(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 428 255 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.03.2012 Bulletin 2012/11

(21) Application number: **11180410.0**

(22) Date of filing: **07.09.2011**

(51) Int Cl.:
A63B 21/045 *(2006.01)* ***A63B 23/02*** *(2006.01)*
A63B 22/14 *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **08.09.2010 US 877321**

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(54) Improved abdominal exerciser with rotatable seat and tandem pulley features

(57) An abdominal exerciser has base and back frames pivotally mounted for movement between upright and recumbent positions, and a seat frame with cushion rotatable on the base frame. A low friction journal between the base and seat frames supports a user's weight. The journal is about 30 to 42% the distance from a rear end of the cushion to its front end so the user's coccyx is vertically aligned with the journal. Arms at each side of the base frame have a pair of extensions connected to either the base or seat frame, each with a U-shaped handhold lying in a plane at an acute angle of about 30 to 80 degrees to the horizontal. A pair of single pulleys or a pair of tandem pulleys are mounted near the rear of the base frame and are engaged by sleeve-covered springs for biasing the back frame toward the upright position.

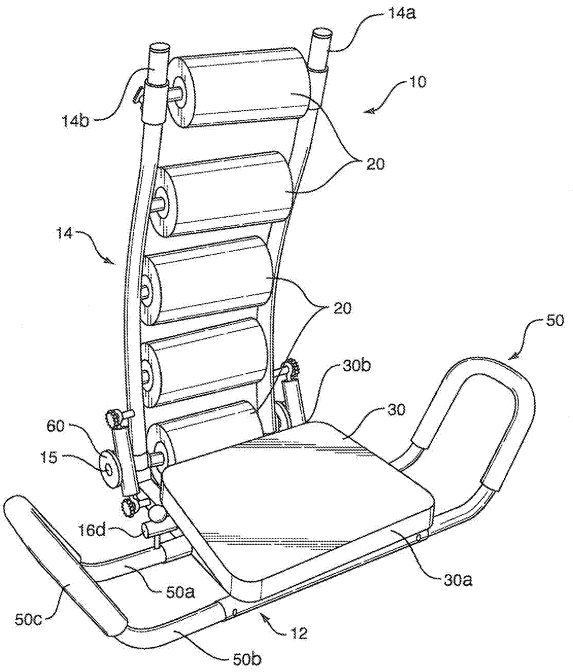

FIG. 1

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Description

Field and background of the invention

[0001] The present invention relates generally to the field of exercise devices, and in particular, to a new and useful abdominal exerciser with a seat and a back supporting structure.

[0002] A wide variety of exercise devices and techniques are known for exercising the muscles of the stomach and back. Of these, the most common is the sit-up or crunch which, however is also known to place adverse pressure on the back and neck muscles.

[0003] U.S. Patents 7,381,171 and D581,471, which are both incorporated here by reference, disclose an abdominal exerciser co-invented by the inventors of the subject application. While effective for exercising the muscles of the stomach and back, the subject application discloses improvements that have been discovered as a result of use and understanding of the dynamics of the inventors' previous device.

[0004] A need thus still remains for further improvements in abdominal exercise devices which enhance the exercising of the stomach and back muscles while avoiding adverse pressure on the back and neck muscles.

Summary of the invention

[0005] An object of the invention is to provide an abdominal exerciser that has a base frame, a back frame pivotally mounted near a rear end of the base frame for movement between upright and recumbent positions, at least one back cushion connected to the back frame for supporting a user's back, a seat frame mounted for rotation on the base frame and a seat cushion fixed to the seat frame on which a user sits. A low friction journal bushing with a journal post rotatably mounted therein, is operatively connected between the base and seat frames for supporting the weight of the user. The bushing and post are about 30% to about 42% of the distance from a rear end of the seat cushion to the front end of the seat cushion so that the user's coccyx is substantially vertically aligned with the bushing and post when the user sits on the seat cushion and his or her back is resting against the back cushion. Arms at each side of the base frame have a pair of extensions connected to either the base or seat frame. Each arm has a U-shaped handhold lying in a plane extending at an acute angle of about 30 to about 80 degrees to the horizontal plane. A pair of pulleys is mounted for rotation near a rear end of the base frame and engages springs with resilient sleeves thereover, the springs being connected between the base and back frames for biasing the back frame toward the upright position.

[0006] A further object of the invention is to provide an abdominal exercise device that comprises: a base frame for lying in a horizontal plane on the floor, the base frame having a pair of side members and a cross member connected between the side members of the base frame; a back frame having a pair of side members pivotally mounted near respective rear ends of the respective side members of the base frame for movement between a forward upright position and a rearward recumbent position; a plurality of back cushions connected between and spaced along the side members of the back frame; an H-shaped seat frame having front and rear members and a cross member connected between the front and rear members; a seat cushion fixed to the seat frame and resting on the front, rear and cross members of the seat frame, the seat cushion having a front end and a rear end; a low friction journal bushing having a vertically extending bore and being connected to the cross member of one of the base and seat frames; a journal post connected to the cross member of the other of the base and seat frames and received for rotation in the low friction journal bushing so that the seat cushion may rotate with respect to the base frame, a support area of the cross member around the journal post and to which the journal post is connected, being in weight-bearing contact with the low friction journal bushing for supporting the weight of a user sitting on the seat cushion, the location of the low friction journal bushing and the journal post received therein, being from about 30% to about 42% of the distance from the rear end of the seat cushion to the front end of the seat cushion so that when a user is sitting on the seat cushion with the users back against the back cushions, the coccyx of the user is substantially vertically aligned with the low friction journal bushing and journal post received therein; an arm at each side of the base frame, each arm having a pair of extensions connected to one of the base frame and the seat frame, each arm including a U-shaped handhold lying in a plane that extends at an acute angle of about 30 degrees to about 80 degrees to the horizontal plane, with the handholds of the arms on opposite sides of the base frame extending outwardly from each other for increasing available room for a user sitting on the seat cushion, and access to the handholds by the user; a pulley mounted for rotation at each side of the base frame near a rear end of the base frame; a tension spring connected between the base frame and the back frame side members for biasing the back frame toward the forward upright position; and a resilient sleeve covering each spring, each resilient sleeve being engaged with one of the pulleys.

[0007] The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its uses, reference is made to the accompanying drawings and descriptive matter in which preferred embodiments of the invention are illustrated.

Brief description of the drawings

[0008] In the drawings:

Fig. 1 is a side, front, top perspective view of an abdominal exercise device embodying the present invention, in an upright forward and ready position awaiting use by a user for exercising the user's abdominal and back muscles;

Fig. 2 is a view of the device similar to Fig. 1 but with the back frame and cushions moved from an upright forward position toward a rearward recumbent position for exercising the back muscles of a user (not shown) sitting on the device;

Fig. 3 is a view of the device similar to Fig. 2 with the back frame and cushions moved toward the recumbent position and with a seat frame and cushion of the device rotated to an extreme left position for further exercising the side muscles of the users abdomen;

Fig. 4 is a view of the device similar to Fig. 3 but with the seat frame and cushion rotated to an extreme right position for further exercising the side muscles of the users abdomen;

Fig. 5 is a front elevational and slightly perspective view of the device for illustrating the non-perpendicular, angled extension of U-shaded handholds of arms of the device, for improved room on the seat cushion and improved access to the handholds;

Fig. 6 is a side elevational and slightly perspective view of the device showing a user sitting on the seat cushion to illustrate the location of a low friction, weight-bearing journal of the device and its vertical alignment with the base of the user's spine;

Fig. 7 is a top plan view of the device that better illustrates the position of the journal with respect to front and rear ends of the seat cushion;

Fig. 8 is an exploded perspective view of the abdominal exercise device of the invention;

Fig. 9 is a top perspective view of an alternate embodiment of the device with the arms fixed to the seat frame rather than to the base frame;

Fig. 10 is an enlarged side elevational view of a locking pin for holding the seat frame in a non-rotatable position of the base frame;

Fig. 11 is an enlarged, exploded, sectional view of the journal area of the device; and

Fig. 12 is a partial, rear, perspective view of a further embodiment of the invention with tandem pulleys and resilient sleeve covered springs for each side of the base and back frames plus a safety band for covering the pulleys and springs.

