ABDOMINAL EXERCISE DEVICE WITH LATERAL ARCUATELY SLIDABLE SEAT

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ABSTRACT

An abdominal exercise device includes a support frame defining a first axis and a second axis generally perpendicular to the first axis. A seat assembly associated with the support frame includes a seat which pivots about the first axis and is laterally and arcuately slideable about the second axis. The exercise device includes a footrest and a bar that attaches the footrest to the seat assembly such that the bar and the footrest pivot with the seat about the first axis.
ABDOMINAL EXERCISE DEVICE WITH LATERAL ARCUATELY SLIDABLE SEAT

BACKGROUND OF THE INVENTION

[0001] The present invention generally relates to exercise devices. More particularly, the present invention relates to an abdominal exercise device having a lateral arcuately slidable seat.

[0002] Exercise is an important part of a healthy lifestyle. A wide variety of exercise devices exist that provide cardiovascular exercise or resistance exercise to various muscle groups of a person’s body. The look of a tight stomach is highly prized, especially among men who desire to have a well-defined abdomen in the form of a “six-pack” (in reference to the appearance of extremely well-defined abdominal muscles). In view of this, it comes as no surprise that included among the aforementioned exercise devices are a variety of abdominal exercise devices.

[0003] In general, it is desirable for an abdominal exercise device to provide a user with more than one type of movement in order to exercise abdominal and other muscles. Prior to the existence of abdominal exercise devices, a person would perform a variety of different types of stand-alone exercises in order to develop his/her abdominal muscles. For example, the sit-up is a strength training exercise as well as one of the oldest and most basic of all the abdominal exercises. The sit-up works the entire rectus abdominis muscle wall although normally more stress is concentrated on the upper part verses the lower sections. To perform a sit-up, a person lies down on the floor with his/her knees bent at ninety degrees. The person then sits up without moving his/her knees. The person’s hands are placed behind his/her head/neck or across his/her chest. The sit-up is intended to work the abdominal muscles, but the sit-up also utilizes the hip flexors and lower back. As some people desire to work only their abdominal muscles, the imprecise targeting of the abdominal muscles by the sit-up has caused sit-ups to be replaced by crunches as the most common abdominal exercise. The sit-up places considerable stress on the lower back vertebrae, so individuals who experience lower back pain should perform the crunch instead. The crunch is performed while lying face up on the floor with knees bent, by curling the shoulders up towards the pelvis. The hands may be placed behind the head, but care should be taken not to pull on the neck. Alternatively, the hands may be placed on the shoulders or with the forearms crossed over the chest. Unlike the sit-up, the lower back should not leave the floor. The difficulty of the sit-up and/or crunch can be increased by lying on a decline bench and/or holding a weight on the chest.

[0004] A desirable feature of an abdominal exercise device provides for more than a single type of movement (e.g., lateral, longitudinal, pivotal, etc.) of the exerciser’s body in order to mimic a wide variety of abdominal exercises, such as the sit-up, crunch or the like. Another desirable feature of such an exercise device is the ability to be adjusted to meet the physical characteristics of a wide variety of exercisers who vary from person-to-person in terms of body type, height, etc.

[0005] Abdominal exercise devices have been used in professional gyms or fitness centers for many years. However, abdominal exercise devices designed for use in professional gyms or fitness centers have certain disadvantages when those abdominal exercise devices are used outside the setting of a professional gym or fitness center as these abdominal exercise devices can be large, cumbersome, limited in their versatility and are often difficult to operate, transport, and store. Such devices are also relatively expensive. While such devices are generally adequate in the fitness center or gym setting due to the large space available in such settings, such devices do not lend themselves to a household setting. For home use, the exercise device must not only be effective, but also compact and/or collapsible in order to easily transport and store the exercise device. The exercise device must also be relatively simple in operation and inexpensive.

[0006] Devices for abdominal exercises are generally known in the art. For example, U.S. Pat. No. 6,379,289 discloses mid-section exercise apparatus with multi-axis capabilities. However, the disclosed device is not collapsible for easy portability or storage and the seat of the device is stationary, allowing only the upper portion of a user’s body to move laterally. In another example, U.S. Pat. No. 5,334,120 discloses a gravity exercise machine that uses pulleys and ropes to connect to weights. However, the seat of the disclosed device does not move laterally or pivotally relative to the frame in order to provide muscle movement in a variety of directions. Another drawback is that the frame is not collapsible for easy transport and storage.

