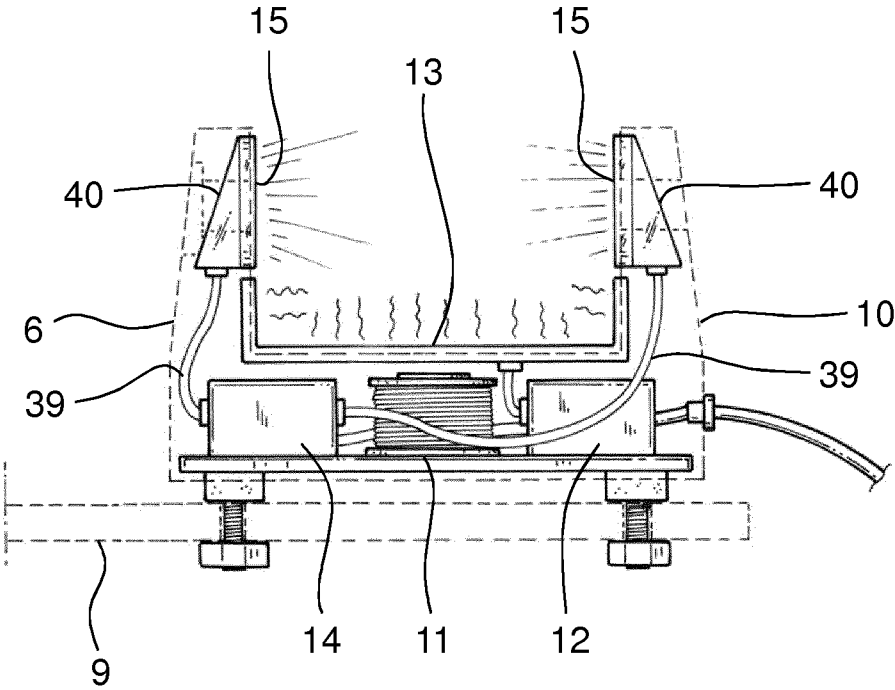


FIG. 13

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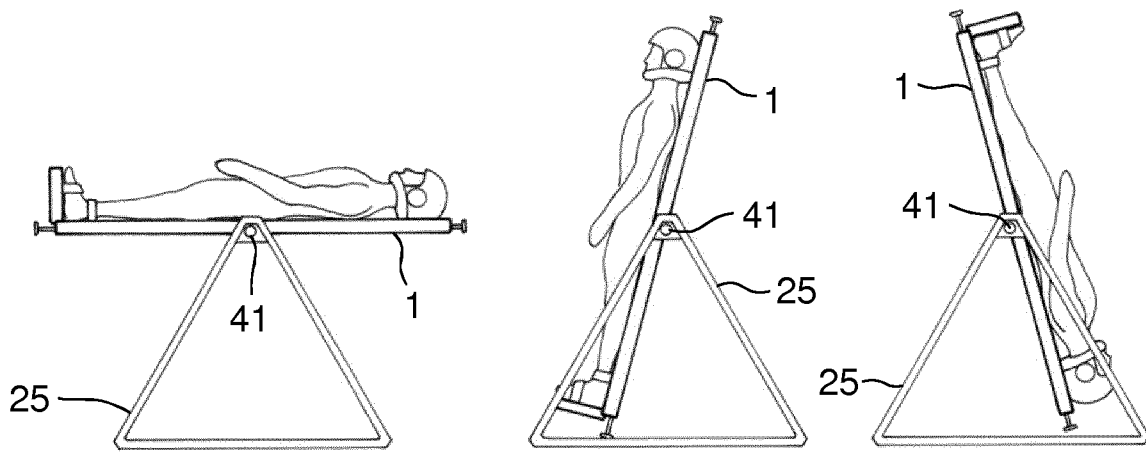


