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(54) **Treatment apparatus and method**

(57) A treatment apparatus comprises a flexible structure for supporting a human body lying either supine

or prone and means for effecting controlled adjustment of the degree of curvature of the flexible structure.

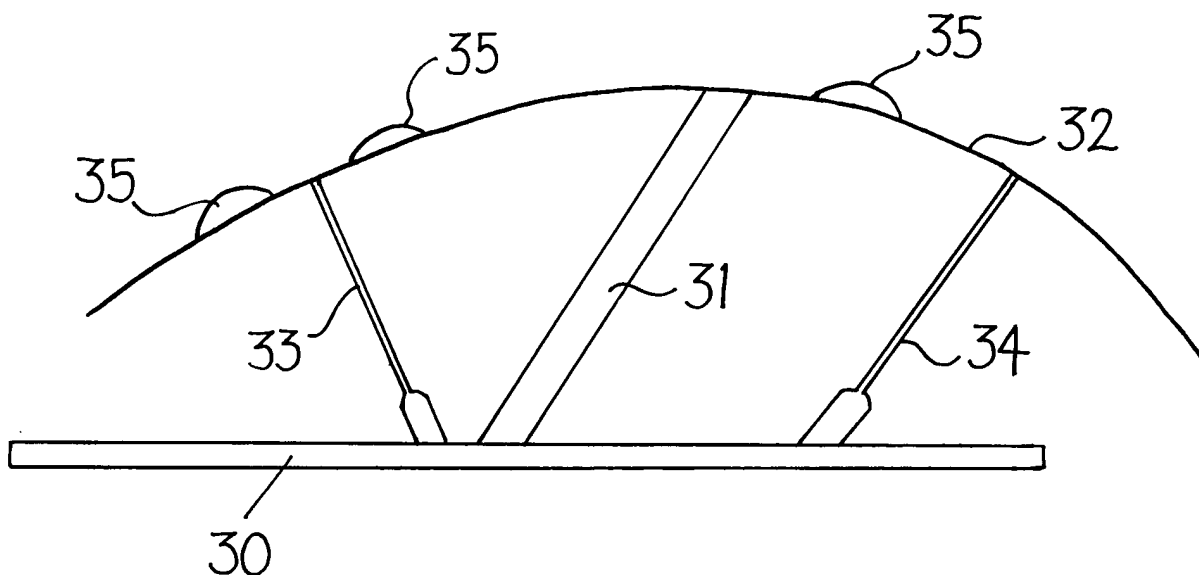


FIG. 6

Description

Field of the Invention

[0001] This invention relates to treatment apparatus and to a method of correcting bad posture.

[0002] Many people spend a large part of each day with their spinal column inclined forwardly as a result of, for example, operating a keyboard. There are also many people who have spinal column problems of one sort or another.

[0003] It is accordingly an object of the present invention to provide an improved form of apparatus for use in treatment of the human body particularly, but not exclusively, for use in the treatment of spinal column problems.

[0004] It is also an object of the present invention to provide a method of correcting bad posture.

Summary of the Invention

[0005] According to a first aspect of the present invention there is provided a treatment apparatus that comprises a flexible structure for supporting a human body lying either supine or prone and means for effecting controlled adjustment of the degree of curvature of the flexible structure.

[0006] The flexible structure is preferably mounted on a rigid base and the means for effecting controlled adjustment of the degree of curvature of the flexible structure preferably includes rollers connected to the flexible structure that are movable along longitudinal guide rails connected to or forming part of the rigid base.

[0007] The rollers are preferably mounted on the ends of a bar that extends transversely of the longitudinal guide rails.

[0008] A linear actuator motor is preferably provided for changing the degree of curvature of the flexible structure, i.e. by effecting movement of the bar.

[0009] The controls for controlling operation of the motor preferably include a memory. The controls preferably also include means whereby the degree of curvature of the flexible structure can be adjusted in timed stages.

[0010] Ankle straps may be provided for fixing the feet (ankles) of the user to the flexible structure.

[0011] The flexible structure may be an inflatable unit or may include an inflatable unit.

[0012] The flexible structure may be inflatable as a whole and controlled adjustment of the degree of curvature of the flexible structure is preferably effected by controlling the degree of inflation of the flexible inflatable structure.

[0013] The inflatable structure may include a flexible base portion of generally rectangular form in plan view with longitudinal pockets at the two sides of the base portion to receive elongated supporting rails to provide lengthwise rigidity for the apparatus.

