2006

PATENT ATTORNEYS

EXAMINATION

PAPER E

The New Zealand Law and Practice
relating to Interpretation and Criticism of Patent Specifications

Regulation 158 (1) (e)

Duration: 4 hours (plus 10 minutes for reading)

Candidates are required to give reasons for their answers. The marks awarded depend on the reasoning displayed rather than the particular conclusions reached. Candidates should discuss fully all issues that appear to them might reasonably arise (even though some of the issues might not have to be decided if the candidate's conclusions on other issues should be correct). Candidates should presume that they are giving their advice to the client on the date of the examination.

Candidates should not write a précis of each specification referred to or of its claims. If part of a specification needs to be referred to it can be done by page/line or column/line reference or by paragraph numbers, as appropriate. The prior art may be referred to by letter or number. Case law need not be detailed as marks are awarded only for a clear statement of the points of interpretation of the client's invention and the patent at issue, the prior art considered, and for the reasoning leading to the conclusions reached.

Question

Your client has bought a company, You Stretch Ltd (YSL). YSL owns a New Zealand patent [Ref A1-provisional specification, Ref A2-complete specification]. The patent is currently in force.

You have found that there was an equivalent patent granted in the USA, but this has lapsed. You have obtained copies of the prior art listed on the US patent [Refs B to D].

Your client has informed you that YSL has been selling its product (the product is as shown in the drawings accompanying Ref A2). However, sales are not strong as there are two competing products on the market in New Zealand. Your client has provided you with details of the two competing products.

The first competing product is shown in a brochure [Ref E].

The second competing product is marked with an Australian patent number. You have obtained a copy of the specification [Ref F]. The client has confirmed that the second competing product is as described in Ref F. This product has been on sale in New Zealand since 2000.

Write a report to your client outlining where YSL stands in relation to both of the competing products and what, if anything, can be done to improve its position.

(100 marks)

Criticism exam

Materials:

- Question
- Ref A1 - NZ patent 267673. Provisional specification. Filed 20 June 1995. In the name of You Stretch Ltd.
- Ref A2 – NZ patent 267673 Complete Specification. Filed 10 June 1996. In the name of You Stretch Ltd.
- Ref B - US 4232662
- Ref C - US 4292962
- Ref D - US 4461287
- Ref E – Bat Frame brochure.
- Ref F - AU 60218/97. Filed 13 May 1997, published 27 May 1998, in the name of Home Gym Pty Ltd.

Reference A1

267673

Patents Act 1953

PROVISIONAL SPECIFICATION

EXERCISING APPARATUS

We, You Stretch Ltd, a New Zealand company of 1000 Great West Road, Auckland, New Zealand do hereby declare this invention to be described in the following statement:-

This invention relates to exercising apparatus which includes a pivotable body rest on which a person taking exercise can support himself in various positions. The object of this invention is to provide such an apparatus having an improved leg rest.

It is known to construct exercising apparatus of the kind described which has a padded body rest which is pivotable about a horizontal axis. Such apparatus has a further padded rest which in use is supported in a fixed relationship with the body rest and higher than (but not usually directly above) the body rest, the user's thighs being received under the further rest to stabilise his body on the apparatus. In this specification, such a further rest is called a "leg rest" although it may be used in contact with parts of the body other than the legs.

The improvement provided by the present invention consists of a leg rest which is mounted on an exercising apparatus to pivot about a substantially horizontal axis which is lower than an axis about which a body rest of the apparatus can pivot, to a position in which it is higher than the body rest.

The leg rest can preferably pivot independently of the pivoting of the body rest so that a variety of configurations of the apparatus can be achieved. The apparatus is preferably provided with an adjustable stop which limits the pivotal movement of the leg rest in the direction in which it moves to a position higher than the body rest. The leg rest is preferably a padded bar connected by arms to its pivotal axis.

In order that the invention may be more clearly understood, one embodiment is hereunder described by way of example only.

This embodiment comprises a double A-frame stand supporting at its apex a horizontally pivoted, padded body rest. To one side of the body rest, both A-frames mount an arm and the arms are pivotable about a common axis parallel with and lower than the pivoting axis of the body rest. The arms are mounted on the ends of an axle which extends between the A-frames a distance below the body rest, and are sufficiently long to extend higher than the body rest when they are vertical. A padded bar forming a leg rest extends between the free ends of the arms, the lengths of the arms being such that, when the arms are substantially vertical, there is sufficient difference in height between the body rest and the leg rest for the thighs of a person resting on the body rest to be received under the leg rest.

The arms mount stops, the lengths of which are adjustable by screw threads, which can contact the A-frames as the leg rest is moved to a high position. In normal use, the stops would be set to prevent the arms from pivoting past a substantially vertical position.

Other embodiments of the invention may be based on supports other than A-frames, for example a suspended frame. All such embodiments including the improved leg rest of the present invention fall within the scope of this application.

END

Reference A2

267673

NEW ZEALAND

PATENTS ACT 1953

COMPLETE SPECIFICATION

AFTER PROVISIONAL NO: 267673

DATED: : 20 June 1995

INVERSION EXERCISING APPARATUS

We, You Stretch Ltd, a New Zealand company of 1000 Great West Road, Auckland, New Zealand, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to an exercising apparatus and more particularly to an exercising apparatus which enables a person to support himself in a variety of positions for rest including an inverted or substantially inverted position.

Hitherto, exercising apparatus have been provided which enable a person to support himself in the inverted position, such exercise apparatus including a frame which rests upon a supporting surface and mounts a first padded rest which is pivotable about a substantially horizontal axis. The frame mounts a second padded rest which in use is supported in a normally fixed relationship with the first rest, higher than, but not usually directly above the first rest, when inverted on the apparatus a user's thighs and lower abdomen are received and rest against the first rest and the user's rear upper legs are received under the second rest to stabilise the user on the apparatus.

Prior art exercising apparatus of the type described incorporates certain inherent disadvantages. A prime disadvantage is the difficulty that a user finds in positioning himself in the apparatus prior to inversion and use, further, the difficulty in disengaging himself from the apparatus after use. Prior art units also create problems in that the first and second rests must be adjusted in position relative to one another to suit the various sizes of users prior to use and thus, where the exercise apparatus is used, for example, in a family by adults of differing sizes, (or children of differing sizes), it is necessary for the apparatus to be adjusted before each usage.

Prior art units have provided means for adjusting the normally fixed relationship of the first rest and second rest relative to each other prior to usage, however such adjustment means requires time and skill to adjust quickly and further leads to complication and therefore expense in the completed unit.

It is an object of this invention to come some way in overcoming the abovementioned problems or at least provide the public with a useful choice.

Other objects of this invention will become apparent from the following description.

According to one aspect of this invention, there is provided an exercising apparatus including a frame, said frame pivotally mounting a first support about a substantially horizontal axis adjacent an upper portion of said frame, a second support pivotally mounted to said frame via a linkage which enables the second support to move between a position below a level of said first support to a position above said level and to one side of said first support.

According to another aspect of this invention there is provided an exercising apparatus wherein the first support is pivotable about a substantially horizontal axis.

According to another aspect of this invention there is provided an exercising apparatus wherein said first support is pivotable on a horizontal axis which is substantially aligned with a contact surface of said first support.

According to another aspect of this invention there is provided an exercising apparatus wherein at least one edge of said first support portion is shaped to fit lower pelvic and/or thigh portions of a person's body.

According to another aspect of this invention there is provided an exercising apparatus wherein the second support pivot axis is positioned spaced below and to one side of said pivot axis of said first support.

According to another aspect of this invention there is provided an exercising apparatus wherein second support is pivotable on a link which extends radially from the pivot mounting of said second support.

According to another aspect of this invention there is provided an exercising apparatus wherein the radius of pivot of said second support is adjustable.

According to another aspect of this invention there is provided an exercising apparatus wherein the pivotable mounting of said second support is adjustable relative to said second support.

According to another aspect of this invention there is provided an exercising apparatus wherein the link includes a plurality of engagement positions for a pivot axle of said second support.

According to another aspect of this invention there is provided an exercising apparatus wherein the frame is in the form of an A frame including two U-shaped portions pivotally engaged with one another adjacent their upper ends, the first support and engaged upper ends of the U-shaped portions engaged via a common pivot axle.

According to another aspect of this invention there is provided an excercising apparatus wherein the second support is mounted via the linkages from one of the U-shaped portions of the frame and wherein said second support pivots between legs of the U of said frame portion.

Other aspects of this invention which should be considered in all its novel aspects will become apparent from the following description which is given by way of example with reference to the accompanying drawings.

Figure 1: is a substantially diagrammatic side view of the invention in a use portion and showing a person exercising in the apparatus according to this invention.

Figure 2: shows a series of views showing a person entering the apparatus of this invention under sub-views 2A, 2B and 2C.

Figures 3A and B: show the apparatus of this invention used in typical exercising modes.

Turning particularly to Figure 1, the apparatus of this invention is formed in any suitable durable and robust materials such as wood, metal and the like. In the preferred form of the invention preferably the apparatus includes a frame as generally indicated by arrow 1 which in the preferred form is provided as a pair of U shaped portions 2 or "legs" having their bases 3 provided to rest upon a supporting surface and their upper ends 4 being preferably conjoined via an axle 5 (such as a bolt).

In the preferred form of this invention, preferably the U-shaped portions of the frame 1 are of slightly different sizes so that one portion 2 can collapse inside the other for storage.

Preferably a stay 6 is provided on each side in the form of an elongate rod having one end thereof securely engaged within an aperture (not shown) in one leg and the other end portion substantially hooked or otherwise engageable in a plurality of apertures 7 spaced along a mid portion of the other leg 2 so as to enable engagement of the rod 6 with legs 2 to provide a variety of frame angles to vary the height of the frame.

In this preferred form of the invention, the axle 5 of the apparatus mounts a first pad 10 thereon. The first pad 10 or body pad is preferably positioned between the end portions 4 of legs 2 and is mounted to pivot about a substantially horizontal axis provided by said axle 5. Preferably at least an upper surface of the first pad 10 is padded. The contact surface of the first pad 10, which in the orientation in Figure 1 is an upper surface, is so arranged as to align (when depressed with the weight of a user) close

to the axis of the axle 5. It will thus be appreciated that the first pad 10 is pivotally mounted on the frame portion 1 and is able to rotate substantially about the substantially horizontal axis provided.

Preferably at least one edge portion 11 of the first pad 10 is substantially curved or arcuate so as to accommodate the shape of a person's body when resting thereagainst. However, it is to be appreciated that this is in no way essential to the invention.

A second rest pad as generally indicated by arrow 20 is provided to be pivotable relative to the remaining portions of the apparatus from a rest position as shown by broken lines 21 to a use position as depicted by the solid lines.

In this preferred form of the invention, the second pad 20 is preferably provided as a substantially small transverse padded element mounted to a link 22, the link in this preferred form of the invention including a pair of spaced apart bar members which have outer end portions 23 engaged with or mounting the second pad 20 thereon and having inner ends 24 thereof pivotally engaged on aligned pivotal axes with upper mid portions of one of the U-shaped leg portions 2.

In the preferred form of the invention, the second pad 20 is preferably mounted on a framework which includes a substantially U-shaped portion, legs of the U-shape providing the links 22, the base of the U-shape providing a reinforcement for mounting the second pad 20 thereon.

In the preferred form of the invention, the link 22 and pad 20 is pivotable between adjacent leg portions 2 of the U-shaped frame portion 1 to which it is mounted.

From the drawing, it will be seen that the second pad 20 is pivotable from the rest position 21 (where the second pad 20 is positioned substantially below a level of the first pad 10 and to one side), to a position in use where it

is positioned substantially above and to one side of the first pad 10.

Preferably adjustment means is provided for facilitating adjustment of at least the use position, and particularly the height of the second pad 20 relative to the first pad 10 when in use. The adjustment is in the preferred form of the invention provided by means of a plurality of apertures in the inner end 24 of the link 22 or alternatively, a number of apertures in the relevant portion of the legs 2 to thus enable the pivotal engagement of the links 22 with the frame 1 to be varied and thus vary the height of the second pad 20.

Use of the apparatus will now be described with reference to Figures 2A, 2B and 2C and Figures 3A and 3B.

Referring to Figures 2A, B and C, firstly, the frame 1 is adjusted so that the axle 5 is positioned substantially on or adjacent the line of the lower pelvic area of the intended user. Thereafter, whilst the second pad 20 is in or adjacent the rest position, the user steps into the apparatus and positions the upper thighs and lower pelvis adjacent the upper surface of the first pad 10 which pivots to lie adjacent the user's body. Further, the second pad 20 is arranged to rest against the rear of the user's legs. The user then leans forwardly into a position substantially as shown by Figure 2B and beyond, rolling forwardly; the first rest pad 10 tilts with the user's body and the second rest pad pivots upwardly into a position as shown by Figure 2C as the user inverts on the apparatus until the links 22 adopt a substantially upright position. A binding action between the first pad 10 and the second pad 20 impinges against the thighs of the user and rear leg of the user and accordingly ceases further rotational movement of the user. Once in position, the user can then carry out various exercises such as those as shown by Figures 3A and 3B.

Various positions can be adopted and maintained for exercise purposes.

It will be appreciated that owing to the pivotal nature of the movement of the second pad 20 from its lower rest position to the use position, it is relatively easy for the user to position in the apparatus prior to inversion. Furthermore, the first and second pads 10 and 20 reach their use relationship substantially automatically upon the user inverting on the apparatus.

In view of the lack of a defined positional relationship between the first and second pads 10 and 20, there is a tendency for the apparatus to advantageously accommodate variations in users' dimensions (such as, thickness and length of thigh or upper leg) which hitherto has not been found in such exercising apparatus.

Dismounting from the apparatus is achieved by merely reversing the entry sequence described.

Thus by this arrangement there is provided an apparatus for inversion exercising.

WHAT I CLAIM IS:

1. An exercising apparatus including a frame, said frame pivotally mounting a first support adjacent an upper portion of said frame, a second support pivotally mounted to said frame via a link for movement of the second support between a position lower than said first support to a position higher than and to one side of said first support.

2. Apparatus as claimed in claim 1 wherein the second support is pivotable on a substantially horizontal axis spaced from the pivot axis of said first support.

3. Apparatus as claimed in claim 1 or claim 2 wherein the second support pivot axis is positioned below and to one side of the pivot axis of said first support.

4. Apparatus as claimed in any one of the preceding claims wherein the second support is pivotable on a link which extends radially from the pivot mounting of said second support.

5. Apparatus as claimed in any one of the preceding claims wherein the radius of pivot rotation of said second support is adjustable.

6. Apparatus as claimed in any one of claims 1 to 4 wherein the pivotable mounting of said second support is adjustable relative to said first support.

7. Apparatus as claimed in any one of the preceding claims wherein the first support is pivotal about a substantially horizontal axis.

8. Apparatus as claimed in any one of the preceding claims wherein the first support is pivotable on an axis which is substantially aligned with a contact surface of said first support.

9. Apparatus as claimed in any one of the preceding claims wherein at least one edge of said first support is shaped to fit lower pelvic and/or thigh portions of a person's body.

10. Apparatus as claimed in any one of the preceding claims wherein the frame is in the form of an A frame including two substantially U shaped

portions pivotally engaged with one another adjacent distal portions thereof, the first support and engaged distal portions of the U shaped portions being engaged via a common pivot axle.

11. Apparatus as hereinbefore described with reference to the accompanying drawings.

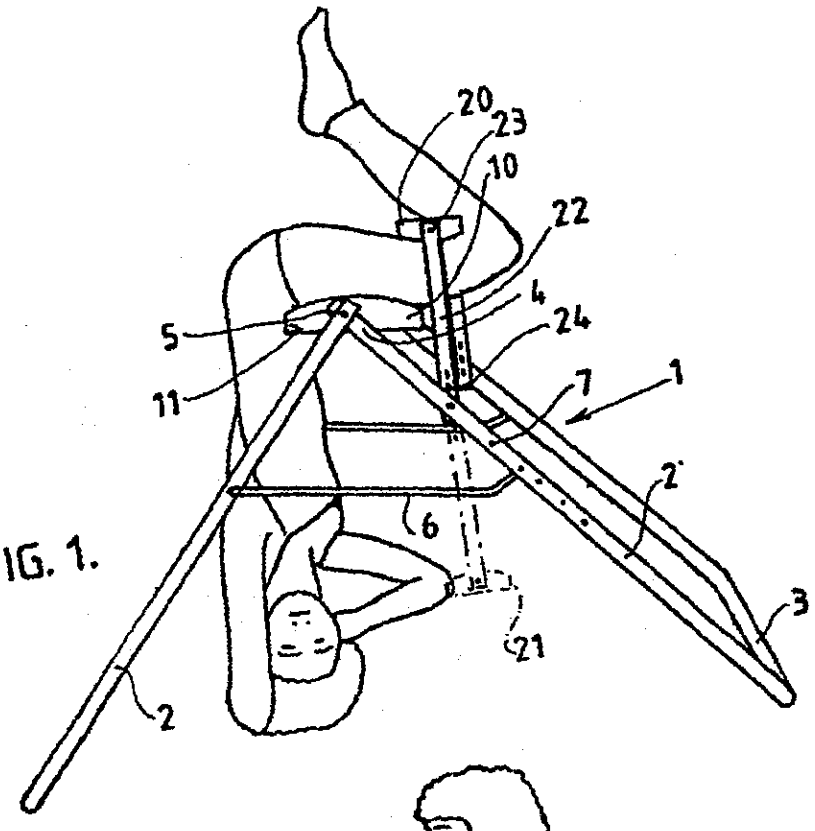

FIG. 1.