FIG. 14

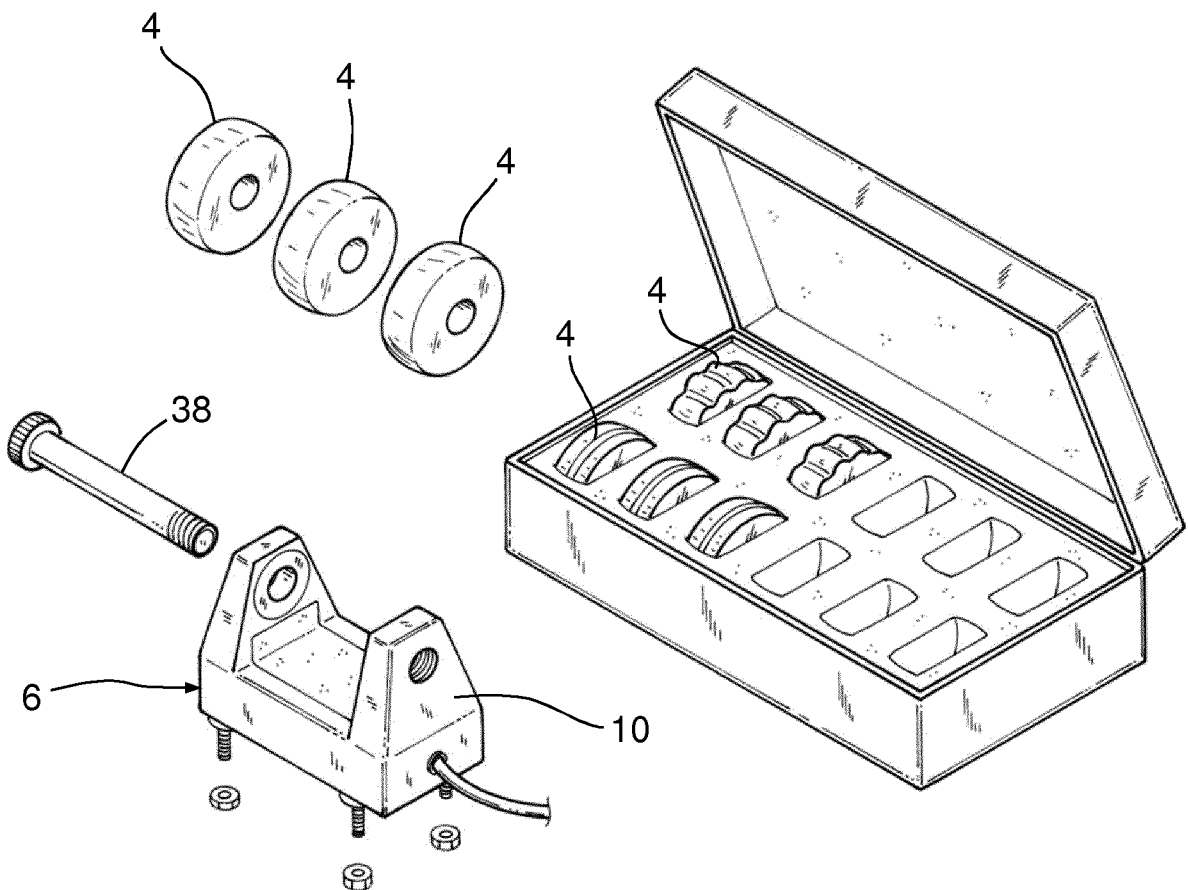


FIG. 15

