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Adjustable Exercise Apparatus

An adjustable exercise apparatus is provided that comprises a support component, first and second actuation elements, and first and second straps. The support component can be a belt or vest, for example, and can include first and second ends that can be interconnected to form the support component in a loop. The first and second actuation elements are disposed along the support component and can be used to engage a portion of the respective first and second straps. Distal ends of each of the first and second straps can be engaged by a user for performing an exercise. In this regard, the straps can be at least partially elastically deformable. Further, the first and second actuation elements can be used to adjust the lengths of the straps to alter the tensile force exerted by the straps during exercise.
ADJUSTABLE EXERCISE APPARATUS

BACKGROUND

[0001] 1. Field of the Inventions

[0002] The present inventions relate generally to exercise equipment, and more specifically, to a uniquely configured adjustable exercise apparatus having a pair of adjustable resistance straps that can be used to perform various exercises and that can allow the user to easily adjust a level of tension and/or path of motion of the straps.

[0003] 2. Description of the Related Art

[0004] In today’s society, there is an increasing demand for exercise routines and equipment that enable an individual to obtain an efficient and effective workout. The increasing demands of life generally require all individuals to be very prudent in how they use their discretionary time. Accordingly, many people hope to maximize the benefit of exercise while minimizing the amount of actual monetary and sweat capital invested into the routine. As a result of this demand, a host of exercise devices have been developed and aggressively marketed to the public.

[0005] At first, many of these devices targeted only select muscle groups of the body. In order to achieve a full-body workout, a plethora of individual devices would have been required. Over time, however, several devices were developed that were multifunctional and could allow an individual to get a complete workout by using the device in different ways.

[0006] More recently, multifunctional devices have evolved into stand-alone home gym devices. In addition, various multi-use cardiovascular exercise devices have been developed. While each of these devices can be used to perform multiple exercises, these devices are generally large and cumbersome structures. Therefore, a substantial portion of any room in an individual’s home must be dedicated to housing this device.

[0007] Further, because individuals sometimes purchase these types of devices impetuously, the desire to use them can often fade as quickly as it developed. A possible reason for such fading commitment may lie in the fact that the individual can only perform this exercise if the individual is at home where the device is found. Indeed, individuals often travel and frequently spend a significant amount of time outside of the home. Therefore, the sedentary nature of the exercise device can be inherited by the owner over time. Although some individuals benefit from a daily visual reminder that they should exercise, such devices are rarely aesthetically pleasing structures, and often find their way into storage closets in short course.

SUMMARY

[0008] According to at least one of the embodiments of the inventions disclosed herein is the realization that the prior art exercise devices are less desirable due to their bulky size and immobility. Further, these prior art devices are often heavy and cumbersome to use due to their various structural components, removable parts, and interchangeable features. Additionally, some of the interchangeable or removable components can be lost, which can greatly frustrate the user and disrupt their exercise regimen.

[0009] In some embodiments, an adjustable exercise apparatus is provided that comprises at least one adjustable resistance member attached to a wearable article, such as a belt. In addition, a second adjustable resistance member can also be attached to the article such that dual resistance can be obtained using the device. In this regard, each resistance member can also include at least one tensioner or actuation element that can be used to change the tension of the first and second resistance members.

[0010] In another embodiment, an adjustable exercise apparatus is provided that comprises a support component, first and second resistance straps, and first and second actuation elements. The support component can have first and second ends and define an outer periphery. The first and second ends of the support component can be coupled together to form the support component in a loop.

[0011] The first and second resistance straps can each define a proximal portion and a distal end. The distal ends thereof can be engageable by the user for performing an exercise.

[0012] The first and second actuation elements can be attached to the support component intermediate the first and second ends at respective first and second positions along the support component. The first and second actuation elements can be configured to receive and securely attach at least a portion of the respective ones of the proximal portions of the first and second resistance straps to define respective first and second attachment points along the respective proximal portions thereof. In this regard, the first and second positions and the first and second attachment points can at least partially correspond to respective ones of first and second loads exerted by the first and second resistance straps when moved by the user from an unloaded position to a loaded position during performance of the exercise.

[0013] Further, the apparatus can be configured such that the distal end of the first resistance strap extends from the first actuation element toward the first end of the support component about the periphery of the support component, and the distal end of the second resistance strap extends from the second actuation element toward the second end of the support component about the periphery of the support component.

[0014] In yet another embodiment, the exercise apparatus can comprise a vest. For example, the vest can have interconnected first and second portions to fasten the vest about a torso of a user. The vest defines an outer periphery. In such an embodiment, first and second straps can extend along the outer periphery of the vest. The first and second straps can each have a proximal portion being securable to the vest and a distal end being engageable by the user for performing an exercise. Further, at least a first pair of actuation elements can be attached to the outer periphery of the vest at respective ones of first and second positions. The actuation elements can be configured to secure thereto at least a portion of the respective ones of the proximal portions of the first and second straps.

[0015] Furthermore, such an embodiment of the exercise apparatus can also comprise first and second guide components that can extend along a rear portion of the vest for receiving and supporting the respective ones of the first and second straps in at least one of a vertical and a horizontal orientation along the periphery of the vest. The first and second straps can each attach to the respective ones of the first and second actuation elements to define respective first and second attachment points therealong. The first and second positions and the first and second attachment points can at least partially correspond to respective ones of first and second loads exerted by the first and second straps when moved by the user from an unloaded position to a loaded position during performance of the exercise.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The above-mentioned and other features of the inventions disclosed herein are described below with refer-
ence to the drawings of the preferred embodiments. The illustrated embodiments are intended to illustrate, but not to limit the inventions. The drawings contain the following figures:

[0017] FIG. 1 is a perspective view of an exercise apparatus, according to an embodiment.

