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(54) **SUPPORT FRAME FOR SUPINE PERSONS**

TRAGGESTELL FÜR LIEGENDE PERSONEN

CADRE DE SUPPORT DE PERSONNES EN DECUBITUS DORSAL

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Description

[0001] This invention relates to a support frame for use by supine persons to provide substantially total relaxation for the spine.

[0002] Although a human being is bipedal and walks while in a vertical position the spine is not relaxed and strain free unless laid in a horizontal position where the forces of gravity, particularly across the vertebral links, are minimal. Supports for various sections of the spinal column, cervical, thoracic and lumbar have been proposed, particularly for seated people, but heretofore no complete support has been available for the whole spinal structure.

[0003] US 3881469 describes a muscle relaxing apparatus for relieving a patient from muscular fatigue. FR 2477870 describes a back massage apparatus which supports the muscles of the trunk.

[0004] The present invention provides a frame on which a person may lie supine with the spinal region supported in a manner that produces minimal strain.

[0005] According to the present invention there is provided a frame for the support of supine persons comprising a rigid rectangular frame carrying a plurality of parallel rods attached to and crossing the space between the two longer sides of the frame and forming four groups located in the position of the cervical, thoracic, lumbar and pelvic regions of the body, the groups of rods located in the cervical, thoracic and lumbar regions carry a pair of barrel shaped or spherical support members on each rod rigidly fixed to or integral with the rod and spaced equidistantly about the longitudinal axis of the frame and extending upwardly above the edges of the frame, the rods and support members being mounted so that the upper surfaces of the support members are raised above the sides of the frame wherein each pair of support members is arranged with a spacing of 30-75mm between the centres of the support members.

[0006] A supine person desiring minimal back strain lies on the frame with their legs flexed with an approximately ninety degree angle between the thigh and the shin portions of the leg.

[0007] The frame is preferably fabricated from timber, the sides having a thickness in the range 15 mm to 30 mm depending on the type of timber used. Preferably the timber is beech. Alternative materials include metals and synthetic resin composites such as glass and carbon fibre reinforced polymers. The sides of the frame must have sufficient height to accommodate the vertical movement of the support members so that when the frame is placed on a flat surface the support members can move freely without vertical restriction through contact with the supporting surface.

[0008] The rods may be formed of a resilient material or, if rigid, may be mounted in a manner that permits vertical movement but not rotary movement. In the preferred embodiments the rods are formed from timber however other materials, such a steel, titanium, aluminium and synthetic polymeric compositions may be used. In the case of timber rods the construction will be solid however the strength of some alternative materials may permit tubular construction.

[0009] The frame must be capable of supporting a supine human being and preferably has a length of about one metre. The support members preferably comprise pairs of barrel shaped or spherical members having an outer diameter of 60 to 140 mm, with a width of about 70 mm and a central spacing of 30 to 75 mm. The central spacing should be sufficient for the surfaces of the support members to rest against the area of the facet joints of the spinal column. The rods are spaced so that there is a gap of approximately 1 mm between the outer convex surface of each support member carried by adjacent rods. This allows the support members to move in a vertical plane without frictional contact between their outermost surfaces.

[0010] In its preferred form the rods carrying the support members are mounted in sets arranged to accommodate the various regions of the spine, cervical, thoracic and lumbar. Beyond these regions, i.e for the pelvic region, plain rods without support members are used to support the buttocks and feet of the user. The rods in the cervical and lumbar regions are located above the horizontal plane of the frame to provide a convex upward surface which substantially follows the natural curvature of the human spine in these regions. The rods in the thoracic and pelvic regions lie in a horizontal plane.

[0011] In use a person lies supine on the frame with the legs flexed at an angle of approximately ninety degrees. The support members support the back of the body each side of the spinal column along the facet joints. This enables the spine to rest in a relaxed state with no pressure on the vertebrae.

[0012] In order that the invention may be clearly understood one form thereof will be described with reference to the accompanying drawings in which:

Figure 1 is a plan view of a frame according to the invention, and

Figure 2 is a side view of the frame shown in Figure 1.

[0013] A frame for the support of supine persons, see Figure 1, consists of a rigid rectangular frame 1 having two end sections 2 and 3 joining two long sections 4 and 5. The sections 2, 3, 4, and 5 are fabricated from timber and rigidly connected at each corner by mechanical fixings or conventional joinery techniques. A series of groups of parallel rods 7, 8, 9 and 10 are located between the sides 4 and 5. The ends of the rods are fitted into the sides in a manner that prevents rotation and can accommodate a the vertical load arising from the portion of the body lying on the frame.

