A resistance training element is described. The resistance training element includes a primary resistance element including a selectable load having a first increment, an incremental resistance element, and an engagement element that is able to selectively couple the incremental resistance element to the primary resistance element. An incremental resistance element includes: a load including a weighted cylinder; and an engagement element including: a body able to rotate about a first shaft; a coupling element able to be attached to the load via a receptacle of the cylinder; and a handle extending out from the body. A resistance exercise machine includes: a selectable weight stack that is able to move along a central shaft; a resistance element that is able to move parallel to the central shaft; and an engagement element able to selectively couple the resistance element to the selectable weight stack.
SELECTABLE INCREMENTAL RESISTANCE ELEMENT

BACKGROUND OF THE INVENTION

[0001] Existing exercise machines offer selectable resistance elements such as a weight stack. Such stacks include a number of "plates". A user may select a range of resistance amounts with resolution equal to the weight of each plate.

[0002] Some users may wish to set the resistance at smaller increments than the weight of a plate. Existing solutions may require a user to manually place additional resistance elements on the stack or otherwise engage alternative resistance elements such as a plate oriented at the opposite end of the weight stack from the other plates. Such a solution may be cumbersome and difficult to engage and may either limit the user's range of motion or be disengaged when a user moves the weight stack too far.

[0003] Thus there is a need for equipment that allows users to easily and selectively add incremental resistance when using a weight stack.

BRIEF SUMMARY OF THE INVENTION

[0004] Some embodiments provide a way to include primary and incremental resistances when performing an exercise using a machine. The primary resistance may be provided by an element such as a weight stack having multiple plates aligned along a movement axis. The incremental resistance may include a weighted cylinder that is arranged parallel to the movement axis. The incremental resistance may be engaged by partially rotating an engagement element about the movement axis. Such an engagement element may include a receptacle of the cylinder. The engagement element may include a portion that is able to rotate about a pivot axis perpendicular to the movement axis such that the engagement element is able to automatically move to a position that does not interfere with the movement of the weight stack.

[0005] A first exemplary embodiment provides a resistance training element including: a primary resistance element including a selectable load having a first increment; an incremental resistance element; and an engagement element that is able to selectively couple the incremental resistance element to the primary resistance element.

[0006] A second exemplary embodiment provides an incremental resistance element including: an incremental load having a weighted cylinder; and an engagement element including: a body able to rotate about a shaft; a coupling element able to be attached to the incremental load via a receptacle of the cylinder; and a handle extending out from the body.

[0007] A third exemplary embodiment provides a resistance exercise machine including: a selectable weight stack that is able to move along a central shaft; a resistance element that is able to move parallel to the central shaft; and an engagement element able to selectively couple the resistance element to the selectable weight stack.

[0008] The preceding Brief Summary is intended to serve as a brief introduction to various features of some exemplary embodiments of the invention. Other embodiments may be implemented in other specific forms without departing from the spirit of the invention.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0009] The novel features of the invention are set forth in the appended claims. However, for purpose of explanation, several embodiments of the invention are illustrated in the following drawings.

[0010] FIG. 1 illustrates a front perspective view of a combinational resistance element of some embodiments;

[0011] FIG. 2 illustrates a rear perspective exploded view of the combination resistance element of FIG. 1;

[0012] FIG. 3 illustrates a rear perspective view of the combination resistance element of FIG. 1 with the incremental resistance element disengaged;

[0013] FIG. 4 illustrates a rear perspective view of the combination resistance element of FIG. 1 with the incremental resistance element engaged during use;

[0014] FIG. 5 illustrates a rear perspective view of the combination resistance element of FIG. 1 with the incremental resistance element engaged;

[0016] FIG. 6 illustrates a rear perspective view of the combination resistance element of FIG. 1 with the incremental resistance element engaged during use;

[0017] FIGS. 7A-7B illustrate a top view of the combination resistance element of FIG. 1 when the incremental resistance element is engaged and disengaged;

[0018] FIG. 8 illustrates a rear perspective view of the combination resistance element of FIG. 1 with the incremental resistance element latch in an obstructive position during use;

[0019] FIG. 9 illustrates a rear perspective view of the combination resistance element of FIG. 1 with the incremental resistance element latch being moved to a non-obstructive position during use; and

[0020] FIGS. 10A-10C illustrate a rear view of the combination resistance element of FIG. 1 with the incremental resistance element latch being moved to a non-obstructive position during use.

