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(19) **United States**(12) **Patent Application Publication****Walter**(10) **Pub. No.: US 2007/0290538 A1**(43) **Pub. Date: Dec. 20, 2007**(54) **SPINE TENSIONING SUPPORT CHAIR**(52) **U.S. Cl. .... 297/316**(76) Inventor: **Brian Anthony Walter**, Vancouver, WA  
(US)(57) **ABSTRACT**

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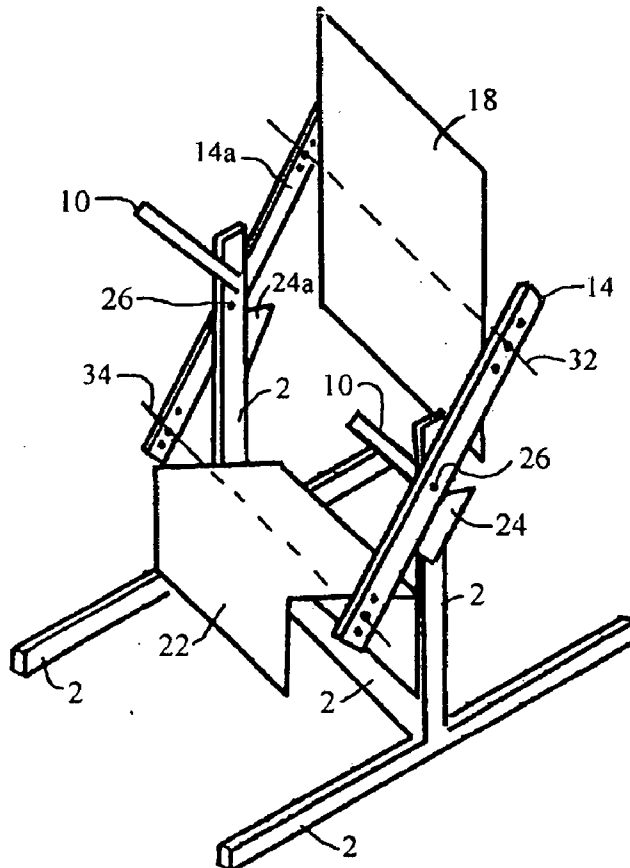
**BRIAN A. WALTER****3004A E. 13TH ST.****VANCOUVER, WA 98661 (US)**(21) Appl. No.: **11/706,628**(22) Filed: **Feb. 16, 2007****Related U.S. Application Data**

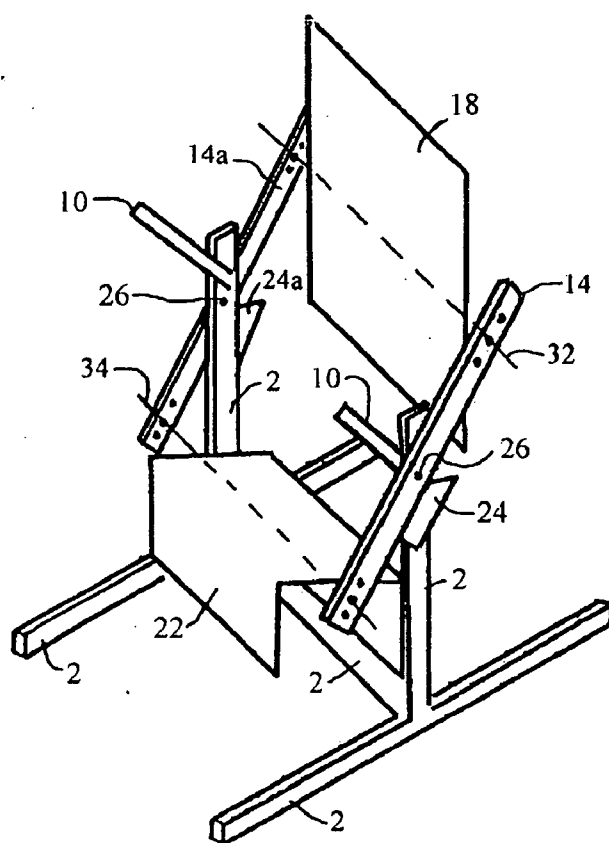
(62) Division of application No. 08/944,945, filed on Oct. 2, 1997, now Pat. No. 6,435,611.

(60) Provisional application No. 60/027,767, filed on Oct. 4, 1996.

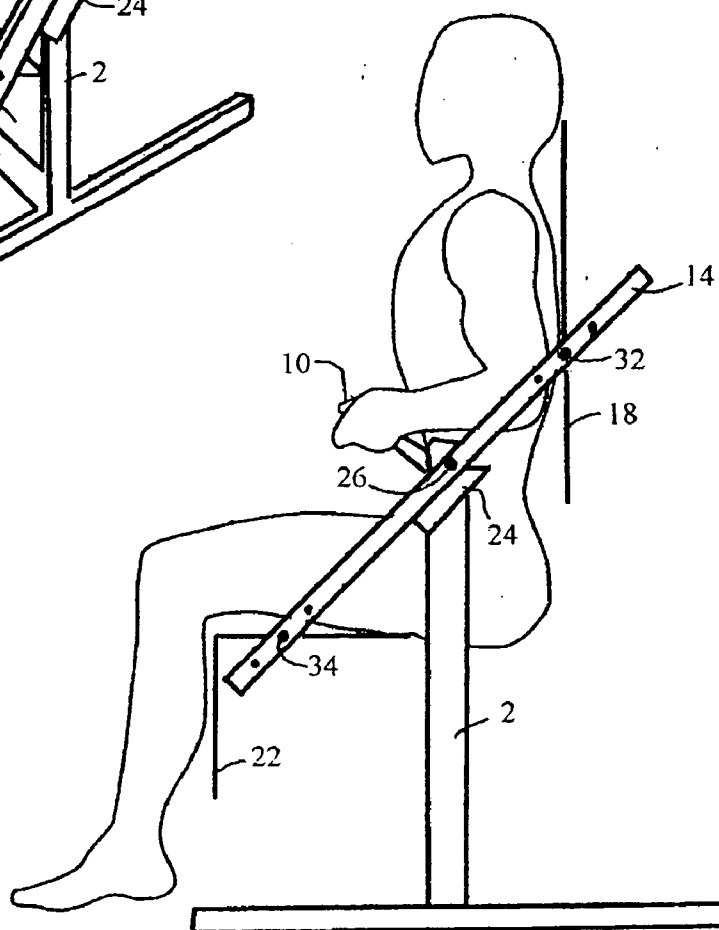
**Publication Classification**(51) **Int. Cl.****A47C 3/00** (2006.01)**A47C 1/00** (2006.01)

A chair has two independent body supports which move in similar rotation and inverse elevation to one another to change from a chair configuration, one support higher than the other, to a spine tensioning apparatus, supports near equal in elevation. Preferably body supports are spaced apart from one another such that the only interconnecting human link between the two supports, when in a near equal elevation configuration, is the human spine. The spine, in this configuration is then subjected to similar forces as a simple beam supported by two separate forces, tension, compression, shear and moment. The spine is aided by and through tension and compression and increased blood flow and afforded the ability for spinal muscle, nerve and soft tissue development and maintenance. The supports, independent of each other, comprise an upper body support and a lower body support and allow an individual's body to practice spine enhancement, development, & or traction, laying in any combination of, or alternately, face up, face down, or on either left or right side. The apparatus is also applicable to retrofitting existing chairs.

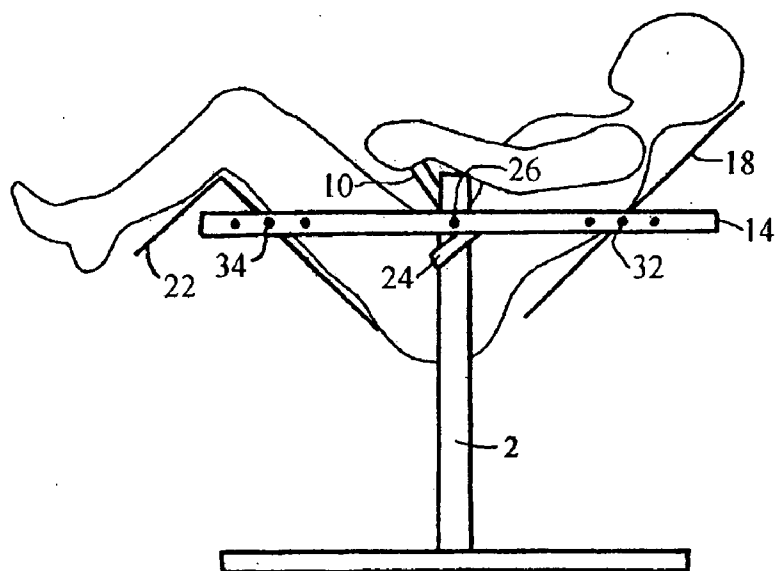




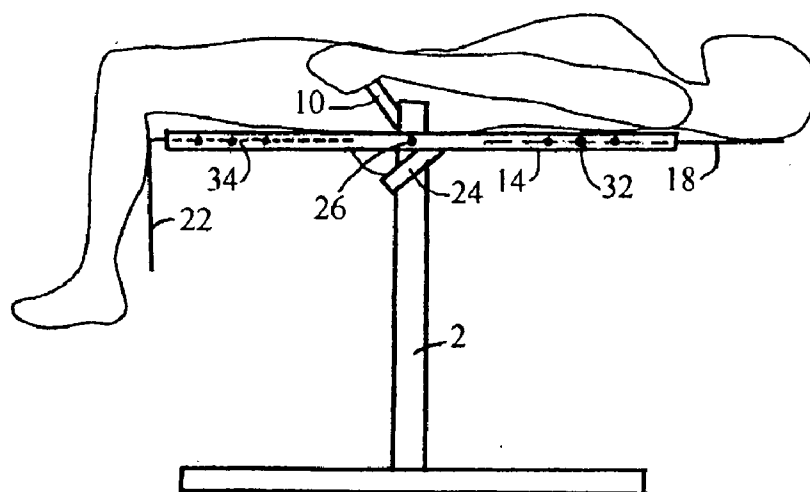
***Fig. 1***



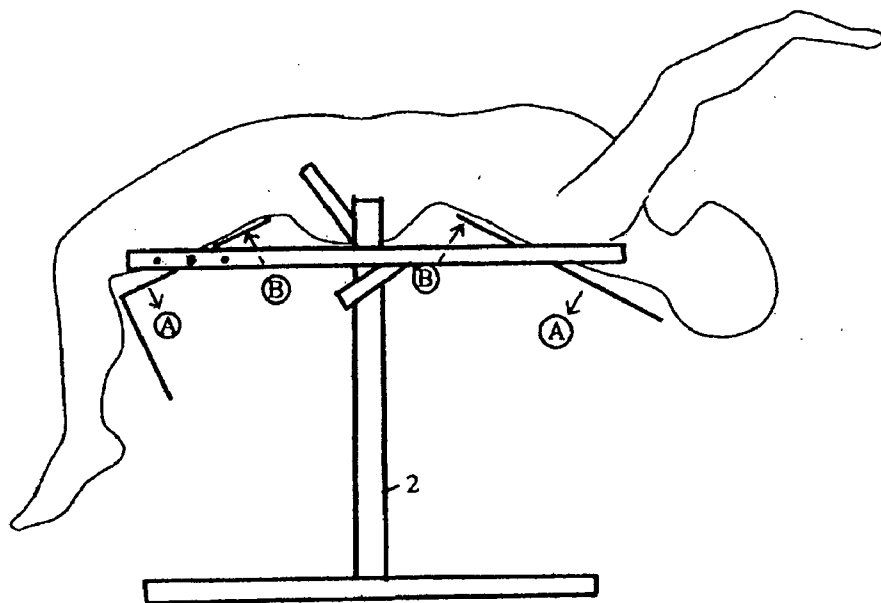
***Fig. 2***



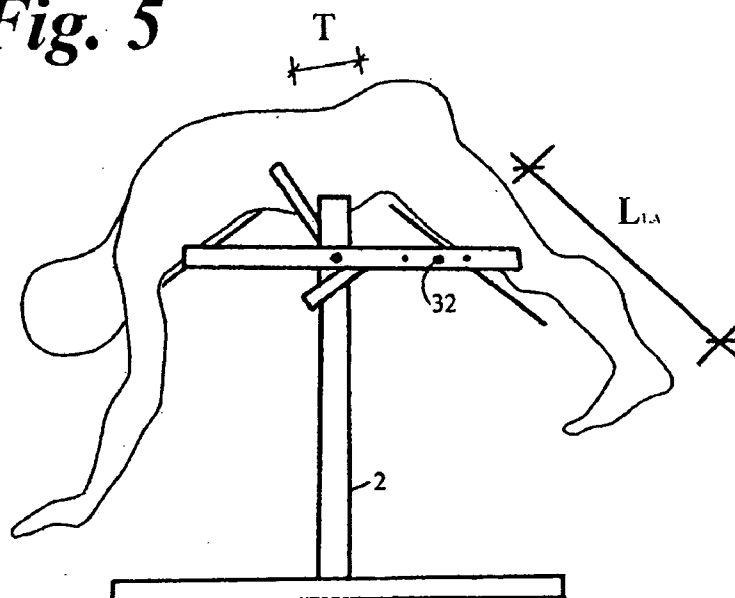
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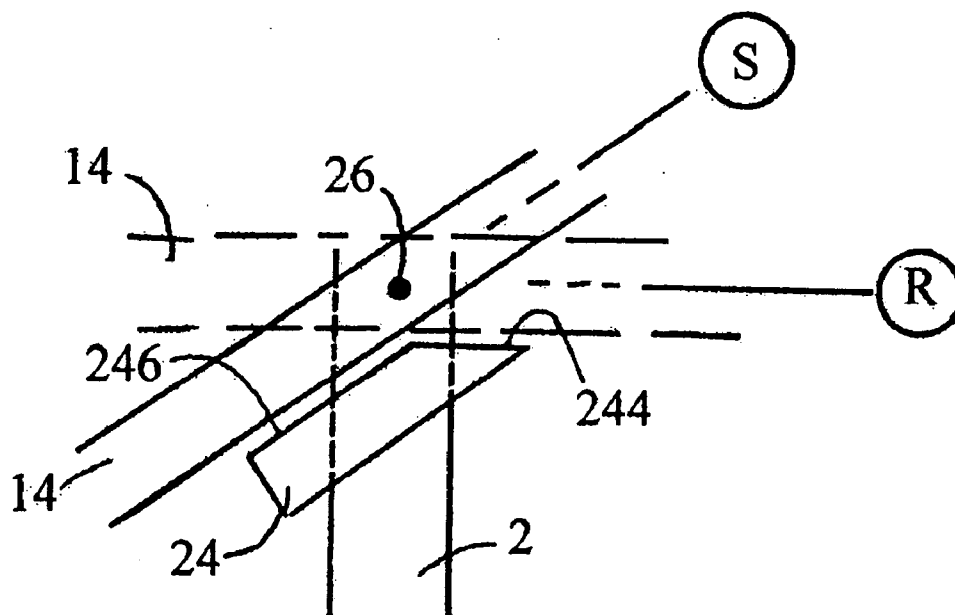
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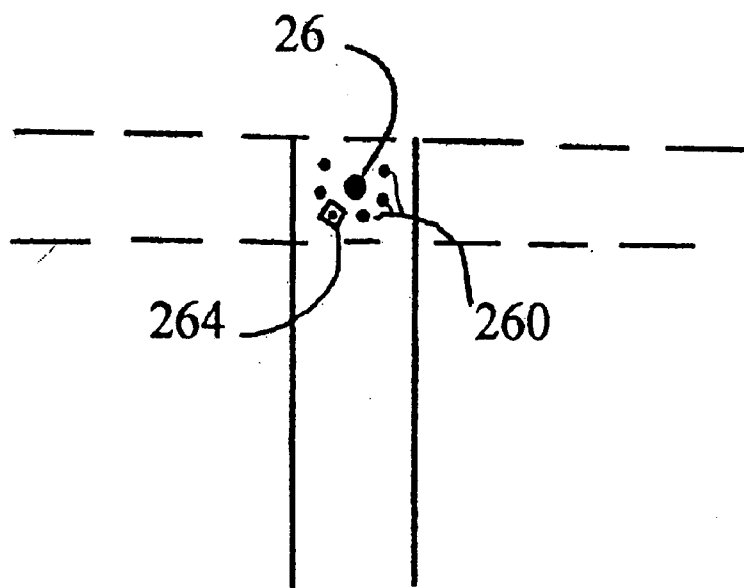
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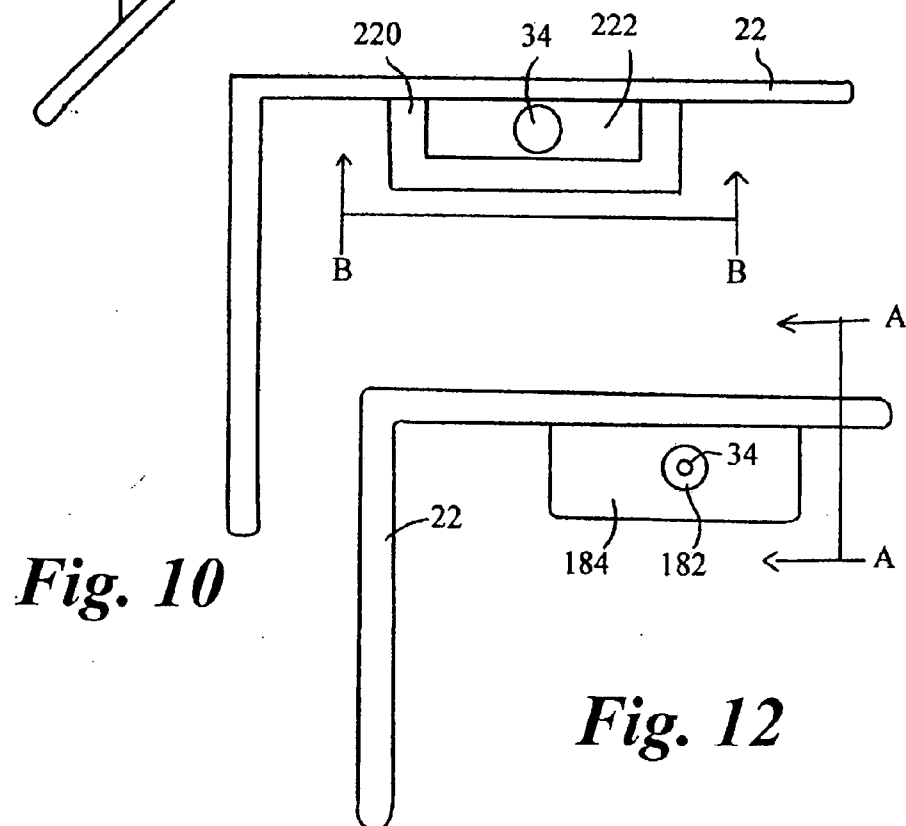
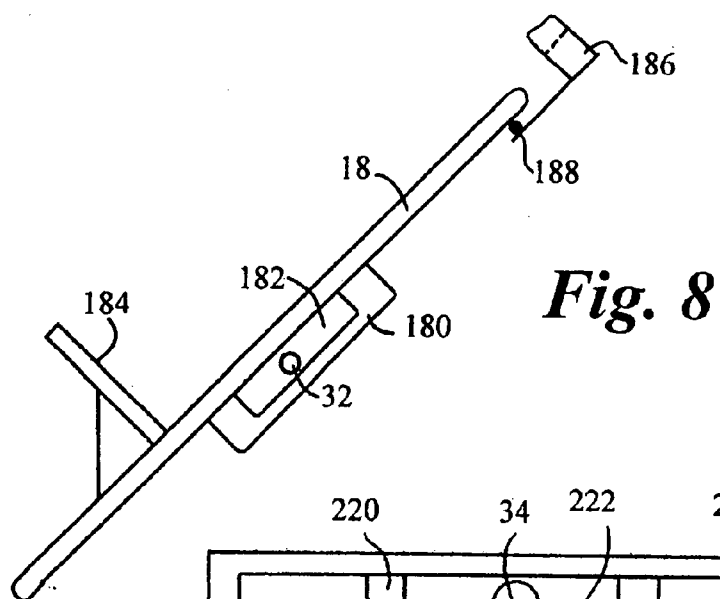
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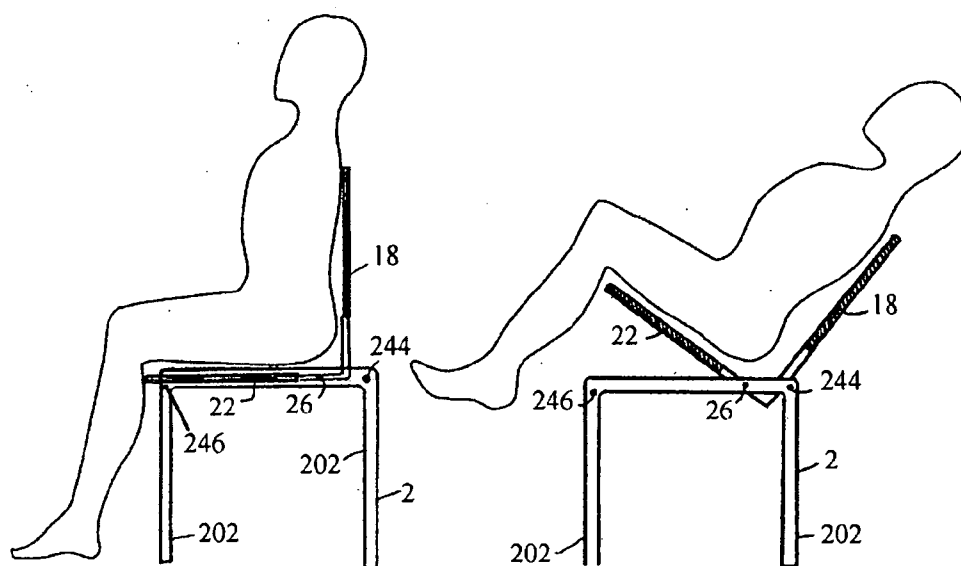


