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(54) A CHAIR-SHAPED LUMBAR VERTEBRA TRACTION DEVICE

STUHLFÖRMIGE LENDENWIRBELTRAKTIONSVORRICHTUNG

DISPOSITIF DE TRACTION VERTÈBRE LOMBAIRE EN FORME DE CHAISE

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Description

TECHNICAL FIELD

[0001] This invention relates to a chair-shaped device for pulling a lumbar vertebra.

BACKGROUND ART

[0002] A conventional chair type towing device, for example, is disclosed in the prior art document 1 (JP-A-2013-215632, see FIG. 28). User's buttocks are held to sitting unit 9 by closing waist harness 6. In this conventional chair type towing device, the arm contact 17 is moved to the armpit of the user. The landing table 52 is tilted backward.

[0003] Thereafter, the separation driving unit 5 moves the buttock portion 9 downward and tows the lumbar vertebra of the user.

[0004] The waist pad 25 held by the waist mat 26 is wound up by the winding unit 24 connected to the seat belt 23 at a conventional chair type towing device (Japanese Unexamined Patent Publication No.H5-49669, see Fig. 29). User's pelvis is held by holding the waist of the user with the waist pad 25 and the waist mat 26. The waist pad 25 can be twisted at the front portion (the stomach side of the user) toward the user's upper body side during towing. As a result, the user's pelvis can't be held properly. There is a possibility that the tow effect will be reduced due to the twisted waist pad 25, because the waist pad 25 may be twisted to the upper body side during the pulling with the attachment portion of the waist pad 25 to the waist mat 26 being as a fulcrum (see FIG. 30).

[0005] Additionally, a conventional bed type towing device, for example, is disclosed in the prior art document 2 (JP-A-Hei-5-49669, see FIG. 31). It is composed of a bed 19 and a main body 20. An arm contact unit 21 and a hip contact unit 18 are used at the treatment. The arm contact unit 21 is fixed on the bed 19. A bed mat is divided into two and placed on the frame.

[0006] The user's lumbar vertebra is towed by pulling the hip contact unit 18 with the lower mat being movable in the longitudinal direction of the frame. The lumbar vertebra of the user is on the boundary between the upper and lower mat. The hip contact unit 18 being attached to the user's waist is connected to the main body 20 via the tow wire 22. The upper body of the user is fixed by the arm contact unit 21. In this state, the towing device is operated to tow the lumbar vertebrae.

[0007] The hip contact unit 18 is held around the pelvic portion and pulled in the toe direction at a conventional bed type towing device. There was a possibility that it could not be pulled at an appropriate angle depending on the lying position on the bed or the towing position of the main body 20. In addition, though a triangular mat 27 for placing the towing posture at the semi-Farrar position is disposed below the buttocks of the user, this triangular mat 27 was impossible to accurately hold the pelvis of

the user with the hip contact unit 18.

[0008] JP 2010 012249 A discloses a chair-shaped lumbar vertebra traction device, comprising: an upper body holding unit to hold user's upper body on a backrest; a seat having a buttock portion, a loin guard and a lower leg rest portion; a waist holding unit to hold the user's waist; a separating drive unit to separate the backrest and the seat from each other; a landing table, the seat and the backrest being set on the landing table; a tilting mechanism for tilting the landing table into a treatment position, and a waist pulling unit; wherein the upper body holding unit can be slid along the backrest in order to adjust the proper position for users' height.

SUMMARY OF THE INVENTION

[0009] The following presents a general summary of aspects of the invention in order to provide a basic understanding of the invention. This summary is not an extensive overview of the invention. It is not intended to delineate the scope of the invention as claimed. The following summary merely presents some concepts of the invention in a general form as a prelude to the more detailed description provided below.

[0010] In order to solve the above mentioned problem, the present invention provides a chair-shaped lumbar vertebra traction device as claimed in claim 1.

[0011] With the above configuration, it is possible to effectively tow the user's lumbar vertebrae during lumbar towing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] To allow for more full understanding of the present invention, it will now be described by way of example, with reference to the accompanying drawing in which:

FIG. 1 is a diagram showing an overall configuration of a lumbar vertebra traction apparatus according to a first embodiment of the present invention;

FIG. 2 is a view showing an arrangement at the towing according to a first embodiment of the present invention;

FIG. 3 is a view showing the structure of the waist holding unit according to a first embodiment of the present invention;

FIG. 4 is a view showing the pulling angle according to a first embodiment of the present invention;

FIG. 5 is a view showing a configuration of a pulling wire according to a second embodiment of the present invention;

FIG. 6 is a view showing a state of angle change of

a seat according to a third embodiment of the present invention;

FIG. 7 is a diagram showing a main body configuration according to a first example of the present invention; 5

FIG. 8 is a view showing a treatment position by a tilting mechanism disposed between the base unit and the landing table according to a first example of the present invention; 10

FIG. 9 is a view showing the operation of the traction arm according to a first example of the present invention; 15

FIG. 10 is a diagram showing a driving situation of the traction arm according to a first example of the present invention; 20

FIG. 11 is a view showing the inclination angle of the backrest according to a first example of the present invention; 25

FIG. 12 is a view showing a state of movement of the seat with respect to the lying body according to a first example of the present invention; 30

FIG. 13 is a view showing the effect of the movement of the seat with respect to the lying body according to a first example of the present invention; 35

FIG. 14 is a view showing an angle change of the seat according to a first example of the present invention; 40

FIG. 15 is a diagram showing the pulling angle of the lumbar vertebra according to a first example of the present invention; 45

FIG. 16 is a view showing the effect of angle change on the loin guard of the seat according to a first example of the present invention; 50

FIG. 17 is a view showing an appropriate position of an angle change with respect to a loin guard of the seat according to a first example of the present invention; 55

FIG. 18 is a view showing a mounting structure of the wire according to a first example of the present invention;

FIG. 19 is a view showing a mounting structure of the wire according to a first example of the present invention;

FIG. 20 is a view showing a mounting structure of

the wire according to a first example of the present invention;

FIG. 21 is a view showing a mounting structure of the wire according to a first example of the present invention;

FIG. 22 is a view showing a winding structure of the wire according to a first example of the present invention;

FIG. 23 is a view showing a towing configuration by the winding drive unit of the wire according to a first example of the present invention;

FIG. 24 is a view showing a state in which a wire is towed by movement of a backrest according to a second embodiment of the present invention;

FIG. 25 is a view showing a configuration for suppressing side movement at towing according to Embodiment 3 of the present invention;

FIG. 26 is a view showing a drawback of a pulling operation by an arm according to a fourth embodiment of the present invention;

FIG. 27 is a view showing a situation where the backrest and the seat are connected by a spring according to a fourth embodiment of the present invention;

FIG. 28 is a view showing a configuration of a waist holding unit according to a conventional technique;

FIG. 29 is a view showing a winding configuration of the waist holding unit according to a conventional technique;

FIG. 30 is a view showing a defect point at the towing according to a conventional technique;

FIG. 31 is a view showing the bed type lumbar traction device according to a conventional technique.

DETAILED DESCRIPTION

Embodiment 1

[0013] Hereinafter, a first embodiment of the present invention is described with reference to FIG. 1 and FIG. 2. The seat 1 for supporting the waist and lower limbs of the user, a chair-like landing table 52 having a backrest 2 for supporting the user's back, a base unit 3 on which the landing table 52 is placed and a tilting mechanism 4 for tilting the landing table 52 toward the back side are provided. A separation driving unit 5 is provided for separating the buttock portion 9 and the backrest 2. A waist holding unit 6 is provided to hold the waist of the user on

the seat 1. An armpit holder 7 for supporting the armpit of the user is provided so that the body of the user does not shift downward. The armpit holder can be moved along the backrest 2 in order to adjust the proper position for various users' height.

[0014] An operation unit is provided to input and display the treatment conditions. A control section is provided for controlling the tilting mechanism unit 4, the separation driving unit 5 and so on. Further, the seat 1 is constituted by the loin guard 8, the buttock portion 9, and the lower leg rest portion 10.

[0015] Further, the waist holding unit 6 is configured to hold the waist circumferentially and cover the pelvis (see FIG. 2). It might be tightened automatically or manually. A wire or belt (waist pulling unit) 11 is attached to two lateral sides of the waist holding unit 6. The wire or belt 11 is towed to the buttock portion 9 side and the user's ischium is pressed against the buttock portion 9 when pulling the lumbar vertebrae. In that state, the vicinity of the iliac crest of the user is towed downward using the waist holding unit 6. It can perform properly to tow with the waist held by the buttock portion 9 and the waist holding unit 6. In addition, since the waist holding unit 6 is towed toward the buttock portion 9, the waist holding unit 6 is not unreasonably twisted toward the upper body side with respect to its connecting point set in the loin guard 8. Therefore, it can tow the user's waist downward accurately.

[0016] The waist holding unit 6 is not necessarily held on the loin guard 8 (see FIG. 3).

[0017] The waist holding unit 6 covers the waist of the user all around to tow to the buttock portion 9 side. Therefore, the waist portion of the user can be pulled downward even if the waist holding unit 6 is separated from the loin guard 8. Also, separating the waist holding unit 6 from the loin guard 8 make it possible to cover the vicinity of the iliac crest properly regardless of the height of the user or the size of the waist part.

[0018] In the prior art, the waist holding unit is not pulled downward. Therefore, it is necessary to tightly hold the circumference of the waist strongly. In the present embodiment, the iliac crest and the sciatic bone of the user are held between the waist holding unit 6 and the buttock portion 9 so that it can be held accurately even without tightening as strongly as previously.

[0019] In the prior art of the bed type, the triangular mat contacting the lower portion of the user is not fixed on the bed. Therefore, it can be moved correspondingly when the buttocks of the user is moved in the foot direction during towing. However, it can't return to the head side automatically on loosening after towing. The triangular mat can't follow the movement of the buttocks of the user well so that the contact between the buttocks of the user and the triangular mat becomes unstable. Therefore, it is difficult to hold the waist of the user near the iliac crest and the sciatic bone accurately.