DETAILED DESCRIPTION OF THE INVENTION

[0021] The following detailed description is of the best currently contemplated modes of carrying out exemplary embodiments of the invention. The description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention, as the scope of the invention is best defined by the appended claims.

[0022] Various inventive features are described below that can each be used independently of one another or in combination with other features. Broadly, some embodiments of the present invention generally provide a selectable combination load for use with resistance exercise machines. Such a combination load may allow a user to selectively engage an incremental resistance element in parallel with a primary resistance element. Several more detailed embodiments of the invention are described below.

[0023] Throughout this disclosure, "primary" resistance may refer to loads that are able to provide a selectable resistance during an exercise movement. For instance, a weight stack may include a number of plates which allow users to select a sub-set of the available plates that will provide a particular load during the movement. "Incremental" resistance may refer to loads that provide an additional selectable resistance that provides a smaller incremental change than the primary resistance. For instance, some embodiments may
include an incremental resistance element that adds half as much weight as a single plate from a stack of plates included in the primary resistance element.

[0024] FIG. 1 illustrates a front perspective view of a combinational resistance element 100 of some embodiments. As shown, the resistance element may include a primary resistance element 110 (e.g., a weight stack), an incremental resistance element 120 (e.g., a weighted cylinder that moves along a shaft), and an engagement element 130.

[0025] FIG. 2 illustrates a rear perspective exploded view of the combination resistance element 100. As shown, the resistance element may include a central shaft 205 associated with the weight stack 110. The engagement element 130 may be coupled to the weight stack 110 along the central shaft 205. As shown, the engagement element 130 may include a handle 210, a body 215, a set of flanges 220, a collar 225 and set screw 230, a set of stop rods 235, and a coupling element 240 and pivot screw 245. The incremental load 120 may include a base connector 250, a rod 255 and cylinder 260, and a coupling receptacle 265.

[0026] The handle 210 may be made of various appropriate materials (e.g., metal, rubber, etc.). The handle may be coupled to the body 215 via a post as shown and/or other appropriate ways (e.g., adhesives, screws, etc.).

[0027] The body may include a through-hole that is able to be placed over the shaft 205. In addition, the body 215 may include a post and/or other appropriate elements that may allow the handle 210 to be attached to the body 215. The body may further include various receptacles (e.g., threaded holes) that may allow other elements to be coupled to the body.

[0028] The flanges 220 may be adapted to be placed around the shaft 205 and within the through-hole of the body 215, such that the body is able to move about the shaft 205. The collar 225 and set screw 230 may allow the body 215 to be held in a fixed position along the shaft 205. The stop rods 235 may be coupled to the body via a set of receptacles. The stop rods may limit the movement of the coupling element 240 about the pivot screw 245.

[0029] The base connector 250 may include a hole or other appropriate element that may allow the incremental resistance element 120 to be coupled to the frame supporting the primary resistance element 110. The cylinder 260 may move along the rod 255 parallel to the axis of movement of the weight stack 110 along the shaft 205. The receptacle 265 may be able to accept the coupling element 240 such that the incremental load 120 is able to be selectively engaged.

[0030] The cylinder 260 may be sized in various appropriate ways (e.g., varying length, inner diameter, outer diameter, etc.) and/or include various appropriate materials to provide the desired amount of incremental resistance. The rod or shaft 255 may be sized such that the cylinder 260 is able to move freely along the shaft 255 without excessive deviation from a straight-line path. The shaft length may be selected based on various appropriate factors (e.g., type of exercise machine, length of the associated cylinder, etc.).

[0031] During use, a user may select a primary resistance 110 (e.g., by inserting a pin into a specific location along the shaft 205). The user may then selectively engage the incremental load 120 by rotating the engagement element 130 such that the engagement element is positioned to lock in place with the receptacle 130. The user may disengage the incremental load 120 by rotating the engagement element away from the receptacle 130 such that the weight stack 110 is able to move freely alongside the incremental load 120.

[0032] One of ordinary skill in the art will recognize that different embodiments may be implemented in various different ways without departing from the spirit of the invention. For instance, different embodiments may include differently sized elements. As another example, different embodiments may include different specific locations for various elements (e.g., set screw position, stop rod position, etc.).

[0033] FIG. 3 illustrates a rear perspective view of the combination resistance element 100 with the incremental resistance element 120 disengaged. FIG. 4 illustrates a rear perspective view of the combination resistance element 100 with the incremental resistance element 120 disengaged during use.

