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Amended claims in accordance with Rule 137(2) EPC.

(54) **Stretching bank for health purposes**

(57) Stretching bank (10, 11) for health purposes, provided with a rigid bank (11) with horizontal basic position and allowing a patient to lie thereon, the bank can be inclined around a pivot hinge (31) with an axis being in the center of gravity or close thereto, the bank (11) is connected to a support frame (12), and a bracket arm (13) is coupled to a first end of the bank (11) holding and connecting the head or feet of the patient to the bank (11), the angular position of the bank (11) can be changed continuously between the horizontal plane and a maximum inclined position by means of a hinge (33) placed at a distance from the center of gravity, the bank (11) is coupled to a positioning assembly that provides for the adjustment of the angular position and is controlled by a switch (15) operated by the patient and which allows angular movement in both directions and fixing the bank (11) in any adjusted position.

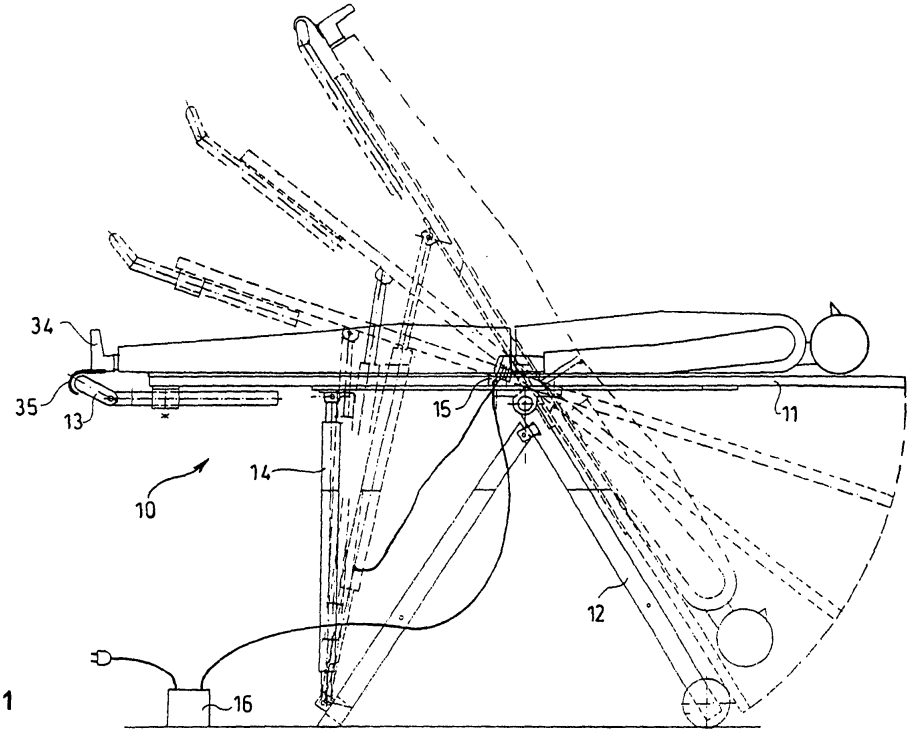


Fig. 1

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Description

[0001] The invention relates to a stretching bank for health purposes comprising a rigid bank with horizontal basic position and allowing a patient to lie thereon, and a support frame connected to the rigid bank wherein the angular position of the rigid bank can be adjusted.

[0002] The symptoms of different problems and diseases of the spinal system (e.g. hernia of the vertebral disks) can be decreased in a known way by therapeutic gymnastic because muscles strengthened by the physical exercises take up the load acting on the ill or injured areas. In the more serious or advanced status of the disease the conventional treatment using no drugs try to cure the symptoms by a kind of stretching the spinal area. For this purpose the application of weight-bath is a widely used method, however, there are differing opinions concerning its efficiency, and state-of-the-art medicine does not prefer weight-bath owing to the associated disadvantages. In connection with stretching exercises difficulties come from the mutually contradictory requirements of providing an appropriate stretching force and taking off the load acting on the spine, because the sick spine cannot be stretched over a limit, and during the treatment the normal vertical load acting on the spine should be neutralized. It is not indifferent whether the direction of the stretching force acts from the head towards the feet or in opposite sense.

[0003] As a consequence of the above grounds stretching has not become a usual treatment for such problems, whereas remedial gymnastics, gymnastics in water and a suitably controlled conduct of life appear as appropriate spinal treatment, not counting here the use of analgesics, the administration of antiphlogistic drugs and treatment by surgery.

[0004] Several embodiments of beds and training devices are known which have adjustable angle of inclination, such devices are used e.g. as operational tables, X-ray or other instrumental examinations, and in training centers, especially for strengthening the abdominal muscles. The actual design of such beds and banks depend primarily on the intended purpose of use and accordingly the fixing of the position of the patient thereon may be different.

[0005] The patent specification HU 210 482 B describes a turning device for medical applications with adjustable angular position, wherein a fairly great distance is provided between the plane of the bank and the axis of rotation, and the subject lying on the bank can control the inclination of the bank by pulling a pair of handles by force, wherein the handles are fixed to the bank and their height is adjustable. The position of the bank is fixed only by the force acting on the handles and such a design is fairly dangerous and its use is not comfortable. In inclined position the position of the patient is fixed by two support members holding his/her feet. Such a positioning is not comfortable, provides an excess load on the feet and there is an increased danger for the feet to slip or turn out from the support members.