[0007] As outlined above, various attempts have been made to overcome the limitations associated with previous abdominal exercise devices. However, as pointed out, some of these exercise devices have certain drawbacks in that the devices are not easily collapsible while others place unnecessary and dangerous strain and stress on the neck and back of the user of the device if the device cannot be adjusted to best suit the physical characteristics of a wide range of users. For example, the same exercise device should be able to be used by a very tall exerciser as well as a very short exerciser so that any size user can obtain optimum results from exercise. These devices also lack the ability to allow a user to move their body laterally while adjusting the relative angle between the user’s legs and their torso. The ability to adjust the relative angle between the user’s legs and their torso allows the user to perform a range of abdominal exercises including, without limitation, crunches. Also, for those individuals who travel and do not have access to a gymnasium in order to exercise, it is imperative that the exercise device be portable in nature.

[0008] Accordingly, there is a need for an abdominal exercise device which is suited for home use that provides for both lateral and pivotal movement of a user’s body, allowing the user to adjust the angle of their legs relative to their torso. Such an abdominal exercise device should be collapsible in order to be easily transported and stored, and also be relatively simple in operation and inexpensive. Preferably, such an exercise device should be adjustable in order to accommodate the size of the user of the device. The present invention fulfills these needs and provides other related advantages.

SUMMARY OF THE INVENTION

[0009] The present invention resides in an abdominal exercise device having a lateral arcuately slideable seat. The
abdominal exercise device is suited for home use, provides for both lateral and pivotal movement of a user's body, and allows the user to adjust the angle of their legs relative to their torso as well as adjust the device to the user's size. The abdominal exercise device is relatively simple to operate and is collapsible in order to be easily transported and stored. An abdominal exercise device embodying the present invention includes a support frame defining a first axis and a second axis. A seat assembly associated with the support frame has a seat which pivots about the first axis and is laterally and accurately slidable about the second axis. In a preferred form, the second axis is generally perpendicular to the first axis.

[0010] A footrest is associated with the seat assembly. A bar attaches the footrest to the seat assembly, wherein the bar and the footrest pivot with the seat about the first axis. A lock for holds the seat in one of a plurality of positions along the bar.

[0011] The seat assembly includes a mechanism for rocking the seat relative to the bar. The rocking mechanism includes a track and roller assembly connecting the seat and bar. The track and roller assembly is pivotally connected to the seat and bar, and moves the seat relative to the bar.

[0012] A cradle is pivotally associated with the support frame and supports the seat for pivotal and rocking movement.

[0013] The support frame comprises two ground-engaging sub-frames, and the seat assembly is pivotally disposed therebetween. Each set of ground-engaging sub-frames include a hinge whereby the ground-engaging sub-frame may be moved between an open position and a folded position. The hinge includes a lock for holding the ground-engaging sub-frames in the open position. A pair of handles extend from the support frame.

[0014] Other features and advantages of the present invention will become apparent from the following more detailed description, taken in conjunction with the accompanying drawings, which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The accompanying drawings illustrate the invention. In such drawings:

[0016] FIG. 1 is a perspective view of an abdominal exercise device embodying the present invention shown in an open configuration;

[0017] FIG. 2 is a front elevational view of the device of FIG. 1;

[0018] FIG. 3 is a rear elevational view of the device of FIG. 1;

[0019] FIG. 4 is a right side elevational view of the device of FIG. 1;

[0020] FIG. 5 is a view similar to FIG. 4, illustrating pivotal movement of a seat assembly relative to a frame;

[0021] FIG. 6 is an enlarged partially-fragmented sectional view taken generally along line 6-6 of FIG. 3;

[0022] FIG. 7 is a sectional view similar to FIG. 6, illustrating lateral sliding movement of a seat;

[0023] FIG. 8 is a side elevational view similar to FIG. 4, showing the device in a folded configuration;

[0024] FIG. 9 is a top plan of the device of FIG. 8 in the folded or collapsed configuration;

[0025] FIG. 10 is an enlarged side elevational view of the area 10 of FIG. 5;

[0026] FIG. 11 is a sectional view taken along line 11-11 of FIG. 10, showing the locking mechanism holding the seat in one of a plurality of positions along the length of a bar;

[0027] FIGS. 12 and 13 are enlarged drawings of the area 12 of FIG. 1, illustrating the hinged members of the frame in locked and folded configurations, respectively; and

[0028] FIG. 14 is a cross-sectional view, taken generally along line 14-14 of FIG. 12.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0029] As shown in the drawings for purposes of illustration, the present invention is concerned with an abdominal exercise device 20 (FIGS. 1-3) that includes a ground-engaging support frame 22 and a seat assembly 24 having an accurately-shaped seat 26 that is pivotally associated with the frame 22 about a first axis 28 and, in general, laterally slidable with respect to the frame 22 about a second axis 30. The second axis 30 of the exercise device is perpendicular to the first axis 28 although the first axis 28 and the second axis 30 may be offset from one another. The seat 26 may be made from a variety of materials including, but not limited to, wood, plastic or the like covered by a waterproof material with foam disposed between the hard base surface of the seat 26 and the waterproof material to provide padding for a user sitting on the seat 26. The exercise device 20 also includes a footrest 32 associated with the seat assembly 24.