[0034] FIG. 5 illustrates a rear perspective view of the combination resistance element 100 with the incremental resistance element 120 engaged. FIG. 6 illustrates a rear perspective view of the combination resistance element 100 with the incremental resistance element 120 engaged during use.

[0035] FIG. 7A illustrates a top view of the combination resistance element 100 when the incremental resistance element 120 is engaged via the engagement element 130. FIG. 7B illustrates a top view of the combination resistance element 100 when the incremental resistance element 120 is disengaged via the engagement element 130.

[0036] FIG. 8 illustrates a rear perspective view of the combination resistance element 100 with the incremental resistance element latch 130 in an obstructive position during use. In this example, the latch 130 position would prevent the selected portion of the weight stack 110 from returning to a fully lowered position.

[0037] FIG. 9 illustrates a rear perspective view of the combination resistance element 100 with the incremental resistance element latch 130 being moved to a non-obstructive position during use.

[0038] FIGS. 10A-10C illustrate a rear view of the combination resistance element 100 with the incremental resistance element latch 130 being moved to a non-obstructive position during use. As shown, the cylinder 260 may include an angled top portion that may cause the coupling element 240 to rotate about the pivot screw 245 and the shaft 205 such that the latch 130 is moved to a location that allows the selected portion of the weight stack 110 to return to a fully lowered position.

[0039] The foregoing relates to illustrative details of exemplary embodiments of the invention and modifications may be made without departing from the spirit and scope of the invention as defined by the following claims.

1 claim:
1. A resistance training element comprising:
   a primary resistance element comprising a selectable load having a first increment;
   an incremental resistance element; and
   an engagement element that is able to selectively couple the incremental resistance element to the primary resistance element.

2. The resistance training element of claim 1, wherein the primary resistance element comprises a weight stack.

3. The resistance training element of claim 1, wherein the incremental resistance element comprises a weighted cylinder that moves along a shaft.

4. The resistance training element of claim 1, wherein the incremental resistance element comprises a load that is half the first increment.
5. The resistance training element of claim 1, wherein the primary resistance element comprises a movement shaft and the engagement element is able to rotate about the movement shaft.

6. The resistance training element of claim 5, wherein at least a portion of the engagement element is able to move about a pivot axis, wherein the pivot axis is perpendicular to the movement shaft.

7. The resistance training element of claim 1, wherein the primary resistance element comprises a first movement shaft, the incremental resistance element comprises a second movement shaft, and the first movement shaft is parallel to the second movement shaft.

8. An incremental resistance element comprising:
   a load comprising a weighted cylinder; and
   an engagement element comprising:
   a body able to rotate about a first shaft;
   a coupling element able to be attached to the load via a receptacle of the cylinder; and
   a handle extending out from the body.

9. The incremental resistance element of claim 8, wherein the first shaft is associated with a weight stack.

10. The incremental resistance element of claim 8, wherein the weighted cylinder moves along a second shaft.

11. The incremental resistance element of claim 10, wherein the second shaft is parallel to the first shaft.

12. The incremental resistance element of claim 8, wherein the coupling element is able to automatically rotate about the first shaft and rotate about a pivot screw to move the coupling element to a non-obstructive position when the coupling element is not attached to the incremental load.

13. The incremental resistance element of claim 8, wherein the coupling element comprises a round opening that is able to enclose at least a portion of the weighted cylinder.

14. The incremental resistance element of claim 13, wherein the weighted cylinder includes a receptacle that is able to receive the round opening.

15. A resistance exercise machine comprising:
   a selectable weight stack that is able to move along a central shaft;
   a resistance element that is able to move parallel to the central shaft; and
   an engagement element able to selectively couple the resistance element to the selectable weight stack.

16. The resistance exercise machine of claim 15, wherein the resistance element comprises a weighted cylinder and support rod.

17. The resistance exercise machine of claim 15, wherein the engagement element is able to rotate about the central shaft.

18. The resistance exercise machine of claim 15, wherein at least a portion of the engagement element is able to rotate about a pivot axis that is parallel to the central shaft.

19. The resistance exercise machine of claim 15, wherein the engagement element comprises a handle; a body coupled to the handle, and a coupling element coupled to the body.

20. The resistance exercise machine of claim 19, wherein the coupling element comprises a hook able to engage a receptacle of the resistance element.

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