(57) Abstract: The present invention resides in an exercise apparatus for individuals with chronic back pain. The apparatus comprises an elongated base frame (21) that is rectangular in configuration, has a U shaped front portion (40) and a T shaped back portion (8). An inverted Y shaped, lower support shaft having three members (12)/(14) with rectangular configurations, is removably attached to the base frame. An elongated, rectangular shaped upper support shaft (28) attached to an angle adjustment cam (18) is attached to the inverted Y shaped lower support shaft with rotating, and locking means. The upper support shaft contains, near the bottom portion thereof, a restraint stand having foot boards (36), and lower extremity restraint (40). The upper support shaft is hollow on the inside, is sliding connected to a telescoping pelvic restraint stand, which contains hip pads (34), pelvic restraints, and bicycle like handle bars (36) near the top portion thereof. The upper support shaft also contains locking, and stabilizing means for securing the telescoping pelvic restraint stand.
BACKGROUND OF THE INVENTION
1. Field of the Invention

The present invention resides in a Backstrong Lumbar Extension Machine which is a trunk extension exercise device for the human body. It should be noted that the BACKSTRONG LUMBAR EXTENSION MACHINE is a new and improved version of the VARIABLE ANGLE ROMAN CHAIR. The device is especially helpful in alleviating chronic low back pain of individuals suffering from severe disability and deconditioning syndrome.

In the past, devices for exercising individuals suffering from chronic low back pain were stationary at approximately 0° and 45° angles at the restrained pelvic portion of the device. These angles are very difficult for the initial use of such a device by some individuals. Through continued research by the inventors herein, it was determined that by varying the angle of the restrained pelvic portion of this invention from 0° to 75° from horizontal, that a severely disabled individual suffering from chronic low back pain could exercise at a more vertical angle where resistance is lower (i.e. 75°) and progressively move to more difficult angles (i.e. 0°) by virtue of a progressive resistance exercise program utilizing this device.

2. Description of the Prior Art

Numerous exercise devices exist for strengthening the various muscles of the human body. It should be noted, however, that exercises to strengthen a particular group of muscles have limitations because of the various muscle interactions. In particular, exercises for the muscles of the trunk are especially difficult to accomplish because of interaction of the back muscles with other quite powerful muscles, particularly those of the legs. Thus, stabilization of the pelvic region during the exercise is quite important. In particular, stabilization of the pelvis to prevent rotation of said pelvis during an exercise routine is needed to isolate the lumbar
region of the trunk and provide for an acceptable exercise device.

Several devices have been proposed in the past to exercise various muscles on the human body.

For example, U.S. Patent 4,564,193 to Stewart describes an adjustable exercise apparatus which consists of a frame, a base supporting said frame, a cable system, a guide rod supported on said frame and a weight lift slidably along said guide rod and attached to said cable system. Auxiliary apparatus such as a bicycle device, weight bench and trampoline are also disclosed.

U.S. Patent 4,832,336 to Lahman relates to a multi-purpose exercising device which consists of an elongated frame having co-planer top and bottom surfaces and front and rear ends. A pivotally mounted support post is mounted near the rear end of the frame which provides for holding a pad positioned on top of the frame at an elevated angular position or extends from the rear end of the frame. A biceps femoris attachment is detachably mounted on the rear end of the frame. The device is particularly suitable for exercising abdominal muscles which can be converted to a biceps femoris exerciser.

U.S. Patent 4,907,798 to Burchatz describes an exercise machine consisting of a vertically elongated open frame of sufficient height for an average individual to stand inside of it. The frame contains weights, a cable system attached to said weights, a single handle bar or a single foot bar and a bench having a front section joined by a lateral hinge to a rear back rest section.

U.S. Patent 5,042,801 to Sterba, et al. relates to an exercise bench system having a lower bench that rests on a floor and contains a separate upper bench which can be adjusted to three separate positions; namely, (1) collapsed flat on the lower bench, (2) inclined relative to the lower bench and (3) upstanding parallel with the lower bench.

U.S. Patent 5,110,121, to Foster discloses an exercise chair for the lower back. The chair contains both anterior and posterior pelvic restraints to prevent rotation of the pelvic region during an exercise routine. A variable resistance mechanism is inclined on the chair for selectively varying the forces that must be overcome during an exercise movement which consists of forcing the back of the chair rearwardly from an initially forward position.

U.S. Patent 5,160,305 to Lin relates to a multi-functional gym exerciser containing an adjustable table. The apparatus contains a plurality of set holes wherein a user can attach a
variety of exercise attachments. In addition, the table portion of the apparatus can be adjusted to a desired slope in order to achieve the best exercise effect.

