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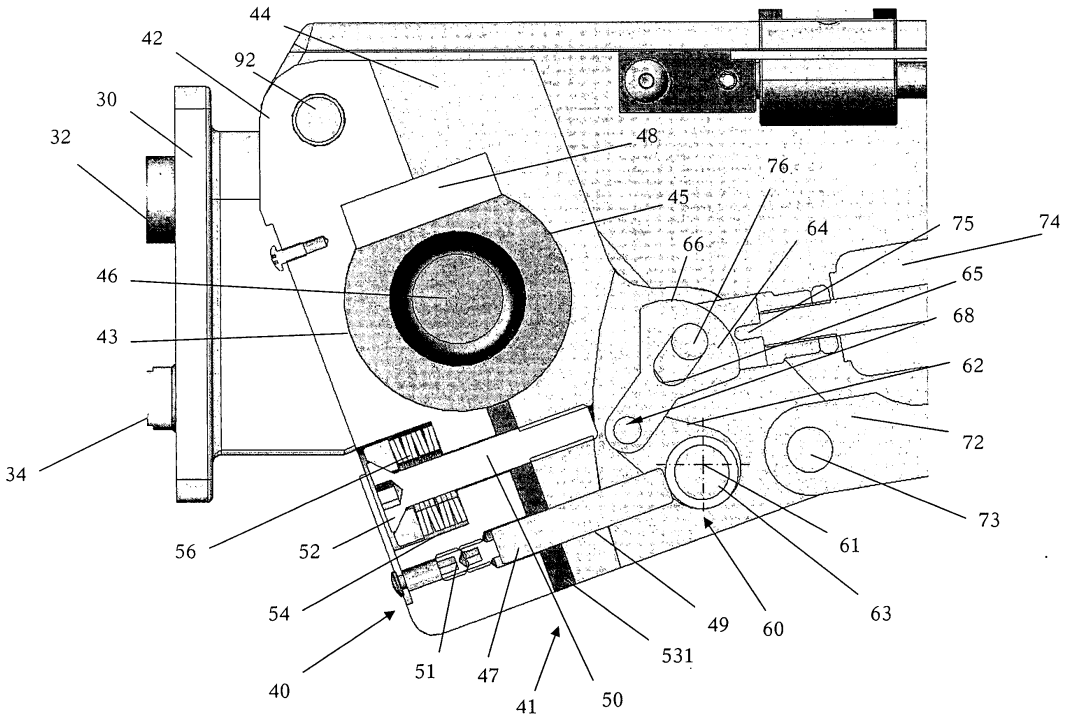
(54) Articulated leg section

(57) The invention relates to an articulated leg section (10) for supporting a leg of a patient wherein the leg section comprises a hinged leg support (70), a rotating joint (42,44,46,48) for rotation of the leg support (70) and a clamp (41) for controlling movement of the hinged leg support (70) and the rotating joint (40,42,44,46,48) wherein:

the rotating joint has a locked position and an unlocked position;
the hinged leg support may be locked; and
the clamp is actuable to unlock the rotating joint and the hinged leg support;

and to a cushion release mechanism.

Figure 5



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Description

[0001] The invention relates to an articulated leg section for supporting a leg of a patient. The invention also relates to a cushion release mechanism.

[0002] In many operation procedures, especially gynaecological, urological and obstetric procedures, the surgeon needs to move the patient from a supine position to a lithotomy position.

[0003] The lithotomy position is a medical term referring to a common position for surgical procedures and medical examinations involving pelvis and lower abdomen. The lithotomy position is perhaps most recognizable as the "standard" position for child birth whereby the patient is lain on the back with their legs bent at the knee, positioned above the hips, and slightly spread apart.

[0004] Known operating tables have a number of joints for controlling different types of movement of a patient's legs. The inventors have identified that it is time consuming to put a patient into a lithotomy position because a joint for controlling lateral rotation of a patient's upper leg is controlled separately from a joint for raising the patient's leg. This can cause a problem for nurses or for operating room staff in an emergency.

[0005] A way of ameliorating these problems has been sought.

[0006] According to the invention there is provided an articulated leg section for supporting a leg of a patient wherein the leg section comprises a hinged leg support, a rotating joint for rotation of the leg support and a clamp for controlling movement of the hinged leg support and the rotating joint wherein:

the rotating joint has a locked position and an unlocked position;

the hinged leg support may be locked; and

the clamp is actuable to unlock the rotating joint and the hinged leg support.

[0007] One of the advantages of the articulated leg section according to the invention is that in having a single clamp controlling the movement of both the rotating joint and the leg support, the articulated leg section is easier to operate. Furthermore, it is quicker to put a leg placed on the articulated leg section according to the invention into the lithotomy position.

[0008] In some embodiments, the rotating joint may be movable from the locked position to the unlocked position. In some embodiments, the clamp is actuable to move from a first position in which the rotating joint and the hinged leg support are locked to a second position in which the rotating joint and the hinged leg support are unlocked. In some embodiments, the hinged leg support may be raised or lowered.

[0009] In some embodiments, the rotating joint may have an element having a curved surface and a joint arm having a correspondingly shaped surface wherein the element and/or the joint arm have a locked position where the joint arm engages the fixed element and an unlocked position where the joint arm does not engage the fixed element.

[0010] In some embodiments, the rotating joint and/or the hinged leg support are adapted to only allow an anatomically acceptable movement of a patient's leg. The advantages of allowing only anatomically acceptable movements include reduction of a risk that a patient might get hurt performing unnatural movements, for example in an emergency.

[0011] To allow only anatomically acceptable rotation of a leg, the rotating joint may be a laterally rotating joint for rotating an upper part of a patient's leg laterally by an angle of up to about 45°, preferably up to about 30°, more preferably up to about 20°. In some embodiments, the rotating joint may be an abducting joint for abducting a patient's leg by an angle of up to about 45°, preferably up to about 35°, more preferably up to about 25°.

[0012] To allow only anatomically acceptable movement of a leg, the hinged leg support may have hinges at positions corresponding to a hip and a knee joint. An advantage of such an embodiment is that it overcomes a problem with known direct supports for a patient's legs in the lithotomy position which are bulky and limit access to a patient from the side. By having a hinged leg support which is shaped in a similar way to a patient's leg, operating theatre staff have improved access to a patient from the side.

[0013] In some embodiments, the hinged leg support may be a four bar linkage formed from a hip joint, an upper leg support, a knee joint and a lower bar. The hinged leg support may be constrained to move from a lowered position where the hinged leg support is horizontal to a raised position. In some embodiments, the lower bar may have a concave shape to improve access to the patient by operating theatre staff.

[0014] In some embodiments, the hinged leg support may have a lower leg support. Where the hinged leg support is a four bar linkage, the lower leg support may be connected to the knee joint. The lower leg support may include a lower leg cushion. The lower leg support may be in the form of a tubular member on which a lower leg support accessory may be removably mounted. Suitable lower leg support accessories include a lower leg cushion and a foot receptacle.

[0015] In some embodiments, the hinged leg support includes a biasing mechanism for biasing the hinged leg support into a raised position. Advantages of the hinged leg support having a biasing mechanism include that it effectively assists movement of the hinged leg support into a raised position which helps an operator of the articulated leg section in manipulating a patient's leg to allow easier positioning of the leg and less strain on the operator.

[0016] In some embodiments, the biasing mechanism may be provided in the form of a resilient member such

a spring or a compressible fluid strut. Where the biasing mechanism is a resilient member, it may be arranged to be compressed when the hinged leg support is in a lowered position and extended when the hinged leg support is raised. An advantage of such an embodiment is that the resilient member assists the raising of the hinged leg support.

[0017] In some embodiments, the biasing mechanism may be a damped biasing mechanism. An advantage of damping the biasing mechanism is that movement of the hinged leg support is controlled further. The damped biasing mechanism may be a compressible fluid strut, for example a gas strut.

[0018] In some embodiments, the biasing mechanism may be a locking biasing mechanism such that it provides the lock of the hinged leg support. A locking biasing mechanism may be a locking gas strut.