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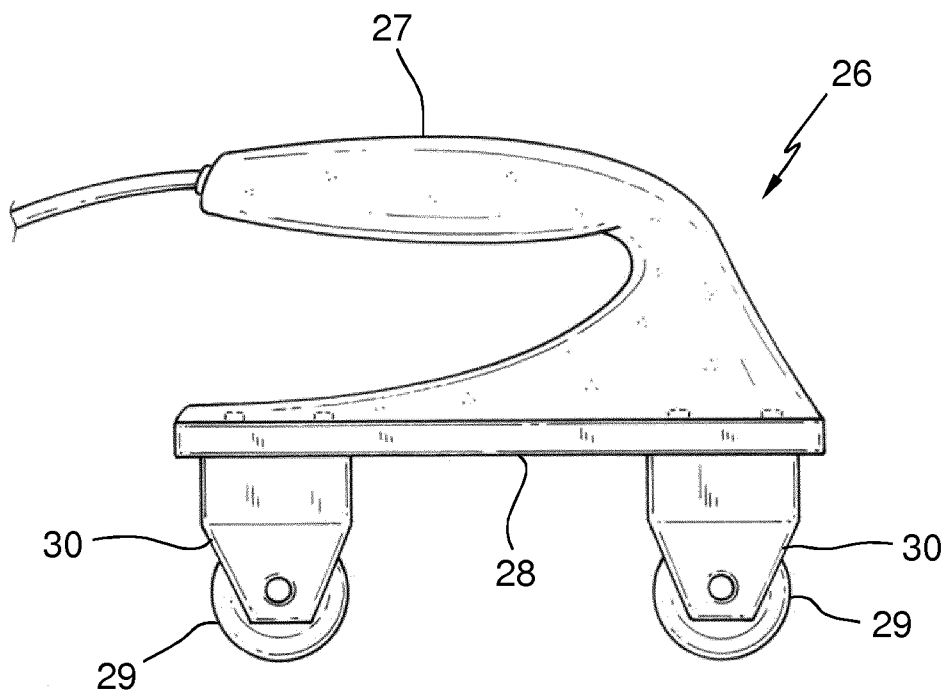