[0014] The inflatable structure preferably has a presented surface against which the user of the apparatus

places his or her back and at least the part of the inflatable structure that provides the presented surface is preferably made from an elasticated material so that it becomes taut on inflation.

[0015] The part of the inflatable structure that provides the presented surface is preferably so shaped that, when inflated, the two sides thereof are at a higher level than the middle thereof so as to restrain the user from slipping or rolling off the presented surface.

[0016] In another embodiment of the invention, the flexible structure is mounted on a support frame and the means for effecting controlled adjustment of the curvature of the flexible structure comprises means for effecting downward movement of parts of the flexible structure.

[0017] The flexible structure may be in the form of a substantially rectangular table that is mounted substantially centrally on the support frame. The means for effecting downward movement of parts of the flexible structure preferably comprises telescopic struts that act between the underside of the table and a base portion of the support frame so that, when the telescopic struts are retracted, the ends of the table are pulled downwardly so as to cause it to adopt a curvate configuration.

[0018] Inflatable elongated supports may be provided on the upper surface of the table and these may extend either transversely of the table or longitudinally thereof.

[0019] The flexible structure may alternatively comprise a flexible elongated strip, fixings at each end of the elongated strip and means for adjusting the distance between the fixings.

[0020] The means for adjusting the distance between the fixings may comprise an element of adjustable length, for example, a piston and cylinder mechanism or a motorised actuator. The element of adjustable length preferably extends horizontally.

[0021] The flexible elongated strip may comprise part of a continuous band part of which is disposed above the element of adjustable length and part of which is disposed beneath the element of adjustable length.

[0022] The continuous band is preferably mounted on a supporting base but may be replaced by two separate elongated strips, one disposed above the element of adjustable length and the other disposed beneath the element of adjustable length.

[0023] According to a second aspect of the present invention there is provided a method of treatment that includes use of the apparatus defined above.

Brief Description of the Figures

[0024]

Figure 1 is a perspective view of an apparatus in accordance with the present invention with the flexible support structure in a first degree of curvature,

Figure 2 is a perspective view of the apparatus of Figure 1 showing the flexible support structure in an

increased degree of curvature,

Figure 3 is a schematic side view of an apparatus in accordance with a second embodiment of the present invention with the flexible support structure inflated,

Figure 4 is a sectional view of the apparatus of Figure 3,

Figure 5 is a schematic side view of an apparatus in accordance with a further embodiment of the present invention showing two conditions of the flexible support structure,

Figure 6 is a side view of the apparatus of Figure 5 to a larger scale showing the flexible support structure in its curvate condition, and

Figure 7 is a schematic side view of an apparatus in accordance with a further embodiment of the present invention.

Description of the Preferred Embodiments

[0025] The apparatus shown in Figures 1 and 2 includes a base comprising a generally rectangular metal frame 10 on which there are two parallel guide rails 11. A flexible support structure 12 is mounted on the base and it comprises a pair of parallel nylon rods 13 interconnected by a plurality of transverse bars 14. One end of each of the nylon rods 13 is connected to the metal frame 10, whilst the other ends of the nylon rods 13 are free to move relative to the metal frame 10, the transverse bar 14 at that end of the flexible support structure 12 being provided at its ends with rollers 15 that rest on the guide rails 11. A flexible pad 16 is mounted on the support structure 12.

[0026] A linear actuator motor (not shown) has its output element connected to the transverse bar 14 on which the rollers 15 are mounted, the motor output element being movable from an initial position, in which the flexible pad 16 is disposed substantially horizontally, into the position shown in Figure 1, through any desired number of stages, into the position shown in Figure 2, again through any number of desired stages, and further onwards if desired.

[0027] Any other form of motor or actuator may be used to effect the required movement of the flexible support structure. For example, the operating mechanism may be operated pneumatically, manually, hydraulically or electrically. Provision may also be made for raising either one end or both ends of the rectangular metal frame 10.

[0028] Any suitable form of control may be provided for controlling operation of the linear actuator motor or other operating mechanism and the control will typically include a memory.

[0029] Optional ankle straps (not shown) may be pro-

vided on or adjacent the transverse bar 14 on which the rollers 15 are mounted and the user of the apparatus will lie on the flexible pad 16 with his or her ankles fixed in position and with the flexible support structure 12 in a substantially horizontal position. The control will then be operated to initiate operation of the linear actuator motor or other operating mechanism and the degree of curvature of the flexible support structure 12 will then be progressively increased.