[0014] Each of the rods in the groups of rods 7, 8 and 9 carry a pair of round or barrel shaped support members 12, 12', 13, 13', 14 and 14' rigidly fixed to the as-

sociated rod and located equidistantly from a central axis. Each pair is spaced so that thier upper surfaces abut the facet joints. The support members 12 to 14 and 12' to 14' extend upwardly above the edges of the frame. The rods 7 and their associated support members 12 and 12' are adapted to support the cervical region of the spine and mounted to form an upwardly curved contour, see Figure 2, matching that of this region of the human body in its relaxed state. The rods in the group 8 and their associated support members 13 and 13' lie in the same horizontal plane and support the thoracic region. The rods in the group 9 their associated support members 14 and 14' are adapted to support the lumbar region of the spine and mounted to form a convex contour. The support members 14 and 14' have a larger diameter than those used to support the cervical and thoracic regions.

[0015] The number and spacing of the rods shown in Figures 1 and 2 may be varied in accordance with the height and weight of the person who will lie on the frame. The thoracic region may have from 5 to 6 rods and the lumbar region from 4 to 8 rods.

[0016] In an example the following dimensions provided an excellent support frame in which the user lay totally relaxed. Each support member is activated under gravitational forces from one or more corresponding facet joints on the spine. The support system enabled each and every spinal joint to move. As a result of a chain reaction through all the joints the passive physiological range of mobility becomes affected causing increased mobility of the complex vertebral column. The benefits of lying on a frame according to the invention include:

Increased spinal mobility
A decrease in stiffness and increased soft tissue elasticity, e.g. spinal duras, ligaments and intra-abdominal pressure.
A decrease in perceived pain.
A decrease in intradiscal pressure.
Hypo-tension of the central nervous system.
Hypo-tension of the vascular system.
Psychosomatic mentality effects, i.e. anti-stress relaxation.

All these effects are obtained without the administration of chemotheraputic agents.

[0017] In an example a frame was constructed having the following measurements:

The rectangular wooden frame was constructed of timber having a thickness of 17 mm. The major sides had a length of 880 mm and the minor sides of 250 mm providing an inside width of 220mm.

The first portion, adapted to support the cervical region, had a length of 260 mm and contained five rods carrying pairs of barrel shaped support members. Each barrel had a diameter of 72 mm and a length of 140 mm. The pairs of barrels were separated by 30 mm. The rods were mounted in the frame in a manner that created a convex curve having a crest 142 mm above the plane of the frame.

The second portion, adapted to support the thoracic region, had a length of 220 mm and contained five rods carrying pairs of barrel shaped support members having the same dimensions as those used for the first portion. Unlike the first portion, the rods with their support members lay in a horizontal plane.

The third portion, adapted to support the lumbar region had a length of 180 mm and contained four rods carrying pairs of barrel shaped support members. The barrels had a larger diameter than those used in the first two portions. The rods were mounted in the frame in a manner that created a convex curve having a crest 120 mm above the plane of the frame.

The fourth portion, adapted to support the pelvic region had a length of 290 mm and contained five rods without any attached shaped support members.

[0018] In all four portions of the frame the rods had a thickness of 95 mm.

[0019] In an alternative embodiment the barrel shaped support members carried by the rods were replaced by substantially spherical support members. The spheres used in the cervical and thoracic portions had an approximate diameter of 40 mm while those for the lumbar portion had a diameter of 50 mm . The first two portions had six rods carrying spherical support members while the third portion had four rods. The rods had a diameter of about 40 mm.

Claims

1. A frame for the support of supine persons comprising a rigid rectangular frame carrying a plurality of parallel rods attached to and crossing the space between the two longer sides of the frame and forming four groups located in the position of the cervical, thoracic, lumbar and pelvic regions of the body, the groups of rods located in the cervical, thoracic and lumbar regions carry a pair of barrel shaped or spherical support members on each rod rigidly fixed to or integral with the rod and spaced equidistantly about the longitudinal axis of the frame and extending upwardly above the edges of the frame, the rods and support members being mounted so that the upper surfaces of the support members are raised above the sides of the frame, each pair of support members being arranged with a spacing of 30-75mm between the centres of the support members.

2. A frame as claimed in claim 1 in which the rods carrying the support members are mounted or constructed in a manner that permits limited movement in a vertical plane.

3. A frame as claimed in claim 1 or claim 2 in which the rods, support members and frame are constructed from timber.

4. A frame as claimed in claim 3 in which the timber is beech.

5. A frame as claimed in any of the preceding claims in which the spacing between the centres of each pair of support members is 75 mm.

6. A frame as claimed in any of the preceding claims in which the spacing between the two longer sides of the frame is 220 mm.