FIG. 16

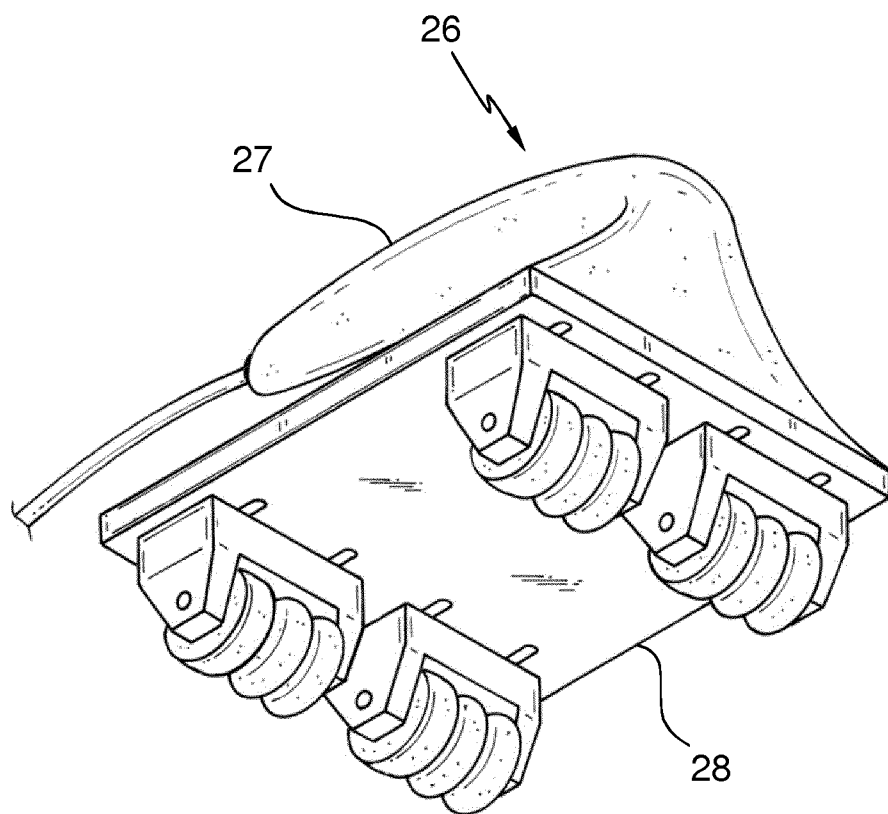


FIG. 17

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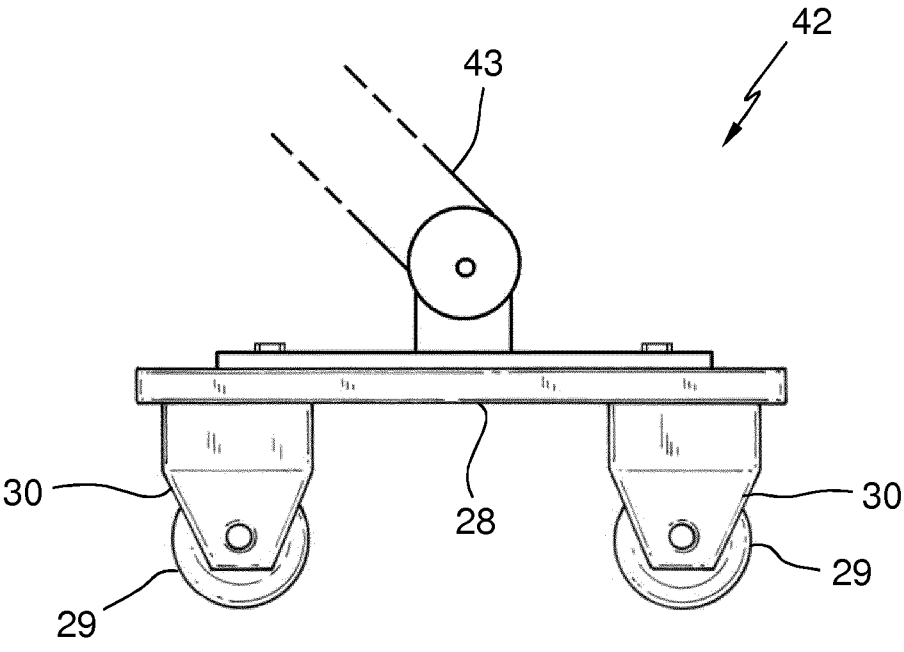


FIG. 18

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/051991

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61H7/00 A61H1/00 A61H1/02
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)
A61H

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 | US 3 003 497 A (NUNES JOHN L) 10 October 1961 (1961-10-10) | 1,2,4,5, 7,11-13, 23 |
| Y | column 1, lines 47-57; column 2, line 47 - column 4, line 26; figures | 3,6, 8-10, 14-22, 24-29 |
| Y | ----- US 2005/020946 A1 (KIM HAKJIN [US]) 27 January 2005 (2005-01-27) paragraph [25] | 3-6,8-10 |
| Y | ----- EP 2 638 889 A2 (CERAGEM CO LTD [KR]) 18 September 2013 (2013-09-18) paragraphs [2], [50], [105], [106] ----- -/- | 8 |



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

5 September 2016

Date of mailing of the international search report

20/09/2016

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
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Fax: (+31-70) 340-3016