[0030] The rate and extent to which the transverse bar 14 on which the rollers 15 are mounted is moved will be determined by the user and, in particular, by the type of treatment that is required.

[0031] Possible uses of the apparatus include use thereof as a therapeutic tool to decrease the thoracic kyphosis, to increase the lumbar lordosis, or to extend the hip joints. It may also be used to effect passive stretching of the anterior abdominal muscles and, in particular, stretching of the iliopsoas and anterior thigh muscles. Further possible uses include traction of the spinal column, lung drainage and treatment of lumbar spine discopathy, ankylosing spondylitis and idiopathic juvenile hyperkyphosis.

[0032] The apparatus can also be used for passive expansion of the thoracic cage, in particular, for stretching of the sterno-costal elements, for post-coital positioning to increase the likelihood of fertilisation and as an enhancement of the sexual experience.

[0033] A particular important feature of the apparatus described above is its ability to effect passive stretching of the iliopsoas muscles which, it is generally accepted, play a major role in posture. The degree of convexity of the flexible support structure 12 can be increased slowly over a period of time, not only during one treatment session but also over a number of treatment sessions spread over a number of weeks.

[0034] The apparatus shown in Figures 3 and 4 includes a generally rectangular flexible base 20 comprising a sheet of webbing with pockets 21 extending along the two sides of the base 20 for the full length thereof. The pockets 21 receive rigid support poles which, when inserted, ensure the stability of the base 20. The ends of the poles may, if desired, be interconnected by means of cross members (not shown) that are secured detachably to the ends of the poles and extend at right angles to the axes of the poles.

[0035] A flexible support structure 22 is connected to the base 20 and it comprises elasticated sheeting so that, together with the base 20, the flexible support structure is in the form of a large inflatable bag which, when inflated, adopts a curvate form as can be seen from Figure 3. The elasticated sheeting is typically of cellular construction and the presented surface thereof is shaped as can be seen from Figure 4 so that the sides of the presented surface are at a greater height than the middle portion thereof to reduce the likelihood of the user of the apparatus sliding or rolling off the presented surface during inflation of the support structure.

[0036] When the poles are removed from the pockets 21, the base 20 and the elasticated sheeting forming the flexible support structure 22 can be rolled up to facilitate storage thereof. In use, the base 20 can be placed on a mattress or other suitable support surface.

[0037] The radius of curvature of the presented surface of the support structure 22 will depend on the pressure within the interior of the inflatable bag and inflation will be carried out by means of a pump (not shown). The pump may be manual, electric or other and, if electric, remote control means may be provided to enable the user of the apparatus to control operation of the pump while lying on the presented surface of the support structure 22.

[0038] The method of use of the apparatus will be substantially as described above with reference to the embodiment shown in Figures 1 and 2. The base 20 may be disposed either horizontally, as described above, or in a vertical plane, for example, attached to a door or wall.

[0039] The degree of convexity of the flexible support structure 22 can be increased slowly over a period of time, not only during one treatment session but also over a number of treatment sessions spread over a number of weeks. The inflatable nature of the apparatus and the ability to roll up the base 20 and the elasticated sheeting forming the support structure 22 facilitate storage and transport of the apparatus shown in Figures 3 and 4.

[0040] The apparatus shown in Figures 5 and 6 includes a support frame comprising a flat base 30 and an inclined pillar 31 extending upwardly from the flat base 30. A rectangular table 32 is attached at its midpoint to the upper end of the pillar 31 and telescopic struts 33 and 34 are pivotally connected to the base 30 and to the underside of the table 32. The telescopic struts 33 and 34 are both movable between an extended position - as shown on the left of Figure 5 - and a retracted position - as shown on the right of Figure 5 and as shown in Figure 6. When the struts 33 and 34 are in their extended positions, the table 32 is disposed substantially horizontally whereas, when the struts 33 and 34 are in their retracted positions, the ends of the table 32 are at a significantly lower level than the mid-portion thereof. The table 32 is formed from a flexible board.

[0041] In use, therefore, a person requiring treatment will lie on the table 32 and the struts 33 and 34 will then be moved, in a controlled manner and to the required extent, into their retracted positions so that the table becomes curved and the spine of the person requiring treatment will be subjected to controlled stretching. The retracting movement of the struts 33 and 34 can be effected either manually or by means of motors and, if motors are employed, a remote operating device controlled by the person being treated may be provided.

