Further, a gyroscope (140) mechanically coupled to the brake cables rotates with the brake cables and prevents the brake cables from twisting.
WEIGHT TRAINING DEVICE

TECHNICAL FIELD

[0001] The embodiments herein relate generally to devices used in exercise, and particularly in weight training.

BACKGROUND ART

[0002] Prior to the disclosed invention there was a substantial risk of injury using free weights due to the possibility that errant movement of either the user or the equipment would cause an injury. Prior art solutions to the problem have limitations either from a range of motion standpoint, meaning they only allow the user to move the bar up and down, front to back or side to side. Also, the user is limited in the exercises one can perform like the inability to do Olympic lifts. Lastly, the area that one must dedicate to performing Olympic lifts is generally occupied by a weight rack and a platform where the Olympic lifts are done, which take up a lot of space. Embodiments of the present invention solve all of these problems.

DISCLOSURE OF THE INVENTION

[0003] A weight training device is configured to allow horizontal, vertical and rotational movement while ensuring safety. The weight training device comprises a barbell that is immediately adjacent to two swivel bearing assemblies. The barbell is configured to slide through the two swivel bearing assemblies. A horizontal guide bar is immediately adjacent to each swivel bearing assembly. Each swivel bearing assembly is configured to slide along its horizontal guide bar. At least four vertical guide assemblies are mechanically coupled to each end of each horizontal guide bar. Each vertical guide assembly is configured to slide vertically along its vertical guide bar. At least two brakes mechanically coupled to the barbell and further mechanically coupled to two of the vertical guide assemblies. A cross bar is mechanically coupled to the barbell wherein rotating the barbell rotates the cross bar until the cross bar makes contact with one of the at least two brakes. The barbell is configured to allow the horizontal, the vertical and the rotational movement and further configured to stop upon release of the at least two brakes in order to permit Olympic lifting while ensuring
safety. In some embodiments, a first inner lower brake cable and a first inner upper brake
cable mechanically coupled to one of the at least two brakes.

[0004] A gyroscope can be mechanically coupled to the barbell, the first inner
lower brake cable and the first inner upper brake cable. A first outer lower brake cable and a
first outer upper brake cable can be mechanically coupled to the gyroscope.

[0005] The gyroscope can include a lower plate. A lower gyroscope can be
mechanically coupled to the lower plate. A central plate can be mechanically coupled to the
lower plate. An upper plate can be mechanically coupled to the central plate. An upper ring
can be fit within the upper plate. The upper ring causes the upper plate to rotate relative to
the lower plate.

[0006] In some embodiments, an upper threaded member, mechanically coupled
to the lower plate and the central plate. A lower threaded member can be mechanically
coupled to the lower plate and the central plate. A first upper string and a second upper
string, mechanically coupled to the central plate and the upper plate.

BRIEF DESCRIPTION OF THE FIGURES

[0001] The detailed description of some embodiments of the invention is made
below with reference to the accompanying figures, wherein like numerals represent
corresponding parts of the figures.

[0002] Figure 1 is a perspective view of an embodiment of the invention.

[0003] Figure 2 is a perspective view of an embodiment of the invention
intentionally illustrated without the frame or the brake mechanism cable for illustrative clarity
and demonstrating vertical translation of the barbell and associated components.

[0004] Figure 3 is a detail perspective view of an embodiment of the invention
demonstrating vertical translation of the vertical guide bar linear bearing and associated
components along the vertical guide bar.

[0005] Figure 4 is a perspective view of an embodiment of the invention
intentionally illustrated without the frame or the brake mechanism cable for illustrative clarity
and demonstrating rotational translation of the barbell and associated components.

[0006] Figure 5 is a detail perspective view of an embodiment of the invention
demonstrating the horizontal guide bar and associated components.

[0007] Figure 6 is a perspective view of an embodiment of the swivel bearing
assembly.
Figure 7 is section detail view of an embodiment of the invention along line 7-7 in Figure 1 demonstrated with the pop pin engaged.