[0018] FIG. 2 is a front view of the exercise apparatus shown in FIG. 1 with a support component being shown in hidden lines and resistance straps being shown in solid lines.

[0019] FIG. 3 is a cross-sectional view of the exercise apparatus taken along line 3-3 in FIG. 1.

[0020] FIG. 4 is a front view of the exercise apparatus as worn by a user in an implementation, according to another embodiment.

[0021] FIG. 5 is a front view of the exercise apparatus as worn by the user in another implementation, according to yet another embodiment.

[0022] FIG. 6A is a perspective view of a cam buckle of the exercise apparatus, according to an embodiment.

[0023] FIG. 6B is a side cross-sectional view of the cam buckle shown in FIG. 6A.

[0024] FIG. 7 is a front view of an exercise apparatus comprising a vest, in accordance with yet another embodiment.

[0025] FIG. 8A is a front view of the exercise apparatus shown in FIG. 7 wherein resistance straps have been moved to another position.

[0026] FIG. 8B is a rear view of the exercise apparatus shown in FIG. 8A illustrating an embodiment of guide sleeves for accommodating the resistance straps in a vertical orientation for over-the-shoulder exercises.

[0027] FIG. 8C is a rear view of the exercise apparatus shown in FIG. 8A illustrating another embodiment of guide sleeves for accommodating the resistance straps in a variety of orientations.

[0028] FIG. 9A is a schematic representation illustrating a configuration of resistance straps relative to actuation elements of the exercise apparatus, according to an embodiment.

[0029] FIG. 9B is a schematic representation of the exercise apparatus illustrated in FIG. 9A depicting another potential configuration of the resistance straps relative to the actuation elements.

[0030] FIG. 9C is another schematic representation of the exercise apparatus illustrated in FIG. 9A depicting another configuration of the resistance straps relative to the actuation elements.

[0031] FIG. 9D is another schematic representation of the exercise apparatus illustrated in FIG. 9A depicting yet another configuration of the resistance straps relative to the actuation elements.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0032] In accordance with some embodiments, an adjustable exercise apparatus is provided that enables a user to engage in a variety of exercises and to vary the desired level of effort expended in using the apparatus. The apparatus can include a central portion and at least one resistance member extending therewith. In many embodiments, the central portion of the apparatus can be fixed in place and the resistance member can be engaged by the user to perform an exercise. In some embodiments, the central portion can be a wearable article, such as a belt, harness, or other device, and the resistance member can be formed as a resilient member that resists the motion, thereby allowing the user to exercise by moving the resistance member.

[0033] The apparatus can beneficially incorporate the use of two resistance members for allowing the user to exercise two limbs of the body. In this manner, the apparatus can be configured such that the force exerted by one of the resistance members during movement is equalized by an equal and opposite force by the other resistance member.

[0034] Further, it is contemplated that the apparatus can be configured such that the force exerted by the resistance member during its movement can be selectively adjusted by the user. Thus, the user can optimize their level of exertion during the exercise. Such adjustability of the force and/or load of the resistance member can be performed by selectively varying at least one of the properties and characteristics of the apparatus. In particular, it is contemplated that in some embodiments, the length of the resistance member can be varied. In such an embodiment, the resistance member can at least partially include an elastic component. However, it is also contemplated that the position and/or configuration of the resistance member in relation to the apparatus can also be altered to modify the force and/or load of the resistance member during exercise.

[0035] In another embodiment, the apparatus can be configured such that the apparatus can be worn on a particular part of the user’s body for a given exercise and then worn on another part of the user’s body for another exercise. For example, the apparatus could be worn at the user’s waist, at the chest, and/or at the feet, to name a few possible areas. This interchangeability of the positioning and use of the apparatus can facilitate the performance of various exercises that can target desired muscle groups.

[0036] In accordance with at least one of the embodiments disclosed herein, the exercise apparatus can be configured to allow the user to exert a force against the straps in any given direction, not just in a horizontal direction. As such, the apparatus can be configured to properly counterbalance against such forces. Thus, the user may be able to comfortably wear and/or use the apparatus without experiencing twisting or deformation of the apparatus. Instead, the user can exert a steady and predictable force using the resistance straps. In order to accomplish such performance, embodiments of the exercise apparatus can be configured to allow the user to selectively adjust locations and attachment points of the straps to the exercise apparatus, the positioning of the straps, and the orientation of the straps relative to the exercise apparatus in order to allow for various types of motion.

[0037] In some embodiments, the exercise apparatus is configured to be secured to a given area of the user’s body, such as to the legs, arms, torso, pelvis, etc. In order to properly leverage against directional movement of the resistance straps in targeting a particular muscle group. Such embodiments can also effectively counterbalance forces and mitigate torsional or transverse in the exercise apparatus when a directional force is transmitted to the exercise apparatus from the resistance straps. For example, the user’s exertion of a horizontal force against a resistance strap can be opposed by a horizontal, oppositely-directed force from another resistance strap, which forces are transmitted through the exercise apparatus.

[0038] In other embodiments, the exercise apparatus can be fixed relative to certain portions of the user’s body such that the user can exert a force using the resistance that is opposed or counteracted by the portion of the user’s body to which the exercise apparatus is fixed. Further, although many of the embodiments illustrate that the straps of the exercise apparatus wrap around a rear portion from a front portion of the apparatus and finally attach to the front portion of the apparatus, the apparatus can be configured such that the straps attach in the rear portion and extend toward the front portion thereof, or vice-versa.
It is also contemplated that the exercise apparatus can be fabricated from a variety of acceptable materials. For example, various elastic and inelastic materials can be used. Further, the apparatus can be fabricated from various types of polymers, such as nylon, various elastic materials, such as rubber, metals, composites, fabrics, etc.