[0020] However, in this embodiment, since the waist holding unit 6 is towed in the direction of the buttock por-

tion 9, the buttocks of the user and the buttock portion 9 are always in close contact with each other. Therefore, it is possible to tow in such a contact state stably.

[0021] Also, in the case of conventional bed-type towing, there is also a problem that the angle at which the waist is pulled is changed depending on the position where the user lies and the height of the towing fulcrum of the towing main body. However, in this embodiment, the towing operation is performed in a state where the user is on the seat 1 regardless of the height of the user. Additionally, the waist pulling unit (wire or the belt) 11 is connected to the fixed pulling position 15 (usually using a pulley) fitted on the landing table 52 to keep a proper pulling angle as shown in FIG. 4. Therefore, height of user hardly affect the towing angle. As a result, the waist pulling unit 11 pulls the waist holding unit 6 in a predetermined angle of about 20 to 40 degree against the backrest 2 with the seat 1 keeping user's lower body as shown in FIG. 4. The predetermined angle against the backrest 2 is set before the user sits down and is then not changed until the user leaves the seat 1 again.

Embodiment 2

[0022] In the next embodiment, the wire or the belt 11 is connected to the upper body holding unit 7 via the pulley 12 to pull the waist holding unit 6. The upper body of the user is pulled upward by the upper body holding unit 7. (See FIG. 5) In conjunction with this, the waist of the user is pulled downward by the waist holding unit 6. Since both the upper body and the waist are simultaneously towed, the amount of movement of the upper body side could become smaller. The connection between the upper body holding unit 7 and the waist holding unit 6 by the towing wire or belt 11 can short the idle running distance until the starting the tensile force after starting the pulling. It can reduce unnecessary pulling action.

[0023] In addition, if the buttock portion 9 is movable with respect to the landing table 52, the upper body and the waist portion can be effectively separated.

Embodiment 3

[0024] In the following embodiment, the angle of the thigh with respect to the lumbar can be changed so that the lumbar vertebrae L1 to L5 can be treated selectively (See FIG. 6). For example, you can select the Furor position for strongly pained person and the semi-Farrar position for obesity or lumbar curve curvature. Changing the attachment angle of the buttock portion 9 with respect to the loin guard 8 can pull on one or more of the lumbar vertebrae L1 to L5 selectively, depending on the selected attachment angle. Further, regardless of the angle of the buttock portion 9 to the loin guard 8, the towing angle on the casing (the landing table 52 and the backrest 2) is fixed. Therefore, it is possible to tow accurately regardless of the angle of the buttock portion 9.

[0025] In addition, upper body on the backrest 2 can

be maintained more surely by using chest band together. Therefore, the pain of the armpit can be reduced in comparison with the traction by the armpit holder 7 alone. For example, an air bag or the like in order to hold the shoulder and the upper arm make it possible to suppress the collapse of the posture during the towing (See FIG. 25).

Example 1

[0026] A specific example will be described below (See FIG. 7). It has a landing table 52, a backrest 2, a seat 1 (general term of the loin guard 8, the buttock portion 9 and the lower leg rest portion 10) on the landing table 52, the armpit holder 7 that can move along the backrest 2 to adjust to various users' height, a waist holding unit 6 on the loin guard 8, a belt retractor (not shown) for tightening the waist holding unit 6 around the user's waist, a tension unit 32 on the base unit 3 or the landing table 52 for applying traction force to the wire or belt 11 to pull the waist holding unit 6 toward the buttock portion 9 side and a load detection unit (not shown) for detecting the tension of the wire or belt 11.

[0027] The backrest 2 is tilted to the treatment position by the tilting mechanism 4 so as to adjust the angle of the landing table 52 to the base unit 3 (See FIG. 8). Tilting angle of the landing table 52 is detected and monitored by the optical sensor, the limit switch, the motor pulse or the like.

[0028] The armpit holder 7 can be moved to user's armpit position (See FIG. 9). In particular, at first the armpit holder 7 is in an upward state without being inserted to user's armpit. Next, the contact state between the cam at the root of the armpit holder 7 and the roller on the backrest 2 is changed for arm 54 to turn down to fall along the underarm of the user.

[0029] Thereafter, when the armpit holder 7 moves upward along the backrest 2, the arm contact 17 moves to the armpit position of the user to hold the upper body properly. It can be monitored to be moved to the appropriate position by measuring the motor current or the load of the drive unit.

[0030] Then, the backrest 2 is tilted to pull the upper body of the user. When the backrest 2 is tilted to the horizontal state, the user may think its head has dropped too much.

[0031] Therefore, it is desirable to be inclined upward by at least about 10 degrees from the horizontal level (see FIG. 11b). Additionally, if the angle of backrest 2 against the horizontal state is too low, for example 5 degrees, it's a difficult to keep user's lower body on the seat 1 tightly during the towing. It may cause the failure for the waist pulling unit 11 to pull the waist holding unit 6 in the predetermined angle against the backrest 2. Therefore, backrest 2 also should be inclined upward by an appropriate angle, at least about 10 degree preferably about 20 degree, against the horizontal level with the landing table 52 being tilted by the tilting mechanism 4. Further, the backrest 2 is to be moved by the driving

portion 55 along with the landing table 52. Therefore, the frictional force between the back of the user and the surface of the backrest 2 can be used to hold the upper body at the towing motion. So, the holding points of the upper body can be prevented from concentrating only on the armpit of the user to reduce the pain around the armpit.

[0032] Further, since the loin guard 8 can move freely on the landing table 52, friction between the body waist and the loin guard 8 can make the seat 1 to follow the movement of the user effectively (see FIG. 12, FIG. 13). It can be treated with keeping user's initial posture, since it keeps no gap between the buttocks and the buttock portion 9.

[0033] In the conventional method, pulling the seat and holding the upper body, it is necessary to move the seat upward a lot to the initial position (backrest side) at the end of the treatment for user to stand up. Therefore, the lumbar vertebrae once extended by towing will shrink again by returning the seat.

[0034] However, in this example, the backrest 2 is operated with the loin guard 8 being free and motion range of the loin guard 8 is limited by using the mechanical stopper so that there is little need to move the seat upward to the initial position at the end of the treatment

[0035] In detail, in this example, as the loin guard 8 is free to move on the back landing table 52, the seat 1 can follow the user's body to keep contact with the buttocks and thighs closely in towing. Additionally, the seat 1 does not move further than the limited position of the foot side. Therefore, the position of the seat 1 is not too low for a user to stand up at the end of the treatment. As a result, there is no need to be forced to move the seat 1 upward a lot to the initial position (backrest side) at the end of the treatment, and it can reduce the shrinking of the lumbar vertebrae.

[0036] Additionally, it can be generally preferable to be 90 degrees as for both a hip joint angle and a knee joint angle in towing. It is also preferable to change the hip joint angle depending on the user's body shape, the state of the lumbar vertebra (lordosis) or the treating portion of at least one of the L1 to L5. It is possible to change the towing posture by changing the angle between the loin guard 8 and the buttock portion 9 (see FIG. 14 and 15). When changing the angle between the buttock portion 9 and the loin guard 8, unless the angle is changed around the hip joint as an axis, it can displace a close contact between the seat and the thigh. Therefore, the angle of the buttock portion 9 to the loin guard 8 is changed around the hip joint as an axis as shown in FIG. 16 and 17.

[0037] The distance from the center of rotation to the contact point of the seat and the thigh respectively according to the angle is to be $a = b = c = d$ when using the hip joint as the center of rotation as shown in FIG. 17a, in the other words, there is no change in the contact position between the seat and the thigh. On the other hand, when not using the hip joint as the rotation center, the distances change to be $a < b < c < d$, and the contact po-

sition between the buttock portion and the thigh portion changes as shown in FIG. 17b, therefore, the back surface of the thigh slides from the buttock portion, and the sitting posture is to be changed.

[0038] Further, the lower leg rest portion 10 is connected to the buttock portion 9. It is possible to adjust the angle of the knee joint to 90 degrees according to the body type (thigh length) by means of the driving part mounted between the buttock portion 9 and the lower leg rest part 10. Additionally, the angle of the lower leg rest part 10 to the buttock portion 9 is to be sharpened at the end of the treatment to make it easy for user to stand up.

[0039] As described above, it is possible to selectively tow user's lumbar vertebrae L1 to L5 by changing the attachment angle of the buttock portion 9 to the loin guard 8. Incidentally, the pulling position of the wire or the belt 11 on the landing table 52 is fixed regardless of the angle between the buttock portion 9 and the loin guard 8, as shown in FIG. 14a. Therefore, the waist holding unit 6 can be towed regardless of the angle between the buttock portion 9 and the loin guard 8.

[0040] Further, the waist holding unit 6 holds the whole waist part mainly by holding the iliac crest. The waist holding unit 6 can be connected to the loin guard 8. It is also possible to mount the waist holding unit 6 separately from the loin guard 8.

[0041] In the conventional technique, attaching the holding unit to the loin guard without the wire or the belt to pull down to the buttocks side, the abdomen side of the holding unit was twisted toward the upper body side during the towing with the connection point between the holding unit and the loin guard as a fulcrum. Therefore, there was a possibility that the substantial traction angle would be changed. In order to avoid this as much as possible, it was necessary to hold the whole waist part with a stronger force. On the contrary, in this example, the iliac crest is pulled downward directly by the wire or the belt 11. Therefore, even if the waist holding unit 6 is connected to the loin guard 8, the abdomen side of the holding unit 6 is not twisted toward the upper body side during the towing with the connection point between the holding unit and the loin guard as a fulcrum and the waist portion can be held with relatively little force in order to keep the predetermined traction angle.