[0006] The publication US 2007/0093367 Al describes a bank for gymnastic and stretching purposes, wherein one end is placed on the ground and the other end can be raised by means of a telescope which can exert force only in one direction. The surface of the bank is designed in such a way that different sections of the overlying body is supported in different heights, and the body when lying thereon in an inclined position is supported against sliding down by means of a cross bar holding the feet. As a consequence of the support that correspond to the shape of the body, in spite of the inclined position the stretching force does not act primarily in longitudinal direction but provides a bias for the body to take an arced shape, therefore such a design cannot be recommended for pure stretching applications. The inclined bank can return to the horizontal position under the combined weight of the subject and the bank when the telescope is released. Here the speed of the return movement cannot be adjusted and this increases the chances of an accident.

[0007] The German publication DE 3201 334 describes also a bank that can be turned around an axis spaced from the center of gravity, in which the inclined position is provided by a telescope or positioning motor and the return occurs under the effect of the combined weight of the patient and the bank. The telescope has to exert a relatively high force to provide the inclined position whereas the return movement occurs when the telescope is released; therefore the speed of return can hardly be controlled. A further drawback of the bank is that the patient is fixed in longitudinal position also by clamping the feet, which is unpleasant and increases the danger of accidents, and difficulties are connected with the secure positioning in case of differing feet sizes.

[0008] Further designs are disclosed in the patent US 4 913 424 and patent publication US 2007/0040078, in which there is a substantial distance between the axis of rotation and the center of gravity. Both designs have the drawback that the bank can be moved in the first direction under the effect of comparatively high forces, and in the other direction the return movement is made possible under the combined weight of the patient and of the bank. Here the aforementioned problem is experienced concerning the difficulty of the adjustment of the speed of return. The longitudinal position of the patient is fixed also by the clamping of the feet which is connected with the above described problems.

[0009] The task of the invention is to provide a health apparatus that can simultaneously ensure the stretching and the balancing of the load in an extent adjusted by the patient himself, which is comfortable, requires minimum amount of controlled force in both directions (i.e. both during the tilting and returning movements), and wherein the longitudinal positioning of the patient can be solved in a comfortable and stable way independent from the height and foot size of the patient.

[0010] For solving this task it has been recognized if the patient is fixed by his/her feet on a horizontal bank

and the angular position of the bank is inclined around the center of gravity or an axis close thereto in a way controlled by the patient, then the turning can be carried out in a comfortable way requiring the use of minimum amount of force, and the apparatus can be stopped and held in a stable way in any angular position then turned further in any required direction. It is preferable to fix the position of the patient by a suitable device attached around his/her leg and not at the feet, which provides a comfortable and reliable positioning. According to our experiences the position-fixing at the legs is very advantageous.

[0011] According to the invention a stretching bank has been provided for health treatments that comprises a rigid bank with horizontal basic position and which allows for the patient to lie thereon, a support frame is connected to the rigid bank wherein the angular position of the rigid bank can be adjusted around an axis, and a patient holding assembly is coupled to the rigid bank for fixing the longitudinal position of the patient, and according to the invention the bank and the support frame are interconnected by means of one or more pivot hinges having an axis including the centre of gravity of the mass rotated or this axis is spaced by at most a predetermined small distance in either longitudinal or normal direction from said centre; a positioning assembly is provided between the bank and the support frame allowing changing of the angular position of the bank and being capable of exerting force in both directions and can be stopped at any required position to keep that position in a stable manner, the positioning assembly is coupled to the lower part of the bank at a position being spaced from the axis of the pivot hinge by means of a second hinge, a bracket arm is connected to a first end of the bank to which a collar strap is connected by means of a hook in a releasable way, the collar strap is placed either around the neck or the feet of the patient, a multi-positioned control switch is coupled to the bank or to the support frame that can be operated by the patient, the control switch is connected to the positioning assembly, whereby the angle of inclination of the bank can be continuously adjusted between the horizontal position and a maximum inclined position and can be fixed in any one of the adjusted positions.

[0012] In a preferable embodiment the positioning assembly is constituted by a telescope rod driven by a motor and having a first end coupled in a pivoted way to central portion of the end part of the bank which is close to the bracket arm and the second end is coupled in a pivoted way to the central portion to a lower cross-bar, the lower cross-bar interconnects the legs of the support frame which are closer to the bracket arm.

[0013] In a preferable construction a pair of support rods are connected to the lower surface of the bank, the rods extend in parallel to the two sides of the bank, the pivot hinges are coupled to the central part of the rods, the support frame comprises a pair of front and a pair of rear legs that can be opened in a V-shape till a limiting end position, the legs are interconnected at their upper regions by means of pivot shafts determining the end positions, and the legs are interconnected above the pivot shafts by means of an upper cross-bar, and the upper cross-bar extends through the pivot hinges connected to the support rods.

[0014] The adjustment which depends from the height of the patient is provided in such a way that the bracket arm is connected in an adjustable distance to the first end of the bank.

[0015] For facilitating moving and transporting of the stretch bank wheels are attached to two of the legs of the support frame.

[0016] The use is facilitated by providing a lower step bank that can be placed beside the support frame for making easier for the patient to step on the bank.

[0017] In a preferred embodiment the collar strap surrounds the legs of the patient around the ankles, it has a Velcro-type tear up closure and a soft lining, and the hook is attached to the exterior of the collar strap with a force bearing connection.

[0018] The stretching bank according to the invention will now be described in connection with exemplary embodiments, wherein reference will be made to the accompanying drawings. In the drawing:

Fig. 1 shows schematically the side view of the stretching bank in different positions;
Fig. 2 shows the top view of the stretching bank;
Fig. 3 is the elevation view of the stretching bank;
Fig. 4 shows the side view of the stretching bank in initial and final positions;
Fig. 5 is a simplified perspective view of the inclined stretching bank with a step bank in front of it; and
Fig. 6 shows the perspective view of the collar strap with the hook attached thereon.

