



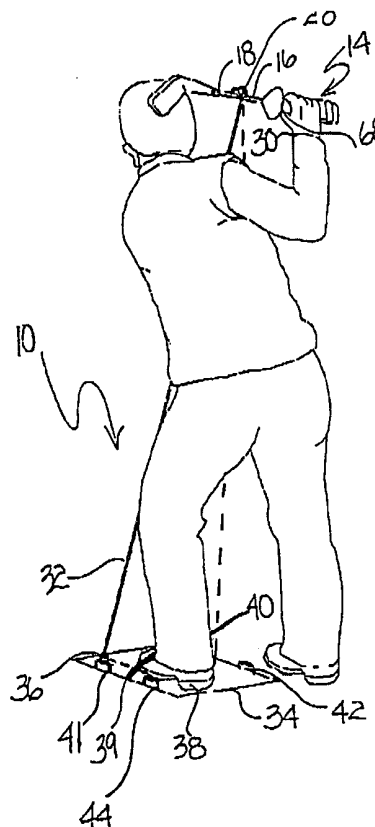
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁷ : A63B 21/04</p>	<p>A1</p>	<p>(11) International Publication Number: WO 00/48686 (43) International Publication Date: 24 August 2000 (24.08.00)</p>
<p>(21) International Application Number: PCT/US00/04085 (22) International Filing Date: 17 February 2000 (17.02.00) (30) Priority Data: 60/120,542 17 February 1999 (17.02.99) US Not furnished 17 February 2000 (17.02.00) US (71)(72) Applicant and Inventor: ERVIN, Derrick [US/US]; 3494 Cambridge, Detroit, MI 48221-1857 (US). (74) Agents: POSA, John, G. et al.; Gifford, Krass, Groh, Sprinkle, Anderson & Citkowski, P.C., Suite 400, 280 N. Old Woodward Avenue, Birmingham, MI 48009 (US).</p>	<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>	

(54) Title: SWING EXERCISER

(57) Abstract

A device is disclosed for sports such as golf wherein an implement such as a golf club (16) is moved along a swing path. An elongated handle has a proximal end with a hand grip and a distal end with a weighted body. A foot plate, sized to receive a foot of the user. A removable, stretchable tether (32) is provided having a first end tied at a point between the proximal and distal ends of the handle and a second end tied to a connection point (41) on the foot plate. The foot plate has inside and outside edges and in the preferred embodiment, each edge includes one or more connection points. An optimal rocker plate defines an area large enough to receive the foot plate and the user's other foot. The rocker plate preferably further includes rotatable plates (58, 60) to assist in positioning the user's feet to achieve a proper stance for the desired sport.



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SWING EXERCISER

Reference to Related Application

This application claims priority from U.S. provisional application Serial No. 60/120,542, filed February 17, 1999, the contents of which are incorporated herein by reference.

5

Field of the Invention

The present invention relates to a portable exercise machine. More specifically, the invention relates to an exerciser for teaching balance, building muscle and developing muscle memory for all sports involving equipment used to create a swing path, including golf, baseball, tennis, hockey, squash and racquetball.

10

Background of the Invention

There are literally hundreds of inventions relating to golf, some of which are over a hundred years old. Various implements have been devised for swing training, typically employing harnesses with loops and tethers to physically constrain one or more body movements. Many of these assemblies are complicated and difficult to set up and/or use.

15

Disclosed in U.S. Pat. No. 4,593,909 is a knock-down golf-swing training for use indoors and outdoors. A main frame is formed of tubular components including a large area base assembly, and a vertically adjustable upright post mounted medially of the rear edge of the base assembly, outriggers for the base assembly, a safety harness, and a

plurality of belt loops adapted for assembly loosely about either or both ends of the player's torso while practicing golf swings.

The golf-swing training device of U.S. Pat. No. 5,149,909 employs an elastic loop worn around the neck, chest and hips, with most of the loop resting over the chest, abdomen and shoulders. The player swings against an upward pull exerted by tension in the elastic loop to produce improved control of the golfer's arms. The device emphasizes left hand and left arm movements for right-handed players, and does not appear to meet a wider variety of goals in swing and exercise conditioning.

U.S. Pat. No. 5,174,575, discloses a harness which restricts a golfer's arm and hand movements while making practice swings. A tether is attached to a point on the shaft of the golf club just above the club head, and extends to a point on the golfer's forearm where it is adjustably fastened. Again, the apparatus appears to be limited in terms of range of motion and other factors.

U.S. Pat. No. 5,295,690 uses two interconnected elastic arm cuffs that fit over a golfer's arms to bias them towards one another other during a golf swing. An elastic hip strap is connected to the cuff holding the trailing swing arm. The device is somewhat complex, and the physical constraints imposed by the apparatus may not improve muscle memory training. An even more complex golf-swing training apparatus is disclosed in U.S. Pat. No. 5,301,948. The device employs a system of articulated arms force a golfer to maintain one swing plane. In addition to swing element, a swing-plane adjuster

element, and an upright post-and-base element to support the movable elements from the floor, the device features an adjustable counterbalance to vary loading.

