The invention is directed to an apparatus for exercising a user's muscles that includes a frame. A platform is attached to the frame, which defines an area on which a user stands. A weight stack is attached to the frame. A linear shaft is attached to the frame between the platform and the weight stack. A carriage runs on the linear shaft and is attached to the weight stack by a cable. An extension arm is pivotally connected to the carriage. A handle is attached to the extension arm. The linear shaft and platform allow the user to adjust the machine to their body by just standing in the position that fits their body. The linear shaft, carriage, and pivotal connected extension arm provides a resistance curve that fits the user's strength curve.
Start

Standing on a platform

Setting a resistance level

Grabbing a handle attached to a carriage running on a lineal shaft

Moving the handle causing the carriage to move along the lineal shaft

End

FIG. 4
APPARATUS AND METHOD FOR EXERCISING A USER'S MUSCLES

RELATED APPLICATIONS

[0001] None

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH

[0002] Not Applicable

THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT

[0003] Not Applicable

REFERENCE TO A SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING

[0004] Not Applicable

BACKGROUND OF THE INVENTION

[0005] Exercise machines using weight stacks are known. The advantages of exercise machines using weight stacks include not requiring a spotter, reducing the risk of injury, and not loading and unloading weights. It also provides a more realistic resistance loading than elastic bands or other non-weight exercise machines. Despite this there have been drawbacks with weight machines. For instance, the machine normally defines an exercise path. As a result, the user does not get the fine motor and balance skills required by free weights. There have been attempts to solve this problem, by allowing greater degrees of freedom in certain weight machines. For instance, one rowing machine provides a ball joint to allow the user a wide range of motions. However, most of these solutions are very specific to the particular machine and exercise.

[0006] Another problem with weight stack machines is that the user is required to make a number of adjustments. For instance, with a standard seated bicep machine the user has to adjust the seat for their height and adjust the position of the pad on which the user’s elbow rests. Because the settings are not continuous the position of the seat and elbow pad is a compromise. In a gym setting, these adjustments have to made every time the user wants to use the machine, since the previous user is unlikely to need the same settings.

[0007] Another problem with weight stack machines is that they rarely are able to match the machine’s resistance curve to the user’s strength curve. One of the reasons for this is the adjustments to the machine do not fit the user perfectly. Another reason is that the machine mimics free weights which have a set resistance throughout the exercise. However, the human body does not have a uniform strength curve through the range of motion of an exercise. For instance, humans have less mechanical advantage at the bottom of a squat press and more mechanical advantage at the top of the squat press. Thus the strength curve is not uniform, whereas the resistance of free weights is constant. This results in suboptimal exercising of the user’s muscles.

[0008] Thus there exists a need for an exercise machine that does not require multiple adjustments before it can be used and matches a resistance curve to the user’s strength curve.

BRIEF SUMMARY OF INVENTION

[0009] An apparatus for exercising a user’s muscles that overcomes these and other problems includes a frame. A platform is attached to the frame which defines an area on which a user stands. A weight stack is attached to the frame. A lineal shaft is attached to the frame between the platform and the weight stack. A carriage runs on the lineal shaft and is attached to the weight stack by a cable. An extension arm is pivotally connected to the carriage. A handle is attached to the extension arm.

[0010] The lineal shaft and platform allow the user to adjust the machine to their body by just standing in the position that fits their body. The lineal shaft, carriage, and pivotal connected extension arm provides a resistance curve that fits the user’s strength curve.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0011] FIG. 1A is a top left perspective view of a tricep exercise machine in accordance with one embodiment of the invention;

[0012] FIG. 1B is a cross sectional view of a tricep exercise machine in accordance with one embodiment of the invention;

[0013] FIG. 1C is a right side view of a tricep exercise machine in accordance with one embodiment of the invention;

[0014] FIG. 2A is a top left perspective view of a bicep exercise machine in accordance with one embodiment of the invention;

[0015] FIG. 2B is a cross sectional view of a bicep exercise machine in accordance with one embodiment of the invention;

[0016] FIG. 2C is a right side view of a bicep exercise machine in accordance with one embodiment of the invention;