[0019] The side view of Fig. 1 shows stretching bank 10 in its horizontal basic position as illustrated by the full line, and in its extreme inclined position and in two intermediate positions which latter inclined positions are shown with dashed lines. The main parts of the stretching bank 10 are constituted by bank 11, a support frame 12 connected by one or more pivot hinges 31 to the bank 11 so that the bank 11 is pivoted at or near to its centre of gravity line, bracket arm 13 connected to one end of the bank 11, a telescope rod 14 hinged at both ends for connecting the support frame 12 and the bank, a control switch 15 adapted to control the movement of an electric or hydraulic motor moving the telescope and arranged on or close to the bank 11 and finally a power supply 16 for providing energy required for moving the telescope. Fig. 1 shows schematically the subject lying on the bank 11 and the legs of the subject are held by respective collar straps 34 encircling his or her ankles or shanks shown in the enlarged view of Fig. 6, and the collar straps 34 are connected to respective hooks 35 which can be brought in engagement with the bracket arm 13 on the

bank 11 to fix the position of the subj ect on the bank 11. The position of the centre of gravity line should be determined by taking account of the weight and weight distribution of the subject on the bank 11 and the pivot hinge 31 or if a pair of hinges 31 are used have a common axis extending in transversal direction and the axis is arranged just below or in a short distance from the centre of gravity line. Naturally the axis of the hinges 31 can be slightly offset in longitudinal direction with the centre of gravity line. By such an arrangement of the axis of the hinges 31 the bank 11 can be inclined from the horizontal basic position by applying a small force and the fixing of such an inclined position also requires a small force.

[0020] Figs. 2 and 3 show the design of the stretching bank 10. The bank 11 is designed to be similar to an ironing bank, it has a larger upper surface and it is made preferably by wood or by a metal plate, it can be provided by a metal frame for providing the required rigidity, and the upper surface is slightly upholstered e.g. by having a foam sheet to provide a soft lying surface and the foam can be covered with a thin white plastic cover layer. The surface of the bank 11 is therefore similar to the examination beds used in hospitals or clinics and to massage tables. On the top view of Fig. 2 it can be observed that two separate support assemblies are connected to the bottom of the bank 11 (the bank 11 covers these assemblies and they are shown with dashed line). The first support assembly uses support rods 20, 21 which have respective closed rectangular profiles, but they can be made by either L-profiled rods or by rods of any other profile, and the rods 20, 21 are connected by threaded bolts led through appropriate bores provided at the upper ends to the bottom of the bank 11. The task of this support assembly is to fix the upper end of the support frame 12. The support rods 20, 21 are parallel and they are spaced by about 60-75 % of the full width of the bank 11. The task of the second support assembly is to hold and fix the bracket arm 13. The associated fixing element 22 is attached in several locations to the bottom of the bank 11 close to the feet-holding end thereof. At both ends of the transverse rod of the fixing element 22 respective clamps are provided for holding and guiding the two end portions of the U-shaped bracket arm 13. In this way the distance of the transverse rod of the bracket arm 13 from the end of the bank 11 can be adjusted in longitudinal direction i.e. by loosening or fastening the clamps the bracket arm 13 can be moved within a predetermined distance range and can be fixed in any required position.

[0021] The upper end of the telescope rod 14 is pivoted to the bottom of the bank 11 close to the foot-holding end thereof. This can be made in the middle zone of the fixing element 22 if an appropriate hinged connection is provided for holding the upper end of the telescope rod, but the pivoted connection can also be realized in the middle of either one of the support rods 20, 21. The telescope rod 14 is designed to have a piston capable of exerting force in both directions, thus its control can both increase and decrease the full length of the telescope rod 14, and the telescope rod 14 can maintain and keep any adjusted position in a stable way, and it can produce force when being moved in any of the two directions.

[0022] The elevation view of Fig. 3 shows the bank 11, the support frame 12 and its cross-bar 23 connected to the support rods 20, 21, the fixing element 22 and the telescope rod 14, and finally legs 24, 25 of the support frame 12 and cross-member 26 connecting the lower region of the legs 24, 25. The support frame 12 comprises two pairs of feet extending in a V-form, and the two front legs under the shoulder of the patient and the cross-member interconnecting these legs are not visible in Fig. 3 as they are covered. What we can still see in Fig. 3 are wheels 27, 28 placed on the two ends of the lower cross-member which itself is in covered position.

[0023] The side views of Fig. 4 together with Figs. 1-3 show all details of the design of the stretching bank 10. Of the diverging V-shaped legs of the support frame 12 Fig. 4 shows the leg 24 which was previously covered by one of the front legs 29 which holds wheel 28 at the end of its horizontal cross-member. The legs (of which only the legs 24 and 29 are visible in Fig. 4) which converge in a V-shape in upward direction are interconnected and hinged by pivot shaft 30 and ensures that the legs cannot be opened further than their limited angular end position. Beyond the pivot shaft 30 the leg 29 extends in upward direction and so does the other front leg behind the leg 29 and they both reach the two pivot hinges 31 and are connected through these hinges 31 to the respective end regions of the upper cross-bar 26. The pivot hinge 31 makes the inclination of the bank 11 possible while its weight is predominantly held by the four legs of the support frame 12. The two ends of the telescope rod 14 are pivotally fixed at hinge 32 connected to the central portion of lower cross-bar 26 interconnecting the bottom of the two rear legs 24, 25 and at hinge 33 connected to the central portion of the fixing element 22 that holds the bracket arm 13. The pivot hinge 31 is arranged under or in the vicinity of the center of gravity line of the bank 11 with the subject lying thereon. Owing to this arrangement the angular inclination of the bank 11 takes place in an optimum balanced position and this requires the minimum force for any inclination and return from the inclined position.