***Fig. 7***

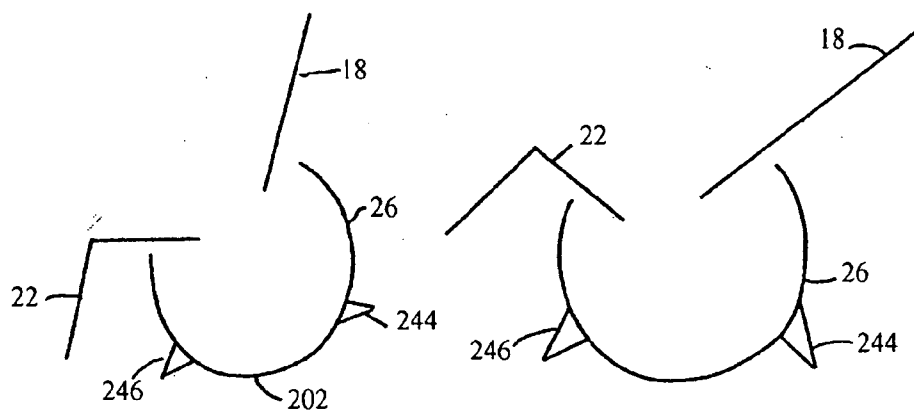


***Fig. 9***

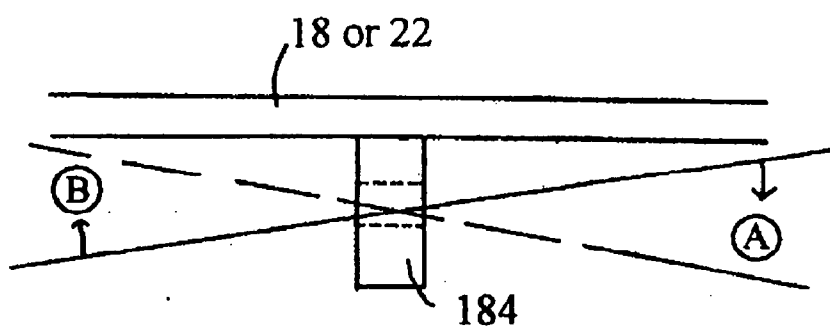




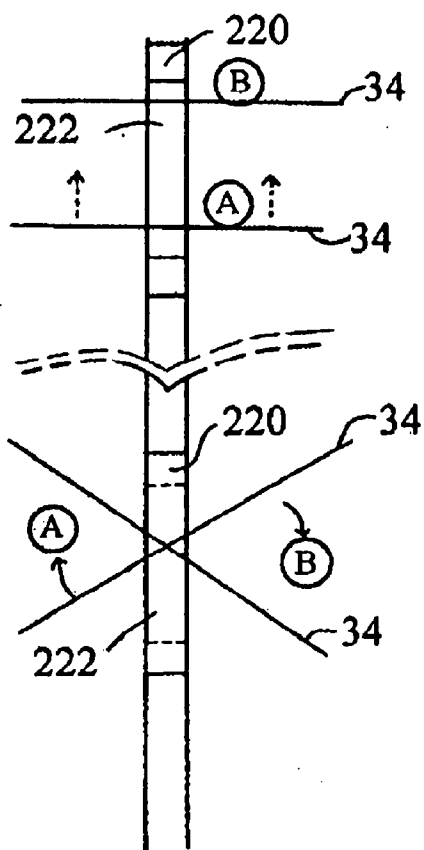
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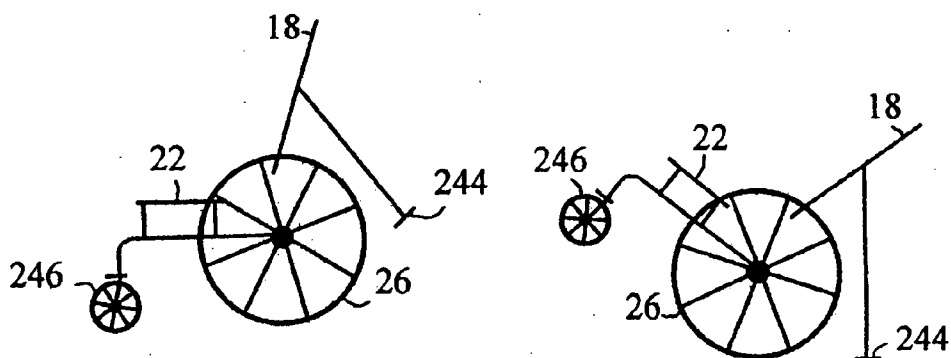
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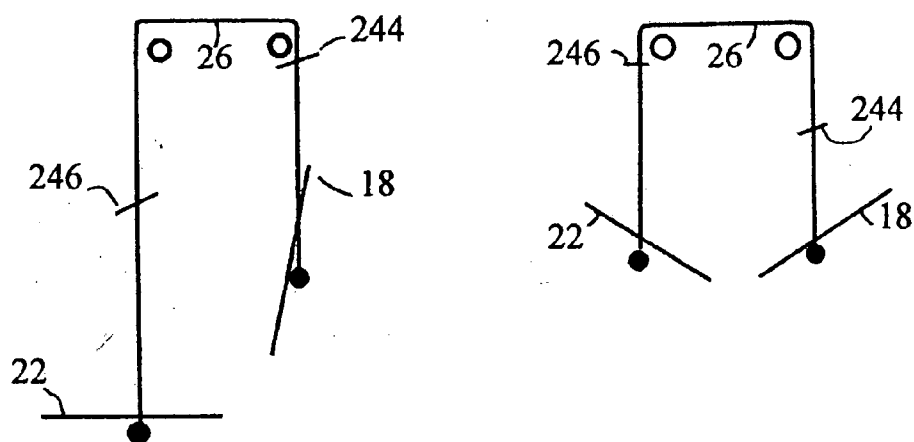
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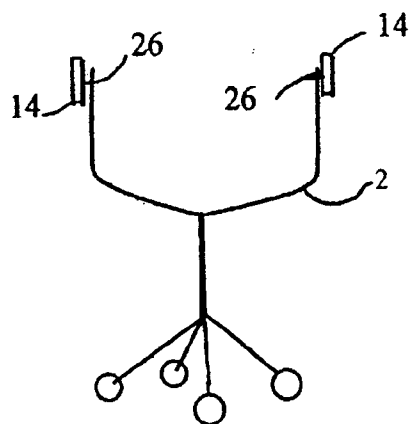
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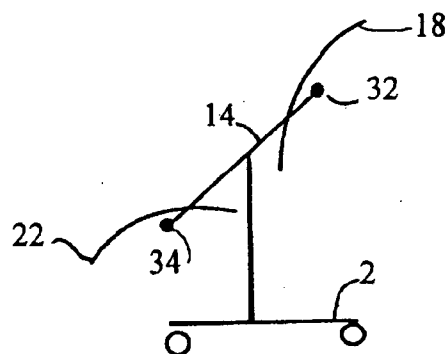
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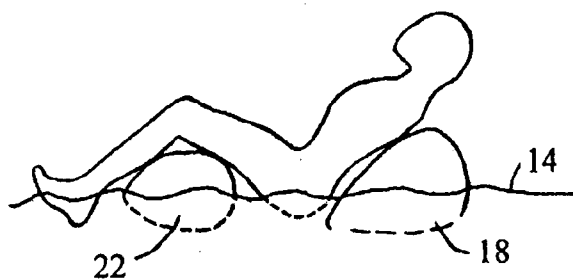
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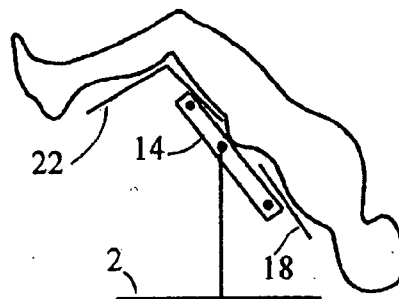
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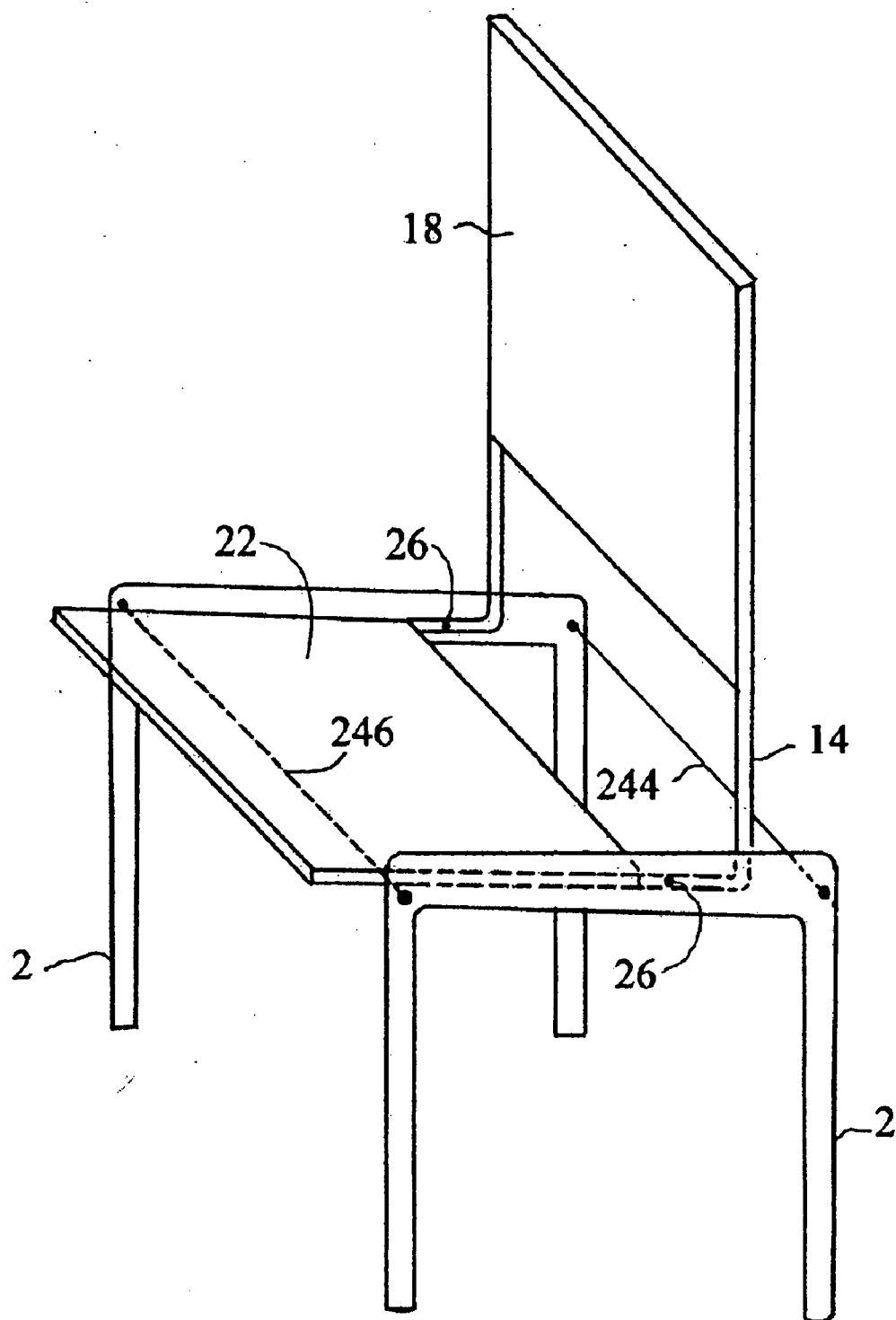
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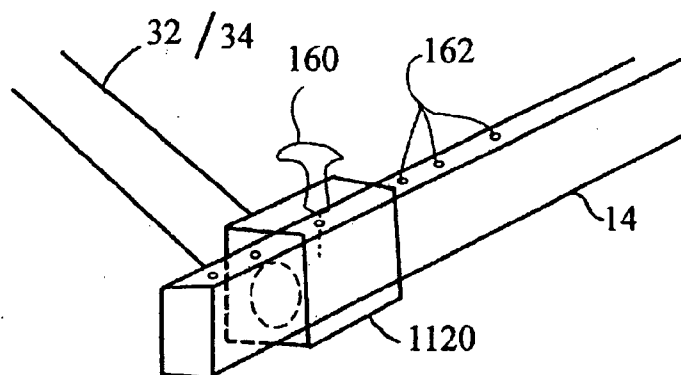
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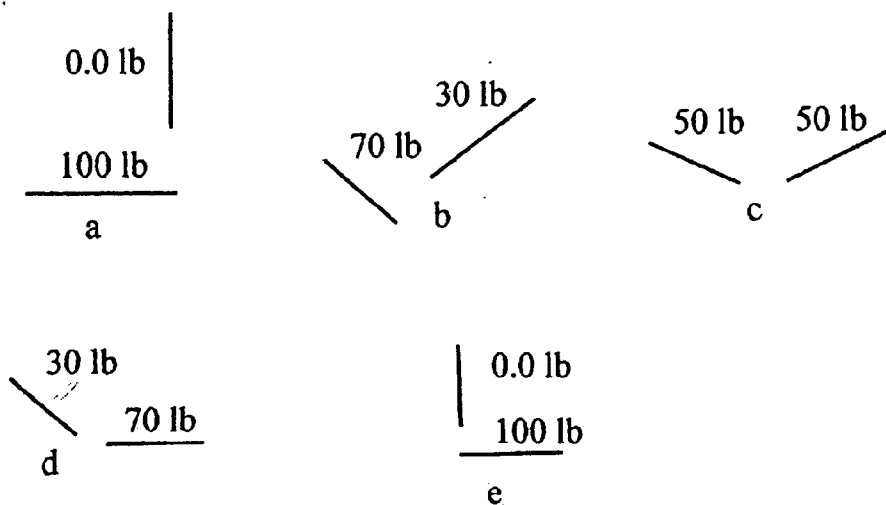
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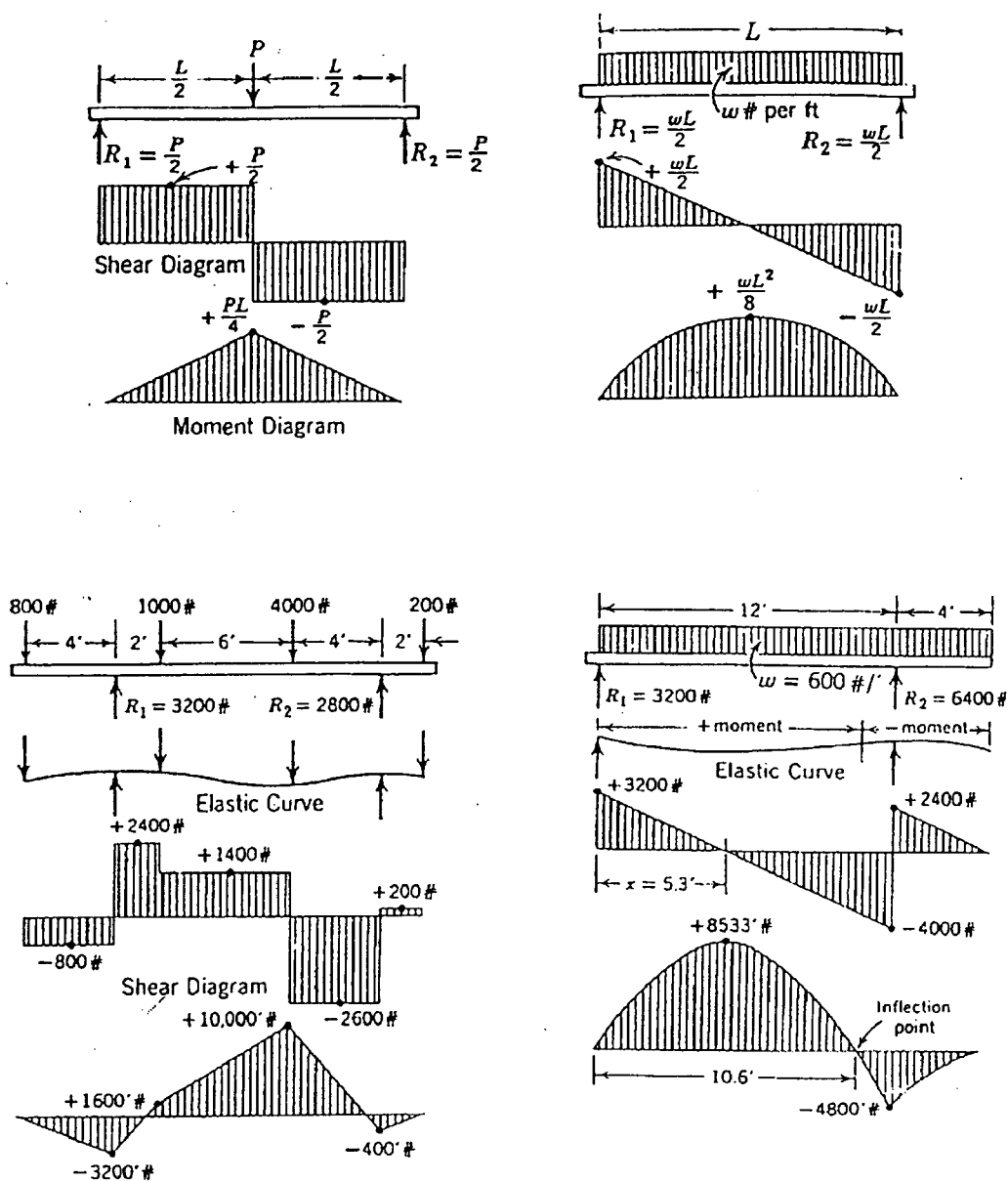
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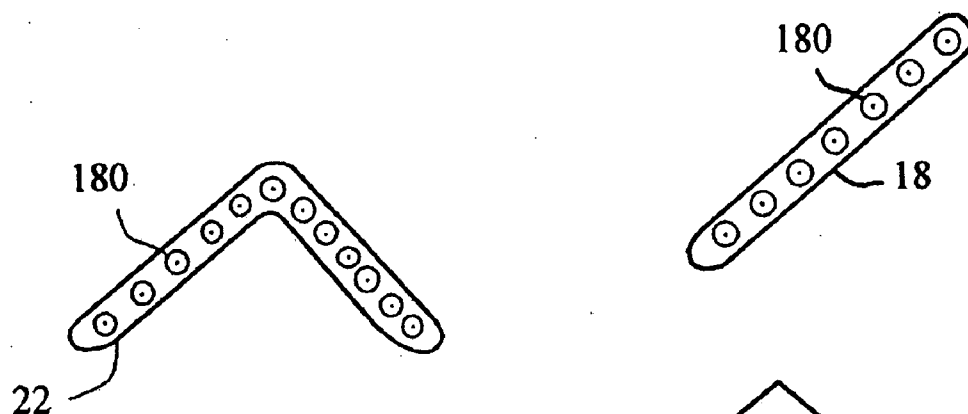
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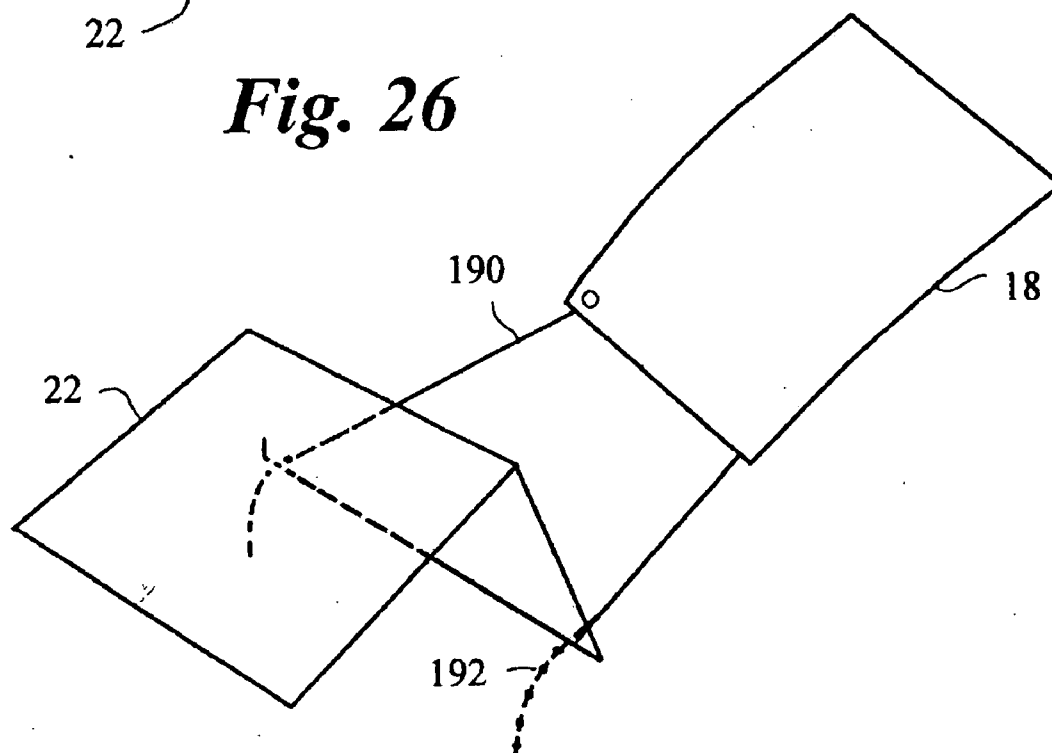
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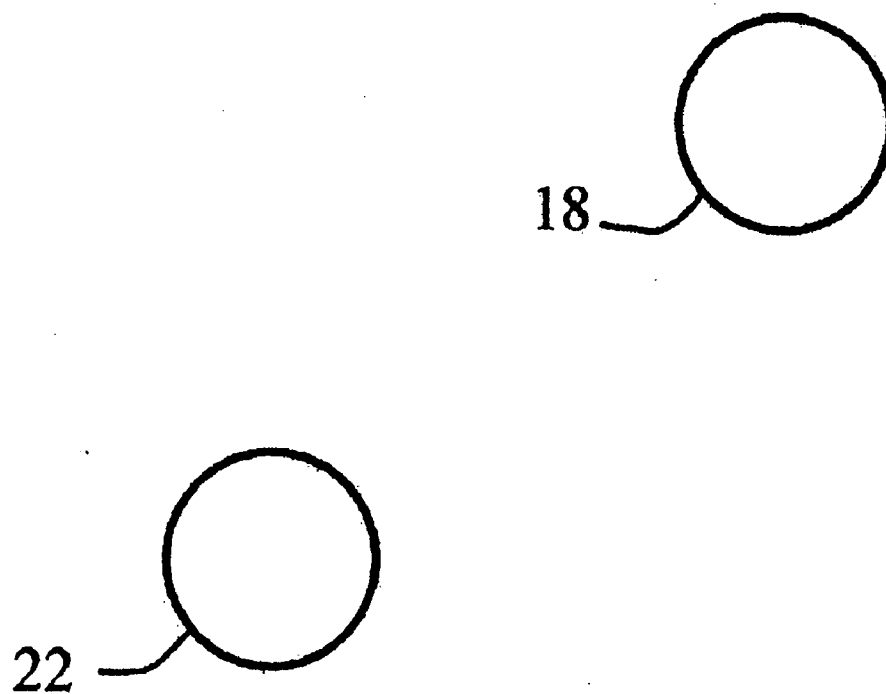
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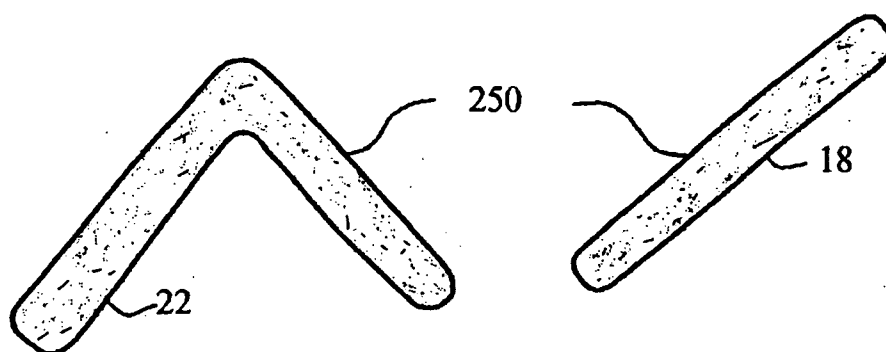
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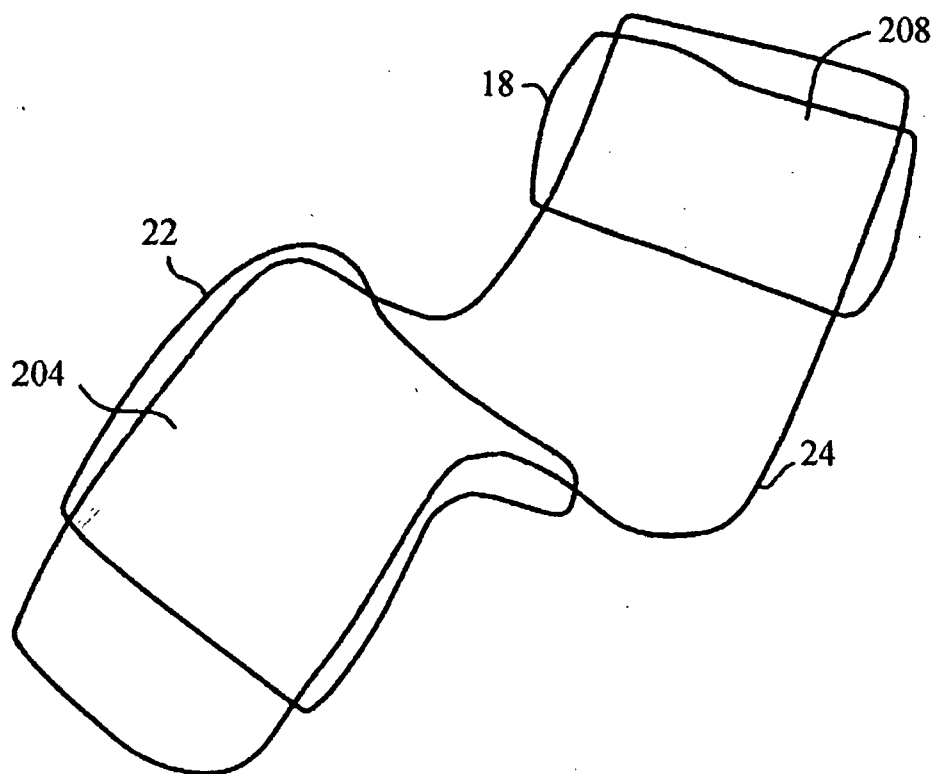
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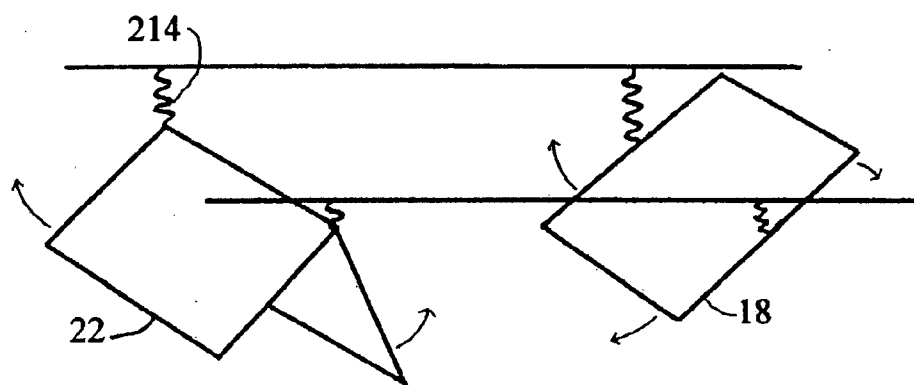
***Fig. 27***