Description of the preferred embodiments

[0009] Referring now to the drawings, in which like reference numerals are used to refer to the same or similar elements, Figs. 1 and 8 illustrate an abdominal exercise device 10 that comprises a base frame 12 for lying in a horizontal plane on the floor, the base frame having a pair of side members 12a and 12b and a cross member 12c connected, e.g. by welding, between the side members of the base frame. Members 12a, 12b and 12c and preferably square of rectangular cross-sectioned metal tubes. A back frame 14 having a pair of side members 14a and 14b is pivotally mounted on a pair of ears 13 at the top of, and near respective rear ends of the side members 12a and 12b of the base frame for movement between a forward upright position shown in Fig. 1, and a rearward recumbent position shown in Fig. 2. A bolt 15 extends through aligned holes in the pair of ears 13 on each side of base frame 12, to hold back frame side members 14a, 14b to the base frame, and to form the axle for one or two pulleys 60 mounted for rotation to each side of the base frame 12. A plurality of back cushions 20, each in the form of a rotatable foam rubber roller, are connected between and spaced along the side members 14a and 14b of the back frame 14. The lowest roller cushion 20 is mounted for rotation on the same axis on which the opposite bolts 15 extend. An H-shaped seat frame 16 having front and rear members 16a and 16b, has a cross member 16c that is connected, e.g. by welding, between the front and rear members. A padded seat cushion 30 is fixed to the seat frame 16 and resting on the front, rear and cross members of the seat frame. The seat cushion has a front end 30a and a rear end 30b.

[0010] A low friction journal bushing 40, shown also in Fig. 11, is made for example from low friction nylon, has a vertically extending bore 40a and is fixed to the cross member 12c, e.g. by extending through a bore in the cross member and by having a small lower flange ring 40a and a large upper flange ring 40b. The upper flange ring 40b has a broad flat upper annular bearing surface. A journal post 42 is connected, e.g. by welding, to the cross member 16c of the seat frame 16 and is received for rotation in the low friction journal bushing bore 40a so that the seat cushion 30 may rotate with respect to the base frame 12.

[0011] A support area of the seat frame cross member 16c that is immediately around the journal post 42, is in weight-bearing contact with the upper surface of the upper flange 14b of low friction journal bushing 40, for supporting all of the weight of a user 100 sitting on the seat cushion as shown in Fig. 6. As shown in Fig. 7, The location of the low friction journal bushing 40 and the journal post 42 received therein, is a distance C from the rear end 30b of the seat cushion 30, that is from about 30% to about 42% (preferable about 33 to 39%) of the total distance B from the rear end 30b of the seat cushion to the front end 30a of the seat cushion 30. Because of this important placement of the rotation journal for the seat frame 16 and its cushion 30, when a user 100 is sitting on the seat cushion 30 with the user's back against the back cushions 20, the user's coccyx at the lower end of his or her spine 102, is substantially vertically aligned with the low friction journal bushing 40 and journal post 42 received therein, as shown by the arrow X in Fig. 6. In this way virtually all the user's weight is centered on the upper surface of the bushing flange 40b so that no other weight bearing mechanism is needed for allowing

free and easy rotation of the seat cushion 30 on the base frame 12. In the embodiment shown, for example, the dimension of distant C is about 4 inches for a total front to back dimension B of about 11 inches for seat cushion 30.

[0012] The same weight-bearing function would be achieved in the alternate embodiment of the invention where the bushing 40 is mounted to the cross member 16c of the seat frame 16 and the post 42 is mounted to the cross member 12c of the base frame 12.

[0013] An arm 50 is also provided at each side of the base frame 12, each arm having a pair of extensions 50a and 50b that are detachably connected to side tubes 12d and 12e extending from the side members 12a and 12b of base frame 12. As best shown in Figs. 5 and 8, the side tubes 12e are circular cross sectioned metal tubes welded to the outside surfaces of side member 12a and 12b, while side tubes 12d are actually the sideways opposite extensions of a front member, circular cross sectioned metal tube of base frame 12, welded to and across the front ends of the side members 12a and 12b.

[0014] Each arm 50 includes a U-shaped handhold 50c best shown in Fig. 5, to lie in a plane that extends at an acute angle A of about 30 degrees to about 80 degrees to the horizontal plane with the handholds 50c of the arms 50 on opposite sides of the base frame extending outwardly from each other for increasing available room for a user sitting on the seat cushion 30, and provided better access to the handholds by the user's hands. The even more preferred range of angle A is about 50 to 70 degrees. Detachable connection of the arms 50 to the base frame 12 is achieved by having the round cross sectioned tubes making arm extensions 50a and 50b, smaller in diameter than the round cross sectioned tubes making base frame extensions 12d and 12e, so that the arm tubes fit inside the base frame tubes. Locking of the arms 50 in position on opposite sides of base frame 12 is achieved by a pair of outwardly spring-loaded hemispheres 50d near the inside ends of front extensions 50a, that snap into opposite holes 12h near the end of the base frame extensions 12d. No separated locking is needed for the rear extensions 50b.

[0015] In this embodiment the arms 50 are fixed to the base frame 12 and the user can hold the arms at the handholds 50c to help rotate the user's waist and thus rotate the seat cushion 30 on the base frame while cycling the back frame 14 between the upright and recumbent positions to target the side muscles of the user's abdomen. In another embodiment of the invention shown in Fig. 9, arm extensions 50a and 50b are detachably connected to the opposite tubular ends of the front and rear members 16a, 16b of the seat frame 16, so that the arms 50 rotate with the seat cushion 30 for a different set of exercise dynamics.

[0016] In order to lock seat frame 16 and its cushion 30 in a centered and nonrotating position shown in Figs. 1 and 2, the rear seat frame member 16b has one tubular end 16d that projects beyond the seat cushion 30 and has a vertical locking hole that aligns with a vertical locking hole 12j that is in the rear arm extension 50b but may alternatively be in the rear base frame extension 12 in the embodiment of Fig. 8, but especially when the arms are connected to the seat frame in the embodiment of Fig. 9. A locking pin 70 having a shaft 70a and a ball handle 70b has its shaft 70a inserted into the aligned locking holes to lock the seat frame in place. As best shown in Fig. 10, an annular groove 70c near the top end of shaft 70a resists accidental withdrawal of the locking pin 70 as the user exercises by catching the sheet metal material of the hollow tubes making up the seat and base frames at the locking holes. By the action of gravity and with the help of the extra weight of ball handle 70a, the pin 70 is randomly cause to fall back into its locked position rather than being pushed out of the locking holes during an exercise session. With the locking pin pulled out of the locking holes as shown in Figs. 3 and 4, the seat cushion 30 can be rotated to the left and right as the user rotates his or her waist for enhancing the exercise routine.

[0017] One pulley 60 is mounted for rotation at each side of the base frame 12 near a rear end of the base frame about the bolts 15. A tension spring 80 has an eye 84 at one end engaged onto a spring post 14c extending from the back frame side member 14a, and an eye 85 on its opposite end engaged onto a spring post 12f extending from the base frame side member 12a, for biasing the back frame 14 toward the forward upright position shown in Figs. 1 and 8. Threaded knobs 86 are screwed onto the threaded ends of spring posts 14c and 12f to secure the springs 80 on place. A resilient, e.g. foam rubber sleeve 82 covers each spring 80 and each resilient sleeve-covered spring is engaged with the groove of one of the pulleys 60.

[0018] Another embodiment of the invention is shown in Fig, 12 where a pair of tandem pulleys 60, 60 mounted for rotation on a longer bold 15 at each side of the base frame and tension springs 80 connected between the base frame and the back frame side members each with a resilient sleeve 82 covering each spring, is engaged with each pulley 60 for biasing the back frame toward the forward upright position with twice the strength. This adds more resistance to each back movement toward the recumbent position for a stronger workout. The tandem pulleys can be used with the prior abdominal exercisers of U.S. Patents 7,381,171 and D581,471, or with the improvements of Figs. 1-11. As also shown in Fig. 12 and also usable with the tandem pulleys and/or with the improvements of Figs. 1-11, is an elastic fabric band 90 that has a width that is wide enough to cover the single pulley 60 or the double pulleys 60, 60, and a circumference that is slightly less than the path around the pulleys 60, the spring posts and the springs 80 with covering sleeves 82. In use the band 90 is stretched over the pulleys and engaged sleeve-covered springs, and is held in place by one or a pair of hook-and-loop covered straps 92 that are threaded behind the one or two springs 80, at locations

over and, if two straps are use, under the area of engagement between the sleeves 82 and the grooves of the pulleys 60, and then back over the band until the straps are engage to themselves at their bases, and held in place be the hook-and-loop action on there touching surfaces. The use of these elastic bands 90 serve two purposes. Firstly, they are a safety measure in case any part of the springs or their attachments break, to keep all parts confined inside the elastic band so nothing flies away for the device. Secondly the elastic bands reduce or muffle any noise created by the springs and pulleys as the device is cycled between upright and recumbent positions during an exercise cession.