[0019] In some embodiments, the hinged leg support may have a cam operated biased lock.

[0020] In some embodiments, the clamp has a cam arm having a first and a second cam wherein the cam arm is rotatable from a first rest position where the rotating joint and hinged leg support lock are locked to a second position where the first cam engages the rotating joint to unlock it and the second cam engages the hinged leg support lock to unlock it. In some embodiments, the first cam may engage a joint arm of the rotating joint. A formation may be provided on the joint arm for engaging the first cam.

[0021] In some embodiments, the clamp has a clamp bias mechanism for biasing it into a locked position. The clamp bias mechanism may be provided by a resilient member such as a plurality of Belleville washers.

[0022] The articulated leg section according to the invention may have a connecting piece to enable it to be removably mounted on a patient support device. A suitable patient support device may be an operating table, trolley or chair.

[0023] According to the invention there is also provided a patient support device comprising the articulated leg section according to the invention.

[0024] When operating on a patient in a lithotomy position, it can be desirable to remove any leg cushions which might be provided on the leg support. This is to improve access to the patient because the leg cushions can get in the way. A problem with known cushion release mechanisms is that they are difficult to operate with a patient *in situ*. This is because they generally involve lifting the leg cushion off the leg support.

[0025] According to the invention there is further provided a cushion release mechanism comprising:

a leg support having a cushion facing upper surface on which is formed one or more apertures and a side surface on which one or more first hinge elements are provided; and

a leg cushion having a leg facing surface and an opposing surface on which one or more catch pins and one or more second hinge elements are provided;

wherein the one or more catch pins are positioned so that in use the one or more catch pins engage the one or more apertures; wherein the one or more first hinge elements are positioned so that in use the one or more first hinge elements removably engage the one or more second hinge elements; wherein the leg support has a catch mechanism for engaging the one or more catch pins when inserted in the one or more apertures; and

wherein the catch mechanism has a release button provided on a surface of the leg support which release button is for releasing the catch mechanism such that the leg cushion may be removed from the leg support.

[0026] Advantages of the cushion release mechanism according to the invention include that to remove the leg cushion from the leg support of the cushion release mechanism according to the invention, the release button is operated such that leg cushion can be rotated about the leg support on the axis of the first and second hinge elements and then slid off. Thus the leg cushion can be removed from the leg support when a patient's leg is resting on the leg cushion because the leg cushion does not need to be lifted off.

[0027] The hinge elements may be male and female hinge elements. A male hinge element may for example have a protrusion and a female hinge element may for example form a receptacle for receiving the protrusion of the male hinge element. Where two or more hinge elements are provided, the first hinge elements and the second hinge elements may each be co-axial.

[0028] The invention will now be illustrated by way of example without limiting the scope of the claims by reference to the following Figures of the drawings:

Figure 1 shows a perspective schematic view of a pair of articulated leg supports according to the invention mounted on an operating table;

Figure 2 shows a side schematic view of a right hand side articulated leg support according to the invention in a lowered position;

Figure 3 shows a side schematic view of the right hand side articulated leg support in a raised position;

Figure 4 shows a schematic perspective view of part of the right hand side articulated leg support;

Figure 5 shows a schematic side cross-sectional view of part of the right hand side articulated leg support;

Figure 6 shows a schematic overhead perspective view of the right hand side articulated leg support in an initial position;

Figure 7 shows a schematic overhead perspective view of the right hand side articulated leg support in a position abducted by an angle C from the initial position indicated by line B;

Figure 8 shows a schematic end perspective view of the right hand side articulated leg support in a direction A shown on Figure 6 wherein the leg support is in a position laterally rotated from the initial position by an angle E;

Figure 9 shows a schematic perspective view of a first embodiment of the upper leg cushion release mechanism;

Figure 10 shows a schematic perspective view of a second embodiment of the upper leg cushion release mechanism in a first position; and

Figure 11 shows a schematic perspective view of a second embodiment of the upper leg cushion release mechanism in a second position.

[0029] Figure 1 shows a pair of articulated leg sections 10,10' mounted on operating table 20. Right hand side articulated leg section 10 corresponds to left hand side articulated leg section 10' in that each leg section 10,10' has the same features but the former is arranged to support the right leg and the latter is arranged to support the left leg.

[0030] As shown in Figures 1, 2 and 3, right hand side articulated leg section 10 has a connecting piece 30, a hip joint 40, a hinged leg support 70 and a lower leg section 110.

[0031] As shown in Figures 2 and 3, hinged leg support 70 has a locking biasing mechanism 74 and a four bar linkage 71 which is formed by hip joint 40, upper leg section 90, knee joint 100 and lower bar 72.

[0032] Connecting piece 30,30' for mounting the articulated leg section 10,10' on an operating table (not shown) is connected to the hip joint 40,40' which is for controlling the raising and rotating of the upper leg support. Hip joint 40,40' is connected to hinged leg support 70,70' for raising the upper leg section 90,90' whilst the lower leg section 110,110' remains parallel to the ground. Hinged leg support 70,70' is connected to the lower leg section 110,110'.

[0033] Right hand side articulated leg support 10 is shown in more detail in Figures 2, 3, 4 and 5. Left hand side articulated leg support 10' corresponds. Connecting piece 30 has a guide pin 32 and an anti-rotation pin 34 for engaging with corresponding apertures (not shown) on the operating table 20. The guide pin 32 is for securing the articulated leg support 10 to the operating table 20. The anti-rotation pin 34 is for preventing the articulated leg support 10 from rotating on the guide pin 32.

[0034] As shown in Figure 5, the locking biasing mechanism 74 has a lock release pin 75 which is resiliently biased to a closed position. The locking biasing mechanism 74 is pivotally mounted on the hip joint 40 by means of pivot 76. Movement of the hinged leg support 70 is controlled by the locking biasing mechanism 74. In one embodiment, the locking biasing mechanism 74 is in the form of a locking compressible fluid strut, for example a locking gas spring. In an alternative embodiment, hinged leg support 70 is controlled by a biasing mechanism such as a spring and a separate cam operated spring-biased lock (not shown).

[0035] As shown in Figures 4 and 5, hip joint 40 has a clamp 41 and a clamp release mechanism 60. Clamp 41 has an inner joint arm 42, a outer joint arm 44, a foam seal 53, an element 46 and a key 48.

[0036] Inner joint arm 42 has an upper leg section pivot 92, a concave, curved, element-facing inner surface 43, a slot 54 and an actuation dowel 47 which has adjustment screws 51.

[0037] Outer joint arm 44 has a lower arm pivot 73, a locking biasing mechanism pivot 76, a concave, curved, element-facing inner surface 45, a slot 49 and a protrusion 50 which has a T-shaped tip 52.

[0038] Inner and outer joint arms 42,44 are bolted together at their upper end by bolts 78. Inner and outer joint arms 42,44 are formed from a material having some resilience such that inner and outer joint arms 42,44 can flex when pushed apart. Inner and outer joint arms 42,44 may be formed from aluminium or another suitable lightweight, low cost, resilient material.

[0039] Foam seal 53 is arranged between the inner joint arm 42 and the outer joint arm 44 to seal clamp 41 and to cushion and/or soften the relative movement of the inner joint arm 42 and the outer joint arm 44.

[0040] Element 46 has a support 31 which is mounted on connecting piece 30. Element 46 has a curved surface and is provided in the form of a ball. It is located between inner and outer joint arms 42,44 on surfaces 43,45. To limit the movement of inner and outer joint arms 42,44 on element 46, element 46 has a flat surface (not shown) formed on its surface and key 48 is provided between inner and outer joint arms 42,44 to engage the flat surface. The flat surface (not shown) and key 48 are inclined such that the inner and outer joint arms 42,44 are restricted to only be able to rotate laterally by up to 20° away from the vertical as shown in Figure 8. The inner facing surfaces of the inner and outer joint arms 42,44 which are where the inner and outer joint arms 42,44 meet are perpendicular to the flat surface (not shown) and key 48 such that the inner facing surfaces of the inner and outer joint arms 42,44 are inclined. The combination of inner and outer joint arms 42,44, an element 46 and a key 48 provide a rotating joint.

