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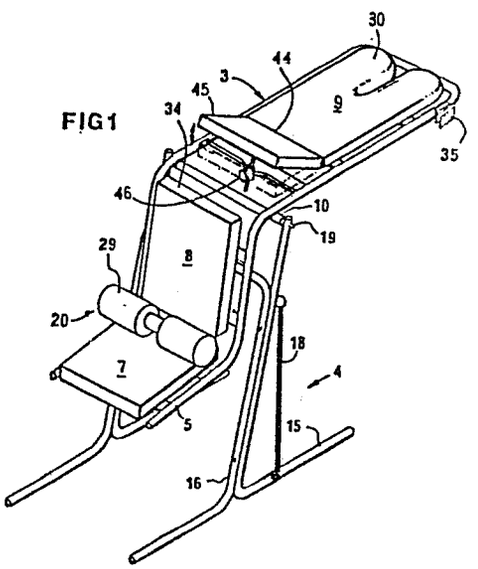
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(54) Therapeutic device for body stretching.

(57) Disclosed is a therapeutic device (2) by the use of which a person may hang in an upside-down posture, with the spine straight, and in complete relaxation. The device (2) comprises a pivotable table (3) mounted on a frame (4) and having a knee platform (7) on which the person first kneels; a tigh platform (8) against which he next rests his thighs; and a torso platform (9) for supporting his chest and head as he leans forwards. Handles (18), mounted on the frame (4), are graspable by the person to pull himself forwardly downwardly by controlled tilting of the table (3) to a freely hanging, or any intermediate inverted, position. Relaxation while hanging is achieved by bending at the hips and by the provision of a behind-the-knee restraint (20), which comprises a pad (29) that fits in the crook of the bent knee. This restraint (20) allows the body weight to be taken entirely by the thighs without the thighs being pulled off the thigh platform (8) by the weight of the torso. The device is adjustable in various ways to suit the individual.

FIG1



EP 0 131 167 A2

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THERAPEUTIC DEVICE

This invention relates to therapeutic devices, especially to body traction devices of the kind in which a person is supported in an upside-down position.

It is well known that there are therapeutic benefits to be had by hanging upside down. It stretches the spine, relieves tension, allows compressed nerves and blood vessels to dilate, and encourages internal organs to function smoothly.

Devices for supporting people in an upside down position have included special boots. Here, a person dons a pair of boots which he attaches to a hook on the ceiling. He then allows himself to hang vertically by his feet. There are three things wrong with this: first, although the spine is subject to stretching (which may be beneficial), so too are the legs, which may not be beneficial and is most uncomfortable; second, when hanging by the feet, a person's spine is not straight but curved, i.e. there is a hollow in the small of the back which, when stretched, causes tension in the back when forcibly straightened and thereby completely inhibiting the desired relaxation effect; third, getting into and getting out of, the inverted position is difficult, and likely to lead to muscle strain and can hardly be done without assistance unless the patient is young and agile.

Another approach is typified by SIEBER in U.S.A. Patent No. 4,214,790 (July 29, 1980). A person sits in a chair, fastens a lap strap, and gradually tilts backwards until almost upside down. Apart from the enormous

expense of such a chair if it is to be reliable and safe, the person cannot relax in the inverted position because some of his muscles are being used to hold the posture.

Another prior art category is that of chairs or beds which a person mounts in a normal standing or kneeling position, after which he leans forwards and tips a pivoting platform and so assumes the inverted position. It is this category with which the invention is particularly concerned.

There was published in the U.S. Armed Forces Medical Journal, Vol. IV, No. 6, June 1953, a disclosure of a device that had a pivoting table. A person knelt on a lower level of the table, and rested his chest on an upper level, both levels being horizontal during mounting. The person's thighs rested against a vertical thigh support. The table was arranged to tilt forward some 60 degrees, much of the person's weight then being taken against the thigh support, and some tension being present in the spine. A similar device is shown in U.S. 2,228,793 (SWOFFORD, January 14, 1941) though here a person stood on a platform, rather than knelt on it, when mounting.

In U.S. 3,722,507 (KRAUSE, March 27, 1973) and in U.S. 4,292,962 (KRAUSE, October 6, 1981) the person's legs were restrained with the legs straight out, by means of restraints placed behind the ankle or behind the calf.

