In one embodiment, an exercise apparatus includes a gas spring, first and second proximate uprights, as well as first and second distal uprights. First and second safety bars extend between and are connected respectively to the first proximate and distal uprights and to the second proximate and distal uprights. An elongated platform or bench is disposed above an elongated base and includes a seat portion rotatably connected to a back portion. The gas spring has a lower end pivotally mounted on the elongated base and an upper end adapted for attachment to each of a plurality of attachment locations located on the back portion of the elongated platform. An actuator is operably coupled to the gas spring and adapted to cause the gas spring to move from an extended position to a retracted position thereby lowering or retracting the back portion of the elongated platform.
FIG. 3f
FIG. 9a
EXERCISE EQUIPMENT SAFETY APPARATUSES

1. FIELD OF INVENTION

This relates to exercise equipment in the nature of weight lifting devices. More specifically, this relates to safety devices for use while lifting freeweights.

2. BACKGROUND

Freeweight barbells are exercise devices that are popular for use in weight training or other exercise programs. However there is the danger that during an exercise session with such a barbell, a user may sustain an injury while holding the barbell or may become too fatigued to safely continue holding the barbell. Because the barbell is a freeweight exercise device, such an injured or fatigued user may be endangered while holding a heavy barbell. In such a condition the user may not be physically able to return the barbell to its starting position bracket on a rack or to a safe location on the ground without incurring further injury.

Accordingly there is a need for improved exercise equipment that includes safety-related features to help overcome some of these dangers that are associated with the use of freeweight barbells.

SUMMARY OF THE ILLUSTRATED EMBODIMENTS

Various exercise apparatuses for use with freeweight barbells are provided. Through the use actuators that can be operated by a user while he/she is exercising, the apparatuses can be caused to move to a safety position or to release secondary weights. Thus the user can more easily place the barbell in a safe location or more easily control the weight of the barbell.

In one aspect, an exercise apparatus comprises a retractable device, first and second proximate uprights, as well as first and second distal uprights. The retractable device is a hydraulic jack, a pneumatic jack or a gas spring. A first safety bar extends between and is connected to the first proximate upright and the first distal upright, and can be positioned in a plurality of elevations. A second safety bar similarly extends between and is connected to the second proximate upright and the second distal upright, and can be positioned in a plurality of elevations.

An elongated base is disposed generally adjacent to the first and second distal uprights. A base support extends generally upward from the elongated base. An elongated platform or bench is located above the elongated base and includes a seat portion rotatably connected to a back portion. The seat portion of the platform is supported by the base support. The back portion of the platform has a plurality of attachment locations disposed in a generally longitudinal orientation.

The retractable device has an extended position and a retracted position. It further has a lower device end pivotally mounted on the elongated base and an upper device end adapted for attachment to each of the plurality of attachment locations of the back portion of the platform. An actuator is operably connected to the retractable device and adapted to cause the retractable device to move from the extended position to the retracted position thereby lowering or retracting the back portion of the platform. A user can then rest a barbell on the first and second safety bars.

In another aspect, an exercise apparatus comprises an elongated platform or bench having a proximate platform end and a distal platform end. A platform support extends generally downward from the distal platform end and is rotatably attached to the distal platform end thereby permitting the proximate platform end to rotate between a first platform position and a second platform position. A retractable device (such as a hydraulic jack, a pneumatic jack or a gas spring) is disposed generally below and abuts the platform. The platform is in the first platform position when the retractable device is in an extended position and in the second platform position when the retractable device is in a retracted position. An actuator is operably connected to the retractable device and can cause it to move from the extended position to the retracted position.

The exercise apparatus further includes first and second proximate uprights, and first and second distal uprights. First and second pulleys are rotatably attached to the first and second proximate uprights, respectively. A first cable has a distal end, a proximate end and a middle portion. The distal end of the first cable is connected to the first distal upright, the proximate end is connected to the proximate platform end, and the middle portion is movably supported by the first pulley. A second cable is similarly connected second proximate upright, the proximate platform end and supported by a second pulley. The first and second cables each are in a generally slack condition when the proximate platform end is in the first platform position and in a generally taut condition when the proximate platform end is in the second platform position. A user can then rest a barbell on the first and second cables when the platform end is in the second platform position and the cables are in the generally taut condition.

In an alternative embodiment, an exercise apparatus comprises a first upright and a second upright. A first support bar is rotatably connected to the first upright and extends generally laterally away from the first upright. Similarly, a second support bar is rotatably connected to the second upright and extends generally laterally away from the second upright. The first and second support bars each are adapted to rotate between a first bar position and a second bar position. The first bar position is generally normal to an imaginary plane defined by the first and second uprights. The second bar position is at an angle in an outward direction from the first bar position by an amount between about 45° to about 270°.

A first bias element, such as for example a spring, couples the first support bar with the first upright and can move the first support bar from the second bar position to the first bar position. Similarly, a second bias element couples the second support bar with the second upright and can move the second support bar from the second bar position to the first bar position. An actuator is operably coupled to the first and second bias elements and can cause them to move the first and second support bars from the second bar position to the first bar position. A user can then rest a barbell on the first and second support bars when they each are in the first bar position.

In another aspect, an exercise apparatus is for use with a barbell having a plurality of primary weights and having one or more secondary weights. The exercise apparatus comprises a release mechanism and a housing attached to the barbell. At least a portion of the release mechanism is disposed within the housing. The release mechanism is adapted to receive a signal and to move from a first mecha-
nism position to a second mechanism position upon receipt of the signal. An actuator can transmit the signal for receipt by the release mechanism. The secondary weight is releasably coupled to the release mechanism if the release mechanism is in the first mechanism position. The release mechanism can release the secondary weight when the release mechanism moves from the first mechanism position to the second mechanism position. Thus the overall weight of the barbell can be significantly reduced during an exercise session for easier handling by a user.

[0013] There are additional aspects to the present inventions. It should therefore be understood that the preceding is merely a brief summary of some embodiments and aspects of the present inventions. Additional embodiments and aspects are referenced below. It should further be understood that numerous changes to the disclosed embodiments can be made without departing from the spirit or scope of the inventions. The preceding summary therefore is not meant to limit the scope of the inventions. Rather, the scope of the inventions is to be determined by appended claims and their equivalents.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] These and/or other aspects and advantages of the present invention will become apparent and more readily appreciated from the following description of certain embodiments, taken in conjunction with the accompanying drawings of which:

[0015] FIG. 1a is a side elevation view of an exercise bench assembly according to the embodiment of the invention;
[0016] FIG. 1b is a front elevation view of the exercise bench assembly of FIG. 1a;
[0017] FIGS. 1c and 1d are side elevation views of the exercise bench assembly of FIG. 1a wherein the bench back portion is in different orientations;
[0018] FIG. 2 is an elevation view of an exercise apparatus in accordance with another embodiment of the invention;
[0019] FIG. 3a is a perspective view of an exercise apparatus in accordance with another embodiment of the invention;
[0020] FIGS. 3b and 3c are side elevation views of another embodiment of a mechanism for holding a safety bar in position;
[0021] FIG. 3d is a side elevation view of another embodiment of a mechanism for holding a safety bar in position;
[0022] FIG. 3e is a side elevation view of another embodiment of a mechanism for holding a safety bar in position;
[0023] FIG. 3f is a rear elevation view of the mechanism of FIG. 3e;
[0024] FIG. 4 is a side elevation view of the exercise apparatus of FIG. 3a;
[0025] FIG. 5 is a perspective view of an exercise apparatus in accordance with another embodiment of the invention;
[0026] FIG. 6 is a perspective view of exercise apparatus in accordance with another embodiment of the invention;
[0027] FIG. 7 is a side elevation view of exercise apparatus in accordance with another embodiment of the invention;
[0028] FIG. 8a is a side elevation view of a portion of an exercise apparatus in accordance with another embodiment of the invention;
[0029] FIG. 8b is a simplified partial cut-away view of the inertia reel of the exercise apparatus of FIG. 8a;
[0030] FIG. 8c is a simplified cross-section view of a ratchet spring assembly for use in an exercise apparatus according to an alternative embodiment of the invention;

[0031] FIG. 9a is a perspective view of an exercise apparatus in accordance with another embodiment of the invention;
[0032] FIG. 9b is a front elevation view of the exercise apparatus of FIG. 9a;
[0033] FIGS. 9c and 9d are plan cross section views of certain components in an upright housing and a portion a support bar of the exercise apparatus of FIG. 9a in different positions;
[0034] FIG. 9e is an elevation, partial cross-section view of certain components in the housing of the exercise apparatus of FIG. 9a;
[0035] FIG. 9f is an elevation view of an exercise apparatus in accordance with another embodiment of the invention;
[0036] FIG. 9g is an elevation view of an exercise apparatus in accordance with another embodiment of the invention;
[0037] FIG. 9h is a side elevation view of the exercise apparatus of FIG. 9g;
[0038] FIG. 9i is a side elevation view of the exercise apparatus of FIG. 9g with the support bar in a different position;
[0039] FIG. 10a is an elevation view of an exercise apparatus with secondary weights attached in accordance with another embodiment of the invention;
[0040] FIG. 10b is the exercise apparatus of FIG. 10a but with the secondary weights released;
[0041] FIGS. 11a and 11b are simplified block diagrams of certain components of the exercise apparatus of FIG. 10a;
[0042] FIG. 11c is a simplified block diagram of the components of FIGS. 11a and 11b wherein the latch is in a released position;
[0043] FIGS. 11d and 11e are simplified block diagrams of certain components of the exercise apparatus of FIG. 10a;
[0044] FIG. 12a is a simplified block diagram of a latch release mechanism according to an alternative embodiment of the invention;
[0045] FIG. 12b is a simplified block diagram of the latch release mechanism of FIG. 12a with the latch in a released position;
[0046] FIG. 13a is a simplified block diagram of a latch release mechanism according to an alternative embodiment of the invention; and
[0047] FIG. 13b is a simplified block diagram of the latch release mechanism of FIG. 13a with the latch in a released position.