The golf training device of U.S. Pat. No. 5,303,927 includes an elastic cord having one end attached to a belt worn by the user and the opposite end is attached to a foot-receiving stirrup. The configuration is intended to create a rotational torque at the hips to assist the player in maintaining a proper body stance associated with a well-executed swing. In the golf training aid of U.S. Pat. No. 5,308,074 a flexible cord extends from a waist belt to a stake in the ground. The cord is designed to stretch during the user's backswing and retract during follow-through.

The golf-swing training device of U.S. Pat. No. 5,916,037 includes a base for receiving a golfer's front foot, at least one pivot arm having a first end pivotally mounted to the base, and biasing means for biasing the pivot arm to a first position with respect to vertical. An engagement member disposed on the opposite end of the pivot arm is used for engaging the golfer's hip area when positioned to address a golf ball. Engagement of the member displaces the pivot arm to a second position with respect to vertical so as to create a constant pressure force against the golfer's hip area. This supposedly causes the golfer to remember the proper pace and body position for performing a golf swing.

Despite these and other training aids, none are entirely adequate in terms of simplicity, exercise training, and applicability to other sports. Existing devices are either so complex that they will not be used often enough to provide rapid benefit or, if the

device is simple, is limited in terms of muscular or memory development for a particular sport or swing pattern.

Summary of the Invention

The subject invention resides in a simple and economical yet effective training
5 and exercising device for sports such as golf, wherein an implement is moved along a swing path. A device according to the invention features an elongated handle having a proximal end with a hand grip and a distal end with a weighted body. In the preferred embodiment, the weighted body resembles a piece of sports equipment such as a golf club, golf ball, hockey stick, or racquet, and these pieces are preferably attachable to the
10 distal end of the handle through a quick-disconnect connector.

At least one foot plate sized to receive the foot of a user, includes one or more connection features, preferably rigidly secured, inverted-U-shaped hooks. A stretchable tether is provided having a first end tied at a point between the proximal and distal ends of the handle and a second end tied to a connection point on the foot plate. The
15 connection point on the handle is preferably an inverted U-shaped hook which doubles as a wrist indicator. A guard proximate the grip may optionally be provided to prevent the tether from contacting the user. The connector on the handle is preferably removably attachable so that it may be attached to a standard piece of sports equipment.

The length of the tether is adjustable so as to resist upward movement of the
20 handle when swung by the user to promote training and exercise with respect to a given

sport. The foot plate has inside and outside edges and, in the preferred embodiment, each edge includes one or more connection points to practice a back swing and a forward swing.

Multiple tethers may also be used, each having a first end secured at the point
5 between the proximal and distal ends of the handle. For example, two tethers may be used, with the second end of one being secured to an outer connection point of the foot plate, and the second end of the other tether being secured to an inner connection point of the foot plate.

The preferred embodiment also further comprises a rocker plate defining an area
10 large enough to receive at least one foot plate and the user's other foot, whether or not a second foot plate is used. The rocker plate optionally further includes one or more movable, rotatable foot positioning plates to assist in stabilizing the user's feet to achieve a proper stance. Each movable, rotatable plate may preferably be locked into place along a rail feature.

15 The invention swing exerciser may be used for many other sports besides golf such as tennis, hockey, and so forth. In each case, a user can practice both the forehand and backhand swings with the tensioned tether and foot plate placed under the corresponding foot. Like the practice golf swing, the exerciser promotes proper foot planting during the practice forehand or backhand while increasing muscle strength and
20 memory.

Brief Description of the Drawings

FIGURE 1 is a drawing of an individual using a swing exerciser according to the invention to practice a golf swing;

FIGURE 2 is a drawing of a handle according to the invention having approximal
5 end of the hand grip, and a weighted body removably attachable to the distal end;

FIGURE 3 is an oblique drawing which illustrates how different bodies resembling pieces of sports equipment may be removably attached to the distal end of the handle shown in Figure 2;

FIGURE 4 is an exploded view of a quick-disconnector applicable to the
10 invention;

FIGURE 5 is a side-view cross section of the quick-disconnector showing the two components being merged together for engagement;

FIGURE 6 is a drawing which continues the process of Figure 5, enabling the two components of the quick-disconnect connector to engage one another and lock into place;

15 FIGURE 7 is a side-view drawing of a rocker plate according to the invention, being sized to receive a footplate and the user's other foot for posture and alignment purposes;

FIGURE 8 is a top-down view of the rocker plate of Figure 7, showing one placement of a user's feet relative to other positioning plates movable and rotatable with
20 respect to a rail and individual locking devices; and

FIGURE 9 is a perspective view drawing of a rocker plate with foot plates and positioning guides according to the invention.