[0017] FIG. 3A is a top left perspective view of a squat exercise machine in accordance with one embodiment of the invention;

[0018] FIG. 3B is a cross sectional view of a squat exercise machine in accordance with one embodiment of the invention;

[0019] FIG. 3C is a right side view of a squat exercise machine in accordance with one embodiment of the invention;

[0020] FIG. 4 is a flow chart of the steps used in using an exercise machine in accordance with one embodiment of the invention;

[0021] FIG. 5A is a top left perspective view of a dead lift exercise machine in accordance with one embodiment of the invention;

[0022] FIG. 5B is a cross sectional view of a dead lift exercise machine in accordance with one embodiment of the invention; and
FIG. 5C is a right side view of a deadlift exercise machine in accordance with one embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The invention is directed to an apparatus for exercising a user's muscles that includes a frame. A platform is attached to the frame, which defines an area on which a user stands. A weight stack is attached to the frame. A lineal shaft is attached to the frame between the platform and the weight stack. A carriage runs on the lineal shaft and is attached to the weight stack by a cable. An extension arm is pivotally connected to the carriage. A handle is attached to the extension arm.

The lineal shaft and platform allow the user to adjust the machine to their body by just standing in the position that fits their body. The lineal shaft, carriage, and pivotally connected extension arm provides a resistance curve that fits the user's strength curve.

FIG. 1A is a top left perspective view of a tricep exercise machine 10 in accordance with one embodiment of the invention. The tricep exercise machine 10 includes a frame 12. The frame 12 is attached to a platform 14. The platform 14 is diamond or triangularly shaped and defines an area where the user stands. A weight stack 16 is attached to the frame 12. A lineal shaft 18 is attached to the frame 12. As more clearly shown in FIGS. 1B and 1C, the lineal shaft 18 slopes toward the platform 14 as it extends upward. The lineal shaft 18 is roughly centered on the longitudinal axis, which is roughly a line from the top 22 of the platform through the center of the platform 14 and roughly divides the machine 10 along a mirror image plane. A carriage 24 is attached to the lineal shaft 18 and connected to the weight stack 16 by a cable 20. In one embodiment, the carriage 24 includes a number of rollers 26, best seen in FIG. 1B. These rollers 26 allow the carriage 24 to move freely along the lineal shaft 18 including allowing the carriage 24 to rotate around the lineal shaft 18.

The carriage 24 is connected by a pivot 28 to an extension arm 30. The extension arm 30 is connected to a handle 32. In the preferred embodiment, the extension arm is rigid.

In one embodiment, the lineal shaft 18 is connected to the frame 12 by a pair of rubber dampeners 34 at the top and bottom of the lineal shaft 18. The weight stack 16 is surrounded by a shroud 36, in one embodiment. The shroud 36 is made of steel in one embodiment. In one embodiment, the weight stack 16 includes a standard pin 38 attached to the machine by a cable for adjusting the resistance level.

FIG. 1B is a cross-sectional view of a tricep exercise machine 10 in accordance with one embodiment of the invention. This view shows more clearly how the carriage 24 is connected to the cable 20 over a first pulley 40 past a second pulley 42 around a third pulley 44 attached to the weight stack 16 and back up to the second pulley 42. FIG. 1C is a right side view of a tricep exercise machine 10 in accordance with one embodiment of the invention. This view more clearly shows how the lineal shaft 18 slopes toward the platform 14 as it extends upward.

In order to use the tricep machine 10 the user first adjusts the resistance level of the weight stack 16. The user then stands on the platform 14 with their feet about shoulder width apart. The user then grabs the handle 32 and pulls the handle downward. The user can adjust the resistance profile over the exercise stroke by standing closer or nearer the weight stack 16. Note that as the user pulls down on the handle the carriage 24 travels down the lineal shaft 18. This causes the angle between the extension arm 30 and the carriage 24 to change. As the user pulls the handle down the angle between the extension arm and the handle moves from a large angle to almost zero and then a large angle again. As a result, the resistance curve goes from a high resistance to a low resistance and back to a higher resistance because of this change in angle and this matches the users the strength while performing this exercise.

Since the user is standing there is no need to adjust seat heights or any other adjustment. This makes it easy for multiple users to rotate through the machine and reduces the time the machine is not being used for exercising.