DETAILED DESCRIPTION

[0048] The following description is of the best mode presently contemplated for carrying out the invention. Reference will be made in detail to embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout. It is understood that other embodiments may be used and structural and operational changes may be made without departing from the scope of the present invention.

[0049] FIGS. 3a and 4 show an exercise apparatus 300 for use in lifting a freeweight barbell 302. The exercise apparatus includes a support frame 304 comprising a first proximate upright 306, a second proximate upright 308, a first distal upright 310, and a second distal upright 312. A first safety bar 314 extends in a generally horizontal direction between the first proximate upright 306 and the first distal upright 310. Similarly a second safety bar 316 extends in a generally horizontal direction between the second proximate upright 308 and the second distal upright 312.
When assembled, the first and second safety bars 314, 316 and the first and second proximate and distal uprights 306, 308, 310, 312 form portions of the support frame 304 that are generally perpendicular to one another. That is, the first proximate upright 306, the first distal upright 310 and the first safety bar 314 define a first imaginary plane that is generally perpendicular to a second imaginary plane defined by the first and second proximate uprights 306, 308. Similarly, the second proximate upright 308, the second distal upright 312 and the second safety bar 316 define a third imaginary plane that is generally perpendicular to the second imaginary plane and that is generally parallel to the first imaginary plane.

Four collars 318a, 318b, 318c, 318d are connected to the ends of the first and second safety bars 314, 316 and are adapted to slidably mate with the first and second proximate and distal uprights 306, 308, 310, 312. Each of these uprights defines a plurality of holes 320 disposed in a generally longitudinal array. Each of the collars 318a-318d also defines at least one hole 322 that is disposed for alignment with any of the plurality of holes 320 in the uprights 306, 308, 310, 312. Thus the first and second safety bars 314, 316 along with the attached collars 318a-318d can be moved to any one of a plurality of vertical positions along the uprights 306, 308, 310, 312 and secured into a selected, vertical position by inserting pegs or similar devices (not shown) in the collar holes 322 and the upright holes 320.

Still referring to FIGS. 3a and 4, an elongated platform or bench 326 has a proximate bench end 326 disposed generally adjacent to and generally between the first and second distal uprights 310, 312 and a distal bench end 330 extending away from the support frame 304. Two bench support legs 332 extend downward from the distal bench end 330 and are rotatably attached to the distal bench end 330 by a hinge 334 thereby permitting the proximate bench end 326 to rotate lip and down between a first bench position and a second bench position while the distal bench end 330 remains at or near a constant elevation, as best seen in FIG. 4. A hydraulic jack 336 (i.e., a retractable device) is disposed below the bench 326 where one end of the jack 336 abuts the under side of the bench 326 and thereby supports the proximate end 328 of the bench 326. A foot pedal 338 is disposed near the distal end 330 of the bench 326 and is operably connected to the hydraulic jack 336 via a Bowden cable 340. When the foot pedal 338 is depressed, it and the Bowden cable 340 cooperate to cause the hydraulic jack 336 to move or retract from an extended position to a retracted position. Thus the bench 326 is in the first or upper bench position when the hydraulic jack 336 is in the extended position, and the proximate end 328 of the bench 326 rotates or moves to the second or lowered bench position when the hydraulic jack 336 moves to its retracted position. As best seen in FIG. 4, the first bench position is shown at a generally horizontal orientation by the broken lines in the figure, whereas the second bench position is shown at a lowered orientation by the solid lines.

While FIG. 3a shows holes into which pegs may be inserted for holding the first and second safety bars 314, 316 in position, alternative embodiments include other holding mechanisms, such as for example, clamps. In yet another embodiment, collars need not be used at all. Rather, the holes 320 in the uprights 306, 308, 310, 312 are of sufficient size to permit the removable insertion of the safety bars 314, 316 themselves directly through the holes at the selected vertical position. The safety bars 314, 316 can define holes extending radially through the sidewalks at or near the ends of the safety bars 314, 316 so that a peg, a cotter pin or other holding device can be inserted for preventing the safety bars 314, 316 from unintentionally sliding out of the uprights 306, 308, 310, 312 while a user is exercising.

FIGS. 3b and 3c are side elevation views of another embodiment of a mechanism for adjustable holding safety bars in position. Shown is an upright 344 and a safety bar 346 extending from the upright 344. (Although only one safety bar and upright is shown, the other safety bar and upright are similarly constructed.) The safety bar 346 includes an outer arm 348 and an inner arm (not shown), wherein the upright 344 extends between the outer arm 348 and inner arm. Referring to FIG. 3b, the outer arm 348 has a first arm portion 350 that extends in a generally horizontal orientation and a second arm portion 352 that is located at one end of the outer arm 348 and that extends upward in a generally lateral direction from the first arm portion 350. Although not shown in FIGS. 3b and 3c, the inner arm that is disposed on the opposite side of the upright 344 has a similar configuration.

The safety bar 346 further includes a first connector member 354 and a second connector member 356. The first connector member 354 extends between and is attached to the first arm portion 350 of each of the outer and inner arms. Similarly, the second connector member 356 extends
between and is attached to the second arm portions 352 of each of the outer and inner arms. Thus the second connector member 356 is disposed at a higher elevation than the first connector member 354 when the safety bar 346 is supported by the upright 344. The upright 344 extends between the first and second connector members 354, 356, and as previously mentioned also extends between the outer arm 348 and inner arm. Thus the upright 344 in effect is surrounded by these components of the safety bar 346. The first and second connector members 354, 356 have a generally circular cross section; however they are rigidly connected to the inner arm 348 and outer arm and do not rotate.

[0060] When the safety bar 346 is in a secured position as shown in FIG. 3b, its weight, as well as the weight of any barbell resting upon it, are supported by the upright 344 and by the first and second connector members 354, 356 abutting opposite sides of the upright 344. When a user desires to adjust the vertical position of the safety bar 346, the first arm portion 350 of the inner and outer arms is lifted upward slightly, as shown in FIG. 3c. The first and second connector members 354, 356 are sized and connected to the inner arm 348 and outer arm at locations such that enough clearance is provided so that the first and second connector members 354, 356 do not abut the upright 344. This permits vertical movement of the safety bar 346 when the first arm portion 350 is tilted upward slightly. Once the user has positioned the safety bar 346 in the desired vertical location, the first arm portion 350 is returned to its original, generally horizontal position, thereby permitting the first and second connector members 354, 356 to abut and grip the upright 344.

[0061] The upright 344 has a layer of resilient material 358, such as rubber, secured to the vertical surfaces of the upright 344 at those locations where the first and second connector members 354, 356 may abut the upright 344 corresponding to the various potentially desired vertical locations of the safety bar 346. The resilient material 358 provides an increased friction surface which in turn reduces the possibility of any downward slippage of the safety bar 346.

[0062] FIG. 3d is an alternative embodiment of a mechanism for adjustably holding safety bars in position. The safety bar 346 of FIG. 3d is basically the same as that described above in connection with the embodiment of FIGS. 3b and 3c. However rather than a layer of resilient material 358 on the rear surface of the upright 344, the safety bar 346 of FIG. 3d has a second connector member 356 that engages any one of a plurality of ledges 360 disposed in a plurality of elevations on the rear surface of the upright 344. Any one of the ledges 360 provides an enhanced grip for the second connector member 356, thus further reducing the likelihood of downward slippage of the safety bar 346.

[0063] FIGS. 3e and 3f illustrate yet another alternative embodiment of a mechanism for adjustably holding safety bars in position. Shown is a safety bar 362 having a distal end 364 that extends generally laterally away from an upright 366. The safety bar 362 further has a proximate end 368 that extends at least part way around the upright 366. A brace 370 secures the distal end 364 of the safety bar 362 to a lower vertical location of the upright 366, thus providing increased strength. Thus the brace 370 includes a brace proximate end 372 that is connected to a collar 374 that is adapted to slide up and down the upright 366. The brace 370 further has a brace distal end 376 that is attached to the safety bar 362.

[0064] As shown in FIG. 3f, the upright 366 defines a plurality of holes 378 disposed in a plurality of elevations. The safety bar 362 includes a spring-loaded pin 380 adapted to mate with any one of the plurality of holes 378 and thereby secure the safety bar 362 in any one of a plurality of vertical positions on the upright 366. The pin 380 is biased in a direction toward the upright 366. Thus a user can pull the pin 380 out from one of the holes 378, slide the safety bar 362 and brace 370 to a different vertical position, and release the spring-loaded pin 380 for mating with another of the holes 378.

[0065] Referring now to FIG. 4, there is shown an exercise apparatus 500 in accordance with an alternative embodiment of the invention. A rotatable bench 502 is placed within a squat rack 508. The rotatable bench 502 is supported by a hydraulic jack 504 adapted to be actuated by a foot pedal 506. The bench 502, hydraulic jack 504 and foot pedal 506 are the same as described above in connection with FIGS. 3 and 4. The squat rack 508 includes four uprights 510, 512, 514, 516 of each of which define a plurality of holes 518 disposed in a vertical array. The holes 518 are of sufficient size to permit the removable insertion of a first safety bar 520 and a second safety bar 522 directly through the holes 518 at a selected vertical position. The safety bars 520, 522 define safety bar holes (not shown) extending radially through the safety bar sidewalls at or near the ends of the safety bars 520, 522 so that a cotter pin, a peg, or other holding device can be inserted for preventing the bars from unintentionally sliding out of the uprights 510, 512, 514, 516 while a user is exercising. In alternative embodiments, however, the safety bars 520, 522 can be adjustably secured to the uprights 510, 512, 514, 516 via collars or other mechanisms as described above in connection with the embodiment of FIG. 3.