Detailed Description of the Invention

With reference to Figures 1 through 6 in particular, a swing exerciser 10 according to the invention includes a grip 12 appropriate for the sport sought to be improved upon. In a preferred embodiment, the grip 12 is a standard golf training grip to ensure proper placement of the hands 14 during the exercise and to promote proper muscle memory.

Extending from one end of the grip 12 away from the user is a shaft 16 preferably provided with a quick disconnect 18 at the distal end 20. The quick disconnect 18 allows for easy attachment and removal of a golf ball or miniature golf club 22, racquet 24 or hockey stick 26, as shown in Figure 3. These attachments may be reduced in size from standard equipment to provide a more compact and travel friendly product.

Details of the preferred quick-disconnect mechanism are provided in Figures 4 through 6. It would be appreciated that the shaft or handle to which the grip and quick-disconnector attached may be made of various materials, hollow or solid, including metal, plastic, fiber-reinforced composites, and so forth. In addition, although a spring-loaded ball-bearing type of quick-disconnect mechanism is shown, other types of fasteners may be used, including bayonet and threaded types. In addition, extension members may be

added, preferably with quick-disconnectors as well, to extend the length of the shaft or handle between the grip and body of the distal end.

Between the quick-disconnect 18 and the grip 12, a wrist indicator 28 is attached along the shaft 16. As indicated by the name, the wrist indicator 28 allows the user to check for proper location of the wrist 30 along the swing path during the exercise as set forth more fully below. The wrist indicator 28 also serves to secure an adjustable tether 32 to the shaft 16. The wrist indicator may be fixed or, optionally may rotate and/or move along the shaft then locked into place. The swing exerciser 10 according to the invention may also be provided with a guard 68 between the grip 12 and shaft 16 to prevent the tether 32 from contacting the user's hands 14 or other body parts. The guard 68 may be necessary where the user is taller or shorter than the average height range for which the swing exerciser is generally designed.

The tether 32 is secured to a foot plate 34 at the opposite end 36. The tether 32 may be adjusted about the wrist indicator 28 and/or foot plate 34 to increase or decrease tension during exercise as desired. In operation, a user places the foot plate 34 under his foot 38 and adjusts the location of the tether 32 to one of the four U-shaped hooks 40, 41, 42, 44, and tensioning the tether 32 as desired. The tether 32 may also be placed under the foot 38 and atop the foot plate 34, as shown with the broken lines in Fig. 1, to retain more control and feel during the swing.

A preferred tether material is surgical tubing, with different sizes being used for different tensions, and with quick-connect hooks being used where they attach to the

handle. It will be apparent to one of skill in the art, however, that since the purpose of the tether is to resist upward motion of the user for forward and back swing movements, other devices may be substituted for this tensioning apparatus, including hydraulic, spring, pneumatic, nautilus type, electro-mechanical tension devices, and free weights
5 connected by pulleys. For example, in addition, although the hooks are shown as rigidly attached to the footplate and shaft 16, either attachment point may rotating or swivel devices to provide reduced wear on the tether. The footplate may also be constructed of various materials, including wood, molded plastic, or metal, and may be of different sizes and shapes, including foot-shaped, though in the preferred embodiment, the footplates
10 measure 12" x 6" x ½" thick.

With the foot plate 34 under the left foot and the tether 32 connected to either inside hook 40, 42, (and/or outside hooks 41,44 and/or inside hooks 40,42) the user can practice a proper back swing including the take away, wrist cock and back swing to impact zone. During each portion of these exercises, the user can constantly monitor the
15 location of his wrists 30 by the wrist indicator 28. With the foot plate 34 under the right foot and the tether 32 connected to either outside hook 41, 44, the user can practice impact zone to follow through, a proper wrist cock at follow through and a complete finish to the swing. As above, the user can monitor the location of his wrists 30 by the wrist indicator 28.

20 An advantage of the swing exerciser is the tension in the tether in conjunction with the wrist monitor and grip increases muscle strength while simultaneously

promoting proper muscle memory resulting in a proper swing path. Tether tension may be increased to increase muscle strength as the user progresses with the exercises.

In addition to securing and tensing the tether, the foot plates help to promote proper spine alignment and proper balance throughout the swing, while, at the same time, preventing the user from lifting his or her feet improperly during the course of the swing exercises. If the user lifts the foot from the foot plate, tension will be released from the tether and result in improper balance during the practice swing. This will immediately become evident to the user and allow the user to adjust his practice swing accordingly.

Two or more tethers may be used simultaneously to increase tension and/or to allow the user to practice a full swing. Both tethers are attached to the wrist indicator 28 at one end, with the other ends being attached to the foot plate(s) at different points in accordance with a desired goal. In one exercise, for example, a first tether will extend from the wrist indicator 28 under the user's right foot and attach to either outside hook 41,44. A second tether will extend from the wrist indicator 28 under the user's left foot and attach to either inside hook. 40,42. Another advantage of using two tethers is the increase in muscle strength and memory during the exercise regime.