[0019] While specific embodiments of the invention have been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

Claims

1. An abdominal exercise device (10) comprising:

- a base frame (12) for lying in a horizontal plane on the floor, the base frame having a pair of side members (12a, 12b) and a cross member (12c) connected between the side members of the base frame;
- a back frame (14) having a pair of side members (14a, 14b) pivotally mounted near respective rear ends of the respective side members (12a, 12b) of the base frame for movement between a forward upright position and a rearward recumbent position;
- a plurality of back cushions (20) connected between and spaced along the side members (14a, 14b) of the back frame (14);
- an H-shaped seat frame (16) having front and rear members (16a, 16b) and a cross member (16c) connected between the front and rear members;
- a seat cushion (30) fixed to the seat frame (16) and resting on the front, rear and cross members of the seat frame, the seat cushion having a front end and a rear end;
- a low friction journal bushing (40) having a vertically extending bore and being connected to the cross member (12c, 16c) of one of the base and seat frames (12, 16);
- a journal post (42) connected to the cross member (12c, 16c) of the other of the base and seat frames (12, 16) and received for rotation in the low friction journal bushing (40) so that the seat cushion (30) may rotate with respect to the base frame (12), a support area of the cross member around the journal post and to which the journal post is connected, being in weight-bearing contact with the low friction journal bushing (40) for supporting the weight of a user sitting on the seat cushion, the location of the low friction journal bushing (40) and the journal post (42) received therein, being from about 30% to about 42% of the distance from the rear end of the seat cushion to the front end of the seat cushion so that when a user is sitting on the seat cushion (30) with the users back against the back cushions (20), the coccyx of the user is substantially vertically aligned with the low friction journal bushing (40) and journal post (42) received therein;
- an arm (50) at each side of the base frame, each arm having a pair of extensions (50a, 50b) connected to one of the base frame and the seat frame, each arm including a U-shaped handhold (50c) lying in a plane that extends at an acute angle of about 30 degrees to about 80 degrees to the horizontal plane with the handholds (50c) of the arms (50) on opposite sides of the base frame extending outwardly from each other for increasing available room for a user sitting on the seat cushion, and access to the handholds by the user;
- a pulley mounted for rotation at each side of the base frame near a rear end of the base frame;
- a tension spring connected between the base frame and the back frame side members for biasing the back frame toward the forward upright position; and
- a resilient sleeve covering each spring, each resilient sleeve engaged with one of the pulleys.

2. The device of claim 1, wherein the side members (12a, 12b) of the base frame (12) each include a tubular side extension (12d, 12e), the extensions (50a, 50b) of each arm (50) being detachably attached to the tubular side extension on each respective side of the base frame (12) so that the arms are fixed to the base frame when the seat frame rotates.

3. The device of claim 1, wherein the extensions (50a, 50b) of each arm (50) are detachably attached to ends of the respective front and rear members (16a, 16b) of the seat frame (16) on each respective side of the seat frame so that the arms rotate with the rotation of the seat frame.

4. The device of claim 1, including a pair of tandem pulleys mounted for rotation at each side of the base frame and a tension spring connected between the base frame and the back frame side members each with a resilient sleeve covering each spring, engaged with each pulleys for biasing the back frame toward the forward upright position.

5. The device of claim 1, wherein the handhold (50c) lying in a plane that extends at an acute angle of about 50 degrees to about 70 degrees to the horizontal plane.

6. The device of claim 1, wherein the location of the low friction journal bushing (40) and the journal post (42) received therein, is from about 33% to about 39% of the distance from the rear end of the seat cushion to the front end of the seat cushion.

7. The device of claim 1, wherein the rear member of the seat frame includes a seat frame extension (16d) that extends beyond the seat cushion (30), locking holes in the seat frame extension and in the base frame or in one arm extension, that are aligned when the seat cushion is rotation to a centered position, and a locking pin for insertion into the aligned locking holes for fixing the seat cushion in the center position.

8. The device of claim 1, wherein the rear member of the seat frame includes a seat frame extension (16d) that extends beyond the seat cushion (30), locking holes in the seat frame extension and in the base frame or in one arm extension, that are aligned when the seat cushion is rotation to a centered position, and a locking pin for insertion into the aligned locking holes for fixing the seat cushion in the center position, the locking pin including an upper handle that is larger in at least one dimension than the locking holes, and a shaft that is smaller in diameter than the locking holes so that the shaft can extend into the aligned locking hole, the shaft including an annular groove near the upper handle.

9. The device of claim 1, including an elastic band with at least one hook-and-loop covered strap extending from one edge of the band for engagement of the band onto the pulley and sleeve covered spring on each side of the base and back frames.

10. An abdominal exerciser comprising: a base frame; a back frame pivotally mounted near a rear end of the base frame for movement between upright and recumbent positions; at least one back cushion connected to the back frame for supporting a user's back; a seat frame mounted for rotation on the base frame; a seat cushion fixed to the seat frame on which a user sits; a low friction journal bushing connected the base frame, a journal post connected to the seat frame and rotatable mounted in the bushing for rotation of the seat frame and cushion on the base frame; the low friction bushing supporting the weight of a user sitting on the seat cushion and the journal post being located at about 30% to about 42% of a distance from a rear end of the seat cushion to the front end of the seat cushion so that the coccyx of a user sitting on the seat cushion is substantially vertically aligned, with the bushing and post; an arm connected at each side of the base frame, each arm having a pair of extensions connected to the base frame; each arm having a U-shaped handhold lying in a plane extending at an acute angle of about 30 to about 80 degrees to a horizontal plane on which the base rests, a pair of pulleys mounted for rotation near a rear end of the base frame and on opposite sides of the base frame; a springs with a resilient sleeve thereover engaged to each pulley, the springs being connected between the base and back frames for biasing the back frame toward the upright position.

11. The device of claim 10, wherein side members of the base frame include tubular side extensions, the extensions of each arm being detachably attached to the tubular side extension on each respective side of the base frame so that the arms are fixed to the base frame when the seat frame rotates, the handhold lying in a plane that extends at an acute angle of about 50 degrees to about 70 degrees to the horizontal plane, the location of the low friction journal bushing and the journal post received therein, being from about 33% to about 39% of the distance from the rear end of the seat cushion to the front end of the seat cushion, a rear member of the seat frame including a seat frame extension that extends beyond the seat cushion, locking holes in the seat frame extension and in the base frame or one of the arm extensions, that are aligned when the seat cushion is rotation to a centered position, and a locking pin for insertion into the aligned locking holes for fixing the seat cushion in the center position, the locking pin including an upper handle that is larger in at least one dimension than the locking holes, and a shaft that is smaller in diameter than the locking holes so that the shaft can extend into the aligned locking hole, the shaft including an annular groove near the upper handle.

12. An abdominal exercise device comprising:

- a base frame for lying in a horizontal plane on the floor, the base frame having a pair of side members;
- a back frame having a pair of side members pivotally mounted near respective rear ends of the side members of the base frame for movement between a forward upright position and a rearward recumbent position;
- a plurality of back cushions connected between and spaced along the side members of the back frame;
- a seat cushion mounted to the base frame;
- an arm detachably connected to each side member of the base frame and on opposite sides of the seat cushion;

- a pair of side-by-side tandem pulleys mounted for rotation at each side member of the base frame near a rear end of the base frame;
- a pair of tension springs connected between the base frame and the back frame side members on each side of the base and back frames for biasing the back frame toward the forward upright position; and
- a resilient sleeve covering each spring, each resilient sleeve engaged with one of the pulleys.

13. The device of claim 12, wherein the side members (12a, 12b) of the base frame (12) each include a tubular side extension (12d, 12e), the extensions (50a, 50b) of each arm (50) being detachably attached to the tubular side extension on each respective side of the base frame (12) so that the arms are fixed to the base frame when the seat frame rotates.

14. The device of claim 12, wherein the extensions (50a, 50b) of each arm (50) are detachably attached to ends of the respective front and rear members (16a, 16b) of the seat frame (16) on each respective side of the seat frame so that the arms rotate with the rotation of the seat frame.