Patentansprüche

1. Rahmen zum Tragen von Personen in Rückenlage umfassend einen starren, rechteckigen Rahmen, der mehrere parallele Stäbe aufweist, die an dem Raum zwischen den zwei längeren Seiten des Rahmens befestigt sind und diesen kreuzen und vier Gruppen bilden, die sich in der Lage der Hals-, Brust-, Lenden- und Becken-Bereiche des Körpers befinden, wobei die Gruppen der Stäbe, die sich in der Lage der Hals-, Brust- und Lenden-Bereiche des Körpers befinden, auf jedem Stab ein Paar walzenförmiger oder kugelförmiger Trageelemente aufweisen, die an dem Stab befestigt oder einstükkig damit ausgebildet sind und sich abstandsgetreu um die Längsachse des Rahmens und aufwärts über die Kanten des Rahmens erstrecken, wobei die Stäbe und Trageelemente derart befestigt sind, dass sich die oberen Flächen der Trageelemente über die Seiten des Rahmens erheben, wobei jedes Paar der Trageelemente zwischen den Mittelpunkten der Trageelemente mit einem Abstand von 30-75 mm angeordnet ist.

2. Rahmen nach Anspruch 1, worin die die Trageelemente tragenden Stäbe auf eine Art befestigt oder ausgebildet sind, die eine eingeschränkte Bewegung in einer senkrechten Ebene ermöglicht.

3. Rahmen nach Anspruch 1 oder 2, worin die Stäbe, Trageelemente und der Rahmen aus Holz ausgebildet ist.

4. Rahmen nach Anspruch 3, worin das Holz Buche ist.

5. Rahmen nach einem der vorstehenden Ansprüche, worin der Abstand zwischen den Mittelpunkten jeden Paars von Trageelementen 75 mm beträgt.

6. Rahmen nach einem der vorstehenden Ansprüche, worin der Abstand zwischen den zwei längeren Seiten des Rahmens 220 mm beträgt.

Revendications

1. Un cadre de support de personnes en décubitus dorsal comprenant un cadre rectangulaire rigide portant une pluralité de tiges parallèles fixées à et traversant l'espace entre les deux côtés les plus longs du cadre et formant quatre groupes positionnés à l'endroit des régions cervicale, thoracique, lombaire et pelvienne du corps, les groupes de tiges positionnés dans les régions cervicale, thoracique et lombaire portant une paire d'éléments de support en forme de tonneau ou de sphère sur chaque tige fixée de façon rigide ou faisant partie intégrante avec la tige et écartée à égale distance par rapport à l'axe longitudinal du cadre et s'étendant vers le haut au-dessus des bords du cadre, les tiges et éléments de support étant montés de telle façon que les surfaces supérieures des éléments de support soient montées par-dessus les côtés du cadre, chaque paire d'éléments de support étant arrangée selon un écartement de 30-75 mm entre les centres des éléments de support.

2. Cadre selon la revendication 1 dans lequel les tiges portant les éléments de support sont montées ou construites d'une façon qui permet un mouvement limité dans un plan vertical.

3. Cadre selon la revendication 1 ou la revendication 2 dans lequel les tiges, éléments de support et cadre sont construits à partir de billots.

4. Cadre selon la revendication 3 dans lequel le billot est en hêtre.

5. Cadre selon l'une quelconque des revendications précédentes dans lequel l'écartement entre les centres de chaque paire d'élément de support est de 75 mm.

6. Cadre selon l'une quelconque des revendications précédentes dans lequel l'écartement entre les deux côtés les plus longs du cadre est de 220 mm.