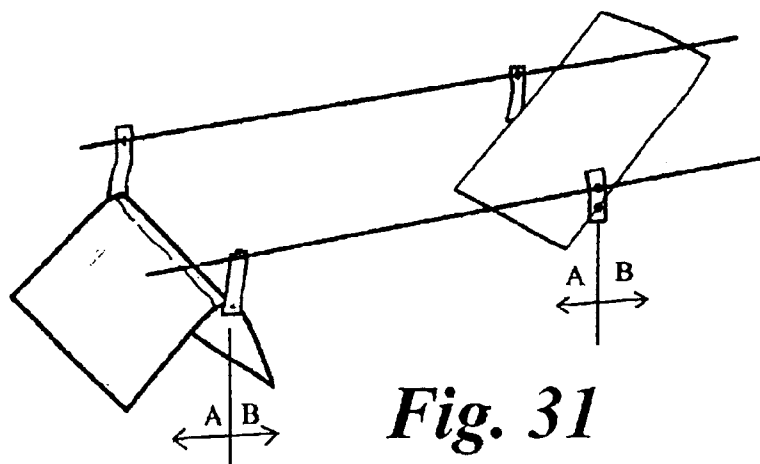
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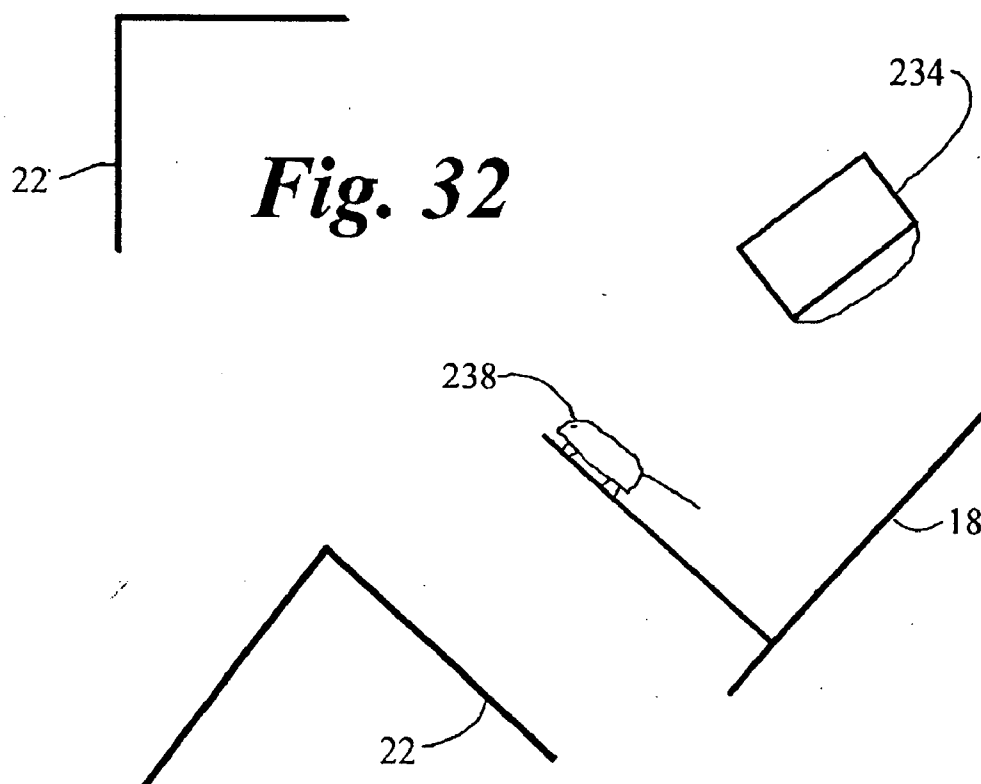
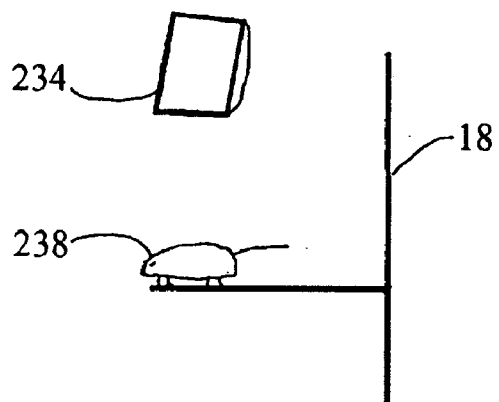
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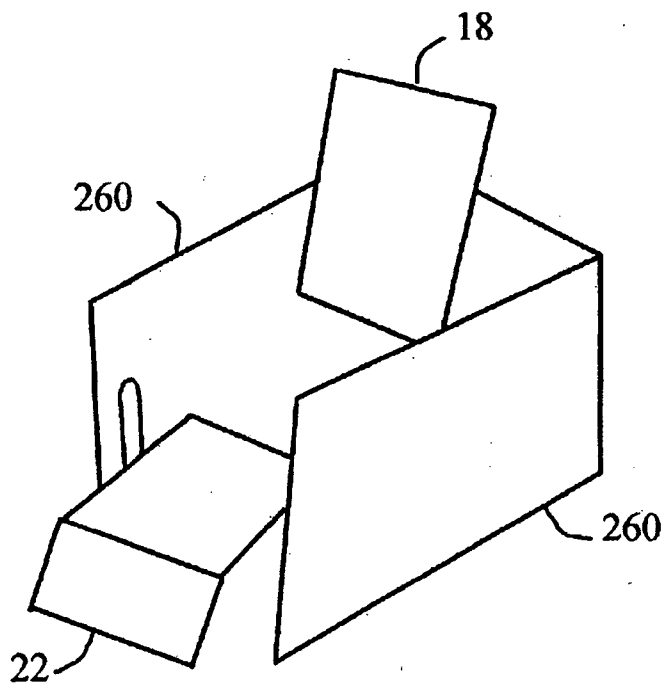
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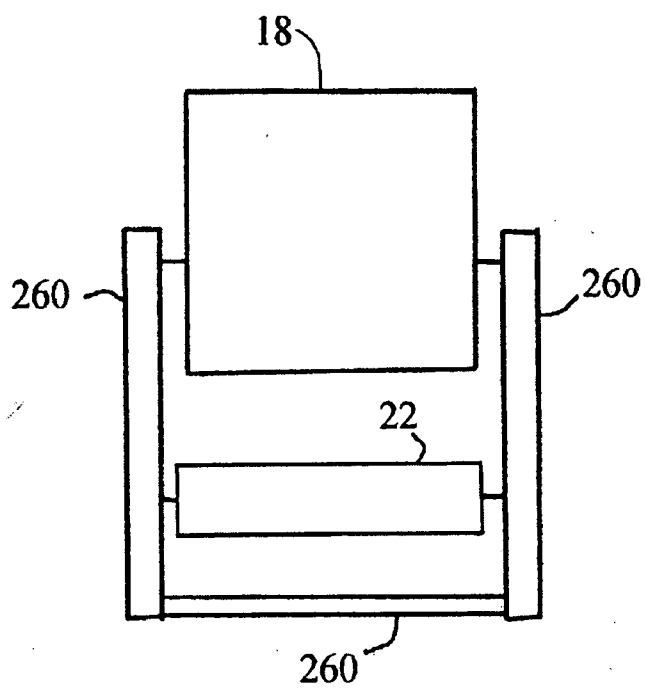
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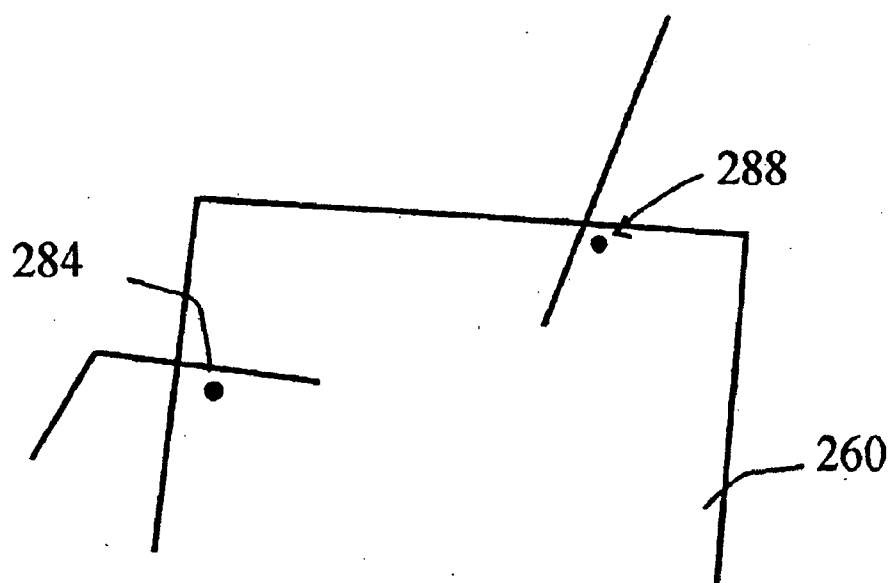
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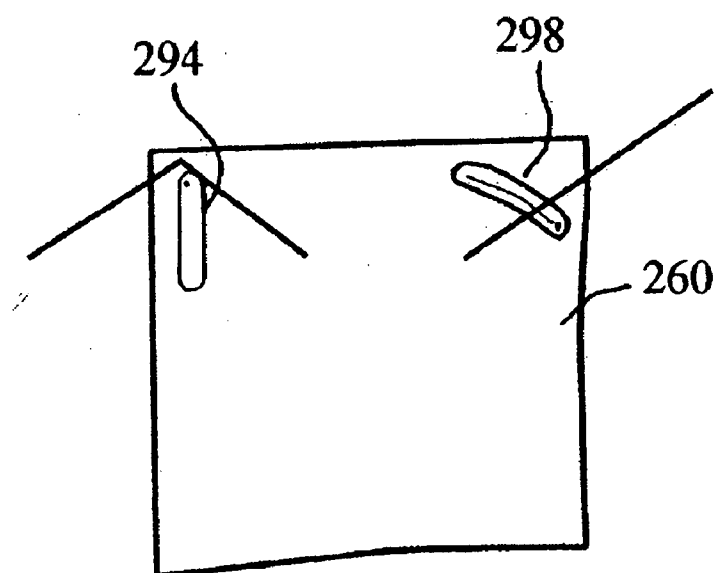
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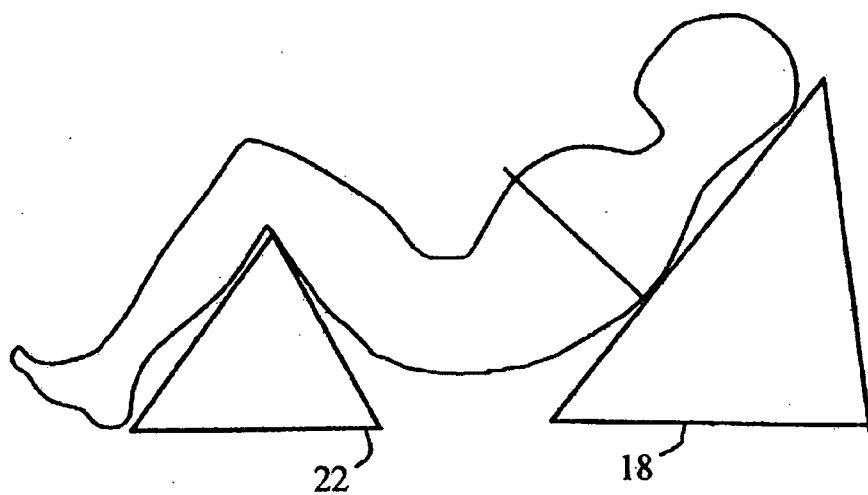
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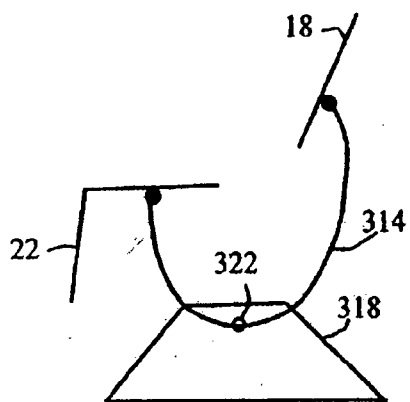
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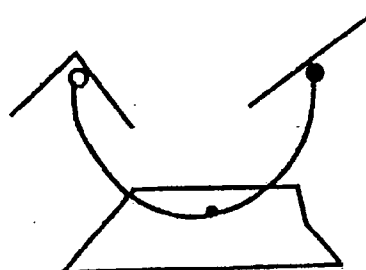
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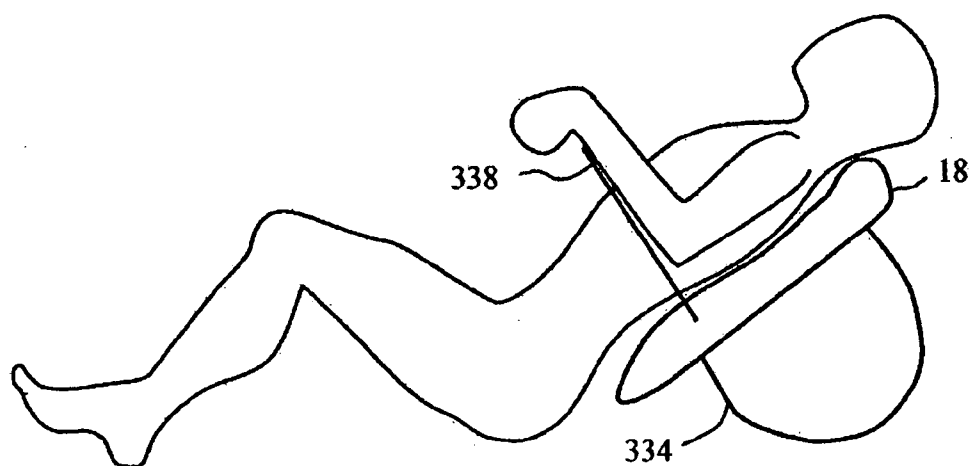
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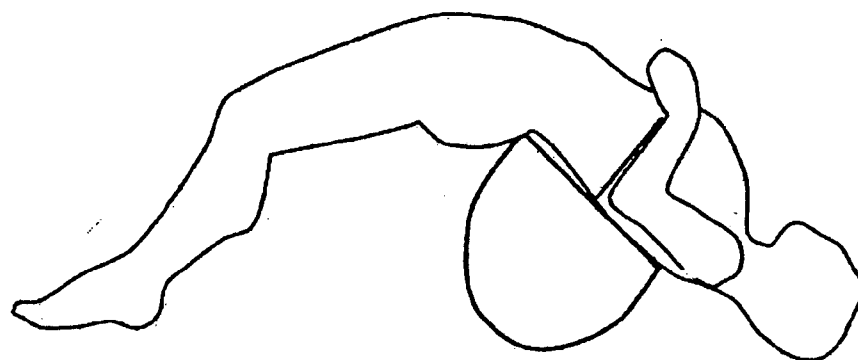
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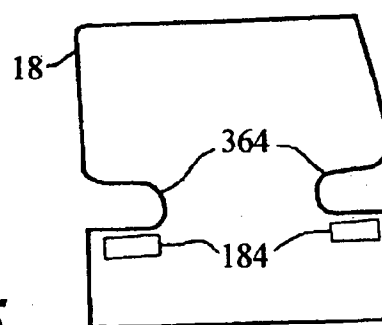
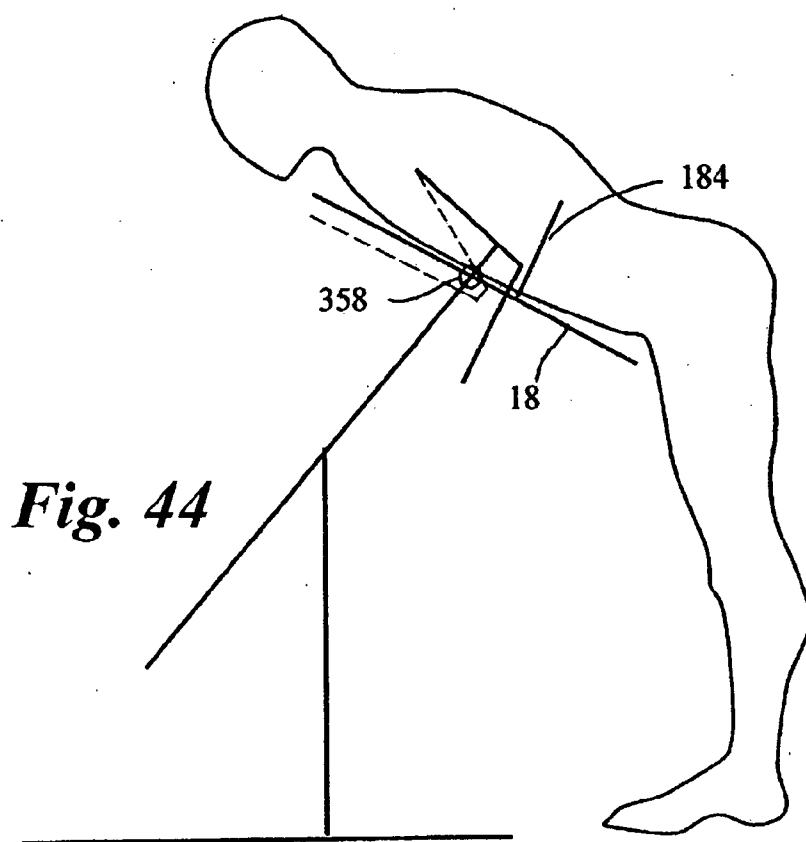
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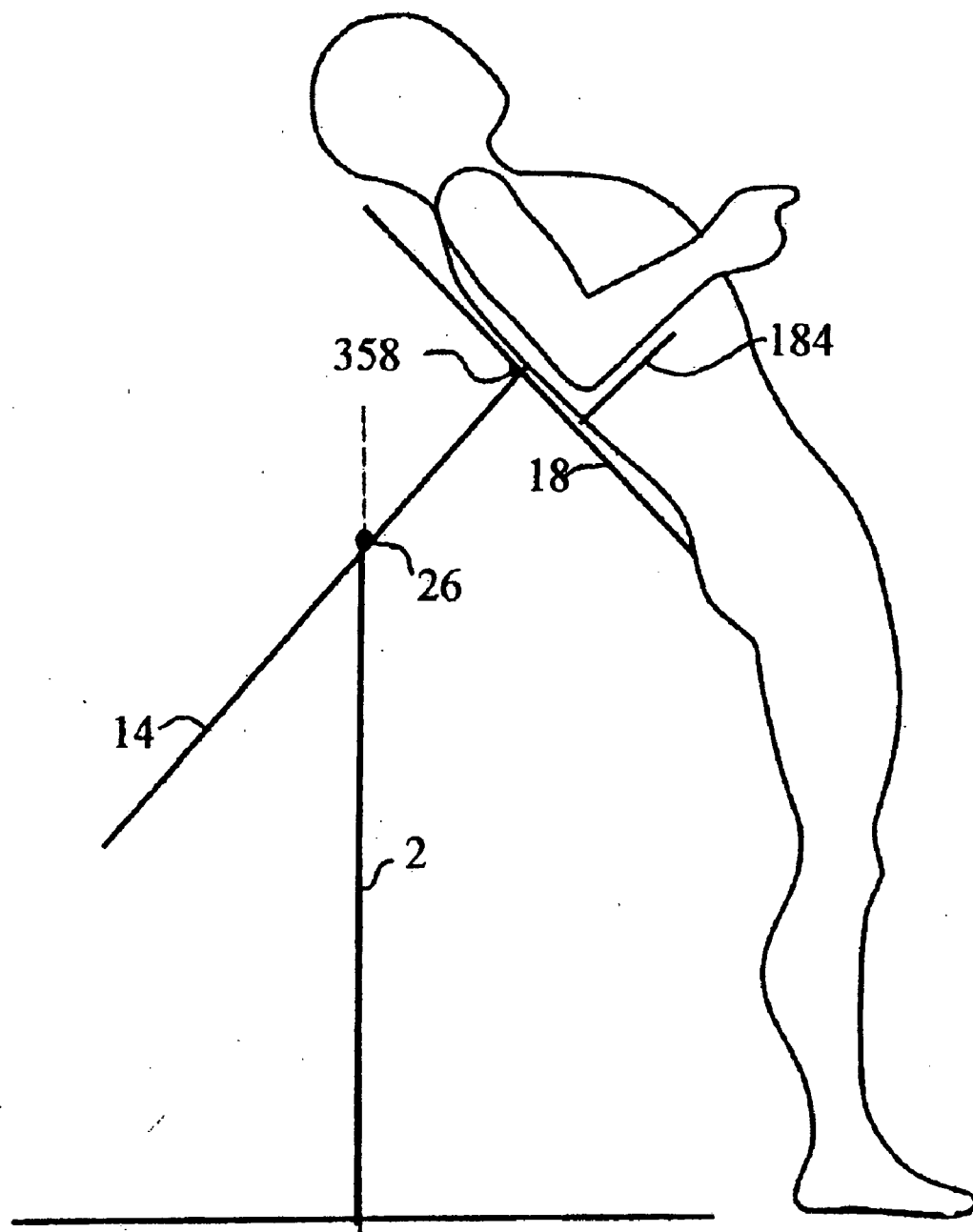
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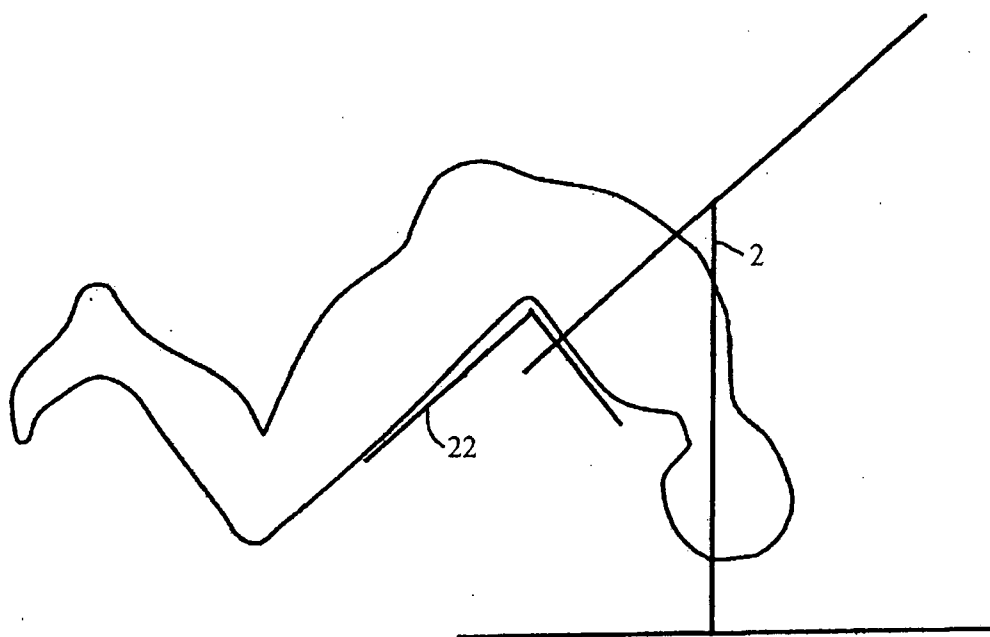
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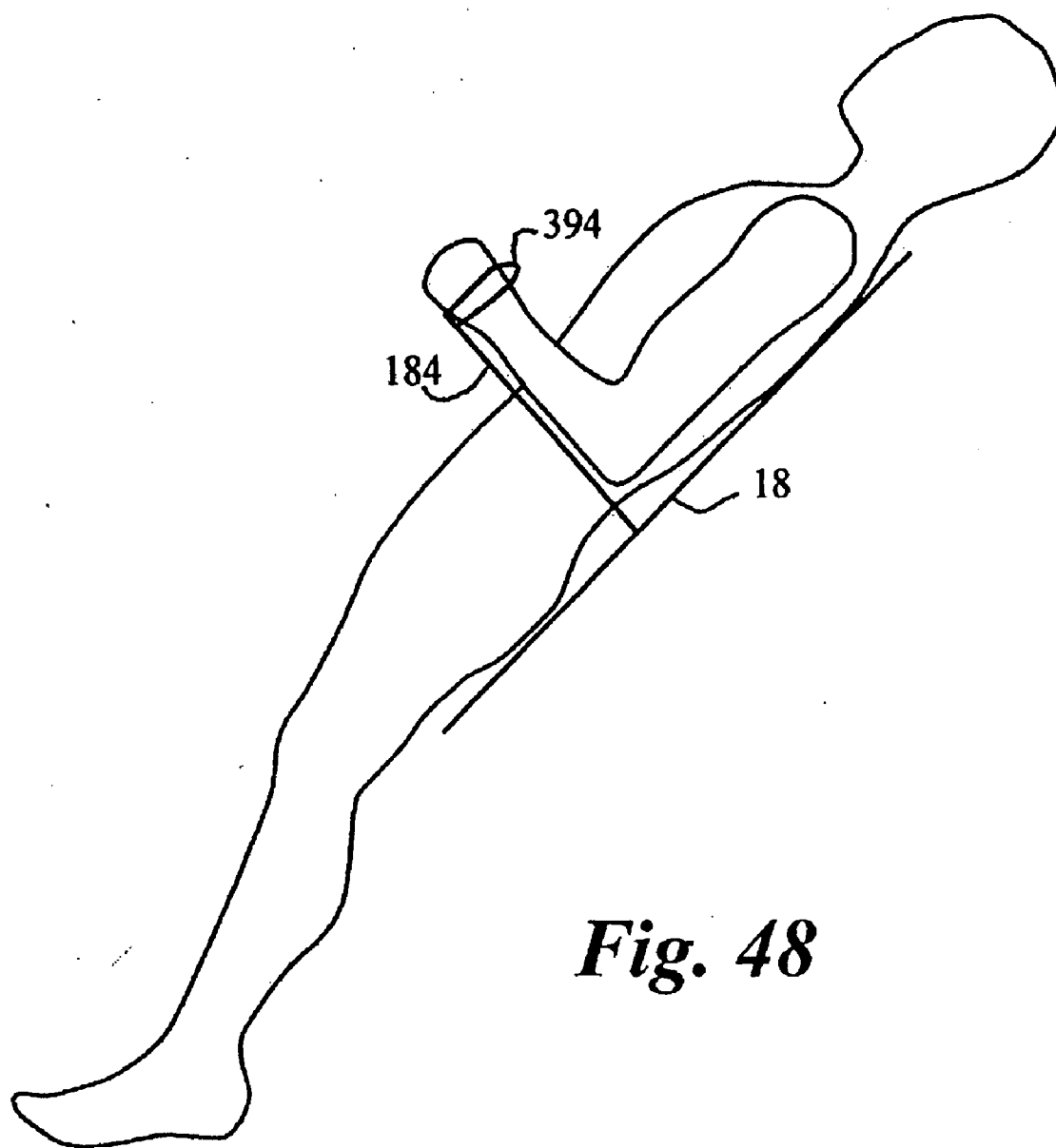
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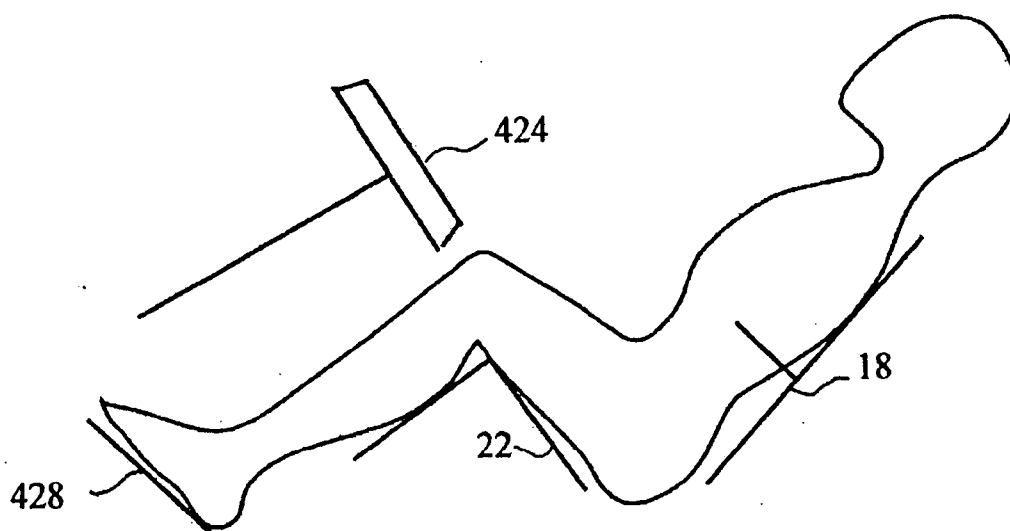
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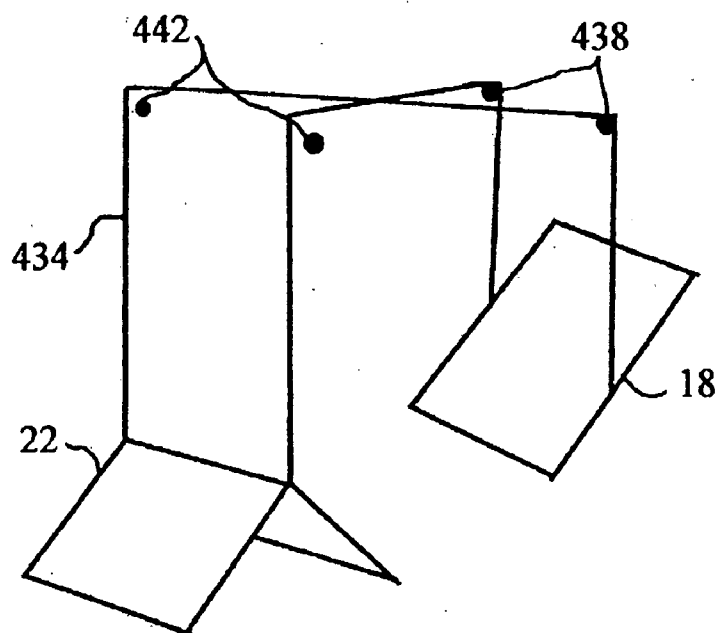
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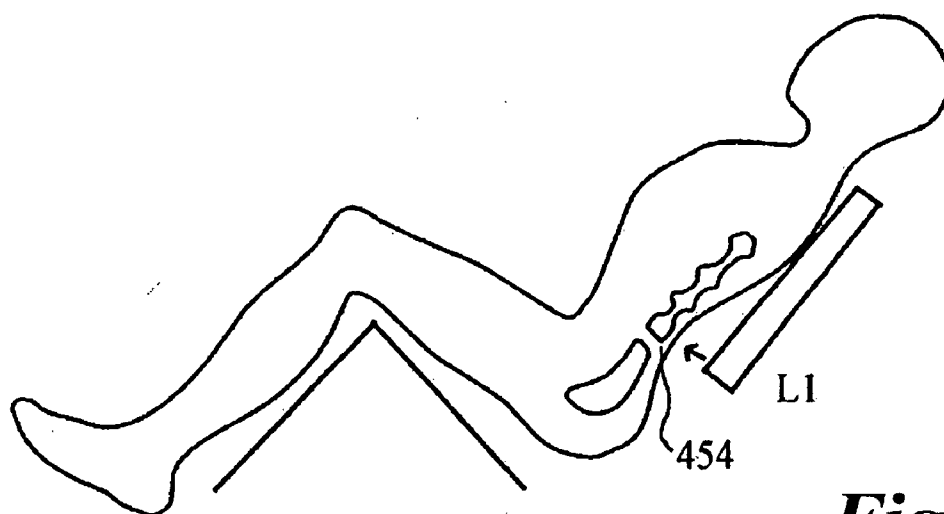
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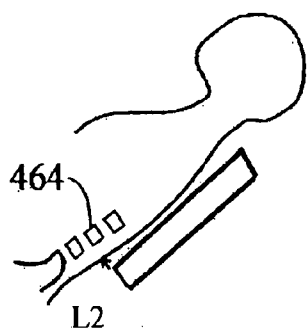
***Fig. 49***