15. The device of claim 12, including a pair of tandem pulleys mounted for rotation at each side of the base frame and a tension spring connected between the base frame and the back frame side members each with a resilient sleeve covering each spring, engaged with each pulleys for biasing the back frame toward the forward upright position.

16. The device of claim 12, wherein the handhold (50c) lying in a plane that extends at an acute angle of about 50 degrees to about 70 degrees to the horizontal plane.

17. The device of claim 12, wherein the location of the low friction journal bushing and the journal post received therein, is from about 33% to about 39% of the distance from the rear end of the seat cushion to the front end of the seat cushion.

18. The device of claim 12, wherein the rear member of the seat frame includes a seat frame extension that extends beyond the seat cushion, locking holes in the seat frame extension and in the base frame or in one of the arm extension, that are aligned when the seat cushion is rotation to a centered position, and a locking pin for insertion into the aligned locking holes for fixing the seat cushion in the center position.

19. The device of claim 12, wherein the rear member of the seat frame includes a seat frame extension that extends beyond the seat cushion, locking holes in the seat frame extension and in the base frame or in one of the arm extensions, that are aligned when the seat cushion is rotation to a centered position, and a locking pin for insertion into the aligned locking holes for fixing the seat cushion in the center position, the locking pin including an upper handle that is larger in at least one dimension than the locking holes, and a shaft that is smaller in diameter than the locking holes so that the shaft can extend into the aligned locking hole, the shaft including an annular groove near the upper handle.

20. The device of claim 12, including an elastic band with at least one hook-and-loop covered strap extending from one edge of the band for engagement of the band onto the pulley and sleeve covered spring on each side of the base and back frames.