Referring now to FIG. 1, an embodiment of an exercise apparatus 10 is shown in a perspective view. As mentioned above, although the apparatus 10 is shown as a belt, the apparatus 10 can be variously configured as a variety of wearable or non-wearable articles. It is contemplated that whether or not the apparatus 10 can be physically worn by the user, the apparatus 10 should be configured to allow the user to easily interact with at least a portion of the apparatus to facilitate exercise using the apparatus 10.

In accordance with some embodiments, the exercise apparatus 10 can comprise a support element 20, at least one resistance strap 22, and at least one actuation element 24. The support component 20 can be configured as an elongate component or as a vest, as described herein, in order to facilitate its use by the user. The actuation element 24 can be attached to the support element 20, and in some embodiments, is fixedly attached to a unique position along the periphery 30 of the support element 20. The resistance strap 22 can extend about an outer periphery 30 of the support element 20, can be engaged by the actuation element 24, and can have at least one end that can be utilized by the user to perform an exercise. Although the apparatus 10 can include various types of biasing means, such as spring mechanisms, etc., for allowing the user to move the resistance strap 22 against a certain amount of resistance or force, the apparatus 10 preferably uses a resilient material to create an elastic spring force against which the user accomplishes physical exertion.

In the illustrated embodiment, the apparatus 10 can include the first resistance strap 22 and a second resistance strap 26, as well as the first actuation element 24 and a second actuation element 28. Thus, in the illustrated embodiment, a pair of resistance straps 22, 26 are used. In addition, it is noted that the support component 20 can define first and second ends 32, 34. A body 36 of the support component 20 can be substantially shaped as a belt, and can incorporate a variety of other features, as discussed further below. The apparatus 10 can also include first and second buckle components 38, 40. In such an embodiment, the first and second buckle components 38, 40 can be used to interconnect the first and second ends 32, 34 of the support component 20 at a central connection point (not shown) to form a loop.

In addition, it is contemplated that the apparatus 10 can include first and second implements 50, 52 that can be attached to distal ends 60, 62 of the respective ones of the first and second straps 22, 26. In the exemplary embodiment shown, the implements 50, 52 are handles that are affixed to the distal ends 60, 62 and are configured to allow the user to easily grasp and use the apparatus 10. However, other embodiments can be devised wherein the implements 50, 52 are configured to interact so as to allow the user to attach the implements 50, 52 to each other or to other structures, as desired. Further, the implements 50, 52 can be removably attachable to the respective ones of the distal ends 60, 62 of the first and second straps 22, 26.

With reference now to FIG. 2, a perspective view of the apparatus 10 is shown wherein the support component 20 is shown in hidden lines to illustrate the configuration of the first and second straps 22, 26. As shown therein, the first and second straps 22, 26 can each extend about the periphery 30 of the support component 20. In some embodiments, the straps 22, 26 can be symmetrically disposed about the periphery 30. The first and second straps 22, 26 can each define proximal portions, respectively 64, 66, and proximal ends 68, 70. In the illustrated embodiment, the first and second straps 22, 26 can be disposed adjacent to each other about the periphery 30. FIG. 3 is a cross-sectional view taken along the apparatus 10 shown in FIG. 1, and illustrates that the first strap 22 and the second strap 26 can be spatially vertically separated to allow free movement of either strap about the periphery 30 of the support component 20.

As illustrated in FIG. 2, the first and second straps 22, 26 can be attached to the respective ones of the first and second actuation elements 24, 28. In particular, it is contemplated that the first and second straps 22, 26 can be attached to the respective ones of the first and second actuation elements 24, 28 along the respective ones of the proximal portions 64, 66 thereof at respective first and second attachment points 80, 82. For example, the proximal portion 64 of the first strap 22 can be received into the first actuation element 24, and the first actuation element 24 can clamp onto or engage the first strap 22 at any of a variety of points therealong, and in particular, can engage the first strap 22 at any of a plurality of points along the proximal portion 64 thereof. In this regard, the proximal portions 64, 66 can be defined as that portion of the first and second straps 22, 26 disposed adjacent to the proximal ends 68, 70 thereof, and can be of a minor length thereof, or half or more than half of the length of the straps 22, 26.

As also shown in the exemplary embodiment of FIG. 2, the first strap 22 can at least partially extend from the first actuation element 24 in the direction of or toward the first end 32 of the support component 20 such that the distal end 60 thereof can be engaged by the user. Additionally, the second strap 26 can also at least partially extend from the second actuation element 28 in the direction of or toward the second end 34 of the support component 20 such that the distal end 62 thereof can be engaged by the user. Therefore, in use, when the user exerts force and places the first and second straps 22, 26 in tension, the first and second straps 22, 26 can distribute the force therethrough and to the support component 20. For example, FIG. 5 illustrates that forces exerted by the user can be distributed through the apparatus and be equal and opposite. In FIG. 5, the upward forces F1 and F2 are distributed through the support component 20, transmitted through the apparatus 10, and result in equal and opposite forces at the first and second ends 32, 34 of the support component 20.

In this regard, the illustrated embodiment of FIG. 2 shows that the first and second actuation elements 24, 28 can be disposed substantially adjacent the respective second and first ends 34, 32 of the support component 20. In this way, a tensile force exerted on the first strap 22 would be transferred to the support component 20 via the first actuation element 24 and be directed from the second end 34 thereof toward the first end 32 thereof. Without an equal and opposite force, this tensile force would cause the apparatus 10 to rotate in the direction of the tensile force. However, the user can beneficially use the second strap 26 to exert an opposite tensile force that would be transferred to the support component 20 via the second actuation element 28 and be directed from the first end 32 thereof toward the second end 34 thereof. In this manner, the apparatus 10 efficaciously allows the user to stress his or her muscles by exerting opposing forces on the apparatus 10.