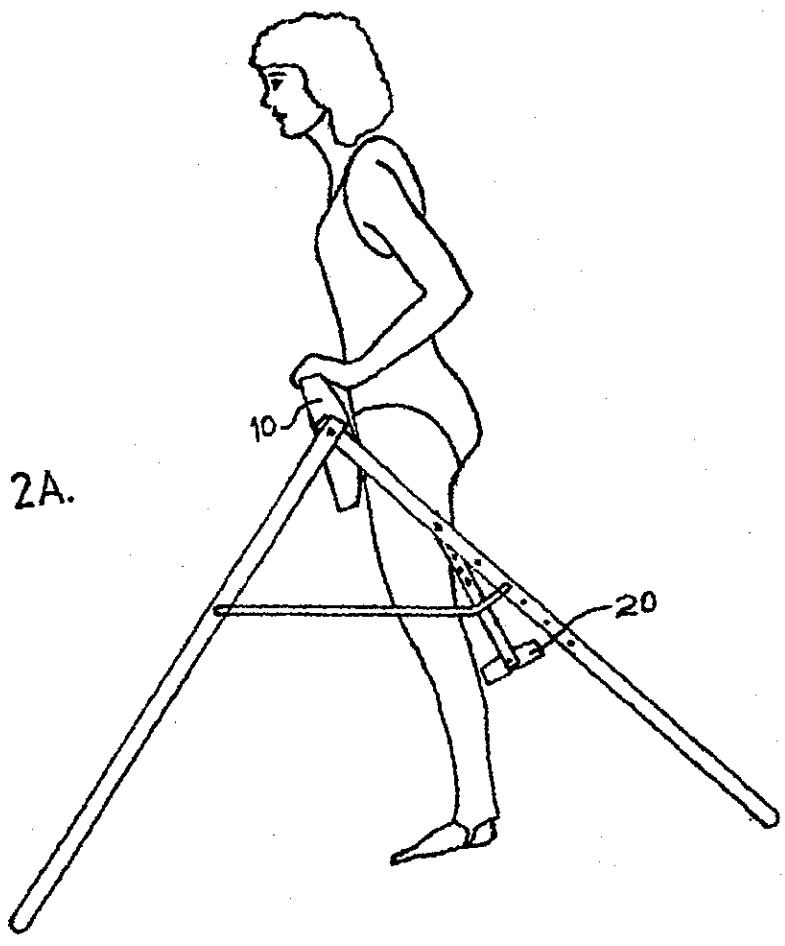

FIG. 2A.

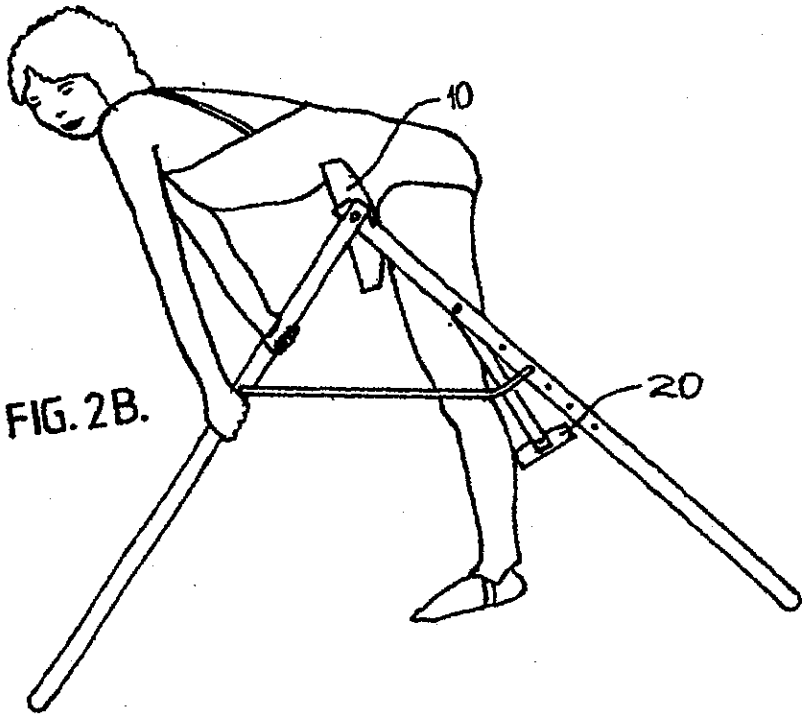

FIG. 2B.

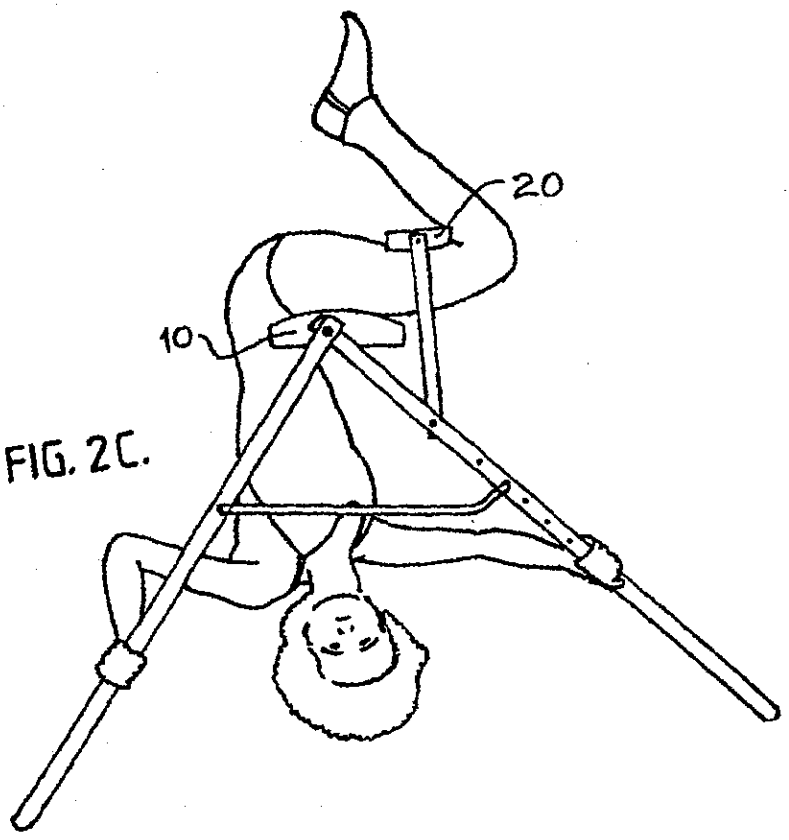

FIG. 2C.

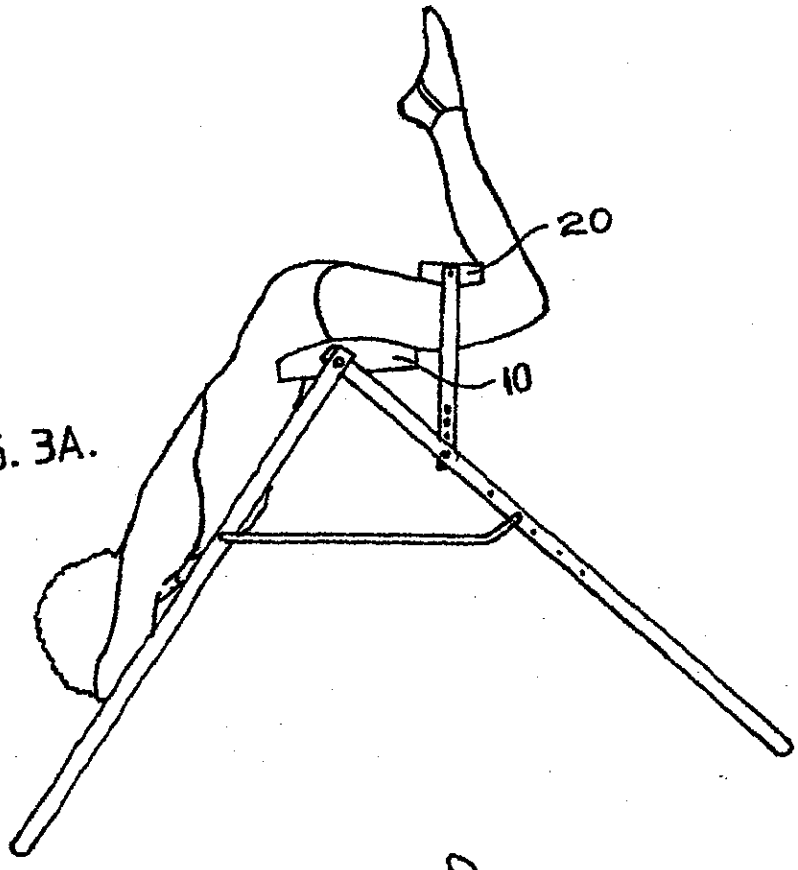

FIG. 3A.

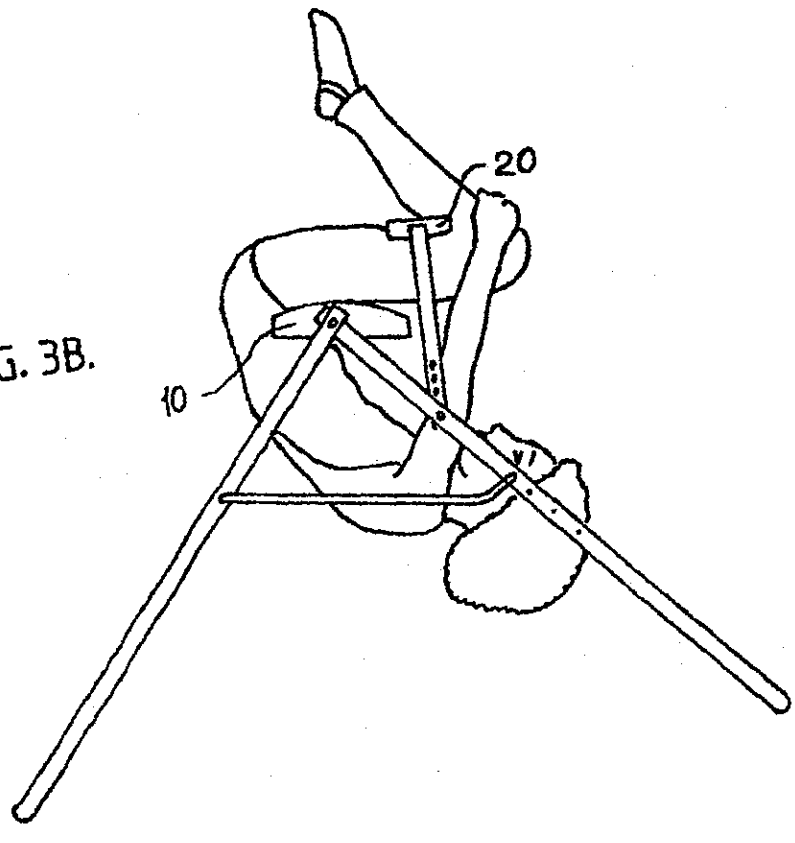

FIG. 3B.

END

Reference B

United States Patent [19]

Barber

[11] **4,232,662**

[45] **Nov. 11, 1980**

[54] **THERAPEUTIC DEVICE FOR A HUMAN BODY**

[76] Inventor: **S. Morgan Barber**, P.O. Box 223, Yerington, Nev. 89447

[21] Appl. No.: **958,013**

[22] Filed: **Nov. 6, 1978**

[51] **Int. Cl.**[3] **A61F 5/00**

[52] **U.S. Cl.** **128/71; 272/144**

[58] **Field of Search** ..... 272/144, 145; 128/24 R, 128/71, 72, 73, 74

[56] **References Cited**

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3,286,708	11/1966	Gartner	272/145 X
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4,114,613	9/1978	Kuhn	128/71 X

FOREIGN PATENT DOCUMENTS

1390536	4/1975	United Kingdom	272/144

Primary Examiner—John D. Yasko
Attorney, Agent, or Firm—Paul A. Weilein; B. F. Spencer

[57] **ABSTRACT**

A therapeutic device for treating and exercising the human body by tilting it to different angular positions. The device has a body supporting structure that is pivotally supported on a main frame, the body supporting structure being comprised of an upper body supporting portion and a lower body supporting portion, these portions being interconnected by a central elongate frame. The upper body supporting portion includes an elongate platform. The lower body supporting portion includes a first support in the form of step members arranged to extend under each foot and form a support to limit endwise movement of the body in a downward direction when the body supporting structure is tilted so as to elevate the head of the body thereon above a horizontal position, and a second support positioned and operative to embrace each ankle area and adjacent foot instep area in a manner to form a support to limit endwise movement of the body in an opposite downward direction when the body supporting structure is tilted so as to lower the head of the body below a horizontal position. A variety of unique adjustments are provided for varying the relationship between the components of the first support and the second support in order to obtain a maximum degree of comfort during use of the device.

18 Claims, 15 Drawing Figures

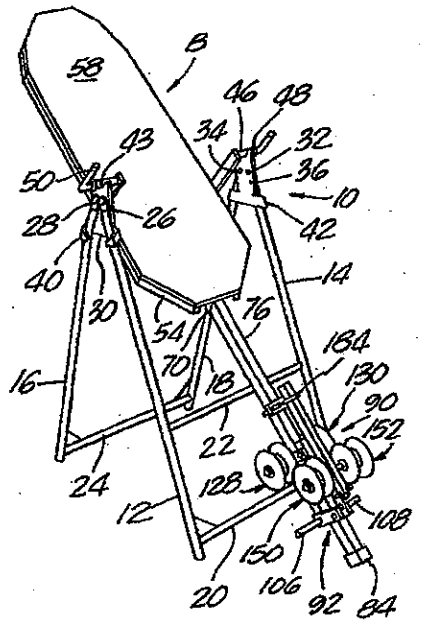


FIG. 3.

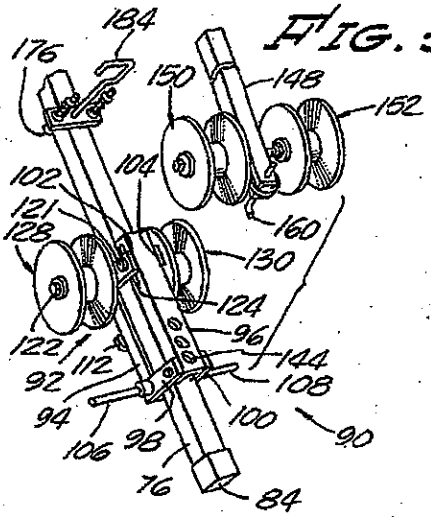


FIG. 1.

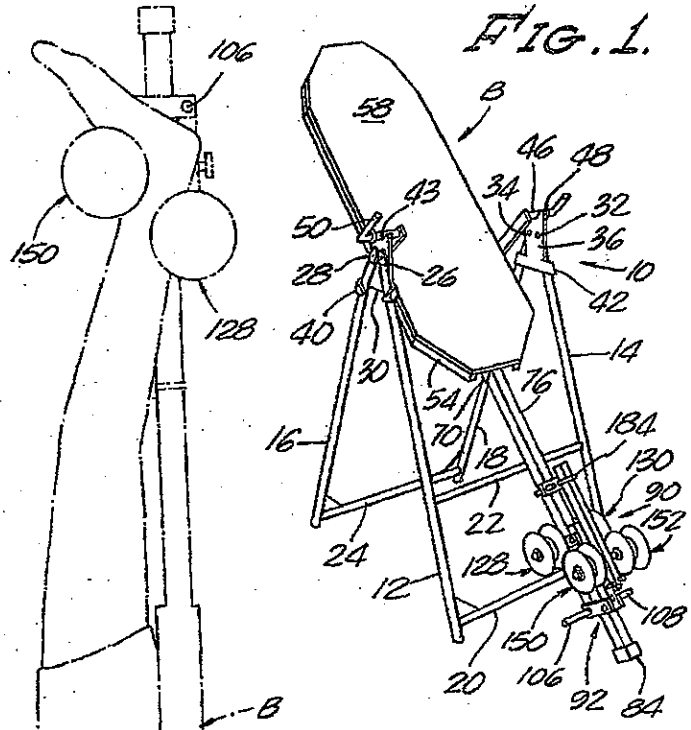
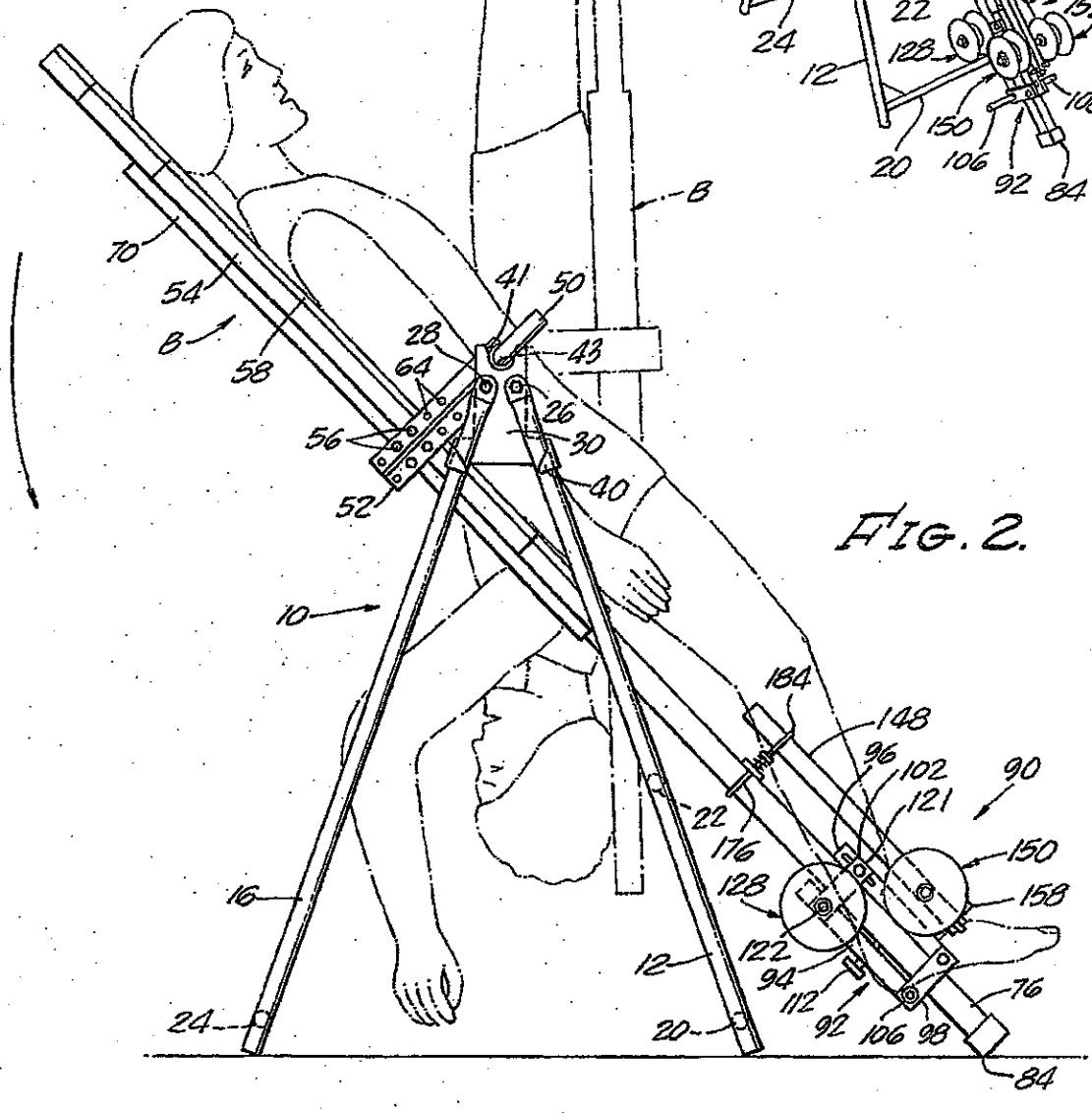


FIG. 2.