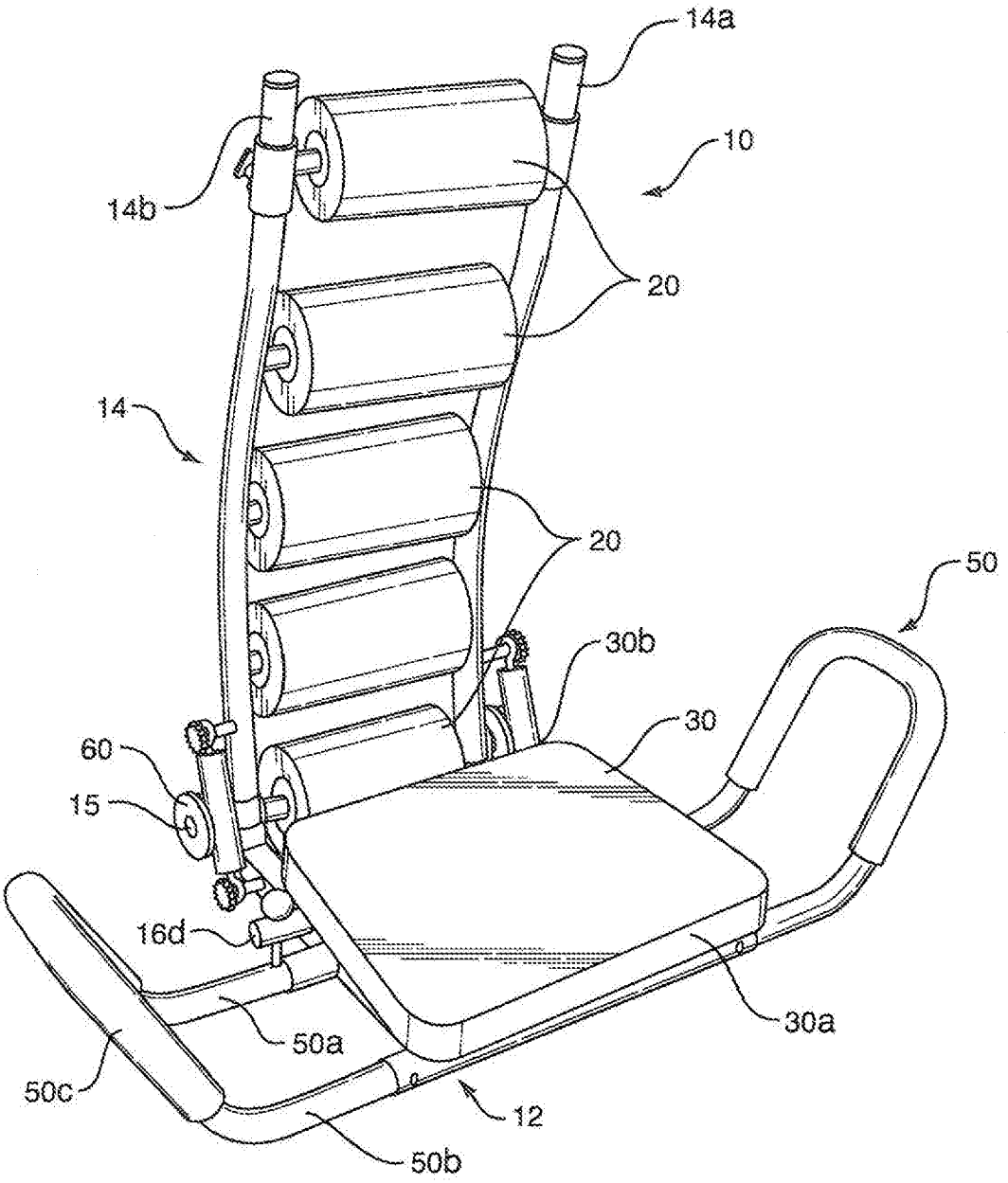


FIG. 1

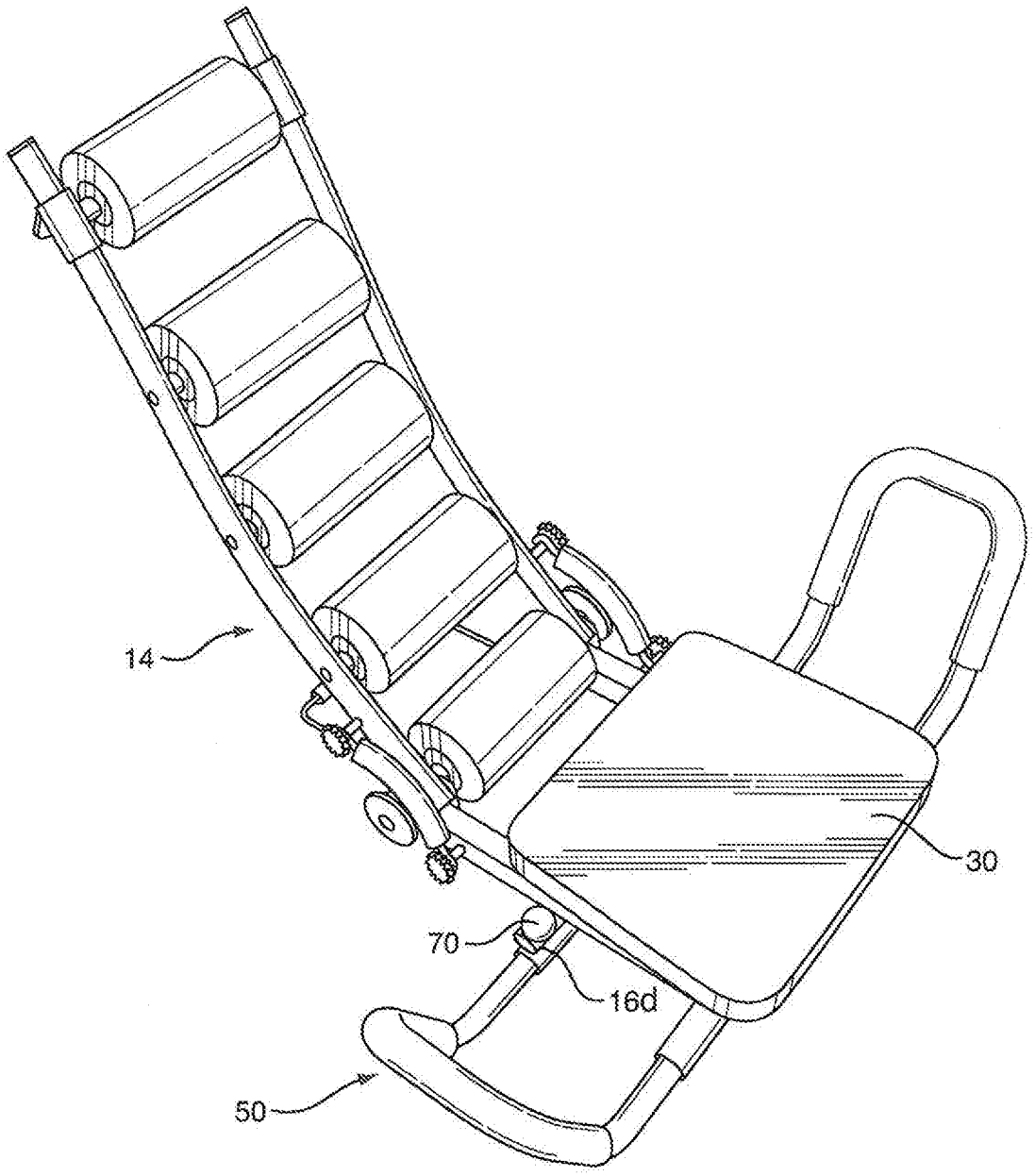


FIG. 2

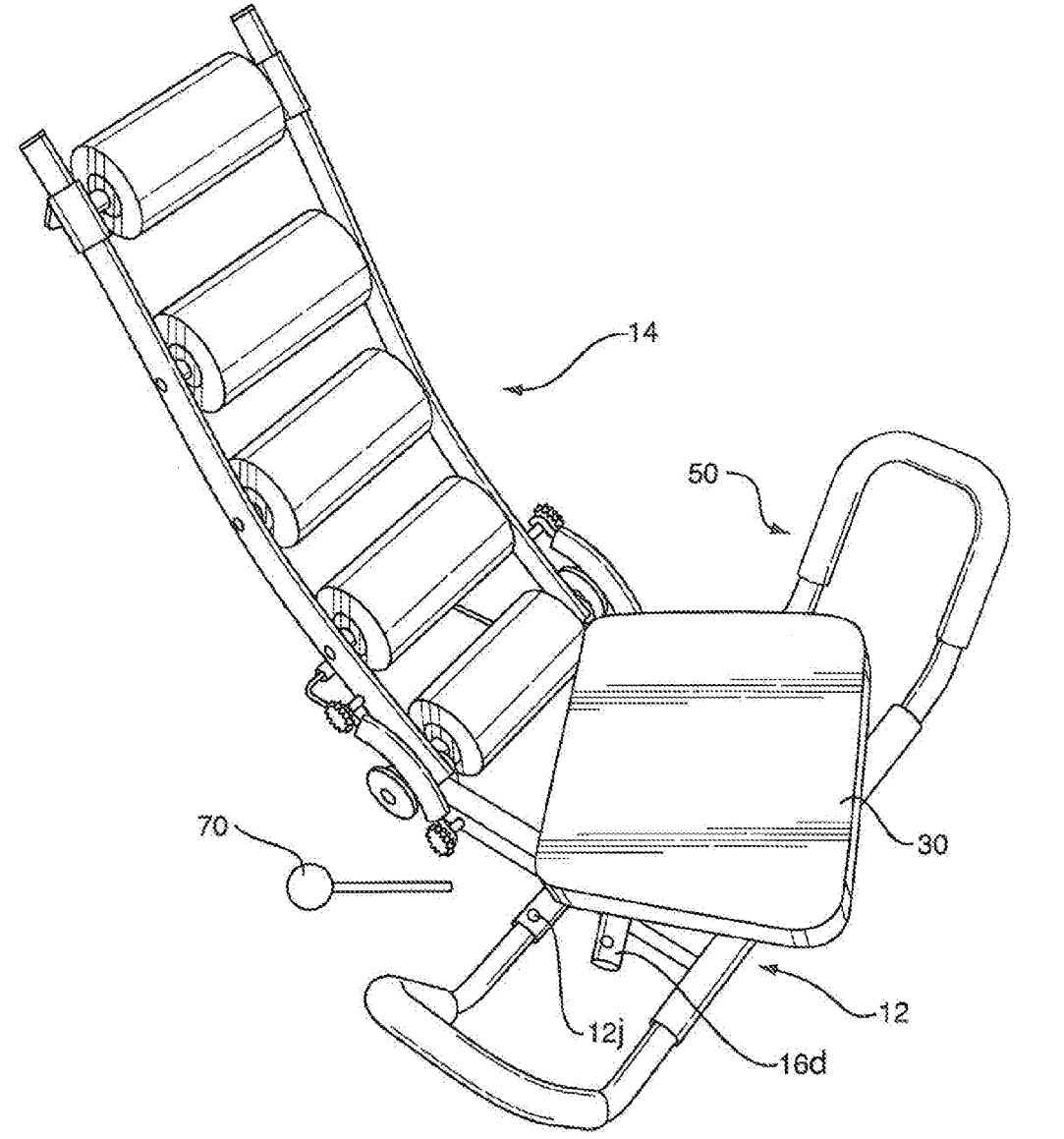


FIG. 3

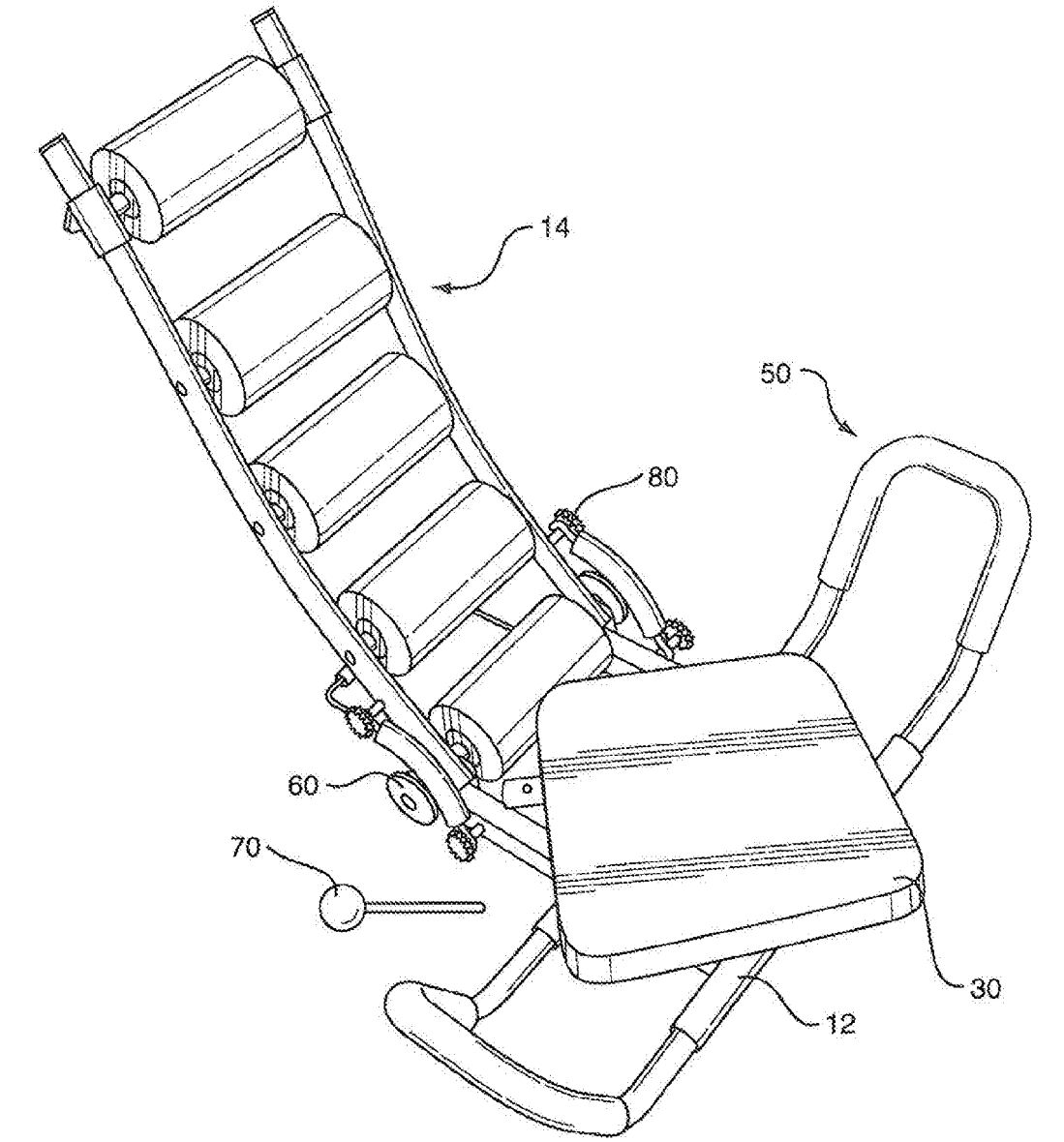


FIG. 4

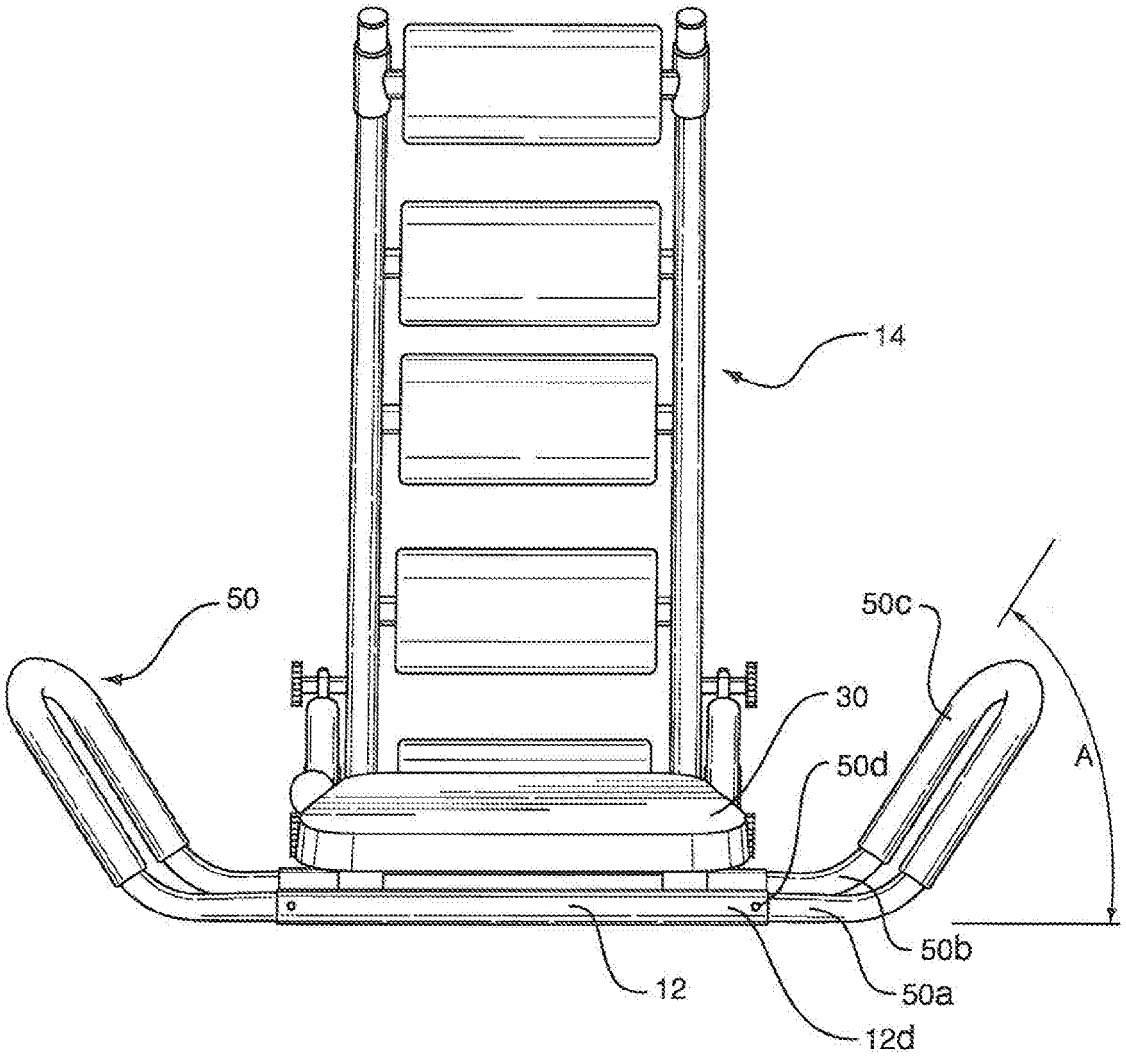