Figure 8 is section detail view of an embodiment of the invention demonstrated with the pop pin disengaged.

Figure 9 is section detail view of an embodiment of the invention along line 9-9 in Figure 1 demonstrated with the pop pin engaged.

Figure 10 is section detail view of an embodiment of the invention demonstrated with the pop pin disengaged.

Figure 11 is a perspective view of an embodiment of the invention in use.

Figure 12 is a perspective view of an embodiment of the invention in use.

Figure 13 is a front perspective view of an embodiment of the invention.

Figure 14 is a front perspective view of an embodiment of the invention.

Figure 15 is a partial front perspective view of an embodiment of the invention.

Figure 16 is an explosion view of gyroscope 140.

**BEST MODE OF THE INVENTION**

By way of example, and referring to Figure 1, one embodiment of the improved weight training device comprises barbell 10. Barbell 10 is immediately adjacent to first swivel bearing assembly 12 and second swivel bearing assembly 12. Barbell 10 is further connected to first brake 16 and second brake 16. First swivel bearing assembly 12 is immediately adjacent to first horizontal guide bar 18. Likewise, second swivel bearing assembly 12 is immediately adjacent to second horizontal guide bar 18. First horizontal guide bar 18 is further mechanically coupled to first vertical guide assembly 14 and third vertical guide assembly 14. Additionally, first vertical guide assembly 14 is connected to first brake 16 with brake line 32. Likewise, third vertical guide assembly 14 is connected to first brake 16 with brake line 32.

First vertical guide assembly 14 is immediately adjacent to and configured to travel along first vertical guide bar 20. While first vertical guide assembly 14 travels along first vertical guide bar 20, first vertical guide assembly 14 is immediately adjacent to first brake plate 22, which is perforated with a plurality of first brake plate holes 24.

Likewise, third vertical guide assembly 14 is immediately adjacent to and configured to travel along third vertical guide bar 20. While third vertical guide assembly 14
travels along third vertical guide bar 20, third vertical guide assembly 14 is immediately adjacent to third brake plate 22, which is perforated with a plurality of third brake plate holes 24.

[0021] Similarly, second horizontal guide bar 18 is further mechanically coupled to second vertical guide assembly 14 and fourth vertical guide assembly 14. Second vertical guide assembly 14 is connected to second brake 16 with brake line 32. Likewise, fourth vertical guide assembly 14 is connected to second brake 16 with brake line 32.

[0022] Second vertical guide assembly 14 is immediately adjacent to and configured to travel along second vertical guide bar 20. While second vertical guide assembly 14 travels along second vertical guide bar 20, second vertical guide assembly 14 is immediately adjacent to second brake plate 22, which is perforated with a plurality of second brake plate holes 24.

[0023] Additionally, fourth vertical guide assembly 14 is immediately adjacent to and configured to travel along fourth vertical guide bar 20. While fourth vertical guide assembly 14 travels along fourth vertical guide bar 20, fourth vertical guide assembly 14 is immediately adjacent to fourth brake plate 22, which is perforated with a plurality of fourth brake plate holes 24.

[0024] Second brake plate 22, first brake plate 22, fourth brake plate 22 and third brake plate 22 are mechanically coupled to enclosure 26, which contains eleven members connected to form a hollow parallelepiped with an open front. In some embodiments, a plurality of pulleys 34 can be used to raise and lower enclosure 26 with lines as desired by a user making the enclosure portable and space saving. In some embodiments weights 30 are on barbell 10, but that is not required for operation. Within the enclosed there are at least four vertical guide assemblies (indicated above).

[0025] Turning to Figure 2, Figure 3, Figure 4, Figure 5 and Figure 6, each swivel bearing assembly 12 comprises counterweight with D-Ring 44 connected through an aperture in barbell guide bushing 46. Barbell guide bushing 46 is configured to accommodate barbell 10. Barbell guide bushing 46 is mechanically coupled to horizontal guide bushing 48 with swivel bearing 50. Horizontal guide bushing 48 is configured to accommodate horizontal guide bar 18.