The invention is aimed at providing an improvement over all these prior art devices by providing means whereby a person can hang with his spine quite straight or, with the addition of flexion of lumbar spine if required, and quite vertical or with the bed adjusted to any desired inclination, with all his muscles relaxed; and whereby the person feels no vulnerability to uncontrolled tipping as the full body is supported on a solid bed, and needs to exert no particularly strenuous muscle action to reach the vertical hanging posture, nor to return to the normal posture. It is also an aim of the invention to do this with inexpensive and easy-to-use equipment.

The invention provides a pivoting table, as did the MEDICAL JOURNAL and the KRAUSE patents, but in the invention the table is arranged so that the person can hang vertically without any of his weight then being taken by the torso platform: the table itself is arranged so that it can swing a few degrees beyond the vertical to ensure that the person is quite freely hanging. In the prior art, if the table tipped so far that the person was hanging vertically then the person would tend to fall off the table. Even with either of the behind-the-lower-leg restraints of KRAUSE, a person's hips could start to slide forwards off the thigh platform and down the table once the person's torso was hanging vertically. Naturally, the person would see to it that he did not slide off, but he would have to exert his muscles to do so, which

militates against relaxation, and also the apparatus would not have a confidence-inspiring feeling of inherent safety, which might be unacceptable to, say, an infirm person. Besides, the legs-out-straight posture taught by KRAUSE strains the backs of the legs, leads to some discomfort, and does not allow for full inversion adjustment to any incline.

In the invention, the comfortable bent-knee and bent-hip posture of the MEDICAL JOURNAL is retained, but the person can safely hang vertically without sliding forwards off the thigh platform because of the provision of a behind-the-knee restraint. This behind-the-knee restraint provides a means of reacting the tendency of a person's hip to slide forwards off the thigh platform. The person may thus hang freely vertically, with his spine straight and his entire body relaxed.

Thus, by one aspect of the invention there is provided a therapeutic device for enabling a patient to adopt an inverted hanging posture in safety and comfort, comprising:

(a) a frame;

(b) a table pivotally mounted about a horizontal axis on said frame and comprising:

(i) a first platform against which said patient may rest his thighs;

(ii) a second platform projecting from one

end of said first platform in a plane perpendicular thereto and upon which said patient may kneel;

(iii) a third platform projecting from the other end of said first platform in a plane perpendicular thereto, parallel and in the opposite direction to the plane of said second platform and against which said patient may support the front portion of his torso when he leans forwardly while kneeling on said second platform; and

(iv) restraint means adjacent said first and second platforms arranged to be disposed behind the knees of the patient kneeling on said second platform so as to retain the person's knees in a substantially fixed position relative to said first and second platforms as said table is rotated; said table being pivotable substantially through a right angle between a first position in which said third platform is in a substantially horizontal plane above said second platform and a second position in which said third platform is in a substantially vertical plane and below said second platform, thereby rotating

the patient forwardly from a kneeling position to one in which his torso may hang substantially vertically and freely head-downwardly without contact between his torso and said third platform.

An exemplary embodiment of the invention will be described hereinafter with reference to the accompanying drawings in which:

Figure 1 is a pictorial view of a therapeutic device which embodies the invention;

Figure 2 is an exploded view of the device of Figure 1;

Figure 3 is a side elevation of the device of Figure 1, in use by a person;

Figure 4 is the same elevation as Figure 3, but with the device in a different position.

The therapeutic device 2 comprises a table 3, and a frame 4. The table 3 includes a support 5 made of metal tubing and bent as shown. Braces 6 are welded between the two limbs of the table support 5. To these braces 6 are fixed a knee platform 7, a thigh platform 8, and a torso platform 9. Three pivot tubes 10 (only one of which is shown in Figure 1) are also welded between the limbs of the support 5.

The frame 4 comprises two uprights 15 and a back piece 16. The uprights 15 each have a hole 17 at the top. Handles or control arms 18, only one of which is shown, are pivoted to the frame 4. The handles may be independent, or may be linked so as to swing in unison.

The table 3 is pivoted to the frame 4 by means of a pivot pin 19 which engages one of the pivot tubes 10 to the holes 17 as required for proper balancing of each patient.