FIG. 5

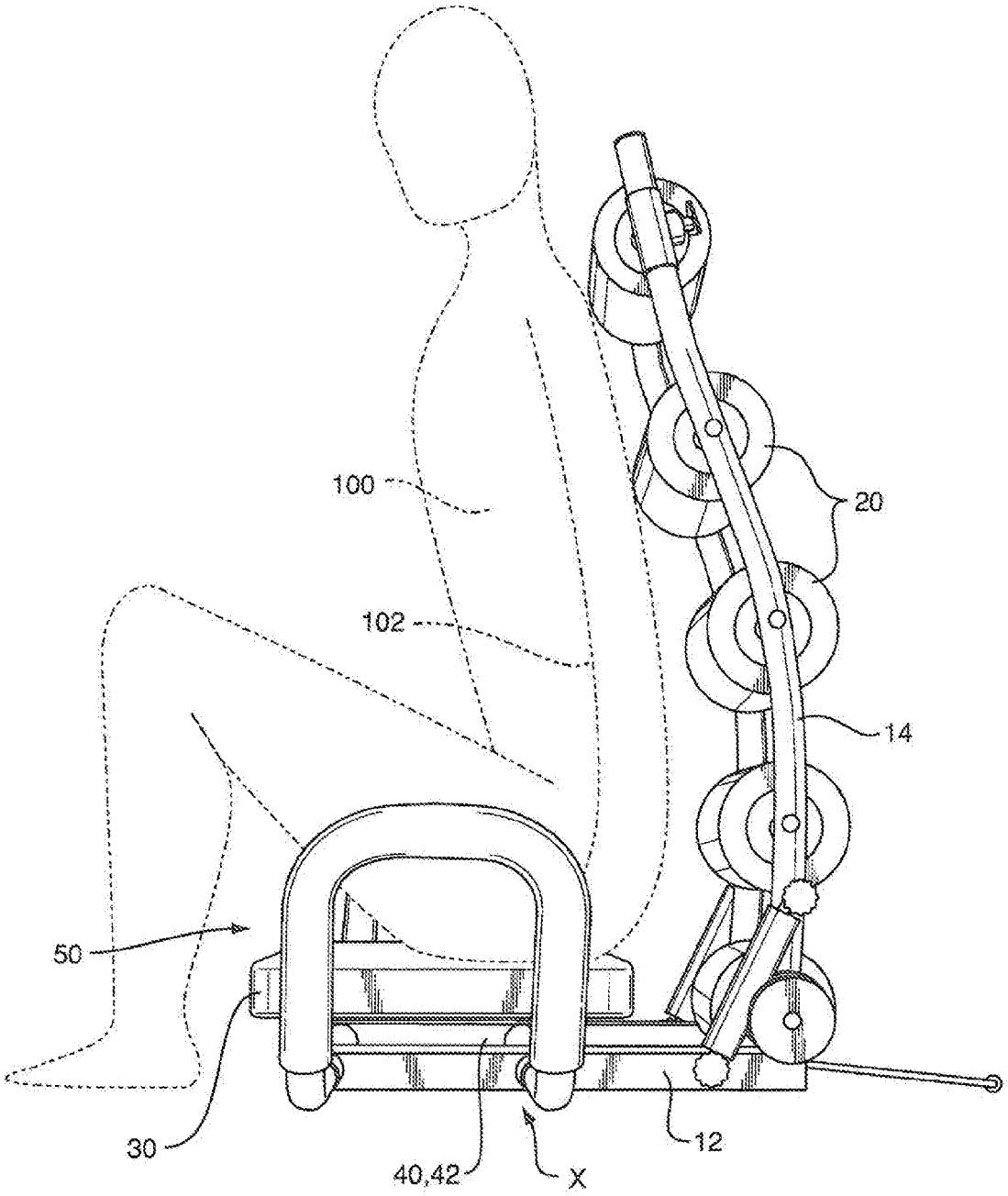


FIG. 6

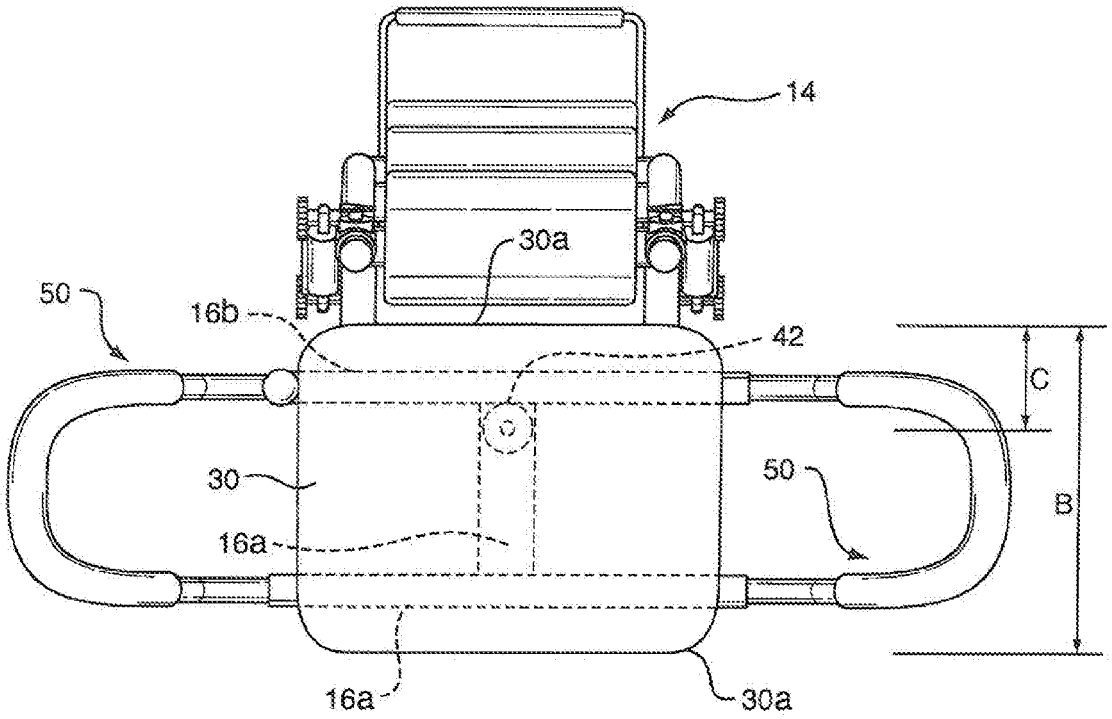
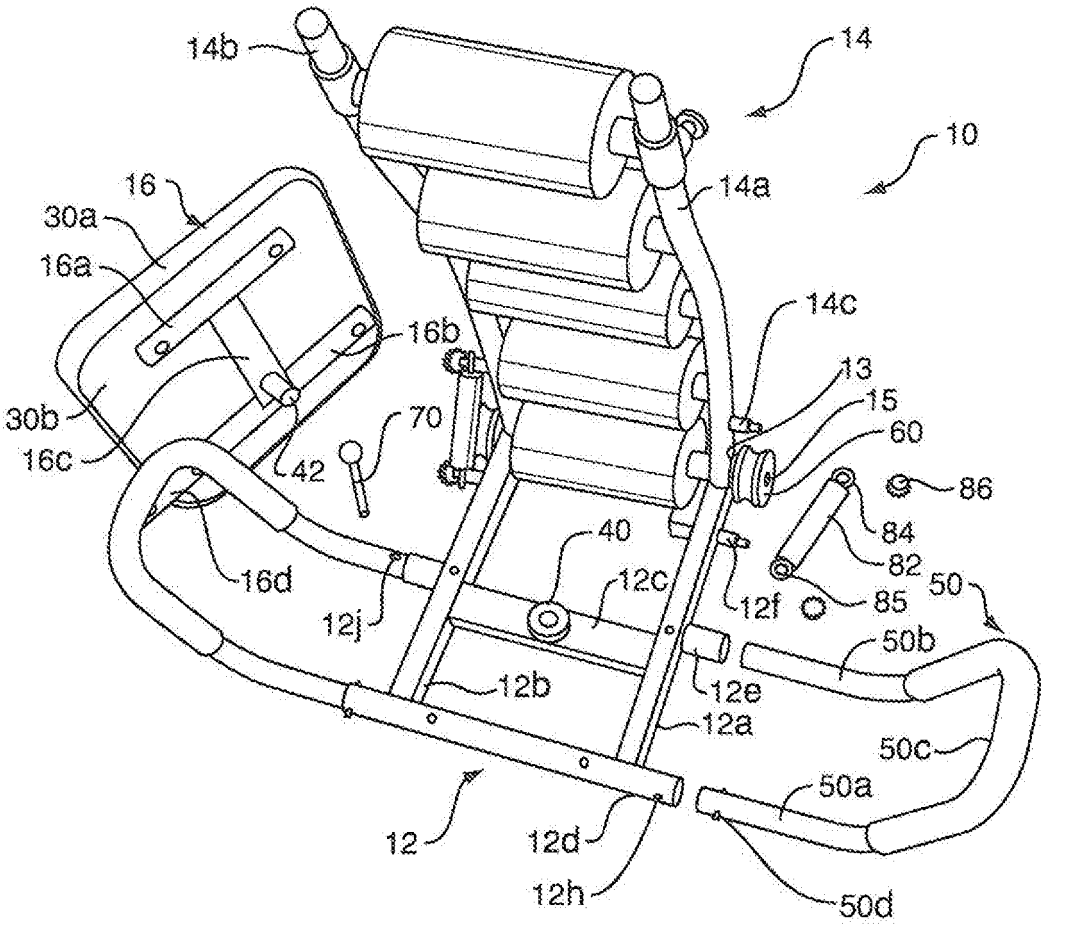


FIG. 7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14a
14c
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16c
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82
16d
12c
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12j
12f
50b
12b
12e
12a
50c
50a
12
12d
12h
50d