[0042] A specific example of attachment of the wire or belt 11 is described below (See FIG. 18). Waist holding unit 6 has an area 41 made of hard material and an area 42 made of soft material. The branch belt 45 (the branch belt 45 is a part of the wire or belt 11) is fixed to a plurality of fixing points 43 on the area 41. The waist holding unit 6 properly holds the pelvis (near the iliac crest) and the wire or belt 11 is pulled through the pulley 12 using connection point 44. Therefore, it is possible to suppress unnecessary direction force with respect to the pelvis during pulling.

[0043] Specifically, the wire or the belt 11 is fixed at the three fixing points 43a, 43b, 43c (See FIG. 19). In order to pull the wire or the belt 11 without giving a turning

force in the unnecessary direction, it can be better to attach the wire or the belt 11 only to the vertex 43a of the iliac crest (See FIG. 20a). However, if there is only one fixed point (holding point), there is a possibility that the waist holding unit 6 will be twisted depending on how the waist holding unit 6 is attached to the waist of the user.

[0044] On the other hand, when only 43b is fixed, since the fixed point is located on the front side of the lumbar vertebrae, an inappropriate rotational force is applied in the direction to curve the lumbar vertebrae (See FIG. 20b).

[0045] In addition, when only 43c points are fixed, since the fixed point is positioned on the back side of the lumbar vertebra, a rotational force is applied in a direction to decrease the frontal curvature of the lumbar spine (See FIG. 20c). From the viewpoint of pelvic posture at the treatment, it can be a good rotation. However, there is a possibility of giving an unnecessary turning force to the pelvis and causing twisting of the waist holding unit 6 as in the case where only the point 43 a is fixed.

[0046] Therefore, in this example, a plurality of points on the waist holding unit 6 are fixed (held) by a wire or a belt 11 so as to tow the iliac crest in a wide range (see FIG. 19b). Further, the connection point 44 of the branch belt 45 is arranged on a line between the pulling point on the pulley 12 and the fixing point 43a or between the pulling point on the pulley 12 and the point ranged from 43a to 43c. Therefore, unnecessary rotation does not occur at the pelvis during pulling. In addition, since it is possible to hold the vicinity of the iliac crest in a wide range from 43b to 43c, twisting of the waist holding unit 6 can be suppressed. As it holds the iliac crest in a wide range, it can accurately tow (pull) the iliac crest.

[0047] By the way, if the branch belt 45 connecting the points between 43b and 43c is too short, the angle between the branch belt 45 and the pulling direction approaches large degrees (an obtuse angle) and there is a risk of forcing unexpectedly in the pulling direction on the fixing point 43 (see Fig 21b). Therefore, it is desirable to select the appropriate length of the branch belt 45 so that it become almost parallel (a sharp angle) to pulling direction as much as possible.

[0048] Furthermore, in order to firmly hold the pelvis (near the iliac crest), the area 41 contacting the iliac crest (the portion connecting 43a, 43b, 43c points) is made with a stretchable stiff material while the area 42 is made of an elastic material. The hard material is used for the part in contact with the iliac crest not to stretch unreasonably. Therefore, the pelvis (near the iliac crest) can be accurately held. In addition, the soft material portion improves fitting so that it can alleviate the feeling of cramping. If every portion is made of stiff material, it compresses unnecessarily and impairs the comfortability. Conversely, if every portion is made of stretchable material, it loosens the holding of the pelvis (near the iliac crest) and prevents proper fixation.

[0049] Further, this example is not limited to the configuration in which the points 43b and 43c on the waist

holding unit 6 are connected by a belt or the like. In addition, the connection point 44 should only be satisfied with being arranged on a line between the pulling point on the pulley 12 and the point 43a or the point ranged from 43a to 43c. Also, the mounting point on the waist holding unit is not limited to only 2 or 3 points.

[0050] In addition, the wire or belt 11 attached to the waist holding unit 6 is not limited to a configuration being pulled through a pulley. If the waist holding unit 6 is not twisted in towing, for example, the wire or the belt 11 can be fixed at a point somewhere under the buttocks portion 9.

[0051] Further, the waist holding unit 6 is connected to the belt winding portion 59 (See FIG. 22). If the belt winding portion 59 is movable in the up and down direction with respect to the loin guard 8, the waist holding unit 6 can be fitted more accurately according to the user's body shape.

[0052] The belt winding portion 59 extends the winding belt from the center of the loin guard 8 to the left and right. Both belts are connected with the buckle 60 in front of the user, and the belt is wound using the motor of the belt winding unit. Therefore, it makes equal tension (belt winding force) for right and left. It also can be tightened by hand without using the belt winding portion 59.

[0053] In addition, the tension unit 32 is mounted on the base unit 3 or the landing table 52. The wire or belt 11 being wound in the tension unit 32 is connected to the waist holding unit 6 via the pulley 12 mounted on the landing table 52 (See FIG. 23). By connecting the waist holding unit 6 to the wire or the belt 11 of the tension unit 32, proper tension is generated in the wire or the belt 11 by the motion of the backrest 2. As a result, pulling force is generated at the lumbar vertebra by using the waist holding unit 6. In addition, in the case where the waist holding unit 6 and the loin guard 8 are not fixed, the torsion of the waist holding unit 6 can be further suppressed, and it makes a more stable traction.

[0054] The traction drive is not limited to a specific one. For example, a direct acting actuator, a method in which a chain or a belt is driven by a motor, a rack pinion, a drive using a gear, and the like can be used.

Example 2

[0055] The following is a different example. The waist holding unit 6 is directly connected to the backrest 2 using a wire or a belt 11 (See FIG. 24). In this case, the tension of the wire or the belt 11 can be measured by the load detection mounted on the backrest 2.

[0056] As described above, by connecting the waist holding unit 6 and the backrest 2 by using the wire or the belt 11 directly, it is possible to tow both the upper body and the lower body in the opposite direction only by the movement of the backrest 2. Therefore, the operating range of the backrest and unnecessary pulling operation can be reduced.

Example 3

[0057] The following is a different example. In the above mentioned example, the upper body is held by the armpit holder 7 and the frictional forces of the backrest 2 and the user's back. In this case, if the traction force is large, the pulling force at the armpit holder 7 becomes larger to open user's arm side unnecessarily. Therefore, it'll be better to hold the upper arm and the shoulder to suppress (See FIG. 25). When the traction force is not large, the shoulder or arm placed on the arm rest 63 does not move upwards unnecessarily (see FIG. 25a), but as the traction force increases, the shoulder moves upwards (see FIG. 25b), and further moves more upwards (see FIG. 25c).

[0058] Therefore, by providing the shoulder wall 61 for suppressing the movement of the shoulder and the arm side wall 62 for suppressing the movement of the arm, it is possible to suppress the upward movement of the arm and the shoulder (see FIG. 25d). It can also reduce the unreasonable movement of the backrest 2 and partially biased traction.

Example 4

[0059] When moving in the direction of elongation, the lumbar spine is easy to move in the direction towards the front curve of the spine. In this example, the loin guard 8 is movable along the direction of elongation or towing on the landing table 52 and connected with the backrest 2 by an elastic means like a spring 69 (see FIG. 26, 27). As a result, movement of the loin guard 8 follows movement of the backrest 2 effectively.

Claims

1. A chair-shaped lumbar vertebra traction device, comprising:

an upper body holding unit (7) to hold user's upper body on a backrest (2);
a seat (1) having a buttock portion (9), a loin guard (8) and a lower leg rest portion (10);
a waist holding unit (6) to hold the user's waist;
a separating drive unit (5) to separate the backrest (2) and the seat (1) from each other;
a landing table (52), the seat (1) and the backrest (2) being set on the landing table;
a tilting mechanism (4) for tilting the landing table (52) into a treatment position, and
a waist pulling unit (11) to pull the waist holding unit (6) toward the buttock portion (9) side, wherein the upper body holding unit (7) can be slid along the backrest (2) in order to adjust the proper position for users' height, the loin guard (8) of the seat (1) can move freely on the landing table (52), and the waist pulling unit (11) is con-

- connected to a fixed pulling position (15) fitted on the landing table (52) and configured to pull the waist holding unit (6) from below the buttock portion (9) in a predetermined angle against the backrest (2) with the seat (1) keeping user's lower body.
2. The chair-shaped lumbar vertebra traction device in accordance with claim 1, wherein the waist holding unit (6) is fixed on the loin guard (8) and the waist pulling unit (11) pulls the waist holding unit (6) in order to prevent the portion of the waist holding unit (6) placed in contact with user's stomach side from twisting toward the user's upper body side with the connection between the waist holding unit (6) and the loin guard (8) acting as a fulcrum.
3. The chair-shaped lumbar vertebra traction device in accordance with claim 1 or 2, wherein the waist pulling unit (11) is configured for pulling the waist holding unit (6) using a wire or belt attached to the waist holding unit (6).
4. The chair-shaped lumbar vertebra traction device in accordance with claim 3, wherein the waist pulling unit (11) is attached to the part of the waist holding unit (6) contacting the user's iliac crest.
5. The chair-shaped lumbar vertebra traction device in accordance with any one of claims 1 to 4, wherein the operation of the waist pulling unit (11) is linked with the operation of the separating drive unit (5).
6. The chair-shaped lumbar vertebra traction device in accordance with any one of claims 1 to 5, wherein the waist pulling unit (11) is further on connected to the upper body holding unit (7) or the backrest (2).
7. The chair-shaped lumbar vertebra traction device in accordance with claim 5 or 6, wherein an attachment angle of the buttock portion (9) against the loin guard (8) can be changed and the pulling angle of the waist holding unit (6) relative to the backrest (2) is kept constant irrespective of the attachment angle of the buttock portion (9) against the loin guard (8).
8. The chair-shaped lumbar vertebra traction device in accordance with any one of claims 1 to 7, wherein an attachment angle of a lower leg rest portion (10) of the seat (1) to the buttock portion (9) can be changed.
9. The chair-shaped lumbar vertebra traction device in accordance with any one of claims 1 to 8; further comprising:
- a shoulder wall (61) for suppressing an upward movement of user's shoulder; and
- an arm side wall (62) for suppressing an upward movement of user's arm.
10. The chair-shaped lumbar vertebra traction device in accordance with any one of claims 1 to 9, wherein the backrest (2), in the treatment position, is inclined upward by at least about 10 degrees from the horizontal level.
11. The chair-shaped lumbar vertebra traction device in accordance with claim 9 or 10, wherein the loin guard (8) is movable on the landing table (52) and connected with the backrest (2) by an elastic means (69).