[0024] Fig. 5 shows the schematic perspective view of the stretching bank 10 according to the present invention, wherein the bank is in inclined position. The power supply 16 has now been arranged in the central area of the bottom of the bank 11. In front of the stretching bank 10 a lower step bank 36 is provided that facilitates getting on and getting off the bank 11. Fig. 6 shows the enlarged perspective view of the collar strap 34 which is a flexible but partially rigid structure provided with a Velcro-type tear up closure that holds tightly but in a soft way the ankle region, and in open position it can be placed easily around the ankle and can be fastened by a simple pressure. Owing to such properties the collar strap 34 can be fitted to any size of the leg. There is a stable attachment

between the hook 35 and the lower part of the collar strap 34, and the hook 35 has an appropriate bow opening whereby it can easily engage the bracket arm 13 arranged over the end of the bank 11 with adjustable longitudinal position, whereby the position of the subject is firmly held when the position of the bank 11 is tilted.

[0025] The use and operation of the stretching bank according to the invention is as follows. In its initial position the elements of the stretching bank 10 can be placed in the plane of the bank 11, this requires only the releasable design of either one of the hinges 32, 33, and the tilting of the telescope rod 14 into the plane of the bank 11, furthermore the four legs can also be bent inwardly around the pivot hinge 31. In collapsed position the assembly can be moved easily by means of the wheels 27, 28 as if it was a barrow. During use the assembly should be folded out to take the position as shown in Fig. 4 when the legs take their open extreme position and provide a stable support. In ready basic position the length of the telescope rod 14 is chosen to ensure the horizontal position of the bank 11.

[0026] Before the treatment the patient should place on his/her legs the collar strap 34 which is similar to a pair of boots and with the straps 34 on he/she has to climb up by using the step bank 36 on the bank 11 and lie thereon, and he/she has to engage the hooks 35 on the legs in the cross-bar of the bracket arm 13. In this position his body is lying on the upper plane of the bank 11 and the bracket arm 13 holds the legs and feet in the same plane. In this way the subject lies comfortably on the bank 11 and one of his/her hands is located close to the control switch 15 that has preferably three positions. It is advantageous if the control switch 15 is fixed to the frame of the bank 11. The central position corresponds to the fixed state of the bank 11 when the electric or hydraulic motor coupled to the telescope rod 14 gets no control and the telescope rod 14 keeps therefore its actual position in a stable way. In the first position of the control switch 15 the length of the telescope rod 14 increases slowly in a continuous way because the motor is controlled to expand the rod. The expanding telescope rod 14 will gradually turn the bank 11 with the subject thereon around the pivot hinge 31 to take an inclined position. As a consequence, the angular position of the bank 11 will change as shown by the dashed lines in Figs. 1 and 4, the feet of the subject are moved higher and the head will take a lower position. The patient will feel the moment when the angle of inclination is just appropriate because in case of any further inclination the injured or sick vertebrae or vertebral disks provide a painful reaction. The patient will therefore fix the bank 11 in the optimum angular position and will stay in this position during the whole time of the treatment. The duration of the treatment should be chosen either in experimental way or according to the recommendations of the physician. In general, daily 1 or 2 treatments that last 5 to 15 minutes each are sufficient. As the treatment sessions progress, the patient will adjust steeper and steeper positions and will stay longer in each position. The return to the horizontal position can be controlled by adjusting the control switch 15 into the third position whereby the length of the telescopic rod 14 will be decreased. The electrical control comprises two end position switches which do not allow the inclination of the bank 11 over the horizontal position and also do not allow the bank 11 to move further to the steepest inclination which is set between about the angular position of 65-75°.

[0027] According to the invention the patient adjusts conveniently the required inclination himself since he feels which position matches the needs of his momentary status. The design is connected with substantial structural advantages because the patient is turned around his actual axis of gravity and to any angular position such a rotation provides the minimum displacement of the two ends of the bank 11 relative to the initial horizontal position. By providing a controlled inclination and return, the likelihood of accidents caused by the sudden return to the initial position is decreased which is otherwise customary at conventional banks that utilize the weight of the patient for the return because the speed of return is not controllable.

[0028] Naturally, in spite of the embodiments shown different technical solutions can be used concerning the design of the support frame and the way how the angular movement is solved in case it is made possible for the patient to adjust the angular position of the bank and to fix any adjusted position.

[0029] It should be noted that most vertebral problems can be treated in a most convenient way by the embodiment shown i.e. wherein the position of the subject is fixed at the feet and the head is moved in downward direction, however, the stretching can be provided even if the patient takes a fully turned position on the bank. In such a case the head will be at the bracket arm 13. Then a special U-shaped head and neck support has to be arranged between the bracket arm 13 and the bank 11 which supports and fixes the head and the neck of the patient. When the bank 11 is turned, the head of the patient will move in upward and his feet in downward direction, and owing to the fixed position of the neck a stretching force will act on the spine that depend on the angle of inclination. This kind of stretching is not as pleasant and useful according to our experience as in case of the illustrated opposite position, however, there can be individual problems which can be treated by such an arrangement.

[0030] The use of the stretching bank according to the invention has provided very outstanding increase in the status of the patients having different kinds of vertebral problems including hernia of the vertebral disks, and the improved condition could be maintained by a daily stretching for about 20-25 minutes, and the improvement made surgical intervention unnecessary.