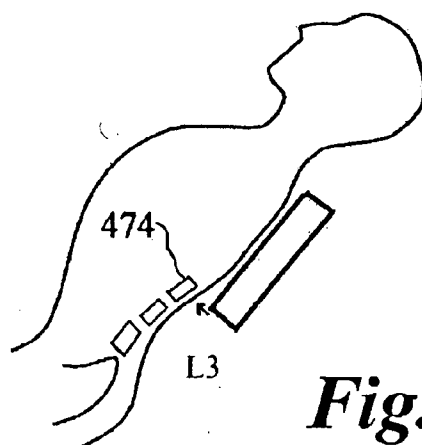
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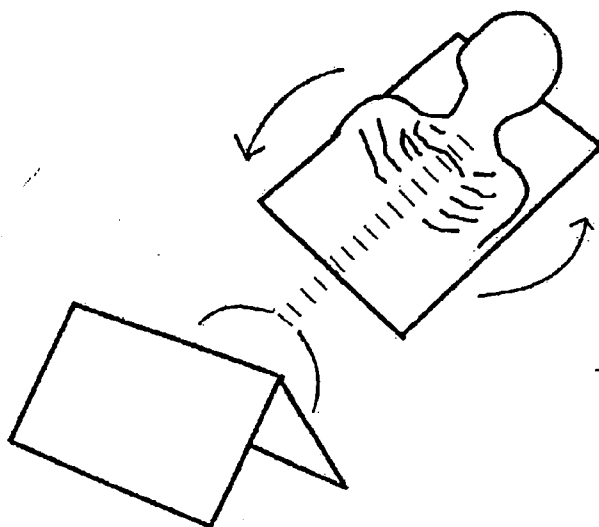
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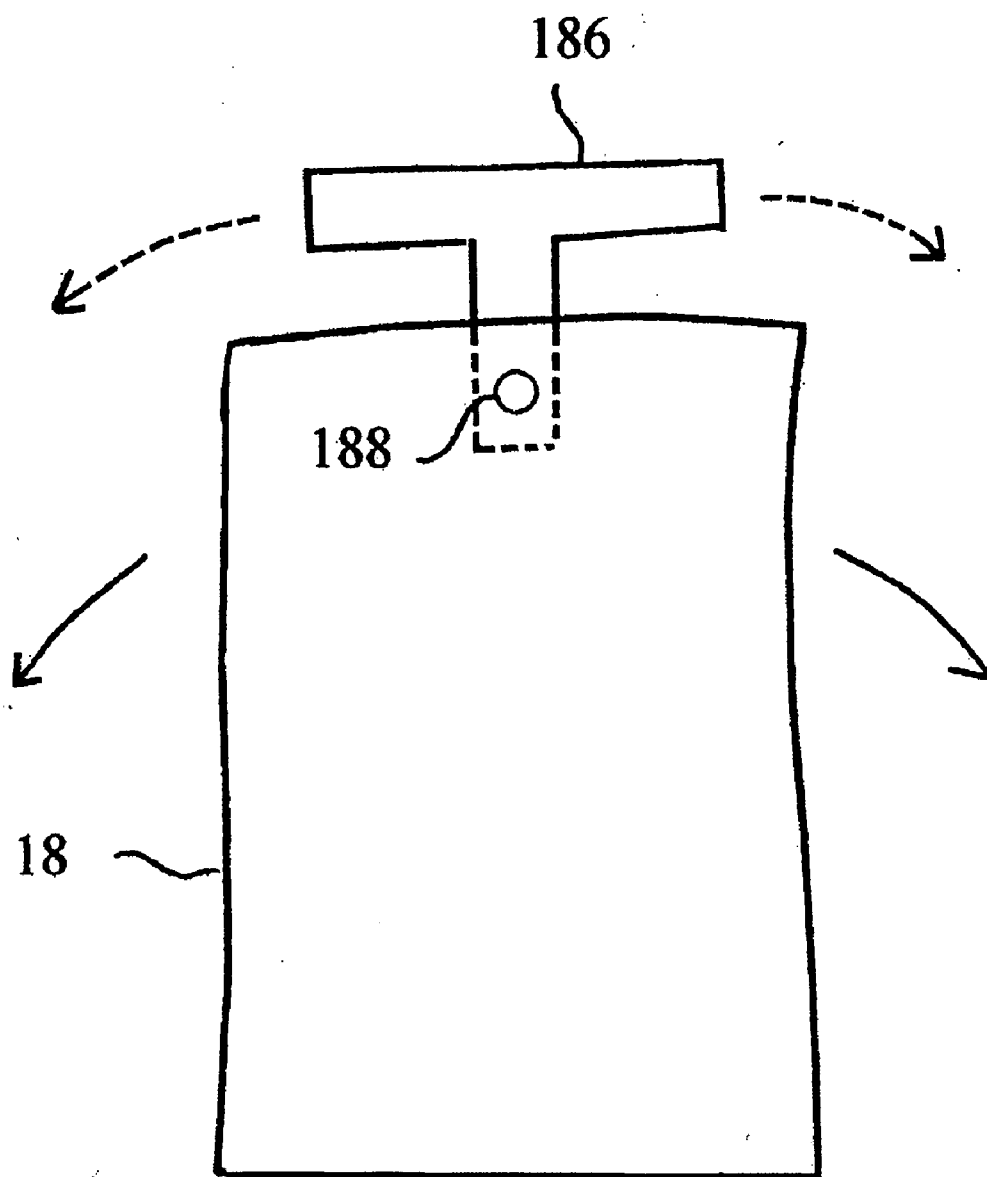


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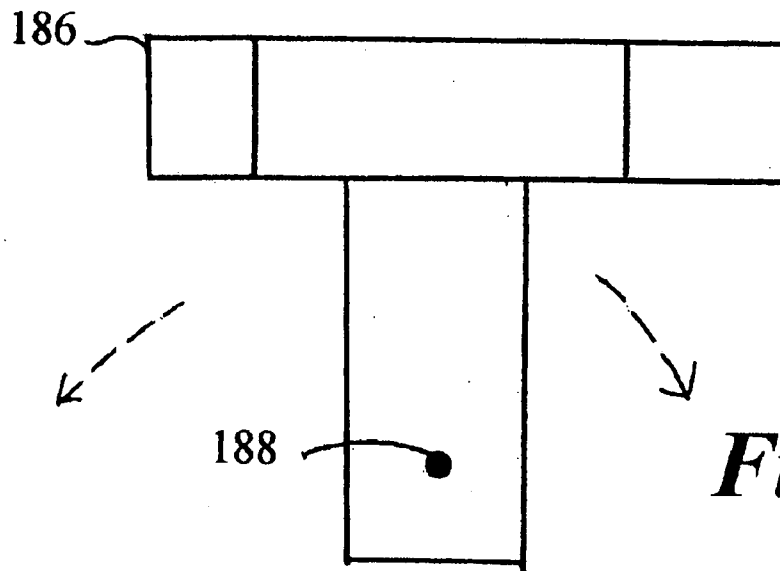


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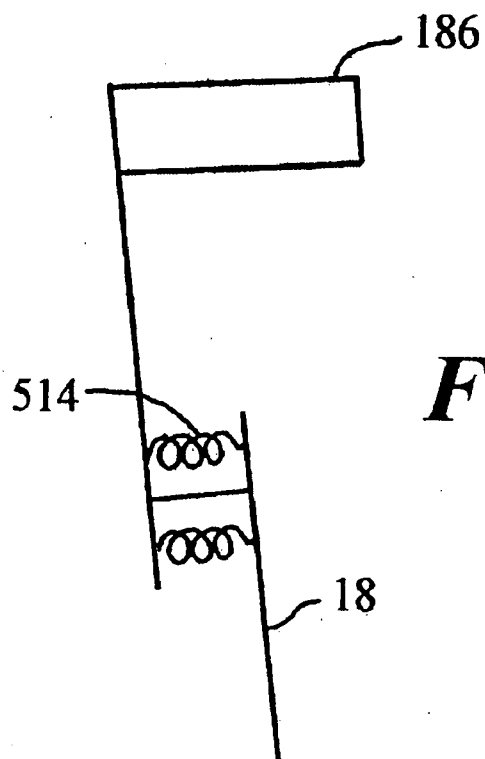




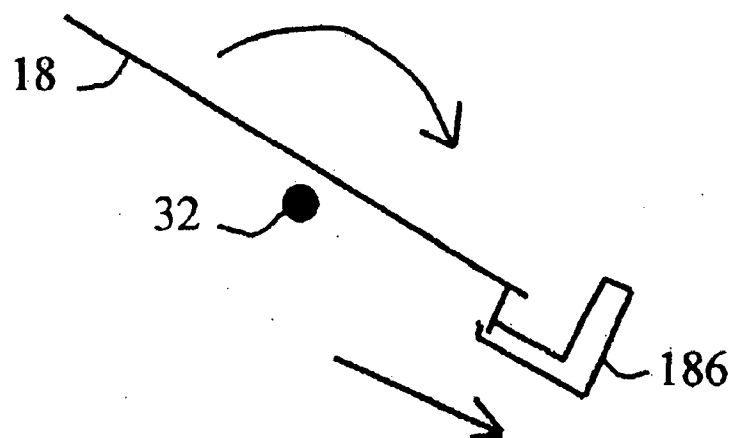
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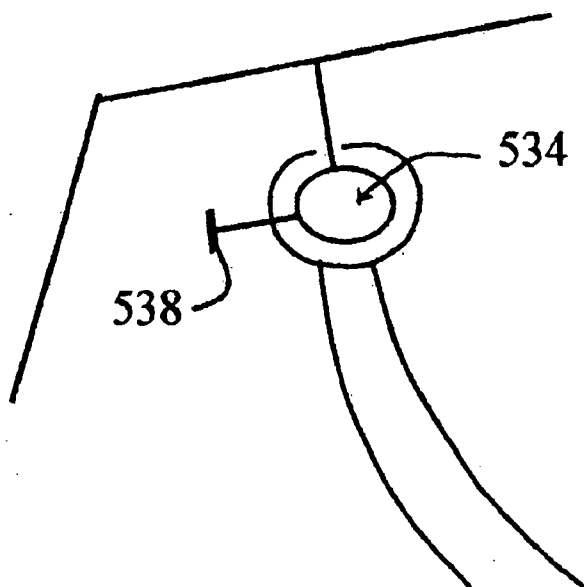
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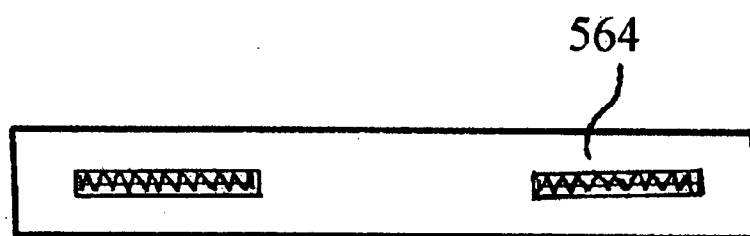
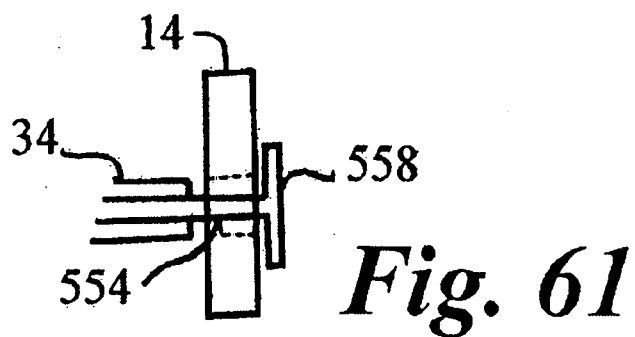
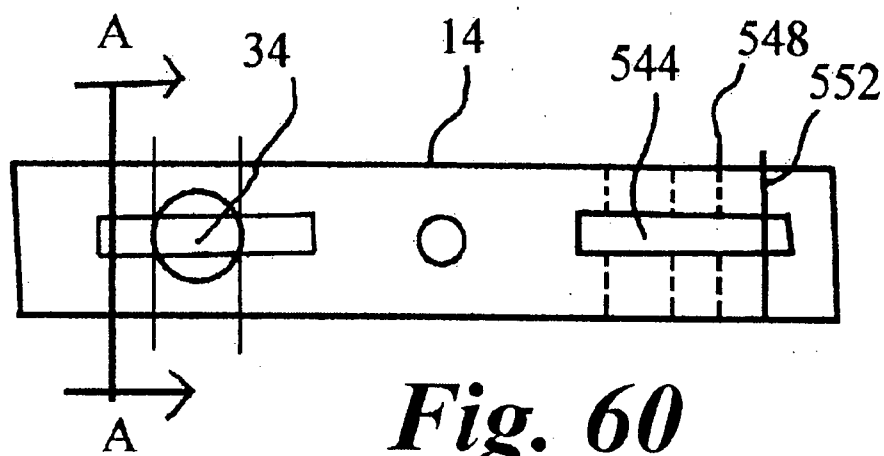
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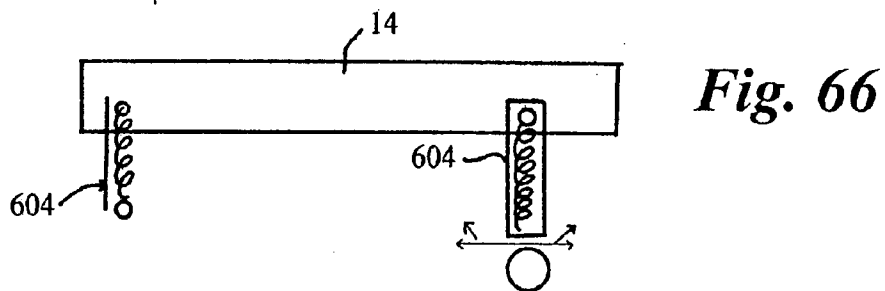
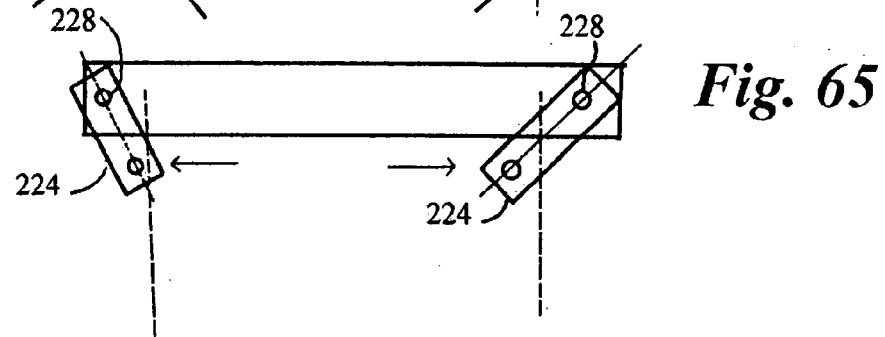
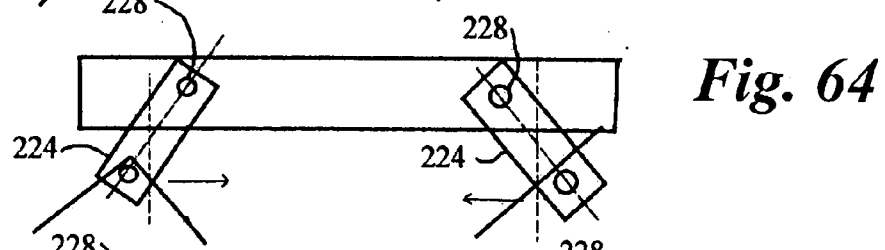
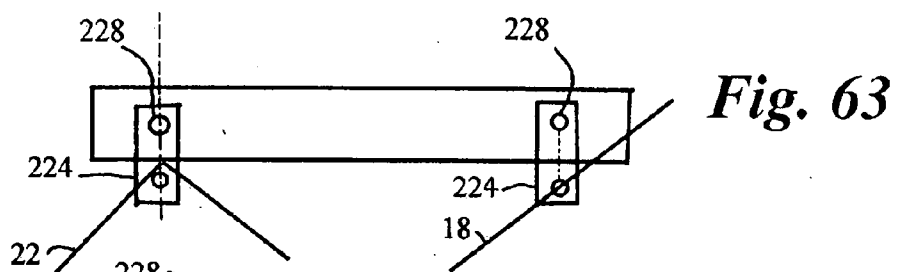


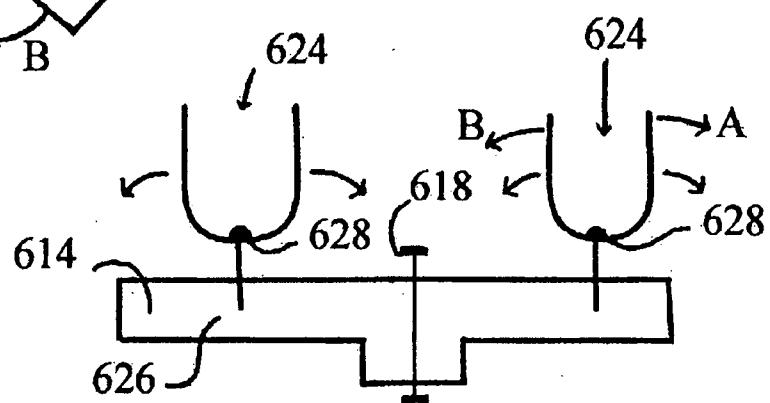
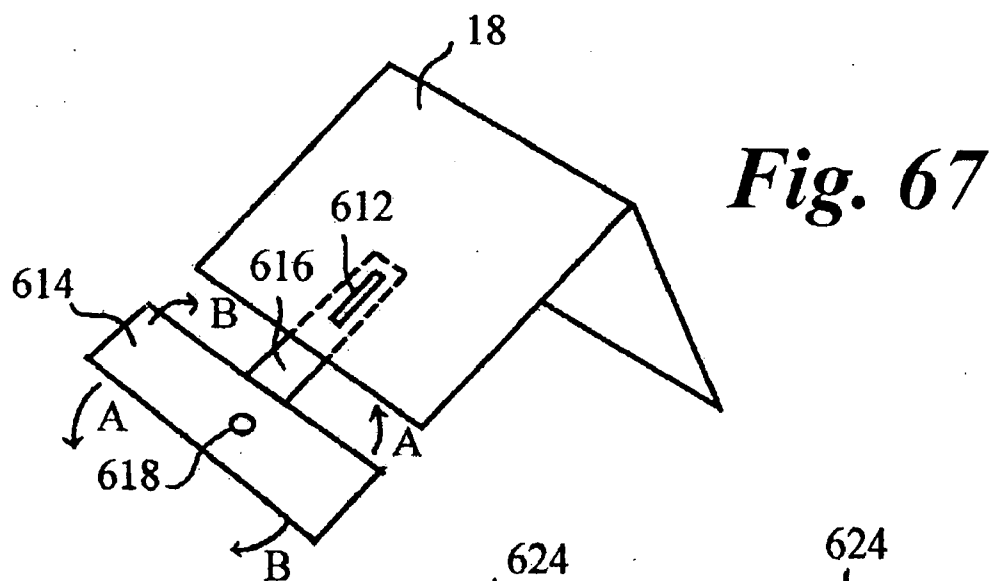
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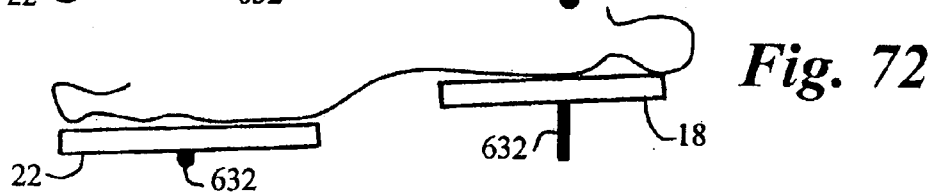
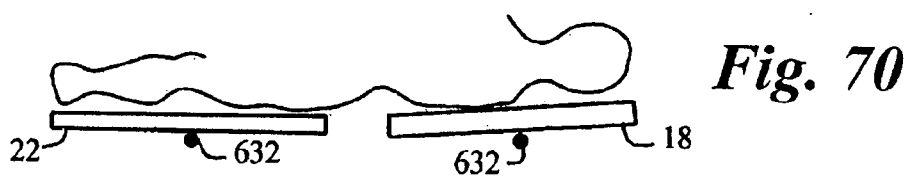
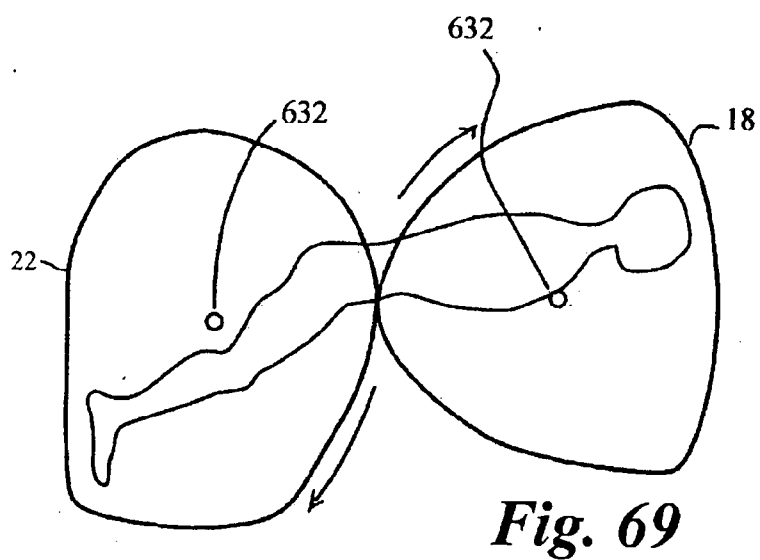