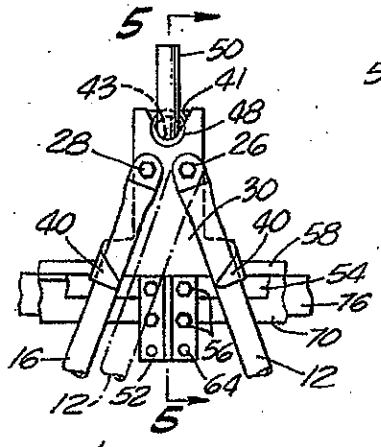


FIG. 4.

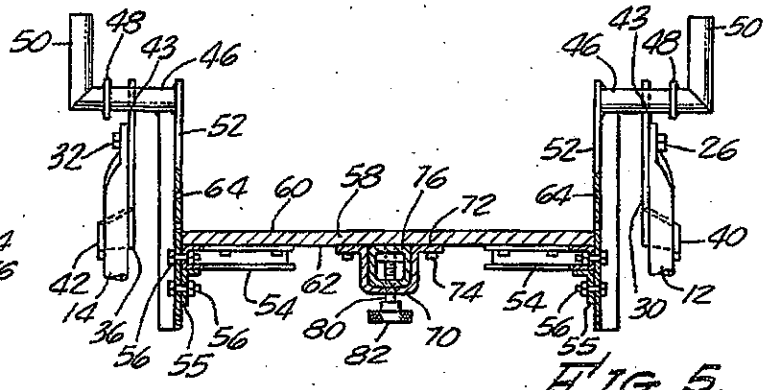


FIG. 5.

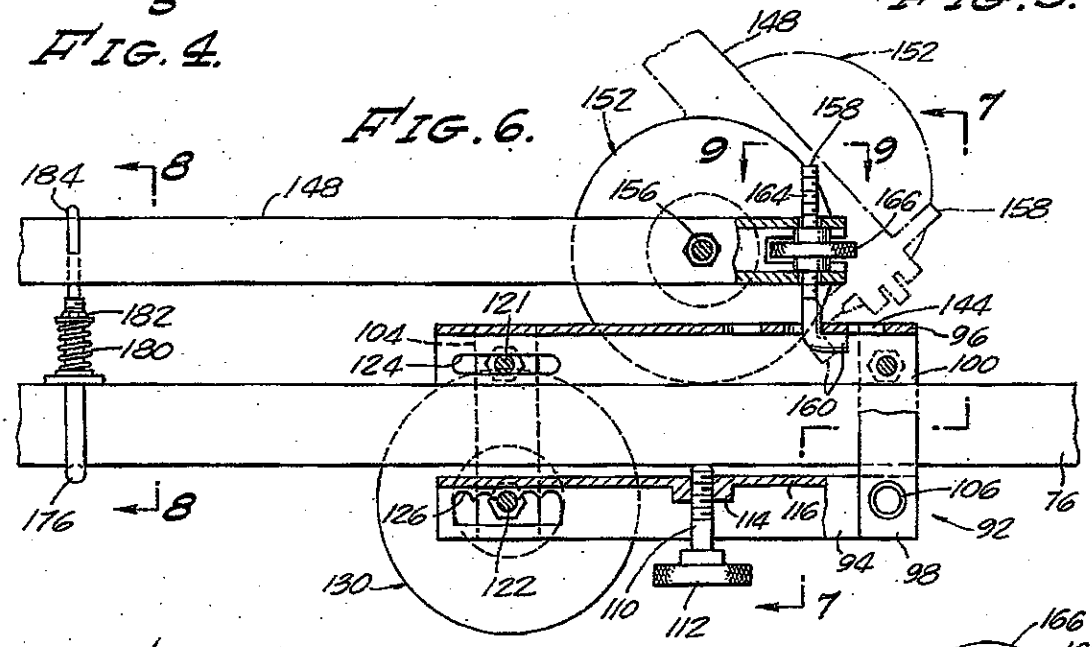
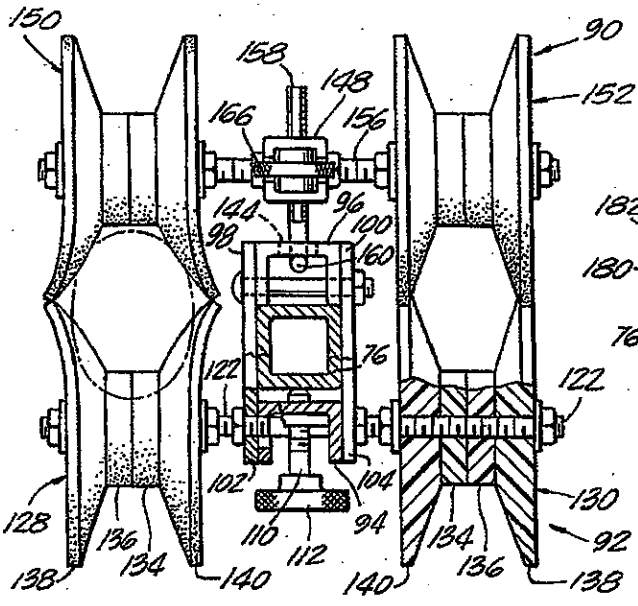


FIG. 6.

FIG. 7.



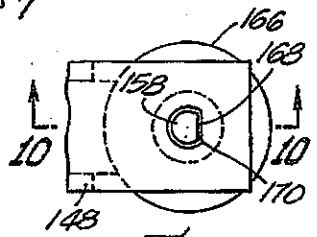


FIG. 9.

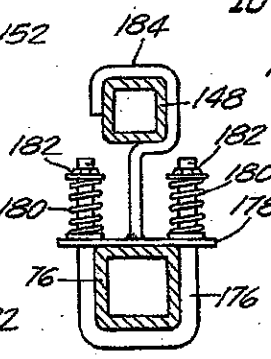


FIG. 8.

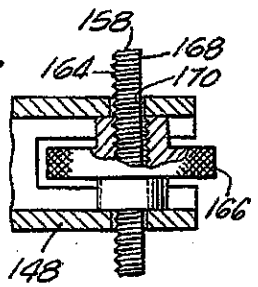


FIG. 10.

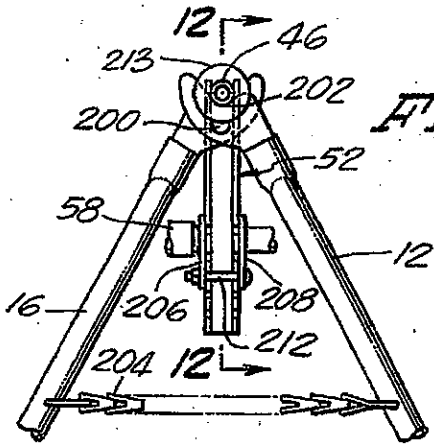


FIG. 11.

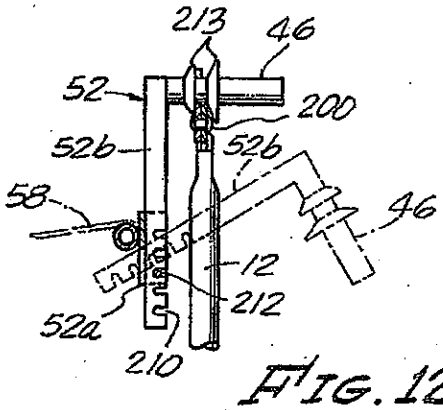


FIG. 12.

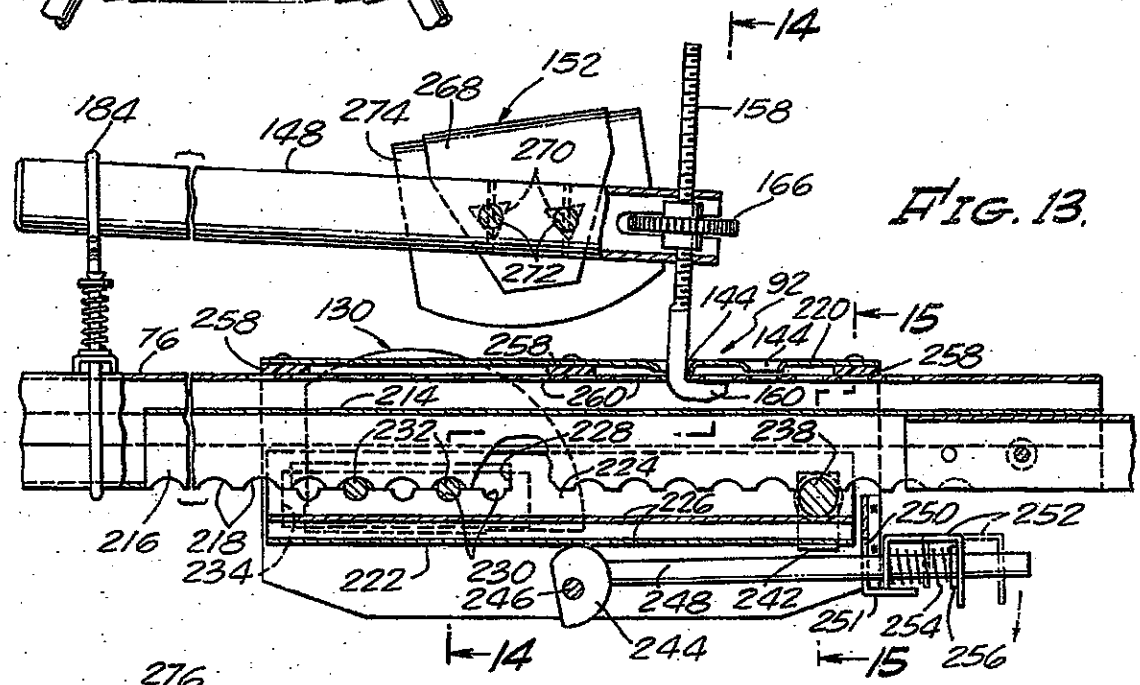


FIG. 13.

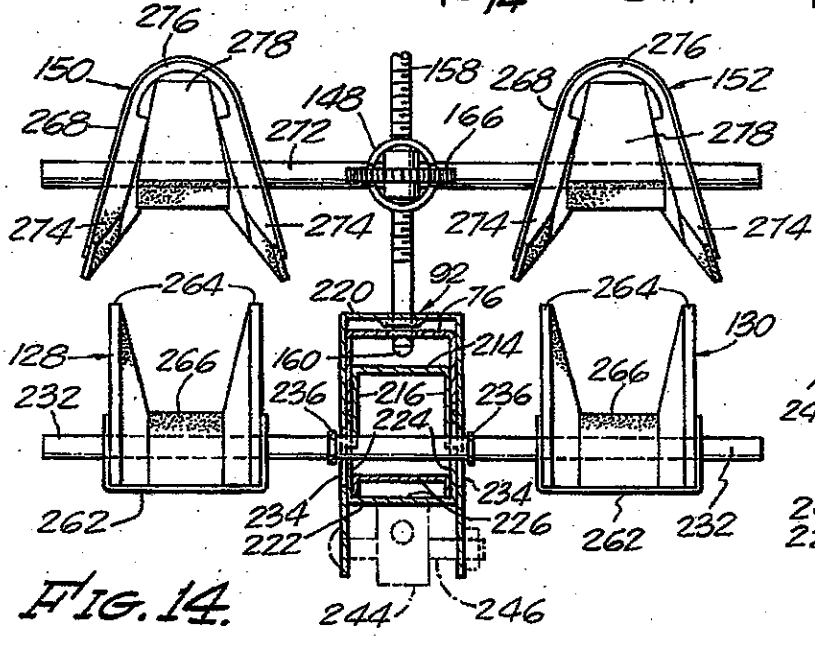


FIG. 14.

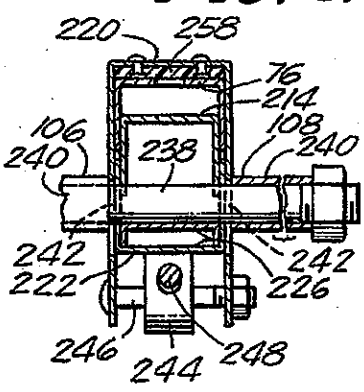


FIG. 15.

THERAPEUTIC DEVICE FOR A HUMAN BODY

BACKGROUND OF THE INVENTION

The present invention relates generally to devices for the therapeutic treatment and exercising of the human body.

It has heretofore been generally known that certain types of body exercising and treatment devices, if properly designed and operated, can produce desirable and healthful therapeutic results upon the human body. In this category, devices for moving the human body between upright and inverted positions have been found to be particularly beneficial. Supporting the human body in an inverted position from the lower limbs tends to produce a lengthening of the body; separate the joint spaces, especially the intervertebral joint spaces; aid in the elimination of vascular and visceral ptosis; to decompress the body; to aid circulatory exchange; and to readjust the lines of stress of the body.

A variety of devices have heretofore been known in which a body could be moved from upright to inverted positions and even continuously rotated. Typical of the prior art devices are those disclosed in the Heisler et al U.S. Pat. No. 3,152,802 and the Gartner U.S. Pat. No. 3,286,708.

The prior art devices differ primarily in the structural design of the parts for embracing and holding the lower body extremities to permit the body inversion, and while such function is in general realized, the prior art devices have, in the main, embodied inherent disadvantages as well as problems attending their use. For example, in a number of these devices it was difficult for one person to use the device without the assistance of another person to aid in placement of the body in the device and in the engagement of the lower body supporting means. In other of the devices it was difficult for the user to tilt or rotate the body supporting structure without assistance.

One of the most prominent difficulties of the prior art devices resides in the inability of the holding means for the lower extremities to hold these extremities comfortably for extended periods of time, or to be able to effectively engage the lower extremities in a manner to prevent undesirable slippage during transitional movements of the body supporting structure between body upright and body inverted positions.

SUMMARY OF THE INVENTION

More particularly, the present invention is concerned with the provision of an improved therapeutic device which can be operated with ease and without assistance to support and move the human body between upright and inverted positions, and in which the holding means for the lower extremities may be conveniently accessible to the user for movement into engaged and disengaged positions, and for the making of the necessary adjustments to properly balance the body on the body supporting structure, and tiltingly change the body position at will.

With the foregoing in mind, it is one object of the herein described invention to provide an improved therapeutic device by means of which an unskilled person can support and move his body through tilting movements between an upright position and an inverted position.

A further object is to provide a device for the foregoing purpose which is economical of manufacture, which

can be easily disassembled and stored, and which embodies adjustments whereby it may be easily and readily accommodated to the variants of sizes of the human body.

Another object of the invention is to provide in a therapeutic device of the type in which the body is tilted into inverted positions, improved holding means for the feet and ankle portions of the body, which provide a cushion support, and which may be easily adjusted to fit the user's extremities, whereby these extremities will be comfortably embraced and held during lengthy periods of body inversion.

Still another object is to provide improved means for orienting the body on the body supporting structure so as to properly position the center of gravity of the body in a balanced relationship to the pivotal support of the body supporting structure, to the end that the user may vary the tilted position of the body supporting structure merely by extending his arms in different directions.

A still further object resides in the provision of improved means for embracing the ankle and instep portions of the user's body, and in which the embracing elements may be releasably locked by the user in their operative positions and easily released to permit the user to dismount from the device.

Further objects and advantages of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing a preferred embodiment of the invention without placing limitations thereon.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to the accompanying drawings, which are for illustrative purposes:

FIG. 1 is a perspective view of a therapeutic device according to the present invention;

FIG. 2 is an enlarged side elevational view illustrating several operative positions of the device;

FIG. 3 is a fragmentary exploded perspective view, showing means for supporting and securing the lower portions of the body therein;

FIG. 4 is a fragmentary side view illustrating the pivotal connection between the body supporting structure and the main frame;

FIG. 5 is a fragmentary transverse sectional view of the same, taken substantially along line 5—5 of FIG. 4;

FIG. 6 is an enlarged fragmentary side view of the lower body supporting portion shown in FIG. 3;

FIG. 7 is an end view, partially in cross section, of the lower body supporting portion, taken substantially along the line 7—7 of FIG. 6;

FIG. 8 is a sectional view taken substantially along the line 8—8 of FIG. 6, showing details of means for locking the lower body supporting portion in an operative position;

FIG. 9 is a fragmentary plan view of the locking means as seen along the line 9—9 of FIG. 6;

FIG. 10 is a fragmentary sectional view, taken substantially on line 10—10 of FIG. 9;

FIG. 11 is a view similar to FIG. 4 of a modified form of the invention;

FIG. 12 is a fragmentary sectional view taken substantially on line 12—12 of FIG. 11;

FIG. 13 is an enlarged fragmentary side view similar to FIG. 6, partly in section, of the lower body supporting portion of the modified form of the invention;

FIG. 14 is a view similar to that of FIG. 7, and including a transverse section taken substantially on line 14—14 of FIG. 13; and

FIG. 15 is a fragmentary transverse sectional view taken substantially on line 15—15 of FIG. 13.

DESCRIPTION OF THE SEVERAL EMBODIMENTS

Referring more specifically to the drawings, for illustrative purposes there is shown in FIG. 1 a therapeutic device, as generally indicated by the numeral 10, embodying the features of the present invention. More specifically, the device comprises a body supporting structure B that is pivotally mounted for rotational swinging movement on a main supporting A-frame formed of two forward legs 12 and 14 and two rearward legs 16 and 18. The legs 12, 14 have a connecting crossbar 20 extending therebetween, and also a connecting crossbar 22 which is in the swinging path of movement of the body supporting structure B and provides a stop for limiting such swinging movement in one direction. Rear legs 16 and 18 have a transverse bottom connecting crossbar 24. The legs 12 and 16 are independently pivotally engaged at 26 and 28 to a pivot support plate 30, and similarly the legs 14 and 18 are pivotally secured at 32 and 34 to a pivot support plate 36 on the other side of the frame. The two sets of legs are adapted to be positioned for use, as shown in full lines in FIG. 4, and moved together as shown in phantom lines for storage. Spreading of the legs into their use position is limited by stops 40 and 42 on the plates 30 and 36, respectively.

