An adjustable dumbbell, comprises a primary section including a plurality of end structures, a handle and a weight selection structure configured to be advanced from the primary section and having a weight selection mark showing the amount of weight selected; and a plurality of nested weights each constructed from a pair of corresponding attached plates arranged in a longitudinal stack and each plate having a corresponding structure configured to accept the weight selection structure. In one embodiment, the weight selection structure includes a gear attached to the primary section for rotation by a user and a toothed rod coupled to the gear which is displaced into the nested weights a distance corresponding to the mark showing the amount of weight selected.
WEIGHT ADJUSTABLE DUMBBELL

RELATED APPLICATIONS


FIELD

[0002] The present invention relates to bodybuilding equipment generally and more particularly to a weight adjustable dumbbell.

BACKGROUND

[0003] A dumbbell is a weight designed for lifting during physical exercise. In particular, a dumbbell is useful for exercising pectoral muscles and building arm strength. The dimensions of a dumbbell are typically small and therefore it does not require a dedicated training area. Additionally, use of dumbbells provides efficient results to the exercise practitioner. Thus, sports practitioners, especially those who train in exercise gyms, prefer dumbbells as an exercise tool. A conventional dumbbell includes a handle and two bell heads. The bell heads are fixed at opposite ends of the handle. Exercise practitioners can conduct weight burden training by grasping the handle and lifting the dumbbell. Such movements can be done both for exercise and to beautify the person exercising.

[0004] In a conventional dumbbell, the weight of the dumbbell is fixed. Therefore, if the exercise practitioner desires to exercise with different weights, i.e., for different muscle groups, the practitioner must purchase dumbbells of different weights as he or she wishes to use during his or her workout. Further, as the nation's economy develops and people's standard of living improves, the popularity of various forms of exercise, including those requiring dumbbells, has increased dramatically. Additionally, the demographics of those who use dumbbells are also changing. No longer is it the case that only young and middle-aged men use dumbbells as part of their exercise regimen. Today, women, children, and the elderly are increasingly using dumbbells. Due to this demographic change, within a given family or household there may be a need for dumbbells having a wide range of weights to ensure that each family member has a dumbbell or dumbbells of the appropriate weight.

[0005] The need for dumbbells of varying weights spurred the invention of the weight adjustable dumbbell. The weight adjustable dumbbell enables the exercise practitioner or family to possess one dumbbell that meets the needs of different training periods and family members of different ages by providing a dumbbell whose weight can be adjusted. The prior art adjustable dumbbell includes a rod-shaped handle. At the two opposite ends of the handle, a plurality of circular weight plates may be symmetrically attached. To increase the weight of the dumbbell, circular plates are symmetrically added to the opposite ends of the handle. To decrease the weight of the dumbbell, circular plates are symmetrically removed from the opposite ends of the handle. The circular plates are secured at the two ends of the handle by fitting a screw bolt through a screw cap at each end of the handle.

[0006] Despite the fact that the prior art adjustable dumbbell provides weight adjustability, the prior art design has several disadvantages. First, because the plates are circular, they easily roll. This rolling of the dumbbell may create a safety hazard when the dumbbell is placed on the ground. Second, the circular plates placed at the two ends of the handle are separated from each other and must be properly paired to each other so that the weight on each end of the handle is equal. This pairing requirement makes assembly of the dumbbell more complicated and invites mistakes by the person assembling the dumbbell. Third, the circular plates are secured at the two ends of the handle by fitting a screw bolt through a screw cap. Inevitably, vibrations are produced while the dumbbells are being used for exercise and these vibrations loosen the screw bolt and cap, causing the circular plates to be less securely fixed to the handle and effecting the operation of the dumbbell.

SUMMARY

[0007] The present invention addresses the disadvantages of the prior art by providing an adjustable dumbbell configured for quick and easy adjustment, safe locking, and equally distributed weights.

[0008] An adjustable dumbbell includes a primary section having a plurality of end structures, a handle and a weight selection structure configured to be advanced from the primary section and having a weight selection mark showing the amount of weight selected. The adjustable dumbbell also includes a plurality of nested weights each constructed from a pair of corresponding attached plates arranged in a longitudinal stack and each plate having a corresponding structure configured to accept the weight selection structure.

[0009] In a first aspect of the present invention, the weight selection structure includes a gear attached to the primary section for rotation by a user and a toothed rod coupled to the gear which is displaced into the nested weights a distance corresponding to the mark showing the amount of weight selected.

[0010] In a second aspect of the present invention, the corresponding structure of each plate that is configured to accept the weight selection structure is a hole.