[0026] Each vertical guide assembly 14 is connected to an end of the barbell. Each vertical guide assembly 14 comprises vertical guide chassis 36 mechanically coupled to vertical guide bearing 38. Vertical guide bearing 38 is configured to accommodate vertical guide bar 20. Brake line 32 is mechanically coupled to pop pin 40 which comprises a D-Ring
surrounding vertical guide bar 20. When brake 16 is squeezed brake line 32 retracts (as shown in Figure 8 and Figure 10) which pulls pop pin 40 from through brake plate hole 24 and from brake plate 22.

[0027] When brakes 16 are squeezed, that is released, then vertical guide assemblies 14 can slide along their respective vertical guide bars 18 as shown in Figure 2. Swivel bearing 50 is configured to permit swivel bearing assembly 12 to slide along horizontal guide bar 14 as shown in Figure 3. Likewise, due to vertical guide bearing 38, one set of vertical guide assemblies 14 can be lifted above or below another set of vertical guide assemblies 14 as shown in Figure 4.

[0028] Thus, barbell 10 can move horizontally, vertically and rotationally. This permits a full range of movement that is necessary for Olympic lifts. Additionally, if a user fails in a lift the user can simply release at least two brakes 16 and pop pins 40 will enter brake plate holes 24 in brake plates 22 causing barbell 10 to immediately stop moving and prevent an injury.

[0029] Additionally, a user can complete lifts known as "true explosive" lifts such as jump squats, snatch throws, push press throws, bench press throws, and so on. In these true explosive lifts, barbell 10 is released by the user at the top of the lift. It is safer than ever to do those types of lifts because, as soon as the user lets go of barbell 10 and brakes 16, brakes 16 will activate and barbell 10 will come to a complete stop. Thus, saving the user from having to take on the excessive and potentially harmful fall of the load of weight 30 and barbell 10.

[0030] Turning to Figure 11, Figure 12, Figure 13 and Figure 14 barbell 10 is immediately adjacent to first swivel bearing assembly 112 and second swivel bearing assembly 112. Barbell 110 is further connected to first brake 116 and second brake 116. First swivel bearing assembly 112 is immediately adjacent to first horizontal guide bar 118. Likewise, second swivel bearing assembly 112 is immediately adjacent to second horizontal guide bar 118. First brake 116 is mechanically coupled to first brake handle 126 with first inner lower brake cable 128A and first inner upper brake cable 128B.

[0031] The difficulty with the truly explosive lift is the propensity to turn barbell 110 such that first inner lower brake cable 128A and first inner upper brake cable 128B become tangled around barbell 110. There are two improvements shown in Figure 15 to resolve this. First, cross bar 130 is mechanically coupled to barbell 110 such that cross bar 130 can rotate into but not through first brake 116. This permits barbell 110 to rotate 300 degrees in either direction around first brake 116. Second, barbell 110 is mechanically
coupled to gyroscope 140. Gyroscope 140 operates to spin in order to prevent tangling of first inner lower brake cable 128A and first inner upper brake cable 128B around barbell 110.

[0032] Gyroscope 140 is shown in more detail in Figure 16. Gyroscope 140 further comprises lower plate 142 mechanically coupled to upper threaded member 144A and lower threaded member 144B. Lower plate 142 is further mechanically coupled to lower gyroscope 146. Upper threaded member 144A is mechanically coupled to central plate 148 with upper fastener 150A. Likewise, lower threaded member 144B is mechanically coupled to central plate 148 with lower fastener 150B. Central plate 148 is mechanically coupled to upper plate 152 with first upper string 154A and second upper string 154B. Upper plate 152 is mechanically coupled to upper ring 156 which operates to cause upper plate 152 to rotate relative lower plate 142, but to have a steady state substantially as shown. First inner lower brake cable 128A and first inner upper brake cable 128B are mechanically coupled to upper plate 152. First outer lower brake cable 128C and first outer upper brake cable 128D are mechanically coupled to upper plate 152. First outer lower brake cable 128C and first outer upper brake cable 128D are further mechanically coupled to anything that does not rotate. This creates a torsion force to keep the system in equilibrium.