The first and second actuation elements 24, 28 can comprise any variety of acceptable structures that can securely and/or relesably engage the respective first and second straps 22, 26. For example, the actuation elements 24, 28 can be formed as cam buckles or other similar structures.

In accordance with another aspect of some embodiments disclosed herein, the first and second actuation ele-
ments 24, 28 can be disposed at respective first and second positions 84, 86 along the support component 20. As shown in FIG. 2, the first actuation element 24 is interposed between the second end 34 of the support component 20 and the second actuation element 28, and the second actuation element 28 is interposed between the first end 32 of the support component 20 and the first actuation element 24. The actuation elements 24, 28 can be used to adjust the length of the first and second straps 22, 26. Additionally, the actuation elements 24, 28 can fixedly attach to the straps 22, 26 at the respective attachment points 80, 82 and the first and second positions 84, 86 can be manipulated, such as by attaching the actuation elements 24, 28 to the body 36 of the support component 20 at selected locations.

[0050] Accordingly, the first and second positions 84, 86 can be selected to adjust certain characteristics of the apparatus 10. For example, it is contemplated that the first and second positions 84, 86 and the first and second attachment points 80, 82 can be selected to at least partially correspond to or set the tensile resistance force exerted by the first and second resistance straps 22, 26 when moved by the user from an unloaded position to a loaded position during performance of the exercise. In some embodiments disclosed herein, the first and second actuation elements 24, 28 can be spaced apart from each other at a distance 90, which can be adjustable or fixed, as desired. In this regard, positioning of the actuation elements 24, 28 and physical characteristics of the straps 22, 26, such as their length, cross-section, and composition, can be manipulated to create a desired amount of tensile force against which the user can exert himself.

[0051] Some embodiments can be configured such that the first and second straps 22, 26 can have adjustable lengths to manipulate and/or adjust the tensile resistance of the apparatus 10. In this regard, one of the many ways in which the tensile resistance of the apparatus 10 can be made to be adjustable is to vary the length of the first and second straps 22, 26.

[0052] For example, the first and second straps 22, 26 can define first and second strap lengths. The first strap length can be measured along the first resistance strap 22 intermediate the first attachment point 80 and its distal end 60, and the second strap length can be measured along the second resistance strap 26 intermediate the second attachment point 82 and its distal end 62. Further, various materials, such as elastic bands, can be used to allow the user to stretch the first and second straps 22, 26 from an unloaded or unstretched position to a loaded or stretched position.

[0053] In some embodiments, the first and second strap lengths can correspond to respective first and second loads. In such embodiments, elastic materials can be used in the first and second straps 22, 26, which can also allow the straps 22, 26 to provide dynamic first and second loads, i.e., loads or resistance forces that increase as the straps 22, 26 are stretched from the unloaded to the loaded position.

[0054] Further, the required amount of force to move the straps 22, 26 from the unloaded to the loaded position can change when the length of the straps 22, 26 is adjusted. For example, the amount of force required by the user will tend to increase as the first and second strap lengths are decreased, and vice-versa. Thus, the user can manipulate the length of the straps 22, 26 to increase or decrease the level of exertion for the exercise.

[0055] As described herein, the first and second straps 22, 26 of the apparatus 10 can use resilient, elastic materials such that the user experiences dynamic loading of the opposing forces during exercise. However, it is also contemplated that the apparatus 10 can employ substantially inelastic materials that allow the user to engage in substantially isometric exercise.

[0056] Referring again to FIG. 2, the first and second straps 22, 26 can each include inelastic portions 100, 102 and elastic portions 104, 106. As shown therein, the inelastic portions 100, 102 can be disposed substantially along the respective ones of the proximal portions 64, 66 of the straps 22, 26. Thus, in some embodiments, the first and second actuation elements 24, 28 can be configured to engage the straps 22, 26 only along the inelastic portions 100, 102 thereof. For example, the inelastic portions 100, 102 can comprise a material such as nylon or other durable fabrics. However, as discussed herein, the first and second actuation elements 24, 28 can be used to adjust the first and second strap lengths by engaging the respective first and second straps 22, 26 at any first and second attachment points 80, 82 at any position thereon.

[0057] In addition, the elastic portions 104, 106 of the first and second straps 22, 26 can be interconnected to the inelastic portions 100, 102 thereof to form unitary straps. The respective elastic and inelastic portions 100, 102 and 104, 106 can be adjoined using materials known in the art. Additionally, it is contemplated that the respective elastic and inelastic portions 100, 102 and 104, 106 can be approximately equal in length relative to the entire length of the straps 22, 26. However, various proportions can be beneficially used as required by the design. For example, the elasticity of the elastic portions 104, 106 can influence the proportion of the respective elastic and inelastic portions 100, 102 and 104, 106. Indeed, elastic portions 100, 102 having a high elasticity may beneficially be combined with inelastic portions 100, 102 that are considerably longer than the elastic portions 100, 102, which in some embodiments can allow the first and second strap lengths to have a wide range of adjustability, and accordingly, a wide range of respective first and second loads.