U.S. Patent 5,308,306 to Wang describes an abdomen exercising apparatus. The apparatus has a back rest supported on two curved supports at two opposite sides of a base by two cranks and two elastic elements. The elastic elements produce an upward force to help the user set up.

SUMMARY OF THE INVENTION

The present invention resides in an exercise apparatus for individuals with chronic back pain comprising a lower, elongated base frame having a front and back. The elongated base frame is rectangular in configuration and has a U-shaped front portion and a T-shaped back portion.

An elongated, rectangular shaped upper support shaft contains, near the bottom portion thereof, a restraint stand having a foot board or rest and a lower extremity restraint. The lower extremity restraint contains a pair of pads for receiving the lower extremity of an individual. A telescoping pelvic restraint stand is slidably attached to and contained inside the elongated, rectangular shaped upper support shaft by sliding and locking means. The telescoping pelvic restraint stand contains hip pads, pelvic restraints and bicycle like handle bars near the top portion thereof. In combination with each other, the telescoping pelvic restraint stand and elongated, rectangular shaped upper support shaft supports the human body of an individual with chronic back pain.

The elongated, rectangular shaped support shaft contains an angle adjustment cam with locking and stabilizing means. An inverted Y-shaped, lower shaft is movably attached to the base frame near the center portion thereof. The inverted Y-shaped, lower support shaft is hingably attached to the upper rectangular shaped support near the angle adjustment cam.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is more readily described by the following drawings where:

FIG. 1 is a back perspective view of the BACKSTRONG LUMBAR EXTENSION MACHINE (BLEM).
FIG. 2 is a front perspective side view of the BACKSTRONG LUMBAR EXTENSION MACHINE.

FIG. 3 is a back perspective view of the BACKSTRONG LUMBAR EXTENSION MACHINE that has been rotated 180 degrees from the view in FIG. 1.

FIG. 4 is a side perspective view of the BACKSTRONG LUMBAR EXTENSION MACHINE.

FIG. 5 is a side view of the BACKSTRONG LUMBAR EXTENSION MACHINE at a 75 degree angle.

FIG. 6 is a side view of the BACKSTRONG LUMBAR EXTENSION MACHINE at a 60 degree angle.

FIG. 7 is a side view of the BACKSTRONG LUMBAR EXTENSION MACHINE at a 45 degree angle.

FIG. 8 is a side view of the BACKSTRONG LUMBAR EXTENSION MACHINE at a 30 degree angle.

FIG. 9 is yet another side view of BACKSTRONG LUMBAR EXTENSION MACHINE at a 15 degree angle.

FIG. 10 is a side view of the BACKSTRONG LUMBAR EXTENSION MACHINE in the level position.

**DETAILED DESCRIPTION OF THE INVENTION**

The present invention comprises a Backstrong Lumbar Extension Machine exercise device which is especially helpful in alleviating pain experienced by individuals suffering from chronic
low back pain, due to severe lumbar dysfunction and deconditioning syndrome. The device is a trunk extension exercise device for the human body. The Backstrong Lumbar Extension Machine is herein referred to as the BLEM. It is to be noted that the BACKSTRONG LUMBAR EXTENSION MACHINE is a new and improved version of the VARIABLE ANGLE ROMAN CHAIR.

With reference now to the drawings, FIG’s (1 to 4) depict the BLEM (2) herein which shows a bottom rectangular-shaped elongated, support base frame (4) having a U-shaped (6) front portion and a T-shaped (8) back portion. The construction of the base frame eliminates the need for additional stabilizers to prevent the BLEM from tipping over in use.

An inverted Y-shaped, lower support shaft (10) is removably attached to lower base support frame (4) using screw threads and nuts (9A and 9B). Inverted Y-shaped, lower shaft (10) is rectangular in configuration and contains two outer members (14A and 14B) and center member (12) which is attached at an angle to the two outer members (14A and 14B) at approximately one third (1/3) distance from the top portion of said inverted, Y-shaped lower support member (10). All three members of the inverted, Y-shaped lower support (10) attaches to bottom support base frame (4) near the bottom portion thereof.

An elongated, rectangular shaped upper support shaft (28) contains a lower T-shaped, portion (38). Foot stands (36A and 36B) are attached to lower T-shaped, portion (38) and support the feet of an individual utilizing the BLEM. An upward projecting, rectangular shaped shaft (44) is attached to lower T-shaped portion (38) of support shaft (28) and contains two lower extremity restraints (40A and 40B). Lower extremity restraints (40A and 40B) are cylindrical in configuration with padded surface area and are designed to fit behind the ankles or the back portion of the lower extremity of an individual.