[0066] The exercise apparatus 500 further includes two starting position brackets 524 adjustably mounted on two of the uprights 512, 516 for holding a barbell 526. Each of the two starting position brackets 524 defines at least one bracket hole (not shown) adapted for alignment with the upright holes 518 so that a peg or similar member can be inserted for removably securing the starting position brackets 524 at any one of a plurality of vertical positions on the uprights 512, 516.

[0067] In operation, a user operates the exercise apparatus 500 in a manner similar to that described in connection with FIG. 3. One difference, however, is that the squat rack 500 can be used on some occasions in a traditional manner without the bench 502 being used at all. On the other hand, the squat rack 500 has the flexibility for use on other occasions with the bench 502 and the first and second safety bars 520, 522 in a manner similar to that described above in connection with FIG. 3.

[0068] FIG. 6 shows an exercise apparatus 600 in accordance with yet another embodiment of the invention. A bench 602 is placed adjacent to a support frame 610 for use in holding a barbell 612 in two adjustable starting position brackets 614. The bench 602 has a back portion 604 rotatably connected to a seat portion 606 by a hinge 608 thereby allowing a user to adjust the angle between the back portion 604 and the seat portion 606 prior to commencing an exercise session. The bench 602 is supported off the ground by a hydraulic jack 616 having a jack housing 618 and a jack plunger 620 extending upward from a jack base 622. The hydraulic jack 616 is actuated by a foot pedal and Bowden cable (not shown) in the same manner as described above in connection with FIG. 3. (Alternatively, the hydraulic jack 616
can be actuated by other actuators as described above.) Thus the entire bench 602 can be raised or lowered by actuation of the hydraulic jack.

The support frame 610 further comprises two uprights 624, 626 supported by a frame base 628. Two safety brackets 636 extend laterally from the uprights 624, 626 at or near the upper portion of the uprights. Each of the uprights 624, 626 defines a hollow interior adapted to receive a starting bracket member 630 that is longitudinal in shape and that is connected at one end to the starting position bracket 614. The bracket members 630 extend upward from the ends of the uprights 624, 626 and define a plurality of holes 632 disposed in a generally vertical array. The bracket members 630 can slide up and down within the hollow interiors of the uprights 624, 626 and can be removably secured at a selected elevation position by inserting pegs 634 into the holes 632. When inserted these pegs 634 abut the ends of the uprights 624, 626 thereby supporting the bracket members 630 and preventing their downward movement into the hollow interiors of the uprights 624, 626.

In use, the elevation of the starting position brackets 614 is selected and the barbell 612 is placed on these brackets 614. A user sits on the bench 602, remains in a generally upright position and lifts the barbell 612 from the starting position brackets 614 to commence exercising. If and when the user tires to the point that it appears the user may not have sufficient remaining strength to lift the barbell 612 back into the starting position brackets 614, the user actuates the hydraulic jack 616 by depressing the foot pedal (not shown) with one of the user’s feet thereby causing the hydraulic jack 616 to retract thus lowering the bench 602 along with the user. With the user thus being lowered, the user can easily allow the barbell 612 to rest upon and be supported by the safety brackets 626 thereby allowing the user to exit the exercise apparatus 600 by sliding out from under the barbell 612.

FIGS. 1a-1d depict an exercise bench assembly 102 in accordance with another embodiment of the invention. The bench assembly 102 is for use with a support frame having safety bars, such as the support frame 304 and safety bars 314, 316 of FIG. 3, for example. For clarity of illustration, however, a support frame is not shown in FIGS. 1a-1d.

Referring first to FIG. 1a, the bench assembly 102 includes an elongated base 104 adapted for disposition generally adjacent to first and second uprights (not shown) of a support frame, such as for example the first and second distal uproots 310, 312 of FIG. 3. A plurality of base supports 106 extend generally upward from the elongated base 104. An elongated platform or bench 108 is disposed above the elongated base 104. The bench 108 includes a seat portion 110 that is supported by the plurality of base supports 106 and that is rotatably connected by a hinge 128 to a back portion 112 of the bench 108. A fastening member 114 is connected to the lower surface of the back portion 112 of the bench 108 and has a plurality of attachment locations 116 disposed in a generally longitudinal orientation along the fastening member 114. A hydraulic jack 118 having an extended position and a retracted position includes a lower jack end 120 pivoted mounted on the elongated base 104 for rotation about a base pivot 122. The hydraulic jack 118 further has an upper jack end 124 adapted for selective attachment to any one of the plurality of attachment locations 116 of the fastening member 114. A foot pedal 126 is connected to the hydraulic jack 118 by a Bowden cable (not shown) and is adapted to cause the hydraulic jack 118 to move from the extended position to the retracted position.

Thus by rotating the jack 118 and securing the jack upper end 124 to any one of the plurality of the fastening member attachment locations 116, the bench back portion 112 can be rotated to and secured in any one of a plurality of elevations or positions while the bench seat portion 110 remains fixed. This permits a user to select and use different horizontal or inclining bench positions for exercising with a barbell while retaining the ability to use adjustable safety bars, if necessary, such as for example the first and second safety bars 314, 316 of FIG. 3a.

FIG. 1b is an elevation view of the bench assembly 102 of FIG. 1a. The fastening member 114 includes two longitudinal rails 130 extending below the lower surface of the bench back portion 112 in a parallel, spaced-apart orientation from one another. The jack upper end 124 includes an engagement bar 132 for interlocking with the rails 130 at any one of the plurality of attachment locations 116 (FIG. 1a). As best seen in FIG. 1a, the attachment locations 116 are defined by a plurality of ridges formed in the rails 130 of the fastening member 114 and adapted to receive the engagement bar. In an alternative embodiment however, the rails 130 could define a plurality of holes adapted to receive the engagement bar 132 which would be removable from the jack upper end 124.

FIG. 1c shows the bench 108 wherein the bench back portion 112 is in a generally horizontal position and is supported by the hydraulic jack 118 that is in an extended position. FIG. 1c shows the bench 108 after the hydraulic jack 118 has been actuated such that it now is in a retracted position as compared to the position shown in FIG. 1a. The bench back portion 112 is retracted by an amount sufficient to permit a user to place the barbell on the safety bars (not shown) and to slide out from under the barbell. FIG. 1d, on the other hand, shows the bench 108 in a different starting position. The hydraulic jack engagement bar 132 is interlocked with a different attachment location 116 of the fastening member 114 so that the bench back portion 112 is in a raised position for commencement of exercising while the bench seat portion 110 remains in its fixed, generally horizontal position.

In operation, a user rotates the back portion 112 of the bench 108 about the hinge 128 to a first position or elevation and secures the back portion 112 in place by rotating the hydraulic jack 118 into the desired position and interlocking the jack engagement bar 132 into selected ridges formed in the fastening member rails 130. The user then reclines on the bench 108 and lifts a barbell from a holding bracket mounted on a support frame having a two safety bars. After exercising with the barbell and upon determining that the user does not have the strength to return the barbell to the holding bracket, the user pushes the foot pedal 126 that is operably connected to a hydraulic jack 118 thereby causing the hydraulic jack 118 to move from an extended position to a retracted position. This in turn causes the back portion 112 of the bench 108 to recline from the first position to a second position that is lower than or retracted from the first position. The user then places the barbell on the safety bars and exits the exercise apparatus by sliding out from under the barbell.

FIG. 2 is a side elevation view of an exercise apparatus 200 in accordance with yet another embodiment of the invention. The exercise apparatus 200 includes a support frame 202 and a bench 204 that are interconnected with one another. The support frame 202 includes a first upright 206
disposed on one side of the bench 204 and a second upright (not shown) disposed on the opposite side of the bench 204. An upper collar 208 slidably mates with the first upright 206 and is adapted to be secured in any one of a plurality of elevations in a manner similar to the collars 318a-318d of FIG. 3. A safety bar 210 extends laterally outward from the upper collar 208 and the first upright 206, and is supported by a brace 212 connecting the outer portion of the safety bar 210 with the upper collar 208. Disposed above the upper collar 208 is a starting position bracket 214 attached to and extending laterally from the first upright 206. The starting position bracket 214 is for holding a barbell (not shown) for use at the commencement of an exercise session. A lower collar 216, which is disposed below the upper collar 208, slidably mates with the first upright 206 and also is adapted to be secured in any one of a plurality of elevations in a manner similar to the collars 318a-318d of FIG. 3. A similar arrangement including a second starting position bracket, second upper collar, second safety bar, second brace and second lower collar are coupled with the second upright (all of which are not shown in FIG. 2) disposed on the opposite side of the bench 204.

[0078] A cross bar member 218 extends laterally between the lower collar 216 and the second lower collar (not shown) and is attached to both of these lower collars thus providing structural support for the support frame 202. The bench 204 includes a seat portion 222 that is constructed in a manner similar to the bench seat portion 110 of FIG. 1a, and a back portion 220 rotatably connected to the seat portion 222 via a hinge 224. The bench back portion 220 is supported by a hydraulic jack 226 that extends upward from the cross bar 218.

[0079] The hydraulic jack 226 is pivotally connected to the bench back portion 226 by coupling with a rail 228 at a pivot location 230. The rail 228 is connected to and extends longitudinally down the lower surface of the bench back portion 220. The rail 228 thus allows one end of the hydraulic jack 226 to slide down the length of the rail 228 at the pivot location 230. This permits the bench back portion 220 to be adjusted to any one of a plurality of elevation locations by adjusting the elevation of the lower collar 216 which in turn adjusts the elevation of the hydraulic jack 226 from the ground. By adjusting the elevation of the upper collar 208, the elevation of the safety bar 210 can be adjusted to a position consistent for use with that of the bench back portion 220.