[0011] In a third aspect of the present invention, the primary section includes a plurality of cross members configured to support the end structures.

[0012] In a fourth aspect of the present invention, the weight selection structure includes a first weight selector disposed within a first cross member for coupling plates adjacent to a first end structure of the primary section, and a second weight selector disposed within a second cross member for coupling plates adjacent to a second end structure of the primary section. The first weight selector may include a first gear attached to the primary section for rotation by a user and a first toothed rod coupled to the first gear which is displaced into a first side of the nested weights a distance corresponding to the mark showing the amount of weight selected. The second weight selector may include a second gear attached to the primary section for rotation by the user and a second toothed rod coupled to the second gear which is displaced into a second side of the nested weights a distance corresponding to the mark showing the amount of weight selected.

[0013] In a fifth aspect present of the invention, the plates are marked showing the amount of weight corresponding to the respective plate when coupled to the primary section.
In a sixth aspect of the present invention, selected cross members include a cushion while other cross members do not include a cushion.

In a seventh aspect of the present invention, the nested weight assembly the plates at the first side are connected to the corresponding plates at the second side by means of coupling rails. The coupling rails may include side rails and bottom rails.

The side rails may connect the sides of the plates at the first side to the sides of the corresponding plates at the second side. The lengths of the side rails may decrease in order from the top to the bottom of the primary section. The location of the joint that couples each side rail to the corresponding plates may gradually move upward from the bottom to the top of the primary section.

The bottom rails may connect the bases of the plates at the first side to the bases of the corresponding plates at the second side. The lengths of the bottom rails may increase in order from inside to outside of the primary section. The location of the joint that couples each bottom rail to the corresponding plates may gradually move outward from the middle to the two sides of the primary section.

In an eighth aspect of the present invention, each plate has a notch formed at its bottom to receive the ends of the rails at the corresponding position.

In a ninth aspect of the present invention, the toothed rod has a locking pin at one end, and a rotation button is configured at the top of the gear displaced into the recess (groove) that supports the gear, with a spring to force the gear to tightly fit into the gear recess.

The present invention provides for integrative connection and adjustment of weight plates at the two ends of a dumbbell. The integrative design prevents variation in the amount of weight placed on either end of the dumbbell. In operation of the dumbbell, a plurality of nested weights is defined by attaching the integrally connected plates at the first side to the corresponding plates at the second side of the dumbbell. In this way, the user couples the primary section to the nested weights and rotate the gear driving the toothed rod joggled therewith to move the toothed rod until the locking pin configured at one end of the toothed rod fits into the nested weights. The various positions to which the toothed rod advances reaches the plates so as to adjust the dumbbell weight through the weight selector defined by the gear and toothed rod.

The weight selection mark is configured so that the distance traveled on the gear corresponds to the number of the attached plates matching the configured weight selection mark on the plates. Thus, the displayed weight selection mark on the gear is equal to the number of plates selected by the weight selection mark after the driving movement of the gear is performed. The user is therefore able to adjust the plates at the two sides of the primary section without making mistakes in equalizing the weight at each side of the dumbbell. The user is also able to select suitable weights according to the weight selection mark to meet with the requirements of people of various ages or training stages (which require different dumbbell weights).

Thus, quick and easy weight adjustment of the dumbbell is possible. The attachment of the plates to the primary section is implemented through the use of the bottom rails to limit the vertical movement of the plates with respect to the primary section, and through the use of the side rails to limit the lateral movement of the plates with respect to the primary section. The weight selector configured on the primary section operates by penetrating the holes in the plates (plate holes) to limit the movement of the nested weights with respect to the primary section. Thus, the present invention provides steady and safe coupling between the nested weights and primary section of the dumbbell.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a frontal view of an embodiment of the present invention;
FIG. 2 is a top view of the embodiment of the present invention;
FIG. 3 is a side view of the embodiment of the present invention;
FIG. 4 is a view showing the structure of the primary section with the toothed rod;
FIG. 5 is a view showing the structure of the primary section;
FIG. 6 is a first view showing the structure of the end structure;
FIG. 7 is a cutaway view of A-A in FIG. 6;
FIG. 8 is a second view showing the structure of the end structure;
FIG. 9 is a cutaway view of B-B in FIG. 8;
FIG. 10 is a view showing the structure of the cross member;
FIG. 11A is a first view showing the structure of the side and bottom rails;
FIG. 11B is a first view showing the structure of the plate;
FIG. 12A is a second view showing the structure of the side and bottom rails;
FIG. 12B is a second view showing the structure of the plate;
FIG. 13A is a third view showing the structure of the side and bottom rails;
FIG. 13B is a third view showing the structure of the plate;
FIG. 14A is a first view showing the structure of the toothed rod;
FIG. 14B is a second view showing the structure of the toothed rod;
FIG. 15A is a view showing the structure of the rotation button; and
FIG. 15B is a view showing the structure of the gear.