[0030] The frame 22 comprises two ground-engaging sub-frames 34, and the seat assembly 24 is pivotally disposed between the two ground-engaging sub-frames 34. Each ground-engaging sub-frame 34 includes first and second legs 36, 38 connected by a hinge pin 40, whereby each of the ground-engaging sub-frames 34 may be moved between an open position (FIGS. 4 and 5) and a folded position (FIGS. 8 and 9). As shown in FIGS. 12-14, a hinged member or linkage 42 also connects the first and second legs 36, 38 of each ground-engaging sub-frame 34. Each linkage 42 is connected to the first and second legs 36, 38 by pins 44, 46. Each linkage 42 includes two links 48, 50 jointed at a pivot pin 52 located generally at the mid-portion of the linkage 42 which allows the exercise device 20 to be folded for storage. The linkage 42 includes a locking mechanism 54 which is the same or similar to those used on conventional ladders. The locking mechanism 54 holds the ground-engaging sub-frame 34 in the open position by a flange 55 on the end of the link 50 nearest the pivot pin 52 abutting against the top of the link 48 when the linkage 42 is in a linear configuration, the flange 55 of the link 50 preventing the linkage 42 from pivoting past a linear configuration in a first direction while allowing the linkage 42 to move into a folded configuration in a second direction as the exercise device 20 is moved into a folded position. Alternatively, the locking mechanism 54 comprises the pivot pin 52 of the linkage 42 which only pivots between the linear and folded configurations.
[0031] A pair of handles 56 are fixed with respect to the frame 22, each handle 56 being attached to an upper portion of the first leg 36 of the sub-frames 34. Each handle 56 has a hand grip 58 which gives the exerciser a firmer grip. The ground-engaging sub-frames 34 are connected by a crossbar 60 extending between the first legs 36 of the sub-frames 34 towards the bottom portion of the support frame 22.

[0032] The seat assembly 24 includes a center bar 62 attaching the footrest 32 to the seat assembly 24, wherein the bar 62 and the footrest 32 pivot with the seat 26 about the first axis 28. The footrest 32 includes first and second foot bars 64, 66 upon which the user can rest a portion of his/her body (e.g., the heels of his/her feet, the soles of his/her feet, his/her legs, or the like) when exercising. The first foot bar 64 is attached to the back side of, and disposed perpendicular to, the center bar 62. The second foot bar 66 is attached to an end of, and disposed perpendicular to, the center bar 62. A user can use the foot bars 64, 66 either individually or in combination. For example, during exercise, a user can rest the heels of his/her feet on the first foot bar 64 while simultaneously resting the soles of his/her feet on the second foot bar 66. In another example, the user could rest the soles of his/her feet on either the first foot bar 64 or the second foot bar 66 during exercise. In yet another example, the user could rest the heels of his/her feet on either the first foot bar 64 or the second foot bar 66 during exercise.

[0033] As seen in FIGS. 6 and 7, the seat assembly 24 includes a cradle 80 pivotally associated with the ground-engaging frame 22 and supporting the seat 26 where the cradle 80 rotates around the hinge pin 40. The cradle 80 includes an arcuate-shaped cross member 82. The seat assembly 24 includes a mechanism 84 for rocking the seat 26 laterally relative to the bar 62. The rocking mechanism 84 includes a track and roller assembly 86 connecting the seat 26 and bar 62. The seat 26 arcuately rotates about the second axis 30 and, in general, slides laterally perpendicular to the bar 62. More particularly, the seat 26 is arcuately slidable about the second axis 30 as the seat 26 rocks back and forth along the track and roller assembly 86. The track and roller assembly 86 includes a first arcuate track 88 attached by fasteners 90 to a bottom side of the seat 26, a second arcuate track 92 formed on a bottom side of the arcuate cross member 82 of the cradle 80 (FIG. 3), and at least two pairs of roller sets 94. The roller sets 94 engage the first arcuate track 88 to hold the first arcuate track 88 in a position offset from the second arcuate track 92 even as the seat 26 rocks from side-to-side. As the user sits on the seat 26, the weight of the user pushes the seat 26 (and the first track 88) against an upper roller 96 of each roller set 94 which then pushes a lower roller 98 of each roller set 94 against the second track 92. This allows the user to laterally move the seat 26 in a rocking motion, from side-to-side of the exercise device 20. Neither of the roller sets 94 is able to travel past the central bar 62 which limits the distance the seat 26 is able to rock from side-to-side as the user exercises.