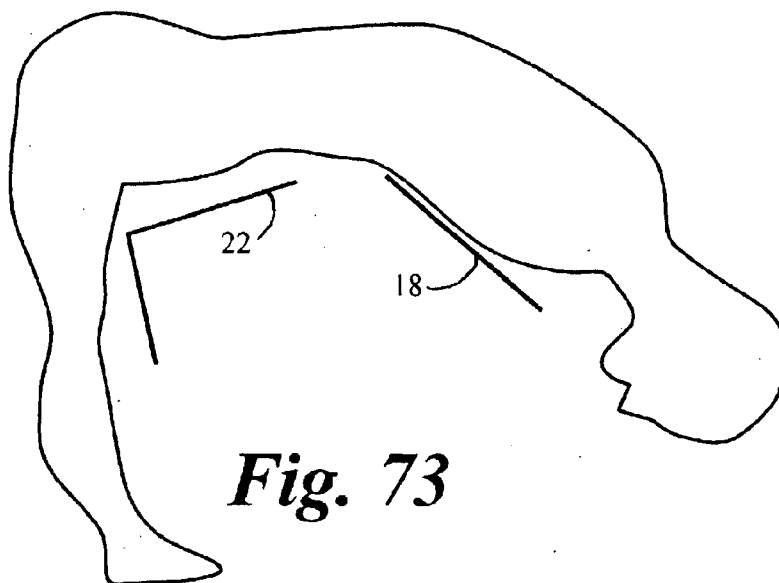
***Fig. 59***



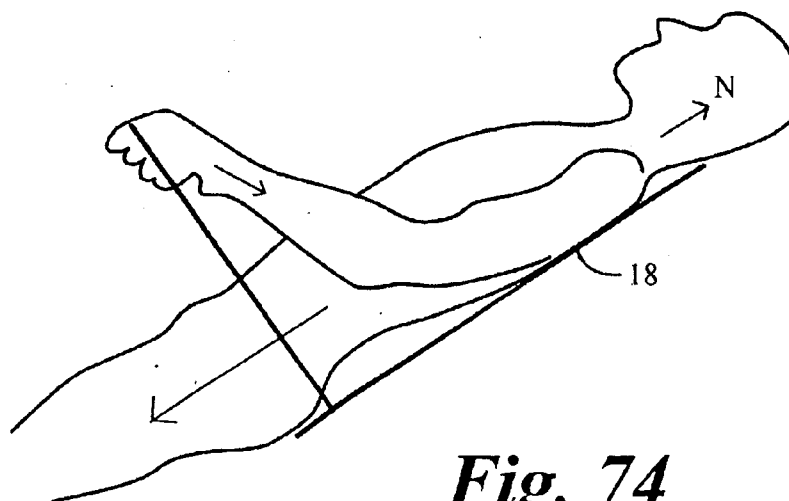




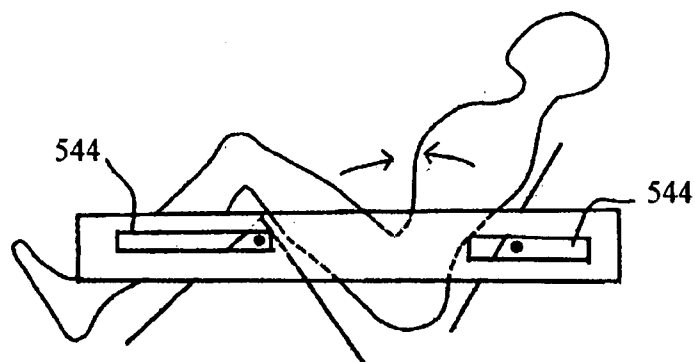




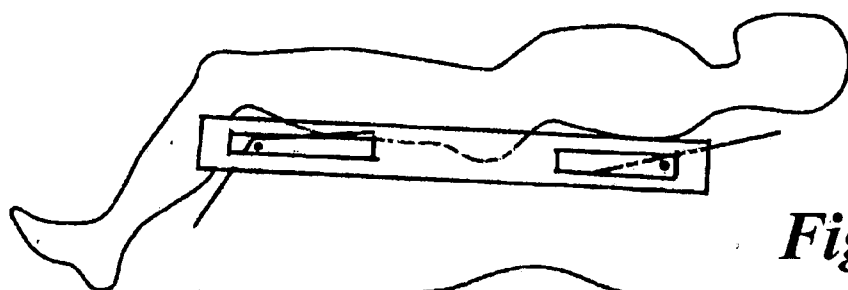
***Fig. 73***



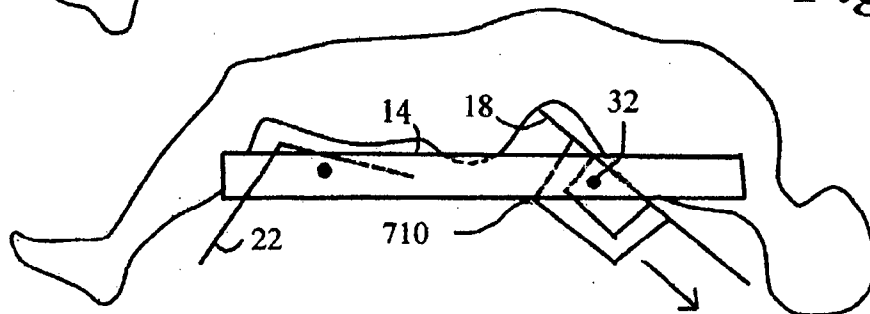
***Fig. 74***



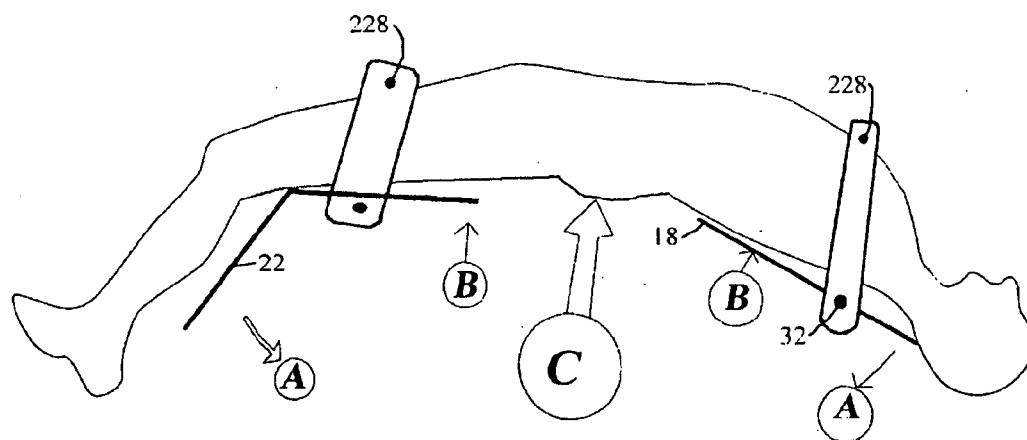
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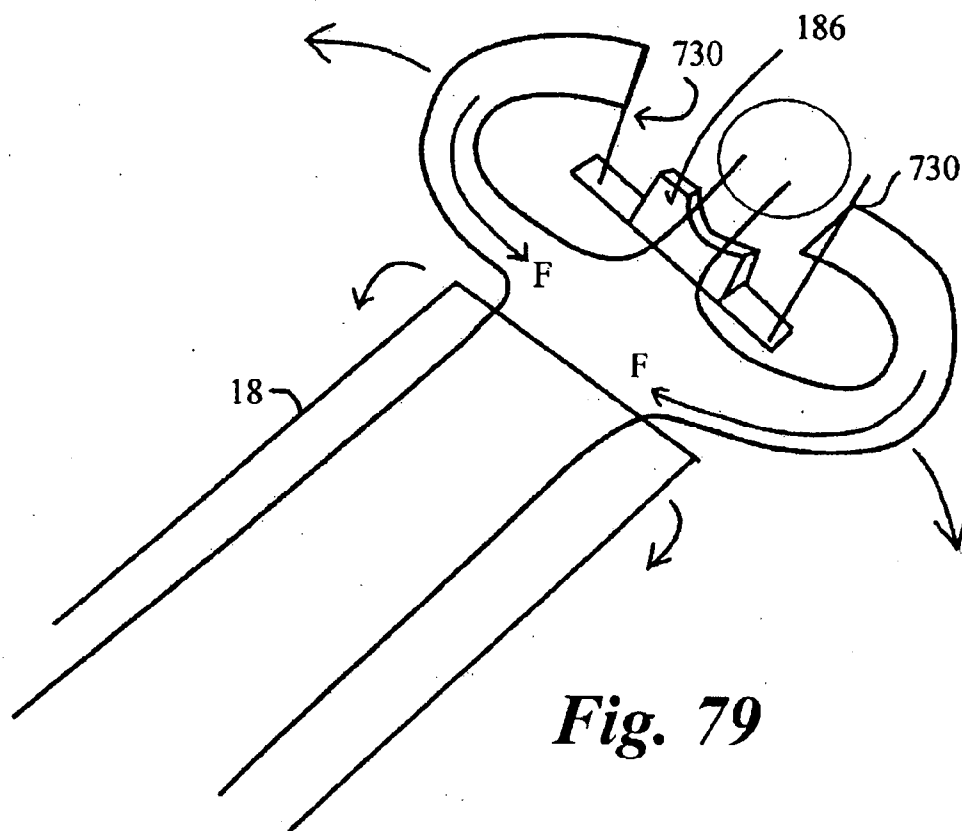
**Fig. 76**



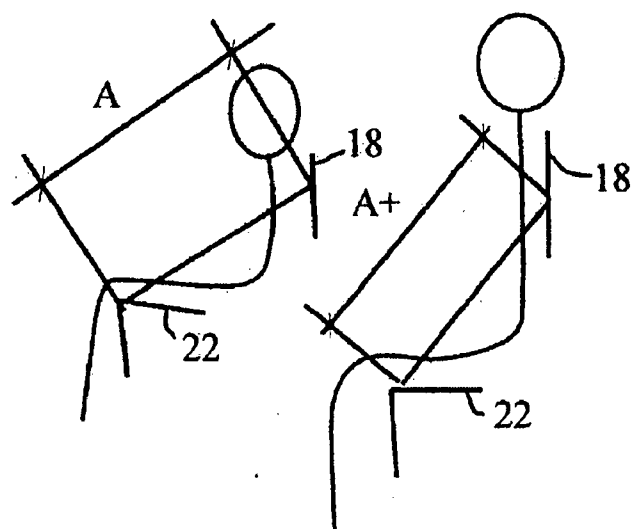
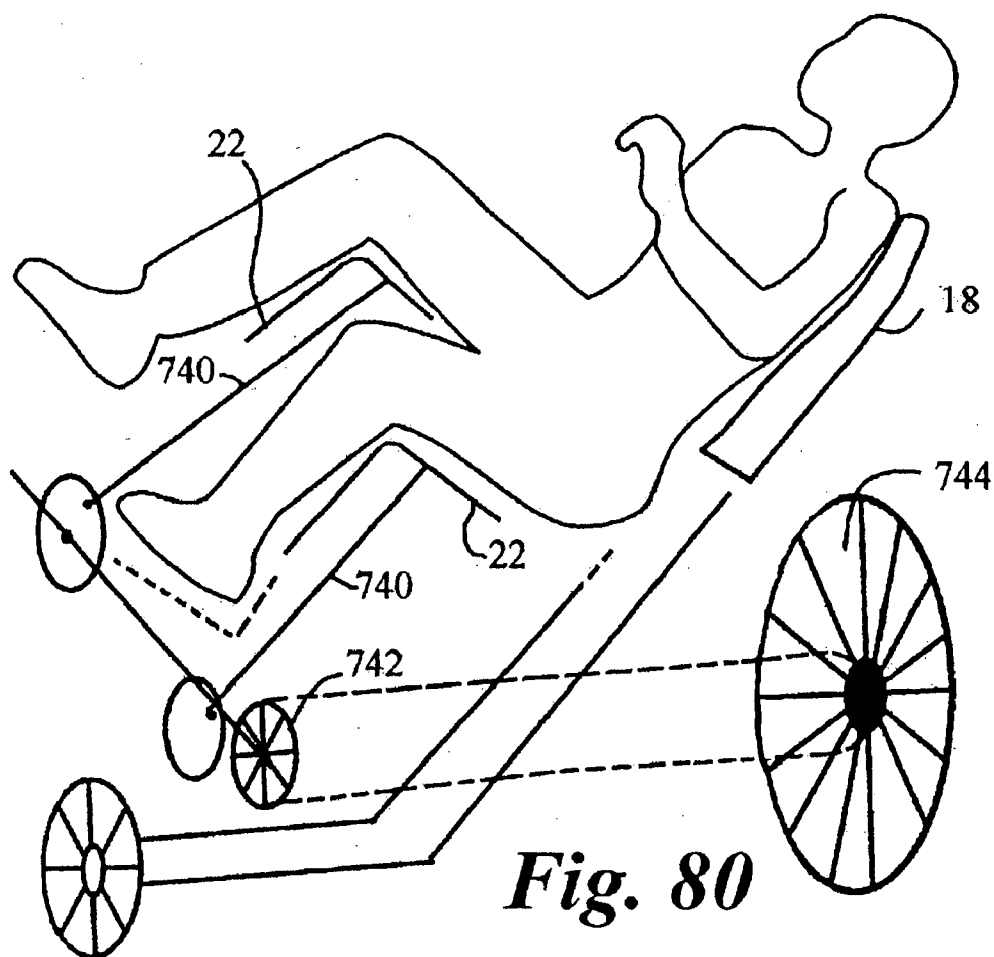
**Fig. 77**



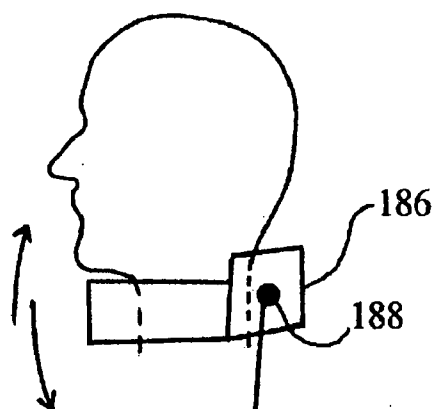
***Fig. 78***



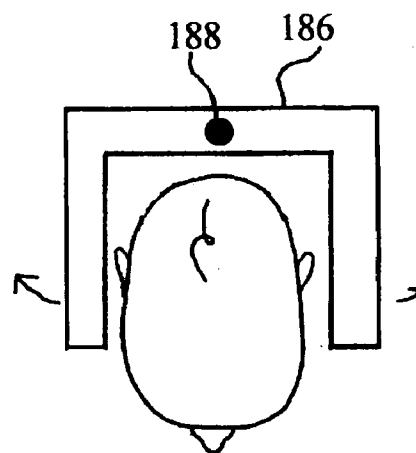
**Fig. 79**



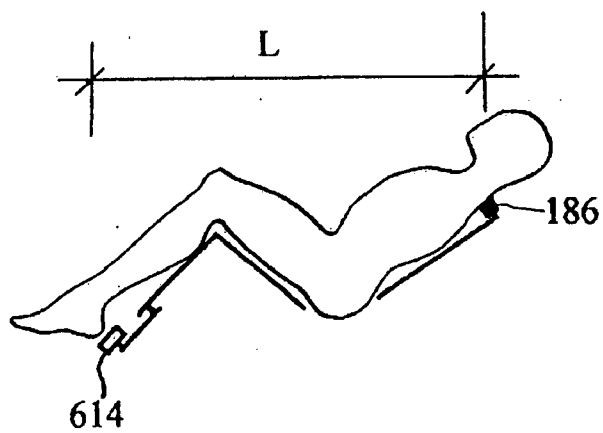
**Fig. 81**



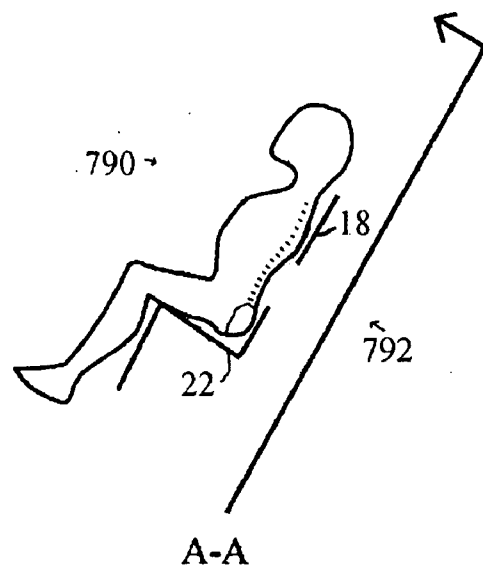
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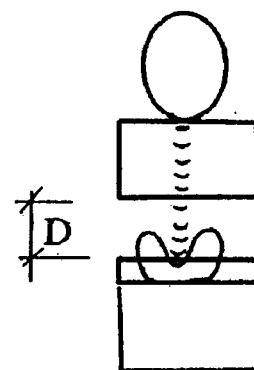
**Fig. 83**