[0080] FIG. 7 is a side elevation view of an exercise apparatus 700 in accordance with yet another embodiment of the invention. A rotatable elongated platform or bench 702 has a distal bench end 706 and a proximate bench end 704 that is supported by a hydraulic jack 708 operably connected to an actuator or foot pedal 710. The bench 702, hydraulic jack 708 and foot pedal are constructed and operate in a manner that is essentially the same as those of FIG. 3. A support frame 712 includes a first proximate upright 714, a first distal upright 716, and a first starting position bracket 718. The proximate bench end 704 is adapted for placement between the first proximate upright 714 and a second proximate upright (not shown). The second proximate upright is part of the support frame 712, as are a second distal upright and a second starting position bracket. These components are not shown due to the nature of the side elevation view of FIG. 7, but are constructed the same as their corresponding illustrated components.

[0081] A first pulley 720 is rotatably attached to the first proximate upright 714. Cooperating with the first pulley 720 is a first cable 722 having a first cable distal end 724, a first cable proximate end 726 and a first cable middle portion 728. The first cable distal end 724 is connected to the first distal upright 716, and the first cable proximate end 726 is connected to an attachment member 730 that in turn is connected to the bench 702 at the proximate bench end 704. The first cable middle portion 728 wraps at least partially around and is movably supported by the first pulley 720. Not shown in FIG. 7 are a second cable and a second pulley. The second cable is attached to the second distal upright and to the attachment member 730, and is supported by the second pulley in a similar manner as described with respect to the first cable 722 and first pulley 720.

[0082] As shown in FIG. 7, the proximate bench end is rotatable about a first bench position when the hydraulic jack 708 is retracted, and a second bench position when the hydraulic jack 708 is extended. The length of the first cable 722 (as well as the unillustrated second cable) is such that it is in a generally slack condition when the proximate bench end 704 is in the first bench position as shown by the broken lines in FIG. 7. On the other hand the first cable 722 is in a generally taut condition when the proximate bench end 704 is in a second bench position as shown by the solid lines in FIG. 7.

[0083] Thus when a user depresses the foot pedal 710 thereby actuating the hydraulic jack 708 and causing it to retract, the proximate bench end 704 moves to the second bench position, and the first cable 722 moves to the generally taut condition. At this point the first cable 722 serves as a safety component of the exercise apparatus 700 by permitting a user to place a barbell on the first cable 722 (and the second cable) which serves a similar safety function as the first and second safety bars 314, 316 of FIG. 3.

[0084] In operation therefore, a user reclines on the elongated platform or bench and lifts a barbell from a starting position or holding bracket mounted on a support frame. The support frame has a first proximate upright, a second proximate upright, a first distal upright, a second distal upright, a first pulley rotatably attached to the first proximate upright and a second pulley rotatably attached to the second proximate upright.

[0085] If the user reaches a point that the user believes he/she has insufficient strength to return the barbell to the holding bracket, an actuator that is operably connected to a hydraulic jack is operated. This causes the hydraulic jack to move from an extended position to a retracted position, and causes the proximate platform end to rotate from a first platform position to a second platform position. First and second cables are in a generally slack condition when the proximate platform end is in the first platform position, but move to a generally taut condition when the proximate platform end moves to the second platform position. The user then places the barbell on the generally taut first and second cables when the proximate platform end is in the second platform position.

[0086] FIGS. 8a and 8b show an alternative embodiment to that of FIG. 7. The embodiment of FIGS. 8a and 8b is similar to that of FIG. 7 in most respects except that rather than use cables that are secured at one end to a bench, the embodiment of FIGS. 8a and 8b includes a first cable 802 that is connected to a first distal upright 804 at one end and wraps around and is connected to a first inertia reel 806 (i.e., a spring-loaded centrifugal brake) at the other end. The first inertia wheel 806 includes a housing 818 that supports a cable reel 814 that in turn is coupled to a spring 816. This construction is similar in principle to those inertia wheels that are used in some automobile seat belt retracting mechanisms.
The first inertia reel 806 is attached to a first proximate upright 808 at approximately the same elevation as the location where the first cable 802 is attached to the first distal upright 804. Thus the first cable 802 can be in a relatively slack condition and to some extent “follow” at least a portion of the path of a barbell 810 as a user exercises. However should the user loose sufficient strength to raise the barbell 810 to a starting position bracket 812, a sudden downward movement of the barbell 810 and the first cable 802 will cause the first inertia reel 806 to lock in position with sufficient strength to hold the first cable 802 (and an unillustrated second cable) for sustaining the weight of the barbell 810. The embodiment of Figs. 8a and 8b further includes the second cable, a second inertia wheel, a second distal upright and a second proximate upright, all of which have essentially the same construction as the illustrated components but which are not illustrated here due to the nature of the side elevation view of this drawing.

In yet another embodiment, the first inertia reel 806 can be replaced with a ratchet spring assembly 820 as shown in FIG. 8c. The ratchet spring assembly 820 includes a cable reel 822 operatively connected by a rod 832 to a ratchet wheel 828 and a torsion spring or coil 826 disposed in a housing 824. The torsion coil 826 exerts a twisting force on the ratchet wheel 828 and cable reel 822 that rotates the cable reel 822 so that any slack would be removed from the first cable 802 (FIG. 8a) which would thereafter be in a relatively taut condition. Thus the first cable 802 can remain in a movable but relatively taut condition and yet be able to “follow” at least a portion of the path of the barbell 810 as a user exercises. However should the user loose sufficient strength to raise the barbell 810 to the starting position bracket 812, a sudden downward movement of the barbell 810 and the first cable 802 will cause an engagement pawl 830 of the ratchet spring assembly 820 to interlock with the ratchet wheel 828 and prevent its rotation in an unwinding direction. The ratchet wheel 828 and cable reel 822 are thereby locked in position by the engagement pawl 830 with sufficient strength to hold the first cable 802 (and an unillustrated second cable) for sustaining the weight of the barbell 810.

In all of the previously-described embodiments, reference has been made to a retractable device that is a hydraulic jack. It should be appreciated however that alternative embodiments can employ retractable devices that are pneumatic jacks or gas springs.

FIGS. 9a-9e illustrate an exercise apparatus 900 in accordance with yet another embodiment of the invention. A first upright 902 and a second upright 904 are disposed in a parallel, spaced-apart relationship from one another and are supported by a base 906. A first support bar 908 is rotatably connected to the first upright 902 and extends generally laterally away from the first upright 902. A second support bar 910 is similarly rotatably connected to the second upright 904 and extends generally laterally away from the second upright 904.

The first and second support bars 908, 910 each are adapted to rotate between a first bar position and a second bar position, wherein the first bar position is shown in solid lines in FIG. 9a and is generally normal to an imaginary plane defined by the first and second uprights 902, 904. The second bar position is shown in FIG. 9a in broken lines and is at an angle in an outward direction from the first bar position by an amount of about 90°. In alternative embodiments however, the second bar position can be at other angles that are in an outward direction from the first bar position by any of a plurality of amounts ranging from an amount between about 45° to about 270°.

FIG. 9b is an elevation view showing the first and second support bars 908, 910 in the second bar position. The first and second support bars 908, 910 can rotate at least partially around the first and second uprights 902, 904, respectively, via a plurality of bearings 912 disposed within the first and second uprights 902, 904. Located on the first and second uprights 902, 904 above the first and second support bars 908, 910 are a first housing 914 and a second housing 916, respectively, each of which encloses components for causing the first and second support bars 908, 910 to rotate between the second and first bar positions. Extending from the first and second housings 914, 916 are two Bowden cables 918, both of which terminate at a foot pedal 920 located adjacent to a bench 922.

Referring now to FIGS. 9c-9e, there are shown certain components for causing the first support bar 908 to rotate from the second to the first bar position. A spring 926 couples the first support bar 908 with the first upright 902 (FIG. 9b). This is accomplished by connecting one end of the spring 926 with a stationary block 928 that is fixedly attached, directly or indirectly, to the first upright 902. The other end of the spring 926 is attached to a support bar block 930 that is fixedly attached, directly or indirectly, to the rotatable first support bar 908. When the first support bar 908 is in the second bar position as shown in FIG. 9c, the spring 926 exerts a pulling force around a post 932. When the spring 926 is released, this pulling force causes the first support bar 908 to move from the second bar position into a direction of the first bar position and indicated by the direction arrows of FIGS. 9d and 9e.

As best seen in FIG. 9e, a pivotal latch 938 is secured to the housing 914 and abuts the support bar block 930 when the latch 938 is in a lowered or latched position. This prevents the first support bar 908 from rotating toward the first bar position via the force of the spring 926. The Bowden cable 918 extends into the housing 914 and terminates at a cable stop 934. When actuated by the foot pedal 920 (FIG. 9a) the Bowden cable 918 cooperates with the cable stop 934 to pull a lifting member 936 attached to the latch 938 so that it rotates upward about a pivot 940 to an upper or unlatched position as illustrated by the directional arrow in FIG. 9e. This in turn releases the spring 926 so that it can pull the support bar block 930 and the first support bar 908 for rotation of the first support bar 908 to the first bar position. Although the illustrated embodiment shows the use of a foot pedal and Bowden cable for moving the latch 938 to release the spring 926, it will be appreciated that other actuators for releasing the spring 926 (or other bias element) may be used as well. Such other actuators may include mechanical actuators comprising other mechanical linkages or may include electrical actuators that transmit either wired or wireless signals.