Reference is now made to Figures 7 and 8, which show the use of a single foot plate 34. In this embodiment, a rocker base plate 46 is provided to ensure proper balance during the practice swing. A level plate 48 is secured atop lower ribs 50, with ends 52,54 being truncated to create a rocker plate. The base plate 48 and ribs 50 are preferably

equipped with means for adjusting the overall length of the plate 48 to adequately provide for the span 56 of the user's stance during swing practice.

Two additional foot-positioning plates 58,60 are provided atop the base plate 48, and are adjustable laterally and rotationally along a slot 62 extending the length of base plate 48. Plates 58,60 may be secured in position by a locking mechanisms 64,66 to
5 secure the plate 58,60 in a desired position within the slot 62 on the base plate 48. The locking mechanisms 64,66 are preferably simple manual fasteners such as thumb-screws which engage with the slot 62 to tighten and hold the plates 58, 60 position. The various plates, including the rocker based plate, level plate and additional plates used for
10 positioning guides may also be constructed of any appropriate material, including metal, plastic, and so forth.

By way of example, and as shown in Figure 8, to use the rocker base plate 46, the user may place plate 58 parallel to the far end 52 of the slot 62 and secure the plate in position by locking mechanism 64. Second plate 60 is then preferably turned 90 degrees
15 from plate 58 along slot 62 a distance equal to the user's span 56. Placing the foot plate 34 between plates 58,60, the user may step on the rocker base plate 46 with the left foot on top of foot plate 34 against plate 58. The right foot is placed at the opposite end against plate 60, thereby imitating a comfortable swing stance. Now when the user practices a swing path, the rocking motion of the base plate 46 will indicate improper
20 balance. The user may adjust plate 58,60 to any angle to accommodate an open or closed stance as desired.

Figure 9 is a drawing which shows a preferred embodiment of the invention using dual foot plates and usrgical tubing tethers, as seen from an oblique perspective. It will be noted that the foot-positioning plates 58-60 are preferably beveled at an angle of 45 degrees, though other angles would be acceptable in casuing the user to feel the resistance
5 in the left and right side for a better stance and/or posture. Each of the footplates 34 may also include additional holes 92 to change the location of the manual operated fasteners 94 or to individually use over-foot straps, as show in Figure 1 with numerical reference 39. Optional feet 98 may also be provided, along with adjusters 99 to defeat the operation of the rocker plate, if so desired. The feet 98 may also be adjusted up and down
10 for an uphill lie or downhill lie or to simulate other types of terrain.

As stated above, the swing exerciser may be used for many other sports such as tennis or the like. A miniature tennis racquet may be attached to the shaft by the quick release mechanism. The user can then practice both the forehand and backhand swings with the tensioned tether and foot plate placed under the corresponding foot. Like the
15 practice golf swing, the exerciser promotes proper foot planting during the practice forehand or backhand while increasing muscle strength and memory. In addition to the various devices shown, as an option, electro-mechanical or electronic devices such as timers and metronomes may be added to the apparatus to assist in synchronizing the users movements.

20 I claim:

1. A training and exercising device for sports such as golf, wherein an
2 implement is moved along a swing path, the device comprising:
an elongated handle having a proximal end with a hand grip and a distal end with
4 a weighted body;
a foot plate sized to receive a foot of the user, the foot including one or more
6 connection features; and
a removable, stretchable tether having a first end tied at a point between the
8 proximal and distal ends of the handle and a second end tied to a connection point on the
foot plate, the length of the tether being adjustable so as to resist upward movement of the
10 handle when swung by the user to promote training and exercise with respect to a desired
sport.

2. The device of claim 1, wherein the weighted body resembles a piece of
2 sports equipment.

3. The device of claim 2, wherein the piece of sports equipment is a golf
2 club, golf ball, hockey stick, or racquet.

4. The device of claim 1, wherein the weighted body attaches to the distal
2 end of the handle through a quick-disconnect connector.

5. The device of claim 1, wherein the foot plate has inside and outside edges,
2 each with a one or more connection point to practice a back swing and forward swing,
respectively.

6. The device of claim 5, further including two or more tethers, each having a
2 first end tied at the point between the proximal and distal ends of the handle, and with the
second end of one tether being tied to an outer connection point of the foot plate, and the
4 second end of the other tether being tied to an inner connection point of the foot plate.

7. The device of claim 5, wherein the foot plate is provided with separate
2 right and left component parts.

8. The device of claim 1, wherein the connection points are inverted-U-
2 shaped hooks rigidly secured to the foot plate.

9. The device of claim 1, further comprising a guard proximate the grip to
2 prevent the tether from contacting the user.

10. The device of claim 1, further comprising a rocker plate defining an area
2 large enough to receive the foot plate and the user's other foot.