As best seen in FIGS. 1, 2, 4 and 5, the top edges of the support plates 30 and 36 are respectively formed with a notch 41 having an arcuate bottom surface 43, in which supporting side trunnions 46 of the body supporting structure B are adapted to pivot. The body supporting structure B is laterally retained in a proper operating position between the plates 30 and 36 by means of outwardly disposed abutment flanges 48. Also, as shown, the outer ends of the trunnions, if desired, may be formed to provide handles 50 which are in a position for easy grasp by a user on the body supporting structure, if desired.

The side trunnions 46 at their inner ends are connected with opposed downwardly extending bracket members 52, which are positioned on opposite sides of a platform 58 that forms an upper body supporting portion of the body supporting structure B. Each side of this platform is reinforced by an edge channel 54 secured to its underside. Intermediate its ends, the platform is secured on each side to the bracket members 52 by means of retaining bolts 56 having securing engagement with the adjacent channel 54 and an underlying reinforced angle member 55. The platform 58 has a body-receiving upper side 60 opposite underside 62. The position of the platform 58 in relation to the trunnions 46 is adjustable, and it can be mounted more closely to or farther away from the trunnions simply by repositioning the bolts 56 in the bolt holes 64 provided in the support members 52 for this purpose, as shown in FIGS. 4 and 5.

The upper body supporting portion of the structure B is connected with a lower body supporting portion by means of an interconnection that includes a longitudinally extending channel 70 disposed on the underside of the platform and secured thereto by means of retaining bolts engaged with side flanges 72 formed along the opposite sides of the channel. A central frame member 76 in the form of a rectangular rod or bar is slidably supported in the channel 70, and is arranged to be secured in a longitudinally adjusted position with respect to the platform by means of a bolt 80 having a finger actuator knurled portion 82, the bolt being threadedly engageable through the channel 70 and the frame member 76 in one of a plurality of tapped bores. The frame member 76 is adjusted so that its lower end 84, FIG. 2, will engage the floor or other surface on which the device is placed, and thus serves to limit the tilting movement of the body supporting structure B in a direction opposite to that in which the stop bar 22 is engaged.

The lower body supporting portion, as generally indicated by numeral 90, is carried by the frame member 76, and will now be described with particular reference to FIGS. 1–3 and 6–10. A frame structure generally designated as 92, is slidably supported on the frame member 76 and is comprised of a downwardly opening channel 94 extending along and below the frame member 76, and an upper channel member 96 supported above frame member 76. The channel members are secured together by a pair of bolted side plates 98 and 100 at their outer ends, and side plates 102 and 104 at their inner ends.

One of the bolts for the plates 98 and 100 provides a pivot for the channel 94 and also extends outwardly on the opposite sides of the frame structure 92 so as to form foot engageable step members 106 and 108 respectively on opposite sides of the frame member 76. From the foregoing, it will be apparent that the position of these step members will determine the balancing position of the center of gravity of the body being supported with respect to the pivoting trunnions 46. Also, due to varying body lengths, it is desirable to permit adjustment of the position of these steps. For this purpose, the frame 92 is slidably adjustable along the frame member 76 and adjustably secured in place by a retaining bolt 110 having a finger actuator portion 112, the bolt being threadedly engaged in a boss 114 extending from channel base 116 of the channel 94, whereby its innermost end may be forced against the underside of the frame member 76 at the adjusted position.

The plates 102 and 104 are secured to the channels 96 and 94 by bolts 121 and 122, FIGS. 6 and 7. The upper bolt 121 extends through opposing aligned slots 124 in the side walls of the channel 96 and the lower bolt 122 is adapted to be selectively fitted into one of a plurality of downwardly opening semicircular notches 126 in the side walls of the channel 94. The plates 102 and 104 and the bolts may be changed to adjust their position towards or away from the foot steps 106 and 108 by loosening the bolt 110 so as to permit limited swinging movement of the channel 94 about its pivoted end to a notch disengaged position, whereupon the bolts 121 and 122 may be shifted to the desired new position and the bolt 110 again tightened to seat the bolt 122 in the selected holding notch at the new position.

The lower bolt 122, FIG. 7, extends substantially beyond the opposite sides of channel 94 and provides a support for ankle area engaging members 128 and 130, each comprised of abutting central cylindrical members 134 and 136 and outer wall portions 138 and 140, the wall portions respectively abutting the inner cylindrical portions. The wall portions preferably taper outwardly from the cylindrical inner portions to form, in effect, a circumferentially extending groove surface of engagement. The walls and cylindrical portions are retained in

assembled relation on bolt 122 by appropriate nuts shown in FIG. 7. The walls and cylindrical portions are formed of soft resilient plastic or elastomeric material which embrace the ankle area and provide a cushion support therefor. Adjustment of bolts 121 and 122 toward or away from the step members 106 and 108, as previously described, enables the members 128 and 130 to be properly positioned so as to comfortably engage the rear of the lower leg or ankle area above the bottom of the foot, and so as to overlap the area of the lower leg adjacent both sides of each ankle.

The base wall of the channel 96, FIGS. 3 and 6, has a plurality of longitudinally spaced openings 144 for making adjustable connections with a lever 148 which supports a pair of spaced instep and ankle area engaging members 150 and 152, which are of the same construction and material as the ankle area engaging devices 128 and 130. It will be appreciated that while the members 128, 130, 150 and 152 have been shown as circular, these members may be of arcuate configuration. As best seen in FIGS. 6 and 7, the members 150 and 152 are fixed in place on opposite sides of the lever 148 adjacent its outer end by means of a bolt 156, extending through the lever member, and a plurality of appropriate nuts for tightening the members on the bolt and the bolt on the lever member. As thus arranged, the members 150 and 152 will be positioned between and above the step members 106, 108 and the members 128 and 130 with which they will coact to snugly and effectively embrace the ankle and instep areas and form a cushion holding support during tilting movements of the body.

In order to obtain maximum comfort, a variety of adjustments have been provided in order to accommodate the ankle and instep embracing members to the varied sizes and contours in body structures. To this end, the lever 148 is adjustably secured to the frame 92 by means of an L-shaped hooking member 158, FIGS. 6, 7, 9 and 10, having a lower L-leg hook 160 which is adapted to be selectively inserted into one of the openings 144 in the channel 96, as shown in phantom lines in FIG. 6. Such adjustment may be readily accomplished by a user while standing on the step members 106 and 108, since the lever member 148 is in convenient operating reach for disconnection, adjustment and reconnection.

The upper leg of the hooking member 158 has threads 164 engaged in an adjusting knurled nut 166 which is rotatably confined within the lever member 148. The upper leg is formed with a flat surface 168, FIGS. 9 and 10, which is adapted to engage a flat portion 170 on the lever member 148 to prevent rotation of the member 158. Thus, by rotation of the knurled nut 166 the operative position of the members 150 and 152 carried by the lever 148 may be preadjusted so as to be closer or farther away from the members 128 and 130 and the step members 106 and 108.

As best shown in FIGS. 1 and 6–8, unique means are provided for releasably locking the lever 148 in its operative position in which it extends in generally spaced parallel relation along the frame member 76 (FIG. 6). For such purpose, an upstanding bail 184, shaped to slip endwise over the outer end of the lever 148, is slidingly and resiliently retained on the frame member 76 for movement therealong. More specifically, the bail has a base end which is welded or otherwise secured to a transverse bridging bar 178 positioned to engage one side of the frame member 76. An attaching U-bolt 176 embraces the frame member 76 and has threaded legs which extend through end apertures in the bridging bar and are fitted with compression coiled springs 180 having one end bearing against the bar and their other end bearing against an abutment washer engaged by a nut 182 in each case. The bail may be readily moved along the frame member to released and locking positions with respect to the lever 148, and in the released position permits the user of the device to conveniently swing the lever to a released detached position with respect to the frame 92 to release the ankle holding means, or readjust the members 150 and 152, or for other reasons.

After the lever 148 has been secured in its operative position by the bail, the feet are in the position as shown in full lines in FIG. 2, wherein the body will be supported against endwise movement primarily by the step members 106 and 108. If the ankle and instep engaging members are in a proper and comfortable adjustment, the user may then pivotally swing the body supporting structure B to the body inverted position shown in phantom lines in FIG. 2, wherein endwise movement of the body will be primarily opposed by the coaction of members 128, 130 and 150, 152, since the step members 106 and 108 are now disengaged from the feet. With the body properly balanced on the body supporting structure B, the pivotal movements thereof may be controlled simply by movements of the arms to differently oriented outstretched positions.

The therapeutic device of the present invention, as described above, is simple and easy to use and adjust. In order for the user to place his body on the body supporting structure B, the structure should be placed in position, as shown in FIG. 1. By then releasing the bail 184, the lever 148 is swung to the release position as shown in phantom lines, FIG. 6, which will enable its detachment together with the members 150 and 152, from the frame 92. The user may now easily recline his body with his back on the platform 58 and his feet respectively upon the steps 106 and 108, steadying himself, if necessary, by grasping one or both of the handles 50, or other parts of the frame structure.

Assuming that the position of the steps 106 and 108 have been previously properly adjustably positioned to place the body in a balanced position with reference to the pivotal support of the body supporting structure B, and that the members 128 and 130 have been properly adjusted to comfortably embrace the ankle areas, the hook end 160, which has preferably been adjusted, will be inserted in the proper opening 144, and the lever 148 swung to its locking position, as shown in full lines in FIG. 6. If the engagement of members 150 and 152 and 128 and 130 feel comfortable, then the lever 148 may be securely locked in its operative position by means of the bail 184. If the engaged portions of the lower body portions are not comfortable, then readjustment should be made in the manner previously described. With the lower body portions thus secured, and with the body in a balanced position, the body supporting structure may be swingably tilted to place the body in an upright or inverted position simply by extending the arms alongside the body or extending them above the head. At the completion of the use period, it is a simple operation to move the bail 184 to a released position and then swing the lever 148 to a position in which the hook 160 may be disconnected, whereupon the user is free to dismount from the step members 106 and 108.

Referring now to FIGS. 11–15, a modified form of the invention is illustrated, which incorporates a num-

ber of structural changes for enhancing the basic operational features of the therapeutic device, as previously described.

One of these changes comprises the incorporation of an adjustable pivotal support for the body supporting structure B so as to facilitate adjustment of the spacing distance of the platform 58 with respect to the trunnions 46. This adjustment enables the user to better control the movements of the platform and body balance characteristics during use. As the distance of the platform from the trunnions is increased, the greater will be the tendency of the platform to assume a horizontal position, and as the distance is decreased, the greater will be the tendency of the platform to assume a vertical position.

More specifically, as shown in FIGS. 11 and 12, the legs of the supporting A-frame are pivotally interconnected in each case by a pivot 200 to provide a scissor-connection such that the upper ends coact to form unpwardly opening notches 202 adapted to supportingly receive the side trunnions 46. The extent of opening of the leg structures is limited by a chain 204.

As best seen in FIG. 12, the supporting bracket 52 is in this case constructed to provide two interconnectable sections 52*a* and 52*b* respectively. Section 52*a* is fixedly secured to the adjacent side frame of the platform 58 and is constructed to provide spaced apart side walls 206 and 208 which extend downwardly from the body supporting structure and are adapted to receive the section 52*b* of channel configuration therebetween. The side walls of this channel are provided in their lower end portions with a series of longitudinally spaced apart side wall edge notches 210 which are in transverse alignment. The side walls 206 and 208 adjacent their lower ends are interconnected by a bolt 212 which is adapted to seat in the notches at the respective adjusted positions of the bracket. The bracket 52 may be adjusted to vary the spacing of the platform 58 with respect to the trunnion 46 by tilting the bracket to an angular position as shown in phantom lines in FIG. 12, whereupon the bracket may be shifted to place the bolt 212 in the appropriate notches, and upon moving the bracket section back to its alignment with the fixed section 52*a*; the platform may be suspended in its adjusted position. Each trunnion is retained longitudinally in its operative position by a pair of spaced annular flanges 213.

The sliding frame structure 92 has also been structurally modified to facilitate its adjustments along the central frame member 76.

As best shown in FIGS. 13, 14 and 15, the outermost end portion of the rectangular tubular frame member 76 has its bottom wall removed together with the lower portion of each side wall, and an inner channel portion 214 secured therein as by welding in a position so that its side walls 216 will extend substantially to the bottom wall of the frame member 76. The side walls 216 are formed with longitudinally spaced semicircular notches 218 which are in transverse alignment.

The sliding frame structure 92 in the modified arrangement comprises an upper U-shaped channel 220 and a lower U-shaped channel 222, these channels being in confronting relationship with their side walls in overlapping relation. The lower channel 222 has side walls 224 which are bridged in this case by a double bridging wall 226.

The inner end portion of the lower channel 222 has its side walls 224 similarly formed with an elongate generally rectangular opening 228 which has its lowermost edge formed with a series of spaced edge notches 230 which are in transverse alignment and adapted to confrontingly mate with the adjacent notches 218 along the lower edges of the side walls 216.

As shown in FIG. 14, the ankle engaging member 128 and 130 are supporting upon a pair of laterally spaced supporting rods 232 which extend through side windows 234 in the side walls of the upper channel 220, and the rectangular openings 228 in positions where they may be clampingly engaged between the notches 218 and 230. The rods 232 are retained against endwise movement by suitable snap rings 236 placed on opposite sides of the side walls of the upper channel 220.

As will be seen in FIG. 15, the steps 106 and 108 are comprised by an elongate bolt 238 and a pair of suitable tubular sleeve members 240 positioned on opposite sides of the side walls of the upper channel 220. As shown in FIG. 13, the bolt 238 extends through the aligned side openings, as generally indicated at 242, in the side walls of the upper channel 220 and the side walls of the lower channel 222. As thus arranged, the bolt 238 will be clampingly engaged between the double bridging wall 226 and the edge notches 218 at the adjusted position of the frame structure 92.

For clampingly securing the frame structure 92 in the desired adjusted position longitudinally of the frame member 76, a clamping cam member 244 is rotatably supported on the side walls of the upper channel member 220 by means of a supporting bolt 246. Manual actuation of the cam 244 is accomplished by means of an elongate rod handle 248 which is arranged to assume a substantially parallel position along the bottom or bridging wall of the lower channel member 222, when the cam is in a fully clamping position. At this position, the handle is arranged to extend through a slot 250 of a fixed bracket 251. A spring-urged latch member 252 is slidably mounted on the outermost end of the handle 248 for sliding movement, the latch member being normally urged towards a latching position by a compression spring 254, one end of this spring bearing against a nut 256 and its other end against the latch member. Upon release, the handle 248 may be freely swung in a clockwise direction to actuate the cam 244 to a position which will permit the downward movement of the lower channel member 222 to a position which will permit adjusting movements of the frame structure 92 longitudinally of the frame member 76, as well as slight adjustment of the positions of the rods 232 in the notches 230, if desired. When the proper adjustment is obtained, the cam 244 is moved to its clamping position and the handle 248 latched to the bracket 251.

Preferably, the upper channel member 220 is supported upon appropriate spacer pads as indicated at 258. As in the case of the structure previously described, the hook 160 is similarly arranged to be selectively inserted into one of the openings 144 of the upper channel member 220. In the modified arrangement, however, it will be seen that the adjacent upper wall of the frame member 76 is provided with a series of openings 260 which have the same spacing as the openings 144 and with which the openings 260 are aligned during adjusting movements of the frame structure 92. Thus, the hook 160 extends through aligned openings 144 and 260 at the adjusted position to releasably lock the frame structure 92 against movement on the frame member 76.

The structure and configuration of the ankle embracing members 128, 130, 150 and 152 has been changed in the modified structure. Basically, each of these mem-

bers preferably comprises a U-shaped support of metal which is arranged to be supported against tilting movement on a pair of spaced supporting rods. In the case of the members **128** and **130**, the U-shaped support, as indicated at **262**, is shown as having parallel side walls which are apertured to receive the rods **232** therethrough. The support **262** mounts a pair of spaced inner liners **264** of an elastomeric or other suitable material, these liners having a generally arcuate configuration and being formed with confronting inner surfaces which converge towards a bridging cushion member **266** of a suitable sponge-like material.

In the case of the members **150** and **152**, a U-shaped support **268** is constructed of a spring material. The support is constructed to provide diverging side walls which are appropriately provided with triangularly shaped openings **270** for the reception of supporting rods **272** therethrough, these rods being fixedly supported between their ends by the lever member **148**. The support **268** has inner liners **274** of elastomeric or other suitable material, and which are connected by a bridging web **276**. Bridging cushion members **278** are similarly provided. The spring characteristic of the U-shaped support **268** normally urges the side walls away from each other into a clamped position with respect to the rods **272**. However, by manually moving the side walls towards each other, the support may be unclamped with respect to the rods **272** and movably adjusted thereon to a desired position and reclamped simply by releasing the side walls.

The invention and its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts of the invention without departing from the spirit and scope thereof or sacrificing its material advantages, the arrangements hereinbefore described being merely by way of example. It is not wished to be restricted to the specific form shown or uses mentioned except as defined in the accompanying claims.

I claim:

1. In a therapeutic device for the human body in which a main frame pivotally mounts a body supporting structure for longitudinal tilting movements, said structure having an upper body supporting portion and a lower body supporting portion, the lower body supporting portion being connected with the upper body supporting portion by an elongated central frame member, the improvement comprising:

first means carried by the lower body supporting portion positioned to extend under each foot and form a support to limit endwise movement of the body in a downward direction, when the body supporting structure is tilted so as to elevate the head of a body thereon above a horizontal position;

second means carried by the lower body supporting portion positioned and operative to embrace each ankle area and adjacent foot instep area, and form a support to limit endwise movement of the body in an opposite downward direction, when the body supporting structure is tilted so as to lower the head of a body thereon below a horizontal position;

said second means carried by the lower body supporting portion for embracing the adjacent foot instep area including an elongated lever having a lower and an outer end, the lower end of said lever being adapted for detachably engaging and pivotally supporting said elongated lever with respect to the lower body supporting portion; and

means adapted for intercoupling said lever near its outer end with the lower body supporting portion for retaining said lever in an engaged and locked position.