In operation therefore, a user secures the first and second support bars 908, 910 in the second bar position as shown by the broken lines of FIG. 9a. The user then reclines on the bench 922, lifts a barbell 944 from two starting position brackets 946 extending from the first and second uprights 902, 904, and commences exercising with the barbell 944. Because the first and second support bars 908, 910 are in the second bar position, they do not interfere with the motion of the barbell 944 or of the user’s body as the user exercises. However if and when the user believes that he/she does not
have sufficient strength to return the barbell 944 to the starting position brackets 946, the user presses down on the foot pedal 920 which cooperates with the two Bowden cables 918 to release the first and second support bars 908, 910 for rotation to the first bar position as shown by the direction arrows in FIG. 9a. The user can then place the barbell 944 on the first and second support bars 908, 910 and thereby avoid having to continue to bear the weight of the barbell 944.

[0096] FIG. 9f is a front elevation view of an exercise apparatus 950 according to an alternative embodiment of the invention. The exercise apparatus 950 includes a first upright 952, a second upright 954, a first support bar 956, a second support bar 958, a bench 960, a foot pedal 962 and two Bowden cables 964. All of these foregoing components are constructed and operate in a similar manner as the corresponding components in FIGS. 9a-9e. However, the exercise apparatus 950 of FIG. 9f further includes a first bracket 970 detachably mounted on the first upright 952 and a second bracket 972 detachably mounted on the second upright 954. The first support bar 956 is rotatably connected to the first bracket 970 and extends generally laterally away from the first upright 952 when the first bracket 970 is detachably mounted on the first upright 952. Similarly, the second support bar 958 is rotatably connected to the second bracket 972 and extends generally laterally away from the second upright 954 when the second bracket 972 is detachably mounted on the second upright 954.

[0097] The first and second support bars 956, 958 each are adapted to rotate between a first bar position and a second bar position when the first and second brackets 970, 972 are detachably mounted on the first and second uprights 952, 954. The first bar position is generally normal to an imaginary plane defined by the first and second uprights 952, 954. The second bar position is at an angle in an outward direction from the first bar position by an amount of about 90°. In alternative embodiments, however, this angle can be any one of a plurality of angles from an amount between about 30° to about 75°. Additionally, the second bar position further is at an angle in an upward direction from the horizontal by an amount of about 60°. (In alternative embodiments, however, this angle can be any one of a plurality of angles from an amount between about 30° to about 75°.) Thus when the first and second support bars 947, 949 rotate from the first bar position to the second bar position, each support bar rotates both outwardly and upwardly.

[0100] The first and second support bars 947, 949 each are adapted to rotate between a first bar position, as shown in FIG. 9f, and a second bar position, as shown in FIGS. 9g and 9h. As can be seen from these figures, the first bar position is one in which the upper surface 951 of each support bar is generally horizontal relative to the ground and in which the support bar extends from the respective upright in a direction that is generally normal to an imaginary plane defined by the first and second uprights 943, 945. On the other hand due to the upward angular orientation of portions of the upper and lower brackets 961, 963, the second bar position is at an angle in an outward direction from the first bar position by an amount of about 60°. (In alternative embodiments, however, this angle can be any one of a plurality of angles from an amount between about 30° to about 75°.) Additionally, the second bar position further is at an angle in an upward direction from the horizontal by an amount of about 60°. (In alternative embodiments, however, this angle can be any one of a plurality of angles from an amount between about 30° to about 75°.) Thus when the first and second support bars 947, 949 rotate from the first bar position to the second bar position, each support bar rotates both outwardly and upwardly.

[0101] An actuator, or foot pedal 953, is operably coupled to the first and second support bars by a first Bowden cable 955 and a second Bowden cable 957. The foot pedal 953 is adapted to release the first and second support bars 947, 949 thereby permitting movement of these support bars from the second bar position to the first bar position. Each of the first and second Bowden cables 955, 957 is connected to a cable stop (not shown) located within a bracket housing 959 that is part of the lower bracket 963. The cable stop is operably connected to a latch (not shown) in the housing 959, so that the latch releases the support bar 947 for movement from the second bar position to the first bar position via the force of gravity.

[0102] Referring now to FIGS. 10a and 10b there is shown an exercise apparatus for use with a barbell 1002 having a plurality of primary weights 1004 and having two secondary weights 1006. A first housing 1008 is coupled or attached to the barbell 1002 by a first collar 1010 that surrounds one end of the barbell 1002. A portion of a first weight release mechanism 1012 is disposed within the first housing 1008 and a portion extends outside of the first housing 1008. The first weight release mechanism 1012 is adapted to receive a signal and to move from a first mechanism position to a second mechanism position upon receipt of the signal. An actuator or transmitter 1014 is disposed within the barbell 1002 and is adapted to transmit the signal for receipt by the first weight release mechanism 1012.

[0103] One of the secondary weights 1006 is releasably coupled to the first weight release mechanism 1012 when it is in the first mechanism position. The first weight release mechanism 1012 is adapted to release the secondary weight 1006 when the first weight release mechanism 1012 moves from the first mechanism position to the second mechanism position upon receipt of the signal. This provides a safety feature for a user who is exercising with the barbell 1002. If during an exercise session the user believes that he/she lacks sufficient strength to continue to hold or otherwise retain control of the barbell 1002, the user can operate the actuator 1014 (such as for example by pushing a button) for transmitting the signal to the first and second weight release mechanisms 1012, 1013. Upon receipt of this signal, these mechanisms release the secondary weights 1006 from the barbell.
so that they may fall to the ground and thereby significantly reduce the overall weight that must be borne by the user.

[0104] The actuator or transmitter 1014 is disposed partially within the barbell 1002 and has a push button 1015 extending outwardly from the barbell 1002. The transmitter 1014 is adapted to transmit the signal as a wireless signal for receipt by the first and second weight release mechanisms 1012, 1013. It will be appreciated however that other embodiments may use other types of actuators for sending the signal, such as for example an electrical actuator disposed in the barbell 1002 and connected to the first and second weight release mechanisms 1012, 1013 via one or more electrical cables running through the barbell, an electrical transmitter for sending a wireless signal wherein the electrical transmitter is disposed in a foot pedal for actuation or is actuated by any other means, such as for example, by a voice command.

[0105] FIG. 11a shows certain components of the first weight release mechanism 1012 of FIGS. 10a and 10b. The first weight release mechanism 1012 includes a battery 1102, a solenoid 1104, an RF receiver 1106, an arm member 1108, a latch release mechanism 1110, and a latch 1112, all of which are enclosed in the first housing 1008 with the exception of the latch 1112 which has a portion that is enclosed but also a portion that extends from the first housing 1008. The first weight release mechanism 1012 further includes a pivot block 1114 and a latch releasing block 1116, both of which are attached to and extend below the first housing 1008.

[0106] As will be described in more detail below, the solenoid 1104 is operably coupled to the latch 1112 and is adapted to move from a first solenoid position to a second solenoid position. The latch 1112 is in a first latch position when the solenoid 1104 is in the first solenoid position, and the latch 1112 is in a second latch position when the solenoid 1104 is in the second solenoid position. The latch 1112 is adapted to hold the secondary weight 1006 (FIG. 10a) when the latch 1112 is in the first latch position and release the secondary weight 1006 when the latch 1112 is in the second latch position.

[0107] As further will be described in more detail below, the arm member 1108 is coupled to the solenoid 1104 and a rod 1128 (FIG. 11b) and is adapted to move between a first arm position and a second arm position. The solenoid 1104 is adapted to move the arm member 1108 from the first arm position when the solenoid 1104 is in the first solenoid position to the second arm position when the solenoid 1104 moves to the second solenoid position. The arm member 1108 is further adapted to move the rod 1128 (FIG. 11b) between a first rod position when the arm member 1108 is in the first arm position to a second rod position when the arm member 1108 moves to the second arm position. The rod 1128 also secures the latch 1112 in the first first position when the rod 1128 is in the first rod position and releases the latch 1112 for movement to the second second position when the rod 1128 is in the second rod position.

[0108] Still referring to FIG. 11a in order to provide a more detailed explanation of the foregoing overview, the pivot block 1114 includes a latch pivot pin 1118 disposed therein for pivotally connecting the latch 1112 to the pivot block 1114. This permits the latch 1112 to rotate about the latch pivot pin 1118 when the latch release mechanism 1110 releases the latch 1112 as described in more detail below. The latch 1112 includes a latch pivot arm 1120 for mating with a holding ring 1122 that is connected to or integral with the secondary weight 1006 (FIG. 10a). Thus the latch 1112 and its latch pivot arm 1120 are adapted to support the mass of the secondary weight 1006 (as best seen in FIG. 10a) when a user lifts the barbell 1002 for exercising. The latch retaining block 1116 defines a groove (not shown) extending longitudinally downward so that the latch pivot arm 1120 may mate with the groove for preventing the secondary weight holding ring 1122 from unintentionally slipping off of the latch 1112 while the user is exercising.

[0109] Referring now to FIG. 11b, the solenoid 1104 includes a plunger 1134, a coil housing 1136, a solenoid lifting block 1138, and a solenoid retaining block 1140. The latch release mechanism 1110 includes a latch releasing housing 1124, a spring 1126, a rod 1128, a collar 1130, and a rod lifting block 1132. The rod 1128 extends upward through the latch release housing 1124 and the collar 1130, and further is adapted to abut the latch 1112 at one end. At the opposite end, the rod 1128 is connected to the rod lifting block 1132. The spring 1126 is enclosed within the latch releasing housing 1124 and is coupled with the rod 1128 so as to bias it downward in the direction of the latch 1112.