Patentansprüche

1. Stuhlförmige Lendenwirbeltraktionsvorrichtung, umfassend:
- eine Oberkörperhalteeinheit (7), um den Oberkörper eines Benutzers an einer Rückenlehne (2) zu halten;
- einen Sitz (1) mit einem Gesäßabschnitt (9), einer Lendenführung (8) und einem Unterschenkelruheabschnitt (10);
- eine Taillenhalteeinheit (6) zum Halten der Taille des Benutzers;
- eine Trennantriebseinheit (5), um die Rückenlehne (2) und den Sitz (1) voneinander zu trennen;
- einen Podesttisch (52), wobei der Sitz (1) und die Rückenlehne (2) auf den Podesttisch aufgesetzt sind;
- einen Neigungsmechanismus (4) zum Neigen des Podesttisches (52) in eine Behandlungsposition, und
- eine Taillenzugeinheit (11) zum Ziehen der Taillenhalteeinheit (6) in Richtung der Seite des Gesäßabschnitts (9),
- wobei die Oberkörperhalteeinheit (7) entlang der Rückenlehne (2) geschoben werden kann, um die richtige Position für die Größe des Benutzers einzustellen, sich die Lendenführung (8) des Sitzes (1) frei auf dem Podesttisch (52) bewegen kann und die Taillenzugeinheit (11) mit einer an dem Podesttisch (52) angebrachten festen Zugposition (15) verbunden ist, und dazu ausgestaltet, die Taillenhalteeinheit (6) von unterhalb des Gesäßabschnitts (9) in einem vorbestimmten Winkel gegen die Rückenlehne (2) zu ziehen, wobei der Sitz (1) den Unterkörper des Benutzers hält.
2. Stuhlförmige Lendenwirbeltraktionsvorrichtung nach Anspruch 1, wobei die Taillenhalteeinheit (6) an der Lendenführung (8) befestigt ist und die Taillenzugeinheit (11) die Taillenhalteeinheit (6) zieht,

um zu verhindern, dass der im Kontakt mit der Bauchseite des Benutzers platzierte Abschnitt der Taillenhalteeinheit (6) in Richtung der Oberkörperseite des Benutzers verdreht wird, wobei die Verbindung zwischen der Taillenhalteeinheit (6) und der Lendenführung (8) als ein Drehpunkt fungiert.

3. Stuhlförmige Lendenwirbeltraktionsvorrichtung nach Anspruch 1 oder 2, wobei die Taillenzugeinheit (11) zum Ziehen der Taillenhalteeinheit (6) unter Verwendung eines an der Taillenhalteeinheit (6) befestigten Drahtes oder Gurtes ausgestaltet ist. 5
4. Stuhlförmige Lendenwirbeltraktionsvorrichtung nach Anspruch 3, wobei die Taillenzugeinheit (11) an dem Teil der Taillenhalteeinheit (6) angebracht ist, der den Deckenkamm des Benutzers kontaktiert. 10
5. Stuhlförmige Lendenwirbeltraktionsvorrichtung nach einem der Ansprüche 1 bis 4, wobei der Betrieb der Taillenzugeinheit (11) mit dem Betrieb der Trennantriebseinheit (5) verbunden ist. 15
6. Stuhlförmige Lendenwirbeltraktionsvorrichtung nach einem der Ansprüche 1 bis 5, wobei die Taillenzugeinheit (11) ferner mit der Oberkörperhalteeinheit (7) oder der Rückenlehne (2) verbunden ist. 20
7. Stuhlförmige Lendenwirbeltraktionsvorrichtung nach Anspruch 5 oder 6, wobei ein Anbringungswinkel des Gesäßabschnitts (9) relativ zur Lendenführung (8) verändert werden kann und der Zugwinkel der Taillenhalteeinheit (6) relativ zur Rückenlehne (2) ungeachtet des Anbringungswinkels des Gesäßabschnitts (9) relativ zur Lendenführung (8) konstant gehalten wird. 25
8. Stuhlförmige Lendenwirbeltraktionsvorrichtung nach einem der Ansprüche 1 bis 7, wobei ein Anbringungswinkel eines Unterschenkelruheabschnitts (10) des Sitzes (1) an dem Gesäßabschnitt (9) verändert werden kann. 30
9. Stuhlförmige Lendenwirbeltraktionsvorrichtung nach einem der Ansprüche 1 bis 8, ferner umfassend: 35
 - eine Schulterwand (61) zum Unterdrücken einer Aufwärtsbewegung einer Schulter des Benutzers; und 40
 - eine Armseitenwand (62) zum Unterdrücken einer Aufwärtsbewegung eines Armes des Benutzers. 45
10. Stuhlförmige Lendenwirbeltraktionsvorrichtung nach einem der Ansprüche 1 bis 9, wobei die Rückenlehne (2) in der Behandlungsposition um mindestens etwa 10 Grad von der horizontalen Ebene 50

nach oben geneigt ist.

11. Stuhlförmige Lendenwirbeltraktionsvorrichtung nach Anspruch 9 oder 10, wobei die Lendenführung (8) auf dem Podesttisch (52) bewegbar und mit der Rückenlehne (2) durch ein elastisches Mittel (69) verbunden ist. 5

10 Revendications

1. Dispositif d'exercice d'une traction sur une vertèbre lombaire présentant la forme d'une chaise, comprenant : 10

une unité de maintien de la partie supérieure du corps (7) pour maintenir la partie supérieure du corps d'un utilisateur sur un dossier (2);
 un siège (1) qui comporte une section d'assise fessière (9), une section d'appui pour les reins (8) et une section de repos pour la partie inférieure des jambes (10) ;
 une unité de maintien de la taille (6) pour maintenir la taille de l'utilisateur ;
 une unité d'entraînement de séparation (5) pour séparer le dossier (2) et le siège (1) l'un de l'autre ;
 une table de réception (52), le siège (1) et le dossier (2) étant positionnés sur la table de réception ;
 un mécanisme d'inclinaison (4) pour incliner la table de réception (52) pour l'amener dans une position de traitement ; et
 une unité pour tirer la taille (11) pour tirer l'unité de maintien de la taille (6) en direction du côté de la section d'assise fessière (9) ;
 dans lequel l'unité de maintien de la partie supérieure du corps (7) peut être coulissée le long du dossier (2) afin de régler la position appropriée pour la stature de l'utilisateur, la section d'appui pour les reins (8) du siège (1) peut être déplacée librement sur la table de réception (52), et l'unité pour tirer la taille (11) est connectée à une position pour tirer fixe (15) qui est prévue sur la table de réception (52) et est configurée pour tirer l'unité de maintien de la taille (6) depuis le dessous de la section d'assise fessière (9) selon un angle prédéterminé contre le dossier (2), le siège (1) conservant la partie inférieure du corps de l'utilisateur. 15

2. Dispositif d'exercice d'une traction sur une vertèbre lombaire présentant la forme d'une chaise selon la revendication 1, dans lequel l'unité de maintien de la taille (6) est fixée sur la section d'appui pour les reins (8) et l'unité pour tirer la taille (11) tire l'unité de maintien de la taille (6) afin d'empêcher que la section de l'unité de maintien de la taille (6) qui est 20

placée en contact avec le côté de l'estomac de l'utilisateur ne réalise une torsion en direction du côté de la partie supérieure du corps de l'utilisateur, la connexion entre l'unité de maintien de la taille (6) et la section d'appui pour les reins (8) jouant le rôle de point d'appui pour un mouvement de pivotement.

3. Dispositif d'exercice d'une traction sur une vertèbre lombaire présentant la forme d'une chaise selon la revendication 1 ou 2, dans lequel l'unité pour tirer la taille (11) est configurée pour tirer l'unité de maintien de la taille (6) en utilisant un élément filaire ou une sangle qui est fixé(e) à l'unité de maintien de la taille (6). 5
4. Dispositif d'exercice d'une traction sur une vertèbre lombaire présentant la forme d'une chaise selon la revendication 3, dans lequel l'unité pour tirer la taille (11) est fixée à la partie de l'unité de maintien de la taille (6) qui est en contact avec la crête iliaque de l'utilisateur. 10
5. Dispositif d'exercice d'une traction sur une vertèbre lombaire présentant la forme d'une chaise selon l'une quelconque des revendications 1 à 4, dans lequel le fonctionnement de l'unité pour tirer la taille (11) est lié au fonctionnement de l'unité d'entraînement de séparation (5). 15
6. Dispositif d'exercice d'une traction sur une vertèbre lombaire présentant la forme d'une chaise selon l'une quelconque des revendications 1 à 5, dans lequel l'unité pour tirer la taille (11) est en outre connectée à l'unité de maintien de la partie supérieure du corps (7) ou au dossier (2). 20
7. Dispositif d'exercice d'une traction sur une vertèbre lombaire présentant la forme d'une chaise selon la revendication 5 ou 6, dans lequel un angle de fixation de la section d'assise fessière (9) contre la section d'appui pour les reins (8) peut être modifié et l'angle de traction de l'unité de maintien de la taille (6) par rapport au dossier (2) est maintenu constant indépendamment de l'angle de fixation de la section d'assise fessière (9) contre la section d'appui pour les reins (8). 25
8. Dispositif d'exercice d'une traction sur une vertèbre lombaire présentant la forme d'une chaise selon l'une quelconque des revendications 1 à 7, dans lequel un angle de fixation d'une section de repos pour la partie inférieure des jambes (10) du siège (1) par rapport à la section d'assise fessière (9) peut être modifié. 30
9. Dispositif d'exercice d'une traction sur une vertèbre lombaire présentant la forme d'une chaise selon l'une quelconque des revendications 1 à 8, compre- 35

nant en outre :

une paroi pour l'épaule (61) pour atténuer, voire supprimer, un déplacement vers le haut d'une épaule de l'utilisateur ; et
une paroi latérale pour le bras (62) pour atténuer, voire supprimer, un déplacement vers le haut d'un bras de l'utilisateur.