[0031] The following example will illustrate such a case:

[0032] On January 8, 2007 a male patient aged 43

years having an intensive back-ache consulted a specialist because of his worsened position, and he was unable to get out of the bed. On April 18 a computer tomography (CT) examination established a protrusion of 7 mm at the vertebra L/4 filling the central and left recesses and at the vertebra L/5 a circular protrusion of 2 mm. The patient could not be left without taking pain-killers. The specialist doctor could not see any alternative treatment other than surgery and gave a date for the operation.

[0033] Instead of following the specialist's advice, the patient started using the stretching bank according to the invention. Even after the first day his pains decreased to a substantial extent and by the end of the third day all pains disappeared. Since that time he has not required any pain-killer.

[0034] Because the carefully started basic movements did not provoke pain, on the suggestion of the specialist the patient started remedial gymnastics under the conduct of a trained conductor as instructed by the specialist. Under the combined effect of using the stretching bank and making the remedial gymnastics, the patient has regained his original healthy status. The result of a repeated computer tomography examination made after a month of such treatment the protrusion decreased to 1 mm. Since that time the patient has been permanently using the stretching bank each day for about 20-25 minutes each. His complaints have disappeared and he has stopped being sensitive against weather fronts.

Claims

1. Stretching bank for health purposes, comprising a rigid bank with horizontal basic position and allowing a patient to lie thereon, a support frame connected to the rigid bank wherein the angular position of the rigid bank can be adjusted around an axis, and a patient holding assembly for fixing the longitudinal position of the patient and which is coupled to the rigid bank, **characterized in that** the bank (11) and the support frame (12) are interconnected by means of a pivot hinge (31) having an axis that includes the centre of gravity of the mass turned or the axis is spaced from said centre of gravity by at most a predetermined small distance in either longitudinal or normal direction; a positioning assembly is provided between the bank (11) and the support frame (12) allowing changing of the angular position of the bank (11) and being capable of exerting force in both directions and can be stopped at any required position to keep that position in a stable manner, the positioning assembly is coupled to the lower part of said bank (11) at a position being spaced from the axis of the pivot hinge (31) by means of a second hinge (33), a bracket arm (13) is connected to a first end of the bank (11) to which a collar strap (34) placed either around the neck or feet of the patient can be coupled by means of a hook (35) in a releasable way, a multi-position control switch (15) is coupled to the bank (11) or to the support frame (12) for being operated by the patient, the control switch (15) is connected to said positioning assembly whereby the angle of inclination of the bank (11) can be continuously adjusted between the horizontal and a maximum inclined position and fixed in any one of said adjusted positions.

2. The stretching bank as claimed in claim 1, **characterized in that** said positioning assembly is constituted by a telescope rod (14) driven by a motor and having a first end coupled in a pivoted way to the central portion of that end part of the bank (11) which is connected to the bracket arm (13) and the second end of the telescope rod (14) is coupled in a pivoted way to the central portion of a lower cross-bar (26) which interconnects those legs (24, 25) of the support frame (12) that are closer to the bracket arm (13).

3. The stretching bank as claimed in claim 1, **characterized in that** a pair of support rods (20, 21) are connected to the lower surface of the bank (11), the rods (20, 21) extend in parallel to the two sides of the bank (11), the pivot hinges (31) are coupled to the central part of the rods (20, 21), the support frame (12) comprises a pair of front and a pair of rear legs (24, 25; 29) that can be opened in a V-shape until an end position is reached, the legs (24, 25; 29) are interconnected at their upper regions by means of pivot shafts (30) determining the end positions, and the legs (24, 25; 29) are interconnected above the pivot shafts (30) by means of an upper cross-bar (23) so that the upper cross-bar (23) extends through said pivot hinges (31) connected to said support rods (20, 21).

4. The stretching bank as claimed in claim 1, **characterized in that** the bracket arm (13) is connected in an adjustable distance to the first end of the bank (11).

5. The stretching bank as claimed in claim 1, **characterized in that** wheels (27, 28) are attached to two of the legs (29) of the support frame (12).

6. The stretching bank as claimed in claim 1, **characterized by** comprising a lower step bank (36) that can be placed beside the support frame (12) for facilitating the climbing of the patient on the bank (11).

7. The stretching bank as claimed in claim 1, **characterized in that** said collar strap (34) encircles the legs of the patient around the ankles, it has a Velcro-type tear up closure and a soft lining, the hook (35) is attached to the exterior of the collar strap (34) with a force bearing connection.

Amended claims in accordance with Rule 137(2) EPC.

1. Stretching bank for health purposes, comprising a rigid bank (11) with horizontal basic position and allowing a patient to lie thereon, a support frame (12) connected to the rigid bank (11), and a patient holding assembly for fixing the longitudinal position of the patient coupled to the rigid bank (11), wherein the bank (11) and the support frame (12) are interconnected by means of a pivot hinge (31) arranged in the central zone of the bank (11), a positioning assembly between the bank (11) and the support frame (12) for changing the angular position of the bank (11) which is capable of exerting force in both directions and can be stopped at any required position to keep that position in a stable manner, the positioning assembly is coupled to the lower part of said bank (11) at a position spaced from the pivot hinge (31) by means of a second hinge (33), a multiposition control switch (15) coupled to the bank (11) or to the support frame (12) for being operated by the patient, the control switch (15) is connected to said positioning assembly whereby the angle of inclination of the bank (11) can be continuously adjusted between the horizontal and a maximum inclined end position and fixed in any one of said adjusted positions, **characterized in that** a bracket arm (13) with a transverse rod is adjustably connected to the rigid bank (11) so that a variable longitudinal distance is provided between the transverse rod and a first end of the bank (11), in use a collar strap (34) is placed either around the neck or a pair of collar straps are placed around the feet of the patient, the collar strap (34) is provided by a hook (35) that can be brought into a releasable engagement with the transverse rod of the bracket arm (13) for holding the longitudinal position of the patient on the bank (11), said pivot hinge (31) has a transversal axis that includes the centre of gravity of the combined mass of the patient and the bank (11) with the support frame (12) or the axis is spaced from said centre of gravity by at most a predetermined small distance in either longitudinal or normal direction.