11. The device of claim 1, wherein the rocker plate further includes one or
2 more movable, rotatable plates to assist in positioning the user's feet to achieve a proper
stance for the desired sport.

12. The device of claim 12, wherein each movable, rotatable plate may be
2 locked into place along a rail feature.

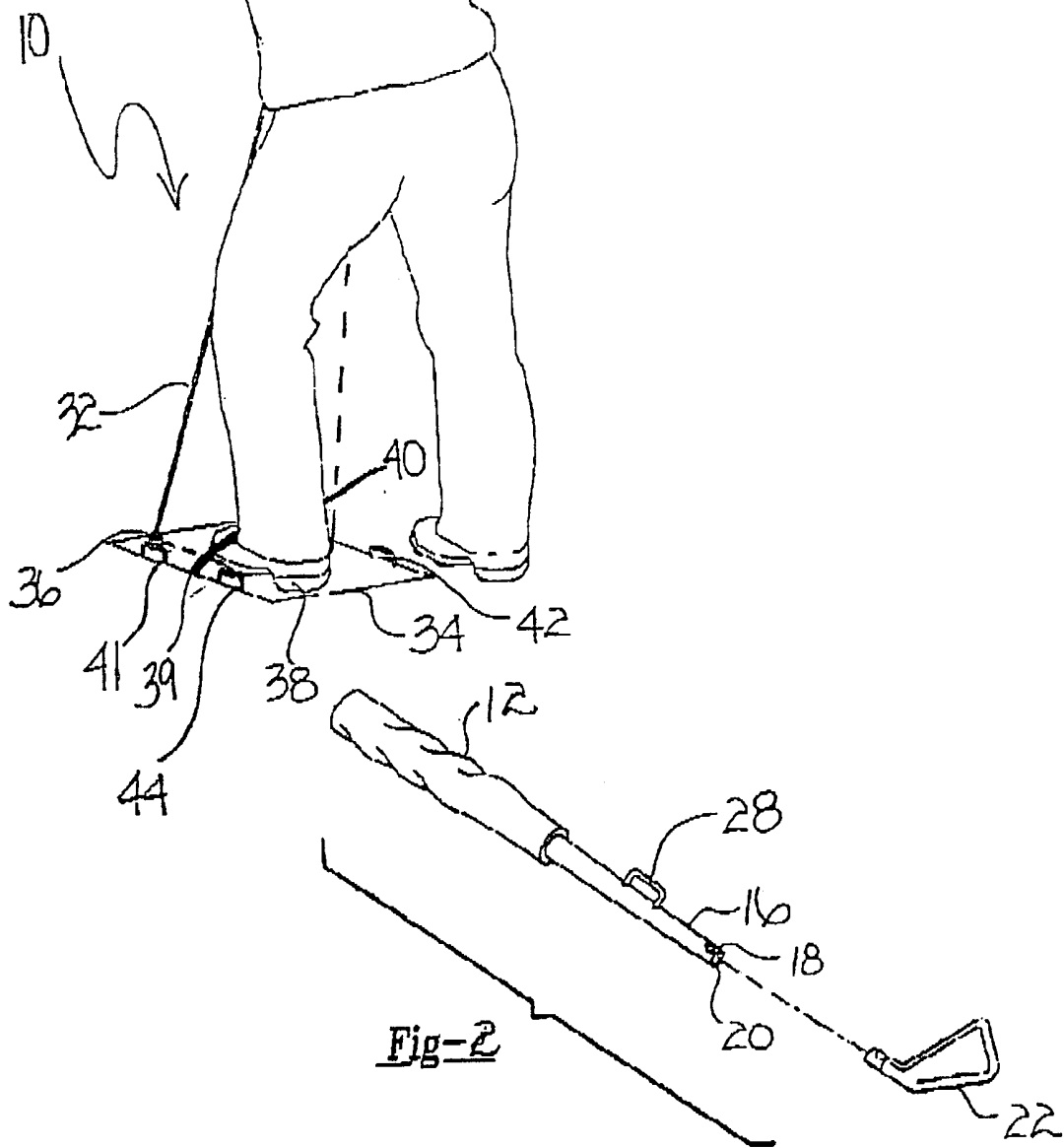
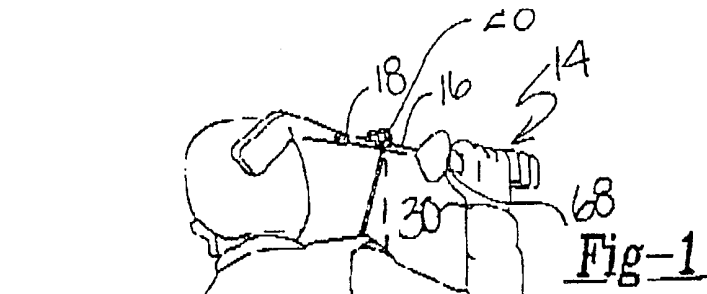
13. A golf-swing training and exercising device, comprising:
2 an elongated shaft having a proximal end with a golf-club-style hand grip, a distal
end with a removeably detachable golf-club head, and a wrist indicator;
4 a foot plate sized to receive a foot of the user, the foot plate including inside and
outside edges, each with a one or more connection devices; and
6 a removable, stretchable tether having a first end tied at the wrist indicator and a
second end tied to one of the connection points on the foot plate.