[0041] The surfaces 43,45 of inner and outer joint arms 42,44 are shaped such that inner and outer joint arms 42,44 are restricted to only be able to abduct by an angle of up to 35° as shown in Figure 7 by surfaces 43,45 abutting support 31.

[0042] Abduction as used herein refers to anatomical

movement of a patient's leg (not shown) about a vertical axis through the hip joint such that the leg moves horizontally in a direction away from the other leg. Abduction of the right hand side articulated leg support 10 is illustrated in Figure 7. Figure 7 shows an articulated leg support 10 which has been abducted by an angle C relative to the initial position of the articulated leg support 10 which is shown in Figure 6 and by line B in Figure 7. Angle C may be up to 25°.

[0043] Lateral rotation as used herein refers to anatomical movement of a patient's leg (not shown) when resting on articulated leg section 10,10' such that the left leg, for example, is rotated anti-clockwise (from the viewpoint of the patient) at the hip about an axis parallel to the left leg in the anatomical position (i.e. away from the other leg). Lateral rotation of right hand side articulated leg support 10 is illustrated in Figure 8. Figure 8 shows a view of an articulated leg support 10 from direction A shown in Figure 7. In Figure 8, articulated leg support 10 has been laterally rotated by an angle D relative to the vertical which is shown by line D in Figure 7. Angle D may be up to 9°.

[0044] To limit the movement of the outer joint arm 44 relative to the inner joint arm 42 and to bias the outer joint arm 44 towards the inner joint arm 42, the T-shaped tip 52 of the protrusion 50 of the outer joint arm 44 is constrained to move in the slot 54 of the inner joint arm 42 wherein the slot 54 contains a plurality of Belleville washers 56 between the T-shaped tip 52 and the outer joint arm end of the slot 54. This is such that when pressure is applied to the clamp release mechanism 60 to move outer joint arm 44 away from inner joint arm 42, T-shaped tip 52 is moved through slot 54 such that it abuts and compresses Belleville washers 56. When pressure is released from the joint release mechanism, the outer joint arm 44 is returned to its normal position by the action of the Belleville washers 56 on the T-shaped tip 52. In an alternative embodiment, the plurality of Belleville washers 56 may be replaced by a functionally equivalent resilient device such as a spring. The protrusion 50 of the outer joint arm 44 and the slot 54 of the inner joint arm 42 are provided below where surfaces 43,45 surround element 46. The combination of Belleville washers 56, slot 52 and protrusion 50 provides a clamp bias mechanism for biasing the clamp 41 into a locked position.

[0045] The actuation dowel 47 of the inner joint arm 42, when acted upon by means of the clamp release mechanism 60, can be used to push apart inner and outer joint arms 42,44 such that they are released from element 46. When inner and outer joint arms 42,44 are pushed apart, they flex such that they are released from element 46. The actuation dowel 47 extends through slot 49 in the outer joint arm 44. The length of actuation dowel 47 may be adjusted by means of adjustment screws 51. Actuation dowel 47 of the inner joint arm 42 and slot 49 of the outer joint arm 44 are provided at a lower end of inner and outer joint arms 42,44. Actuation dowel 47 provides a formation to be acted upon by a first cam of the clamp release mechanism 60.

[0046] Inner and outer joint arms 42,44 are movable between a first locked position where the inner and outer joint arms 42,44 engage element 46 and a second unlocked position. In the locked position of the inner and outer joint arms 42,44, the inner and outer joint arms 42,44 are unable to move. In the unlocked position of the inner and outer joint arms 42,44, the inner and outer joint arms 42,44 are able to rotate about element 46.

[0047] Clamp release mechanism 60 is mounted on the inner joint arm 44 and has a handle 61 and a cam arm 68. Cam arm 68 has an actuation lever 62 and a reciprocating linkage 64. Actuation lever 62 has a cylindrical formation 63 at its proximal end. Cylindrical formation 63 abuts actuation dowel 47 and has a needle roller bearing mounted on its external surface. Handle 61 is mounted off centre on cylindrical formation 63 at a point above the centre of cylindrical formation 63 which is indicated on Figure 5 by cross-hairs 61. Thus cylindrical formation 63 provides cam arm 68 with a first cam. A proximal end of reciprocating linkage 64 is rotatably mounted on a distal end of actuation lever 62 such that there is an initial angle of about 90° between the actuation lever 62 and the reciprocating linkage 64. Reciprocating linkage 64 forms a slot 65 which is mounted on pivot 76. A distal end of reciprocating linkage 64 forms a curved cam surface 66. Curved cam surface 66 locates onto lock release pin 75 of the locking biasing mechanism 74. Curved cam surface 66 provides cam arm 68 with a second cam. Slot 65 has a lock release pin end and an actuation lever end. In a first position, reciprocating linkage 64 is mounted on pivot 76 such that pivot 76 is at the lock release pin end of slot 65. When acted upon by actuation lever 62, reciprocating linkage 64 is movable to a second position where pivot 76 is at the actuation lever end of slot 65. Thus clamp release mechanism 60 is arranged so that both the clamp 41 and the locking biasing mechanism 74 are released at the same time by the movement of handle 61.

[0048] As shown in Figure 2, the upper leg section 90 comprises an upper leg cushion 92 and an upper leg support 94. The lower leg section 110 comprises a lower leg cushion 112 and a lower leg support 114. Lower leg support 114 is in the form of a tubular member on which the lower leg cushion 112 is slidably mounted. Lower leg cushion 112 has a tubular mounting 116 for receiving the lower leg support 114 so that the lower leg cushion 112 may be mounted on the lower leg support 114. Tubular mounting 116 has an adjustable screw fitting 118 so that the position of lower leg cushion 112 may be adjusted on lower leg support 114 and then fixed.

[0049] When the articulated leg section 10 is in use, it may be desirable to remove the upper and lower leg cushions 92,112. Accordingly, the upper leg cushion 92 may be removable, for example by means of a leg cushion release mechanism 300,500 as illustrated in Figures 9-11. Figure 3 shows the articulated leg section 10 in a raised position where the upper and lower leg cushions

92,112 have been removed and where a foot receptacle 113 has been slidably mounted on lower leg support 114. Foot receptacle 113 has a tubular mounting 116 for receiving the lower leg support 114 so that the foot receptacle 113 may be mounted on the lower leg support 114. Tubular mounting 116 has an adjustable screw fitting 118 so that the position of foot receptacle 113 may be adjusted on lower leg support 114 and then fixed.

[0050] The inner and outer joint arms 42,44 are movable between a first locked position as shown in Figures 4 and 5 and a second unlocked position. To move the inner and outer joint arms 42,44 between the first and second positions, the handle 61 is lifted to cause the actuation lever 62 to rotate clockwise such that the cylindrical formation 63 acts as a cam surface by engaging actuation dowel 47 such that outer joint arm 44 moves away from inner joint arm 42, forcing inner and outer joint arms 42,44 apart into the second unlocked position. The action of the cylindrical formation 63 on actuation dowel 47 is eased and effectively lubricated by the needle roller bearing which ensures that the handle 61 can be easily moved and prevents there being two hard, inflexible metal surfaces grinding against each other. At the same time, actuation lever 62 acts upon reciprocating linkage 64 to move it from its first position to its second position. When reciprocating linkage 64 is in its second position, its curved cam surface 66 engages and releases lock release pin 75 of the locking biasing mechanism 74.

[0051] When the handle 61 is released, the inner and outer joint arms 42,44 are returned to their first locked position by the action of Belleville washers 56 on T-shaped tip 52 and by the resilience of the inner and outer joint arms 42,44. The actuation dowel 47 acts on cylindrical formation 63 to return cam arm 68 and handle 61 to its original position. In an alternate embodiment, lock release pin 75 may be resiliently biased to return to a closed position to lock locking biasing mechanism 74, thereby acting on reciprocating linkage 64 to move it to its first position and to thereby assist in the movement of cam arm 68 and handle 61 to their original positions.