[0042] Inflatable supports 35 can be provided on the upper surface of the table 32 and the inflatable supports 35 can extend either transversely of the table 32 (as shown in Figure 6) or longitudinally thereof.

[0043] The apparatus shown in Figure 7 includes an

element 40 of adjustable length, for example, a piston and cylinder mechanism or a motorised actuator and the ends of the element 40 are connected to fixings 41 and 42. The element 40 extends horizontally and, by varying the length of the element 40, the distance between the fixings 41 and 42 can be varied between a maximum spacing, an intermediate spacing and a minimum spacing.

[0044] A flexible band 43 is connected to the fixings 41 and 42, with one part of the band 43 disposed above the element 40 and with the other part of the band 43 disposed below the element 40. When the distance between the fixings 41 and 42 is reduced, the radius of curvature of each part of the band 43 is reduced. The lower part of the band 43 is connected to a supporting base 44.

[0045] Inflatable supports (not shown) can be provided on the upper surface of the flexible band 43 and the inflatable supports can extend either transversely of the flexible band 43 or longitudinally thereof.

[0046] In a modification of the arrangement described above, the continuous flexible band 43 is replaced by two flexible elongated strips of the same length, with the strips being connected at their ends to the fixings 41 and 42.

[0047] In use, a person requiring treatment will lie on the presented surface of the upper part of the band 43 with the fixings 41 and 42 at their maximum spacing. The fixings 41 and 42 will then be moved relative to one another, in a controlled manner and to the required extent, by reduction of the length of the adjustable element 40 so that the presented surface of the upper part of the band 43 becomes increasingly curved and the spine of the person requiring treatment will be subjected to controlled stretching.

[0048] The adjustment in the length of the element 40 can be effected either manually or by means of motors and, if motors are employed, a remote operating device controlled by the person being treated may be provided.

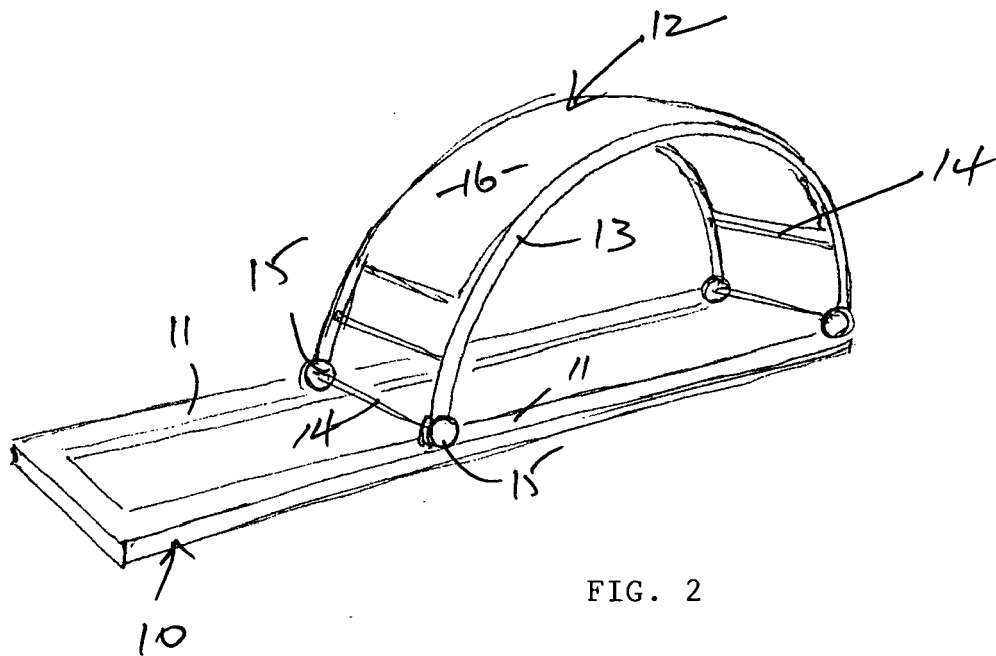
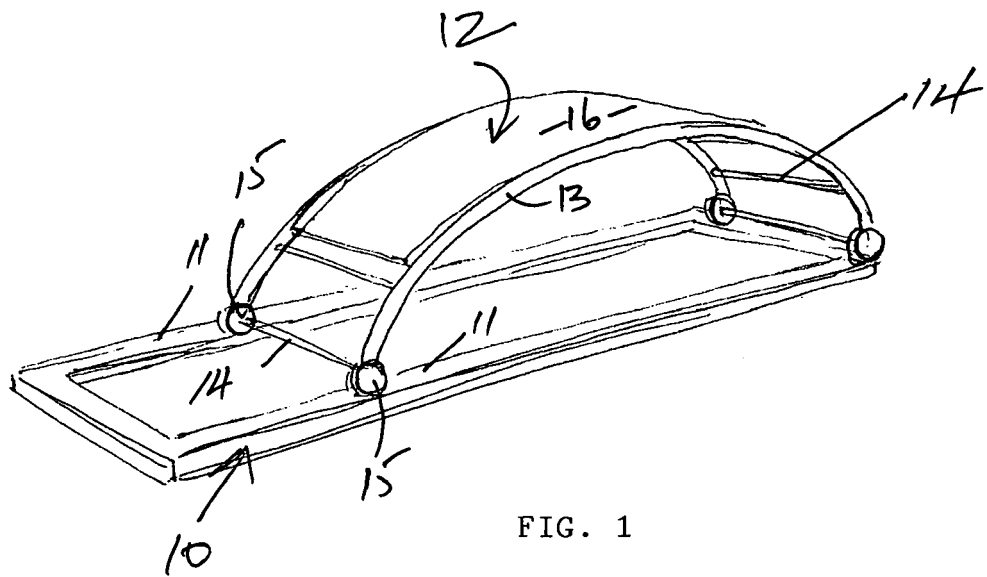
[0049] Straps (not shown) may be provided for either of the embodiments described above and can be arranged for engagement with either the ankles or the thighs of the users of the apparatus.