[0110] The solenoid plunger 1134 extends through the coil housing 1136 and is connected at its upper end to the solenoid retaining block 1140. Disposed below the solenoid retaining block 1140 is the solenoid lifting block 1138 that likewise is connected to the plunger 1134 at a location above the coil housing 1104. The solenoid lifting block 1138 has an upper surface that is arc-shaped and is adapted to abut one end of the arm member 1108. Similarly, the solenoid retaining block 1140 has a lower surface that is arc-shaped and is adapted to abut the same end of the arm member 1108.

[0111] Referring to FIG. 11c, the arm member 1108 defines a longitudinally-shaped opening or channel 1142 through which the plunger 1134 extends. Because the solenoid retaining block 1140 is disposed on the upper end of the plunger 1134 and is larger than the channel 1142, the arm member 1108 is sandwiched between the solenoid lifting block 1138 and the solenoid retaining block 1140 and therefore can be driven by the solenoid plunger 1134 as it moves up and down. The channel 1142 has a greater width than that of the plunger 1134 and therefore allows for some lateral motion of the arm member 1108 relative to the plunger 1134 as shown by the arrow in FIG. 11c thus accommodating the transfer of linear motion of the plunger 1134 to rotary motion of the arm member 1108.

[0112] Referring again to FIG. 11b, the latch release mechanism 1110 and the solenoid 1104 are shown in a condition whereby the latch 1112 is closed in a mating relationship with the holding ring 1122 thereby supporting the mass of the secondary weight 1006 (FIG. 10a). Upon receipt of a signal, electrical power is delivered to the solenoid 1104 thereby causing it to move the plunger 1134 and the solenoid lifting block 1138 in an upward direction. Because the arm member 1108 is secured to the first housing 1008 at an arm pivot 1144, the solenoid lifting block 1138 exerts an upward force on one end of the arm member 1108 thereby causing it to rotate about the arm pivot 1144 located at the opposite end.

[0113] The upward rotation of the arm member 1108 exerts an upward force on the collar 1130 of the latch release mechanism 1110. The collar 1130 in turn abuts the rod lifting block 1132 which drives the rod 1128 upward and overcomes the downward force of the spring 1126. Referring to FIG. 11c, when the rod 1128 is driven upward to the point that it no longer abuts the latch 1112, the mass of the secondary weight...
1106 (FIG. 10a) pulling downward on the holding ring 1122 and the latch pivot arm 1120 causes the latch 1112 to rotate about the latch pivot pin 1118. The latch pivot arm 1120 thus no longer mates with the holding ring 1122 thereby releasing it (as best seen in FIG. 11c) so that the secondary weight 1006 can fall to the ground.

[0114] FIG. 11d illustrates the operation of the collar 1130 of the latch release mechanism 1110, including the ability to permit axial movement of the rod 1128 through the collar 1130 and radial movement of the rod 1128 within the collar 1130. The arm member 1108 defines a rectangular-shaped opening 1146 through which the rod 1128 and the collar 1130 extend. The arm pivot 1144 is connected to a frame member 1148 that in turn is attached to the first housing 1008 (FIG. 11a). The collar 1130 is pivotally attached to the arm member 1108 at two collar pivots 1150 thus permitting the collar 1130 to rotate as it moves upward or downward in response to the rotational movement of the arm member 1108. The collar 1130 defines an elliptical-shaped collar opening 1152 that has a major axis extending laterally in the direction of the length of the arm member 1108 and having a length that is greater than the diameter of the rod 1128. This allows sufficient clearance so that the rod 1128 may slide radially back and forth in the direction of the arrow in FIG. 11d in order to accommodate the transfer of the rotary motion of the arm member 1108 with the linear motion of the rod 1128.

[0115] It will be appreciated that while the foregoing describes the operation and construction of the first weight release mechanism 1012, the second weight release mechanism 1013 is similarly constructed and operated so that both release mechanisms 1012, 1013 simultaneously release both of the secondary weights 1006 upon receipt of the signal.

[0116] FIG. 12a shows a latch release mechanism 1202 according to an alternative embodiment of the invention. The arrangement shown in FIG. 12a is similar to that of FIG. 11b except that the collar 1130 and rod lifting block 1132 of the latch release mechanism 1110 of FIG. 11b are replaced by a wheel 1204 for transferring the rotational motion of the arm member 1108 to the linear motion of the rod 1128. Thus the wheel 1204 couples the arm member 1108 to the rod 1128 by rotatably coupling the wheel 1204 to the rod 1128 by attachment of the wheel 1204 to the rod 1128 at a wheel axle or pivot 1206. The wheel 1204 abuts the arm member 1108 and rotates in response to movement of the arm member 1108 between a first arm position and a second arm position thereby causing the rod 1128 to move between a first rod position wherein the latch 1112 is held fixed as shown in FIG. 12a to a second rod position wherein the latch 1112 (and the holding ring 1122) is released as shown in FIG. 12b.

[0117] FIG. 13a shows a portion of a weight release mechanism 1302 according to an alternative embodiment of the invention. In this embodiment a solenoid 1304 is operably coupled to a latch 1306 by a plunger 1308 in a more direct manner. The solenoid 1304 comprises a coil housing 1310, the plunger 1308, and a solenoid spring 1312. The plunger 1308 extends from the coil housing 1310. The solenoid spring 1312 is coupled to the plunger 1308 so as to bias it in a direction away from the coil housing 1310 and toward the latch 1306.

[0118] When the solenoid 1304 is not energized, the force of the spring 1312 holds the plunger 1308 in a first plunger position so that the plunger 1308 abuts the latch 1306 and secures it in a first latch position as shown in FIG. 13a. In this first latch position, the latch 1306 mates with the holding ring 1122 and supports a secondary weight (not shown) in the same manner described above in connection with the embodiment of FIG. 11b. When energized, the solenoid 1304 overcomes the force of the solenoid spring 1312 and moves the plunger 1308 in a direction toward the coil housing 1310 from the first plunger position to a second plunger position. This releases the latch 1306 for movement or rotation to a second latch position so that the holding ring 1122 (and secondary weight) may be released as shown in FIG. 13b.

[0119] In view of the above, it will be appreciated that embodiments of the invention overcome many of the long-standing problems in the art by providing exercise apparatuses for use with free weight barbells. Through the use actuators that can be operated by a user while he/she is exercising, the apparatuses can be caused to move to a safety position or to release secondary weights. Thus the user can then more easily place a barbell in a safe location or more easily control the weight of the barbell.

[0120] While the description above refers to particular embodiments of the present invention, it will be understood that many modifications may be made without departing from the spirit thereof. The claims are intended to cover such modifications as would fall within the true scope and spirit of the present invention. The presently disclosed embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the claims rather than the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed is:

1. A weight bench apparatus for use with a support frame having first and second uprights, said support frame further having a first bar and a second bar wherein the first bar is coupled to the first upright, and wherein the second bar is coupled to the second upright, the weight bench apparatus comprising:
   - an elongated base adapted for disposition generally adjacent to the first and second uprights of the support frame;
   - a base support extending generally upward from the elongated base;
   - an elongated platform disposed above the elongated base, wherein the elongated platform includes a seat portion rotatably connected to a back portion, wherein the seat portion is supported by the base support, and wherein the seat portion has a plurality of attachment locations disposed in a generally longitudinal orientation;
   - a retractable device having an extended position and a retracted position, wherein the retractable device has a lower device end pivotally mounted on the elongated base and an upper device end adapted for attachment to any one of the plurality of attachment locations of the back portion of the elongated platform, and wherein the retractable device is one of a hydraulic jack, a pneumatic jack and a gas spring; and
   - an actuator operably connected to the retractable device and adapted to cause the retractable device to move from the extended position to the retracted position.

2. The apparatus of claim 1 wherein the back portion of the elongated platform includes a fastening member and wherein the fastening member includes the plurality of fastening locations.
3. The apparatus of claim 1, wherein the actuator is a foot pedal and wherein the foot pedal is operably connected to the retractable device by a Bowden cable.

4. An exercise apparatus comprising:
   a first proximate upright, a second proximate upright, a first distal upright, and a second distal upright;
   a first bar extending between and connected to the first proximate upright and the first distal upright, and adapted to be positioned in a plurality of elevations;
   a second bar extending between and connected to the second proximate upright and the second distal upright, and adapted to be positioned in a plurality of elevations;
   an elongated base adapted for disposition generally adjacent to the first and second distal uprights;
   a base support extending generally upward from the elongated base;
   an elongated platform disposed above the elongated base, wherein the elongated platform includes a seat portion rotatably connected to a back portion, wherein the seat portion is supported by the base support, and wherein the back portion has a plurality of attachment locations disposed in a generally longitudinal orientation;
   a retractable device having an extended position and a retracted position, wherein the retractable device has a lower device end pivotally mounted on the elongated base and an upper device end adapted for attachment to any one of the plurality of attachment locations of the back portion of the elongated platform and wherein the retractable device is one of a hydraulic jack, a pneumatic jack and a gas spring; and
   an actuator operably connected to the retractable device and adapted to cause the retractable device to move from the extended position to the retracted position.

5. An exercise apparatus comprising:
   a first proximate upright, a second proximate upright, a first distal upright, and a second distal upright;
   a first bar extending between and connected to the first proximate upright and the first distal upright, and adapted to be positioned in a plurality of elevations;
   a second bar extending between and connected to the second proximate upright and the second distal upright, and adapted to be positioned in a plurality of elevations;
   an elongated base adapted for disposition generally adjacent to the first and second distal uprights;
   a base support extending generally upward from the elongated base;
   an elongated platform disposed above the elongated base, wherein the elongated platform includes a seat portion rotatably connected to a back portion, wherein the seat portion is supported by the base support, and wherein the back portion has a plurality of attachment locations disposed in a generally longitudinal orientation;
   a retractable device having an extended position and a retracted position, wherein the retractable device has a lower device end pivotally mounted on the elongated base and an upper device end adapted for attachment to any one of the plurality of attachment locations of the back portion of the elongated platform and wherein the retractable device is one of a hydraulic jack, a pneumatic jack and a gas spring; and
   an actuator operably connected to the retractable device and adapted to cause the retractable device to move from the extended position to the retracted position.