[0052] When the inner and outer joint arms 42,44 are in the first locked position, the upper and lower leg sections 90,110 are parallel to the ground. When the inner and outer joint arms 42,44 are in the second unlocked position, it is possible to abduct and laterally rotate inner and outer joint arms 42,44 and to move hinged leg support 70 up and down. When hinged leg support 70 is moved up, any weight, such as the weight of a patient's leg, is supported by the resilience and the biasing of the locking biasing mechanism 74. This is because the locking biasing mechanism 74 biases the hinged leg support 70 to be in a raised position. Where the locking biasing mechanism 74 is a locking gas strut, the locking biasing mechanism 74 is compressed when the hinged leg support 70 is the initial lowered position and extended when it is in a raised position.

[0053] When the hinged leg support 70 is moved up, the lower leg section 110 remains parallel to the ground because the lower bar 72 is of fixed length. In some circumstances, hinged movement of the lower leg section 110 may be desired. Accordingly, in an alternate embodiment, lower bar 72 is replaced by a member having a variable length (not shown) such that the orientation of the lower leg section 110 may be independently manipulated to allow fine tuning of the position of the lower leg section 110. A member having a variable length may be a locking biasing mechanism as defined herein.

[0054] Figure 9 shows a first embodiment of the leg cushion release mechanism 300. The release mechanism 300 is for releasably attaching a leg cushion 400 to a upper leg support 94.

[0055] The leg cushion 400 has a length and a width. The leg cushion 400 also has a proximal end 404 and a distal end 408. The leg cushion has a leg facing surface 430 and an opposing leg support facing surface 440. On the opposing surface 440, a pair of catch pins 420 and a pair of female hinge elements 410 are mounted.

[0056] The upper leg support 94 has a length, a proximal end 304 which may be connected to inner joint arm 42 of the clamp 60 and a distal end 308 which may be connected to a knee joint (not shown).

[0057] The upper leg support 94 has an upper surface 310 on which the leg cushion 400 may be mounted, an inner surface 330 which faces the other leg support (not shown) in use and an outer surface 320. Spaced apart on the inner surface 330 and coaxially mounted are provided a pair of male hinge elements 360 having axes arranged parallel to the length of the upper leg support 94. Each of the male hinge elements 360 has a protrusion. Each of the pair of female hinge elements 410 on the leg cushion 400 forms a receptacle which is arranged to engage the protrusion of one of the pair of male hinge elements 360.

[0058] In an alternate embodiment, one or both of the pair of male and female hinge elements 360,410 may be switched such that one or both of the male hinge elements 360 is located on the leg cushion 400 and one or both of the female hinge elements 410 is located on the upper leg support 94.

[0059] Spaced apart on the upper surface 310 are formed a pair of apertures 340. Each of the pair of catch pins 420 on the leg cushion 400 is arranged to engage each of the pair of apertures 340. On the outer surface 320, a catch release button 350 is provided.

[0060] Inside the upper leg support 94, a catch mechanism (not shown) is provided. The catch mechanism (not shown) is arranged to engage the pair of catch pins 420 when they are inserted into the pair of apertures 340. The catch mechanism (not shown) is arranged to release the catch pins 420 so that they can be removed from the pair of apertures 340 when the catch release button 350 is operated.

[0061] In operation, to mount the leg cushion 400 on the upper leg support 94, the leg cushion 400 is placed against the distal end of the upper leg support 94 such that its opposing surface 440 is against inner surface 330

and such that each of the pair of female hinge elements 410 on the leg cushion 400 is distal to its corresponding one of the pair of male hinge elements 360. The leg cushion 400 is then slid longitudinally along upper upper leg support 94 in a proximal direction so that each of the pair of female hinge elements 410 on the leg cushion 400 engages its corresponding one of the pair of male hinge elements 360. The leg cushion 400 is then rotated about the axis of the upper leg support 94 such that the opposing surface 440 is against the upper surface 310 of the upper support 300 and such that the pair of catch pins 420 are inserted into the pair of apertures 340 and engage the catch mechanism (not shown).

[0062] Conversely, to remove the leg cushion 400 from the upper leg support 94, the catch release button 350 is operated and then the steps set out in the preceding paragraph are performed in reverse order. Thus the leg cushion 400 may be removed from the upper leg support 94 whilst in use without a patient having to move their legs. This is because the leg cushion is swung below the patient's leg to remove it. Thus, it does not have to be lifted off the upper leg support 94.

[0063] A second embodiment of the leg cushion release mechanism 500 is shown in Figures 10 and 11. The release mechanism 500 is for releasably attaching a leg cushion 600 to a leg support 94. Like features of leg cushion release mechanism 500 and leg cushion 600 to leg cushion release mechanism 300 and leg cushion 400 are indicated by like reference numbers.

[0064] The leg cushion 400 has a length and a width. The leg cushion 400 also has a proximal end (not shown) and a distal end (not shown). The leg cushion has a leg facing surface 430 and an opposing leg support facing surface 440. On the opposing surface 440, a pair of catch pins 420 and a pair of hooks 610 are mounted.

[0065] The upper leg support 94 has a length, a proximal end 304 which may be connected to inner joint arm 42 of the clamp 60 and a distal end (not shown) which may be connected to a knee joint (not shown).

[0066] The upper leg support 94 has an upper surface 310 on which the leg cushion 400 may be mounted, an inner surface 330 which faces the other leg support (not shown) in use and an outer surface 320. A rail 560 is provided on the inner surface 330 having an axis arranged parallel to the length of the upper leg support 94. The pair of hooks 610 on the leg cushion 400 are shaped to engage rail 560.

[0067] Spaced apart on the upper surface 310 are formed a pair of apertures 340. Each of the pair of catch pins 420 on the leg cushion 400 is arranged to engage each of the pair of apertures 340. On the outer surface 320, a catch release button 350 is provided.

[0068] Inside the upper leg support 94, a catch mechanism (not shown) is provided. The catch mechanism (not shown) is arranged to engage the pair of catch pins 420 when they are inserted into the pair of apertures 340. The catch mechanism (not shown) is arranged to release the catch pins 420 so that they can be removed from the pair of apertures 340 when the catch release button 350 is operated.

[0069] In operation, to mount the leg cushion 600 on the upper leg support 94, the leg cushion 600 is placed against the upper leg support 94 such that hooks 610 on the leg cushion 400 engage rail 560 as shown in Figure 11. The leg cushion 400 is then rotated about rail 560 such that the opposing surface 440 is against the upper surface 310 of the upper support 300 and such that the pair of catch pins 420 are inserted into the pair of apertures 340 and engage the catch mechanism (not shown).

[0070] Conversely, to remove the leg cushion 400 from the upper leg support 94, the catch release button 350 is operated and then the steps set out in the preceding paragraph are performed in reverse order. Thus the leg cushion 400 may be removed from the upper leg support 94 whilst in use without a patient having to move their legs. This is because the leg cushion is swung below the patient's leg to remove it. Thus, it does not have to be lifted off the upper leg support 94.

Claims

1. An articulated leg section for supporting a leg of a patient wherein the leg section comprises a hinged leg support, a rotating joint for rotation of the leg support and a clamp for controlling movement of the hinged leg support and the rotating joint wherein:

   the rotating joint has a locked position and an unlocked position;
   the hinged leg support may be locked; and
   the clamp is actuable to unlock the rotating joint and the hinged leg support.

2. A leg section according to Claim 1 wherein the rotating joint and/or the hinged leg support are adapted to only allow an anatomically acceptable movement of a patient's leg.

3. A leg section according to Claim 2 wherein the rotating joint is a laterally rotating joint for rotating an upper part of a patient's leg laterally by an angle of up to about 30°, preferably up to about 20°, more preferably up to about 10°.