2. In a therapeutic device for the human body in which a main frame pivotally mounts a body supporting structure for longitudinal tilting movements, said structure having an upper body supporting portion and a lower body supporting portion, the improvement comprising:

first means carried by the lower body supporting portion positioned to extend under each foot and form a support to limit endwise movement of the body in a downward direction, when the body supporting structure is tilted so as to elevate the head of a body thereon above a horizontal position;

second means carried by the lower body supporting portion positioned and operative to embrace each ankle area and adjacent foot instep area, and form a support to limit endwise movement of the body in an opposite downward direction, when the body supporting structure is tilted so as to lower the head of a body thereon below a horizontal position;

an elongated central frame member interconnected between the upper body supporting portion and the lower body supporting portion;

a frame structure mounted on said central frame member for sliding adjusting movements therealong;

said second means comprises a pair of confronting members for embracing each ankle area and adjacent instep area;

said pair of confronting members being supported on said sliding frame structure for relative positioning adjustments, and for independent relative adjustments with respect to said first means;

one of said pair of confronting members being adjustably supported for movement toward and away from said first means to selective operative positions;

the other of said pair of confronting members being carried by a support that is releasably connectible with said sliding frame structure and said elongated central frame member;

the releasably connectable support for said other of said pair of confronting members comprises an elongated lever

a laterally offset hook member is mounted at the outer end of said lever;

a series of openings in spaced relation longitudinally extend along said sliding frame structure for selectively receiving said hook member, and for forming a connection enabling swinging movement of said lever to an operative position extending generally in parallel spaced relation along said central frame; and

means releasably latches said lever in said operative position.

3. A therapeutic device according to claim 2, in which:

said latching means comprises a bail member supported for sliding movements on said central frame member, said bail having a looped end positioned for endwise reception of the lever end.

4. A therapeutic device according to claim 2, in which:

mounting means adjustably supports said hook, and is manually operable to increase and decrease the extent of hook offset to thereby vary the operative spaced relationship between said pair of confronting members of said second means.

5. In a therapeutic device for the human body in which a main frame pivotally mounts a body supporting structure for longitudinal tilting movements, said structure having an upper body supporting portion and a lower body supporting portion, the improvement comprising:

first means carried by the lower body supporting portion positioned to extend under each foot and form a support to limit endwise movement of the body in a downward direction, when the body supporting structure is tilted so as to elevate the head of a body thereon above a horizontal position;

second means carried by the lower body supporting portion positioned and operative to embrace each ankle area and adjacent foot instep area, and form a support to limit endwise movement of the body in an opposite downward direction, when the body supporting structure is tilted so as to lower the head of a body thereon below a horizontal position;

said main frame comprises a pair of elevated upwardly opening supporting notches disposed on opposite sides of said upper body supporting portion;

bracket supports are respectively connected with the opposite sides of said upper body supporting portion, said bracket supports having oppositely extending trunnions in spaced relation to said upper body portion and being adapted to respectively seat in said supporting notches; and

means for selectively adjusting said brackets to vary the spacing of the upper body supporting portion from said trunnions.

6. A therapeutic device according to claim 5, in which:

each of said brackets comprises adjustably interconnectable sections;

one of said sections being fixedly secured to the upper body supporting portion and including laterally spaced apart side walls;

the other of said sections being formed of a channel member having the trunnions fixedly secured at one end, and side walls having a series of transversely aligned edge opening notches in spaced relation longitudinally along the other end portion of the channel;

and a bolt member extending between the side walls of said one section, and being so positioned as to enable selective positioning in said notches, when said sections are in tilted relation, and being operable to retain the sections in the selected adjustment, when the sections are positioned in axial alignment.

7. In a therapeutic device for the human body in which a main frame pivotally mounts a body supporting structure for longitudinal tilting movements, said structure having an upper body supporting portion and a lower body supporting portion, the improvement comprising:

first means carried by the lower body supporting portion positioned to extend under each foot and form a support to limit endwise movement of the body in a downward direction, when the body supporting structure is tilted so as to elevate the head of a body thereon above a horizontal position;

second means carried by the lower body supporting portion positioned and operative to embrace each ankle area and adjacent foot instep area, and form a support to limit endwise movement of the body in an opposite downward direction, when the body supporting structure is tilted so as to lower the head of a body thereon below a horizontal position;

said second means for each ankle area and instep area comprises a pair of generally confronting members conformed to embrace opposite sides of said ankle area, one of said pair of confronting members additionally embraces the foot instep area;

each of said confronting members comprises a generally U-shaped support mounted against tilting movement on a pair of laterally spaced rod members extending transversely through its side walls;

inner liners of resilient material respectively on the side walls; and

inner cushion means in the bottom portion of the U-shaped support extending between the inner liners.

8. A therapeutic device according to claim 7, in which:

the U-shaped member of certain of said embracing members is of a spring material normally operative to urge the side walls away from each other into clamping engagement with its supporting rod members, but upon manual movement of the walls towards each other being clampingly released and enabling adjusting movement of the said embracing member to a different position on said rod members.

9. In a therapeutic device for the human body in which a main frame pivotally mounts a body supporting structure for longitudinal tilting movements, said structure having an upper body supporting portion and a lower body supporting portion, the improvement comprising:

first means carried by the lower body supporting portion positioned to extend under each foot and form a support to limit endwise movement of the body in a downward direction, when the body supporting structure is tilted so as to elevate the head of a body thereon above a horizontal position;

second means carried by the lower body supporting portion positioned and operative to embrace each ankle area and adjacent foot instep area, and form a support to limit endwise movement of the body in an opposite downward direction, when the body supporting structure is tilted so as to lower the head of a body thereon below a horizontal position;

an elongated central frame member interconnected between the upper body supporting portion and the lower body supporting portion;

a frame structure mounted on said central frame member for sliding adjusting movements therealong;

said first means and second means being connected with said sliding frame structure;

means for releasably securing said sliding frame structure in a selected position of adjustment;

said sliding frame structure includes upper and lower U-shaped channel members extending along upper and lower sides of said central frame member, and having their side walls in confronting overlapping relation, the side walls of the upper channel being outwardly of the side walls of the lower channe

and projecting beyond the connecting wall of the lower channel;

the releasable securing means comprises a manually rotatable cam supported on the side walls of the upper channel, said cam being engageable with the connecting wall of the lower channel and upon rotation being operative to selectively move said upper and lower channel members into clamped and unclamped positions; and

means for releasably latching said cam in the clamped position of said channel members.

10. A therapeutic device according to claim 9, in which:

said elongated central frame member carries longitudinally extended spaced side walls having a series of longitudinally spaced transversely aligned downward opening edge notches;

said first means includes a rod member supported at the outer end of the lower U-shaped channel adapted to seat in a pair of said aligned notches of the central frame member in a clamped adjusted position of said sliding frame structure;

said lower U-shaped channel is formed at its inner end portion with a series of upwardly opening transversely aligned side wall edge notches correspondingly longitudinally spaced and in confronting relation to the notches of the central frame member; and

said second means includes ankle embracing members supported on laterally spaced rods adapted to be clampingly engaged between the confronting notches of said lower channel and said central frame member in the clamped adjusted position of said sliding frame structure.

11. In a therapeutic device for the human body in which a main frame pivotally mounts a body supporting structure for longitudinal tilting movements, said structure having an upper body supporting portion and a lower body supporting portion, the improvement comprising:

first means carried by the lower body supporting portion positioned to extend under each foot and form a support to limit endwise movement of the body in a downward direction, when the body supporting structure is tilted so as to elevate the head of a body thereon above a horizontal position;

second means carried by the lower body supporting portion positioned and operative to embrace each ankle area and adjacent foot instep area, and form a support to limit endwise movement of the body in an opposite downward direction, when the body supporting structure is tilted so as to lower the head of a body thereon below a horizontal position;

an elongated central frame member interconnected between the upper body supporting portion and the lower body supporting portion;

a frame structure is mounted on said central frame member for sliding adjusting movements therealong;

said first means are supported at the outer end of said sliding frame structure;

said second means comprises a pair of confronting members for embracing each ankle area and adjacent instep area;

one member of each pair of confronting members is supported at the inner end of said sliding frame structure; and

the other member of each pair of confronting members is carried by a detachable support that is releasably connectable with said sliding frame structure and said central frame.

12. A therapeutic device according to claim 11, in which:

the detachable support for said other member of each pair of confronting members comprises an elongate lever with said other of the members positioned adjacent the outer end thereof;

a laterally offset hook member is mounted at the outer end of said lever;

a series of openings extending along an upper portion of said sliding frame structure are adapted to selectively receive said hook member and form a connection enabling swinging movement of said lever to an operative position extending generally in parallel spaced relation along said central frame; and

means releasably retains said lever in said operative position.

13. A therapeutic device according to claim 12, in which:

said hook is adjustable to increase and decrease the extent of hook offset.

14. A therapeutic device according to claim 12, in which:

a series of openings in an adjacent surface of said central frame structure are adapted to register with the openings of said sliding frame structure at its respective adjusted positions; and

said hook extends through one set of the registered openings to thereby lock the sliding frame structure to the central frame structure at a selected adjusted position.

15. The therapeutic device according to claim 1 wherein said first and second means carried by the lower body supporting portion is adjustably positionable along said elongated central frame member.

16. The therapeutic device according to claim 1 wherein the lower end of said elongated lever includes a hook, said hook being adapted for detachably engaging and pivotally supporting said elongated lever with respect to the lower body supporting portion, the outer end of said elongated lever being adapted to serve as a handle for gripping said lever.

17. The therapeutic device according to claim 1 wherein said means adapted for intercoupling said lever with the lower body supporting portion includes a bail member slidably carried by the elongated central frame member, said bail member being adapted to slip endwise over the outer end of said lever.

18. The therapeutic device according to claim 16 wherein said hook at the lower end of said lever is adjustable with respect to said lever to increase or decrease the extent of hook offset.

* * * * *

Reference C

United States Patent [19]

Krause

[11] 4,292,962

[45] Oct. 6, 1981

[54] **APPARATUS FOR POSTURAL TREATMENT OF HUMANS**

[76] Inventor: Nicolaas J. P. R. Krause, 35 Machine St., Elsburg, Transvaal Province, South Africa

[21] Appl. No.: 31,518

[22] Filed: Apr. 19, 1979

[51] Int. Cl.³ A61F 5/00

[52] U.S. Cl. ..... 128/68; 128/24 R; 272/49; 272/93

[58] Field of Search ..... 128/68, 69, 71, 72, 128/73, 74, 75, 84 R, 24 R; 272/55, 56, 49, 144, 145, 134, 93; 269/323, 324, 325, 326

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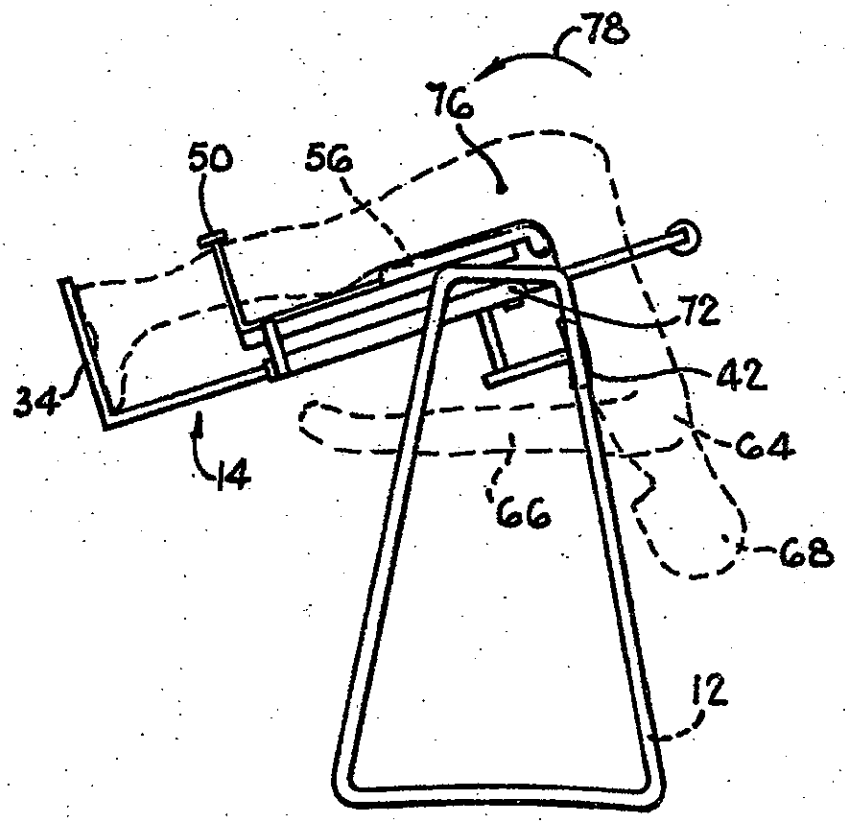
Primary Examiner—Kyle L. Howell
Assistant Examiner—Arthur S. Rose

[57] **ABSTRACT**

An apparatus for effecting postural treatment of humans. The apparatus includes a pivoting platform structure pivotally mounted on a stand. The platform structure is such that a person can be supported in the region of his hip in a bent over, face down attitude and an adjusting mechanism is provided whereby the position of the platform relative to the pivotal axis may be varied. By such adjustment of the pivotal axis, the center of gravity of a person supported on the platform can be adjusted and in particular can be adjusted in such a way that a person, supported on the platform, can control pivoting of the platform by varying the position of his arms.

24 Claims, 6 Drawing Figures



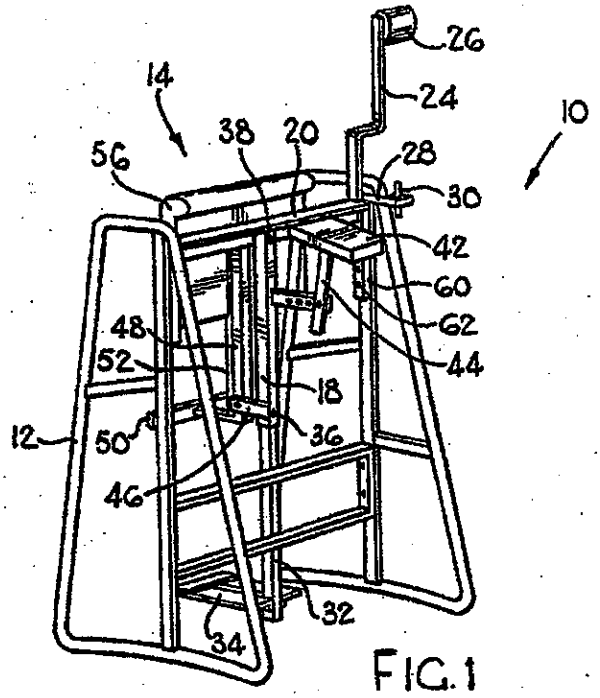

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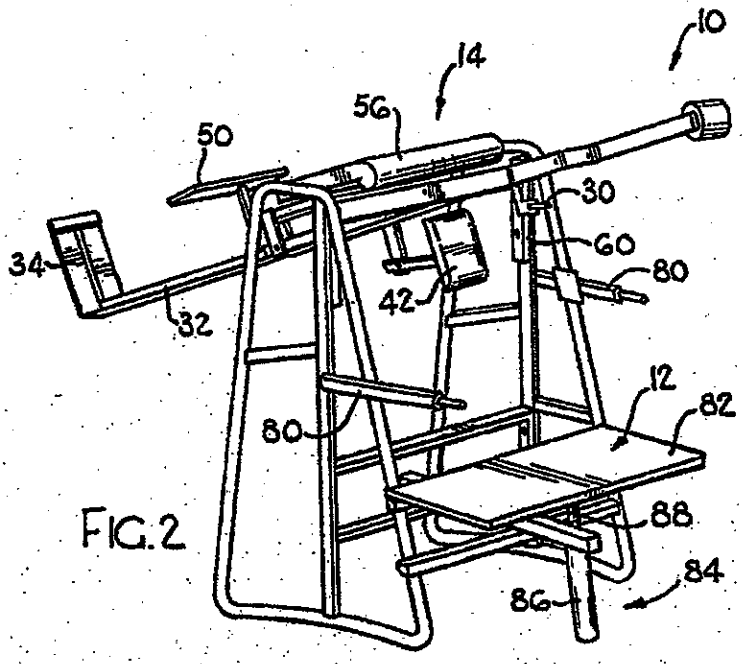
FIG. 1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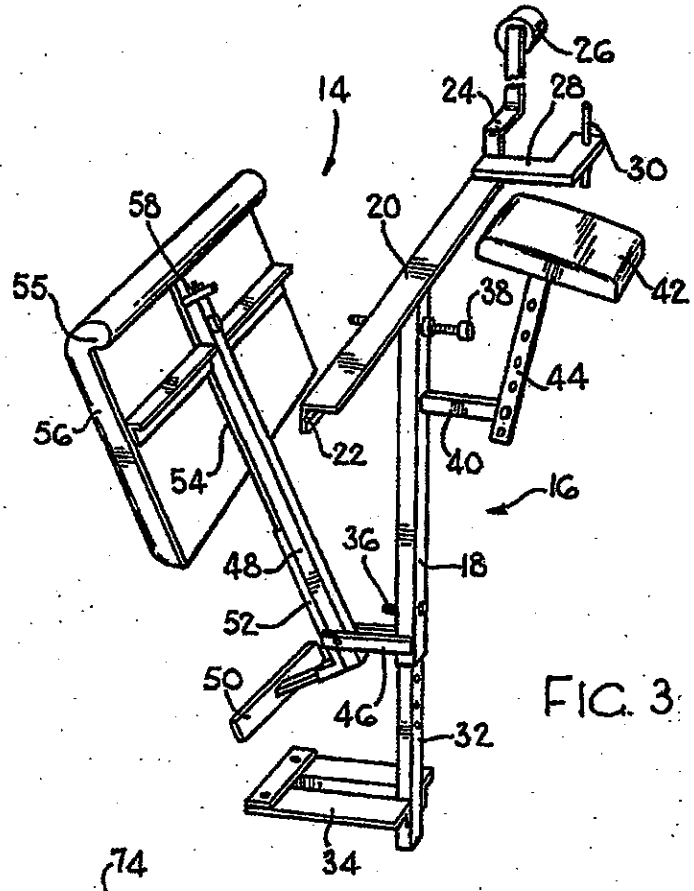
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FIG. 3