6. The apparatus of claim 4 further comprising a plurality of collars connected to the first and second bars and adapted to slidably mate with the first and second proximate uprights and with the first and second distal uprights.

7. The apparatus of claim 4 wherein the first and second proximate uprights and the first and second distal uprights each define a plurality of holes disposed in a generally longitudinal array, wherein the plurality of holes is adapted to receive the first bar and the second bar for positioning the first bar and the second bar in the plurality of elevations respectively between the first proximate upright and the first distal upright and between the second proximate upright and the second distal upright.

8. The apparatus of claim 4 further wherein the back portion of the elongated platform includes a fastening member and wherein the fastening member includes the plurality of fastening locations.

9. An exercise apparatus comprising:
   a first upright and a second upright;
   a first bar extending from the first upright and adapted to be positioned in a plurality of elevations;
   a second bar extending from the second upright and adapted to be positioned in a plurality of elevations;
   an elongated base adapted for disposition generally adjacent to the first and second uprights;
   a base support extending generally upward from the elongated base;
   an elongated platform disposed above the elongated base, wherein the elongated platform includes a seat portion rotatably connected to a back portion, wherein the seat portion is supported by the base support, and wherein the back portion has a plurality of attachment locations disposed in a generally longitudinal orientation;
   a retractable device having an extended position and a retracted position, wherein the retractable device has a lower device end pivotally mounted on the elongated base and an upper device end adapted for attachment to any one of the plurality of attachment locations of the back portion of the elongated platform and wherein the retractable device is one of a hydraulic jack, a pneumatic jack and a gas spring; and
   an actuator operably connected to the retractable device and adapted to cause the retractable device to move from the extended position to the retracted position.

10. The apparatus of claim 9 wherein the first bar and the second bar each comprises:
    an outer arm and an inner arm, wherein one of the first upright and the second upright extends between the outer and inner arms, wherein each of the outer and inner arms has a first arm portion and a second arm portion, wherein the first arm portion is in a generally horizontal orientation and the second arm portion extends in a generally lateral direction from the first arm portion; and
    a first connector member extending between and attached to the first arm portions of each of the outer and inner arms; and
    a second connector member extending between and attached to the second arm portions of each of the outer and inner arms, wherein the one of the first upright and the second upright extends between the first and second connector members.

11. The apparatus of claim 10 further comprising at least one layer of resilient material attached to each of the first and second uprights,
    wherein the first connector member is adapted to abut the one of the first and second uprights in a plurality of locations on the one of the first and second uprights, wherein the second connector member is adapted to abut the one of the first and second uprights in a plurality of locations on the one of the first and second uprights, and
    wherein each of the first and second pluralities of locations is covered with the at least one layer of the resilient material.

12. The apparatus of claim 10 wherein each of the first and second uprights includes a plurality of ledges disposed in a plurality of elevations, and wherein the second connector member is adapted to be seated on any one of the plurality of ledges.

13. The apparatus of claim 9 wherein each of the first and second uprights defines a plurality of holes disposed in a plurality of elevations, the apparatus further comprising:
    a first brace having a first brace proximate end and a first brace distal end, wherein the first brace proximate end is slidably attached to the first upright, and wherein the first brace distal end is attached to the first bar; and
    a second brace having a second brace proximate end and a second brace distal end, wherein the second brace proximate end is slidably attached to the second upright, and wherein the second brace distal end is attached to the second bar;
wherein each of the first and second bars includes a spring-loaded pin adapted to mate with any one of the plurality of holes, and wherein the spring-loaded pin is biased in a direction toward one of the first and second uprights.

14. An exercise apparatus comprising:
   a first proximate upright, a second proximate upright, a first distal upright, and a second distal upright;
   a first bar extending between the first proximate upright and the first distal upright;
   a second bar extending between the second proximate upright and the second distal upright;
   a plurality of collars connected to the first and second bars and adapted to slidably mate with the first and second proximate uprights and with the first and second distal uprights;
   an elongated base adapted for disposition generally between the first and second distal uprights;
   a base support extending generally upward from the elongated base;
   an elongated platform disposed above the elongated base, wherein the elongated platform includes a seat portion rotatably connected to a back portion, and wherein the seat portion is supported by the base support;
   a fastening member connected to the back portion of the elongated platform and having a plurality of attachment locations disposed in a generally longitudinal orientation;
   a retractable device having an extended position and a retracted position, wherein the retractable device has a lower device end pivotally mounted on the elongated base, wherein the retractable device has an upper device end adapted for attachment to any one of the plurality of attachment locations of the fastening member and wherein the retractable device is one of a hydraulic jack, a pneumatic jack and a gas spring; and
   a foot pedal connected to the retractable device by a Bowden cable and adapted to cause the retractable device to move from the extended position to the retracted position.

15. A method of exercising with a barbell, comprising the steps of:
   rotating a back portion of an elongated platform to a first position, wherein the elongated platform includes a seat portion rotatably connected to the back portion, wherein the seat portion is supported by a base support extending from an elongated base, and wherein the back portion is supported by a retractable device having a lower device end pivotally mounted on the elongated base and an upper device end adapted for attachment to each of a plurality of attachment locations on the back portion of the elongated platform;
   reclining on the elongated platform;
   lifting the barbell from a holding bracket mounted on a support frame having a first safety bar and a second safety bar, wherein the first and second safety bars are disposed in a generally horizontal orientation below the holding bracket and are adapted to be positioned on the support frame in a plurality of elevations below the holding bracket;
   operating an actuator operably connected to the retractable device thereby causing the retractable device to move from an extended position to a retracted position, and thereby causing the back portion of the elongated platform to recline from the first position to a second position, wherein the retractable device is one of a hydraulic jack, a pneumatic jack and a gas spring; and
   placing the barbell on the first and second safety bars.

16. An exercise apparatus comprising:
   an elongated platform having a proximate platform end and a distal platform end;
   a platform support extending generally downward from the distal platform end and rotatably attached to the distal platform end thereby permitting the proximate platform end to rotate between a first platform position and a second platform position;
   a retractable device disposed generally below the elongated platform and abutting the elongated platform, wherein the retractable device has an extended position and a retracted position, wherein the elongated platform is in the first platform position when the retractable device is in the extended position, wherein the elongated platform is in the second platform position when the retractable device is in the retracted position and wherein the retractable device is one of a hydraulic jack, a pneumatic jack and a gas spring;
   an actuator operably connected to the retractable device and adapted to cause the retractable device to move from the extended position to the retracted position;
   a first proximate upright, a second proximate upright, a first distal upright, and a second distal upright;
   a first pulley rotatably attached to the first proximate upright and a second pulley rotatably attached to the second proximate upright;
   a first cable having a first cable distal end, a first cable proximate end and a first cable middle portion, wherein the first cable distal end is connected to the first distal upright, wherein the first cable proximate end is connected to the proximate platform end, and wherein the first cable middle portion is movably supported by the first pulley;
   a second cable having a second cable distal end, a second cable proximate end and a second cable middle portion, wherein the second cable distal end is connected to the second distal upright, wherein the second cable proximate end is connected to the proximate platform end, and wherein the second cable middle portion is movably supported by the second pulley;
   wherein the first and second cables each are in a generally slack condition when the proximate platform end is in the first platform position and in a generally taut condition when the proximate platform end is in the second platform position.

17. The apparatus of claim 16 wherein the actuator is a foot pedal and wherein the foot pedal is operably connected to the retractable device by a Bowden cable.

18. A method of exercising with a barbell, comprising the steps of:
   reclining on an elongated platform having a proximate platform end and a distal platform end, wherein the proximate platform end is adapted to rotate between a first platform position and a second platform position;
   lifting the barbell from a holding bracket mounted on a support frame;
   operating an actuator operably connected to a retractable device thereby causing the retractable device to move from an extended position to a retracted position, and thereby causing the proximate platform end to rotate from the first platform position to the second platform position.
position, wherein the retractable device is one of a hydraulic jack, a pneumatic jack and a gas spring; placing the barbell on a first cable and a second cable when the proximate platform position is in the second platform position, wherein the first and second cables are in a generally slack condition when the proximate platform position is in the first platform position and in a generally taut condition when the proximate platform position is in the second platform position, wherein a second inertia reel is connected to one of a first upright and a second upright, wherein the cable proximate end is connected to the proximate platform end, and wherein the cable middle portion is movably supported by one of a first pulley and a second pulley.

19. An exercise apparatus for use with an elongated platform, a retractable device and an actuator, wherein the elongated platform has a proximate platform end, a distal platform end, and a platform support extending generally downward from the distal platform end and rotatably attached to the distal platform end thereby permitting the proximate platform end to rotate between a first platform position and a second platform position; wherein the retractable device is disposed generally below the elongated platform and abutting the elongated platform, wherein the retractable device has an extended position and a retracted position, wherein the elongated platform is in the first platform position when the retractable device is in the extended position and wherein the elongated platform is in the second platform position when the retractable device is in the retracted position; wherein the actuator is operably connected to the retractable device and adapted to cause the retractable device to move from the extended position to the retracted position; wherein the retractable device is one of a hydraulic jack, a pneumatic jack and a gas spring.

the exercise apparatus comprising:

a first proximate upright, a second proximate upright, a first distal upright, and a second distal upright, wherein the first and second distal uprights are spaced apart from one another by a distance sufficient to permit the placement of the elongated platform between the first and second distal uprights;
a first inertia reel attached to the first proximate upright and a second inertia reel attached to the second proximate upright;
a first cable having a first cable distal end and a first cable proximate end, wherein the first cable distal end is connected to the first distal upright, wherein the first cable proximate end is connected to the first inertia reel, and wherein at least a portion of the first cable is adapted to wrap around the first inertia reel; and
a second cable having a second cable distal end and a second cable proximate end, wherein the second cable distal end is connected to the second distal upright, wherein the second cable proximate end is connected to the second inertia reel, and wherein at least a portion of the second cable is adapted to wrap around the second inertia reel.