14. The device of claim 13, further including two or more tethers, each having
2 a first end tied at the wrist indicator, and with the second end of one tether being tied to
an outer connection point of the foot plate, and the second end of the other tether being
4 tied to an inner connection point of the foot plate.

15. The device of claim 13, further comprising a rocker plate defining an area
2 large enough to receive the foot plate and the user's other foot.

16. The device of claim 15, wherein the rocker plate further includes one or
2 more movable, rotatable plates to assist in positioning the user's feet to achieve a proper
stance for the desired sport.

17. The device of claim 16, wherein each movable, rotatable plate may be
2 locked into place along a rail feature.



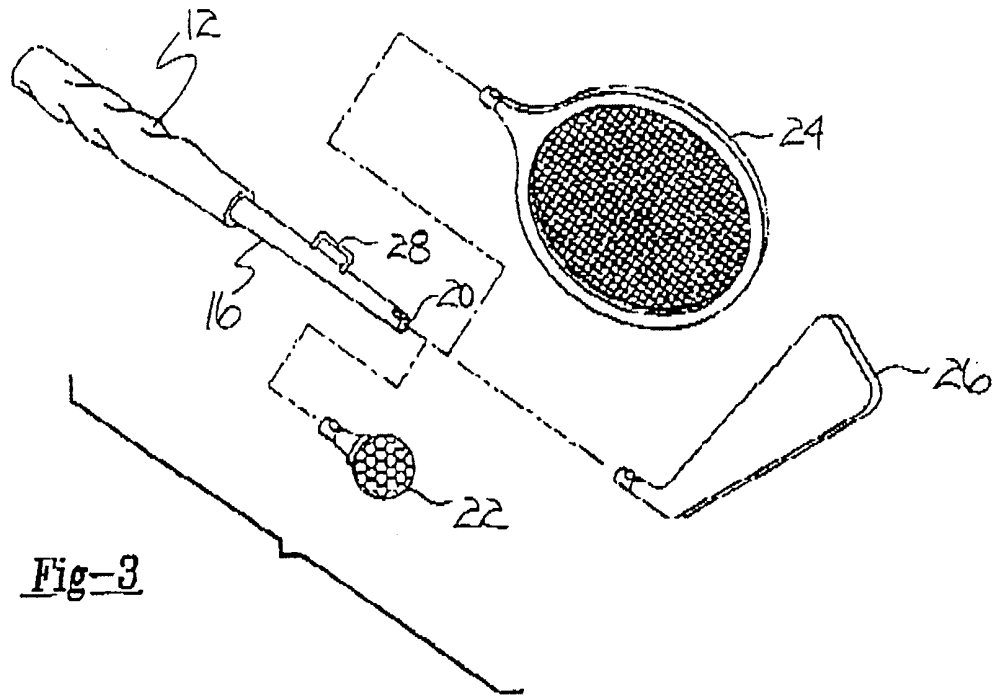


Fig-3

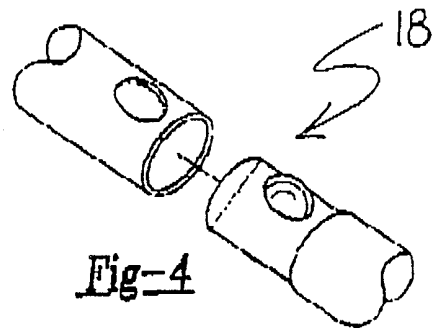


Fig-4

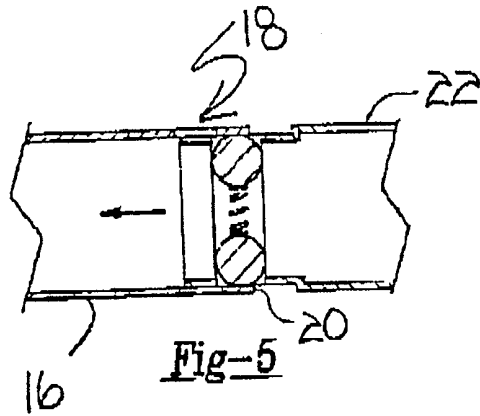


Fig-5

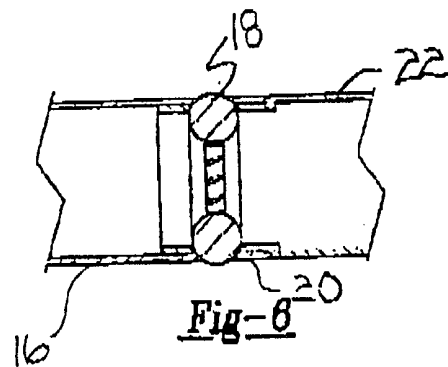


Fig-6

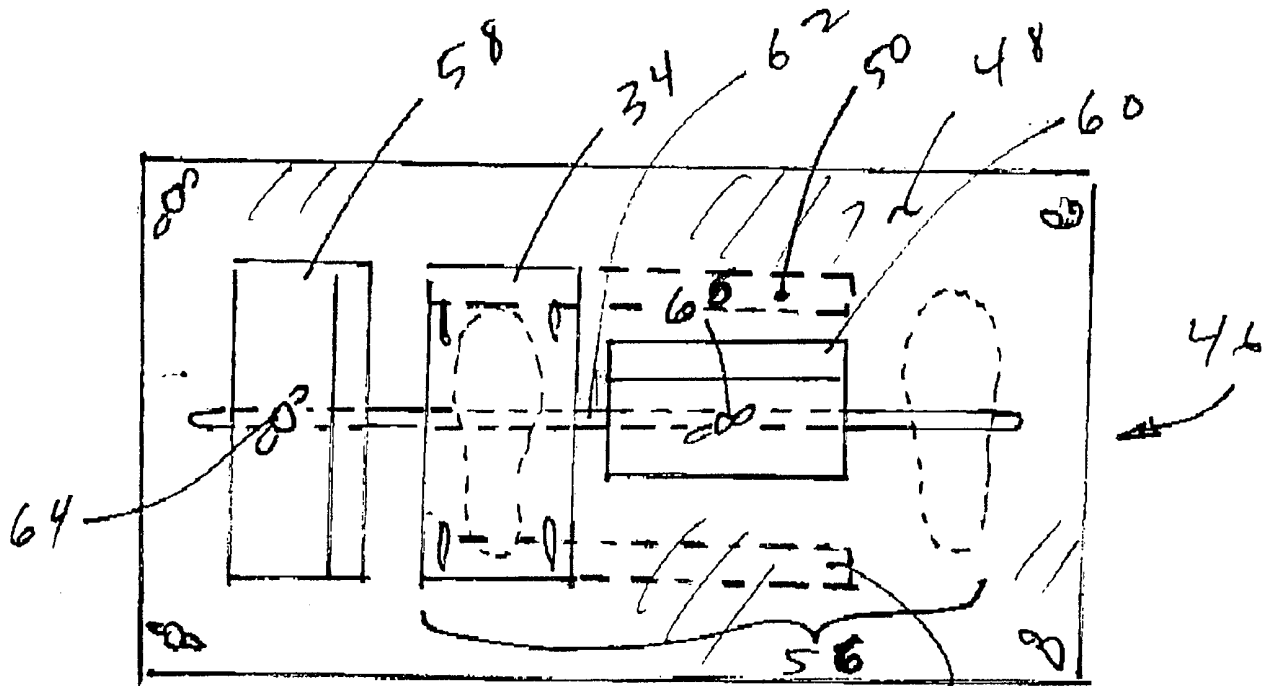


Fig-8

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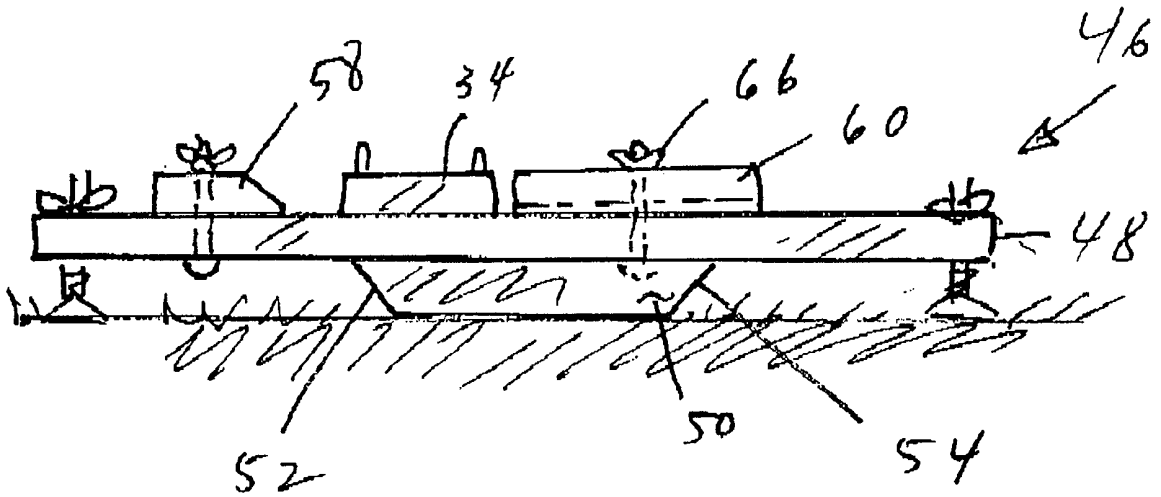