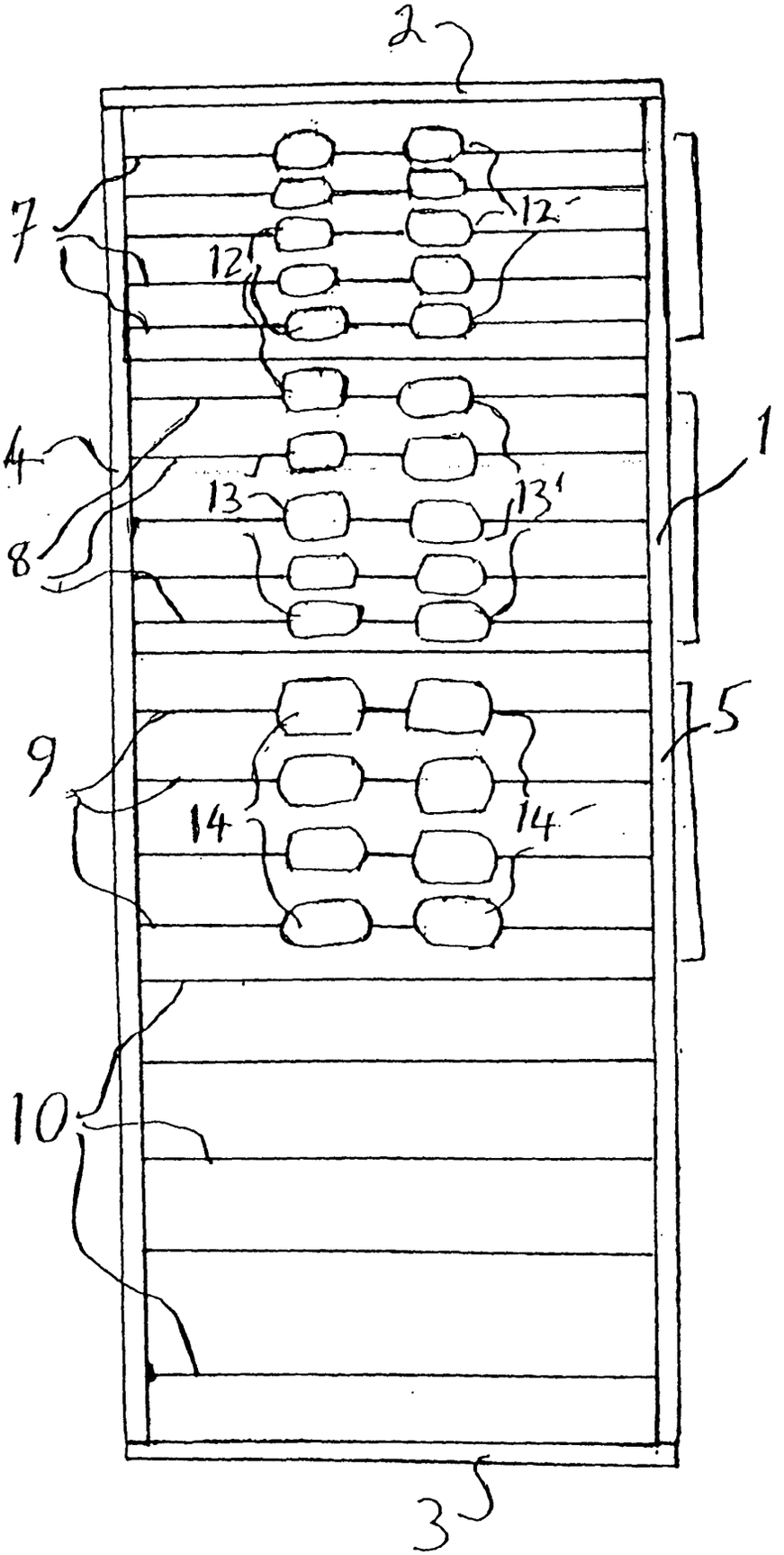

Figure 1

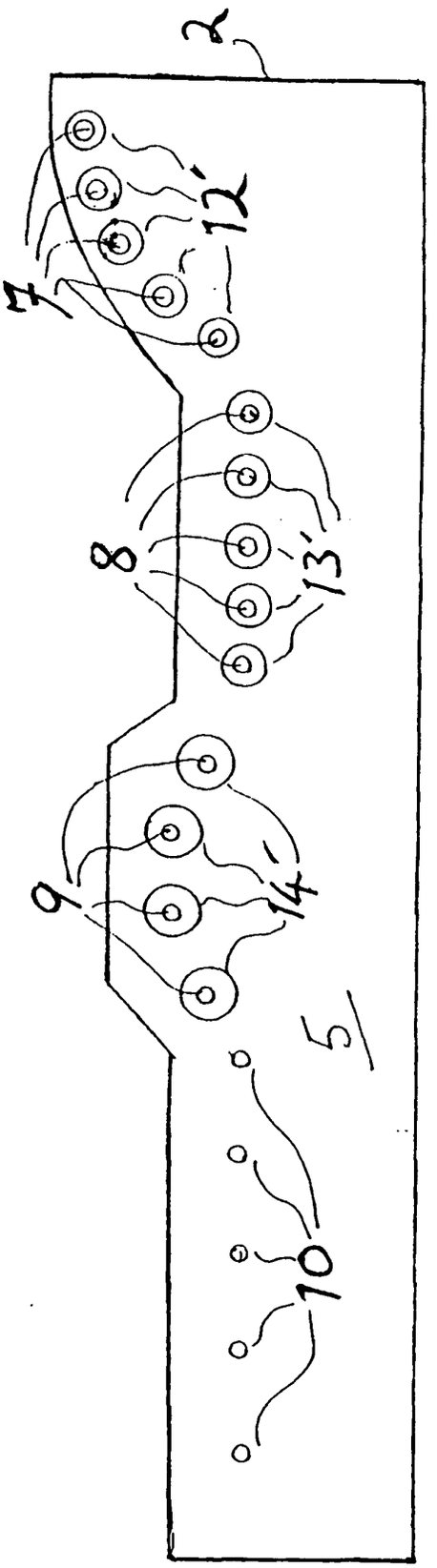

Figure 2