[0058] Referring now to FIG. 3, the cross-section of the apparatus 10 shown in FIG. 1 illustrates that in some embodiments, the apparatus 10 can comprise a sheath 110 that is disposed about the outer periphery 30 of the support component 20. For example, the sheath 110 can be stitched or sewn to cover the first and second straps 22, 26, which can not only provide protection for the straps 22, 26, but can also help prevent inadvertent tangling or hooking of the straps 22, 26 with themselves or with other structures. The sheath 110 can cover any portion of the straps 22, 26, and preferably covers a majority of the straps 22,ler with only the ends 60, 68 and 62, 70 thereof being exposed. However, it is contemplated that in other embodiments, the sheath 110 can be replaced by a series of loops that are connected to the outer periphery 30 of the support component 20 and aid in maintaining the first and second straps 22, 26 in a generally stable position on the apparatus 10.

[0059] As mentioned, the sheath 110 can be configured to allow the ends 60, 68 and 62, 70 of the straps 22, 26 to be exposed. Accordingly, as shown in FIGS. 2 and 4, the sheath 110 can be configured to include first and second side apertures 120, 122 and first and second front apertures 124, 126. In this regard, the first and second side apertures can be configured to allow the distal ends 60, 62 of the respective first and second straps 22, 26 to pass therethrough.

[0060] The first and second side apertures 120, 122 can be disposed along medial areas of the support component 20 to allow for improved flexion and mobility of the distal ends 60, 62 of the respective straps 22, 26. Thus, the user can have a greater degree of motion with the implements 50, 52 if the straps 22, 26 are freed from the sheath 110 along the medial and/or rear areas of the support component 20.
Additionally, in the illustrated embodiment, the first and second front apertures 124, 126 can be disposed adjacent the first and second ends 32, 34 of the support component 30 with the proximal ends 68, 70 of the respective straps 22, 26 extending therethrough. In some embodiments, the first and second actuation elements 24, 28 can be fixed adjacent the first and second front apertures 124, 126, and the user can thereby easily adjust the first and second strap lengths of the straps 22, 26.

It is contemplated that the first and second side apertures 120, 122 and the first and second front apertures 124, 126 can be disposed substantially adjacent to one another along a front area of the support component 20. Such a configuration could thereby allow the user to easily access each of the implements 50, 52 and each of the actuation elements 24, 28 disposed at the respective ends 68, 70 of the straps 22, 26 for adjusting and using the apparatus 10. This general configuration is illustrated in FIG. 4.

As shown in FIG. 4, the apparatus 10 can be positioned about the torso of the user with the implements 50, 52 hanging in front of the user within reach. The user can perform a variety of upper-body exercises, such as a pectoral exercise, by extending the implements 50, 52 away from the user’s torso. Additionally, the tension of the straps 22, 26 can be increased by adjusting the first and second strap lengths, as discussed above. As mentioned above, the sheath 110 can cover at least a portion of the first and second straps 22, 26, which can serve to reduce and/or eliminate friction against other objects, such as the user’s clothing or body. Therefore, the movement of the straps 22, 26, as well as the use of the apparatus 10 in general, can be unencumbered by clothing or other objects.

The apparatus 10 can be effectively used to train various muscles of the human body, and in many embodiments, can be easily transported due to its compact size and light weight. The apparatus 10 can be used to exercise the various muscles of the body by positioning the central portion or body 36 of the support component 20 against a stationary object, which can sometimes be the user’s torso, legs, etc., and can also be surrounding structures that can safely withstand forces exerted by the user through the straps 22, 26. Accordingly then, the user can utilize the straps 22, 26 to exercise a muscle of the body, such as in the arms, legs, back, abdomen, chest, etc. Thus, exercise positions and targeted muscles can be thoroughly varied.

For example, FIG. 5 illustrates an exemplary exercise being performed by the user with the apparatus 10. In this figure, the apparatus 10 is positioned at the feet of the user, and upward forces F₁ and F₂ are exerted by the user on the first and second straps. The upward forces F₁ and F₂ are distributed through the support component 20 and result in equal and opposite forces at the first and second ends 32, 34 of the support component 20.

Referring now to FIGS. 6A-B, detailed views of an exemplary actuation element and strap are shown. FIG. 6A illustrates a perspective view of the actuation element, shown as a cam buckle 200, and a strap 202 that is looped through the cam buckle 200. The cam buckle 200 is shown in an open position 203 in FIG. 6A which thereby allows the strap 202 to freely move within the cam buckle 200. Accordingly, the user can thereby modify the length of that portion of the strap intermediate the buckle 200 and the implement/handle (not shown) in order to vary the resistance thereof.

FIG. 6B is a side cross-sectional view of the cam buckle 200 and strap 202 shown in FIG. 6A. FIG. 6B depicts the cam buckle 200 in a closed position 205 such that a lever 206 of the cam buckle 200 exepts a restraining force on the strap in order to prevent the strap 202 from being withdrawn from the cam buckle 200 in the direction of the arrow 204. As discussed herein, although the cam buckle 200 is shown as an embodiment of the actuation element, other suitable devices can also be utilized to secure an end of the strap 202 to the exercise apparatus 300.

As described in greater detail below with reference to FIGS. 7-80, the exercise apparatus can be configured to allow the user to selectively adjust the position of the straps in order to achieve a variety of exercise movements. The user can therefore exert forces in a vertical and/or horizontal direction. As such, the exercise apparatus can allow the user to exert countervailing forces to perform an exercise. Such configurations of the exercise apparatus can tend to ensure that the user’s muscles develop properly and bear loads that are appropriate for the user’s level of strength and fitness.

We refer to the embodiment shown in FIG. 7, the exercise apparatus 300 can be configured as a vest 302 that can be worn on a torso of the user. The vest 302 can define an outer periphery or exterior surface. The vest 302 can include a fastening means 304 in order to secure the vest 302 to the user. For example, the fastening means 304 can be disposed on its periphery and can include a zipper, Velcro®, buttons, or other such devices to close the vest 302 around the torso of the user. Additionally, the fastening means 304 can also include one or more buckle closures, clips, belts and belt buckles, and the like.