Fig-7

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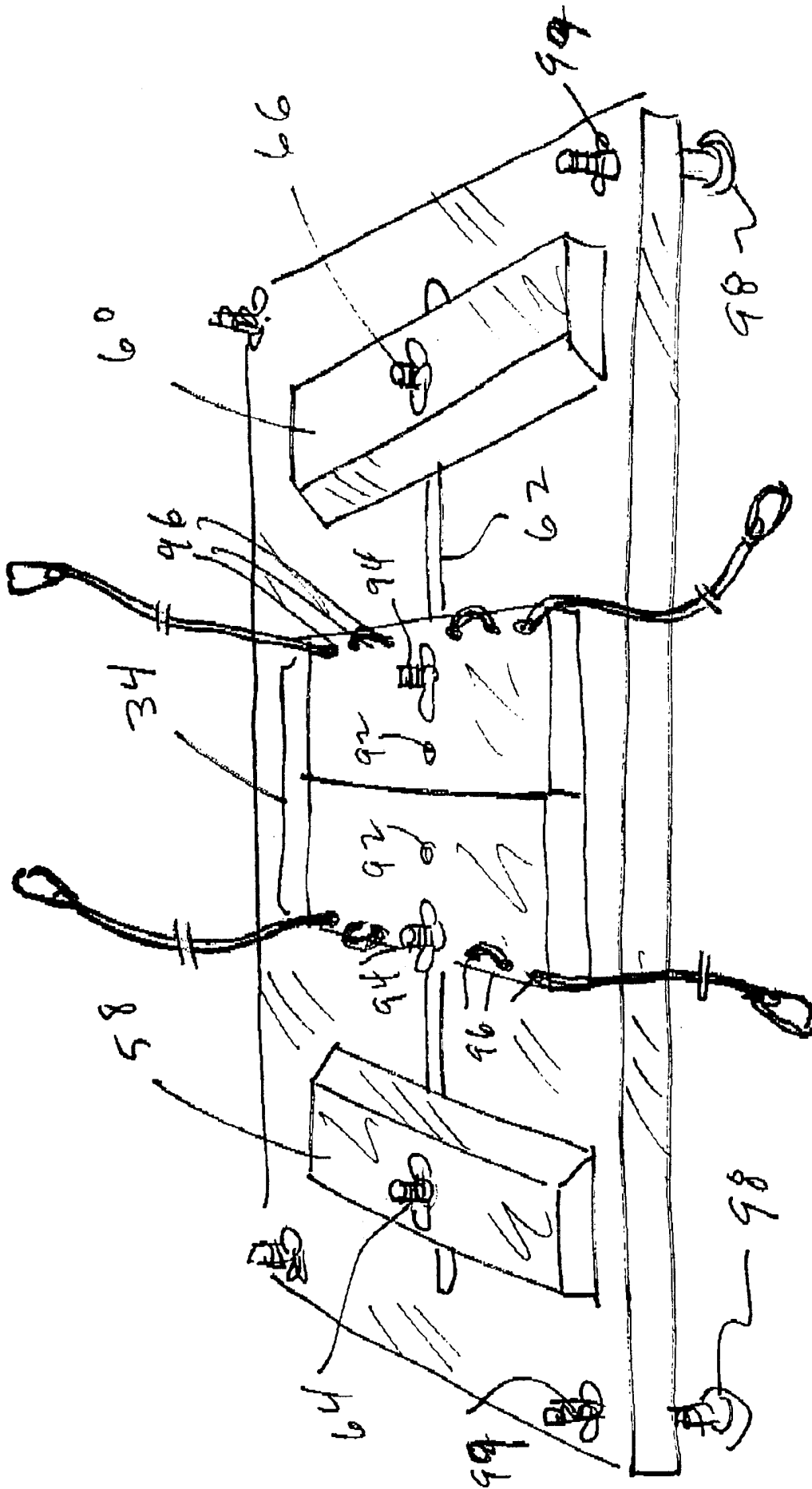


Fig-9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/04085

A. CLASSIFICATION OF SUBJECT MATTER		
IPC(7) : A63B 21/04 US CL : 482/121		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) U.S. : 482/121, 124, 126, 129, 145, 146, 904		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,431,617 A (RATTRAY, JR.) 11 July 1995, see Fig. 1.	1-17
A	US 5,637,061 A (PRICE, II) 10 June 1997, see Fig. 18.	1-17
A, E	US 6,048,281 A (PLACE et al.) 11 April 2000, see Fig. 1.	1-17
A	US 4,749,189 A (FRANK) 07 June 1988, see Fig. 1.	1-17
A	US 4,944, 518 A (FLYNN) 31 July 1990, see Fig. 1.	1-17
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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