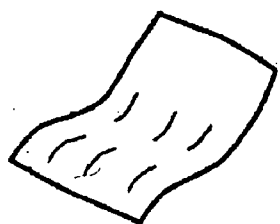
**Fig. 84**



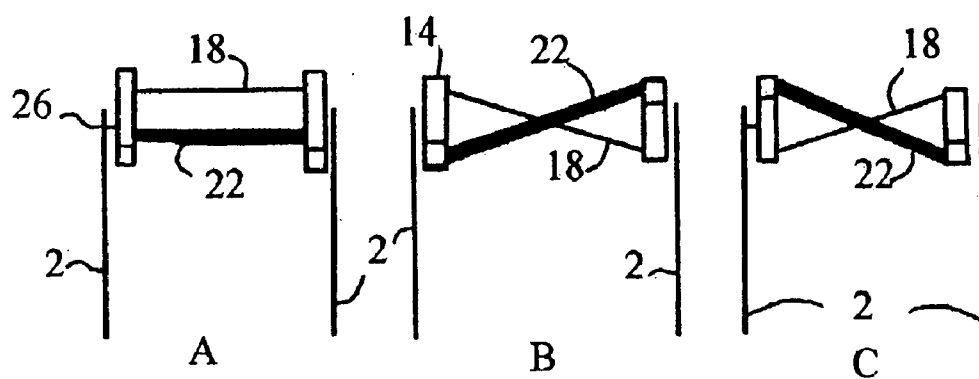
**Fig. 85**



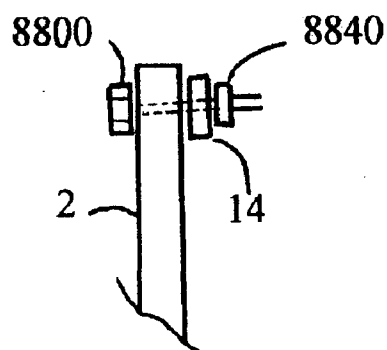
**Fig. 86**



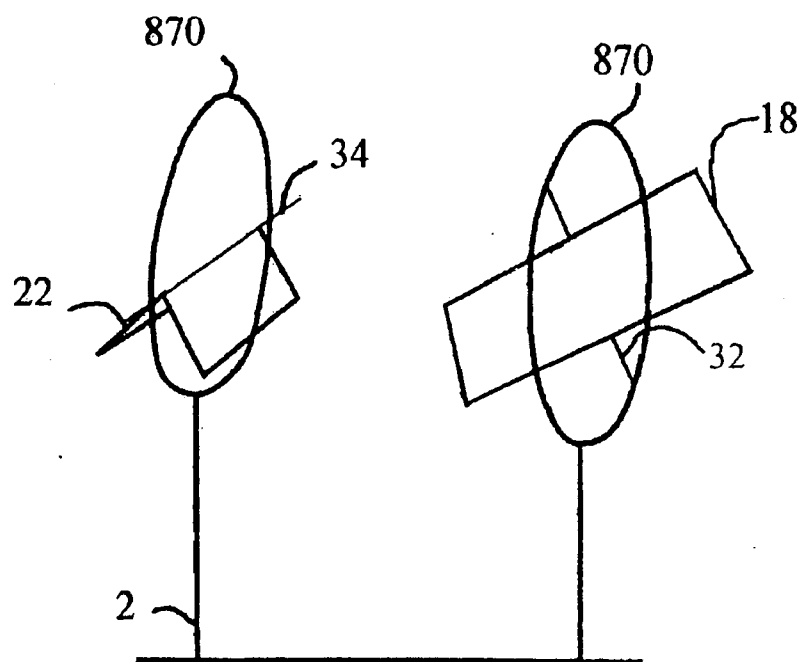
**Fig. 87**



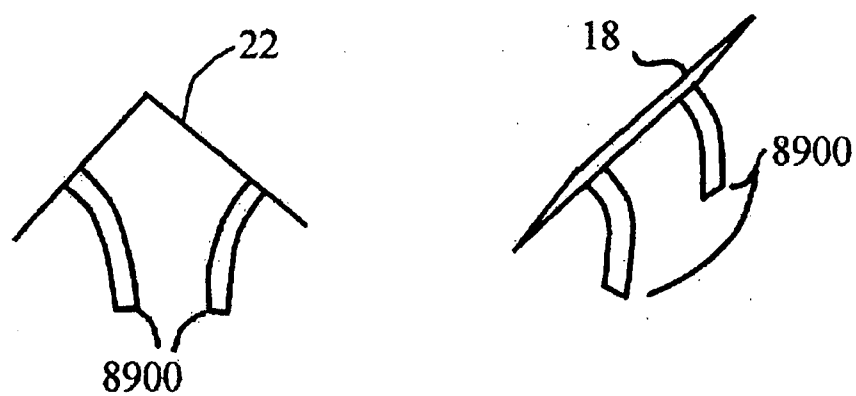
***Fig. 88***



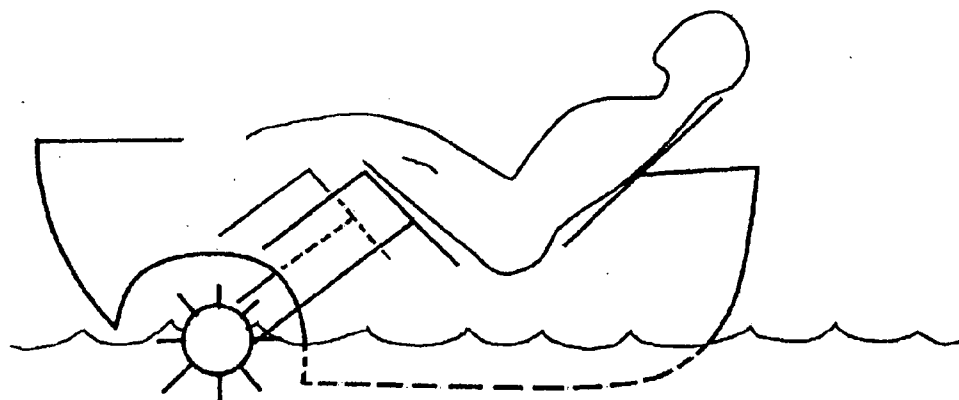
***Fig. 90***



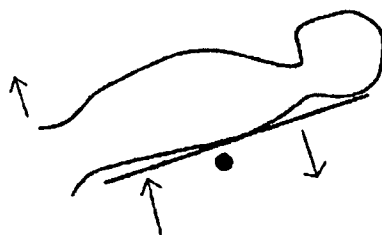
***Fig. 89***



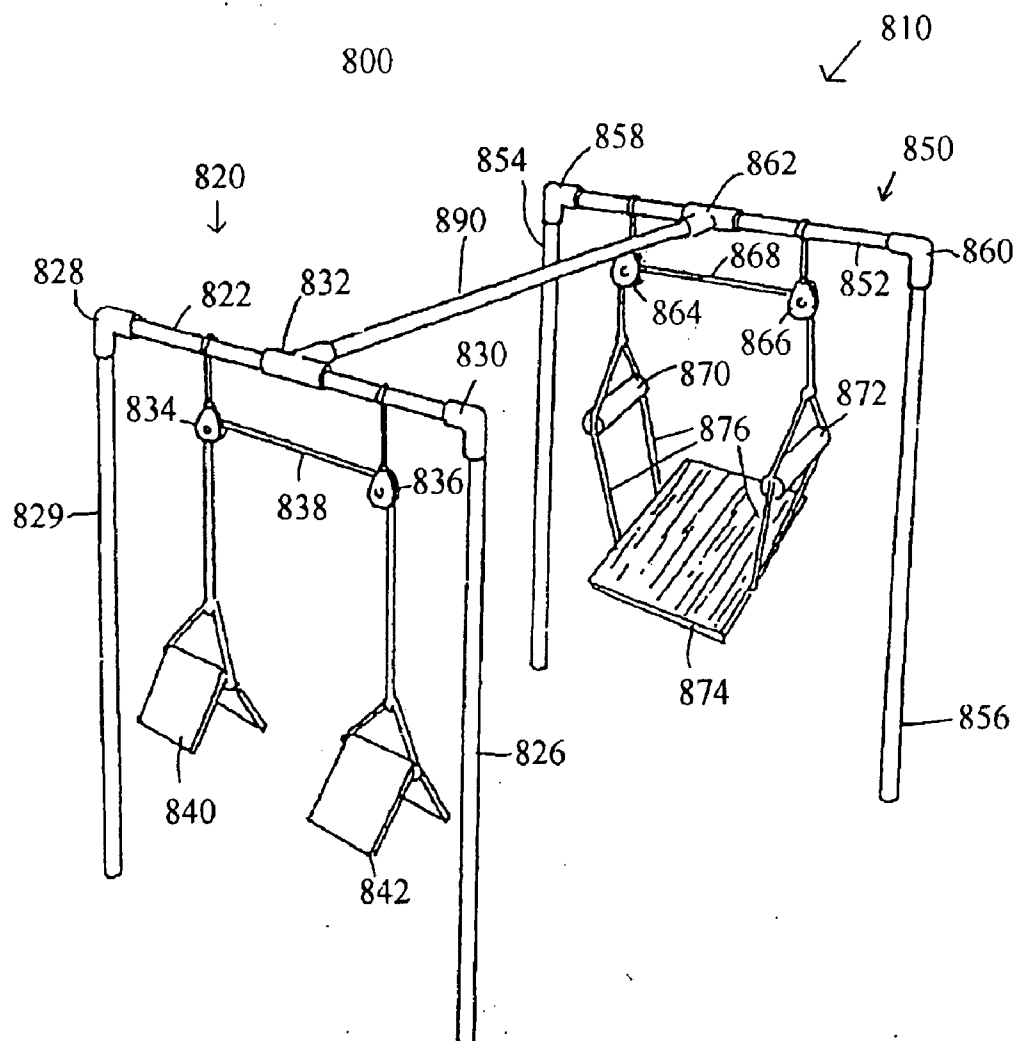
***Fig. 91***



***Fig. 92***

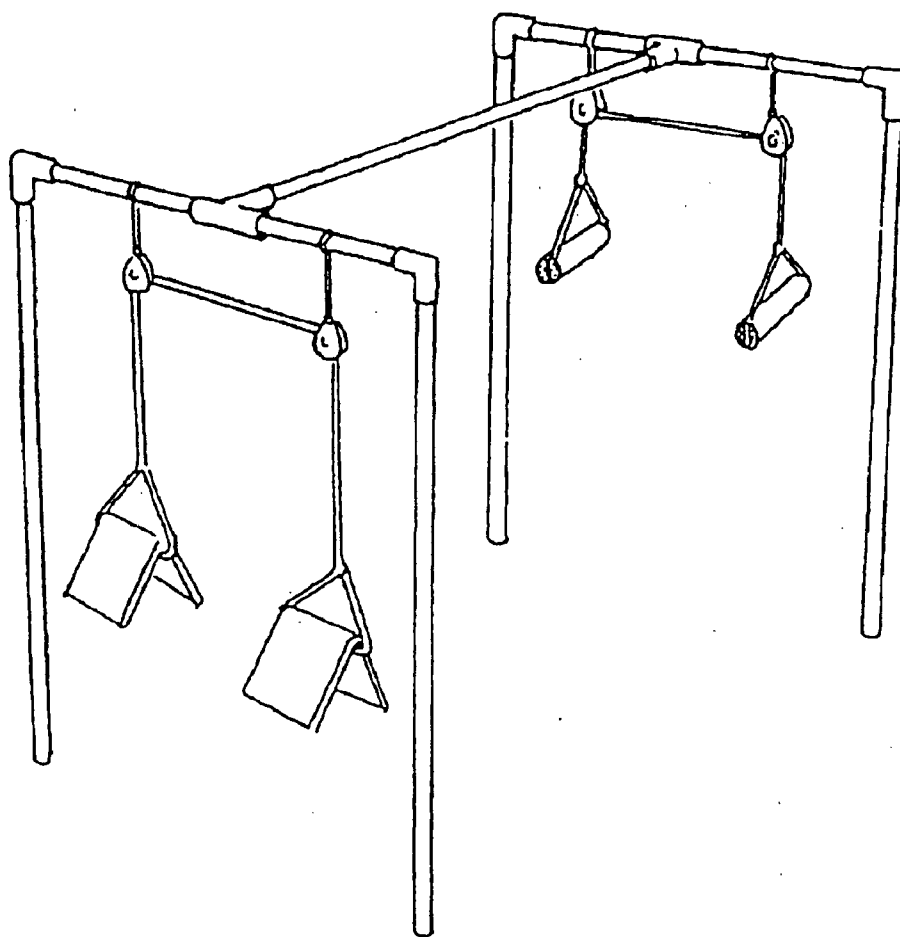


***Fig. 93***



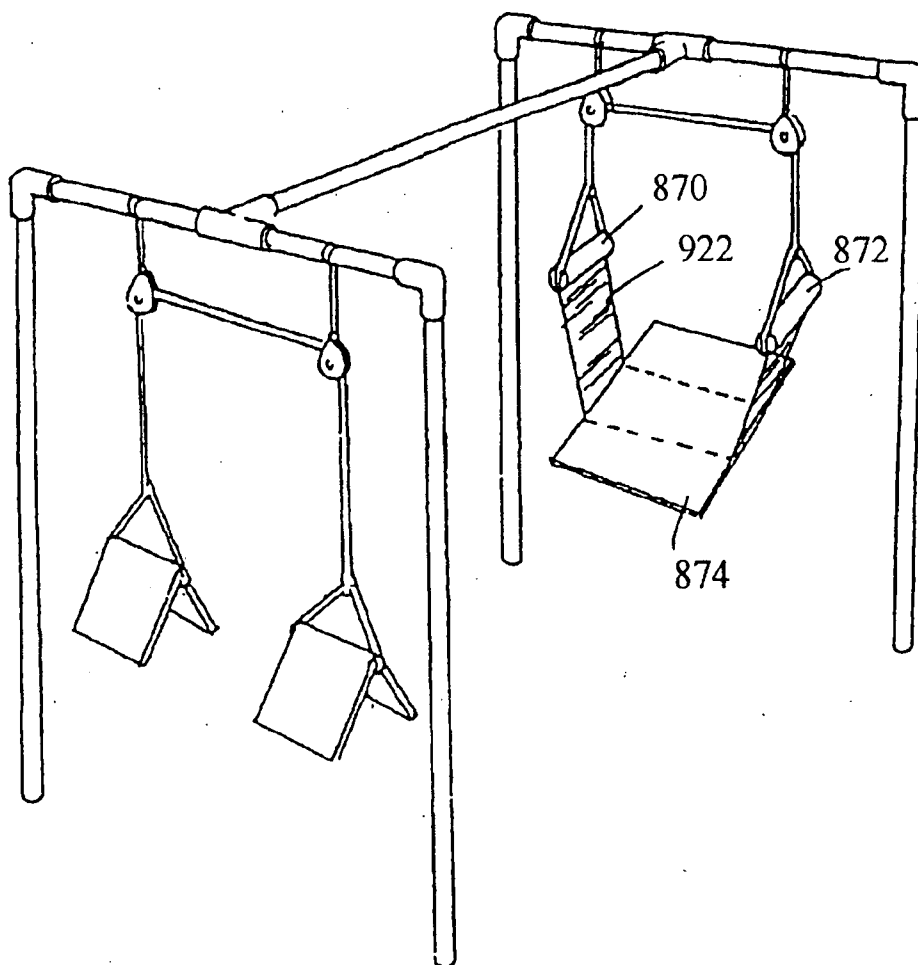
**Fig. 94**

900



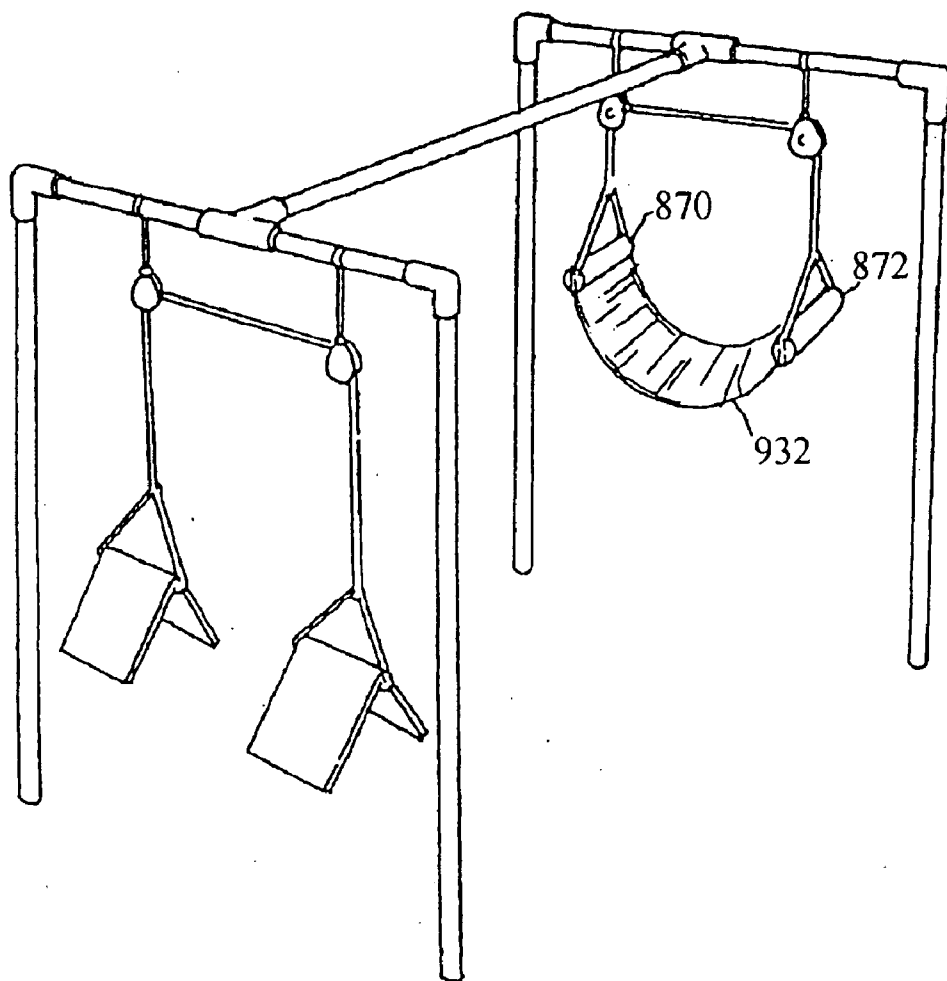
***Fig. 95***

920



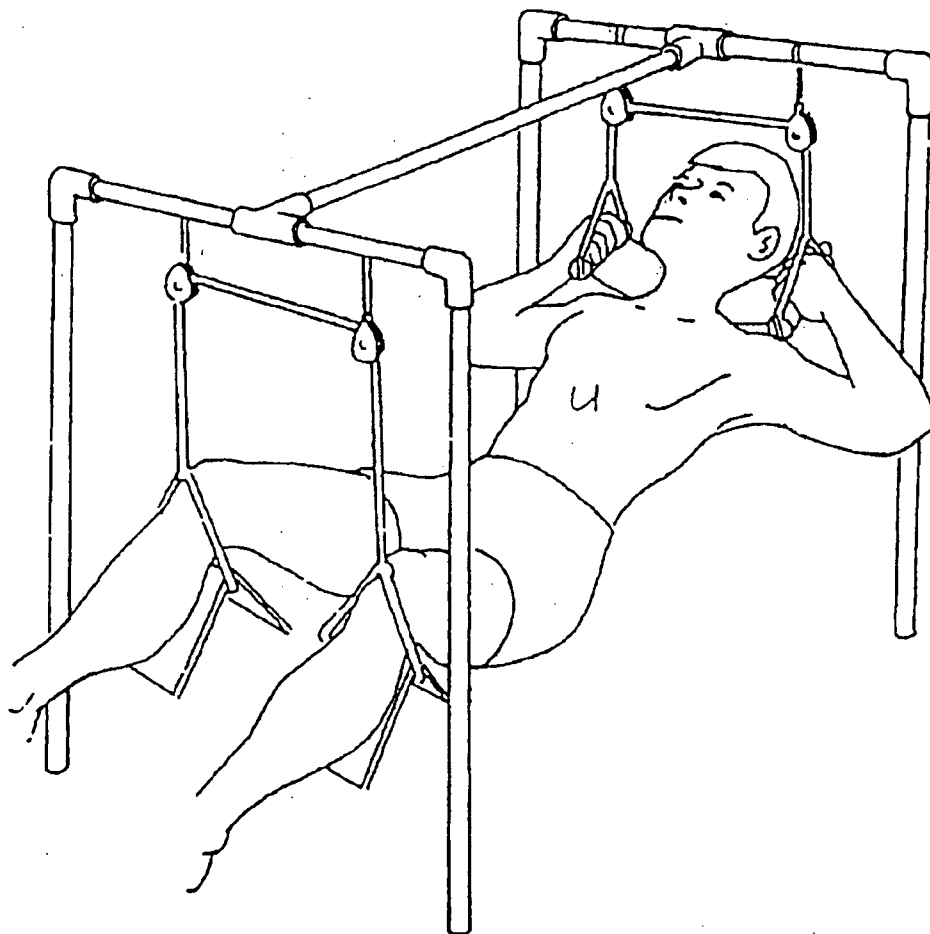
***Fig. 96***

930

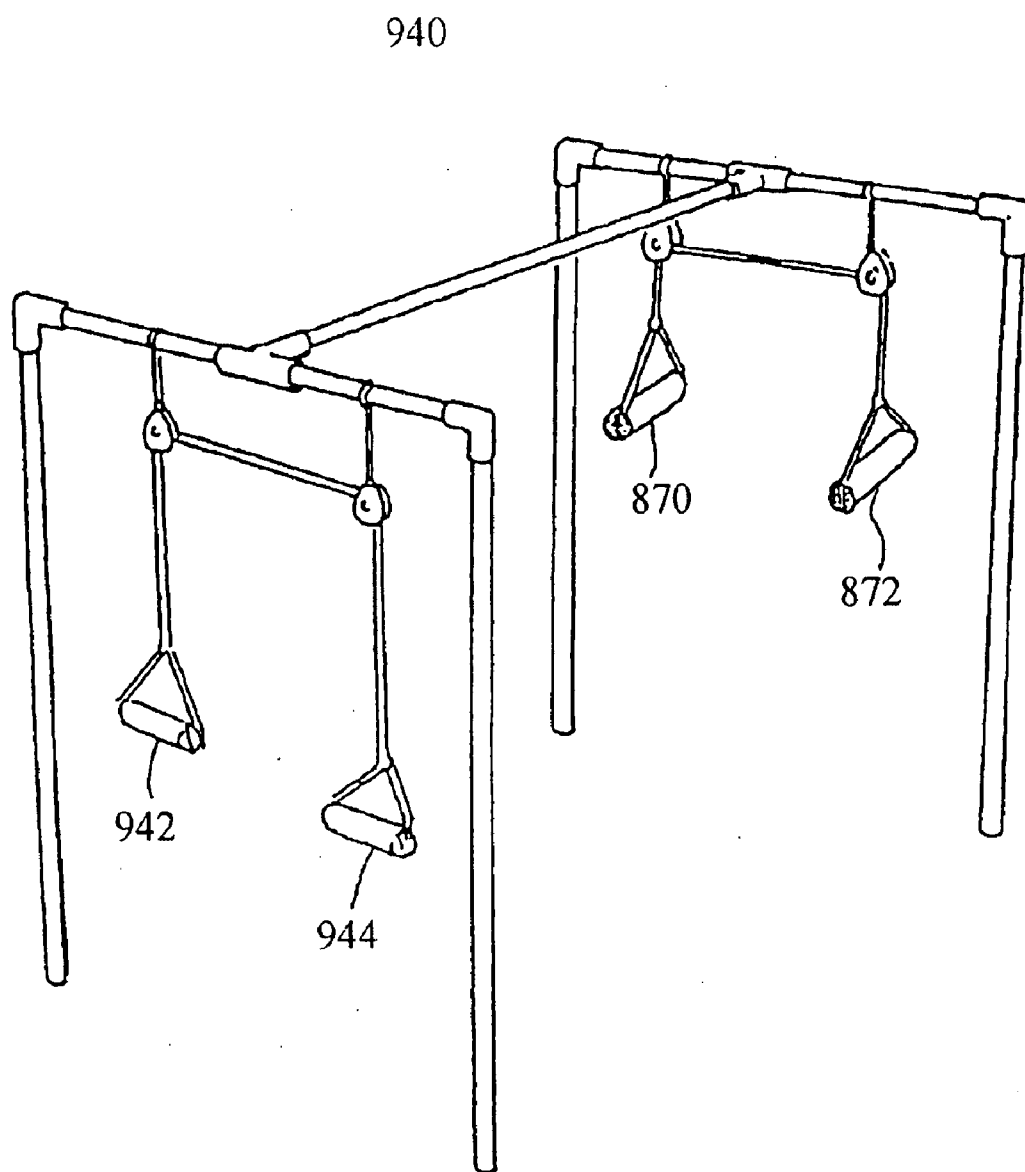


***Fig. 97***

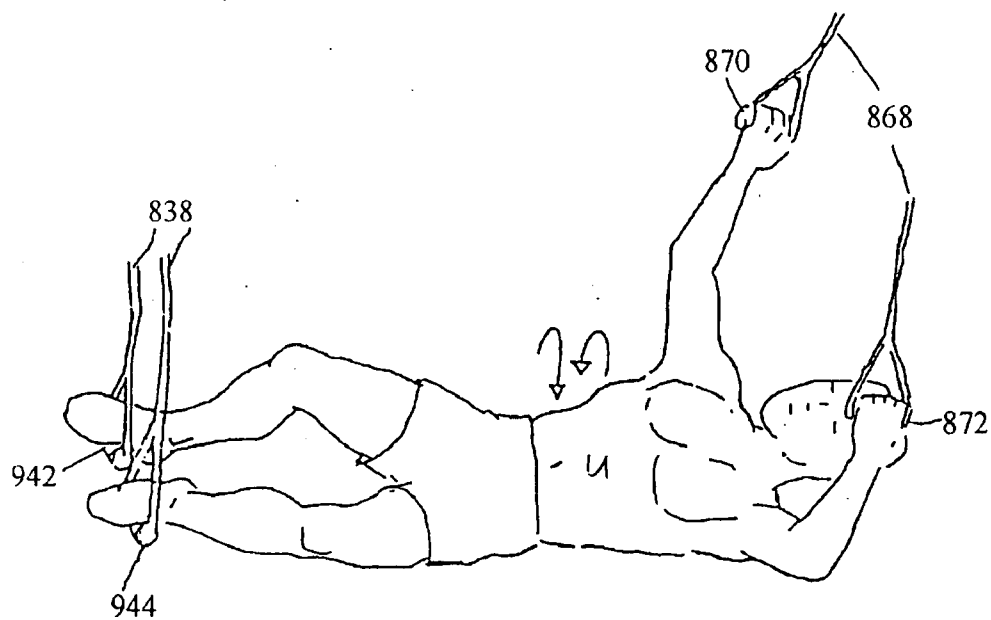
930



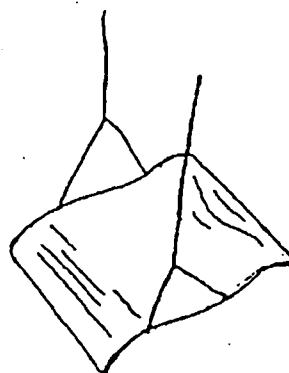
***Fig. 98***



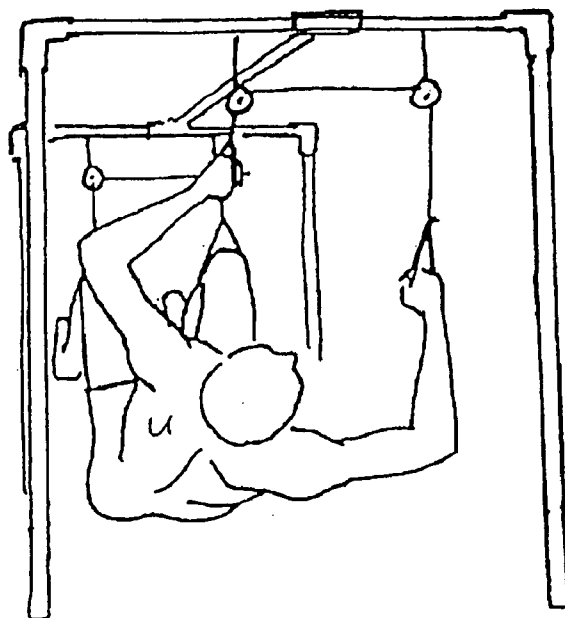
***Fig. 99***



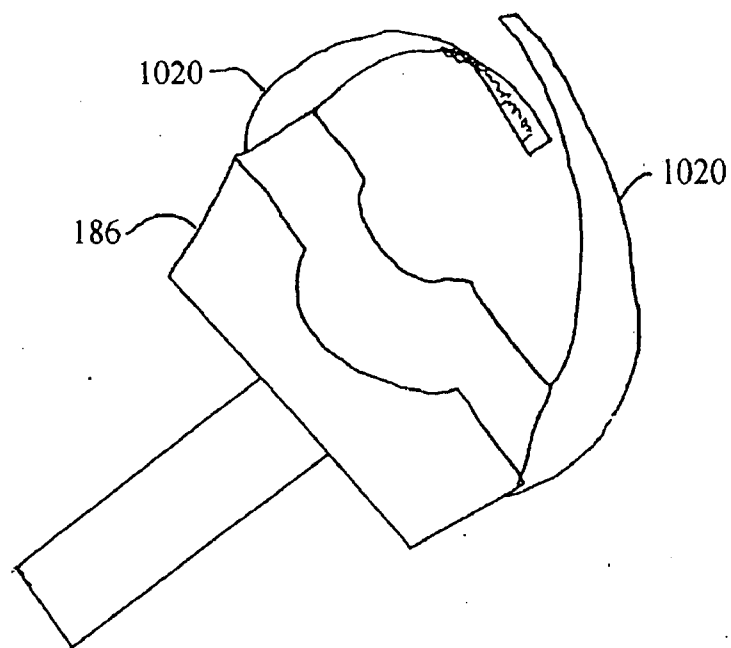
***Fig. 100***



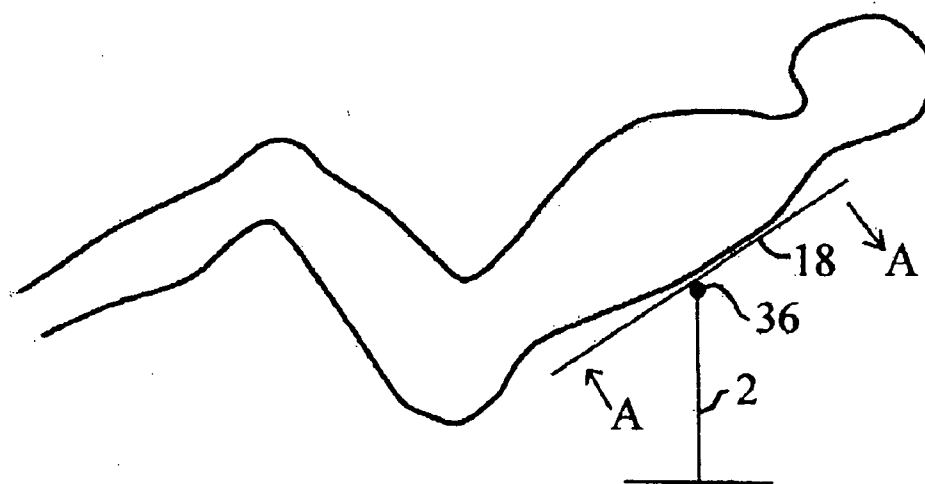
***Fig. 101***



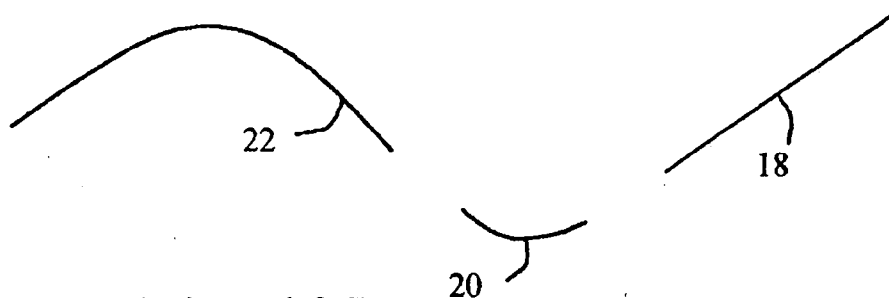
***Fig. 102***



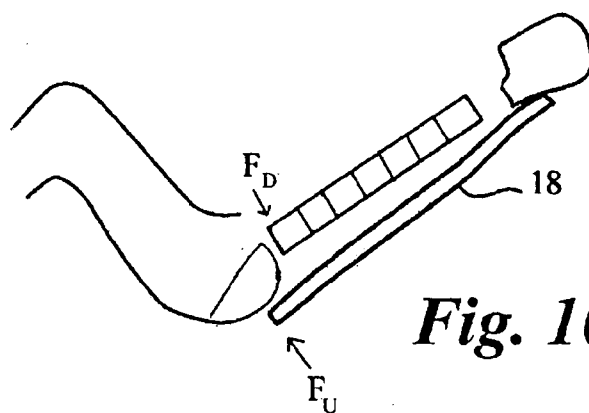
***Fig. 103***



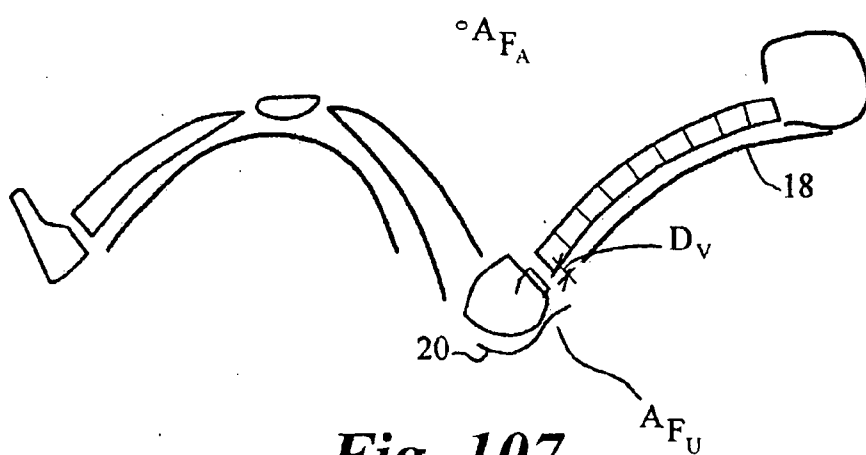
***Fig. 104***



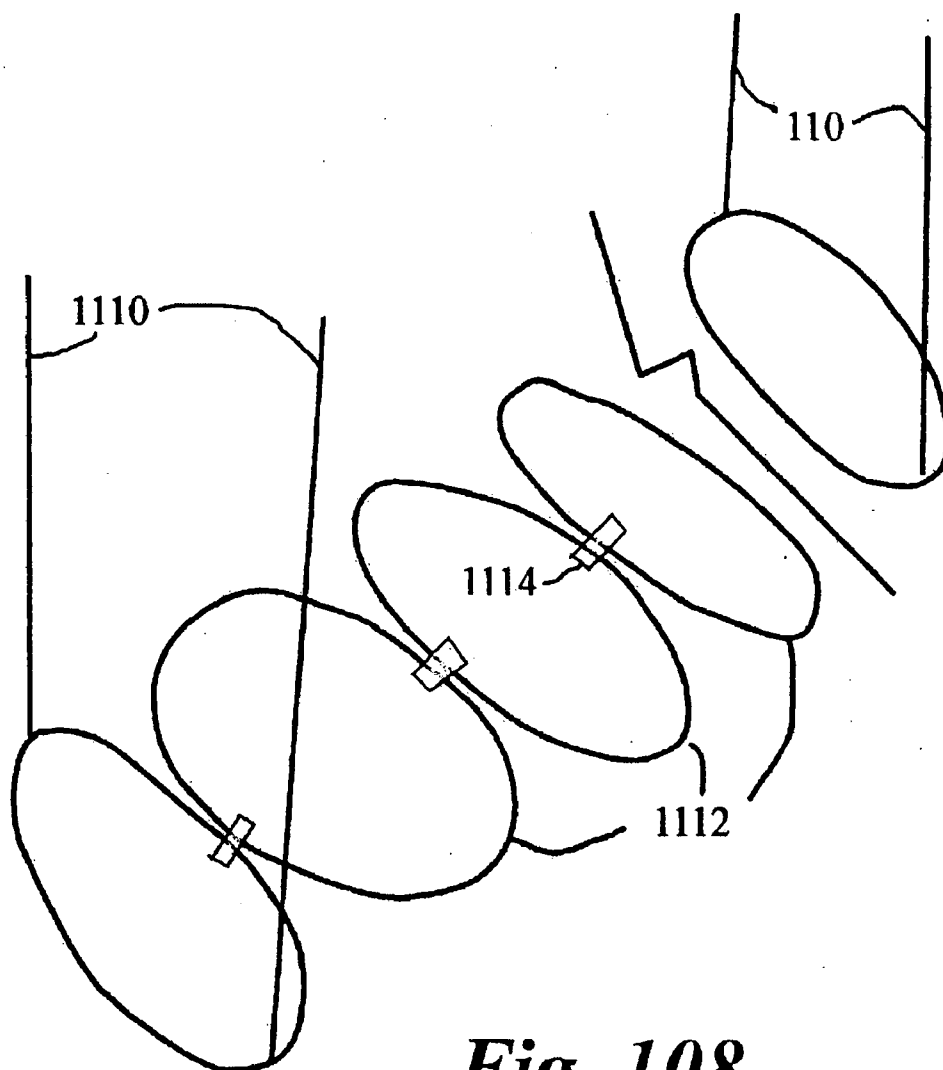
**Fig. 105**



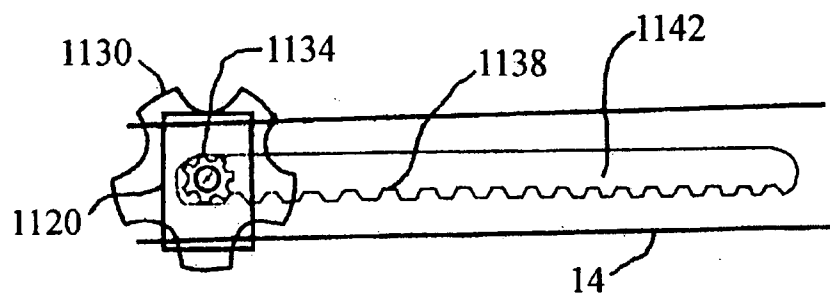
**Fig. 106**



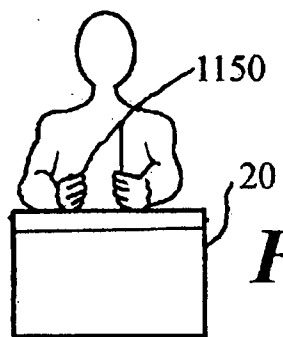
**Fig. 107**



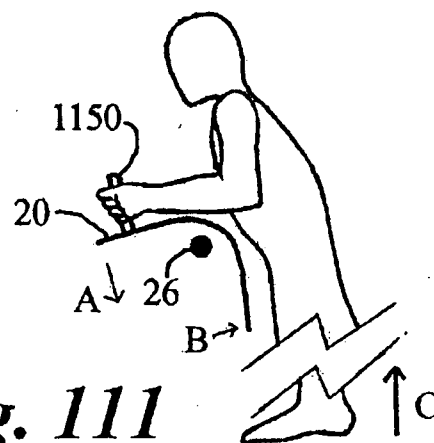
***Fig. 108***



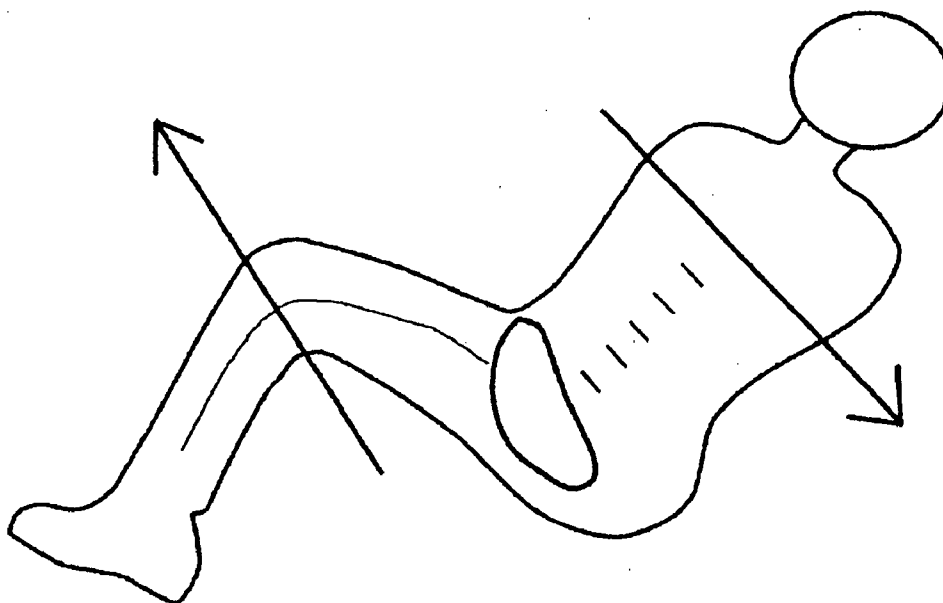
**Fig. 109**



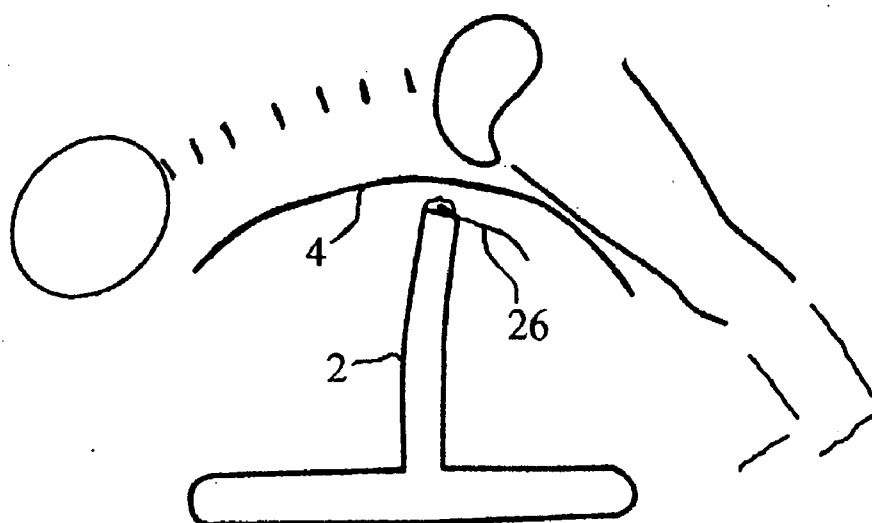
**Fig. 110**



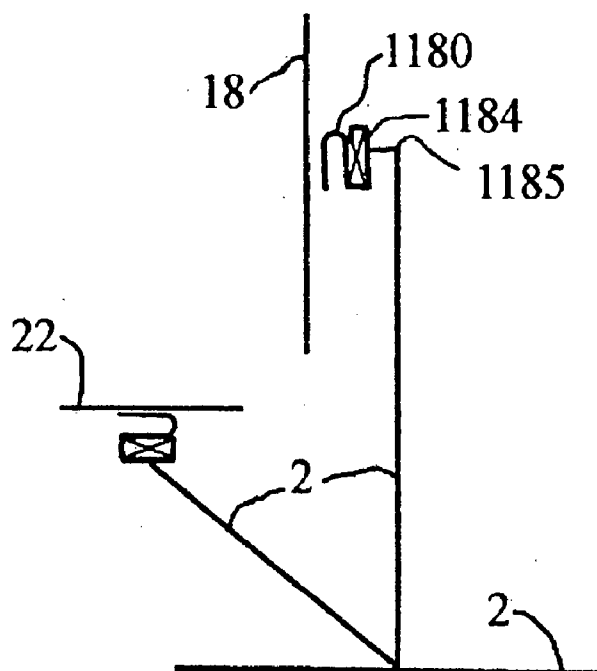
**Fig. 111**



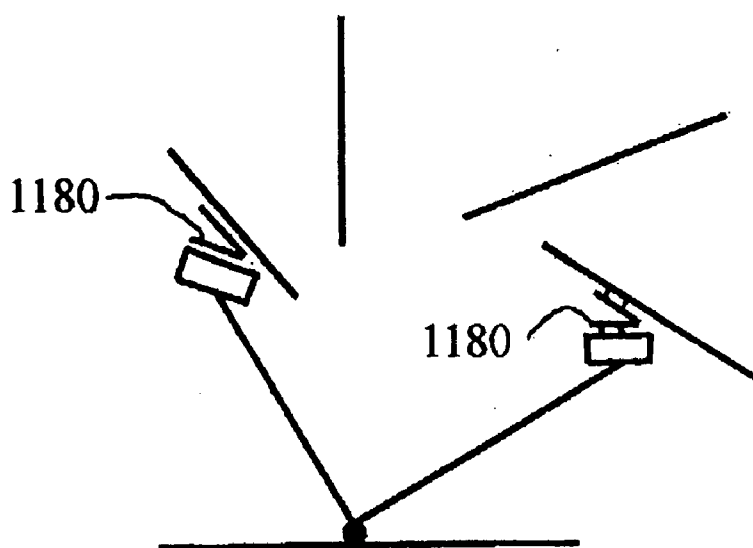
***Fig. 112***



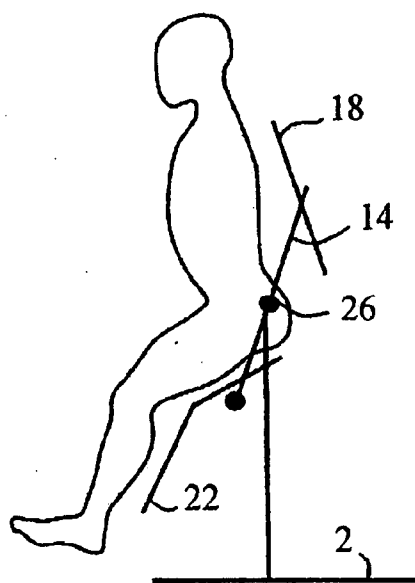
***Fig. 113***



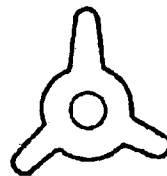
***Fig. 114***



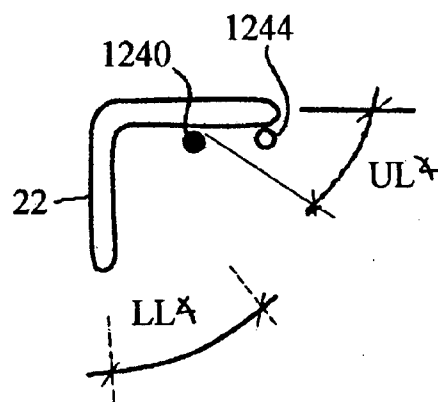
***Fig. 115***



**Fig. 117**



**Fig. 116**



**Fig. 118**

### SPINE TENSIONING SUPPORT CHAIR

[0001] This is a Division of application Ser. No. 08/944, 945 wherein applicant elects Species No. 8, Fig. No. 21, of the Parent Issued U.S. Pat. No. 6,435,611, for prosecution.

### CROSS REFERENCE TO RELATED APPLICATIONS

[0002] Provisional application No. 60/027,767, filed on Oct. 4, 1996.

### STATEMENT REGARDING FEDERALLY SUPPORTED RESEARCH OR DEV

[0003] Not applicable.

### REFERENCE TO A SEQUENCE LISTING, A TABLE, ETC

[0004] Not applicable.

### BACKGROUND OF THE INVENTION

[0005] This invention relates generally to devices used in physical therapy and, more particularly, to a spine tensioning, traction and muscle exercise apparatus.

[0006] Back pain is a national health problem. It is the second most likely reason people go to the doctor. It is estimated Americans spent \$20 billion alone in 1990 on back-related medical bills. More and more people sit for hour upon hour and perform computer work. Studies show that sitting creates two times the pressure on the low back as compared to standing.

[0007] Numerous devices have been devised to help with this problem, including the following:

[0008] U.S. Pat. No. 4,793,665 to Kvalheim discloses a chair with a seat rest and separate backrest. However, it cannot provide spine tensioning because it supports the user's posterior.

[0009] U.S. Pat. No. 4,432,108 to Chapman, U.S. Pat. No. 2,248,369 to Laudersen and U.S. Pat. No. 2,112,678 to Rausch all teach leg supports, but do not teach spine tensioning.

[0010] U.S. Pat. No. 5,042,800 to Walter teaches a spine tensioning body support whereby the user's back and legs are supported but not the posterior. The four vertical risers and two elongated members are fixed and require dismounting and disassembly to change leg and back support location. Additionally, the users must support themselves with their arms on the elongated members and lift one leg at a time over the leg rest to place them in the device. This feat is difficult for some users and may prohibit older users and those with back pain from obtaining the benefits of the device.

### SUMMARY OF THE INVENTION

[0011] It is thus an object of this invention to provide the user a simplified access for practicing spine tensioning, traction and development.

[0012] Another object of this Invention is to provide an economical means to practice spine tensioning, traction at a minimal cost without the aide of a therapist.

[0013] Still another object of this invention is to provide a device, which may readily be utilized as a chair and, with no structure adjustments, nor dismounting also function as a dual support spine-tensioning device.

[0014] Another object of the invention is to provide the user with an opportunity to vary and increase the mild limited tension to the spine by allowing the user to lay face down in the apparatus.

[0015] Another object of this invention is to provide a chair that, in the reclined position, decompresses the low back as opposed to doubling the pressure when sitting upright.

[0016] Still another object of this invention is to provide a computer input chair that may also function as a spine tensioning computer input chair from which one may still be able to perform computer related tasks.

### BRIEF SUMMARY OF THE INVENTION

[0017] These and other objects of the invention are accomplished by a spine tensioning dual body support chair that includes two substantially planar body supports that rotate in similar direction and opposite elevation to one another. A rotating means will move body supports in similar rotation and opposite elevation to one another. Preferably, body support rotating means will have two end limits which will hold the body supports in a chair position, one support higher than the other, or in a spine tensioning position, both body supports in near equal elevation. Rotating means may also be fixable so that body supports may be fixed in any rotation or elevation to one another so desired to perform various spine tensioning, traction or developing exercises. These body supports will support the human body with different reactive forces depending on their relative elevations, rotational position and distance from one another.

### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0018] FIG. 1 is a perspective view of the dual body support spine-tensioning chair, an enhanced chair apparatus for sitting and spine developing.

[0019] FIG. 2 is a side view of the apparatus with the user in a sitting position, one body support higher than the other.

[0020] FIG. 3 is a side view of the apparatus with a user in a reclined seated position with body supports near equal in elevation.

[0021] FIG. 4 is a side view of the apparatus with body supports near equal in elevation user in horizontal position.

[0022] FIG. 5 is a side view of the apparatus with the body supports near equal in elevation user stretching VIA hips elevated face up.

[0023] FIG. 6 is a side view of the apparatus with the body supports near equal in elevation user stretching VIA hips elevated face down.

[0024] FIG. 7 is an enlarged side view of the body support pivot and elevation limit device.

[0025] FIG. 8 is a side view of the upper body support-connecting block

- [0026] FIG. 9 is an enlarged side view of an alternate body support elevation limit device.
- [0027] FIG. 10 is a side view of the lower body support-connecting block
- [0028] FIG. 11 is a side view of alternate means to achieve and maintain chair and spine tensioning dual body support elevations.
- [0029] FIG. 12 is a side view of an alternate support-connecting block.
- [0030] FIG. 13 is a side view of alternate means to achieve and maintain chair and spine tensioning dual body support elevations.
- [0031] FIG. 14 is section A A of FIG. 12.
- [0032] FIG. 15 is a side view of alternate means to achieve and maintain chair and spine tensioning dual body support elevations.
- [0033] FIG. 16 is section B B of FIG. 10, showing alternate lower body support movements in relation to support rod.
- [0034] FIG. 17 is a side view of alternate means to achieve and maintain chair and spine tensioning dual body support elevations.
- [0035] FIG. 18 is front view of office chair spine tensioning dual body support base.
- [0036] FIG. 19 side view of alternate spine tensioning dual body support chair
- [0037] FIG. 20 is a perspective view of the apparatus with alternate base for mounting positioning means.
- [0038] FIG. 21 is water application of dual body support VIA floats.
- [0039] FIG. 22 is a side view of alternate user positioning.
- [0040] FIG. 23 is a perspective view of alternate attachment of rod to elongated member with sliceable adjustment.
- [0041] FIG. 24 is a side view of each dual body supports reactive force on a 100-LB. user as body supports rotate and elevation changes occur.
- [0042] FIG. 25 load, shear and moment diagrams, of a simple beam with two supports.
- [0043] FIG. 26 side view with rollers at upper and lower body support
- [0044] FIG. 27 is a side view of alternate rounded pad body supports.
- [0045] FIG. 28 perspective view with rope between upper and lower body support
- [0046] FIG. 29 perspective view of cloth upper and lower body support
- [0047] FIG. 30 perspective view of cloth upper and lower body support suspended via rope.
- [0048] FIG. 31 perspective view of upper and lower body support suspend via metal straps
- [0049] FIG. 32 side view of computer application
- [0050] FIG. 33 side view of computer application in reclined position
- [0051] FIG. 34 side view mattress application
- [0052] FIG. 35 perspective view of alternate base
- [0053] FIG. 36 front view of alternate base
- [0054] FIG. 37 side view of alternate base