4. A leg section according to Claim 2 or Claim 3 wherein the rotating joint is an abducting joint for abducting a patient's leg by an angle of up to about 45°, preferably up to about 35°, more preferably up to about 25°.

5. A leg section according to any one of the preceding claims wherein the hinged leg support is a four bar linkage.

6. A leg section according to any one of the preceding

claims wherein the hinged leg support includes a biasing mechanism for biasing the hinged leg support into a raised position, preferably the biasing mechanism is a resilient member.

7. A leg section according to Claim 6 wherein the biasing mechanism may be a damped biasing mechanism, preferably the biasing mechanism is a locking biasing mechanism.

8. A leg section according to any one of the preceding claims wherein the clamp has a cam arm having a first and a second cam wherein the cam arm is rotatable from a first rest position where the rotating joint and hinged leg support are locked to a second position where the first cam engages the rotating joint to unlock it and the second cam engages the hinged leg support to unlock it.

9. A leg section according to claim 8 wherein the joint arm has a formation for engaging the first cam.

10. A leg section according to claim 8 or claim 9 wherein the second cam is provided by a reciprocating linkage having a cam surface.

11. A leg section according to any one of the preceding claims wherein the clamp has a clamp bias mechanism for biasing it into a locked position.

12. A leg section according to any one of the preceding claims which has a connecting piece to enable it to be removably mounted on a patient support device.

13. A patient support device comprising an articulated leg section as defined in any one of the preceding claims.

14. A cushion release mechanism comprising:

a leg support having a cushion facing upper surface on which is formed one or more apertures and a side surface on which one or more co-axial first hinge elements are provided; and
a leg cushion having a leg facing surface and an opposing surface on which one or more catch pins and one or more co-axial second hinge elements are provided;

wherein the one or more catch pins are positioned so that in use the one or more catch pins engage the one or more apertures; wherein the one or more first hinge elements are positioned so that in use the one or more first hinge elements removably engage the one or more second hinge elements; wherein the leg support has a catch mechanism for engaging the one or more catch pins when inserted in the one or more apertures; and wherein the catch mechanism has a release button provided on a surface of the leg support which release button is for releasing the catch mechanism such that the leg cushion may be removed from the leg support.

15. A cushion release mechanism as defined in Claim 14 wherein the first hinge elements are male or female hinge elements and wherein the second hinge elements are corresponding female or male hinge elements.