It is contemplated that the fastening means 304 should be selected in order to ensure that the vest 302 remains closed and secured along its central sections 306. It is necessary because in some embodiments, such as that illustrated in FIGS. 7-83, the forces exerted in stretching each of the resistance straps will opposed each other and be transmitted through the vest 302 by the actuation elements and through the central portion 306 thereof. Therefore, the central sections 306 of the vest 302 preferably should remain securely fastened.

In accordance with an embodiment of the vest 302, a plurality of actuation elements can be used for securing the resistance straps to the vest 302. The actuation elements can be selectively and/or adjustably disposed at one or more positions on the periphery of the vest 302. In some embodiments, the actuation elements can be selectively positioned at a plurality of discrete positions on the periphery of the vest 302. For example, FIG. 7 shows an embodiment in which an upper pair 310 and a lower pair 312 of actuation elements are used. In this embodiment, the user can couple distal ends 314, 316 of the respective ones of the first and second straps 318, 320 to each of the upper pair 310 of actuation elements. In this manner, the user can have the straps arranged at an upper position 322.

In like manner, as shown in dashed lines, the user can attach the distal ends 314, 316 to each of the actuation elements of the lower pair 312 in order to arrange the first and second straps 318, 320 in a lower position 324. Thus, the user can selectively configure the exercise apparatus 300 at one of the upper and lower positions 322, 324 in order to perform various exercise movements. The user can thereby target different muscle groups of the body to perform a more complete exercise regimen. Furthermore, the selectively adjustable design of the exercise apparatus 300 provides the user with a compact and versatile exercise aid. With very little effort and minimal time, the user can quickly modify the configuration of the exercise apparatus 300 in order to achieve different types of work-outs. Indeed, other configurations and designs of the exercise apparatus are contemplated, and examples of such are provided below.
FIGS. 8A and 8B are front and rear views, respectively, of another embodiment of the exercise apparatus which allows the user to perform “over-the-shoulder” exercises. The term “over-the-shoulder” can refer to the actual positioning or displacement of the straps 352, 354. FIGS. 8A and 8B illustrate an exercise apparatus 350 wherein first and second straps 352, 354 can attach to a vest 356 and extend upwardly about a rear portion 358 of the vest 356 such that the first and second straps 352, 354 come across the shoulders of the user.

In an embodiment, it is therefore contemplated that the user can grasp handles 360, 362 to perform a triceps exercise, for example, by extending the handles 360, 362 forwardly in front of the user such that the handles 360, 362 move substantially within parallel vertical planes aligned with the user. Alternatively, by adjusting the straps 352, 354 to a shortened length, the user can extend the handles 360, 362 generally vertically above the head of the user to perform a shoulder exercise, for example. By adjusting the straps 352, 354 to a greater length, the user can loop their feet into the handles 360, 362 to perform a hamstring, buttocks, or quadriceps exercise. Accordingly, the user can perform various exercises targeting muscle groups that benefit from movement within generally vertical planes (or more specifically, planes that are generally transverse or normal to a plane passing through a waist of the user).

As illustrated in FIG. 8A, the first and second straps 352, 354 include distal ends 370, 372. The distal ends 370, 372 of the respective ones of the first and second straps 352, 354 can be secured to either a lower or upper pair 374, 376 of actuation elements of the exercise apparatus 350. The configuration and spacing of the actuation elements can be varied as desired. Further, the vest 302 can be configured to allow the removable attachment of actuation elements at a variety of discrete positions and orientations thereon.

As noted, the first and second straps 352, 354 can be coupled to the upper pair 376 of actuation elements. When the user is performing an over-the-shoulder exercise, attachment of the straps 352, 354 to the upper pair 376 of actuation elements can allow for a greater available strap length in comparison to an attachment with the lower pair 374 of actuation elements. Thus, modifying the attachment position can allow the user to modify the available strap length of the first and second straps 352, 354 in order to increase or decrease resistance. Further, the user can modify the available strap length in order to facilitate use of the exercise apparatus 350 in exercises requiring more strap slack to achieve an initial or unextended position, for example, in a leg exercise.

FIG. 8B is a rear view of the exercise apparatus 350 shown in FIG. 8A. FIG. 8B illustrates an exemplary configuration of the rear portion 358 of the vest 356 which can allow the straps 352, 354 to be repositioned for over-the-shoulder exercises. As shown in FIG. 8B, the vest 356 can include a pair of guide sleeves 380. The guide sleeves 380 can extend horizontally from lateral positions of the vest 356 from one of the respective ones of the lower and upper pairs 374, 376 of the actuation elements and rise upwardly across the rear portion 358 of the vest 356. In some embodiments, such as that illustrated in FIG. 8B, the guide sleeves 380 can crisscross in the rear portion 358. However, it is contemplated that the guide sleeves 380 can extend upwardly without crisscrossing such that the first and second resistance straps 352, 354 do not crisscross in the rear portion of 358 of the vest 356.

In other embodiments, it is also contemplated that a plurality of guide sleeves 380 can be provided in order to allow the user to selectively configure the arrangement and positioning of the first and second resistance straps 352, 354. For example, the guide sleeves 380 can extend horizontally about the torso at an upper position of the upper pair 376 of the actuation elements or at a lower position of the lower pair 374 of the actuation elements. In this manner, the user can configure the exercise apparatus 350 in a desired manner.

In accordance with another aspect of the present embodiments, the guide sleeves 380 can comprise sections of continuous material, however, the guide sleeves 380 can be arranged to include a plurality of slots or apertures such that the user can more easily thread the first and second straps 352, 354 through the guide sleeves 380.