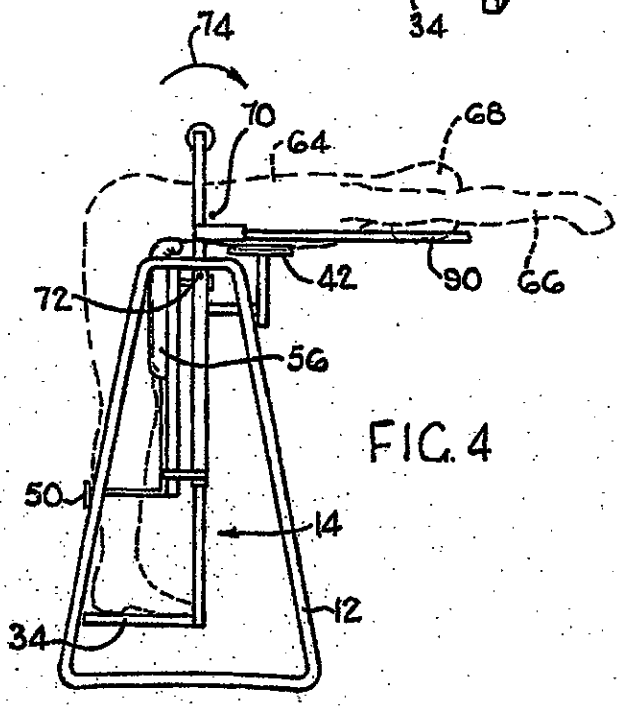
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FIG. 4

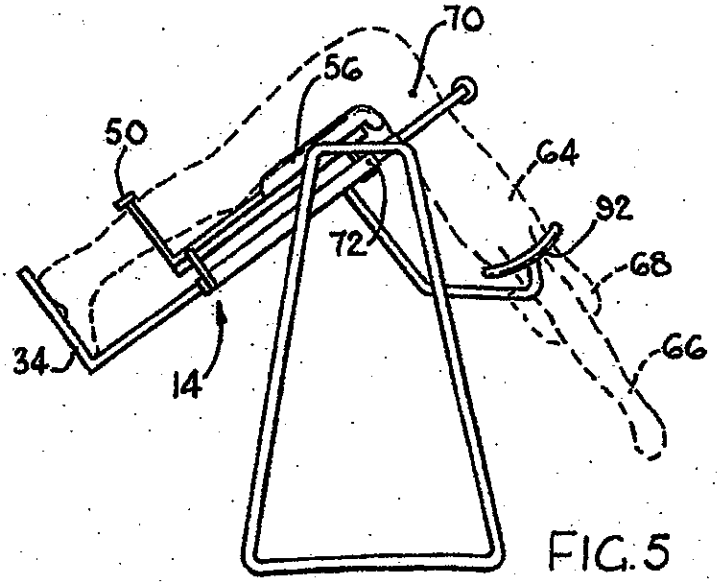

FIG. 5

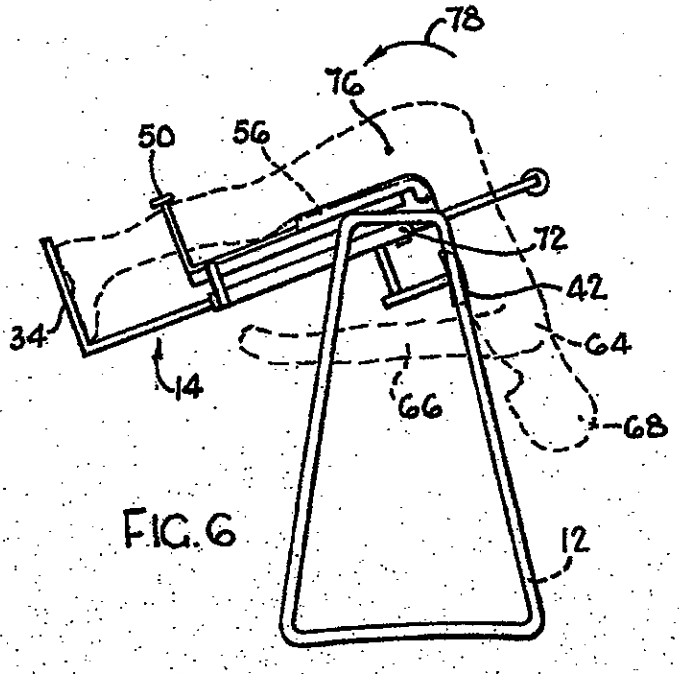

FIG. 6

APPARATUS FOR POSTURAL TREATMENT OF HUMANS

BACKGROUND OF THE INVENTION

This invention relates to postural treatment of humans. The invention relates in particular to an apparatus for effecting postural treatment of humans.

SUMMARY OF THE INVENTION

According to the invention there is provided an apparatus for effecting postural treatment of humans, the apparatus including

a supporting structure; and

a platform structure, that is pivotally mounted on the supporting structure to be pivotal about a horizontal pivotal axis, which has a platform on which a human may be supported in the region of his hip, in a bent over, face down attitude, and which has an adjusting mechanism whereby the position of the platform relative to the platform structure and thus the pivotal axis may be varied so that the position of the centre of gravity of the platform and a person supported thereon, relative to the pivotal axis, can be adjusted.

The adjusting mechanism may be such that the position of the platform relative to the pivotal axis can be varied so that the centre of gravity of the platform and a person supported thereon may be displaced from one side of the pivotal axis to the other by varying the position of a part of the person's body.

Conveniently, the centre of gravity may be displaced by the person varying the position of his arms.

Thus, the platform may be such that when a person is not supported thereon it tends to assume an initial position, hereinafter termed the 'upright' position. In this position the platform is disposed with a portion thereof, which is engaged in use by the hip and thighs of the person, in a substantially vertical position. The platform is then pivoted, in use, into a position—the 'inverted' position—in which the said hip and thigh engaging portion is substantially horizontally disposed. Accordingly, the platform may be such, and may be so pivotally mounted, that when it supports a person, the centre of gravity of the person and the platform in combination, is on the side of the pivotal axis on which the person's head is located when the person extends his arms beyond his head, and is on the other side when the person retracts his arms towards his knees.

The platform may be radially displaceable with respect to the pivotal axis.

Thus, the platform may be adjustable in two mutually orthogonal radial directions so that in use the centre of gravity of the person and the platform may be suitably located to be displaced from one side of the pivotal axis to the other when the person extends and retracts his arms.

The adjusting mechanism may be infinitely and continuously variable.

The platform may be of substantially angular form to fit into the angle defined at the hip of a human whose torso is bent relative to his thighs. The platform may in one form be of L-shape to thereby define two limbs, the angle included between the limbs of the platform being about 90 degrees.

A fulcrum may be provided on the supporting structure to pivotally support the platform structure. The platform structure may be mounted in trunnion fashion in or on the supporting structure. Conveniently, the position of the pivotal mounting of the platform structure on the supporting structure may be adjustable to permit humans of different lengths to be supported on the platform. This may be effected by providing a number of sets of apertures in the supporting structure in which two pins projecting from the platform structure may be engaged.

In order to prevent the platform structure from executing a dangerous manoeuvre such as overturning, a stop may be provided on the supporting structure against which the platform structure may abut. The position of the stop may be adjustable. The platform structure may have foot rests on which a person may position himself prior to leaning over onto the platform to cause the platform structure to pivot. The distance of the foot rests from the fulcrum may also be adjustable.

If desired, a bracket may be provided fast with and extending from the platform structure to grip the legs of a user in the vicinity of his calves to prevent the user from tipping over and falling off the platform. The position of this bracket may also be adjustable.

In a preferred form, the adjusting mechanism may be screw-threadedly adjustable. Thus, the platform structure may have a 'T'-bar the trunnion pins projecting from the arms of the 'T'. The foot rest may then be telescopically slidable in the leg of the 'T'. The platform may then be secured to a support member which is telescopically adjustable in an intermediary member which is pivotally attached to the bottom of the leg of the 'T'. The distance of the platform from the arm may then be varied by pivoting the auxiliary member away from the arm by means of a screwthreaded nut and bolt arrangement. The platform may further be displaced in a direction parallel to that of the leg of the 'T', by telescopically displacing it by means of a further screw-threaded nut and bolt arrangement.

A cushion may be provided on which the chest of a person using the apparatus is supported. This chest support cushion may also be adjustable.

Finally, the platform structure may be provided with a counterweight extending beyond the pivotal axis in a direction opposite to that of the foot rest.

The invention is now described by way of an example with reference to the accompanying drawings.

DESCRIPTION OF DRAWINGS

FIG. 1 shows a three dimensional view of an apparatus in accordance with the invention, from the rear, with the platform structure of the apparatus in the upright position;

FIG. 2 shows a three dimensional view similar to that of FIG. 1 but with the platform structure in a pivoted, inverted position;

FIG. 3 shows a three dimensional view of the platform structure of the apparatus;

FIG. 4 shows diagrammatically a side view of the apparatus of FIG. 1 with the platform in an upright position immediately prior to being operated;

FIG. 5 shows the apparatus of FIG. 3 when operated; and

FIG. 6 shows the apparatus of FIG. 4 and the manner in which the platform is pivoted back to its upright position.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIGS. 1 and 2, the apparatus is designated generally by reference numeral 10. The apparatus comprises a stand 12 and a pivoting platform structure 14, the platform structure 14 being shown in more detail in FIG. 3. Referring to FIG. 3, it can be seen that the platform structure 14 comprises a 'T'-bar 16 having an upright portion 18 and a cross member 20. At the ends of the cross member 20 are pins 22. Extending upwardly from one end of the cross member 20 is an arm 24 having at its end a countermass 26. A further member 28 is provided extending transversely from the cross member 20, which member 28 has at its free end a screw-threaded stud 30 which acts as a stop formation as will be explained hereinafter. The upright member 18 is hollow and slidably located therein is a length of tubing 32 which has at its free end two foot rests 34. The position of the tubing 32 in the upright member 18 may be fixed by means of a peg 36 which is received in a bore in the upright member 18. A number of bores are provided in the tubing 32 so that the distance of the foot rests 34 from the cross member 20 may be varied.

At the top end of the upright member 18 there is a transversely extending screw-threaded bore in which a screw-threaded bolt 38 is inserted. Extending transversely from the upright member 18, and secured thereto, is a bracket 40 to the free end of which is removably secured a chest support cushion 42. The chest support cushion 42 is secured to the bracket 40 by means of a rod 44 having a number of bores therein, the rod being variably secured to the bracket 40 by means of a nut and bolt arrangement. A further bracket 46 is secured to the bottom end of the upright member 18 extending transversely in an opposite direction to the bracket 40. Pivotally attached to the free end of this bracket 46 is an auxiliary support member 48. The support member 48 is secured at its bottom end to the bracket 46 by means of a nut and bolt. Extending away from the bracket 46 is a further 'T' member 50 the arms of which are padded and in use engage the calves of a person utilising the apparatus 10, to restrain the body of the person. The length of the leg of the 'T'-bar 50 may also be varied in a telescopically slidable manner. Secured to the bottom end of the support member 48 is a hollow member 52 in which is slidingly received a bar 54 to which is attached an L-shaped platform 56. The position of the bar 54 in the hollow member 52 may be varied by adjusting a screw-threaded nut and bolt arrangement 58 which is received in a bore in the upper end of the member 48 and on which a flange 55, fast with the bar 54, rests. It will thus be appreciated that the position of the platform 56 relative to the cross member 20 may be varied in two mutually orthogonal transverse directions by adjusting the bolt 38 and the nut and bolt 58.

Referring once more to FIGS. 1 and 2, the stand 12 has two spaced apart vertically disposed members 60 (only one of which is shown) having a number of apertures 62 in which the pins 22 of the platform structure 14 are received. These members 60 accordingly provide the fulcrum on which the platform structure 14 is pivotally mounted by means of the pins 22. It will thus be appreciated that the height of the cross member 20, and accordingly the pivotal axis of the platform structure 14, above the surface on which the stand 12 is supported may be varied. As can be seen in FIG. 2, the stud 30 engages one of the members 60 upon pivoting of the platform structure 14, to limit pivoting thereof.

Use of the apparatus 10 is now described with reference to FIGS. 4, 5 and 6.

In FIG. 4 the platform 56 is shown in the upright position, with a person 64 standing on the foot rests 34 and being supported thereon and on the chest support cushion 42, in a bent over, face down manner. With the person's arms 66 extended beyond his head 68, the centre of gravity of the person 64 and the platform structure 14 is at 70, on the side of the pivotal axis 72 on which the person's head 68 is located-to the right of the pivotal axis 72 in FIG. 4. As the centre of gravity is above the pivotal axis 72, the platform structure 14 and the person 64 are in unstable equilibrium and the platform structure 14 pivots in the direction of arrow 74 until the stop 30 engages the member 60 to adopt the position shown in FIG. 5, with the person's torso substantially vertically disposed and with his legs substantially horizontally disposed.

In order to pivot the platform structure back to the upright position the person retracts his arms towards his knees, as shown in FIG. 6. This causes the centre of gravity to be displaced to the other side of the pivotal axis 72, as shown at 76. The platform structure 14 thus pivots back, as shown by arrow 78 to the upright position.

It will further be appreciated that the position of the platform 56 is adjusted, by adjusting the bolt 38 and the nut and bolt 58, so that the centre of gravity is suitably located in accordance with the size and shape of the person using the apparatus. The foot rests 34, the 'T'-bar 50, the chest support cushion 42, and the height of support of the pins 22 are also suitably adjusted to cater for the particular person using the apparatus.

Further optional additions to the apparatus to ensure the comfort and safety of persons using the apparatus may include two arm supports 80 secured to each side of the stand 12 (only shown in FIG. 2). A person mounting the apparatus can use these supports for tilting himself slowly from an upright position into an inverted position. Furthermore a head support 82 may be provided (also only shown in FIG. 2). The head support 82 is secured to the stand 12 and includes a base 84, also secured to the stand 12 which base includes a base member 86 which stands on the ground and a screw-threaded member 88 which can screw into a bore in the base member 86. The member 88 provides a support beneath the head support 82 and provides adjustment of the head support 82 by being screwed into or from the base member 86.

In FIG. 4 there is shown an additional arm rest 90 secured to the platform structure 14. The rest 90 provides a support for a person to rest his arm on during use of the apparatus. A rest 90 as shown may be provided for one or both of the arms of a person using the apparatus.

FIG. 5 shows an alternative support for the chest cushion support 42 in the form of a shoulder support 92 in which a person can rest his shoulders when inverting himself on the apparatus.

I claim:

1. An apparatus for effecting postural treatment of humans, the apparatus including

a supporting structure;

a platform structure that is pivotally mounted on the supporting structure to be pivotal about a horizontal pivotal axis;

a platform adjustably secured on the platform structure, having a support surface on which a human may be supported in the region of his hip in a bent over, face down attitude;

a first adjusting mechanism for adjusting the position of the platform relative to the platform support structure in a first direction transverse to the pivotal axis of the platform support structure; and

a second adjusting mechanism for adjusting the position of the platform relative to the platform support structure in a second direction transverse to the pivotal axis of the platform support structure and substantially orthogonal to the first direction,

the position of the centre of gravity of the platform and a human supported thereon thus being adjustable relative to the pivotal axis of the platform support structure.

2. An apparatus as claimed in claim 1, in which the support surface of the platform faces away from the pivotal axis of the platform support structure so that the centre of gravity of the platform and a human supported thereon is located above the pivotal axis to thereby be adjustable to provide a condition of unstable equilibrium.

3. An apparatus as claimed in claim 2, in which the first and second adjusting mechanisms are such that the position of the platform relative to the platform support structure and thus the pivotal axis thereof can be varied so that the centre of gravity of the platform and a human supported thereon may be displaced from one side of the pivotal axis to the other by varying the position of a part of the human's body.

4. An apparatus as claimed in claim 3, in which the centre of gravity is displaceable by the human varying the position of his arms.

5. An apparatus as claimed in claim 1, in which the first and second adjusting mechanisms provide, within practical limits, infinite and continuous adjustability of the platform.

6. An apparatus as claimed in claim 5, in which the first and second adjusting mechanisms are screw-threadedly adjustable.

7. An apparatus as claimed in claim 6, in which the platform support structure has a "T"-bar with the arms of the "T"-bar extending parallel to and coinciding with the pivotal axis of the platform support structure and the leg of the "T"—bar extending perpendicular thereto, and in which the platform is secured to a support member which is telescopically adjustable in an intermediary member which intermediary member is pivotally attached to the leg of the "T"-bar near the free end thereof.

8. An apparatus as claimed in claim 7, in which the first adjusting mechanism includes a screw-threaded nut and bolt arrangement for pivotally adjusting the angular relationship between the leg of the "T"-bar and the intermediary member and thus the distance between the platform and the arms of the "T"-bar.

9. An apparatus as claimed in claim 7, in which the second adjusting mechanism includes a screw-threaded nut and bolt arrangement for telescopically displacing the platform relative to the intermediary member and thus substantially longitudinally with respect to the leg of the "T"-bar.

10. An apparatus as claimed in claim 1, in which the platform is of a substantially angular form to fit into the angle defined at the hip of a human whose torso is bent relative to his thighs.

11. An apparatus as claimed in claim 1, in which the platform support structure is pivotally mounted in trunnion fashion in or on the supporting structure.

12. An apparatus as claimed in claim 11, in which the pivotal mounting of the platform support structure on the supporting structure is adjustable to permit humans of different lengths to be supported on the platform.

13. An apparatus as claimed in claim 12, in which the supporting structure is provided with a number of sets of opposed apertures in which two pins projecting from the platform support structure may be engaged.

14. An apparatus as claimed in claim 1, which includes a countermass fast with the platform support structure to facilitate pivoting of the platform support structure with a human being supported on the platform.

15. An apparatus as claimed in claim 1, in which the platform support structure includes footrests on which a person may position himself prior to leaning over onto the platform to be supported thereon.

16. An apparatus as claimed in claim 15, in which the distance between the footrests and the pivotal mounting of the platform support structure to the supporting structure is adjustable.

17. An apparatus as claimed in claim 1, which includes a stop on the supporting structure against which the platform support structure may abut to prevent overturning thereof.

18. An apparatus as claimed in claim 17, in which the position of the stop is adjustable to vary the extent of turning of the platform support structure.

19. An apparatus as claimed in claim 1, which includes a bracket fast with and extending from the platform support structure, which bracket is positionable behind the legs of a human supported on the platform in the vicinity of his calves to thereby prevent him from tipping over and falling from the platform.