FIG. 2A is a top left perspective view of a bicep exercise machine 50 in accordance with one embodiment of the invention. Note that there are a number of similarities between the bicep machine 50 and the tricep machine 10 as a result the same reference numerals will be used for similar elements. Again the bicep machine 50 has a platform 14 attached to a frame 12. A weight stack 16 is attached to frame. A lineal shaft 18 is again attached to frame 12. In this machine 50 the lineal shaft 18 is lower and starts at essentially the height of the platform 14 and does not extend as high. The carriage 24 rests at the level of the platform 14. Note that the lineal shaft 18 slopes away from the platform as you move up the shaft 18.

FIG. 2B is a cross-sectional view of a bicep exercise machine 50 in accordance with one embodiment of the invention. This view shows that the cable 20 extends over a first pulley 52, under a second pulley 54, over a third pulley 56, under a fourth pulley 58 and is attached to the frame at 60. The fourth pulley 58 is attached to the weight stack 16. FIG. 2C is a right side view of a bicep exercise machine 50 in accordance with one embodiment of the invention. This view more clearly shows that the lineal shaft 18 for the bicep machine slopes away from the platform as it extends up.

In order to use the bicep machine the user stands on the platform 14 and lifts the handle 32 causing the user's hands to rotate from fully extended until their hands are adjacent to their chest. Note that angle between the lineal shaft 18 and the extension handle 30 is changes during the exercise stroke. This occurs because of the angle of the lineal shaft 18 and the fact that the carriage 24 is pivotally attached to the extension arm 30. As a result, the resistance curve starts with a higher resistance, is lower in the middle and then higher again at the end of the exercise stroke and this matches the users strength while performing this exercise.

FIG. 3A is a top left perspective view of a squat exercise machine 70 in accordance with one embodiment of the invention. Note that there are a number of similarities between the squat machine 70 and the tricep machine 10 as a result the same reference numerals will be used for similar elements. Again the squat machine 70 has a platform 14 attached to a frame 12. A weight stack 16 is attached to frame 12. A lineal shaft 18 is again attached to frame 12. In this machine 70 the lineal shaft 18 is lower and starts at essentially the height of the platform 14 and does not extend as high. The carriage 24 is somewhat different than for the tricep machine 10 and the bicep machine 50. In this case the carriage 24 still has rollers (as best seen in FIG. 3B) 26 but the housing of the carriage 24 is much longer. A pair of extension arms 30 are attached to handles 32. The extension arm 30s are still pivotally 28 attached to the carriage 24. A brace 72 is attached between the extension arms 30 and the lower part of the
Carriage 24. Note that the brace 72 is pivotally attached to the carriage 24 and pivotally attached to the extension arms 30. The brace 72 includes an adjustment pin 80 for setting an initial height of the shoulder pads 78. Unlike the bipec and tricep machine, the angle between the carriage and the extension arms 30 remain set throughout the exercise stroke. The extension arms 30 only pivot to set an starting position. A shoulder pad 78 is attached to the ends of both extension arms 30. Note that the lineal shaft 18 slopes away from the platform 14 as you move up the shaft 18.

[0035] FIG. 3B is a cross sectional view of a squat exercise machine 70 in accordance with one embodiment of the invention. This view shows the cable 20 extends from the carriage 24 under a first pulley 82, under a second pulley 84, over a third pulley 86 and is attached to the weight stack 16. FIG. 3C is a right side view of a squat exercise machine 70 in accordance with one embodiment of the invention. This view shows that the lineal shaft 18 slopes away from platform as the lineal shaft extends upward.

[0036] In operation the user adjusts the weight stack 16 to the desired resistance level. The user then stands on the platform 14 facing from the weight stack 16. The user squats and places their shoulders against the shoulder pads 78. The user then straightens their legs. The angle of the carriage 24 and the cable 20 changes to match the user’s strength curve to the resistance curve of the machine 70. In this case the resistance curve starts at the lowest and increases throughout the exercise stroke. The squat machine 70 also requires the user to perform the exercise with proper form, keeping the user to back straight throughout the stroke.