- [0055] FIG. 38 side view of alternate base in reclined position
- [0056] FIG. 39 side view of alternate base
- [0057] FIG. 40 side view of alternate base
- [0058] FIG. 41 side view of alternate base in reclined
- [0059] FIG. 42 side view of alternate upper body support
- [0060] FIG. 43 side view of alternate upper body support in hyper extension mode
- [0061] FIG. 44 side view alternate upper body support
- [0062] FIG. 45 front view alternate back support
- [0063] FIG. 46 side view alternate upper back support practiced VIA lower body support
- [0064] FIG. 47 side view alternate upper body support
- [0065] FIG. 48 side view alternate upper body support
- [0066] FIG. 49 side view auto application
- [0067] FIG. 50 respective alternate with rope reversibly connected
- [0068] FIG. 51 side view with upper body support positioned to target L1
- [0069] FIG. 52 side view with upper body support positioned to target L2
- [0070] FIG. 53 side view with upper body support positioned to target L3
- [0071] FIG. 54 perspective with rotating upper body support to target thoracic spine
- [0072] FIG. 55 front view upper body support demonstrating independent or concurrent movement
- [0073] FIG. 56 front view neck support
- [0074] FIG. 57 side view neck support
- [0075] FIG. 58 side view neck support that extends with clockwise movement of upper body support
- [0076] FIG. 59 side view alternate upper or lower body support connection
- [0077] FIG. 60 side view alternate positioning means
- [0078] FIG. 61 section AA of FIG. 60
- [0079] FIG. 62 side view alternate arm support
- [0080] FIG. 63 side view alternate upper and lower body support hangers
- [0081] FIG. 64 side view alternate upper and lower body support for compression
- [0082] FIG. 65 side view alternate upper and lower body support tension

[0083] FIG. 66 side view alternate upper and lower body support rope/rubbers hangers

[0084] FIG. 67 side view alternate lower body support with alternate heel attachment

[0085] FIG. 68 end view of alternate lower body lower body support heel attachment

[0086] FIG. 69 top view alternate upper and lower body support

[0087] FIG. 70 side view alternate upper and lower body support

[0088] FIG. 71 side view with upper body support lower

[0089] FIG. 72 side view lower body support lower

[0090] FIG. 73 side view person face down in apparatus

[0091] FIG. 74 side view upper body support/skeletal force diagram

[0092] FIG. 75 side view upper body support and lower body support with sliceable/adjustable knee to chest movement in compressed position

[0093] FIG. 76 side view upper body support and lower body support in compressed position

[0094] FIG. 77 side view showing upper body support extension/movement

[0095] FIG. 78 side view force diagram and resulting hip elevation force

[0096] FIG. 79 perspective view alternate neck support with hand grips

[0097] FIG. 80 side view bicycle application

[0098] FIG. 81 side view dimensioning of upper and lower body supports separation distance when compared to different size people

[0099] FIG. 82 side view of alternate neck support

[0100] FIG. 83 top view of alternate neck support

[0101] FIG. 84 side view of extremity spine exercising

[0102] FIG. 85 side view of alternate lower body support

[0103] FIG. 86 is A A view of FIG. 85

[0104] FIG. 87 is a contoured upper body support

[0105] FIG. 88 end view of various alternate arm positions

[0106] FIG. 89 perspective view spine exercising with round support holding means

[0107] FIG. 90 detail of pivot locking means

[0108] FIG. 91 side view of supports equipped with retaining straps

[0109] FIG. 92 side view of paddle boat spine exercising application

[0110] FIG. 93 side view of upper body support

[0111] FIG. 94 is a perspective view of another alternative embodiment in which the back support and the leg support are suspended by rope running through pulleys attached to portions of a frame, and in which hand grips are provided above the back support.

[0112] FIG. 95 is the same embodiment as FIG. 94, except with the back support omitted.

[0113] FIG. 96 is a perspective view of the embodiment of FIG. 94, except with a flexible non-stretchable strap (instead of ropes) connecting the back support to the hand grips.

[0114] FIG. 97 is a perspective view of the embodiment of FIG. 95, with a flexible non-stretchable strap mounted between the hand grips.

[0115] FIG. 98 is a perspective view of the embodiment of FIG. 97 showing a user using the flexible strap to support his neck and also using the hand grips.

[0116] FIG. 99 is a perspective view of the embodiment of FIG. 95 except with an alternate leg support for the user's feet of the underside of the user's knees.

[0117] FIG. 100 is a perspective view showing a user employing the embodiment of FIG. 99 for rotational tension along the spine.

[0118] FIG. 101 shows an alternate rigid contoured back support for all of the previous embodiments.

[0119] FIG. 102 is an end view of the user of FIG. 100 using the apparatus of FIG. 99.

[0120] FIG. 103 is a perspective view of neck support with retaining strap

[0121] FIG. 104 side view of upper body support

[0122] FIG. 105 side view of three support mode

[0123] FIG. 106 side view of upper body support positioned to place force on the sacrum for those suffering from spondylolisthesis

[0124] FIG. 107 side view of force above or under for rear end support

[0125] FIG. 108 perspective view of alternate upper body support

[0126] FIG. 109 is a side view of alternate roller to select and set rod to arm location

[0127] FIG. 110 front view of alternate upper body support equipped with hand grips

[0128] FIG. 111 side view FIG. 110

[0129] FIG. 112 shows the natural opposite movements of upper and lower body members when rotating

[0130] FIG. 113 side view of single body support

[0131] FIG. 114 side view of hinged supports

[0132] FIG. 115 side view of FIG. 114 in reclined position

[0133] FIG. 116 side view of turning block applicable to FIG. 109 part 1134

[0134] FIG. 117 is an elderly application that allows for near standing mounting in to instant invention

[0135] FIG. 118 side view of lower body support

#### DETAILED DESCRIPTION OF THE INVENTION

[0136] Referring to FIG. 1, the apparatus comprises a base member 2, consisting of two parallel elongated horizontal

base members, two vertical risers, and a horizontal base member perpendicular to and connecting the two elongated horizontal base members. Body support elevation arms **14**, **14a** are elongated members pivotally mounted to base member **2** via pivot connection **26**. Dual body supports, **18** and **22**, are pivotally mounted to body support elevation arms **14** and **14a** via support rods **32** and **34**. Hand grips **10** and body support elevation limit blocks **24** and **24a** are attached to base member **2**.

[0137] FIG. 2 shows a user in the sitting position. The elevation of body support **18** is higher than body supports **22** creating a chair or seated position. A fixed, stable seat is created when body support elevation arm **14** rests on body support elevation limit block **24**.

[0138] FIG. 3 shows the user in the reclined seated position dual body supports at near equal elevation. A fixed, stable, reclined position is the result of body support elevation arm **14** resting on body support elevation arm limit block **24**. Hand grip **10** enables the user to change from seated to reclined position via a light force. Pivot **26** is placed near center of body support elevation arm **14**, between rods **32**, **34** such that body support elevation arm **14** will rest in either the seated or reclined position.

[0139] FIG. 4 shows the user in a horizontal position body supports near equal in elevation. Body supports **18** and **22**, pivotally mounted to rod **32** and **34**, enable this positioning.

[0140] FIG. 5 shows the user enabled to perform gravity assisted inverted stretch with body supports near equal in elevation. The body mass distributed on the A side of body supports creates this gravity assisted stretch by placing an upward force to the mid section of the body via resulting B pivot force.

[0141] FIG. 6 demonstrates dual body supports, near equal in elevation, user lying face down. The lever arm of users legs L about pivot **32** creates a greater traction force T than is achievable in FIG. 3, user face up. This is because FIG. 3 traction force is not increased via lever arm L of FIG. 6. Additionally, the resulting force T of FIG. 6 is directed to the lumbar portion of the spine where a majority of back discomfort occurs. FIG. 3 on the other hand is gravity induced only.

[0142] FIG. 7 shows body support elevation limit block **24** with its two limits: for sitting, **246**, and for reclining, **244**, that produces a fixed seat position S or fixed reclined position R.

[0143] FIG. 8 shows the upper body connecting block **180**, with travel range created by void **182** that allows support rod **32** to move freely within void **182**. Arm support **184** provides an arm rest that doubles as a means to provide the user a means to counteract the gravity forces that create spine tensioning. Neck rest **186** is pivotal mounted to upper body support VIA pivot **188**. Pivot **188** allows 360 degree movement of neck rest support **186**. Neck rest **186** has the ability to work in combination with armrest support **184** to match the gravity forces generated when the back support is positioned such that traction/gravity is acting on the upper body. All or half or combinations thereof of the gravity forces acting on the upper body may be countered with these supports.