[0033] Persons of ordinary skill in the art may appreciate that numerous design configurations may be possible to enjoy the functional benefits of the inventive systems. Thus, given the wide variety of configurations and arrangements of embodiments of the present invention the scope of the invention is reflected by the breadth of the claims below rather than narrowed by the embodiments described above.

**INDUSTRIAL APPLICABILITY**

[0034] Embodiments of the disclosed invention are useful for weight training. In particular, embodiments of the disclosed invention are useful for ensuring brake cables do not wrap around a barbell.
WHAT IS CLAIMED IS:

1. An weight training device, configured to allow horizontal, vertical and rotational movement while ensuring safety; the weight training device comprising:
   - a barbell, immediately adjacent to two swivel bearing assemblies; wherein the barbell is configured to slide through the two swivel bearing assemblies;
   - a horizontal guide bar, immediately adjacent to each swivel bearing assembly; wherein each swivel bearing assembly is configured to slide along its horizontal guide bar;
   - at least four vertical guide assemblies; wherein a vertical guide assembly is mechanically coupled to each end of each horizontal guide bar; wherein each vertical guide assembly is configured to slide vertically along its vertical guide bar;
   - at least two brakes; wherein each brake mechanically coupled to the barbell and further mechanically coupled to two of the vertical guide assemblies;
   - a cross bar mechanically coupled to the barbell wherein rotating the barbell rotates the cross bar until the cross bar makes contact with one of the at least two brakes;
   wherein the barbell is configured to allow the horizontal, the vertical and the rotational movement and further configured to stop upon release of the at least two brakes in order to permit Olympic lifting while ensuring safety.

2. The weight training device of Claim 1, further comprising a first inner lower brake cable and a first inner upper brake cable mechanically coupled to one of the at least two brakes.

3. The weight training device of Claim 2, further comprising a gyroscope mechanically coupled to the barbell, the first inner lower brake cable and the first inner upper brake cable.

4. The weight training device of Claim 3, further comprising a first outer lower brake cable and a first outer upper brake cable mechanically coupled to the gyroscope.

5. The weight training device of Claim 4, wherein the gyroscope further comprises:
   - a lower plate;
   - a lower gyroscope, mechanically coupled to the lower plate;
   - a central plate, mechanically coupled to the lower plate;
   - an upper plate, mechanically coupled to the central plate;
an upper ring, fit within the upper plate; wherein the upper ring causes the upper plate to rotate relative to the lower plate.

6. The weight training device of Claim 5, further comprising
   an upper threaded member, mechanically coupled to the lower plate and the central plate;
   a lower threaded member, mechanically coupled to the lower plate and the central plate;
   a first upper string and a second upper string, mechanically coupled to the central plate and the upper plate.
A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A63B 21/078 (2015.01)
CPC - A63B 21/078 (2015.04)

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)
IPC(8) - A63B 21/00, 21/06, 21/062, 21/072, 21/078, 21/16, 23/00, 26/00 (2015.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 108/134; 482/94, 98, 104, 142, 908

Electronic database consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, Google Patents, Google.
Search terms used: cross bar, crossbar, barbell latch, smith machine, weightlifting gyroscope, safety system, brake wire, smith press, rotate to latch

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 2006/0122042 A1 (LUNDAHL) 08 June 2006 (08.06.2006) entire document</td>
<td>1-6</td>
</tr>
</tbody>
</table>

* Further documents are listed in the continuation of Box C.

Date of the actual completion of the international search
08 April 2015

Date of mailing of the international search report
08 MAY 2075

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