In yet other embodiments, such as that illustrated in FIG. 8C, the guide sleeves 380 can comprise a plurality of individual loops through which the first and second resistance straps 352, 354 can be passed. In such an embodiment, the first and second straps 352, 354 can be selectively passed through one or more loops in order to allow the user to configure the straps 352, 354 at any angle, orientation, and/or position, as desired.

The loops can be integrally or separately formed from the support component, which is illustrated as a vest in the present embodiment. The loops can be formed from a fabric material, or can be formed of a metal or other composite. The loops are preferably lightweight and strong. Further, the loops should allow the straps to pass therethrough with minimal friction in order to facilitate use of the apparatus. In addition, the loops can be specially configured to support the straps through a variety of strap orientations and positions.

For example, as shown in the embodiment of FIG. 8C, the guide sleeves 380 can comprise lower loops 382, upper loops 384, and common loops 386. Thus, when the straps 352, 354 are being used in the lower position, as shown in solid lines in FIG. 8C, the straps 352, 354 can be passed through the lower loops 382 and the common loops 386 in order to properly position the straps 352, 354 in a vertical orientation for an over-the-shoulder exercise. Similarly, when the straps 352, 354 are being used in the upper position, as shown in dashed lines in FIG. 8C, the straps 352, 354 can be passed through the upper loops 384 and the common loops 386 in order to properly position the straps 352, 354 in a vertical orientation for an over-the-shoulder exercise. At least some of the upper and lower loops 382, 384 can also be used to configure the straps 352, 354 in a horizontal orientation for extending the straps in a substantially horizontal plane or direction, as illustrated in FIG. 7.

In accordance with some embodiments, a minimal number of loops can be used for allowing variability of simple configurations and numerous loops can be used for allowing maximum variability. Unlike embodiments using continuous sections of material that are stitched or sewn to the rear portion 358 of the vest 356 to form the guide sleeves 380, as illustrated in FIG. 8B, the loops 382, 384, 386 can generally provide a greater range of alternative configurations. However, due to the exertion of forces on the guide sleeves 380 or loops, such should be securely stitched or otherwise attached to the vest 356. Other modifications and combinations are also contemplated.

Referring now to FIGS. 9A-9D, exemplary arrangements of first and second straps 400, 402 relative to upper and lower pairs 404, 406 of actuation elements are shown. For example, as illustrated in FIG. 9A, the first and second straps 400, 402 can be coupled to the lower pair 406 of actuation elements and extend upwardly about the vest such that the user can perform over-the-shoulder exercises. Referring to FIG. 9B, the first and second straps 400, 402 can also be coupled to the lower pair 406 of actuation elements 406. However, in this arrangement, the first and second resistance
straps 400, 402 are horizontally opposed about the torso of the user at a lower position 410. Accordingly, the user can perform exercises in a substantially horizontal plane at the lower position 410.  

[0085] Referring to FIG. 9C, another arrangement of the first and second straps 400, 402 is illustrated. In this arrangement, the first and second straps 400, 402 are coupled at their distal ends to the upper pair 404 of actuation elements. The first and second resistance straps 400, 402 then extend upwardly about the rear of the exercise apparatus and over the shoulders of the user. Accordingly, as in FIG. 9A, the user can be enabled to perform over-the-shoulder exercises. However, relative to the arrangement shown in FIG. 9A, the arrangement of FIG. 9C increases the available strap length of the first and second resistance straps 400, 402, as discussed above.  

[0086] With reference now to FIG. 9D, yet another arrangement is illustrated. In this arrangement, the first and second straps 400, 402 are shown as being connected at their distal ends to the upper pair 404 of actuation elements. Accordingly, the resistance straps 400, 402 will tend to move in a horizontal plane that is relatively higher than the plane of movement available in the arrangement shown in FIG. 9B. As such, a single exercise apparatus can allow the user to selectively position the straps 400, 402 in any variety of selected positions.  

[0087] Accordingly, various arrangements can be configured and prepared using many of the embodiments discussed herein. Yet other embodiments and arrangements are also contemplated provided the present disclosure.  

[0088] Although these inventions have been disclosed in the context of certain preferred embodiments and examples, it will be understood by those skilled in the art that the present inventions extend beyond the specifically disclosed embodiments to other alternative embodiments and/or uses of the inventions and obvious modifications and equivalents thereof. In addition, while several variations of the inventions have been shown and described in detail, other modifications, which are within the scope of these inventions, will be readily apparent to those of skill in the art based upon this disclosure. It is also contemplated that various combination or sub-combinations of the specific features and aspects of the embodiments may be made and still fall within the scope of the inventions. It should be understood that various features and aspects of the disclosed embodiments can be combined with or substituted for one another in order to form varying modes of the disclosed inventions. Thus, it is intended that the scope of the present inventions herein disclosed should not be limited by the particular disclosed embodiments described above.  

1. An adjustable exercise apparatus comprising:  
a wearable support component having first and second ends;  
first and second actuation elements secured to the wearable support component intermediate the first and second ends at respective first and second positions;  
a first elastic strap having a proximal portion and a distal end, the first elastic strap being attachable to the first actuation element along the proximal portion thereof to define a first attachment point of the first elastic strap and a first strap length, the first elastic strap at least partially extending from the first actuation element in the direction of the first end of the support component such that the distal end thereof can be engaged by a user, the first strap length being measured along the first elastic strap intermediate the first attachment point and its distal end, the first strap length corresponding to a first load exerted by the first elastic strap when moving the distal end of the first elastic strap from an unloaded position to a loaded position, the first strap length being selectively adjustable upon actuation of the first actuation element for adjusting the first load; and  
a second elastic strap having a proximal portion and a distal end, the second elastic strap being attachable to the second actuation element along the proximal portion thereof to define a second attachment point of the second strap and a second strap length, the second elastic strap at least partially extending from the second actuation element in the direction of the second end of the support component such that the distal end thereof can be engaged by the user, the second strap length being measured along the second elastic strap intermediate the second attachment point and its distal end, the second strap length corresponding to a second load exerted by the second elastic strap when moving the distal end of the second elastic strap from an unloaded position to a loaded position, the second strap length being selectively adjustable upon actuation of the second actuation element for adjusting the second load.  