[0144] FIG. 9 teaches another means for establishing fixed elevation relationships between the two body supports via

limit block **264**. This body support elevation relationship block is adjustable through adjustment holes **260** to fix and hold body support elevation arm at any desired body support relationship.

[0145] FIG. 10 shows the connecting block **220** with void **222** that allows rod **34** to move freely within the void.

[0146] FIGS. 11, 13, 15 and 17 show alternate body support elevation relationship varying means. FIG. 11 is a typical stack able chair consisting of a base **2** with four support risers **202**. FIG. 13 is a rocking chair with rounded bottom end **209**. FIG. 15 is a wheelchair. FIG. 17 utilizes ropes supported by rollers above. All above FIGS. 11, 13, 15, 17 utilize dual body supports **18**, **22** and a form of the body support elevation relationship varying means **26** and limit blocks, **246** for sitting, and **244** for reclining.

[0147] FIG. 12 shows an alternate mounting block that has void **182** that allows leg support **22** to rotate in any direction.

[0148] FIG. 14 shows the ranges of motion A and B for either upper body support **18** or lower body support **22**.

[0149] FIG. 16 shows the A and B movements of either upper body support or lower body support in relation to rod **34**.

[0150] FIG. 18 shows an office chair base **2** for mounting dual body support elevation arms **14** via pivots **26**. FIG. 19 shows alternate dual body supports **18** and **22** that are substantially planar with convex cross section.

[0151] FIG. 20 shows an alternate enhanced chair for spine developing, tensioning and development. It comprises a base member **2** that consist of two upside down u shaped members that are interconnected and made stable by members **244** and **246** that also serve as limit blocks **246** and **244**. Positioning means **14** assumes a 90 degree fixed position as opposed to the elongated members **14** of FIG. 1. Upper body support **18** is fixedly mounted to positioning means **14** canceling the need for rods shown in FIG. 1 as does the fixed lower body support **22** cancel the need for rod **34** shown in FIG. 1. Pivot **26** performs the same function as **26** of FIG. 1 allowing the positioning means **14** to assume either a sitting position or a reclined position in FIG. 11. Alternately upper body support and lower body support could be pivotally mounted in the alternate base mode FIG. 20 to provide the same benefits to the user as taught in FIGS. 4 and 5. Benefits to the user in the alternate base mode FIG. 20 are equal to those taught by FIGS. 3 and 4 with fixed upper and lower body supports as shown in FIG. 22. To gain the benefits of this enhanced chair for aiding the spine one sits in the chair and reclines. By reclining the body weight is distributed over two supports. This places the human spine under the same member forces as a simple beam supported by two vertical forces, it produces tension and compression. The human spine is undoubtedly the most important muscle bone structure in the human body. Chiropractic teaches this and anyone realizes the many functions of the spine. Simply supporting the human body in two different places with the only human link between the supports places the spine subject to any number of forces in any number of directions. It is this placing the human spine as the only human link between the two vertical supporting forces that enables one to practice exercise of the spine.

[0152] Referring to FIG. 21, body supports **22** and **18** are shown as floats to be utilized in a pool or body of water to

practice another mode of dual body support spine tensioning. The water **14** acts as the dual body support elevation relationship arms **14** of FIG. 2.

[0153] Referring to FIG. 22, dual body support elevation relationship arm **14** is set with body support **22** higher than body support **18** to facilitate sit ups and alternate directional forces on the spine.

[0154] FIG. 23 teaches slide able mounting of rod **32** to arm **14** of FIG. 1 as a preferred alternate. Position is fixed via pin **160** into holes **162** into arm **14**. This allows for easy adjustment to accommodate the varying user's height as required. A clamp means would also be applicable here. This connection could also be slide able with user in device to create another exercise range for the device.

[0155] FIG. 24 represents the dual body supports weight transfer from one support to the other as rotation and elevation changes occur. The support locations shown in FIG. 24a depicts the full 100 pound user load on the lower support. In FIG. 24b, the user's load is distributed 70/30 and in FIG. 24c it is 50/50. In FIGS. 24d and e, the user's weight continues to transfer until the full user weight is carried by the body support of FIG. 24a that had no load on it. This, in combination with the moment and shear drawings, is what distinguishes this device from a traditional chair. The dual body supports in this invention can take a user from a seated position and place their body subjected to two forces that are spaced apart and create beneficial forces to the skeletal system.

[0156] Referring to FIG. 25, shear and moment diagrams are shown for simple beams with two supports. What is important about these diagrams is the way shear and moment forces change, as a result of supports location change. Body support location changes have similar effect on the user's body and spine. The two supports are created in the Dual Body Support spine-enhancing chair. Varying support locations under a simple beam/user, supported by two supports, creates different shear, moment, compression and tension forces, induced in the supported beam/user. The ability to adjust the dual body supports' horizontal distance from each other, as well as their relative elevation and rotation positioning enables any number of force combinations; compression, tension, shear and moment, to be applied to the spine and skeletal system. This enables the dual body support spine-enhancing chair to increase spinal mobility, flexibility and health through a rotatable dual body support means.

[0157] FIG. 26 demonstrates an alternate leg and back support that consists of rollers **180** which enables a person to roll and receive greater stimulation from the rollers when sitting in this apparatus.

[0158] FIG. 27 is a side view of alternate padded rounded supports.

[0159] FIG. 28 shows another version of the apparatus where part **190** may serve as a limiting device, which may limit the distance between the back support and leg support. Knots or something similar (like rosary beads) will enable the flexible **190** to fix position on the lower body support **22**.

[0160] FIG. 29 shows another alternate means of the chair to where the leg support **22** and the back support **18** consists

of a canvas type of material stretched around the frame **24** and form leg support **204** and back support **208**.

[0161] FIG. 30 shows an alternate means of supporting the leg support and the back support via flexible member **214** that will enable the leg support or the back support move in the various ways shown.

[0162] FIG. 31 is another alternate means of supporting the body supports **22** and **18** via straps **224** that will enable legs support to move in the A B motion or the back support to move in the A B motion.

[0163] FIG. 32 shows another alternate version of the apparatus in the sitting position, back support **18** equipped with a mouse support **238** also shown is a video screen to **234**.

[0164] FIG. 33 the computer version of the apparatus is shown in the reclined position.

[0165] FIG. 34 shows an alternate means for the lower and upper support in which they consist of mattress or cushion **250**.

[0166] FIG. 35 is a perspective view of the apparatus with the leg support **22** and back support **18** are supported by a substantially rectangular members **260**.

[0167] FIG. 36 the front view of the alternate apparatus shown of FIG. 35 is shown with the substantially rectangular base member **260** and back support **18** and leg support **22**. The rectangular members **260** are connected via a horizontal member **260**.

[0168] FIG. 37 is a side view of FIG. 35 in which the pivot for the leg **284** is shown and the pivot for the back **288** is shown connected to the substantial rectangular member **260**.

[0169] FIG. 38 members **284** and **288** the FIG. 37 are shown able to move within slide **294** for the leg and **298** for the back which will enable the apparatus the sitting and reclined position.

[0170] FIG. 39 shows another alternate version of the apparatus which the leg support **22** and back support **18** maybe mounted on the floor.

[0171] FIG. 40 is an exercise apparatus of the device where leg support **22** and back support **18** are connected via semi circular member **314**. This member **314** is a pivot connected to the base member **318** via pivot **322**.

[0172] FIG. 41 shows reclined position.

[0173] Referring to FIG. 42, it has round ridged member **334** under upper body support **18** and lower arm grips **338**.

[0174] Referring to FIG. 43 the reclined position is shown rocking backwards on number **334**.

[0175] FIG. 44 is an alternate means where user is supported only on the upper body support. Pivot **358** may be set and locked for varying pivot positions or alternate pivot ranges.

[0176] FIG. 45 is a front view of back support **18** showing arm supports **184** and notches **364** to enable user's arms to pass by back support **18**.

[0177] FIG. 46 alternate means where back support **18** provides upper body support only. **184** can hold user in position pivot **358** may be rotated or fixed in location.

Positioning arm **14** is connected to said base member **2** via pivot **26** which is fixable or rotated.

[0178] FIG. **47** alternative use is shown, where the user kneels and obtains body support on **2**.

[0179] FIG. **48** alternate means of upper body support **18** where **184** arm supports have hand grips attached whereby user may obtain a varying means of skeletal forces.

[0180] FIG. **49** defines the upper and lower back support in motor vehicle operated mode. Supports **22** and **18** are shown, steering wheel **424** and gas pedal **428** are also shown.

[0181] FIG. **50** another alternate method where rope **434** of FIG. **43** is shown across **442** and **438** so that reverse horizontal variances are created between **18** upper body support and lower body support **22**.

[0182] FIG. **51** shows alternate positioning of upper body support so its force is discontinued at L1 vertebrae creating force directed specifically on L1 vertebrae.

[0183] FIG. **52** upper body support is positioned to create a force change (support vs. no support) directed at the L2 vertebra.

[0184] FIG. **53** upper body support is positioned to create differing forces on the L3 lumbar.

[0185] FIG. **54** rotational movement of upper body support allows user to exercise the thoracic portion of the spine.

[0186] FIG. **55** shows the upper body support **18** able to rotate side to side what is beneficial to the users spine is that neck support **186** may rotate in the same and opposite direction of upper body support **18**, additionally neck support **186** may operate independently of a fixed upper body support **18**.

[0187] Referring to FIG. **56** neck support **186** is shown with pivot **188** that enables neck support **186** to rotate side to side

[0188] Alternate version of neck support **186** is shown in FIG. **57**. It is connected to upper body support **18** via **514** spring or similar means to allow forward backward movement of neck support **186** with resistance.

[0189] FIG. **58** alternate view upper body support **18** is shown where upper body support clockwise rotation creates extension of neck support **186**.

[0190] Referring to FIG. **59** alternate connection of lower support **22** is achieved via ball joint **534** equipped with tensioning screw **538** that locks ball joint **534** or allows its user lower back support position to be subjected to resistance to movement.

[0191] FIG. **60** shows alternate version of positing arms slide **544** enables rod **34** to move within its opening. Pin **552** may limit movement of rod **34** and be adjusted via pin sleeves **548**.

[0192] FIG. **61** is section A-A of FIG. **60**. Rod **34** narrowed at **554** and enlarged at **558** provides slide able attachments of rod **34** to positing arms **14**.

[0193] FIG. **62** displays an alternate version of positioning means **14** with springs **564** incorporated to create a spring like resistance to movement of rod **34**.

[0194] FIGS. **63**, **64**, **65** all displays the same positioning means **14** with flat bar **224**. What is significant is the gravitational effect when the user is supported in these three different figures.

[0195] In FIG. **63** the pivots **228** are directly above leg support **22** and back support **18**.

[0196] In FIG. **64** pivots **228** are extended and create an increased volatile tension on the body due to gravity acting on flat bar **224**, attempting to cause it to hang vertical. The opposite body effect, compression is created when flat bars **224** are moved inwards of FIG. **63**.

[0197] Flat bar **224**'s rotatable connection to positioning means **14** in FIGS. **63**, **64** and **65** allows dynamic movement of lower back support **22** and upper back support **18**.

[0198] In FIG. **66** positioning means **14** has a rope or rubber element **604** connecting to and supporting upper body support **18** and lower back support **22** enabling these body supports any horizontal movement and also with resistance if **604** where rubber or elastic.

[0199] Referring to FIG. **67** foot support **614** is pivotally mounted via pivot **618** to arm **616** that is slide able mounted to lower body support **18** via slide **612**. This enables the user to extend foot support **614** and lock slide **612** so the users heels will rest beyond foot support **614**. Once in **450** this position the user may obtain tension and muscle exercise from neck support **186** continuously down through the body to the ankles. Contracting one ankle cause the other ankle to be extended via pivot **618**.

[0200] Referring to FIG. **68** an alternate version of leg support **614** or FIG. **67** consists of ankle supports **624** that may be tubular in shape and U shaped to receive users heels and fixedly attached to heel rest **614**. Additionally pivots **628** may be utilized to allow foot rotation as shown in the A or B direction.

[0201] Referring to FIG. **69** a plan view is shown of an alternate lower body support **22** and upper body support **18**. Pivots **632** enable substantially planar support members to rotate in clockwise or counterclockwise direction.

[0202] Referring to FIGS. **70**, **71** and **72** the planar upper body support **18** and lower body support **22** are shown at varying elevations to each other by alternating height of pivot **632**.

[0203] Referring to FIG. **73** an alternate use of the instant invention shows the user able to mount the apparatus face down, to reverse the spine stimulation/forces obtained when using the apparatus.

[0204] Referring to FIG. **74** a force diagram displays the counteracting forces to keep the user in a static position. Notable is the neck force N (at one end of the spine) and the lower arm force that is transferred into the upper body support **18**.

[0205] FIG. **75** demonstrates the users ability to perform sit ups via slides **544** of FIG. **60**.

[0206] FIG. **76** demonstrates the users ability to flatten their body into a horizontal plane, hips higher then FIG. **75**.

[0207] FIG. **77** displays the user with hips in a higher position than FIG. **76**; and the ability to further extend upper body support **18** via slide opening **710**. It is the users hip

movement from FIG. 75 to 76 to 77 and back to FIG. 75 that is very therapeutic to the spine.

[0208] Referring to FIG. 78, the user is shown in the apparatus moving in direction A with resulting hip in the C motion. Additionally what is significant in FIG. 78 is back support 18's pivotal motion around pivot 32, such that as the weight increases to the right of pivot 32 an opposite uplifting force occurs to the left of 32 via back support 18.

[0209] Referring to FIG. 79 an alternate neck support 186 is shown with hand grips 730 attached thereto. This enables skeletal forces to be transferring from hand grips 730 through users arms 480 to users spine and thoracic vertebrae.

[0210] Referring to FIG. 80 another alternate means of the invention is shown where the lower body supports 22 are independently mounted to gear driver rods 740, which in turn rotate axle 742 to power wheel 744.

[0211] Referring to FIG. 81, two different height individuals are shown on the upper body support 18 and the lower body support 22. What is significant about the two individuals of daring heights is that no modification is required to upper body support 18 nor lower body support 22. The only difference required to accommodate the individuals height difference is only a greater A dimension for the taller individual.

[0212] Referring to FIG. 82 an alternate version of neck support 186 is shown connected to pivot 188 which allows neck support 186 up and down rotation.

[0213] Referring to FIG. 83 a plan view of neck support 186 is shown whereby pivot 188 allows the user to turn their head side to side. Note that FIG. 82 and FIG. 83 may be combined to produce each affect simultaneously.

[0214] Referring to FIG. 84 the user is shown in a reclined position. What is important is the dimension L over which spine tensioning compression and twisting may occur. It extends from neck support 186 down through heel support 614.

[0215] Referring to FIG. 85 an alternate means of the apparatus is shown. The lower body support 22 and upper body support 18 are positioned to provide an unsupported distance D of FIG. 86. Thus creating an upper body support and lower body support which are connected only by the spine so that independent movements of either body support will be transferred via the spine.

[0216] Referring to FIG. 87 a contoured version of back support is shown. This may be a felt or plastic molded member.

[0217] FIG. 88 displays front view of FIG. 1. Base 2, positioning means 14, pivot 26, lower body rod 34 are shown. What is significant of these three different views is different horizontal plain variances of the upper and lower body supports which enables the user to twist the spine longitudinally along its length promoting spine health through, compression, traction, muscle development and increased blood flow.

[0218] Referring to FIG. 89 an alternate version of the instant invention is shown with tubular round guides slidably connected to lower body rod 34 and upper body rod 32 to enable 360 degree rotation of upper body support 18 and lower body support 22.

[0219] Referring to FIG. 90 alternate pivot 8800 with nut 8840 enables the tensioning of positioning means 14 to be set so that, with a balanced lower body rod 34 and upper body rod 32, the positioning arm 14 will hold user in any position from sitting to reclining and allow changes in rotational position with minimal effort/force on hand grip 10

[0220] Straps 8900 shown in FIG. 91 would be of nylon or similar material to retain user in position while partially or fully inverted.

[0221] Referring to FIG. 94 shown is another alternative embodiment 800 of the present invention. In this embodiment 800, the collapsible frame 810 comprises a leg support frame 820 and a back support frame 850 joined together by a positioning means for positioning the leg support frame 820 and the back support frame 850 appropriately so that a user's posterior will not be supported, preferably a longitudinal member 890. The leg support frame 820 comprises an elevated leg support member 822 joined to vertical leg support legs 824 and 826 by elbow joints 828 and 830. The longitudinal member 890 is joined to the elevated leg support member 822 by a T-joint 832. Two pulleys 834 and 836 are preferably mounted on the elevated leg support member 822, preferably on opposite sides of the T-joint 832, and preferably adjustably spaced apart from each other. A leg support rope 838 preferably is run between the pulleys and preferably V-shaped leg supports 840 and 842 are suspended from the ends of the leg support rope 838 by a triangular trapeze arrangement so that the underside of a user's knees can contact the leg supports 840 and 842. Thus, downward movement of the left leg support will cause equal upward movement of the right leg support and vice versa. The back support frame 850 preferably comprises an elevated back support member 852 joined to two vertical back support legs 854 and 856 by elbow joints 858 and 860. The longitudinal member 890 is preferably joined to the elevated back support member 852 by a T-joint 862. Two pulleys 864 and 866 are preferably mounted on the elevated back support member 852 on opposite sides of the T-joint 862 and adjustably spaced apart from each other. A hand grip rope 868 is preferably run through both pulleys 864 and 866 and hand grips 870 and 872 are preferably suspended from the ends of the hand grip rope 868 by a triangular trapeze arrangement. Thus, downward movement of the left hand grip will cause equal upward movement of the right hand grip and vice versa. Preferably a back support 874 is suspended from the hand grip 870 and 872 by back support ropes 876. Preferably, the elevated leg support member 822, the two vertical leg support legs 824 and 826, the elevated back support member 852, the two vertical back support legs 854 and 856 and the longitudinal member 890 are adjustable in length either through being telescoped or through the use of joints that would allow attachment of the various members and legs to each other at points other than their ends. Preferably also, these members and legs are rigid piping of a material such as metal or plastic and have a circular or square cross-section. Preferably, the leg support ropes 838, hand grip rope 868 and back support ropes 876 all comprises a strong, light, durable rope, such as nylon rope. The pulleys 834, 836, 864 and 866 can be a conventional construction as can the elbow joints 828, 830, 858 and 860 and the T-joints 832 and 862. The hand grips 870 and 872 preferably comprise a cylindrical cushioned material for comfort. With the construction, it can be seen that the device is easy and economical to manufacture, ship and store, and easily

assembled and collapsed by the user. The device also allows the user to turn his body sideways and to create tension along different lines of the body.

[0222] Referring to FIG. 95 shown is still another embodiment 900 identical to the embodiment of FIG. 94 but without the back support ropes or back support.

[0223] Referring to FIG. 96 shown is still another embodiment 920 non-stretching strap 922 is mounted between the hand grips 870 and 872 and the back support 874, instead of the back support ropes 876.

[0224] Referring to FIG. 97 shown is an embodiment 930 identical to the embodiment of FIG. 95, except that a flexible non-stretching strap 932 has been suspended between the hand grips 870 and 872.

[0225] Referring to FIG. 98 shown is the manner in which a user would use the embodiment 930 of FIG. 97 by resting his or her neck on the strap 932 while the user's legs are retained by the leg supports.

[0226] Referring to FIG. 99 shown is an alternative embodiment 940 in which the leg supports are replaced by a leg support bars 942 and 944, preferably of cylindrical cushioned material similar to the hand grips 870 and 872.

[0227] Referring to FIG. 100 shown is a side view of a user using the embodiment 940 and FIG. 99 for rotational spinal tension, with only the hand grips 870 and 872, leg support bars 942 and 944 and ropes 838 and 868 shown for clarity and the user's feet engaged with the leg support bars. Alternatively, the user can engage the leg support bars with his or her knees or other parts of his or her legs.

[0228] Referring to FIG. 101 shown is an alternate rigid contoured back support for use with all the preceding embodiments. Referring to FIG. 102 shown is an end view of the user using the embodiment 940 of FIG. 99. Optionally, for greater strength and stability, additional longitudinal members can be added between the leg support frame 820 and the back support frame 850 of any of the preceding embodiments in order to provide additional bracing. Other additional bracing can be provided, such as anchored wires or additional reinforcing members, attached to various portions of the leg support frame 820, the back support frame 850, or the longitudinal member 890.

[0229] Referring to FIG. 103 neck support 186 is equipped with nylon or similar straps that may be utilized for securing and retaining the users head in the neck support. This increases the amount of tension that may be created from the neck down.

[0230] FIG. 104 shows a upper body support that is connected to pivot 36 to base member 2. This alternate version enables facilitation of spine movement due to the A movement of the user's weight over pivot 36.

[0231] Referring to FIG. 105 an alternate version of the teaching of the instant invention is shown with three independent supports, lower 22, middle 201, and upper 18. These three forces may be applied under the body to create any one of a variety of force, moment and shear forces as 590 indicated in FIG. 25 by adding the third force or support.

[0232] Referring to FIG. 106 the upper body support is positioned to create shear forces on the hips to facilitate spinal movement and correction of individuals who suffer from spondylolisthesis.

[0233] FIG. 107 indicates how the forces of FIG. 106 may be applied, from the bottom Au, from below or above, Afa via ropes or hangers. Dv, shows the distance of the miss aligned spine, that AFu attempts to help correct or assist.

[0234] Referring to FIG. 108 an alternate upper body support is shown. Planar members 1112 are rounded and oblong and connected via clips 1114. These supports 1112 are designed to permit as near complete movement similar to the spine itself, vertebrae by vertebrae. These spine like supports may be supported in any number of ways either from ropes 1110 or from below.

[0235] FIG. 109 shows an alternate of FIG. 112 whereby casing 1120 is adjusted by grip 1130 that rolls in track 1138 along 14 in opening 1142.

[0236] FIGS. 110 and 111 show how the user may practice upper body support only and facilitate the forces on ones body by adding the vertical hand grips 1150 to body support 20 that enable lever arm forces to be generated and transferred to the spine. Additionally important is the pivot forces that may be created about pivot 26. User weight to the left of 26 will cause a raising force to the right of 26. Preferably pivot 26 will be equipped with any number of means available today to create locking and holding of 20 as it rotates degree by degree in the counter clockwise direction. Preferably the pivot 26 would lock after every increasing degree movement in the counterclockwise direction and remain locked until a button or similar switch were activated on the hand grips 1150. This apparatus will allow a user to walk up to it and grab hand grips 1150 and rotate forwards and be retained in the counterclockwise rotation and continue to rock in that direction until their feet or heels became elevated, 26 would lock and the user could practice spine exercise with heels just off the ground so as to create tension along the spine. At which time user is ready hand grips 1150 would have a switch that could be activated which would release 20 to rotate clockwise which would return the user's feet to the ground.

[0237] Referring to FIG. 112 the natural movement of the body is shown when they rotate when sitting. The user's upper rotates right and their lower body moves to the left. The instant invention immolates these natural motion as shown in application of FIG. 88.

[0238] FIG. 113 shows an expanded body support 4 similar to 20 of FIGS. 110 and 111. Pivot 26 preferably has the same rotate and lock increments, as well as releasing ability of FIGS. 110 and 111.

[0239] FIGS. 114 and 115 teach a hinge mounting of body supports. The hinge mounting will not allow the upper body support to rotate any further counterclockwise in FIG. 114 that would allow the user to fall through, yet it allows rotation of upper body support in the clockwise direction, FIG. 115, which benefits the user. Additionally and for the same reasons hinge 1180 is utilized at the lower body support. While it may have hinge pivot in the wrong place in FIG. 114, if it were switched with hinge pivot on other side it could be easily seen how it would provide the similar function of the upper body hinge in FIG. 114, stopping the user from falling through the supports and allowing for rotation in horizontal position.

[0240] Referring to FIG. 117 the arm 14 is positioned near vertical that will allow an older individual easy access as

both upper and lower body supports are in the near vertical plane, like leaning up against the wall. This makes it easier for them to mount the device by eliminating the drop to the sitting position, rather they are taken from a standing position to a sitting or horizontal position by supports **18** and **22** connected to arms **14** to pivot **26** to base member **2**.

[0241] FIG. 118 teaches a seat similar to the lower body support of previous figures. What is important about this lower body support is its ability to function as a resting plane VIA pivot **1240** and pivot limit device **1244**. Yet when user wants to get out of chair they simply rotate forward and pivot **1240** allows lower body support **22** to rotate counter-clockwise yet limit device **1244** will stop clockwise rotation.

What is claimed is:

1) A spine tensioning dual floating body support comprising:

A space between a 1 st and 2nd floating body support,  
said space provides an unsupported midsection of an occupant in said space,  
said space, said 1 st and 2nd floating body supports, aide the spine by and through tension, compression and increased blood flow in addition to providing said occupant the ability for spinal muscle, nerve and soft tissue development and maintenance and,  
increase spinal mobility, flexibility and health of said occupant in said space between said 1st and 2nd floating body supports.

2) A spine tensioning dual floating body support comprising:

A space defined between a 1 st and 2nd floating body support,  
said space provides an unsupported posterior of an occupant in said space, said space, said 1 st and 2nd floating

body supports, aide the spine by and through tension, compression and increased blood flow in addition to providing said occupant the ability, for spinal muscle, nerve and soft tissue development and maintenance and,

increase spinal mobility, flexibility and health of said occupant in said space between said 1 st and 2nd floating body supports.

3) A spine tensioning dual body support comprising:

A space defined between a 1 st and 2nd floating body support,

said space provides an unsupported midsection of an occupant in said space,

A means to rotate said 1 st and 2nd floating body supports,

said space, said 1 st and 2nd floating body supports, aide the spine by and through tension, compression and increased blood flow in addition to providing said occupant the ability for spinal muscle, nerve and soft tissue development and maintenance and,

increase spinal mobility, flexibility and health of said occupant in said space between said 1st and 2nd floating body supports.

4) A spine tensioning dual body float support according to claim 3 wherein:

said floating body supports to move in two orthogonal planes.

5) A spine tensioning dual body float support according to claim 3 wherein:

said space is adjustable.

\* \* \* \* \*