Figure 1

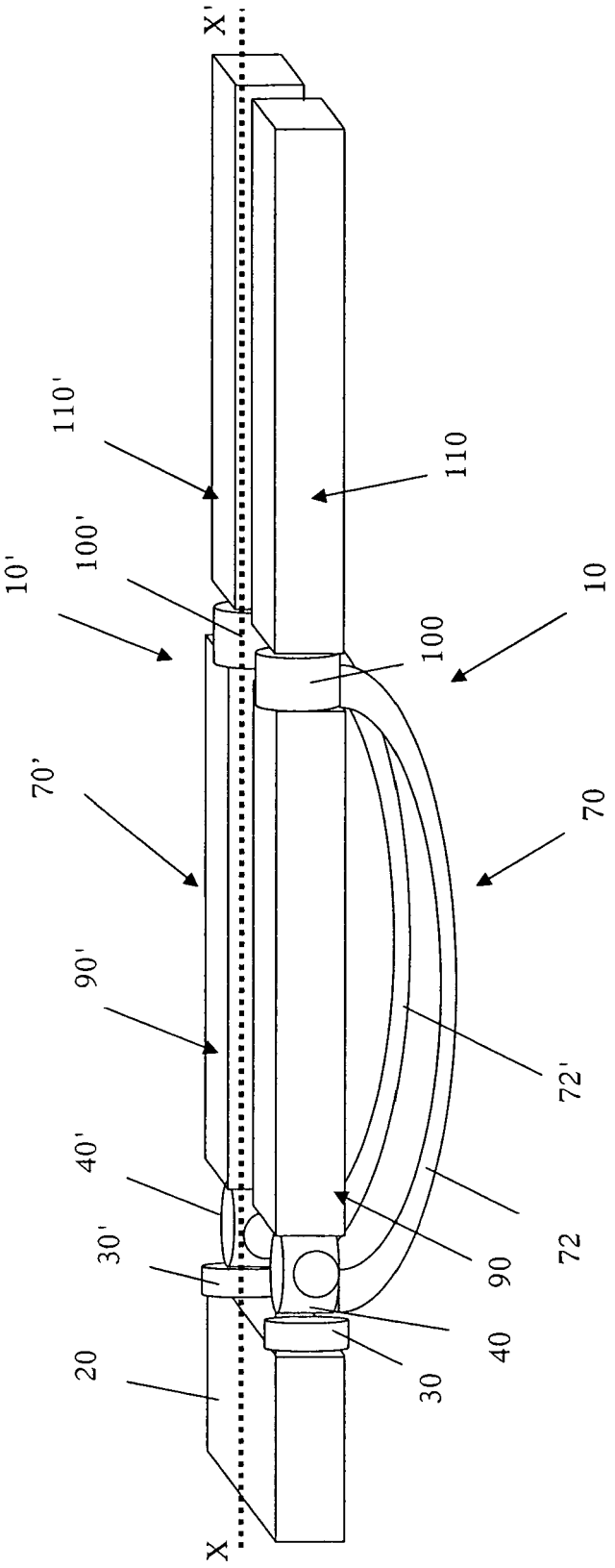


Figure 2

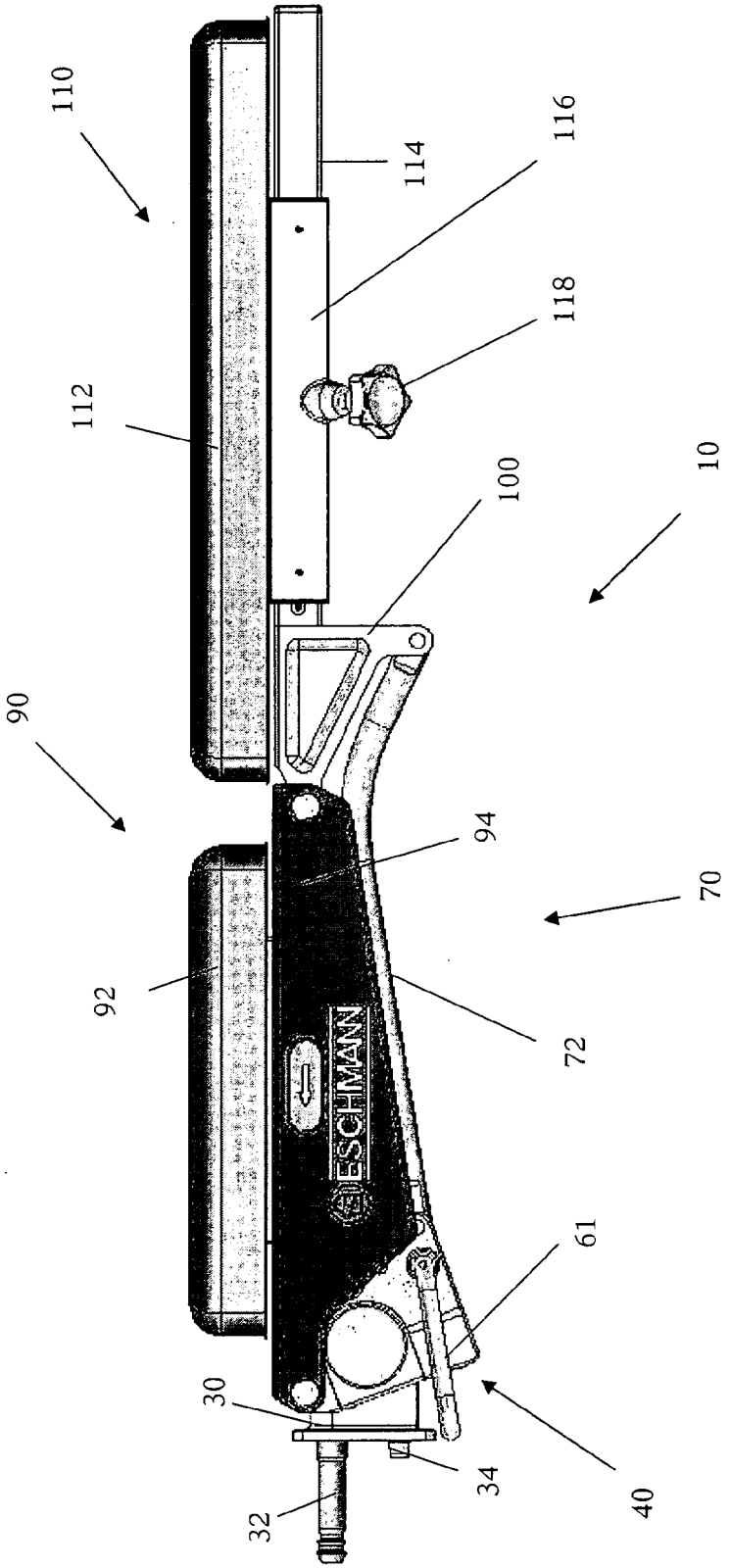


Figure 3

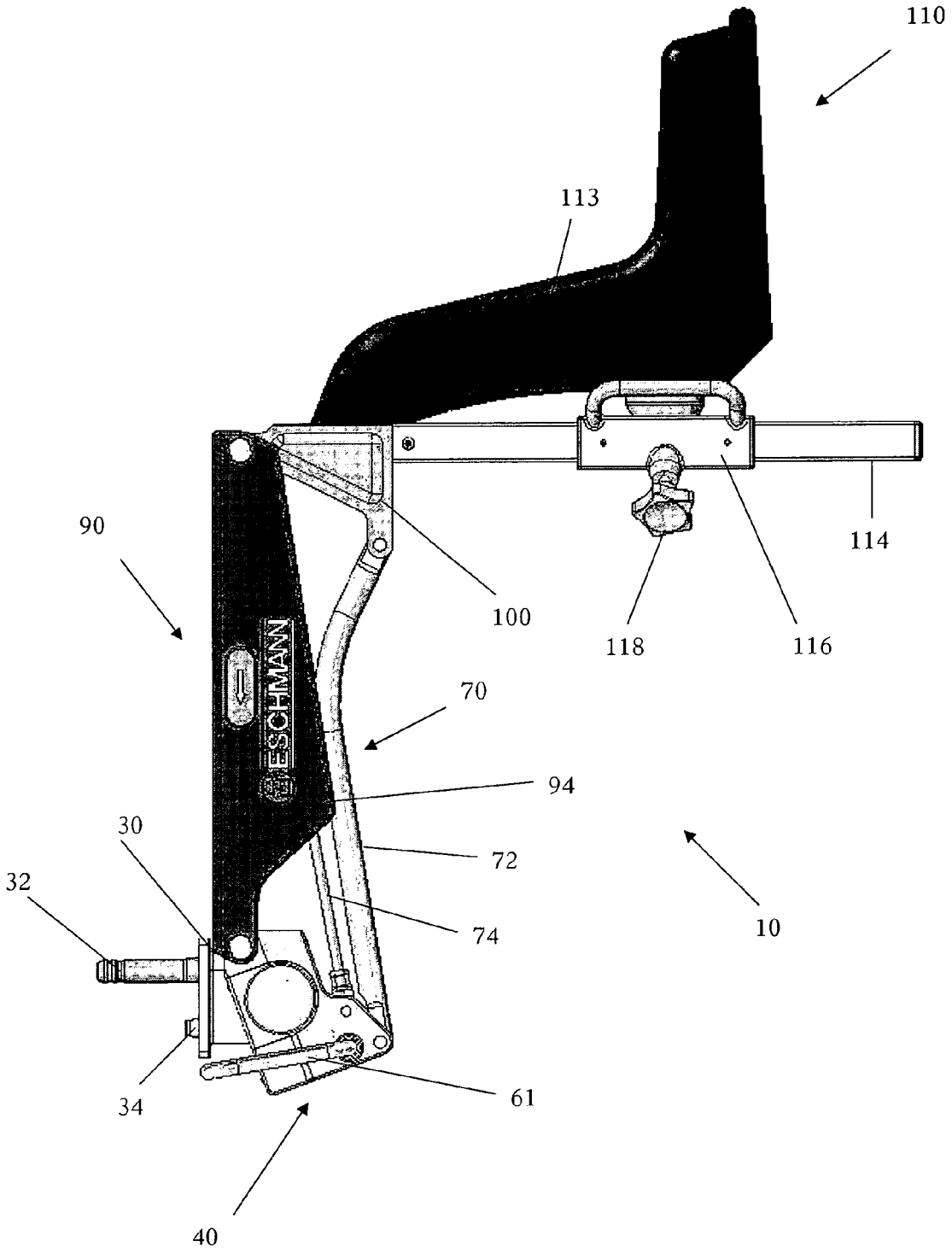
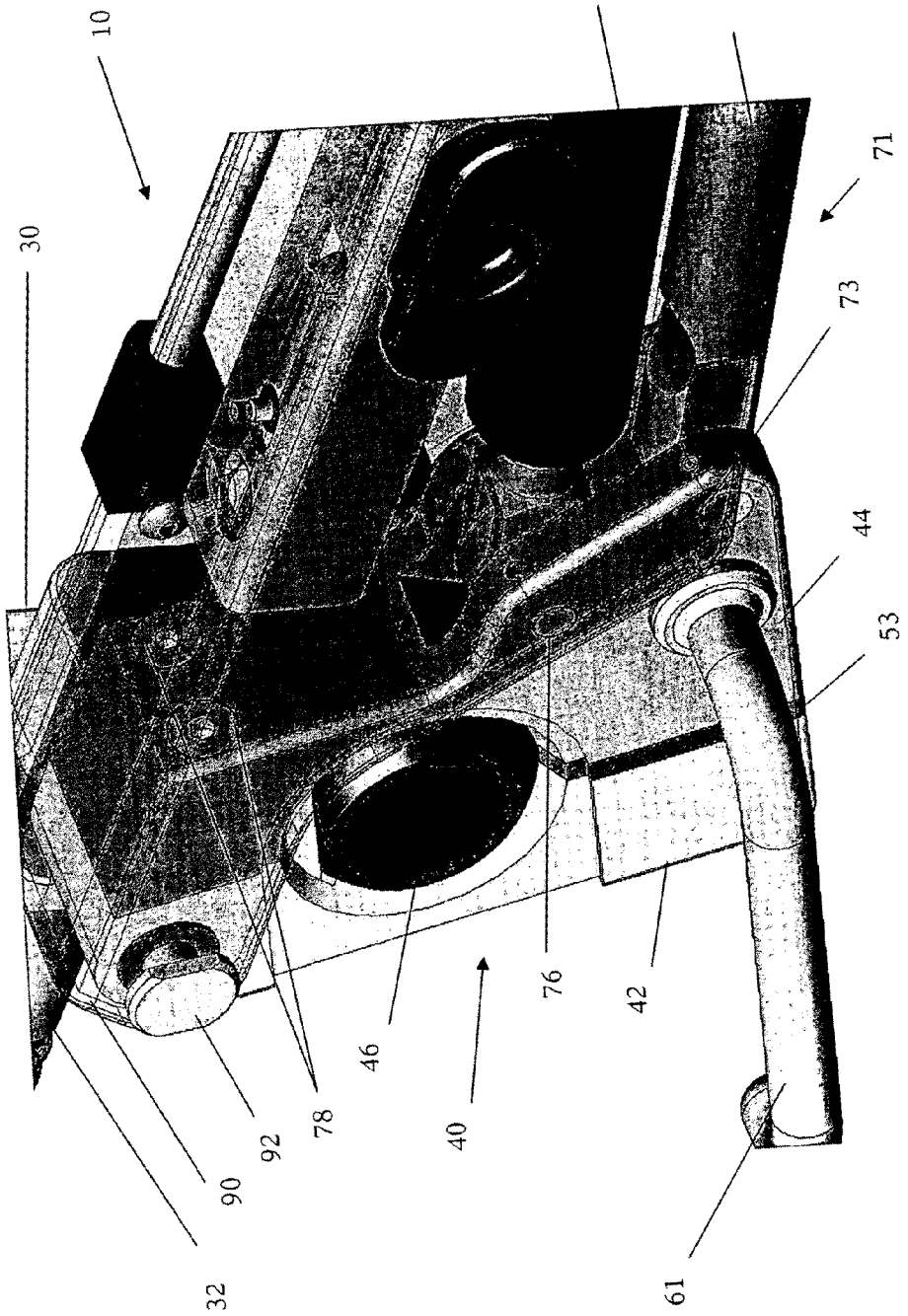