DETAILED DESCRIPTION

FIG. 1 shows a frontal view of a weight adjustable dumbbell 100 (dumbbell), according to an embodiment of
the present invention. The weight adjustable dumbbell includes a primary section 1 and a plurality of nested weights 2 (nested weight assembly). The primary section includes a first end structure 11, a second end structure 12, a handle 13, a first weight selection structure 31, a second weight selection structure 32, a first weight selection mark 41, and a second weight selection mark 42 (see FIG. 2). An exercise practitioner, or user, grabs and holds the dumbbell at the handle. The weight selection structures include toothed rods 312, 322 (FIG. 4) configured to be advanced from the primary section into corresponding plate holes 211, 222 (not shown) to adjust the weight. The weight selection marks show the amount of the weight selected. The handle is part of the primary structure and is located between the first end structure and the second end structure.

[0044] The first end structure and the second end structure may be collectively referred to herein as the end structure. The first weight selection structure and the second weight selection structure may be collectively referred to herein as the weight selection structure.

[0045] In the weight selection structure, the first weight selection structure is disposed on the first end structure and the second weight selection structure is disposed on the second end structure. The first weight selection mark shows the amount of weight selected and disposed on the first end structure from the nested weights. The second weight selection mark shows the amount of weight selected and disposed on the second end structure from the nested weights. A plurality of cross members 15 and 16 (see FIG. 2) are disposed between the first end structure and the second end structure. The first cross member 15 and the second cross member 16 are disposed at either side of the handle. The two bottom cross members 14 (FIG. 4) join the first and second end structures near the bottom of the end structures. The bottom cross members are separately arranged at the two sides of the handle. The handle and the first and second cross members may include a cushion, such as a rubber cushion.

[0046] The first weight selection structure 31 comprises a first gear 311 (FIG. 15B) and a first toothed rod 312 (FIG. 4) that couples to the first gear. A first locking pin (not shown) is disposed at one end of the first gear. The top of the first gear also has a first rotation button 3111 (FIG. 15A) and a first spring 3112 (FIG. 15B) to lock the first gear into a first groove 111 (FIG. 6) disposed on the first end structure. The first end structure further has a first hole 112 (FIG. 6) adjacent to the first groove. The first gear is displaced into the first groove and the first toothed rod is displaced into the first hole. More specifically, the first gear inserts into the first groove by means of the first spring, providing for rotation of the first gear inside the first groove. The first gear engages the first toothed rod. The rotation of the first gear drives movement of the first toothed rod into the first hole. The first cross member has a first coupling hole 151 (FIG. 10) to couple to the first toothed rod at the end of the first toothed rod that is disposed near the first end structure.

[0047] The second weight selection structure comprises a second gear (not shown) and a second toothed rod 322 (FIG. 4). The second toothed rod is configured to couple with the second gear. A second locking pin (not shown) is disposed at one end of the second gear. The top of the second gear also has a second rotation button (not shown) and a second spring (not shown) to lock the second gear into a second groove (not shown) disposed on the second end structure. The second end structure also has a second hole (not shown) adjacent to the second groove. The second gear is displaced into the second groove and the second toothed rod is displaced into the second hole. More specifically, the second gear inserts into the second groove by means of the second spring, providing for rotation of the second gear inside the second groove. The second gear engages the second toothed rod. The rotation of the second gear drives movement of the second toothed rod into the second hole. The second cross member has a second coupling hole (not shown) formed at the end connecting to the second end structure. The second toothed rod is partially inserted into the second coupling hole.

[0048] The nested weight assembly 2 includes a pair of corresponding attached plate sets; a first plate set 21, and a second plate set 22. The two plate sets are arranged in a longitudinal stack. The first plate set 21 is disposed at the first side of the primary section, and the second plate set is disposed at the second side of the primary section. Each plate of the two plate sets has a corresponding plate hole 211 (FIG. 3). Plates from the first plate set are configured to couple to the first weight selection structure. Plates from the second plate set are configured to couple to the second weight selection structure. The plates of the first plate set couple to the plates of the second plate set by means of side rails 23 and bottom rails 24 (FIGS. 2 and 3). The side rails symmetrically couple to the sides of the two plate sets. The bottom rails symmetrically couple to the bottoms of the two plate sets. The lengths of the side rails decrease in order from the top to the bottom of the primary structure. The location of the joint that couples each side rail to the corresponding plates gradually moves upwards from the bottom to the top of the primary structure. The lengths of the bottom rails increase in order from inside to outside. The location of the joint that couples each bottom rail to the corresponding plates gradually moves outward from the middle to the two sides of the primary structure. Each of the plates from the two plate sets have notches 212 formed at the bottom to couple to the bottom rails.