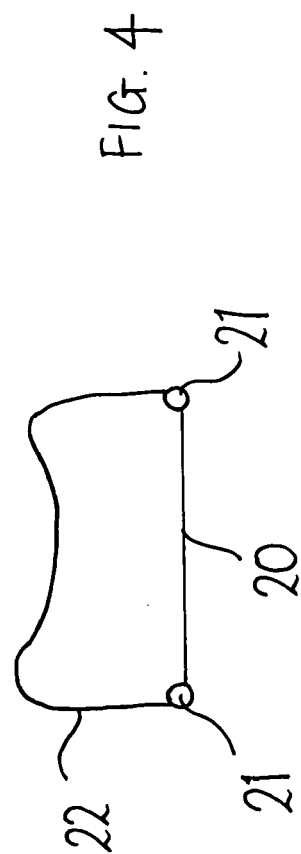
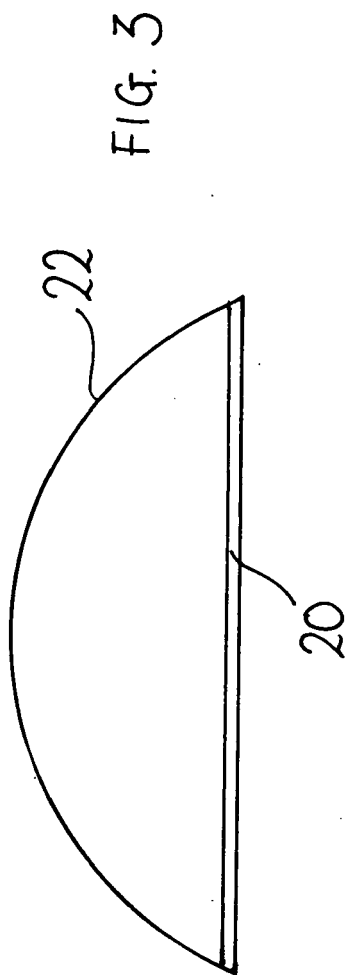
Claims

1. A treatment apparatus that comprises a flexible structure for supporting a human body lying either supine or prone and means for effecting controlled adjustment of the degree of curvature of the flexible structure.
2. A treatment apparatus as claimed in Claim 1, in which the flexible structure is mounted on a rigid base and the means for effecting controlled adjustment of the degree of curvature of the flexible structure includes rollers connected to the flexible structure that are movable along longitudinal guide rails connected

to or forming part of the rigid base.