The table 3 includes a knee restraint 20. This comprises a T-shaped cross-bar 23 on a post 24 formed by welded tubes; an elbow 25 also of welded or bent tubes; a tube 27 welded to two of the braces 6; and round pads 29 which fit over the cross-bar 23. The elbow 25 telescopes into the post 23 and into the tube 27.

In use, the table 3 is set to the position shown in Figure 1. A person kneels onto the knee platform 7, and tucks the pads 29 one behind each knee, i.e., in the crook of the knee. The person leans forward until his thighs rest against the thigh platform 8. He then bends forwards at the hips until his chest rests against the torso platform 9. He takes hold of the handle 18, and commences to lower himself downwards, as shown in Figure 3. He carries on lowering himself until his torso is hanging vertically, as shown in Figure 4. A head extension 30 of platform 9 may be provided so as to support

the head without arching the neck during the lowering stage, but it will be seen that the head is clear of the head-rest 30, and also the chest is clear of the torso platform 9, when the person has reached the stage shown in Figure 4 in which platform 9 has moved to a position of about 3-10° beyond the vertical. The person's torso hangs freely vertically with the spine straight: the hands or arms may rest on the ground, as shown.

The person can remain in the posture shown in Figure 4 without any discomfort, and without using his muscles; i.e., in complete relaxation. It is a feature of the invention that there would be a tendency for the person's thighs to slide to the right (in Figure 4) were it not for the knee restraint 20.

In order that the hip-end 34 of the thigh platform 8 may be firmly located against the hip-bone area of the person, it may be necessary that the position of the pad 29 be adjusted with respect to the hip-end 34 of the platform 8. The elbow 25 may be telescoped and locked to the tube 27 at the desired position. Similarly, a person might need a greater distance between the thigh platform 8 and the pad 29 to accommodate the thickness of his legs, and the post 24 may be telescoped and locked to the elbow 25. Alternatively, it could be arranged that the thigh platform could be movable, and the pad 29 not movable, with respect to the support 5. It will also be

appreciated that the length of the femur may require some adjustment in the spacing between pads 7 and 9. This may be effected by providing telescoping tube members 40, 41 perpendicularly between the portions of support 5 bearing pads or platforms 7 and 9.

Another adjustment that might be required is to the angle between the thigh platform 8 and the torso platform 9. This adjustment can be achieved by means of packing placed between the appropriate brace 6 and the thigh platform 8, or by making the support 5 such that it hinges between the thigh platform 8 and the torso platform 9 and by also providing means to lock the angle between the two platforms at the desired value.

Yet another adjustment is provided by the three pivot tubes 10. The appropriate one is selected to receive the pivot pin 19 according to the ease with which the pivoting or tipping movement of the table 3 can be controlled. If the person finds himself, for instance, starting to gradually rise upwards from the hanging position, he can change the pivot position so that his centre of gravity when hanging is more nearly in line with the pivot. It will of course be appreciated that adjustment of the centre of gravity may also be effected in numerous other ways. For example, a single tube 10 may engage in a selected groove in a tri or more groove fitting 42 or uprights 15, and locked therein by a suitable locking wheel.

Besides providing the means whereby a person can hang freely vertically without discomfort, the device 2 may also be used with the torso resting against the torso platform 9. Here, the table 3 is not tipped quite so far so that part of the body weight is taken by the torso platform 9. To hold the table 3 in this position, a clip 35 (shown only in Figure 1) is attached to the table support 5. The clip 35 comprises a fold of metal which is lined with rubber. The handle 18 may be inserted into the clip 35 at the desired position of the table 3, and will remain there until released. Alternatively, the handle 18 may include a peg which engages one of a series of suitably spaced holes in the table support 5, to hold the table at an intermediate hanging position.

In a preferred embodiment the lower (or waist) end of torso platform 9 may be adjustable. The cushion may be divided or at least pivotable about an axis 44 and the end 45 held in any convenient selected position by means of a telescoping or locking rod 46 in conventional fashion. Raising the end 45 serves to adjust the distance between platforms 7 and 9 and, moreover, provides additional support for the stomach and solar plexus region of the patient's body. Firm pressure in this area may, in some circumstances, provide an additional therapeutic effect as it triggers relaxation and slightly flexes the lumbar spine and thereby improves the traction effect.