Figure 4



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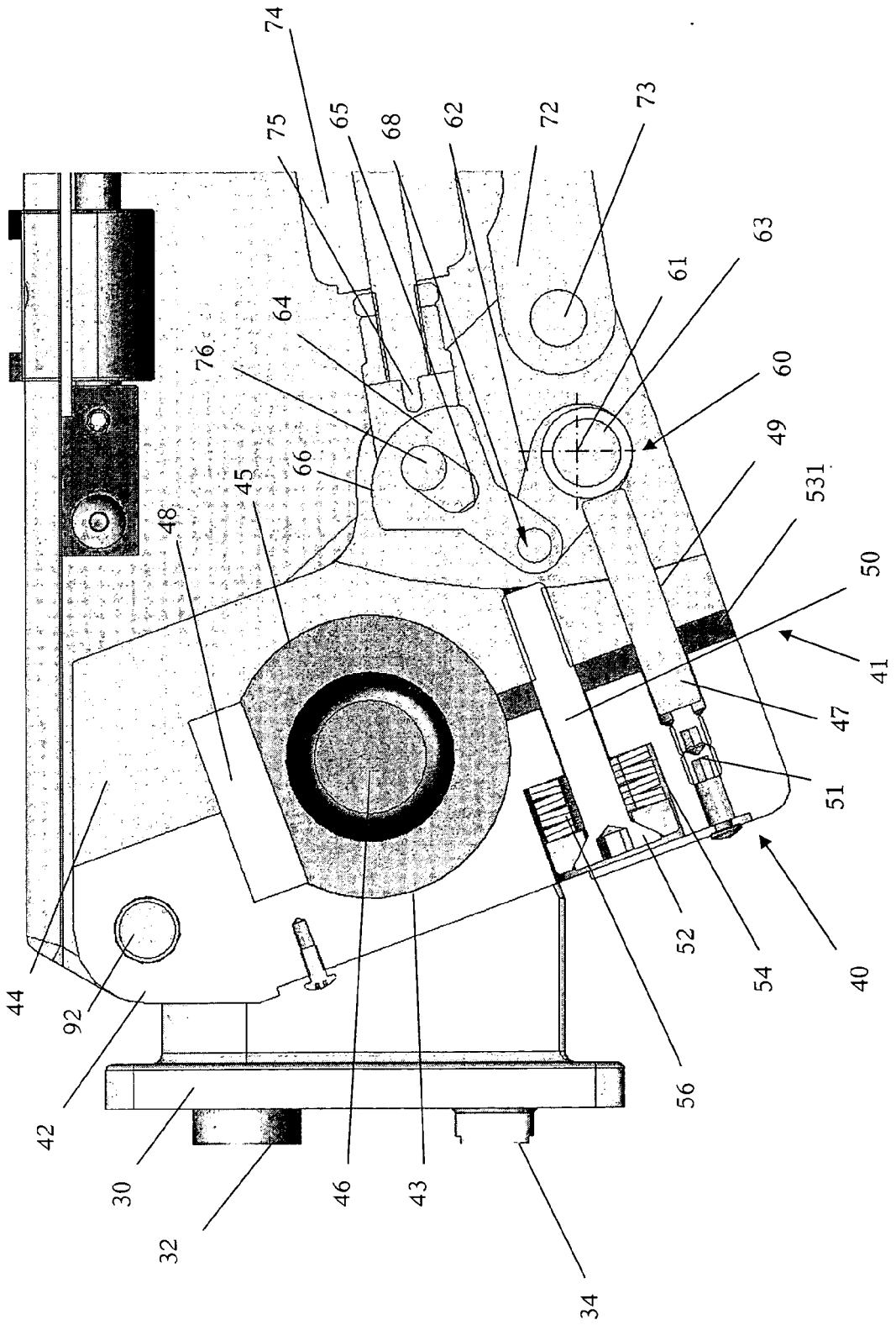
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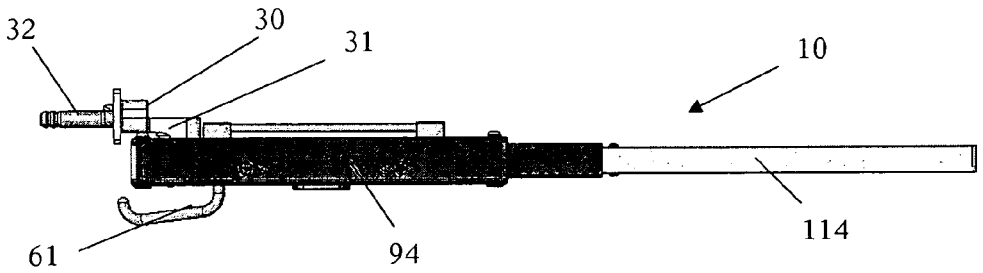
Figure 6



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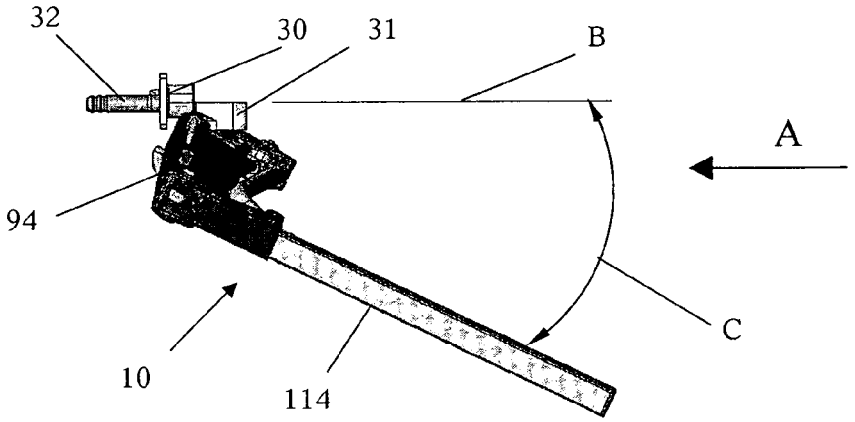