3. A treatment apparatus as claimed in Claim 2, in which the rollers are mounted on the ends of a bar that extends transversely of the longitudinal guide rails. 5
4. A treatment apparatus as claimed in any one of the preceding claims, in which straps are provided for fixing the feet or ankles of the user to the flexible structure. 10
5. A treatment apparatus as claimed in Claim 1, in which the flexible structure is inflatable as a whole and controlled adjustment of the degree of curvature of the flexible structure is effected by controlling the degree of inflation of the flexible inflatable structure. 15
6. A treatment apparatus as claimed in Claim 5, in which the inflatable structure includes a flexible base portion of generally rectangular form in plan view with longitudinal pockets at the two sides of the base portion to receive elongated supporting rails to provide lengthwise rigidity for the apparatus. 20
7. A treatment apparatus as claimed in Claim 5 or Claim 6, in which the inflatable structure has a presented surface against which the user of the apparatus places his or her back and at least the part of the inflatable structure that provides the presented surface is made from an elasticated material so that it becomes taut on inflation. 25 30
8. A treatment apparatus as claimed in Claim 7, in which the part of the inflatable structure that provides the presented surface is so shaped that, when inflated, the two sides thereof are at a higher level than the middle thereof so as to restrain the user from slipping or rolling off the presented surface. 35 40
9. A treatment apparatus as claimed in Claim 1, in which the flexible structure is mounted on a support frame and the means for effecting controlled adjustment of the degree of curvature of the flexible structure comprises means for effecting downward movement of parts of the flexible structure. 45
10. A treatment apparatus as claimed in Claim 9, in which the flexible structure is in the form of a substantially rectangular table that is mounted substantially centrally on the support frame and in which the means for effecting downward movement of parts of the flexible structure comprises telescopic struts that act between the underside of the table and a base portion of the support frame so that, when the telescopic struts are retracted, the ends of the table are pulled downwardly so as to cause it to adopt a curvate configuration. 50 55
11. A treatment apparatus as claimed in Claim 10, in which inflatable elongated supports are provided on the upper surface of the table and extend either transversely of the table or longitudinally thereof.
12. A treatment apparatus as claimed in Claim 1, in which the flexible structure comprises a flexible elongated strip, fixings at each end of the elongated strip and means for adjusting the distance between the fixings.
13. A treatment apparatus as claimed in Claim 12, in which the means for adjusting the distance between the fixings comprises a horizontally extending element of adjustable length.
14. A treatment apparatus as claimed in Claim 13, in which the flexible elongated strip comprises part of a continuous band a portion of which is disposed above the element of adjustable length and a portion of which is disposed beneath the element of adjustable length, the continuous band being mounted on a supporting base.
15. A treatment apparatus as claimed in Claim 13, which includes two separate elongated strips, one disposed above the element of adjustable length and the other disposed beneath the element of adjustable length.





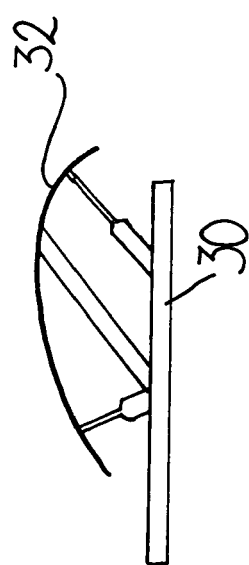
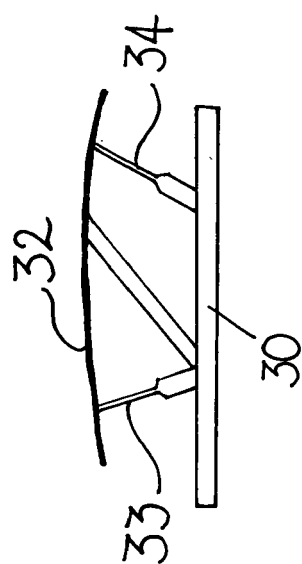