20. An exercise apparatus for use with an elongated platform, a retractable device and an actuator, wherein the elongated platform has a proximate platform end, a distal platform end, and a platform support extending generally downward from the distal platform end and rotatably attached to the distal platform end thereby permitting the proximate platform end to rotate between a first platform position and a second platform position;

wherein the retractable device is disposed generally below the elongated platform and abutting the elongated platform, wherein the retractable device has an extended position and a retracted position, wherein the elongated platform is in the first platform position when the retractable device is in the extended position and wherein the elongated platform is in the second platform position when the retractable device is in the retracted position; wherein the actuator is operably connected to the retractable device and adapted to cause the retractable device to move from the extended position to the retracted position, and

wherein the retractable device is one of a hydraulic jack, a pneumatic jack and a gas spring.

the exercise apparatus comprising:

a first proximate upright, a second proximate upright, a first distal upright, and a second distal upright, wherein the first and second distal uprights are spaced apart from one another by a distance sufficient to permit the placement of the elongated platform between the first and second distal uprights;
a first ratchet spring assembly attached to the first proximate upright and a second ratchet spring assembly attached to the second proximate upright;
a first cable reel coupled to the first ratchet spring assembly and a second cable reel coupled to the second ratchet spring assembly;
a first cable having a first cable distal end and a first cable proximate end, wherein the first cable distal end is connected to the first distal upright, wherein the first cable proximate end is connected to the first cable reel, and wherein at least a portion of the first cable is adapted to wrap around the first cable reel;
a second cable having a second cable distal end and a second cable proximate end, wherein the second cable distal end is connected to the second distal upright, wherein the second cable proximate end is connected to the second cable reel, and wherein at least a portion of the second cable is adapted to wrap around the second cable reel.

21. An exercise apparatus comprising:

a first upright and a second upright;
a first support bar rotatably connected to the first upright and extending generally laterally away from the first upright;
a second support bar rotatably connected to the second upright and extending generally laterally away from the second upright;

wherein the first and second support bars each are adapted to rotate between a first bar position and a second bar position, wherein the first bar position is generally normal to an imaginary plane defined by the first and second uprights, and wherein the second bar position is at an angle in an outward direction from the first bar position by an amount between about 45° to about 270°;
a first bias element coupled to the first support bar and to the first upright and adapted to move the first support bar from the second bar position to the first bar position; a second bias element coupled to the second support bar and to the second upright and adapted to move the second support bar from the second bar position to the first bar position; and an actuator operably coupled to the first and second bias elements and adapted to cause the first and second bias elements to move the first support bar and the second support bar respectively from the second bar position to the first bar position.

22. The apparatus of claim 21 wherein the first bias element is a first spring and wherein the second bias element is a second spring.

23. The apparatus of claim 21 wherein the actuator is a foot pedal and wherein the foot pedal is operably connected to the first and second bias elements by a first Bowden cable and a second Bowden cable.

24. The apparatus of claim 23 wherein each of the first and second Bowden cables is connected to a cable stop, wherein the cable stop is operably connected to a latch, and wherein the latch is adapted to release the one of the first bias element and the second bias element for movement of one of the first support bar and the second support bar from the second bar position to the first bar position.

25. An exercise safety apparatus for use with a first upright and a second upright, the exercise safety apparatus comprising:

- a first bracket adapted for detachable mounting on the first upright and a second bracket adapted for detachable mounting on the second upright;
- a first support bar rotatably connected to the first bracket and extending generally laterally away from the first upright when the first bracket is detachably mounted on the first upright;
- a second support bar rotatably connected to the second bracket and extending generally laterally away from the second upright when the second bracket is detachably mounted on the second upright;
- wherein the first and second support bars each are adapted to rotate between a first bar position and a second bar position when the first and second brackets are detachably mounted on the first and second uprights, and wherein the second bar position is at an angle in an outward direction from the first bar position by an amount between about 45° to about 270°;

27. The apparatus of claim 25 wherein the actuator is a foot pedal and wherein the foot pedal is operably connected to the first and second bias elements by a first Bowden cable and a second Bowden cable.

28. The apparatus of claim 27 wherein each of the first and second Bowden cables is connected to a cable stop, wherein the cable stop is operably connected to a latch, and wherein the latch is adapted to release the one of the first bias element and the second bias element for movement of one of the first support bar and the second support bar from the second bar position to the first bar position.

29. An exercise apparatus comprising:

- a first upright and a second upright;
- a first support bar rotatably connected to the first upright and extending generally away from the first upright;
- a second support bar rotatably connected to the second upright and extending generally away from the second upright;
- wherein the first and second support bars each are adapted to rotate between a first bar position and a second bar position, wherein the first bar position is generally normal to an imaginary plane defined by the first and second uprights, and wherein the second bar position is at an angle in an upward direction from the horizontal by an amount between about 30° to about 75°; and

30. The apparatus of claim 29 wherein the actuator is a foot pedal and wherein the foot pedal is operably connected to the first and second support bars by a first Bowden cable and a second Bowden cable.

31. The apparatus of claim 30 wherein each of the first and second Bowden cables is connected to a cable stop, wherein the cable stop is operably connected to a latch, and wherein the latch is adapted to release the one of the first and second support bars for movement from the second bar position to the first bar position.

32. An exercise apparatus for use with a barbell having a plurality of primary weights and having a secondary weight, the exercise apparatus comprising:

- a housing coupled to the barbell;
- a release mechanism, wherein at least a portion of the release mechanism is disposed within the housing, wherein the release mechanism is adapted to receive a signal, and wherein the release mechanism is adapted to move from a first mechanism position to a second mechanism position upon receipt of the signal; and

33. The exercise apparatus of claim 32 further comprising an electrical cable running through the barbell between the actuator and the housing, wherein at least a portion of the
actuator is disposed on the barbell and wherein the actuator is adapted to transmit the signal to the release mechanism via the electrical cable.

34. The exercise apparatus of claim 32 wherein the signal is a wireless signal and wherein the actuator includes a transmitter adapted to wirelessly transmit the wireless signal for receipt by the release mechanism.

35. The exercise apparatus of claim 34 wherein at least a portion of the actuator is disposed on the barbell and wherein the actuator includes a manually operable button for initiating the transmission of the wireless signal.

36. The exercise apparatus of claim 34 wherein the actuator includes a foot pedal.

37. The exercise apparatus of claim 32 wherein the release mechanism comprises a latch and a solenoid, wherein the solenoid is operably coupled to the latch and is adapted to move from a first solenoid position to a second solenoid position, wherein the latch has a latch first position and a latch second position, wherein the latch is adapted to hold the secondary weight when the latch is in the first latch position, and wherein the latch is further adapted to release the secondary weight when the latch is in the second latch position, and wherein the latch is adapted to be held in the first latch position when the solenoid is in the first solenoid position, and wherein the latch is adapted to be in the second latch position when the solenoid is in the second solenoid position.

38. The exercise apparatus of claim 37 wherein the release mechanism further comprises an arm member and a rod, wherein the arm member is coupled to the solenoid and the rod and is adapted to move between a first arm position and a second arm position, wherein the solenoid is adapted to move the arm member from the first arm position when the solenoid is in the first solenoid position to the second arm position when the solenoid moves to the second solenoid position, wherein the arm member is adapted to move the rod between a first rod position when the arm member is in the first arm position to a second rod position when the arm member moves to the second arm position, and wherein the rod is adapted to secure the latch in the first latch position when the rod is in the first rod position and to release the latch for movement to the second latch position when the rod is in the second rod position.

39. The exercise apparatus of claim 38 wherein the release mechanism further comprises a spring and wherein the spring is coupled to the rod and biases the rod in the direction of the first rod position.

40. The exercise apparatus of claim 38 wherein the release mechanism further comprises a collar for coupling the arm member to the rod, wherein the collar is pivotally attached to the arm member, wherein the rod extends through the collar, and wherein the collar is adapted to permit axial movement of the rod through the collar and radial movement of the rod within the collar.

41. The exercise apparatus of claim 38 wherein the release mechanism further comprises a wheel for coupling the arm member to the rod, wherein the wheel is rotatably coupled to the rod, wherein the wheel abuts the arm member and is adapted to rotate in response to movement of the arm member between the first arm position and the second arm position thereby causing the rod to move between the first rod position to the second rod position.

42. The exercise apparatus of claim 37 wherein the solenoid comprises a coil housing and a plunger extending from the coil housing, wherein the solenoid is operably coupled to the latch by the plunger, wherein the solenoid is adapted to move the plunger between a first plunger position and a second plunger position, wherein the first solenoid position is the first plunger position and the second solenoid position is the second plunger position, and wherein the plunger is adapted to abut the latch and secure the latch in the first latch position when the plunger is in the first plunger position, and wherein the plunger is adapted to release the latch for movement to the second latch position when the plunger moves to the second plunger position.

43. The exercise apparatus of claim 42 wherein the solenoid further comprises a solenoid spring coupled to the plunger to bias the plunger in a direction away from the coil housing, and wherein the solenoid moves the plunger in a direction toward the coil housing when the solenoid moves the plunger from the first plunger position to the second plunger position.

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