[0034] The seat assembly 24 includes a locking mechanism 68 for holding the seat 26 in one of a plurality of positions along the length of the bar 62 by holding and/or releasing the bar 62 to move relative to the seat 26, as illustrated in FIGS. 10 and 11. This allows the relative distance between the seat 26 and the footrest 32 to be increased and/or decreased. The locking mechanism 68 includes a pair of flanges 70 located on, and extending downwardly from, a bottom portion of the seat assembly 24 and a plurality of bent flexible members 72, each including a pair of cylindrical posts or stubs 74, located within the hollow center bar 62. Each stub 74, respectively, extends through one aperture 76 of a plurality of pairs of aligned apertures 76 (i.e., the apertures 76 of each pair are located on opposite sides of the center bar 62 from each other). The stubs 74 extend through the apertures 76 which located at a fixed point(s) on the center bar 62. The stubs 74 also extend through respective aligned apertures 78 of the flanges 70. The apertures 78 of the flanges 70 are aligned with each other. A user can move the footrest 32 relative to the seat 26 by depressing the stubs 74 extending through the apertures 78 of the flanges 70. Once the stubs 74 are depressed so that the stubs 74 no longer engage the apertures 78 of the flanges 70, the bar 62 is moved relative to the seat 26, the interior surface of the flanges 70 maintains the positions 74 in depressed positions. Adjacent pairs of stubs 74 are also depressed as the bar 62 moves relative to the seat 26 in order to allow the adjacent stubs 74 to engage the interior surface of the flanges 70. However, once a new pair of stubs 74 become coaxial with the apertures 78 of the flanges 70, the force of the flexible member 72 pushes the stubs 74 through the apertures 76 that the stubs 74 are aligned with, locking the bar 62 in position relative to the seat 26. The process of depressing the stubs 74 to allow the bar 62 to travel relative to the seat 26 may be repeated until the desired distance between the seat 26 and footrest 32 is achieved. In the alternative, the locking mechanism 68 may use a turnable knob connected to a threaded shank that extends through the apertures 78 of the flanges 70 and one of a plurality of threaded bores along the length of the bar 62. The threaded shank is placed into the aperture 78 (which may be threaded) of one of the flanges 70 and then into a first opening of one of the plurality of threaded bores on one side of the center bar 62 and the knob is rotated in one direction until an end of the knob abuts against the flange 70 and/or when the threaded shank extends through the second opening of the threaded bore on the opposite side of the center bar 62 from the first opening and through the aperture 78 of the other flange 70. Turning the knob in the opposite direction until the shank is freed from the flanges 70 and threaded bore frees to the bar 62 to be moved relative to the seat 26.

[0035] In the alternative, the exercise device 20 includes a mechanism to limit pivotal movement of the cradle 80 relative to the ground-engaging frame 22 and/or lock the cradle 80 in position so that the cradle 80 cannot pivot relative to the ground-engaging frame 22.

[0036] In use, a user opens the exercise device 20 from a folded or collapsed, storage configuration to an open, use configuration by moving the legs 36, 38 of the ground-engaging sub-frames 34 from the folded to the open positions by moving the linkage 42 until the locking mechanism 54 engages and maintains the legs 36, 38 of the sub-frames 34 in an open position. The user then, in order to suit his/her individual height, adjusts the relative distance between the seat 26 and the footrest 32 by moving the seat 26 to one of several positions along the length of the bar 62, as outlined in more detail below. The user then sits on the seat 26 of the exercise device 20. With each of his/her hands on one of the hand grips 58 of the handles 56, the user pivots the cradle 80 until the seat 26 and footrest 32 are at a desired angle relative to a surface of the ground the exercise device 20 is resting upon. In this manner, a user that maintains his/her torso in
a generally vertical orientation relative to the ground is able to increase/decrease the angle between the user's legs and his/her torso. Maintaining this angle between the user's legs and his/her torso exercises the user's abdominal muscles.