FIG. 5

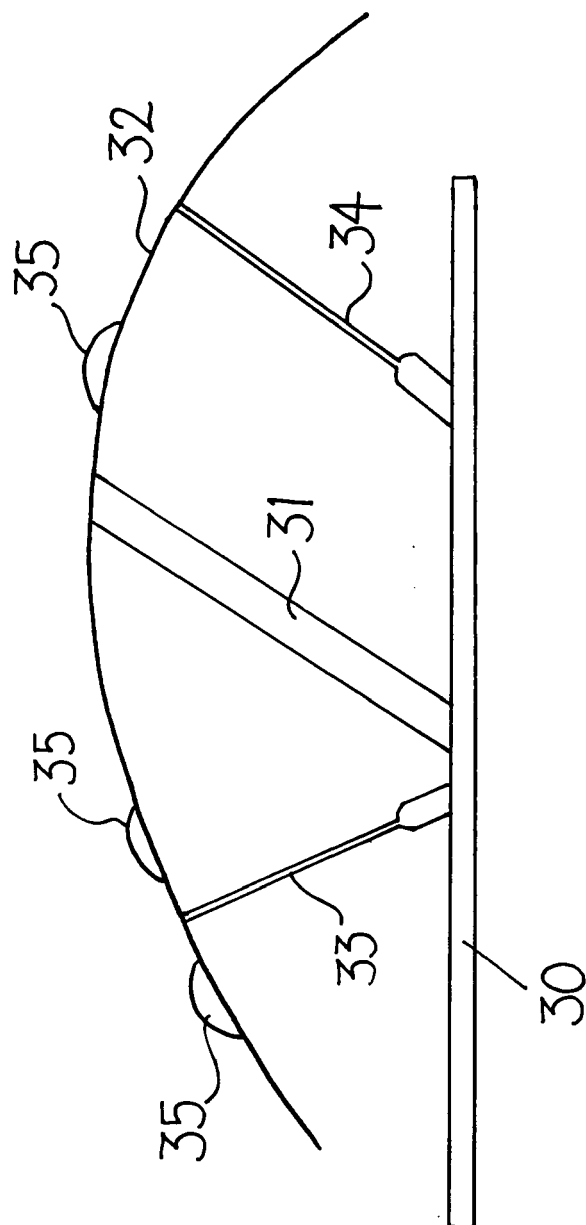


FIG. 6

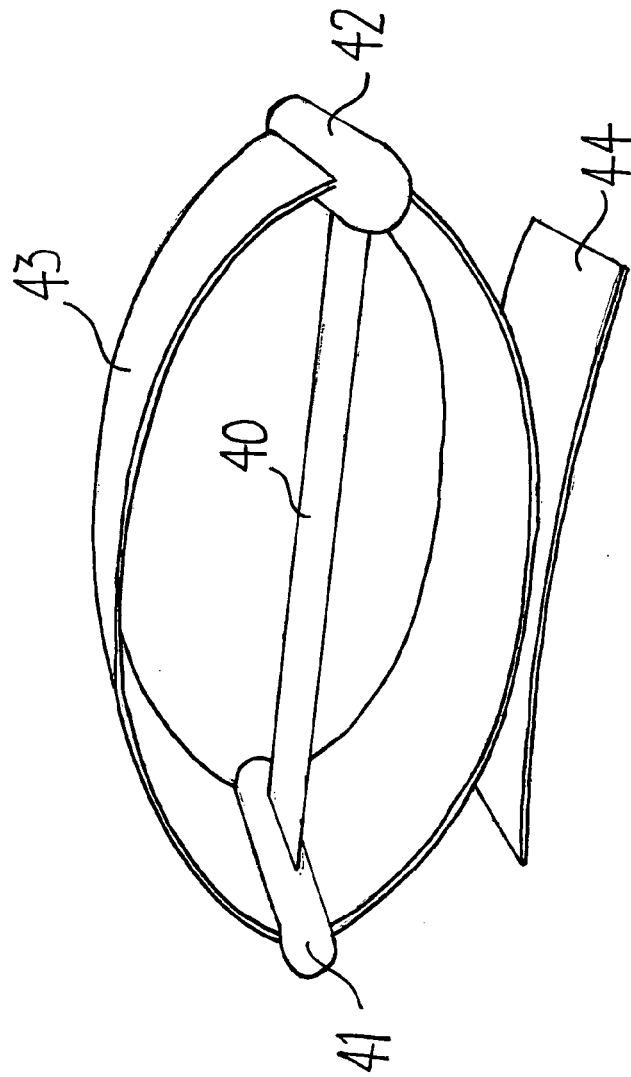


FIGURE 7



EUROPEAN SEARCH REPORT

Application Number
EP 08 25 2140

DOCUMENTS CONSIDERED TO BE RELEVANT			
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 October 2008	Examiner Teissier, Sara
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 25 2140

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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10-10-2008

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