[0037] FIG. 4 is a flow chart of the steps used in using an exercise machine in accordance with one embodiment of the invention. The process starts, step 100, by standing on the platform at step 102. The user then sets the resistance level at step 104. The user then grabs the handle that runs on the lineal shaft at step 106. At step 108, the user moves the handle causing the carriage to move along the lineal shaft, which ends the process at step 110.

[0038] FIG. 5A is a top left perspective view of a dead lift exercise machine 120 in accordance with one embodiment of the invention. This machine is fairly similar to the squat machine in FIG. 3, except the lineal shaft 18 is straight not tilted from vertical. The carriage 24 is attached to a brace 72 with the extension arms 122 attached to lower portion of the carriage 24. The handles 124 are attached to the extension arms 122.

[0039] FIG. 5B is a cross sectional view of a dead lift exercise machine 120 in accordance with one embodiment of the invention. This figure shows that the cable 20 connects to the carriage 24 under pulley 126 and pulley 128 then over pulley 130 to the weight stack 16. Unlike the squat machine the angle between the cable 20 and the carriage 24 does not change throughout the exercise stroke. As a result, the resistance curve is flat through the exercise stroke, but so is the user’s strength curve through the exercise. So the machine again matches the user’s strength curve to its resistance curve.

[0040] Thus there has been described an exercise machine that is easy to use, matches a user’s strength curve to the resistance curve, and requires a minimal number of adjustments. This machine more effectively works the user’s muscles and is able to be used by more athletes in a given period of time.

[0041] While the invention has been described in conjunction with specific embodiments thereof, it is evident that many alterations, modifications, and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such alterations, modifications, and variations in the appended claims.

What is claimed is:
1. An apparatus for exercising a user’s muscles, comprising:
   a frame;
   a platform attached to the frame defining an area on which a user stands;
   a weight stack attached to the frame;
   a lineal shaft attached to the frame between the platform and the weight stack;
   a carriage running on the lineal shaft and attached to the weight stack by a cable,
   an extension arm pivotally connected to the carriage; and
   a handle attached to the extension arm.
2. The apparatus of claim 1, wherein the lineal shaft is essentially vertical.
3. The apparatus of claim 3, wherein the lineal shaft is canted at an angle.
4. The apparatus of claim 1, wherein the lineal shaft slopes away from the platform and essentially extends along the center longitudinal axis of the apparatus.
5. The apparatus of claim 1, further including a rubber dampener between the lineal shaft and the frame.
6. The apparatus of claim 1, wherein the platform is roughly triangular.
7. An apparatus for exercising a user’s muscles comprising:
   a frame;
   a weight stack attached to the frame;
   a lineal shaft attached to the frame;
   a carriage traveling on the lineal shaft attached to the weight stack by a cable; and
   an extension arm pivotally attached to the carriage.
8. The apparatus of claim 7, further including a platform attached to the frame.
9. The apparatus of claim 7, wherein a resistance curve essentially matches a strength curve.
10. The apparatus of claim 7, wherein the lineal shaft is essentially vertical.
11. The apparatus of claim 11, wherein the lineal shaft slopes away from the weight stack.
12. The apparatus of claim 8, wherein the platform is diamond shaped.
13. The apparatus of claim 7, further including a dampener between the lineal shaft and the frame.
14. The apparatus of claim 7, further including a shroud enclosing the weight stack.
15. A method of exercising a user’s muscles comprising the steps of:
   standing on a platform;
   setting a resistance level;
   grabbing a handle attached to a carriage running on a lineal shaft; and
   moving the handle causing the carriage to move along the lineal shaft.
16. The method of claim 15, wherein the step of standing on the platform includes selecting a position wherein a resistance curve essentially matches a strength curve.

17. The method of claim 15, wherein the step of grabbing the handle does not include adjusting a handle length.

18. The method of claim 15, wherein the step of standing on the platform includes the step of selecting a diamond shaped platform.

19. The method of claim 15, wherein the step grabbing the handle includes the step of selecting the lineal shaft to be essentially vertical.

20. The method of claim 19, wherein the step of selecting the lineal shaft to be essentially vertical includes the step of selecting the lineal shaft to slope away from the platform.