2. The exercise apparatus of claim 1, wherein the support component comprises a belt.  

3. The exercise apparatus of claim 2, wherein the support component includes a buckle component to connect the first and second ends of the support component.  

4. The exercise apparatus of claim 1, wherein the support component comprises a vest.  

5. The exercise apparatus of claim 4, wherein the first and second ends of the support component are attachable to each other at a connection point and the first and second loads are distributed through the connection point of the apparatus.  

6. The exercise apparatus of claim 5, wherein the first actuation element is interposed between the second end of the support component and the second actuation actuator and the second actuation element is interposed between the first end of the support component and the first actuation element.  

7. The exercise apparatus of claim 1, wherein the first and second positions of the respective ones of the first and second actuation elements are fixed along the support component.  

8. An adjustable exercise apparatus comprising:  
a wearable support component having first and second ends, a periphery, and first and second buckle components disposed at the respective ones of the first and second ends thereof, the first and second buckle components being operable to connect the first and second ends of the wearable support component to form the wearable support component in a loop;  
first and second elastic straps each defining a proximal portion and a distal end, the distal ends thereof being engageable by a user for performing an exercise; and  
first and second actuation elements attached to the wearable support component intermediate the first and second ends at respective first and second positions along the wearable support component, the first and second actuation elements being configured to receive at least a portion of the respective ones of the proximal portions of the first and second elastic straps at first and second attachment points along the respective proximal portions thereof and to securely attach the first and second elastic straps at the respective first and second positions on the wearable support component to define respective first and second strap lengths, the first and second strap
lengths at least partially corresponding to respective ones of first and second elastic tensile loads exerted by the first and second elastic straps when elongated by the user from an unloaded position to a loaded position during performance of the exercise; wherein the first elastic strap extends from the first actuation element toward the first end of the wearable support component about the periphery of the wearable support component, and the second resilient strap extends from the second actuation element toward the second end of the wearable support component about the periphery of the wearable support component, and wherein the first and second strap lengths are selectively adjustable upon adjustment of the first and second actuation elements to adjust the elastic tensile load of the respective ones of the first and second straps when elongated to their loaded position.

9. (canceled)

10. (canceled)

11. The exercise apparatus of claim 8, wherein the first and second actuation elements are fixed at the respective ones of the first and second positions.

12. The exercise apparatus of claim 8, wherein the first actuation element is interposed between the second end of the support component and the second actuation element, and the second actuation element is interposed between the first end of the support component and the first actuation element.

13. The exercise apparatus of claim 8, wherein the first and second strap lengths are measured between the respective first and second attachment points and the respective distal ends of the first and second elastic straps.

14. (canceled)

15. (canceled)

16. An adjustable exercise apparatus comprising:
   a wearable vest having interconnectable first and second portions to fasten the wearable vest about a torso of a user, the wearable vest defining an outer periphery;
   first and second elastic straps extending along the outer periphery of the wearable vest, the first and second elastic straps each having a proximal portion being securable to the wearable vest and a distal end being engageable by the user for performing an exercise, each and second elastic straps having at least one elastic component disposed along respective lengths of the respective ones of the first and second straps;
   at least a first pair of actuation elements attached to the outer periphery of the wearable vest at respective ones of first and second positions, the actuation elements being configured to secure thereto at least a portion of the respective ones of the proximal portions of the first and second elastic straps; and
   first and second guide components extending along a rear portion of the wearable vest for receiving and supporting the respective ones of the first and second elastic straps in at least one of a vertical and a horizontal orientation along the periphery of the wearable vest;
   wherein the first and second elastic straps attach to the respective ones of the first and second actuation elements to define respective first and second adjustable strap lengths, the first and second strap lengths at least partially corresponding to respective ones of first and second elastic tensile loads exerted by the first and second elastic straps when elongated by the user from an unloaded position to a loaded position during performance of the exercise, wherein the first and second strap lengths are selectively adjustable upon adjustment of the first and second actuation elements to adjust the elastic tensile load of the respective ones of the first and second elastic straps when elongated to their loaded position.

17. The exercise apparatus of claim 16, further comprising a second pair of actuation elements attached to the outer periphery of the vest at respective ones of third and fourth positions, the second pair actuation elements being configured to secure thereto at least a portion of the respective ones of the proximal portions of the first and second elastic straps.

18. The exercise apparatus of claim 17, wherein the third and fourth positions are lower than the first and second positions.

19. The exercise apparatus of claim 17, wherein the first and second elastic straps are selectively attachable to one of the first and second pairs of actuation elements.

20. The exercise apparatus of claim 16, wherein each of the first and second guide components comprises a plurality of loops.

21. The exercise apparatus of claim 1, wherein the first and second elastic straps are separate.

22. The exercise apparatus of claim 8, wherein the first and second elastic straps are separate.

23. The exercise apparatus of claim 16, wherein the first and second strap lengths are measured between respective first and second attachment points of the first and second elastic straps to the vest and the respective distal ends of the first and second elastic straps.

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