Upper support shaft (28) is hollow and has an opening (42) near the top portion thereof. A rectangular shaped, telescoping pelvic restraint (26) is slidably attached and fits into the opening (42) of upper support shaft (28). The telescoping pelvic restraint stand (26) has a series of spaced holes (30) drilled into the side portion thereof. The upper support stand (28) contains spring loaded pull pin (24) on one side and a torsion or tighten down knob on the other side. Telescoping pelvic restraint (26) is slidably adjusted to the proper height for the individual using the BLEM and the spring loaded pull pin (24) is released where the pin (24) penetrates the
desired hole (30) in the telescoping pelvic restraint stand (26) thus immobilizing it. The tighten down knob is located on the other side of the upper support shaft (28) and is tightened, applying pressure on pelvic restraint stand (26) thus stabilizing it. Telescoping pelvic restraint stand (26) contains support (32) for two hip pads (34A and 34B) near the top portion thereof. The upper portion of telescoping pelvic restraint stand (26) contains a handle bar shaped extension (36) which additionally contains two pelvic restraint pads (38A and 38B) and handle bar grips (40A and 40B). It should be noted that pelvic restraint pads (38A and 38B) are cylindrical in configuration.

Angle adjustment cam (16) is permanently attached to the bottom of upper support shaft (28) near the top portion thereof, angle adjustment cam (16) is semi-circular in configuration and has holes (20) drilled through the outer portion thereof at 15 degree increments. The angle adjustment cam (16) which is permanently attached to upper support shaft (28) for example by welding, is rotatably attached to the inverted Y-shaped lower support shaft (10) by a cold roll cylindrical shaft or axle (22) which contains bronze oil light T-flange bushings on both ends. The T-flange bushings fit around the ends of the cylindrical shaft (22) and are held in place by button head screws which are screwed into the ends of said axle. Angle adjustment cam (16) fits between the upper portion of the two outer members (14A and 14B) of Y-shaped support shaft (10).

Matching holes are drilled into each of the outer members (14A and 14B) of the inverted Y-shaped, lower shaft (10) near the top portion thereof. The holes are adapted to receive a spring loaded pull pin (18). The holes of the two members (14A and 14B) of the lower shaft (10) are constructed to align with the holes of the angle adjustment cam (16). The angle of the upper support shaft is adjusted by rotating the upper shaft (28), including the angle adjustment cam (16) on the cylindrical shaft (22) and stopping at the desired angle represented by holes (18) drilled into said adjustment cam (16) at 15 degree increments. A spring loaded pull pin (18) attached to one of the two members (14A and 14B) of the lower shaft (10) secures the upper support shaft (28) at the desired angle by pulling the pin (18) out, rotating the cam (16) to the desired angle, releasing the pull pin (18) thus allowing it to pass through the desired hole (20) in the angle adjustment cam (16) and the hole in the other outer support members (14A and 14B), thus securing the upper shaft at the desired angle.
In use position, an individual substantially as shown in FIG.s 1 to 4, stands on the foot rest (36A and 36B) of the BLEM (2), rests his hips and pelvic on the hip pads (34A and 34B) and pelvic restraint pads, places the heels of his feet against the lower extremity restraint (40A and 40B) and begins his exercise routine. The upper support frame (28), including the telescoping pelvic restraint stand (26), can be adjusted from angles of zero degrees (0°) to seventy five degrees (75°) as measured from a horizontal plane.

FIG.'s 5 to 10 show the BLEM (2) at angles from approximately level to about 75 degrees in 15 degree intervals from a horizontal plane.

It should be noted that many modifications and variations to this invention may be made without departing from the spirit and scope thereof and therefore only such limitations should be made as indicated by the appended claims.
We Claim

Claim 1. A Backstrong Lumbar Extension Machine which comprises a bottom, elongated base frame having a U-shaped front portion and a T-shaped back portion, an inverted Y-shaped, lower support shaft that is removably attached to the elongated base frame, an upper support shaft containing an angle adjustment cam is attached to the inverted Y-shaped lower shaft with rotation and locking means, and a telescoping pelvic restraint stand with locking and stabilizing means is slidably attached to the upper support shaft.

Claim 2. The Backstrong Lumbar Extension Machine of Claim 1, wherein the elongated base frame and the inverted Y-shaped lower shaft are rectangular in configuration and the base frame has two spaced apart holes therein for attachment of the inverted Y-shaped lower shaft thereto.