Authorized officer

Turmo, Robert

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/051991

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|--|--|-----------------------|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| Y | US 2004/260215 A1 (KIM HAKJIN [US]) 23 December 2004 (2004-12-23) paragraphs [47], [74], [78], [97], [126],; claims 22, 64, 68; figures 1, 3 ----- | 3-5,8,14 |
| Y | US 3 238 936 A (SIEDENTOP ALFRED T) 8 March 1966 (1966-03-08) column 4, lines 17-45; column 6, lines 15-69; column 7, line 42 - column 8, line 21; column 11, lines 43-61 ----- | 15 |
| Y | US 2009/076421 A1 (GRANT JR THOMAS E [US]) 19 March 2009 (2009-03-19) paragraphs [63]-[67]; figures 5-7 ----- | 16,17 |
| Y | US 2 566 600 A (COLON AMADO B) 4 September 1951 (1951-09-04) column 3, lines 39-54; figure 1 ----- | 18,19 |
| Y | EP 2 628 505 A1 (PELLICER CARLOS F [AD]) 21 August 2013 (2013-08-21) page 8, line 33 - page 9, line 4; figures 7, 8a ----- | 20 |
| Y | WO 02/091984 A1 (JEONG DONG-MYONG [KR]) 21 November 2002 (2002-11-21) paragraphs [27]-[30]; figures 1, 2 ----- | 21,22 |
| Y | WO 2015/121695 A1 (NORMANDY TIBOR [HU]) 20 August 2015 (2015-08-20) page 13, lines 10-20; page 14, lines 11-19; page 15, lines 1-3; figure 1 ----- | 24-26 |
| Y | US 2013/079689 A1 (THIERMAN JONATHAN [US]) 28 March 2013 (2013-03-28) paragraphs [0034], [0035] ----- | 27-29 |
| A | US 6 409 689 B1 (CHEN PETER [TW]) 25 June 2002 (2002-06-25) the whole document ----- | 1 |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2016/051991

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-14, 23

Directed to a therapeutic device comprising specific types of movement means and pressure-applying elements.

2. claims: 15-22, 27-29

Directed to a therapeutic device with specific securing means, feet and head supports, etc. adapted to apply stretching force to a user.

3. claims: 24-26

Directed to a therapeutic device comprising a movable applicator.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2016/051991

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|----------------------------|---|
| US 3003497 | A | 10-10-1961 | NONE |
| US 2005020946 | A1 | 27-01-2005 | US 2005020946 A1 27-01-2005 WO 2005009320 A1 03-02-2005 |
| EP 2638889 | A2 | 18-09-2013 | CN 102462617 A 23-05-2012 EP 2638889 A2 18-09-2013 KR 20120049797 A 17-05-2012 US 2013253390 A1 26-09-2013 WO 2012064107 A2 18-05-2012 |
| US 2004260215 | A1 | 23-12-2004 | KR 20050000296 A 03-01-2005 TW I248813 B 11-02-2006 US 2004260215 A1 23-12-2004 US 2006195052 A1 31-08-2006 WO 2005000187 A2 06-01-2005 |
| US 3238936 | A | 08-03-1966 | NONE |
| US 2009076421 | A1 | 19-03-2009 | BR PI0612446 A2 23-11-2010 CA 2669880 A1 23-11-2006 JP 2008539976 A 20-11-2008 US 2009076421 A1 19-03-2009 WO 2006124559 A2 23-11-2006 ZA 200709722 B 30-09-2009 |
| US 2566600 | A | 04-09-1951 | NONE |
| EP 2628505 | A1 | 21-08-2013 | AU 2011315390 A1 02-05-2013 BR 112013008729 A2 28-06-2016 CA 2814638 A1 19-04-2012 CN 103189104 A 03-07-2013 CU 20130055 A7 31-07-2013 EP 2628505 A1 21-08-2013 ES 1073912 U 01-03-2011 JP 5933567 B2 15-06-2016 JP 2013540015 A 31-10-2013 KR 20130098394 A 04-09-2013 RU 2013121903 A 20-11-2014 SG 189875 A1 28-06-2013 US 2013204073 A1 08-08-2013 WO 2012049348 A1 19-04-2012 |
| WO 02091984 | A1 | 21-11-2002 | KR 20010069869 A 25-07-2001 WO 02091984 A1 21-11-2002 |
| WO 2015121695 | A1 | 20-08-2015 | NONE |
| US 2013079689 | A1 | 28-03-2013 | NONE |
| US 6409689 | B1 | 25-06-2002 | NONE |