When adjusted correctly for the user, the device described can be used with safety; not only that, but the device inspires confidence and relaxation in the user in that there is no feeling of being vulnerable to uncontrolled swinging, nor to falling down. A person may lower himself to, and raise himself from, the hanging posture without straining himself, and in a smooth, controlled manner: this can be important in avoiding giddiness due to blood leaving the head if a normal posture were resumed too suddenly. Even if the device is not adjusted correctly for a particular person, this merely may cause some slight discomfort, but it does not cause a loss of balance or other unsafe condition, and it is easy for the person to realise just what correction he should make. The device can be used without an assistant being needed, though of course an infirm person might need assistance.

The device may be used by physiotherapists, either for the hanging as described, or to support a patient for manipulation or other treatment of the back. For use by physiotherapists, or in hospitals, the device may be mechanised, so that the swinging motion is under the remote control of a supervisor, not of the patient. When the device is intended for use by many people, the various adjustments can be provided automatically.

The device may be freestanding, as shown, or it may form part of other therapeutic equipment. For instance, the frame of the device could include an attachment to the bench of a weight lifting outfit.

Claims

1. A therapeutic device for enabling a patient to adopt an inverted hanging posture in safety and comfort, comprising:

a) a frame (4); and

b) a table (3) pivotally mounted about a horizontal axis on the frame (4)

characterized in that the table (7) comprises:

(i) a first platform (8) against which said patient may rest his thighs;

(ii) a second platform (7) projecting from one end of the first platform (8) in a plane perpendicular thereto and upon which said patient may kneel;

(iii) a third platform (9) projecting from the other end of the first platform (8) in a plane perpendicular thereto, parallel and in the opposite direction to the plane of the second platform (7) and against which the patient may support the front portion of his torso when he leans forwardly while kneeling on the second platform (7); and

(iv) restraint means (20) adjacent the first (8) and the second platforms (7) arranged to be disposed behind the knees of the patient kneeling on the second platform (7) so as to retain the person's knees in a substantially fixed position relative to the first (8) and second platforms (7) as the table (3) is rotated; the table (3) being pivotable substantially through a right angle between a first position in which the third platform (9) is in a substantially horizontal plane above the second platform (7) and a second position in which the third platform (9) is in a substantially vertical plane and below the second platform (7), thereby rotating the patient forwardly from a kneeling position to one in which his torso may hand substantially vertically and freely head-downwardly without contact between his torso and the third platform (9).

2. A therapeutic device as claimed in claim 1 characterized in that the horizontal axis is in a plane adjacent the first (8) and third platforms (9).

3. A therapeutic device as claimed in claim 1 or 2 characterized in that the first platform (8) is of such dimensions that the hip-end (34) of the first platform (8) is in firm contact with the hip-bone area of a person's body, when the person is kneeling on the second platform (7) and resting his torso on the third platform (9).

4. A therapeutic device as claimed in any of claims 1 to 3 characterized in that the behind-the-knee restraint (20) comprises a cross-bar (23), the position of which is adjustable with respect to the hip-end (34) of the first platform (8), so that the cross-bar (23) may be personally adjusted to be tucked in firmly and snugly behind the knees, and at the same time the hip-bone area of the body may be in firm contact with the hip-end (34) of the first platform (8).

5. A therapeutic device as claimed in claim 4 characterized in that the cross-bar (23) is secured to the table (3) with a post (24), and wherein the post (24) is in the centre of the cross-bar (23) so that a person's two knees are placed one on either side of the post (24).

6. A therapeutic device as claimed in claim 5 characterized in that the length of the post (24) is adjustable so that the cross-bar (23) may be adjusted as to its distance from the first platform (8), independently of and in addition to its adjustment along the thigh platform (8) with respect to the hip-end (34) of the first platform (8).

7. A therapeutic device as claimed in any of claims 1 to 6 characterized in that the third platform (9) has such dimensions and position as to be in contact with the chest area of a person's body when the person is resting his torso on the torso platform (9).

8. A therapeutic device as claimed in any of claims 1 to 7 characterized in that the angle between the third platform (9) and the pad on the first platform (8) is adjustable.

9. A therapeutic device as claimed in any of claims 1 to 8 characterized in that the third platform (9) includes means (30) to receive and support the patient's head.