10. Dispositif d'exercice d'une traction sur une vertèbre lombaire présentant la forme d'une chaise selon l'une quelconque des revendications 1 à 9, dans lequel le dossier (2), dans la position de traitement, est incliné vers le haut d'au moins environ 10 degrés par rapport au niveau horizontal. 40
11. Dispositif d'exercice d'une traction sur une vertèbre lombaire présentant la forme d'une chaise selon la revendication 9 ou 10, dans lequel la section d'appui pour les reins (8) peut être déplacée sur la table de réception (52) et est connectée avec le dossier (2) à l'aide d'un moyen élastique (69). 45

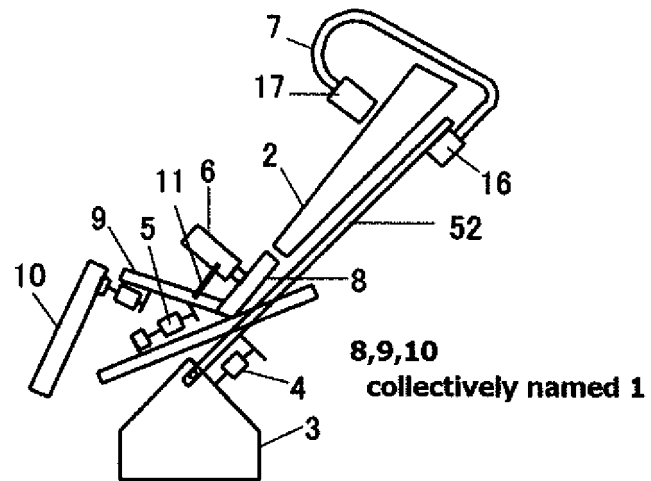


FIG. 1

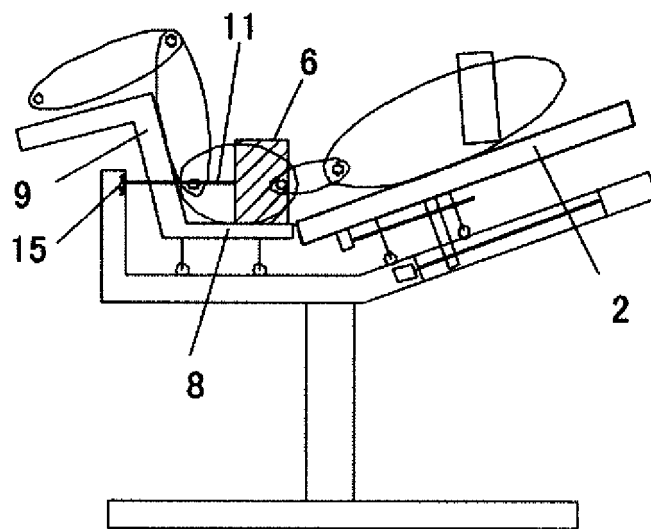


FIG. 2

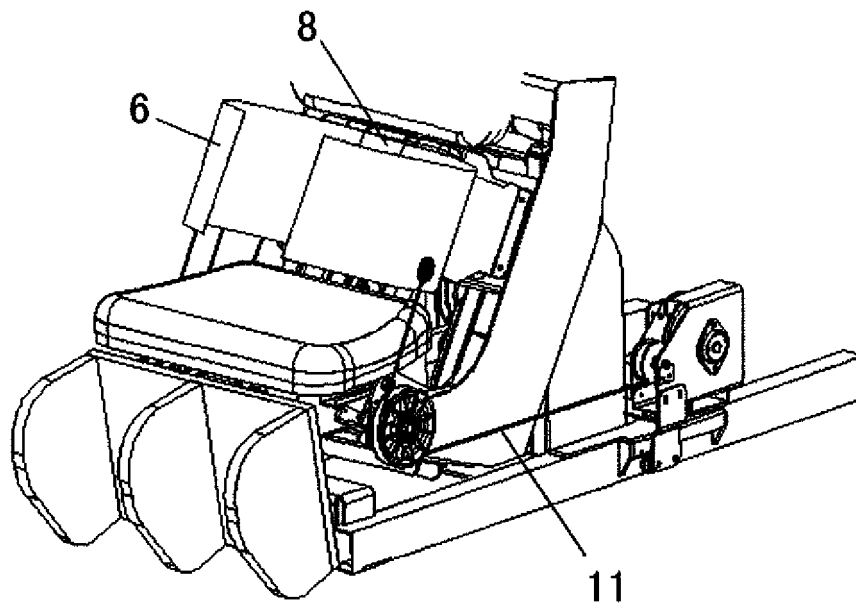


FIG. 3

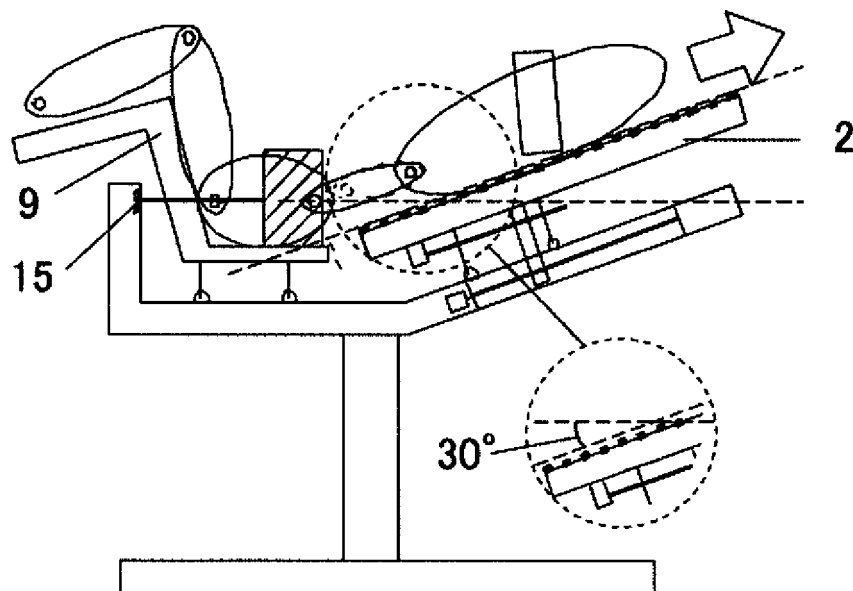


FIG. 4

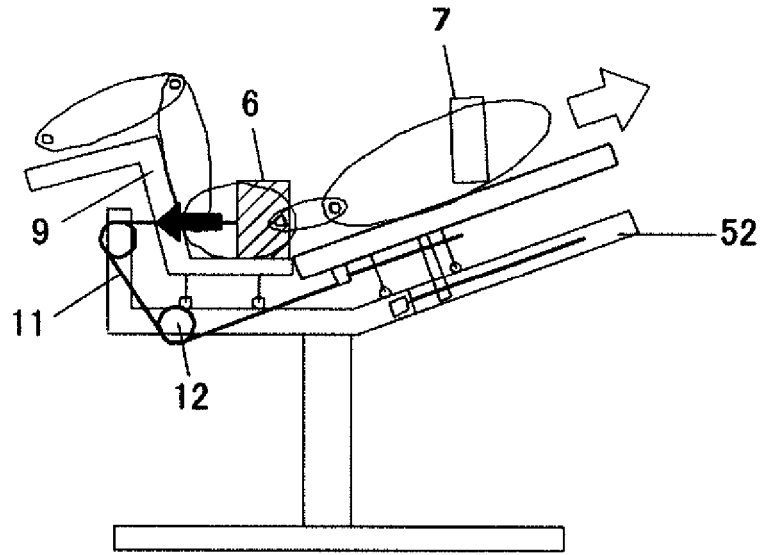


FIG. 5

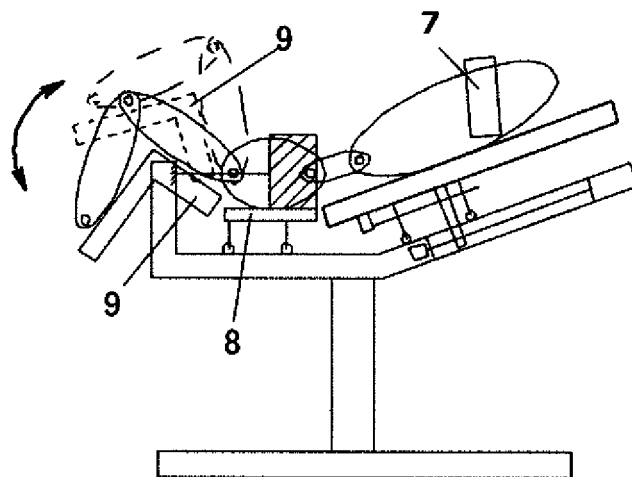


FIG. 6

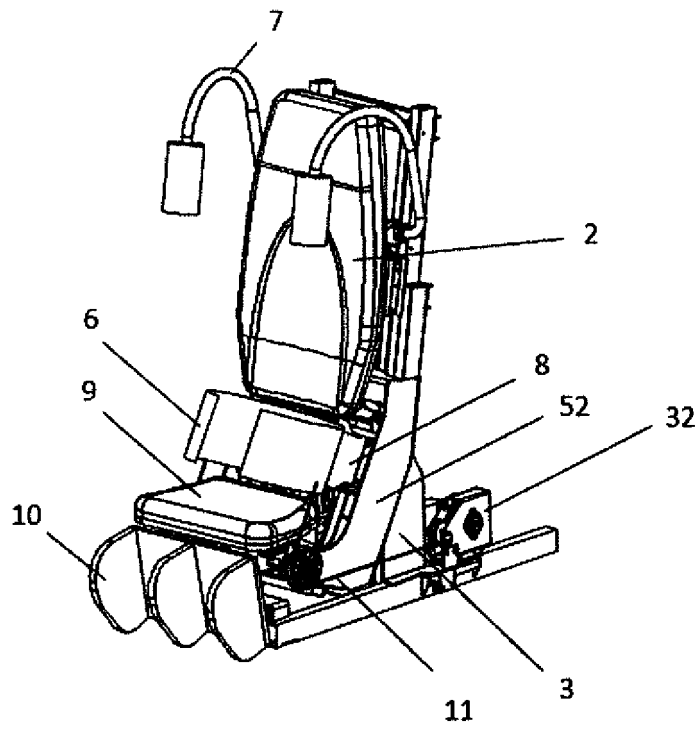


FIG. 7

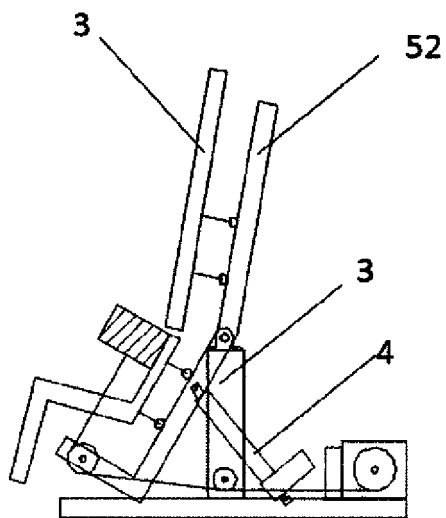


FIG. 8a

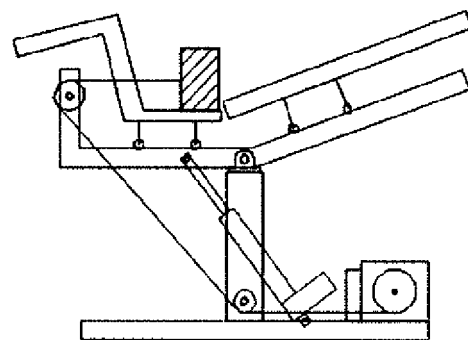


FIG. 8b

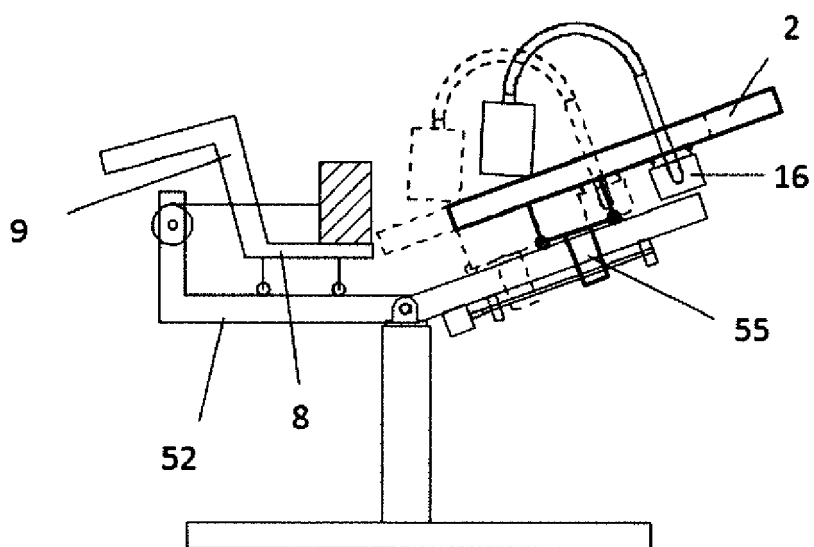
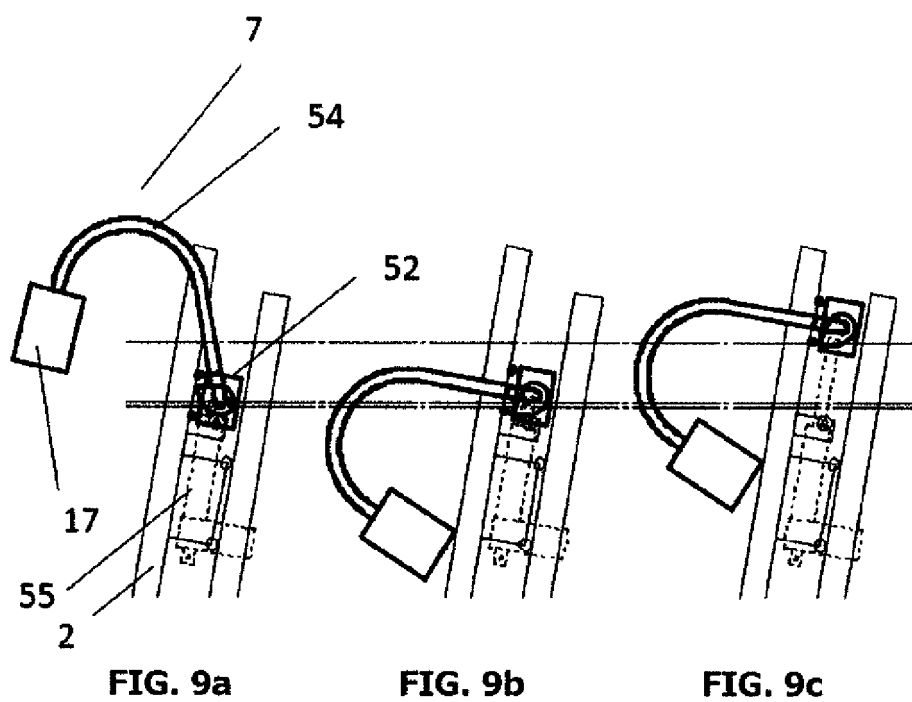