Figure 8

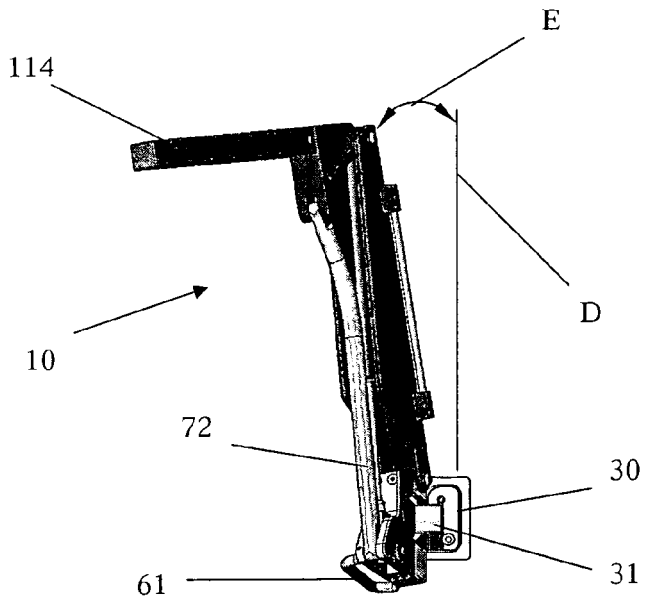

Figure 9

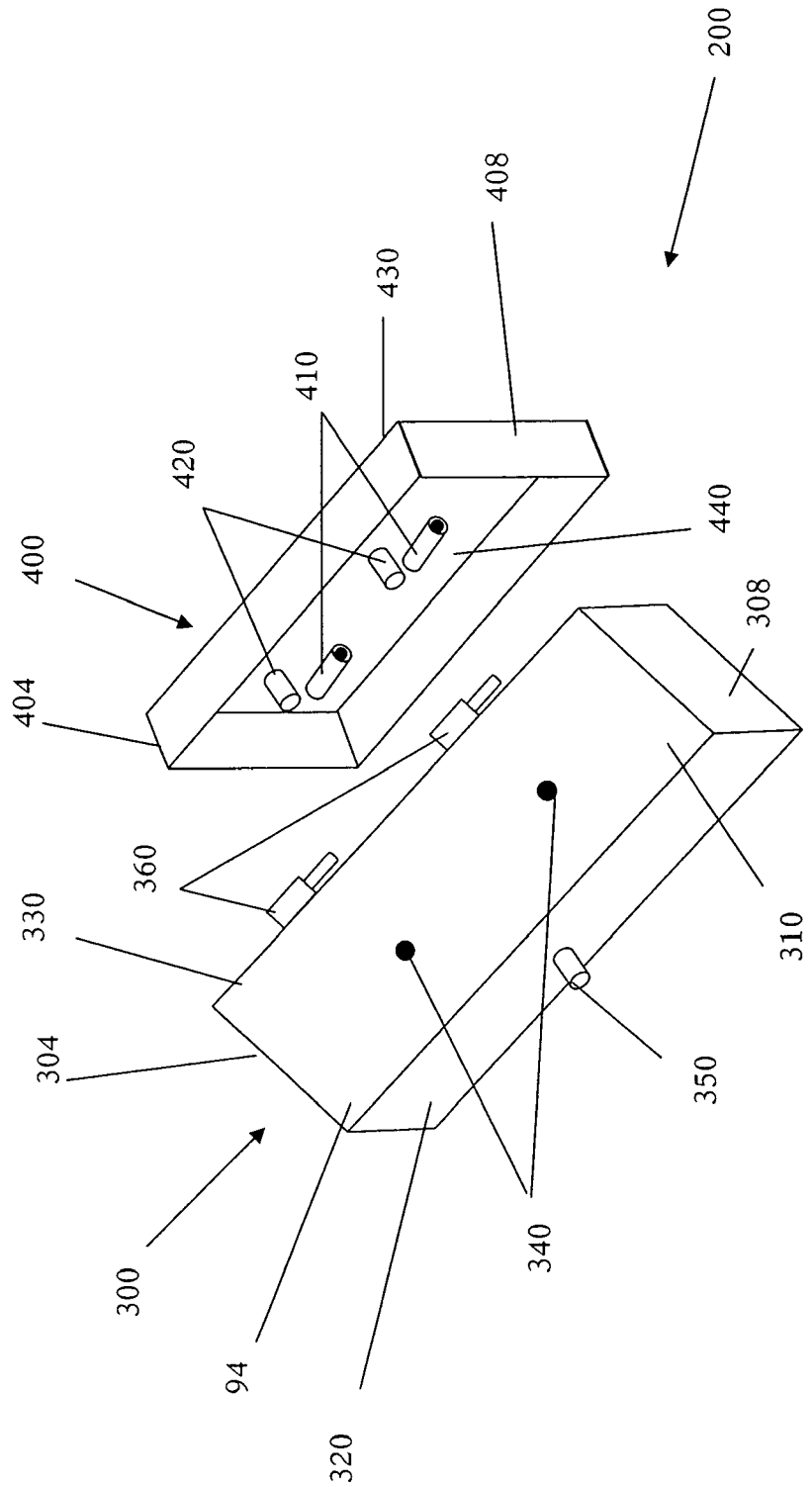
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Figure 10

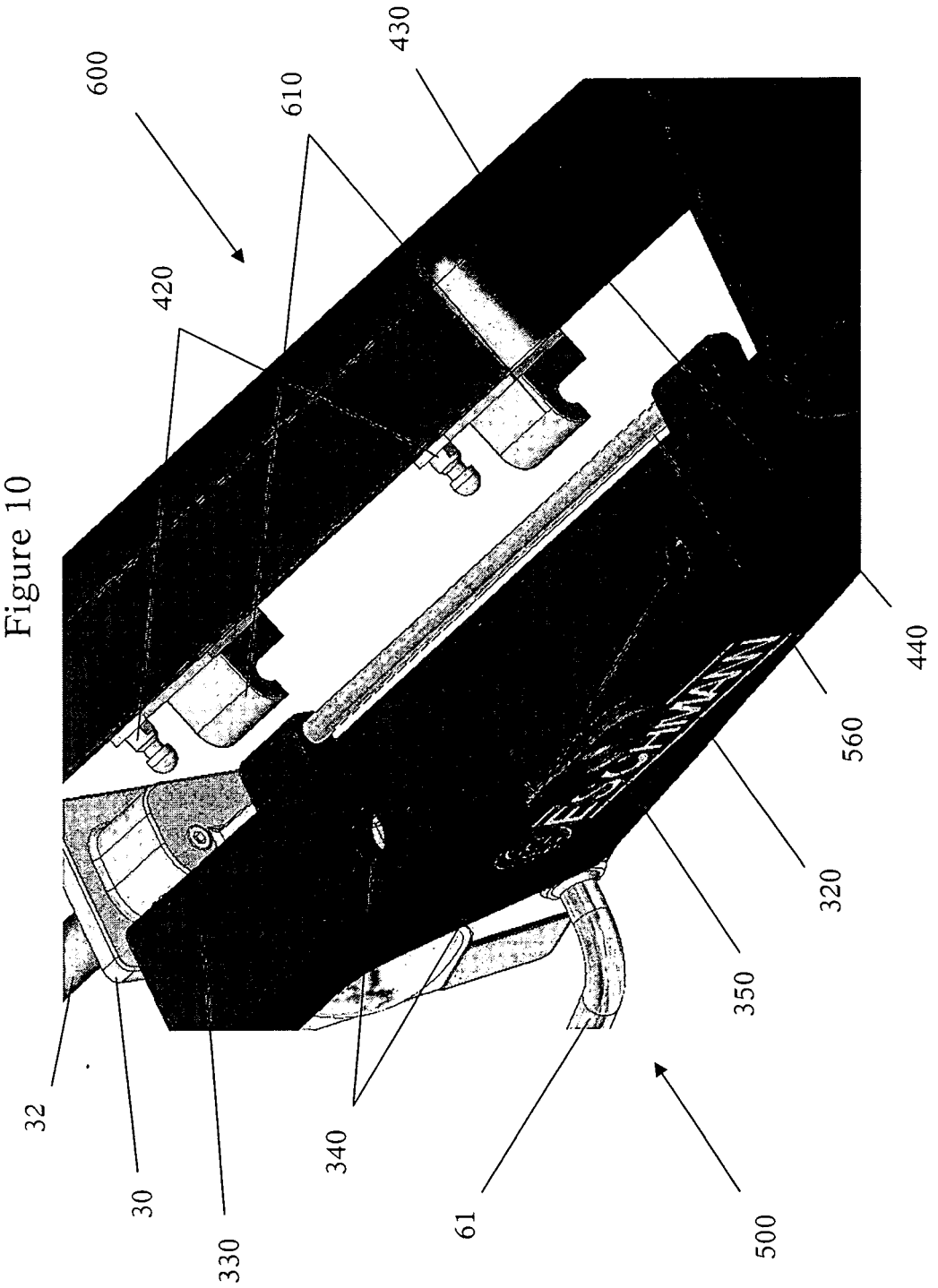

Figure 11