10. A therapeutic device as claimed in any of claims 1 to 9 characterized in that the frame (4) is adapted to be placed on the ground, and is so dimensioned as to hold a person's head clear of the ground when the person is hanging vertically.

11. A therapeutic device as claimed in any of claims 1 to 10 characterized in that the position of the pivot (10, 19) between the table (3) and the frame (4) is adjacent to the hip-end (34) of the first platform (8) and wherein the position of the pivot (10, 19) is adjustable with respect to the table (3).

12. A therapeutic device as claimed in any of claims 1 to 11 characterized in that a handle (18) is provided, attached to the frame (4), by means of which a person may guide himself from a kneeling posture to a hanging posture and vice versa.

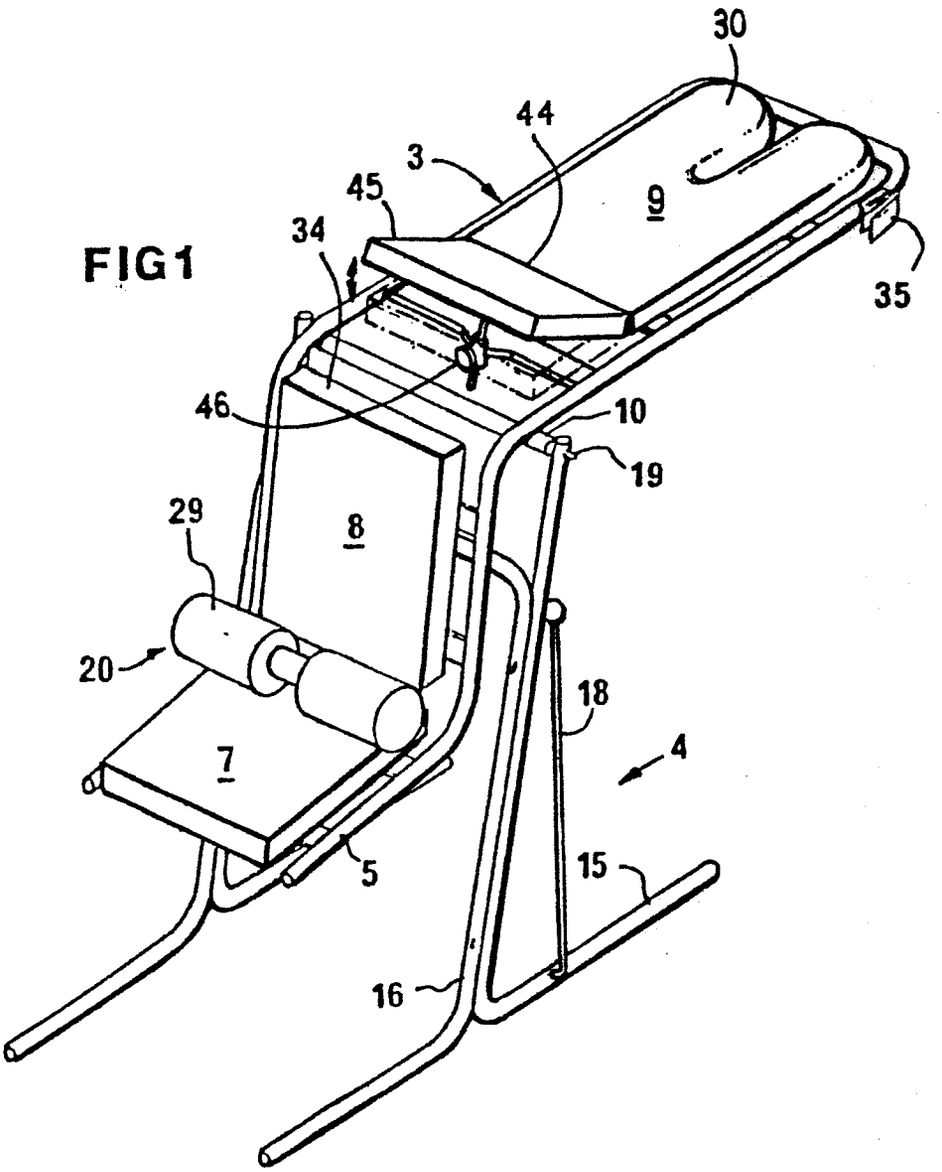
13. A therapeutic device as claimed in claim 12 characterized in that the handle (18) is pivoted to

the frame (4), adjacent to ground level.