20. An apparatus as claimed in claim 1, which includes a chest support on which the chest of a human supported on the platform can be supported.

21. An apparatus as claimed in claim 20, in which the position of the chest support is adjustable.

22. An apparatus as claimed in claim 1, which includes a shoulder support on which the shoulders of a human supported on the platform can be supported.

23. An apparatus as claimed in claim 1, which includes a head support on which the head of a person supported on the platform can be supported.

24. An apparatus as claimed in claim 23, in which the position of the head support is adjustable.

* * * * *

Reference D

United States Patent [19]

Takahashi

[11] **Patent Number: 4,461,287**

[45] **Date of Patent: Jul. 24, 1984**

[54] **PORTABLE EXERCISE AND TRACTION APPARATUS**

[76] Inventor: **Hiroshi Takahashi**, 153 E. Whittier Blvd., Ste. A, LaHabra, Calif. 90631

[21] Appl. No.: **361,743**

[22] Filed: **Mar. 25, 1982**

[51] **Int. Cl.**[3] **A01B 1/02; A61H 1/02**

[52] **U.S. Cl.** **128/75; 272/145; 272/900**

[58] **Field of Search** ..... 128/75, 71, 25 R; 272/62, 63, 144, 145, 93, 134, 61, 900

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Primary Examiner—Richard J. Johnson
Attorney, Agent, or Firm—Robert Louis Finkel

[57] **ABSTRACT**

A horizontal padded body-supporting bar is rigidly mounted to a pair of spaced, parallel, upright floor-standing stanchions and supports the weight of the user's body with the head, torso and upper limbs hanging inverted on one side of the bar and the legs on the other. Mounting brackets permit a pair of arms, carrying a leg restraining cross member, to be mounted to the stanchions extending either horizontally rearwardly or vertically upwardly of the body-supporting bar. For rigidity the stanchions may be provided with a pair of rails at their lower ends, or with mounting brackets adapted releasably to engage mating brackets attached to the jambs at the opposite sides of a doorway.

16 Claims, 5 Drawing Figures

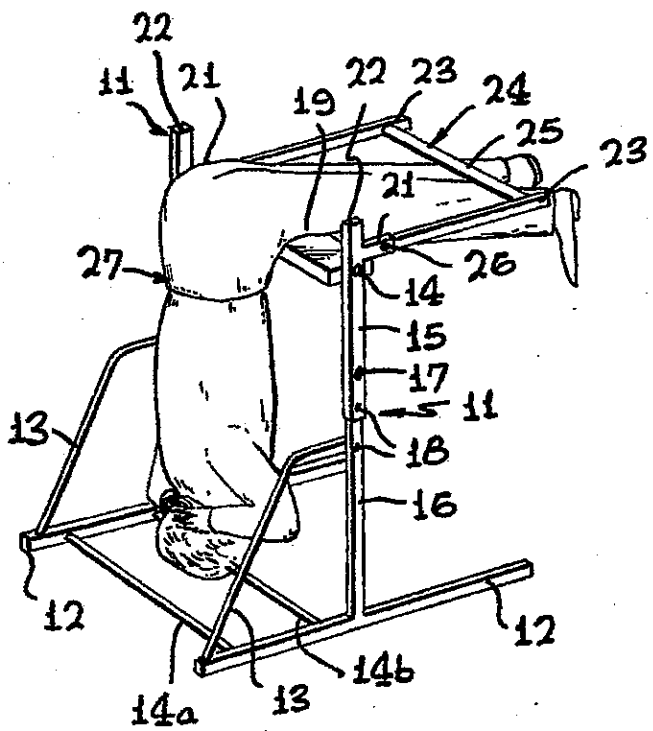


FIG. 1

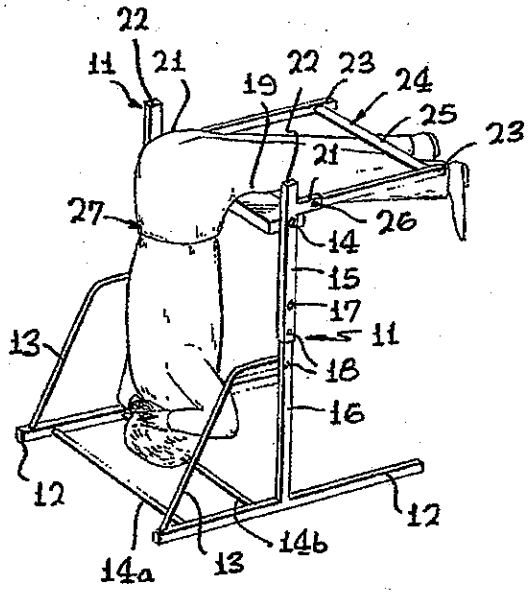


FIG. 2

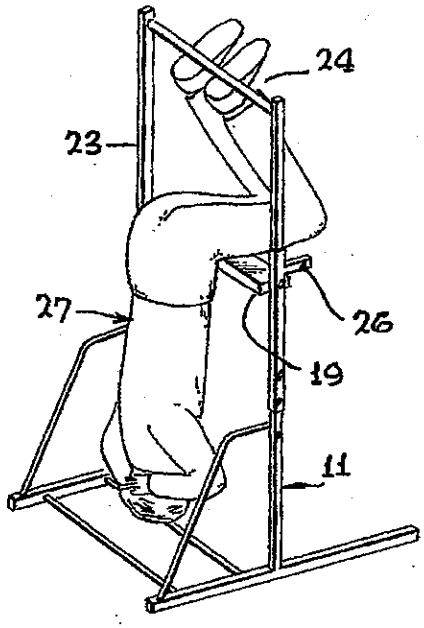


FIG. 4

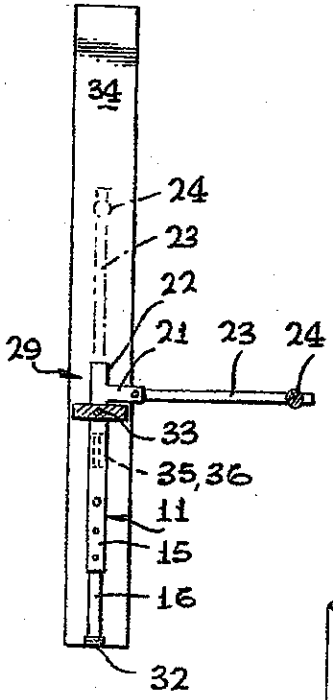
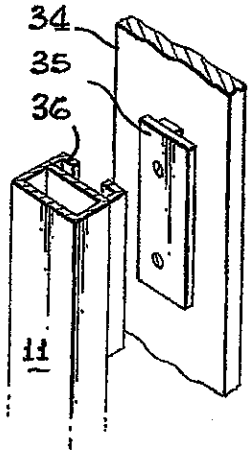


FIG. 5



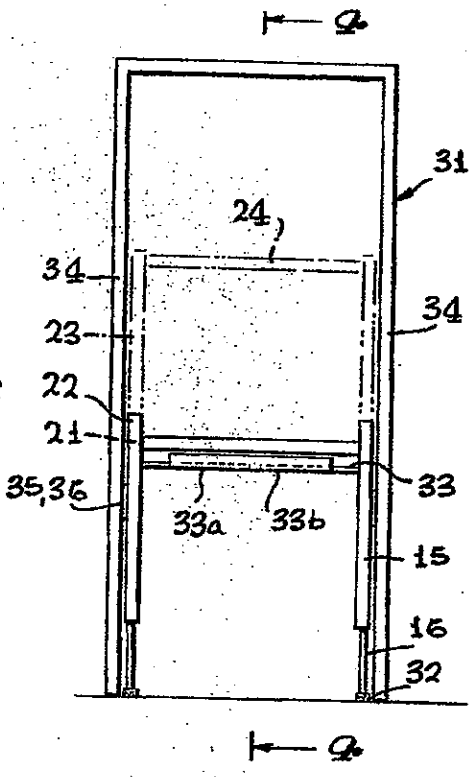


FIG. 3

PORTABLE EXERCISE AND TRACTION APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to devices for applying traction to the back, and more particularly to such devices in which the body is supported to utilize the weight of the head, torso and upper limbs, suspended to hang inverted, to supply the tractional force.

2. Prior Art

The theraputic value of spinal traction is well known. Various means have been devised to provide such traction.

Some of these, intended primarily for use under professional supervision or in commercial gymnasia, require the body to be supported and restrained on a bed or platform and apply tractional force by means of weights acting through systems of cables and pulleys, cams, levers, and the like.

Others are designed to employ the weight of the body itself as the source of tractional force. Some of these provide means for supporting the upper body upright and allowing the weight of the lower body and legs to pull downwardly. Some are adapted to support the body in an inverted position, head downward, and utilize the weight of the head, torso and upper limbs to provide the desired force. U.S. Pat. Nos. 1,366,155 to Bardwell, et al., 3,874,375 to Penner, and 4,077,403 to Steele are illustrative of this last category.

Typically, these latter devices are difficult or awkward to mount and dismount, especially for the infirm and those who are athletically less adept. Many of them are relatively complex, bulky structures or utilize mounting hardware which is permanently affixed to a door jamb or some other fixture and are thus not easily transported or stored.

SUMMARY OF THE INVENTION

The subject invention employs a pair of upstanding stanchions to support a padded, rigid, horizontal body-supporting cross member at the height of the user's pelvic region. The stanchions may be mounted to stabilizing bases for free-standing use, or may be provided with means for releasably securing them for stability to the jambs of a doorway.

A pair of parallel arms attached to the stanchions extend rigidly rearwardly, perpendicular to the body-supporting cross member. At their ends they carry a second cross member which serves to restrain the user's legs.

The user stands between the rearwardly projecting arms, facing the body-supporting cross member and bends forwardly over the cross member until the entire weight of his or her body is supported by it, head, torso, and upper limbs hanging downwardly, and legs extended and directed rearwardly. Although not necessary, the second cross member supported by the parallel arms is in a position to engage the backs of the legs to prevent them from rotating upwardly beyond the horizontal and allowing the user inadvertently to slip off the body-supporting member. The stanchions are within easy reach and may facilitate mounting and dismounting.

In an alternative embodiment of the invention, means are provided for mounting the arms supporting the leg restraining member to the stanchions vertically upright, so that the leg restraining cross member is positioned above the body-supporting member. In this configuration, the device permits the user to bend the legs at the knees and engage the leg restraining member with the feet, shins or ankles, thereby providing a desired degree of security against unintentionally slipping from the body-supporting member.

An object of the subject invention is to provide an apparatus for utilizing body weight in spinal extension exercise and to apply spinal traction.

Another object is to provide such an apparatus which is readily portable and easily stored.

Yet another object is to provide an exercise and traction apparatus of simple construction which can easily be mounted and dismounted, even by the infirm or athletically inept.

Yet another object is to provide an apparatus of the type described which may be adapted to be free-standing or to be mounted in a doorway.

A further object is to provide an apparatus of this type which does not require the installation of special hardware for its use.

Additional objects and advantages of the invention will become apparent from the following specification and the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a preferred embodiment of the subject invention illustrating one mode of its operation;

FIG. **2** is a perspective view of the embodiment of FIG. **1** illustrating another mode of operation;

FIG. **3** is a front elevational view illustrating another preferred embodiment of the subject invention installed in a doorway;

FIG. **4** is a side elevational view of the embodiment of FIG. **3**, taken in the direction **4**—**4**; and

FIG. **5** is an enlarged fragmentary perspective view of the stabilizing brackets and bracket engaging means of the embodiment of FIGS. **3** and **4**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. **1** and **2**, a preferred embodiment of the subject invention includes a pair of sturdy stanchions **11** held rigidly upright by rails **12**. Braces **13** stabilize the upper end of stanchions **11**, and rigid spacer **14** maintains them in spaced parallel alignment. If desired, additional spacers **14***a*, **14***b* may be employed to further strengthen the structure.

Preferably, stanchions **11** are constructed from telescoping sections **15**, **16** and are provided with fastening means, such as removable pins **17** and mating holes **18**, for conveniently adjusting their length.

A horizontal body-supporting member **19** is secured to the upper ends of stanchions **11**. In the embodiment illustrated in FIG. **1**, member **19** is mounted to spacer **14**; however, other conventional means may be used for attaching member **19** to stanchions **11**.

The upper ends of stanchions **11** are provided with a pair of attachment means, shown here in the form of sleeves **21**, **22**, one directed rearwardly and the other upwardly, adapted to receive the ends of a pair of rigid, parallel arms **23**. The opposite ends of arms **23** support a cross piece **24** which may be a padded, rigid or resilient bar **25**, as illustrated, or a flexible strap (not shown). A removable pin **26** insertable through matching holes

in sleeves 21, 22 and the ends of arms of 23 permit arms 23 easily to be positioned to extend horizontally rearwardly, as shown in FIG. 1, or vertically upwardly, as in FIG. 2.

To use the apparatus, the user adjusts stanchions 11 to position body-support member 19 at a convenient height, preferably at the level of the pelvic region, and facing the device from the rear, bends forwardly over member 19 until his or her body 27 is comfortably supported by it, head and torso downward. Stanchions 11 and braces 13 may be used, if desired, to facilitate mounting member 19.

This inverted position is found to be surprisingly stable, since the unsupported weight of the legs balances the weight of the downwardly depending head, upper body and arms. For psycological reasons, in practice it is advantageous to give the user an added sense of stability, and for this reason the arms 23 and cross piece 24 are provided to serve as leg restraining means in the manner illustrated in FIGS. 1 and 2. In the former, the legs extend rearwardly nearly horizontally and are prevented from rotating upwardly by cross piece 24. In the latter, the legs are bent at the knees and are forced downwardly by the cross piece 24. In either configuration, the apparatus allows the downward pull of the head, torso and upper limbs to exert the maximum tractive force available on the spine and its associated muscles and tissues.

To dismount, the mounting procedure is reversed, the stanchions 11 and braces 13 again being used for assistance as necessary.

In the embodiment of FIGS. 3 and 4, the apparatus 29 is adapted to be supported by a structure, such as the frame 31 of the doorway. As shown, the stanchions 11 formed by telescoping sections 15, 16 are provided with friction pads 32 at their lower ends. Spacer 14 is formed in telescoping sections 33*a*, 33*b* having conventional locking means (not shown) allowing them to be adjusted to position stanchions 11 in close proximity to the jambs 34 on either side of door frame 31 when the apparatus 29 is set up in a doorway. To stabilize the apparatus 29, conventional interlocking means, such as the brackets 35 attached to jambs 34 and bracket-receiving flanges 36 mounted to stanchions 11 shown in FIG. 5, are provided.

In all other particulars the structure and operation of the apparatus 29 of this embodiment are substantially identical with those of the embodiment illustrated in FIGS. 1 and 2.

It will be understood that the structures shown and described, while preferred embodiments of the subject invention, are intended to serve as representative examples of the various alternative forms and constructions covered by the claims.

What is claimed is:

1. A portable exercise and traction apparatus, comprising:

a pair of spaced upstanding stanchions;

spacing means bridgingly connected to said stanchions and rigidly maintaining them in parallel relationship;

a horizontal body supporting member immovably mounted to said stanchions and adapted to support the full weight of the body upon the user's upper thighs;

leg restraining means rigidly mounted to said stanchions, said restraining means including a cross member positioned generally parallel to, and spaced from said body supporting member for restraining engagement by the user's lower extremities when the user's upper body depends vertically from said body supporting member;

stabilizing means associated with said stanchions for rigidly maintaining said stanchions in a vertical position; and

mounting means on said stanchions for selectively positioning said leg restraining means alternatively in vertical or horizontal alignment with said body supporting member.

2. The apparatus of claim 1, wherein said body supporting member is rigidly mounted to said spacing means.

3. The apparatus of claim 2, wherein the lower ends of said stanchions are adapted to support said apparatus on a floor.

4. The apparatus of claim 3, wherein the lower ends of said stanchions are provided with floor mounts.

5. The apparatus of claim 4, wherein said floor mounts are friction pads.

6. The apparatus of claim 4, wherein said floor mounts are elongated rails.

7. The apparatus of claim 4, wherein said stabilizing means include a pair of elongated braces rigidly attached at their upper ends to said stanchions, extending perpendicular to said body supporting member downwardly away from said stanchions, and supported at their other ends by the floor, the upper portions of said braces defining a pair of horizontally disposed hand holds.

8. The apparatus of claim 7, wherein said floor mounts are elongated rails, and the said other end of each of said braces is attached to one of said rails at a distance from the point of attachment of the associated stanchion to said rail.

9. The apparatus of claim 2, wherein:

said stanchions are adapted to support said apparatus on a floor; and

said spacing means is adjustable for selectively varying the distance between said stanchions.

10. The apparatus of claim 9, wherein said stabilizing means comprises:

a pair of brackets secured to the opposed jambs of a doorway; and

bracket engaging means mounted to said stanchions in registry with said brackets for releasably engaging said brackets.

11. The apparatus of claim 4, wherein said leg restraining means comprise a pair of rigid, elongated arms, each of said arms being attached at one of its ends to one of said stanchions and supporting said cross member at its other end.

12. The apparatus of claim 11 wherein said mounting means comprises a pair of sleeves fixed to the upper extremities of each of said stanchions and adapted to receive the ends of said arms.

13. The apparatus of claim 11, wherein said cross member is rigid.

14. The apparatus of claim 10, wherein said leg restraining means comprise a pair of rigid, elongated arms, each of said arms being attached to one of said stanchions and supporting said cross member at its other end.

15. The apparatus of claim 14, comprising attachment means for releasably attaching said arms to said stanchions alternatively in vertical alignment with, or perpendicular to said stanchions.