[0049] The first toothed rod and the second toothed rod have a row of first weight location marks 30 (see FIG. 14B) and a row of second weight location marks (not shown), respectively. The amount of the weight selected is determined by the distance along the respective toothed rod to a particular weight location mark that is selected from among the respective row of weight location marks. When the first toothed rod moves inside the first end structure, a weight location mark configured thereon will show a different amount of weight selected through a first observing hole 301 (FIG. 9) of the first end structure, thus defining a first weight selection mark 41 (FIG. 2). When the second toothed rod moves inside the second end structure, a weight location mark configured thereon will show a different amount of weight selected through a second observing hole of the second end structure, thus defining a second weight selection mark 42 (FIG. 2). The plates of the first plate set and the second plate set, respectively, have a plate mark 20 that shows the amount of weight corresponding to a respective plate that is coupled to the primary section. The first toothed rod advances into the corresponding nested weights at the first side of the primary section by means of
the first weight selection mark 41. By so doing, the nested weights selected from the first plate set properly include the plates spanning from the outermost to the innermost edge of the primary section. The plate mark 20 on the outermost plate is identical to the first weight selection mark 41, defined by the observance of the weight location mark 30 through the first observing hole 301.

[0050] Similarly, the second toothed rod advances into the corresponding nested weights at the second side of the primary section by means of the second weight selection mark 42. By so doing, the nested weights selected from the first plate set properly include the plates spanning from the outermost to the innermost edge of the primary section. The plate mark (not shown) configured on the outermost plate is identical to the second weight selection mark 42, defined by the observance of the weight location mark through the second observing hole.

[0051] In practice, when the primary section is assembled, the first weight selection structure and the second weight selection structure are coupled to the first end structure and the second end structure, respectively. The first gear of the first weight selection structure is displaced into the first groove. The first toothed rod fits into the first hole. The placement of the first gear in the first groove and the first toothed rod in the first hole, respectively, creates a joggle between the first toothed rod and the first gear. A joggle is a joint between two pieces of material formed by a notch and a fitted projection. The first gear locks into the first groove, which may be covered by a cap plate (not shown), under the application of the weight selection structure 32 couple in the same way as described above with respect to the first gear and the first toothed rod.

[0052] The first toothed rod is inserted into the first coupling hole 151 of the first cross member, which in turn connects the first end structure to the second end structure. The second cross member operates in the same manner as described in the previous sentence with respect to the first cross member. The handle and the two bottom cross members respectively connect the first end structure to the second end structure under application of screws (not shown), thus defining an integrative primary section which may be used as a dumbbell of the lightest weight.

[0053] To assemble the nested weights, a plate from the first plate set is coupled to a corresponding plate from the second plate set. Corresponding plates 21, 22 are connected by the side rails and the bottom rails 23, 24 by welding or other means of attachment. The lengths of the attached side rails decrease in order from the bottom to the top of the primary section (FIG. 1). The location of the coupling between the side rails and the corresponding plates moves upward along the two sides from the bottom of the primary section (as shown in FIGS. 1, 11A, 12A, and 13A). Likewise, the lengths of the attached bottom rails increase in order from inside to outside. The location of the coupling between the extended bottom rails and the corresponding plates moves outward to the two sides from the middle of the primary section (as shown in FIGS. 11B, 12B, and 13B). A nested weight assembly is defined as an attached pair of corresponding plates from the first plate set and the second plate set. The weight of the dumbbell is based on the number of plates attached to the primary structure. Thus, to define a dumbbell weight, the first and second weight selection structures are inserted into the plate holes 211, 222 (not shown) of the attached plates.