14. A therapeutic device as claimed in claim 12 or 13 characterized in that the position of the handle (18) may be set relative to the table (3), so that a person may set the table (3) suitably for a posture intermediate between a kneeling posture and a hanging posture.

15. A therapeutic device as claimed in any of claims 1 to 14 further characterized by means to pivotally adjust the hip-end (34) of the second platform (7) relative to the head end thereof.

FIG1



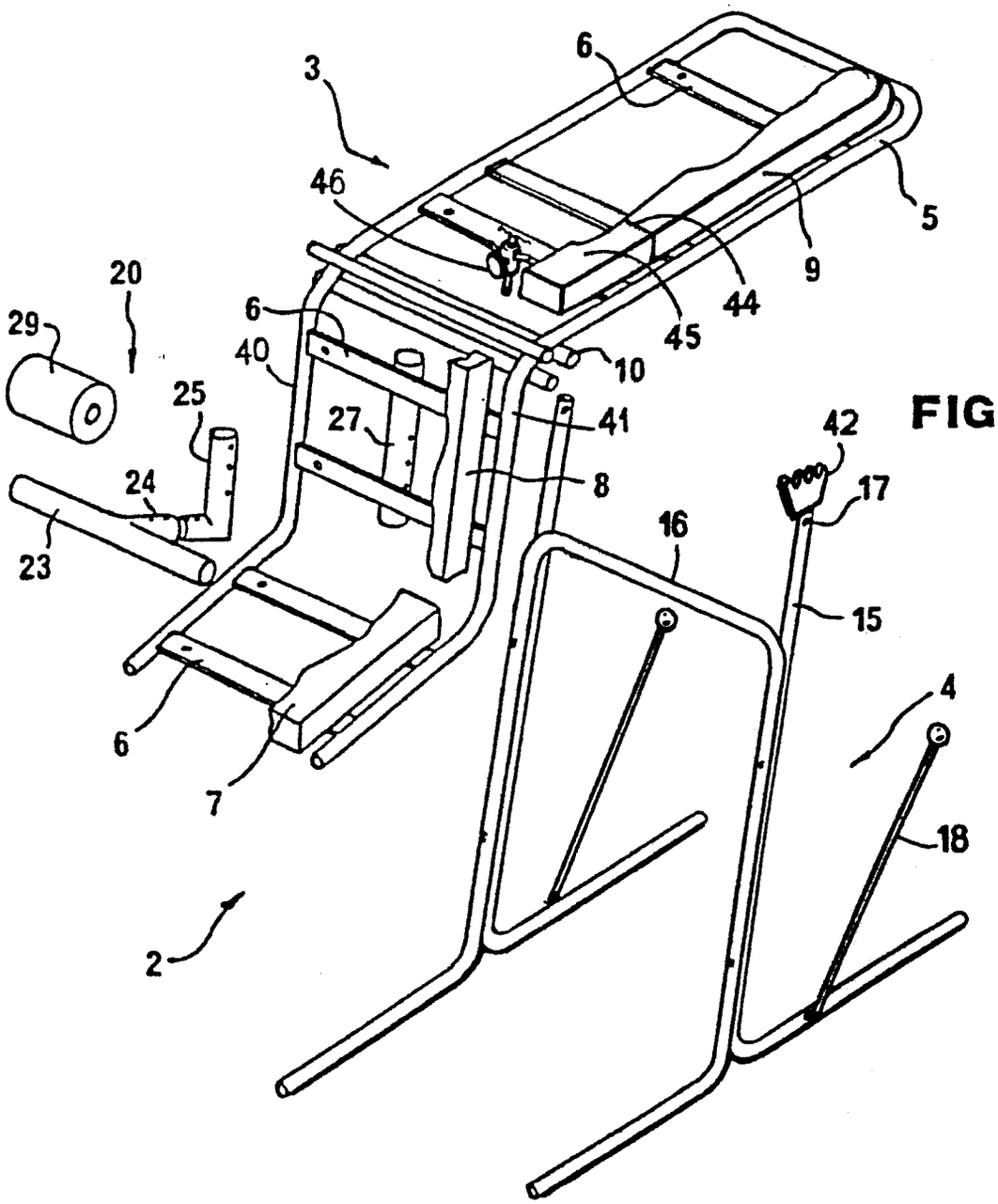


FIG 2

FIG 3

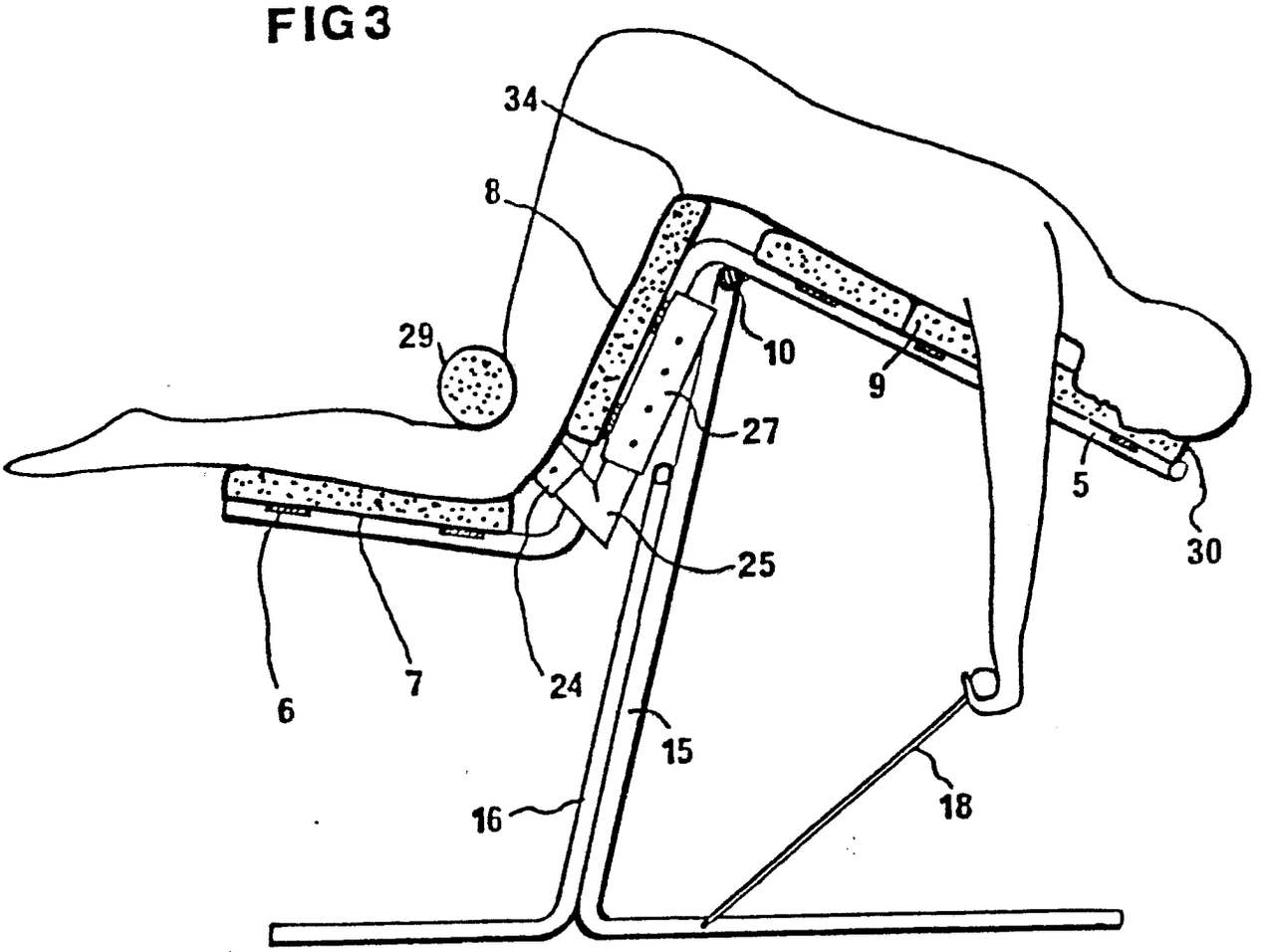


FIG 4