FIG. 8

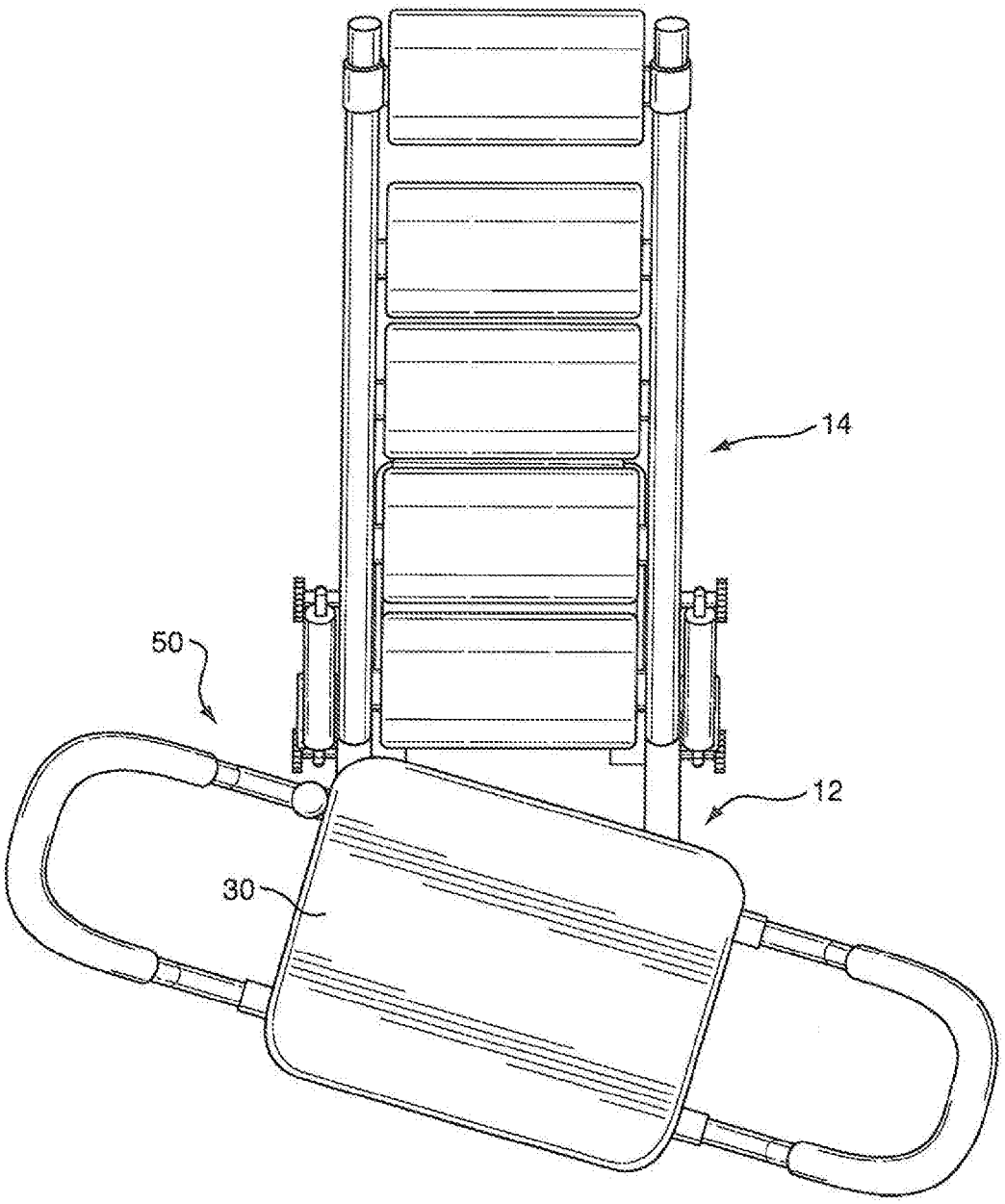

FIG. 9

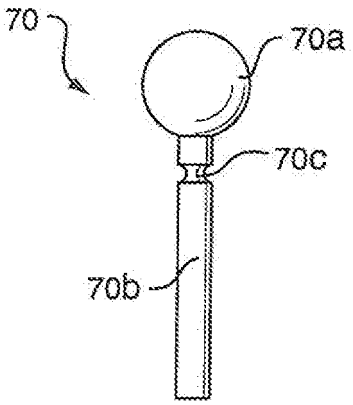

FIG. 10

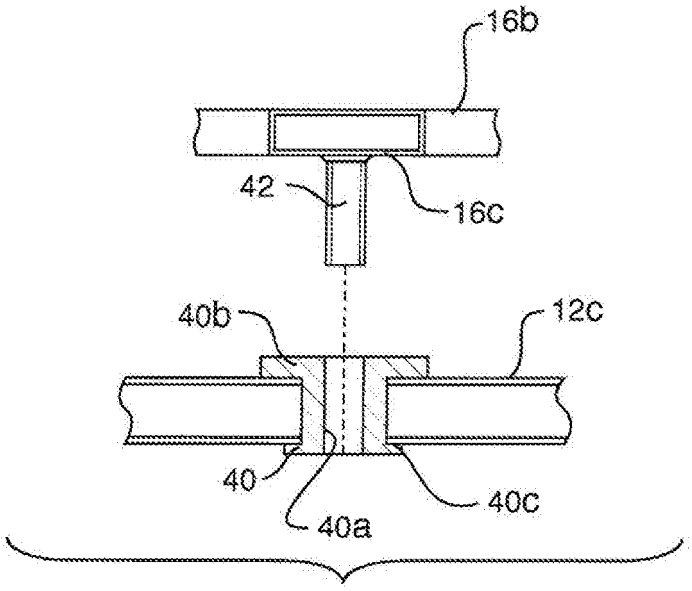

FIG. 11

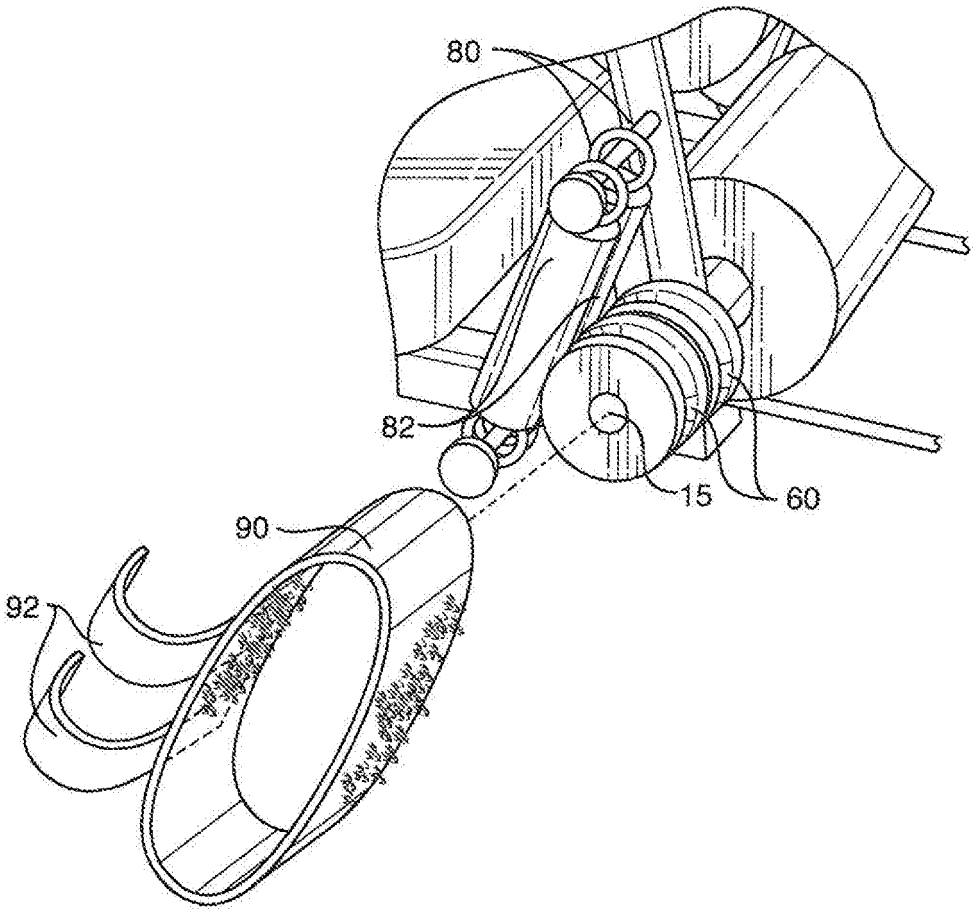

FIG. 12

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EUROPEAN SEARCH REPORT

Application Number
EP 11 18 0410

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y,D	US 7 381 171 B2 (CHEN CHIH-LIANG [TW]) 3 June 2008 (2008-06-03) * the whole document *	1-20	INV. A63B21/045 A63B23/02 A63B22/14
Y	US 7 179 212 B2 (HSIUNG BOB [US] ET AL) 20 February 2007 (2007-02-20) * figures 6,9,11 *	1-20	
A	DE 20 2006 008507 U1 (LEE LUNG INTERNAT INC [TW]) 3 August 2006 (2006-08-03) * the whole document *	2,6	
A	US 6 666 802 B1 (RASMUSSEN AARON P [US]) 23 December 2003 (2003-12-23) * the whole document *	3	
A	DE 20 2004 016866 U1 (HSIN LUNG ACCESSORIES CO [TW]) 24 March 2005 (2005-03-24) * the whole document *	3	
A	US 2007/099778 A1 (KO MING-JEN [TW]) 3 May 2007 (2007-05-03) * paragraph [0046]; figures 2,10,11 *	7	TECHNICAL FIELDS SEARCHED (IPC) A63B
A	US 2008/161175 A1 (HO SHOU-SHAN [TW]) 3 July 2008 (2008-07-03) * the whole document *	7	
A,P	DE 20 2011 004957 U1 (CHEN YI TZU [TW]) 10 August 2011 (2011-08-10) * figure 2 *	1-20	
A,P	DE 20 2010 014622 U1 (CHEN YI TZU [TW]; LIN CHANG FENG [TW]) 23 December 2010 (2010-12-23) * figure 2 *	1-20	

-/--

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 October 2011	Tejada Biarge, Diego

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Application Number
EP 11 18 0410

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,P	US 7 878 957 B1 (CHEN YI-FAN [TW]) 1 February 2011 (2011-02-01) * the whole document * -----	7	

TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 October 2011	Tejada Biarge, Diego

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21-10-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 7381171 B2	03-06-2008	US 2008090709 A1	17-04-2008
US 7179212 B2	20-02-2007	US 2006116261 A1	01-06-2006
DE 202006008507 U1	03-08-2006	NONE	
US 6666802 B1	23-12-2003	NONE	
DE 202004016866 U1	24-03-2005	TW M244932 U US 2005101449 A1	01-10-2004 12-05-2005
US 2007099778 A1	03-05-2007	NONE	
US 2008161175 A1	03-07-2008	NONE	
DE 202011004957 U1	10-08-2011	NONE	
DE 202010014622 U1	23-12-2010	NONE	
US 7878957 B1	01-02-2011	NONE	

EPO FORM P0459

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Patent documents cited in the description

- US 7381171 B **[0003] [0018]**
- US D581471 B **[0003] [0018]**