[0054] To adjust the weight of the dumbbell, the first gear of the first weight selection structure is rotated to cause the first gear to move into a plate hole 211, 222 of one of the plates from the first plate set. The amount of weight on the dumbbell is selected by means of the weight location marks 30. The weight location marks 30 may be incremented by various scale or weight values. For example, scale values of 5, 10, 15, 20, 25, 30, 35, and 40 may be configured on the first gear, with the scale values increasing as the distance from the center of the primary section increases. When the scale value is increased, the weight of the dumbbell is correspondingly increased. Conversely, when the first gear moves inward along the primary section, the scale value is decreased and the weight of the dumbbell correspondingly decreases. With the exception of the lowest scale value (scale value 5 in the exemplary case) which is configured on the end structure, all of the other scale values (10, 15, 20, 25, 30, 35, and 40 in the exemplary case) are marked on the corresponding attached plates, with the scale values increasing from inside to outside of the primary section. When the user observes the first weight selection mark 41 through the first observing hole 301, the scale value is identical to the value on the plate at the outermost edge (outermost plate). The first toothed rod is inserted into a corresponding plate hole 211 of the outermost plate. The first toothed rod may also be inserted into plate holes 211 from other attached plates.

[0055] To increase the weight of the dumbbell, the user rotates the first gear 311 to cause the first toothed rod 312 to move outward into the plate hole 211 so that additional plates are added to the first toothed rod 312. Conversely, to decrease the weight of the dumbbell, the user rotates the first gear to cause the first toothed rod to move inward so that the number of plates held by the first toothed rod is decreased. The weight on the second side of the primary structure may be similarly adjusted by rotating the second gear of the second weight selection structure to cause the second toothed rod to move into the desired plate holes of plates from the second plate set. Therefore, the desired dumbbell weight may be easily selected by means of the connection between the first toothed rod and the first plate set and between the second toothed rod and the second plate set.

[0056] Having disclosed exemplary embodiments and the best mode, modifications and variations may be made to the disclosed embodiments while remaining within the subject and spirit of the invention as defined by the following claims.

1. An adjustable dumbbell, comprising:
   a primary section including a plurality of end structures, a handle and a weight selection structure configured to be advanced from the primary section and having a weight selection mark showing the amount of weight selected; and
   a plurality of nested weights each constructed from a pair of corresponding attached plates arranged in a longitudinal stack and each plate having a corresponding structure configured to accept the weight selection structure.
2. The adjustable dumbbell of claim 1, wherein:
   the weight selection structure includes a gear attached to
   the primary section for rotation by a user and a toothed rod coupled to the gear which is displaced into the
   nested weights a distance corresponding to the mark showing the amount of weight selected.
3. The adjustable dumbbell of claim 1, wherein:
   the corresponding structure of each plate that is configured to accept the weight selection structure is a hole.
4. The adjustable dumbbell of claim 2, wherein:
   the corresponding structure of each plate that is configured to accept the weight selection structure is a hole.
5. The adjustable dumbbell of claim 1, wherein:
   the primary section includes a plurality of cross members configured to support the end structures.
6. The adjustable dumbbell of claim 2, wherein:
   the primary section includes a plurality of cross members configured to support the end structures.
7. The adjustable dumbbell of claim 5, wherein:
   the weight selection structure includes a first weight selector disposed within a first cross member for coupling plates adjacent to a first end structure of the primary section, and a second weight selector disposed within a second cross member for coupling plates adjacent to a second end structure of the primary section.
8. The adjustable dumbbell of claim 7, wherein:
   the first weight selector includes a first gear attached to the primary section for rotation by a user and a first toothed rod coupled to the first gear which is displaced into a first side of the nested weights a distance corresponding to the mark showing the amount of weight selected; and the second weight selector includes a second gear attached to the primary section for rotation by the user and a second toothed rod coupled to the second gear which is displaced into a second side of the nested weights a distance corresponding to the mark showing the amount of weight selected.
9. The adjustable dumbbell of claim 8, wherein:
   the corresponding structure of each plate that is configured to accept the weight selection structure is a hole.
10. The adjustable dumbbell of claim 1, wherein:
    the plates are marked showing the amount of weight corresponding to the respective plate when coupled to the primary section.
11. The adjustable dumbbell of claim 2, wherein:
    the plates are marked showing the amount of weight corresponding to the respective plate when coupled to the primary section.
12. The adjustable dumbbell of claim 7, wherein:
    the plates are marked showing the amount of weight corresponding to the respective plate when coupled to the primary section.
13. The adjustable dumbbell of claim 8, wherein:
    the plates are marked showing the amount of weight corresponding to the respective plate when coupled to the primary section.
14. The adjustable dumbbell of claim 5, wherein:
    selected cross members include a cushion while other cross members do not include a cushion.
15. The adjustable dumbbell of claim 7, wherein:
    selected cross members include a cushion while other cross members do not include a cushion.
16. The adjustable dumbbell of claim 8, wherein:
    selected cross members include a cushion while other cross members do not include a cushion.

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