FIG. 10

FIG. 11

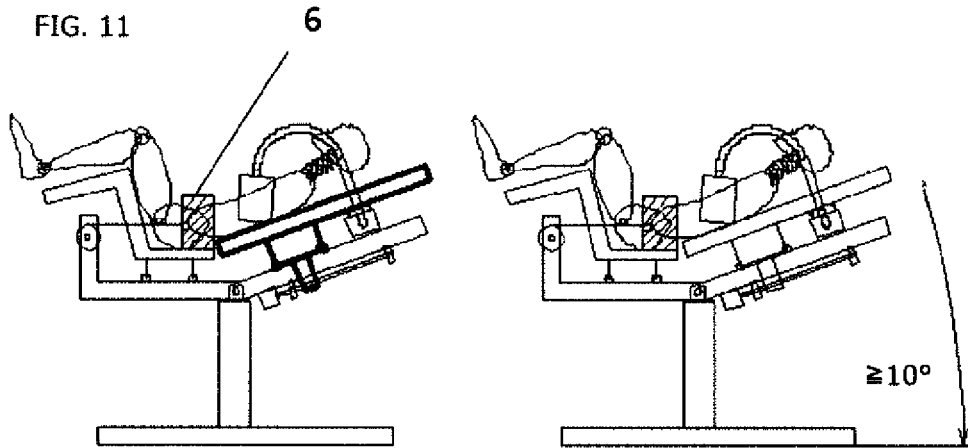


FIG. 11a

FIG. 11b

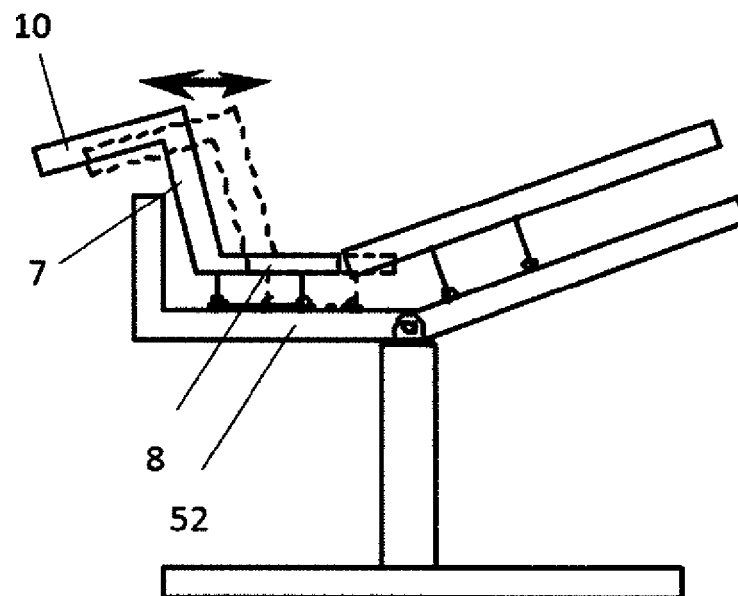


FIG. 12

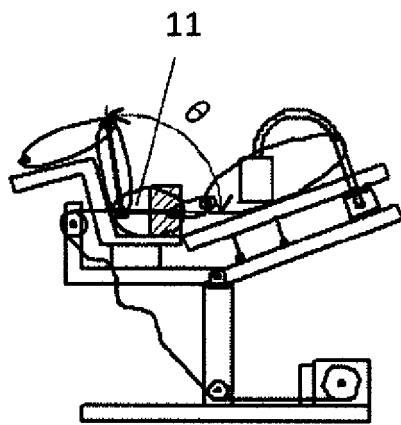


FIG. 13a

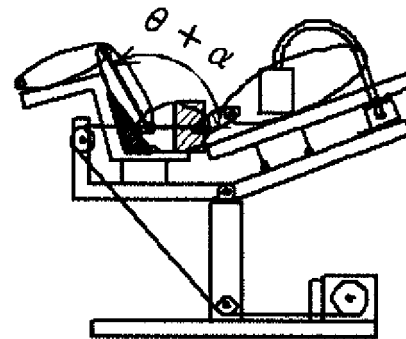


FIG. 13b

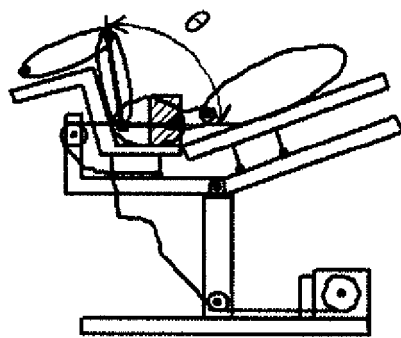


FIG. 13c

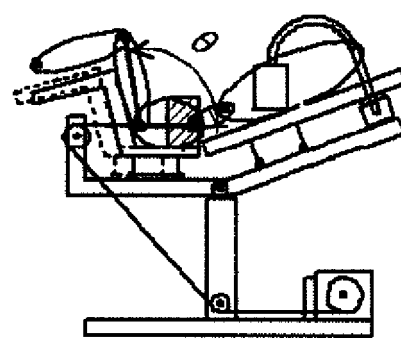


FIG. 13d

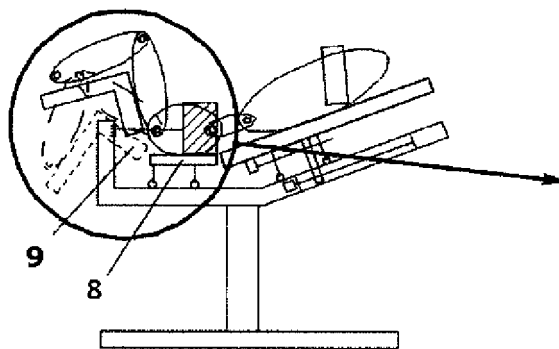


FIG. 14a

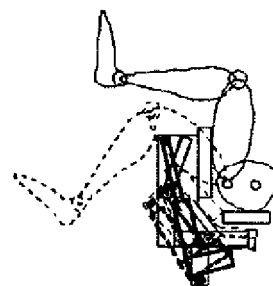


FIG. 14b

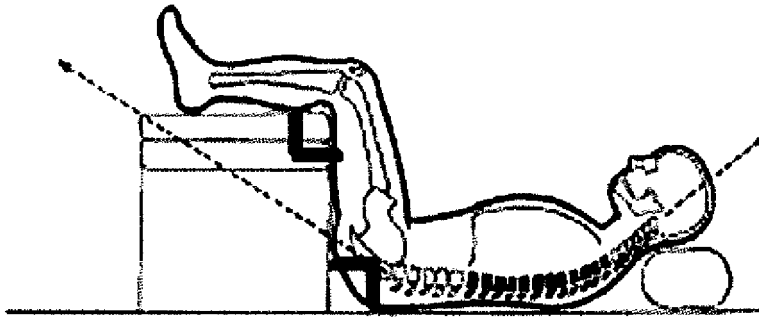


FIG. 15

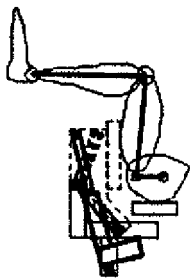


FIG. 16a

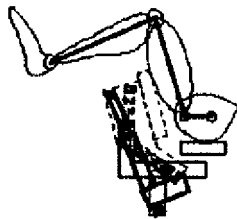


FIG. 16b

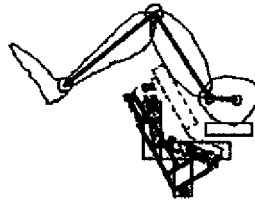


FIG. 16c

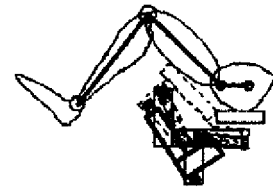


FIG. 16d

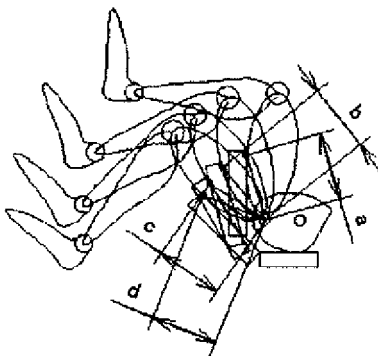


FIG. 17a

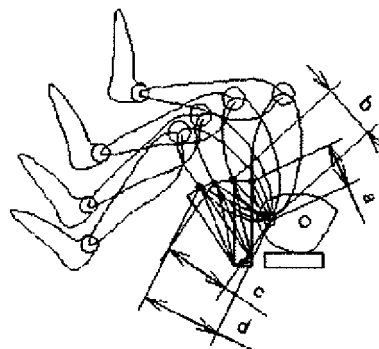


FIG. 17b

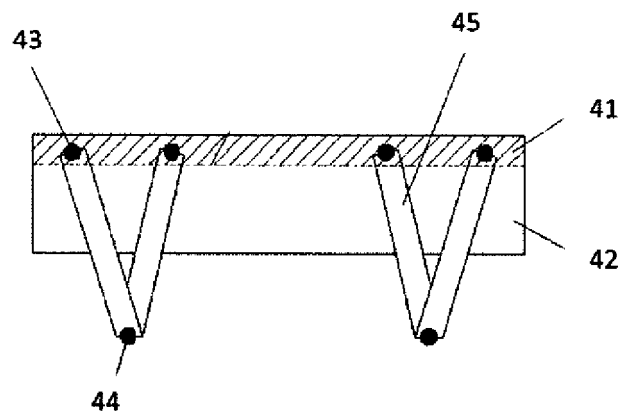


FIG. 18

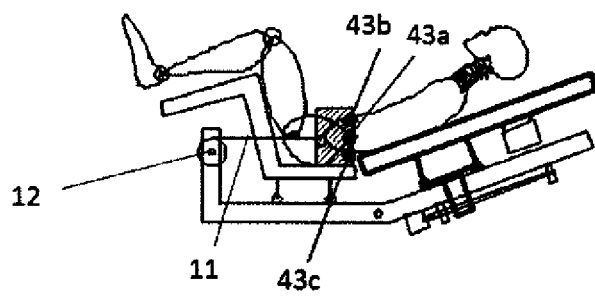


FIG. 19a

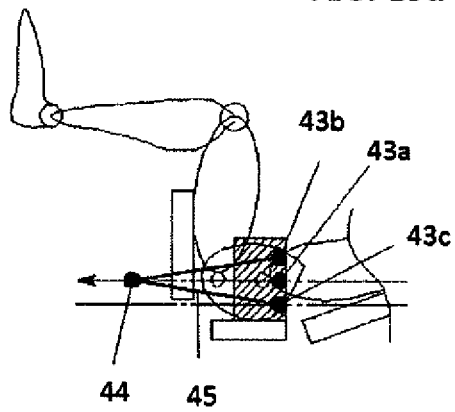


FIG. 19b

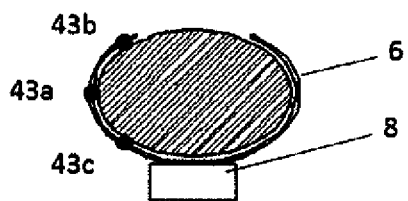


FIG. 19c