Claim 3. The Backstrong Lumbar Extension Machine of Claim 1, wherein the upper support shaft is rectangular in configuration and contains foot rests and lower extremity restraints near the bottom portion thereof.

Claim 4. The Backstrong Lumbar Extension Machine of Claim 1 wherein the upper support shaft is hollow on the inside and contains an opening near the top portion thereof.

Claim 5. The Backstrong Lumbar Extension Machine according to Claim 1, wherein the telescoping pelvic restraint stand is rectangular in configuration and contains a plurality of spaced holes along the side of said stand.

Claim 6. The Backstrong Lumbar Extension Machine in accordance with Claim 1, wherein the telescoping pelvic restraint contains two hip pads and bicycle like handle bars which contain two pelvic restrains connected to the bicycle like handle bars.

Claim 7. The Backstrong Lumbar Extension Machine of Claim 6, wherein the two hip pads,
bicycle like handle bars and pelvic restraints are located near the top portion of the telescoping pelvic restraint stand.

Claim 8. The Backstrong Lumbar Extension Machine of Claim 5, wherein the telescoping pelvic restraint stand is slidably attached to the upper support shaft using a spring loaded pull pin which fits into one of the spaced holes therein.

Claim 9. The Backstrong Lumbar Extension Machine of Claim 1, including a tighten down torsion knob located on the upper support shaft which exerts pressure on the telescoping pelvic restraint stand.

Claim 10. The Backstrong Lumbar Extension Machine of Claim 1, wherein the angle adjustment cam is rotatably attached to the top portion of the inverted Y-shaped, lower shaft by a cold roll cylindrical shaft (axle) which contains bronze oil light T-flange bushings on both ends.

Claim 11. The Backstrong Lumbar Extension machine of Claim 10, wherein the angle adjustment cam contains holes drilled therethrough at 15 degree angles.

Claim 12. The Backstrong Lumbar Extension Machine of Claim 1, wherein the inverted Y-shaped lower support shaft contains two outer members attached to an inner member.

Claim 13. The Backstrong Lumbar Extension Machine of Claim 12 wherein the two outer members of the inverted Y-shaped lower support stand contains matching holes drilled into the upper portion of the outer members.

Claim 14. The Backstrong Lumbar Extension Machine of Claim 11, wherein the locking means for the angle adjustment cam comprises a spring loaded pull pin that is attached to the upper portion of the inverted Y-shaped lower support stand and passes through one of the holes contained in said angle adjustment cam.
Claim 15. The Backstrong Lumbar Extension Machine of Claim 1, wherein the angle adjustment cam contains a rectangular shaped stop located near the open end portion of said cam to prevent the upper support shaft from extending past a level position at a negative angle.
**INTERNATIONAL SEARCH REPORT**

**International application No.**
PCT/US99/25006

**A. CLASSIFICATION OF SUBJECT MATTER**

| IPC(6) | A63B 23/02 |
| US CL | 482/142-144 |

According to International Patent Classification (IPC) or to both national classification and IPC.

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

| U.S. | 482/142-145, 907; 601/24 |

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched.

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US 5,967,956 A (TEETER) 19 October 1999, entire document.</td>
<td>1-15</td>
</tr>
<tr>
<td>A</td>
<td>US 4,502,682 A (MILLER) 05 March 1985, Fig. 1.</td>
<td>1-15</td>
</tr>
<tr>
<td>A</td>
<td>US 4,867,143 A (MORIN) 19 September 1989,</td>
<td>1-15</td>
</tr>
<tr>
<td>A</td>
<td>US 5,575,745 A (LIN) 19 November 1996.</td>
<td>1-15</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C.

See patent family annex.

---

* Special categories of cited documents:
  - "A" document defining the general state of the art which is not considered to be of particular relevance
  - "E" earlier document published on or after the international filing date
  - "L" document which may throw doubts on priority claimed or which is cited to establish the publication date of another citation or other special reason (as specified)
  - "O" document referring to an oral disclosure, use, exhibition or other means
  - "P" document published prior to the international filing date but later than the priority date claimed
  - "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand art, principle or theory underlying the invention
  - "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
  - "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
  - "&" document member of the same patent family

Date of the actual completion of the international search: 21 DECEMBER 1999

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231
Facsimile No. 703 305-3230

Authorized officer: JEROME DONELLY

Date of mailing of the international search report: 10 FEB 2000

Telephone No. 703 308-2668

Form PCT/ISA/210 (second sheet)(July 1992)*