2. The stretching bank as claimed in claim 1, **characterized in that** said positioning assembly is constituted by a telescope rod (14) driven by a motor and having a first end coupled in a pivoted way to the central portion of that end part of the bank (11) which is connected to the bracket arm (13) and the second end of the telescope rod (14) is coupled in a pivoted way to the central portion of a lower cross-bar (26) which interconnects those legs (24, 25) of the support frame (12) that are closer to the bracket arm (13).

3. The stretching bank as claimed in claim 1, **characterized in that** a pair of support rods (20, 21) are connected to the lower surface of the bank (11), the rods (20, 21) extend in parallel to the two sides of the bank (11), the pivot hinges (31) are coupled to the central part of the rods (20, 21), the support frame (12) comprises a pair of front and a pair of rear legs (24, 25; 29) that can be opened in a V-shape until an end position is reached, the legs (24, 25; 29) are interconnected at their upper regions by means of pivot shafts (30) determining the end positions, and the legs (24, 25; 29) are interconnected above the pivot shafts (30) by means of an upper cross-bar (23) so that the upper cross-bar (23) extends through said pivot hinges (31) connected to said support rods (20, 21).

4. The stretching bank as claimed in claim 1, **characterized in that** the bracket arm (33) has a U-shaped form, wherein the transversal rod is constituted by the interconnecting portion of the legs of the U-shape, and a support assembly provided with a fixing element (22) is connected to the lower surface of the bank (11), wherein the legs of the bracket arm (33) are guided by clamps in the fixing element (22).

5. The stretching bank as claimed in claim 1, **characterized in that** wheels (27, 28) are attached to two of the legs (29) of the support frame (12).

6. The stretching bank as claimed in claim 1, **characterized by** comprising a lower step bank (36) that can be placed beside the support frame (12) for facilitating the climbing of the patient on the bank (11).

7. The stretching bank as claimed in claim 1, **characterized in that** said collar strap (34) encircles the legs of the patient around the ankles, it has a Velcro-type tear up closure and a soft lining, the hook (35) is attached to the exterior of the collar strap (34) with a force bearing connection.