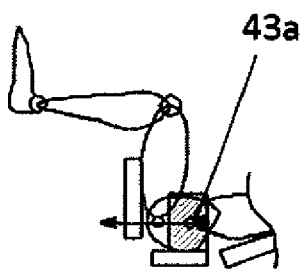


FIG. 20a

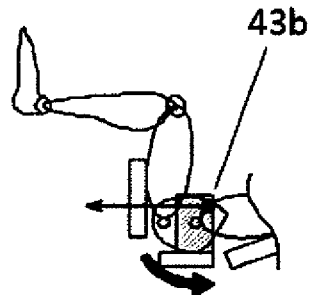


FIG. 20b

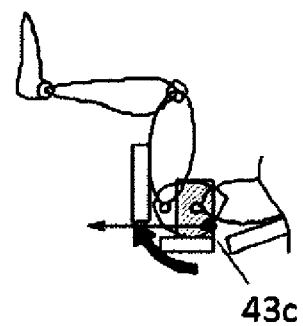


FIG. 20c

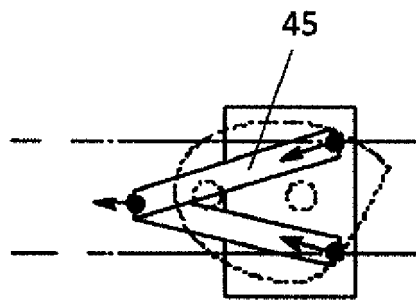


FIG. 21a

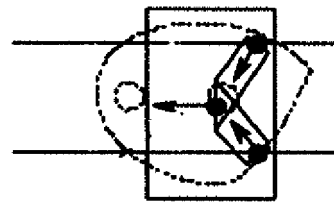


FIG. 21b

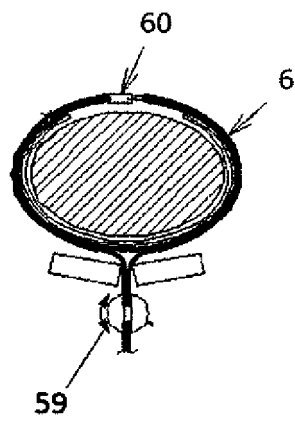


FIG. 22a

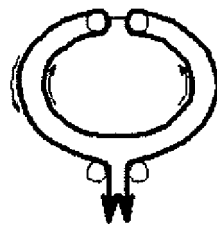


FIG. 22b

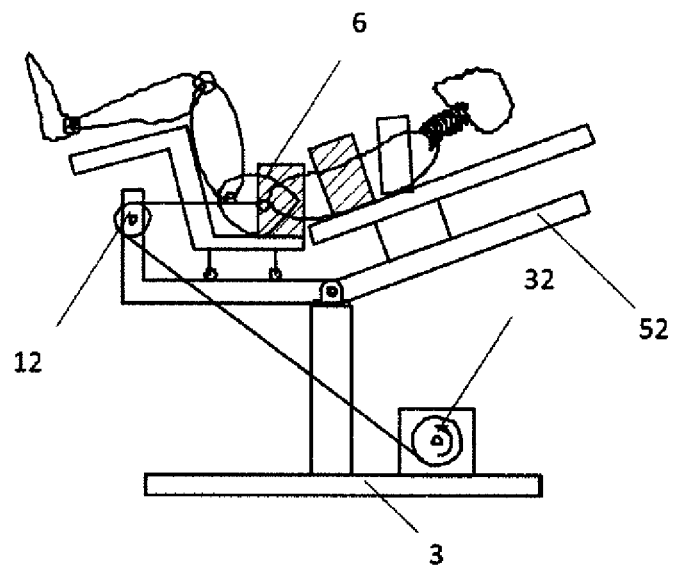


FIG. 23

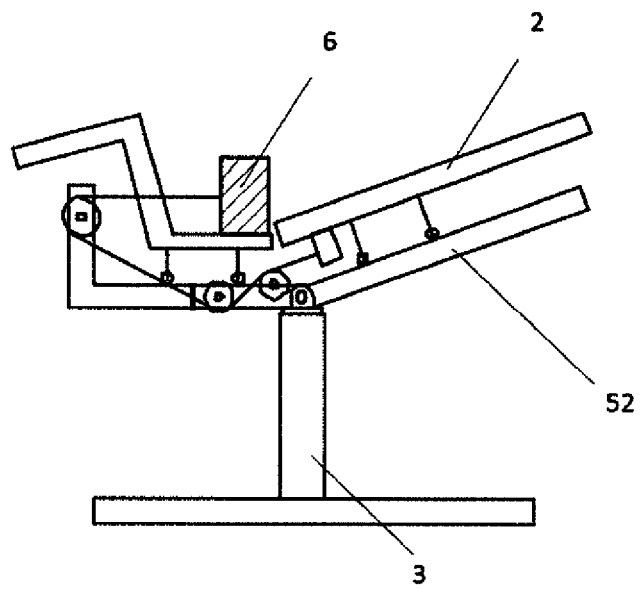
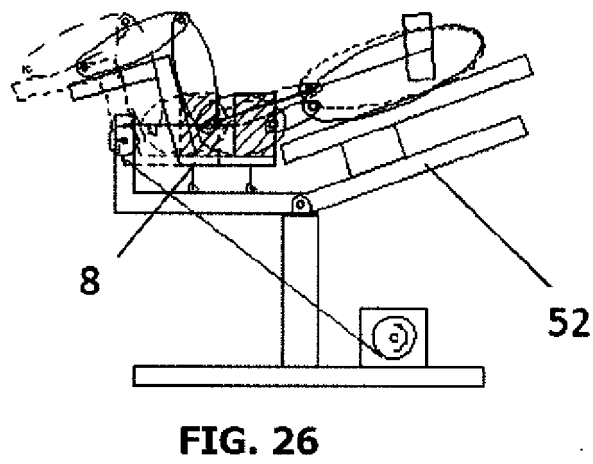
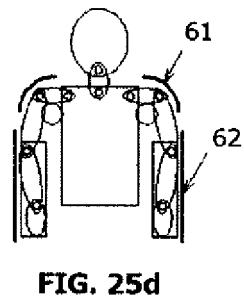
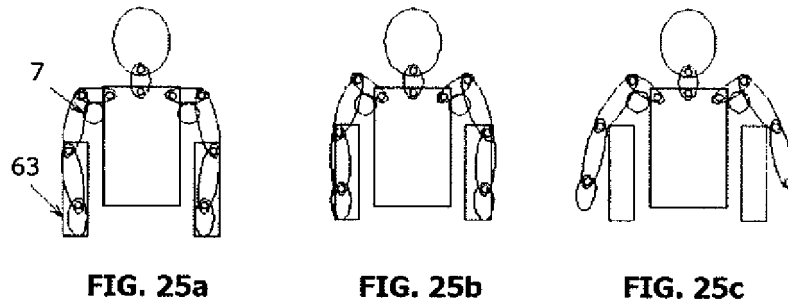


FIG. 24



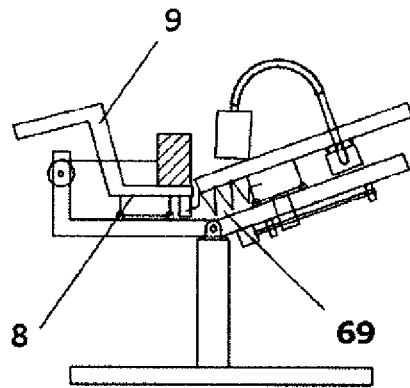


FIG. 27a

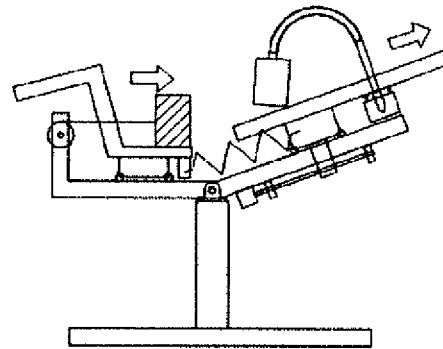


FIG. 27b

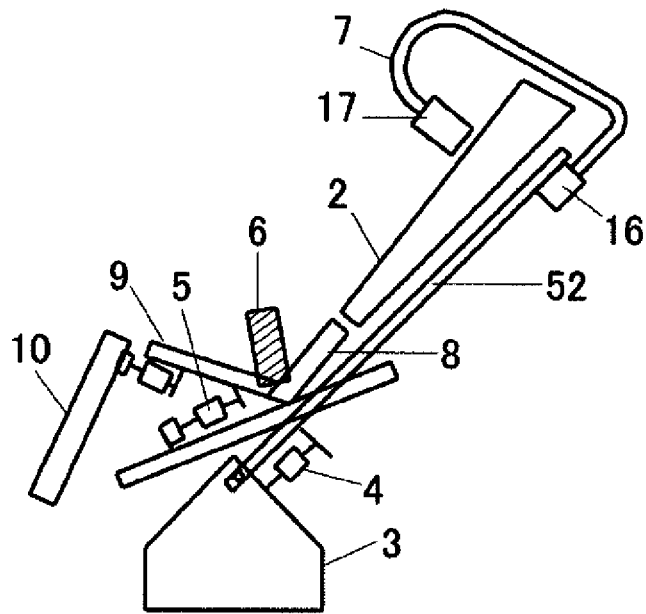


FIG. 28

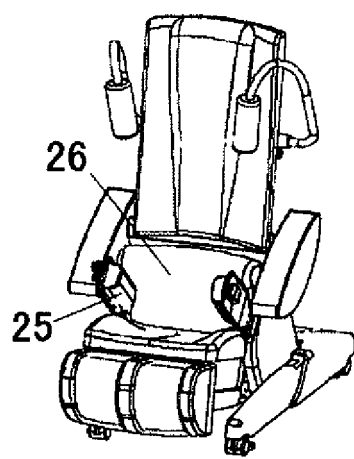


FIG. 29a

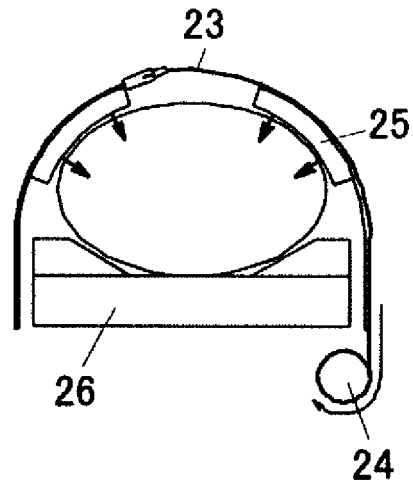


FIG. 29b

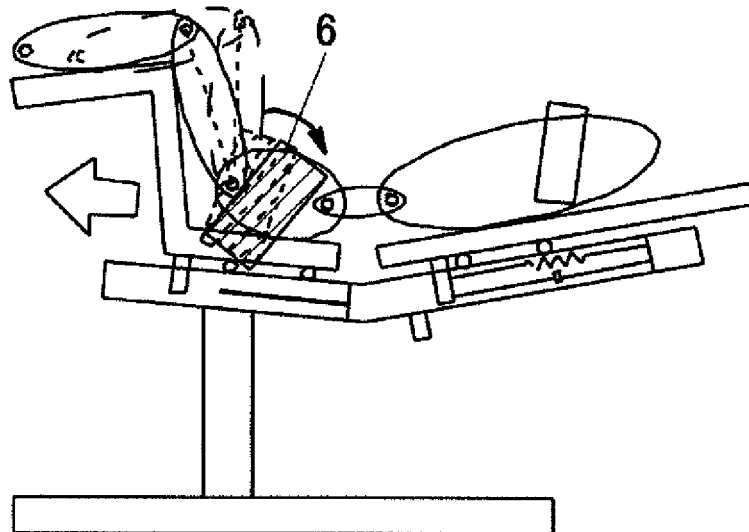


FIG. 30

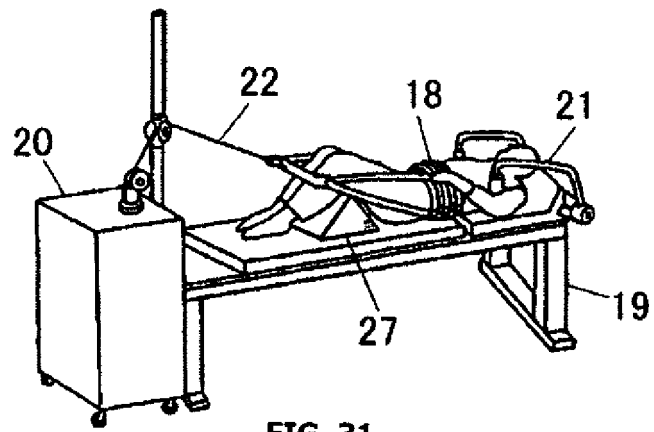


FIG. 31

REFERENCES CITED IN THE DESCRIPTION

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