The user is also able to rock the seat 26 in the manner described above, in order to further exercise their abdominal muscles, as well as their oblique muscles, with the arcuately lateral movement of their pelvis relative to the generally vertical orientation of the user's torso, especially the upper torso, as the seat 26 travels in an arcuate manner with the aid of the track and roller assembly 86. When a user is finished exercising, the user reverses the set-up process and collapses the exercise device 20 into a folded, storage configuration.

[0037] The above-described embodiment of the present invention is illustrative only and not limiting. It will thus be apparent to those skilled in the art that various changes and modifications may be made without departing from this invention in its broader aspects. Therefore, the appended claims encompass all such changes and modifications as falling within the true spirit and scope of this invention.

What is claimed is:

1. An abdominal exercise device, comprising:
   a support frame defining a first axis and a second axis; and
   a seat assembly associated with the support frame, including a seat which pivots about the first axis and is laterally and arcuately slideable about the second axis.

2. The device of claim 1, wherein the second axis is generally perpendicular to the first axis.

3. The device of claim 1, wherein the seat assembly includes a bar attaching a footrest to the seat assembly, wherein the bar and the footrest pivot with the seat about the first axis.

4. The device of claim 1, wherein the seat assembly means for rocking the seat relative to the bar.

5. The device of claim 4, wherein the seat arcuately rotates about the second axis and slides laterally perpendicular to the bar.

6. The device of claim 4, wherein the rocking means includes a track and roller assembly connecting the seat and bar.

7. The device of claim 1, wherein the seat assembly includes a cradle pivotally associated with the support frame and supporting the seat.

8. The device of claim 1, wherein the support frame comprises two ground-engaging sub-frames, and the seat assembly is pivotally disposed therebetween.

9. The device of claim 8, wherein each ground-engaging sub-frame includes a hinge, whereby the ground-engaging sub-frame may be moved between an open position and a folded position.

10. The device of 9, wherein the hinge includes a lock for holding the ground-engaging sub-frame in the open position.

11. The device of claim 1, wherein the support frame includes a pair of handles.

12. The device of claim 1, including a footrest associated with the seat assembly.

13. The device of claim 1, wherein the seat assembly includes a lock for holding the seat in one of a plurality of positions along the bar.

14. An abdominal exercise device, comprising:
   a support frame defining a first axis and a second axis generally perpendicular to the first axis;
   a seat assembly associated with the support frame, including a seat which pivots about the first axis and is laterally and arcuately slideable about the second axis;
   a footrest; and
   a bar attaching the footrest to the seat assembly, wherein the bar and the footrest pivot with the seat about the first axis.

15. The device of claim 14, wherein the seat assembly includes means for rocking the seat relative to the bar comprising a track and roller assembly connecting the seat and bar, wherein the seat arcuately rotates about the second axis and slides laterally perpendicular to the bar as the seat arcuately slides about the second axis.

16. The device of claim 14, wherein the support frame comprises two ground-engaging sub-frames, the seat assembly pivotally disposed therebetween, and each ground-engaging sub-frame includes a hinge having a lock for holding the ground-engaging sub-frame in an open position, whereby the ground-engaging sub-frame may be moved between the open position and a folded position.

17. The device of claim 14, wherein the seat assembly includes a cradle pivotally associated with the support frame and supporting the seat.

18. The device of claim 14, wherein the seat assembly includes a lock for holding the seat in one of a plurality of positions along the bar.

19. The device of claim 14, wherein the support frame includes a pair of handles.

20. An abdominal exercise device, comprising:
   a support frame defining a first axis and a second axis generally perpendicular to the first axis;
   a seat assembly associated with the support frame, including a seat which pivots about the first axis and is laterally and arcuately slideable about the second axis;
   a footrest;
   a bar attaching the footrest to the seat assembly, wherein the bar and the footrest pivot with the seat about the first axis; and
   means for rocking the seat relative to the bar comprising a track and roller assembly connecting the seat and bar, wherein the seat arcuately rotates about the second axis and slides laterally perpendicular to the bar as the seat arcuately slides about the second axis;

means for rocking the seat relative to the bar comprising a track and roller assembly connecting the seat and bar, wherein the seat arcuately rotates about the second axis and slides laterally perpendicular to the bar as the seat arcuately slides about the second axis;

wherein the support frame comprises two ground-engaging sub-frames, the seat assembly pivotally disposed therebetween, and each ground-engaging sub-frame includes a hinge having a lock for holding the ground-engaging sub-frame in an open position, whereby the ground-engaging sub-frame may be moved between the open position and a folded position.

21. The device of claim 20, wherein the support frame includes a pair of handles.

22. The device of claim 20, including a lock for holding the seat in one of a plurality of positions along the bar.

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