16. The apparatus of claim 14, wherein said cross member is rigid.

* * * * *

Reference E

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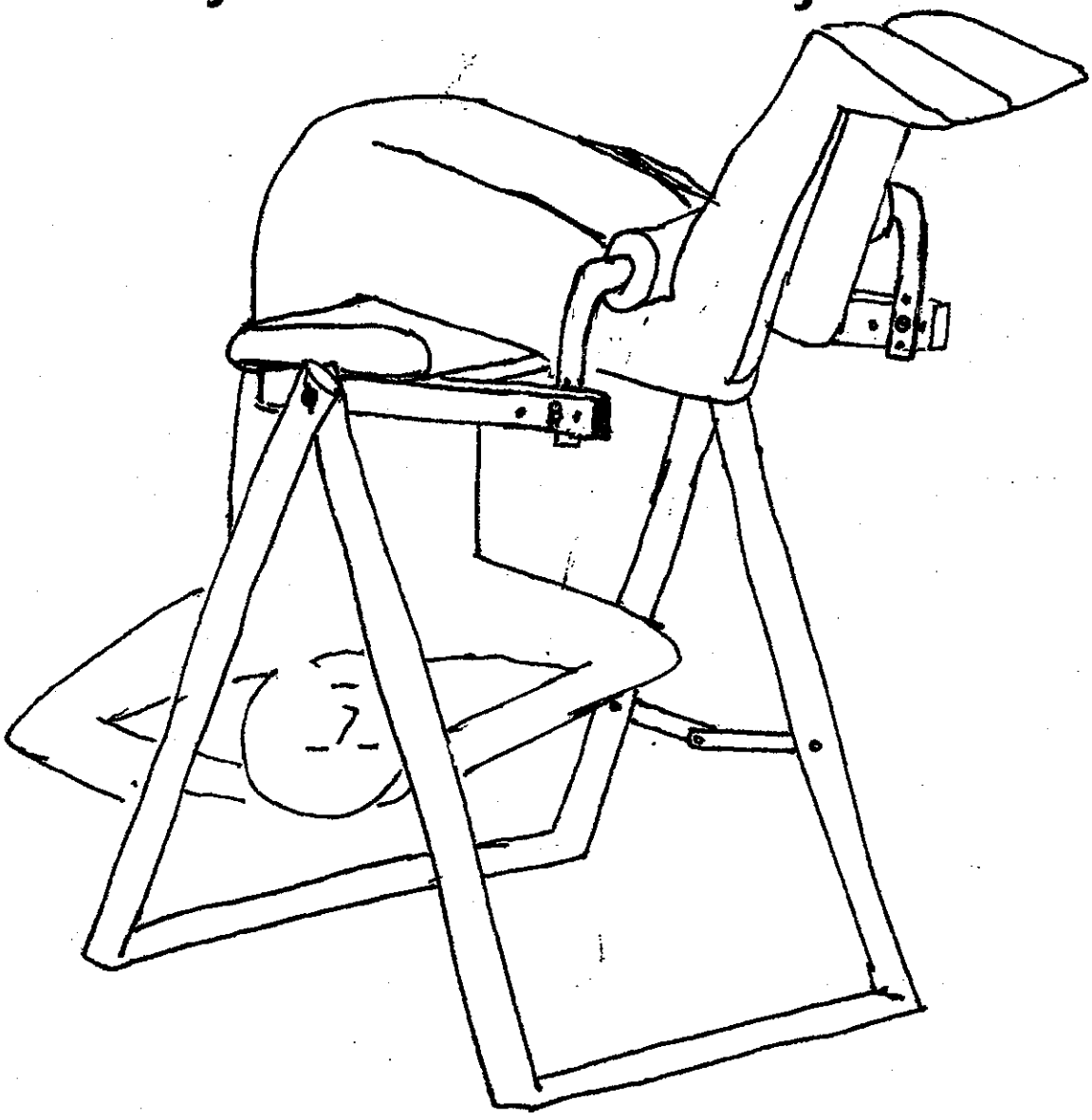

Studies show that inversion therapy provides immediate relief. Our Bat Frame is the easiest to use home inversion frame on the market.

Bat Frame features:

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- **Folds flat for storage.**
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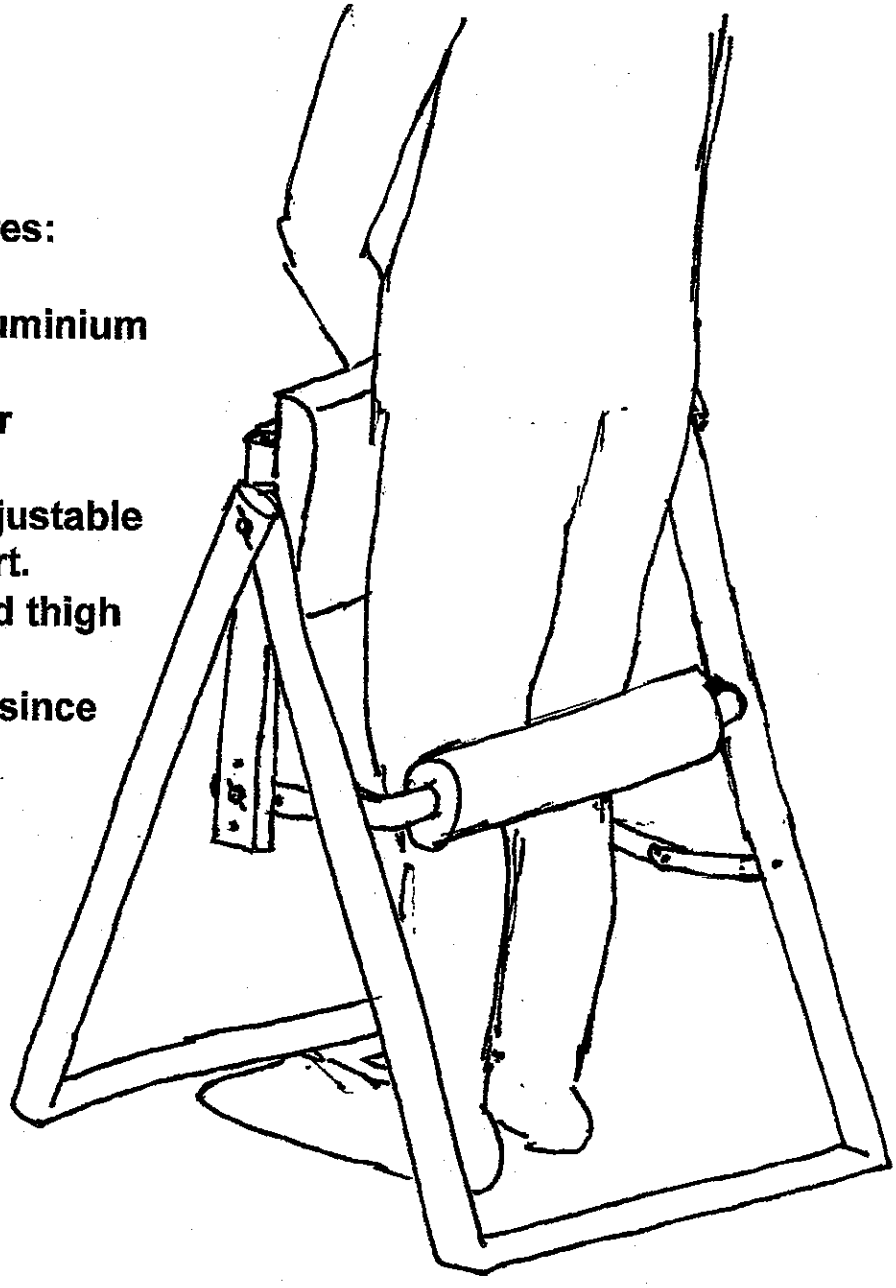

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Reference F

(12) PATENT APPLICATION
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Home Gym Pty Ltd.

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Norma Sanderson

This invention relates to an inversion device and has been devised particularly for use in inverting the human body so as to apply traction to the back.

It is therefore an object of the present invention to provide an inversion device which will at least provide the public with a useful choice.

In one broad form, the invention provides an inversion device comprising:

a support frame;

a body support platform pivotally affixed adjacent a top end of said support frame and rotatable about a substantially horizontal axis;

a leg bar pivotally connected to said support frame intermediate the ends of said support frame, such that said leg bar can horizontally pivot to a position substantially equal to or slightly higher than the position of said body support platform; and

a pair of hand grips extending substantially outwardly fro said support frame intermediate the ends of said support frame and extending from an opposite side of said support frame to that on which said leg bar is connected.

A preferred embodiment of the invention provides an inversion device as claimed in claim 1, wherein:

said support frame comprises a pair of side frames, each side frame comprising a first member and a second member forming a substantially A frame shaped structure;

said body support platform being pivotally connected directly or indirectly to the apex of each of said side frames;

said leg bar being a U shaped member, the ends of said U shaped member being pivotally connected to substantially the centre of each second member of each of said side frames;

said pair of hand grips extending from a cross-member said first member and said second member and extending outwardly from said first member.

Preferably said body support member is fixed to rotate about an axis displaced from the plane in which said body support member lies.

Preferably said leg bar comprises the web of a substatially U shape member pivotally affixed to said frame at or adjacent the ends of the arms thereof.

Preferably said body support member comprises a pad mounted on the web of a substantially U shaped member the arms of said substantially U shaped being pivotally affixed to said frame at or adjacent the ends of said arms.

Preferably handles are provided positioned to be grippable by the user of said device.

Preferaby said support frame comprises a pair of A frames with said body support member and said leg bar pivotally mounted thereon.

Preferably said body support member is pivotally mounted at or adjacent the apex of the A of said A frame and said leg bar is pivotally mounted to corresponding parts on said A frame so that when said length bar substantially U shape member is substantially inverted the web of said U is positioned at a height above said surface greater than the height at which said body support member is positioned.

This invention may also broadly be said to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more of said parts, elements or features, and where specific integers are mentioned herein which have known equivalents in the art to which this invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

The invention consists in the foregoing and also envisages constructions of which the following gives examples.

One preferred form of the invention will now be described with reference to the accompanying drawings in which:

Fig. 1 is a diagrammatic perspective view of an inversion device according to one preferred form of the invention having a body support member and a leg bar positioned in the position that they would be in when carrying a user; and

Fig. 2 is a view as in Fig. 1 with a body support member and leg bar in the position in which a user is contacting the body support member but before an inversion has taken place.

Referring to the drawings an inversion device is provided as follows.

The inversion device comprises a support frame 1 which is able to stand on a surface in use. The support frame 1 may comprise a pair of A frames each having a first member 2 and a second member 3 these members being connected one to the other at an apex preferably pivotally by means of a pivot pin such as a bolt and nut 4. The A frames may also be connected together at the lower ends thereof by suitable web members or braces 5

and 6 between the pairs of arms 2 and the pairs of arms 3 respectively. The support frame carries a body support member which is pivotally affixed to the support member 1 so as to be rotatable and preferably rotates about an axis displaced from the plane of the body support member. To this end the body support member may comprise a pad 7 mounted on the web of a substantially U shape member 8 the arms of which are pivotally affixed to the support frame 1 preferably at the apex of the A frames and again pivotally supported preferably on the pivot pins 4. Thus in a rest position the body support member 7 will be positioned substantially as shown in Fig. 1 wherein it hangs downwardly from the axis upon which the pivot pins 4 lie. A leg bar 10 is also provided which desirably takes the form of the web of a substantially U shaped member pivotally affixed to the support frame for example to reach member 3 through a pivot pin 11. The leg bar is preferably provided with padded material as is the body support member 7. The leg bar 10 is therefore pivoted to rotate about an axis displaced from the base or web of the substantially U shaped member 12.

The inversion device is also desirably provided with handles for example a pair of handles positioned so as to be grippable in use by the hands of the user. Thus the handles extend outwardly beyond the A frame at a suitable position on the opposite side to the leg bar 10. Thus the handles may comprise bars 13 extending between the members 2 and 3 and extending outwardy to terminate in grips 14.

The size of the substantially U shape member 12 is such that when in the inverted position that is to say as shown in

Fig. 1 the leg bar 10 will be positioned at a distance from the ground surface greater than the distance above the ground surface of the support pad 7 being for example a distance substantially equal to the thickness of a user's thighs.

The use of the invention is as follows.

In the rest position the device will be substantially in the position shown in Fig. 2 except that the support pad 7 will be substantially in the position shown in Fig. 1. The user steps over the leg bar 10 and positions part of his or her body in particular the thighs against the pad 7 rotating that part to the position shown in Fig. 2. By leaning over the pad 7 the user can grip the grips 14 and by leaning forward will rotate the pad 7 to the position shown in Fig. 1 whilst at the same time catching the leg bar 10 with the legs for example in or about the position of the knees. The member 12 will rotate from the position in Fig. 2 to the position in Fig. 1. In this position the thighs for example of the user will be in a substantially horizontal position on the pad or body support member 7 and the upper part of the torso of the user will be able to hang downwardly from the body support member 7 thereby applying traction to the spine which traction will also be applied in the lumbar region. The legs of the user will be hooked around the leg bar 10 substantially preventing the user from falling from the device. By pushing on the grips 14 the user may reverse the procedure so as to remove him or herself from the inversion device.

Thus is can be seen that at least in the preferred form of the invention an inversion device is provided which allows a

user to invert his or her body in a simple yet effective manner on a device which will apply traction to the lumbar region as well as other parts of the parts of the spine. It is an advantage of the invention as described that by undoing the fixing pins or bolts holding the handle for example to the frame members 2 the device may be folded into a substantially flat position and also the device is readily demountable so as to be able to be stored or transported in a relatively small package.

The claims defining the invention are as follows:

1. An inversion device comprising:

a support frame;

a body support platform pivotally affixed adjacent a top end of said support frame and rotatable about a substantially horizontal axis;

a leg bar pivotally connected to said support frame intermediate the ends of said support frame, such that said leg bar can horizontally pivot to a position substantially equal to or slightly higher than the position of said body support platform; and

a pair of hand grips extending substantially outwardly fro said support frame intermediate the ends of said support frame and extending from an opposite side of said support frame to that on which said leg bar is connected.

2. An inversion device as claimed in claim 1, wherein:

said support frame comprises a pair of side frames, each side frame comprising a first member and a second member forming a substantially A frame shaped structure;

said body support platform being pivotally connected directly or indirectly to the apex of each of said side frames;

said leg bar being a U shaped member, the ends of said U shaped member being pivotally connected to substantially the centre of each second member of each of said side frames;

said pair of hand grips extending from a cross-member said first member and said second member and extending outwardly from said first member.

3. An inversion device as claimed in claim 2, wherein said

body support platform is affixed to a U shaped bar, said U shaped bar having ends which are pivotally attached to the apex of each of said side frames.

4. An inversion device as claimed in any one of claims 1 to 3, wherein to use said device, a user steps over said leg bar and contacts part of his or her body such as the thighs to said body support platform to rotate said body support platform and catch his or her legs on said leg bar thereby rotating said leg bar about its pivot axis until a position is reached wherein the part of said body engaged with said body support member is substantially horizontal allowing the remainder of the upper part of said body to hang therefrom and wherein the legs are engaged with said leg bar to substantially prevent said body from falling from said device.

5. An inversion device as claimed in any one of claims 1 to 4, wherein a user may remove himself or herself from said inversion device by pushing on said pair of hand grips and raise himself or herself to a substantially vertical position.

6. An inversion device as claimed in any one of claims 1 to 5, wherein said body support platform is provided with padding material mounted on said platform.

7. An inversion device as claimed in any one of claims 1 to 6, wherein said body support platform is moulded to the shape of a user's thighs.

8. An inversion device as claimed in any one of claims 1 to 7, wherein said leg bar is provided with a web of padded material over said U shaped member.

9. An inversion device as claimed in any one of claims 1 to

8, wherein said pair of hand grips are provided with handles positioned to be grippable by the user of said device.

10. An inversion device as claimed in any one of claims 1 to 9, wherein said device may be collapsed or folded into a substantially flat position such that it may be stored or transported in a relatively small package.

11. An inversion device substantially as herein described with reference to the accompanying drawings.

FIG. 1

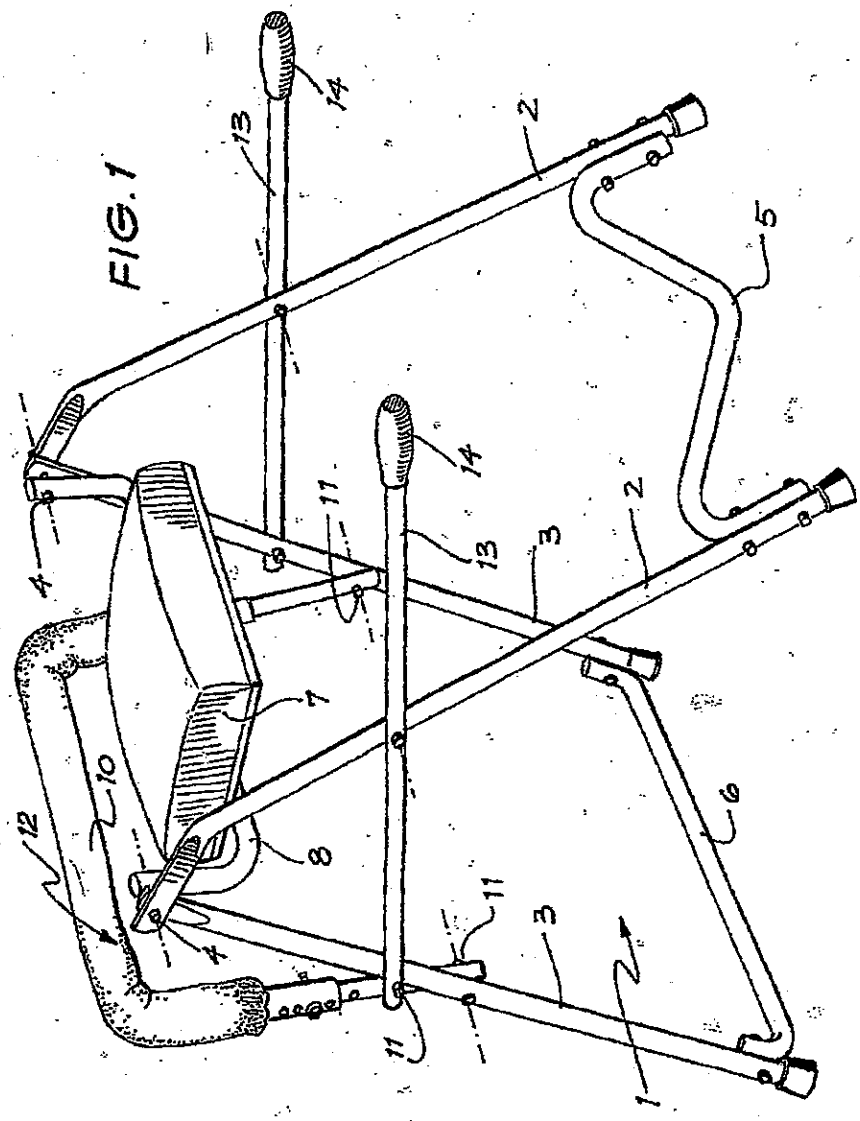

FIG. 2