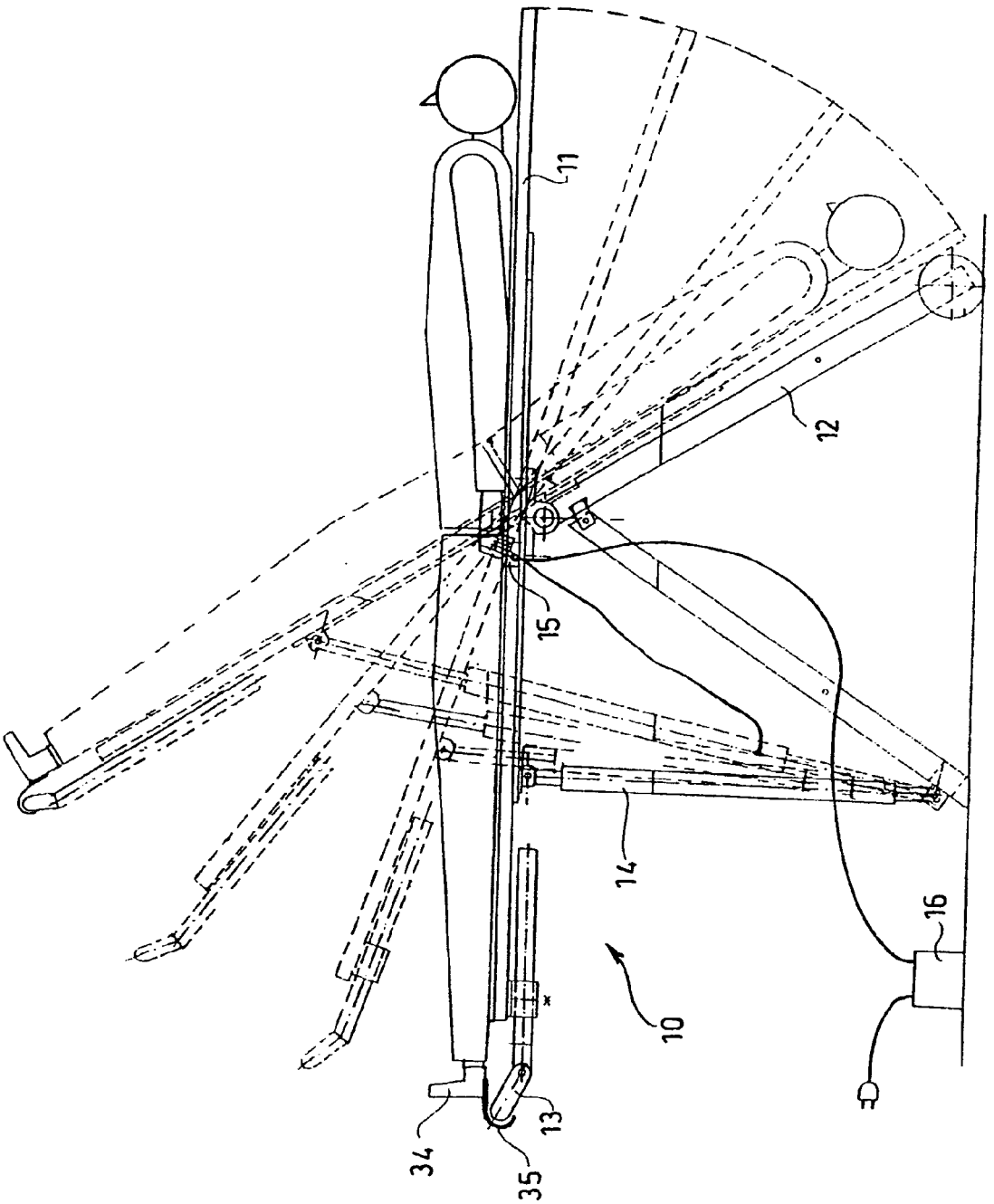


Fig. 1

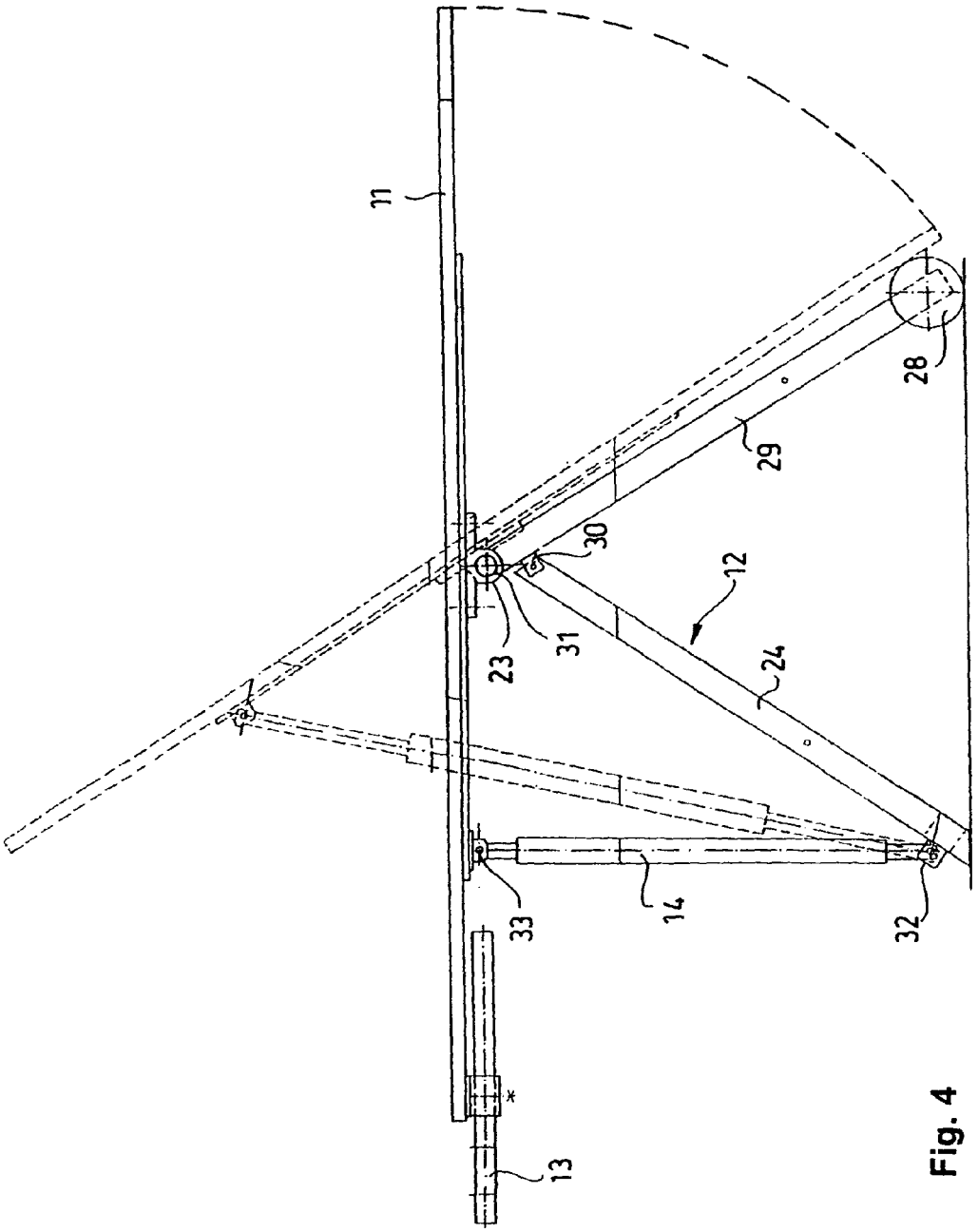


Fig. 4

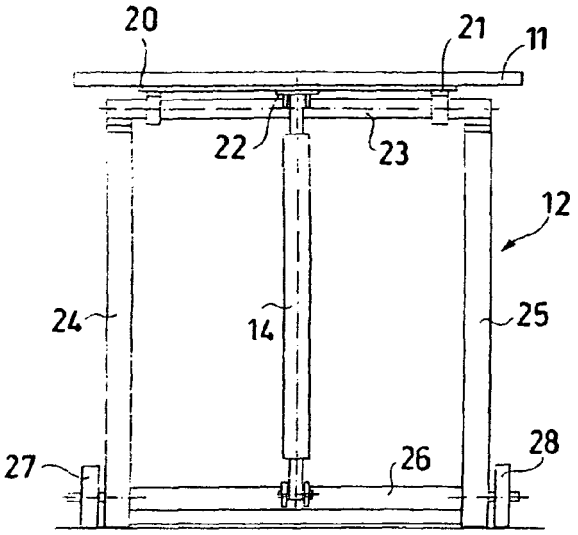


Fig. 3

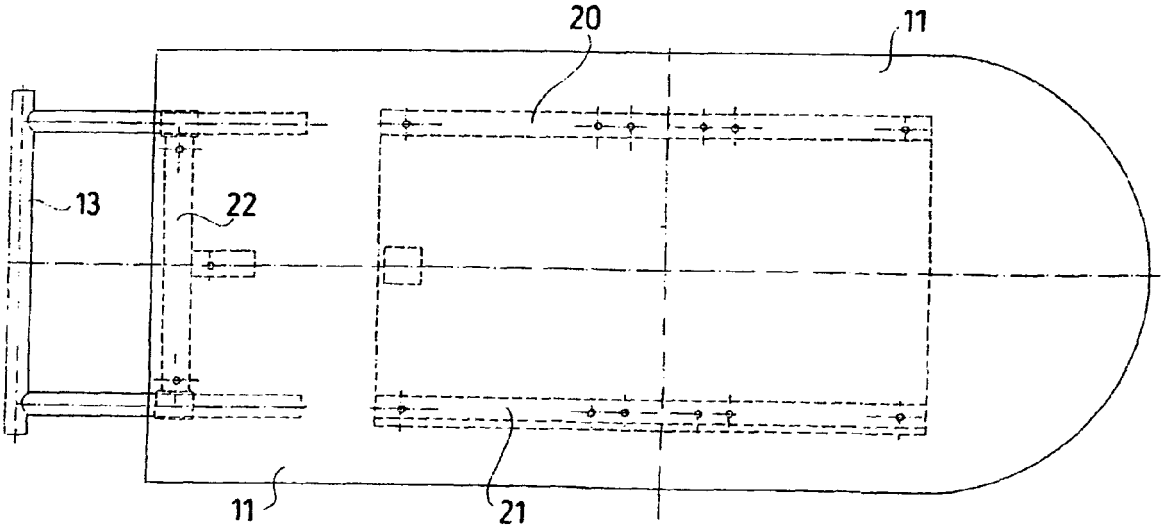


Fig. 2

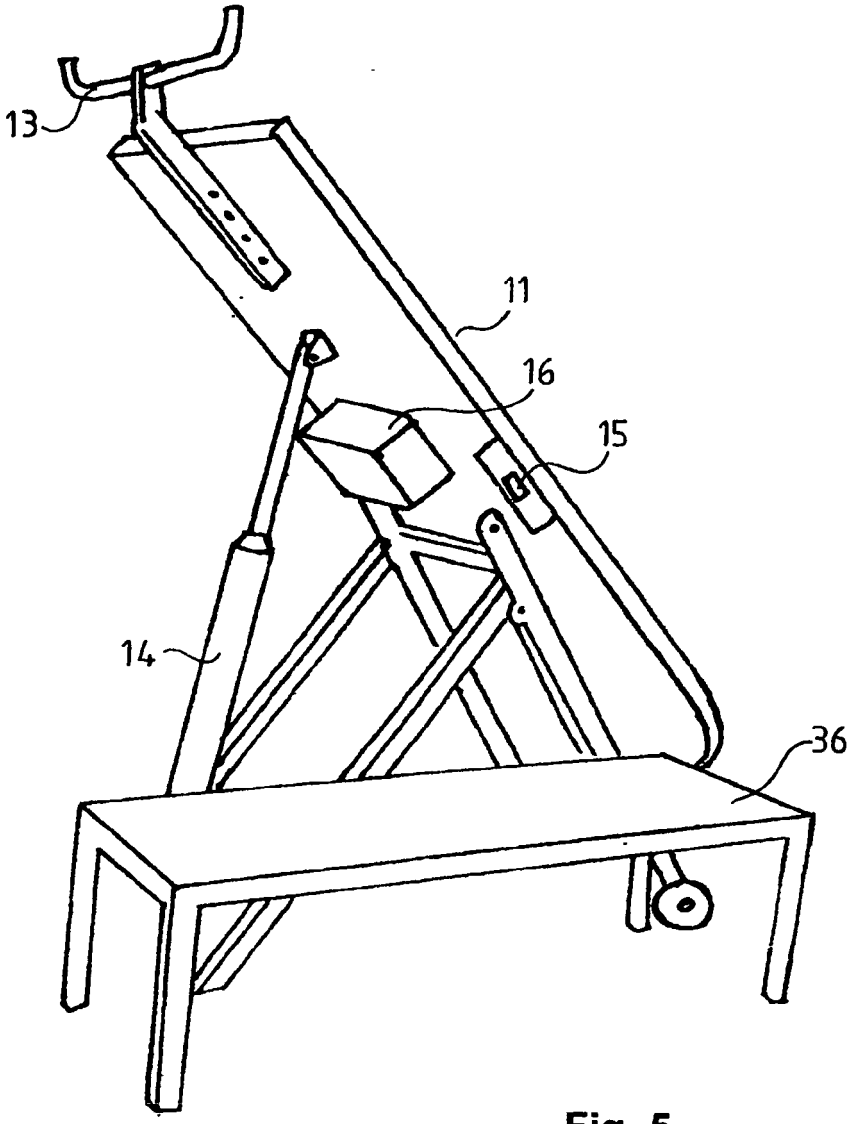


Fig. 5



Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
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The Hague	3 December 2008	Knoflacher, Nikolaus

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