

[54] **GOLF EXERCISER DEVICE**
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[63] Continuation-in-part of Ser. No. 169,701, Aug. 6, 1971, abandoned.
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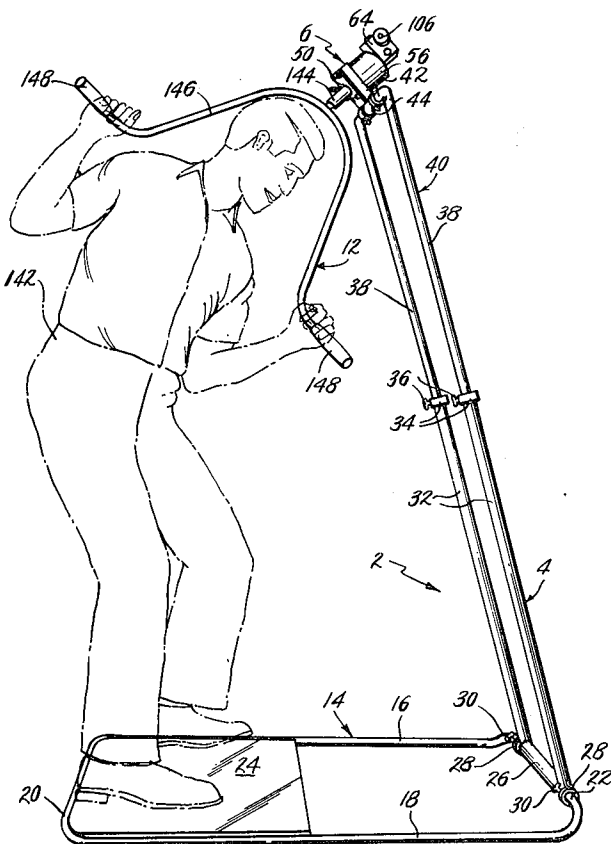
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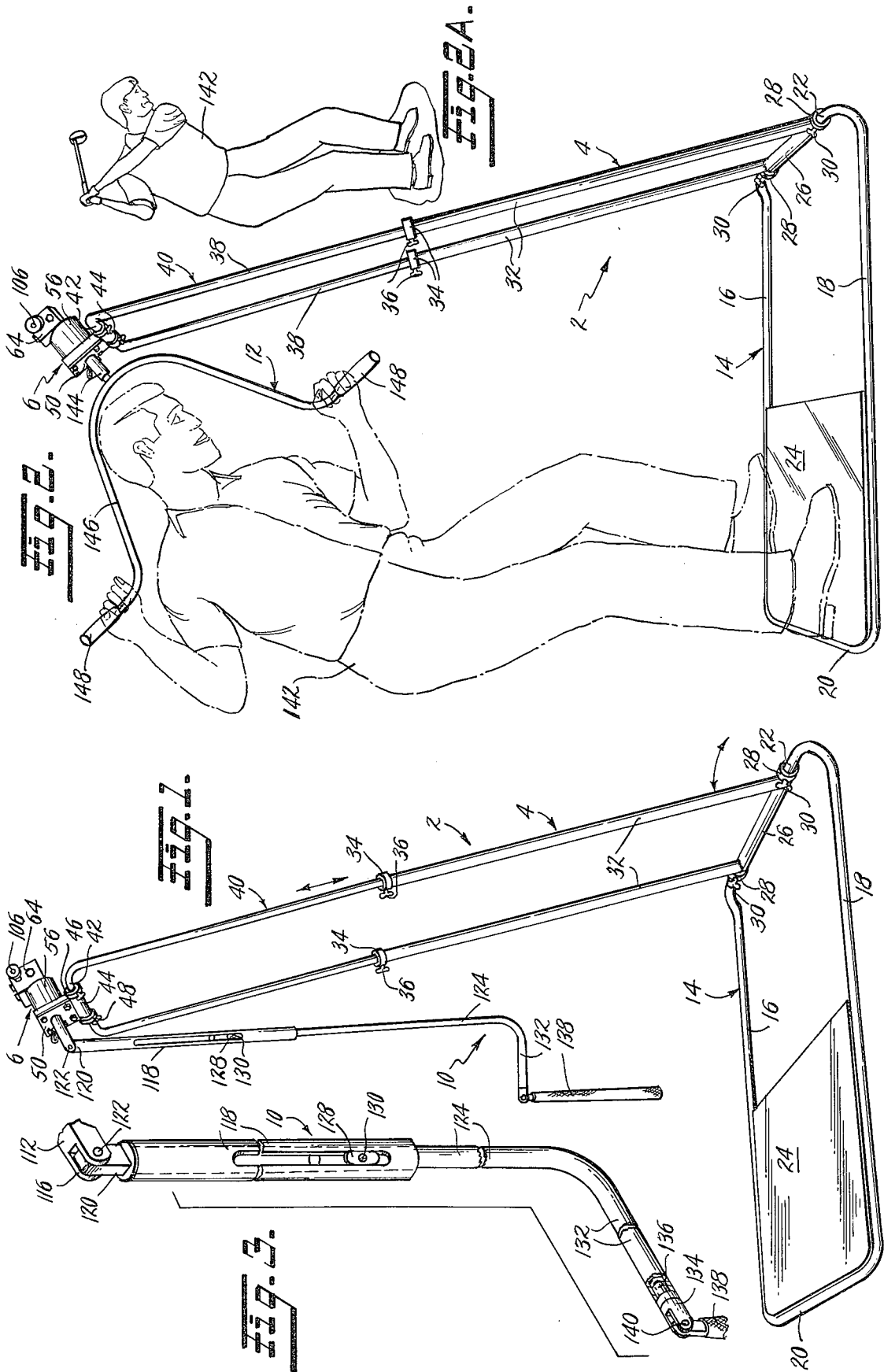
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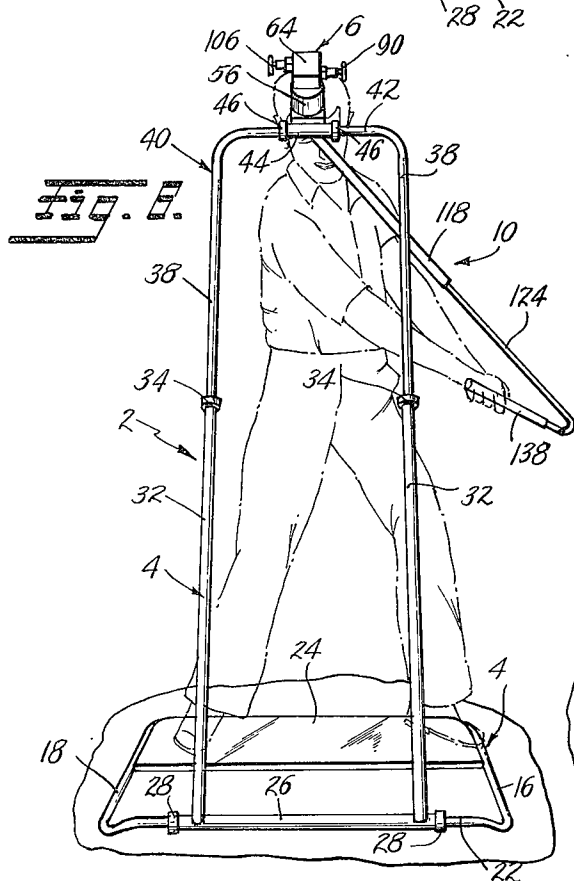
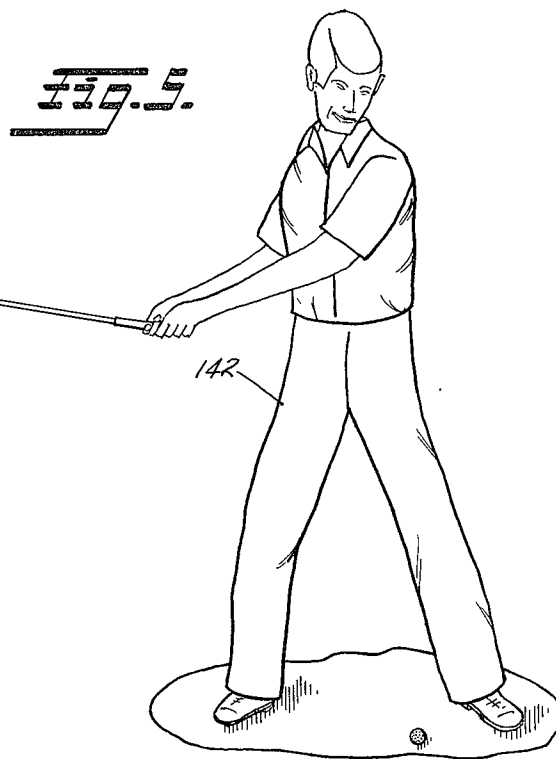
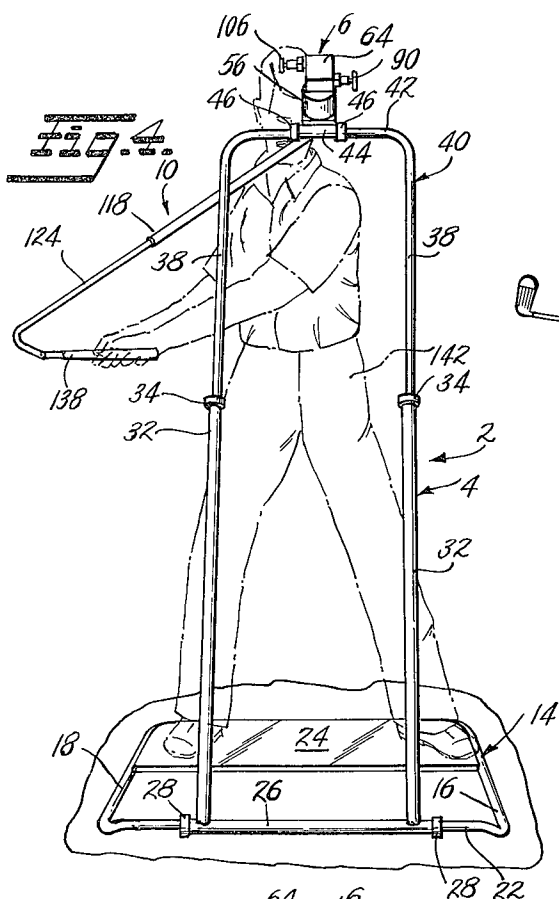
[57] **ABSTRACT**

A hydraulic resistance unit having an operating shaft is mounted above shoulder level by a support stand, the resistance unit being adjustable and designed to generate a progressively and smoothly increasing resistance torque as the speed of the operating shaft increases. A handle means, including interchangeable L-shaped and T-shaped handles, is provided that can be detachably connected with the operating shaft. By manipulating the handle means to rotate the operating shaft, a golfer can exercise and strengthen all the principal muscle groups used in playing golf.

22 Claims, 15 Drawing Figures







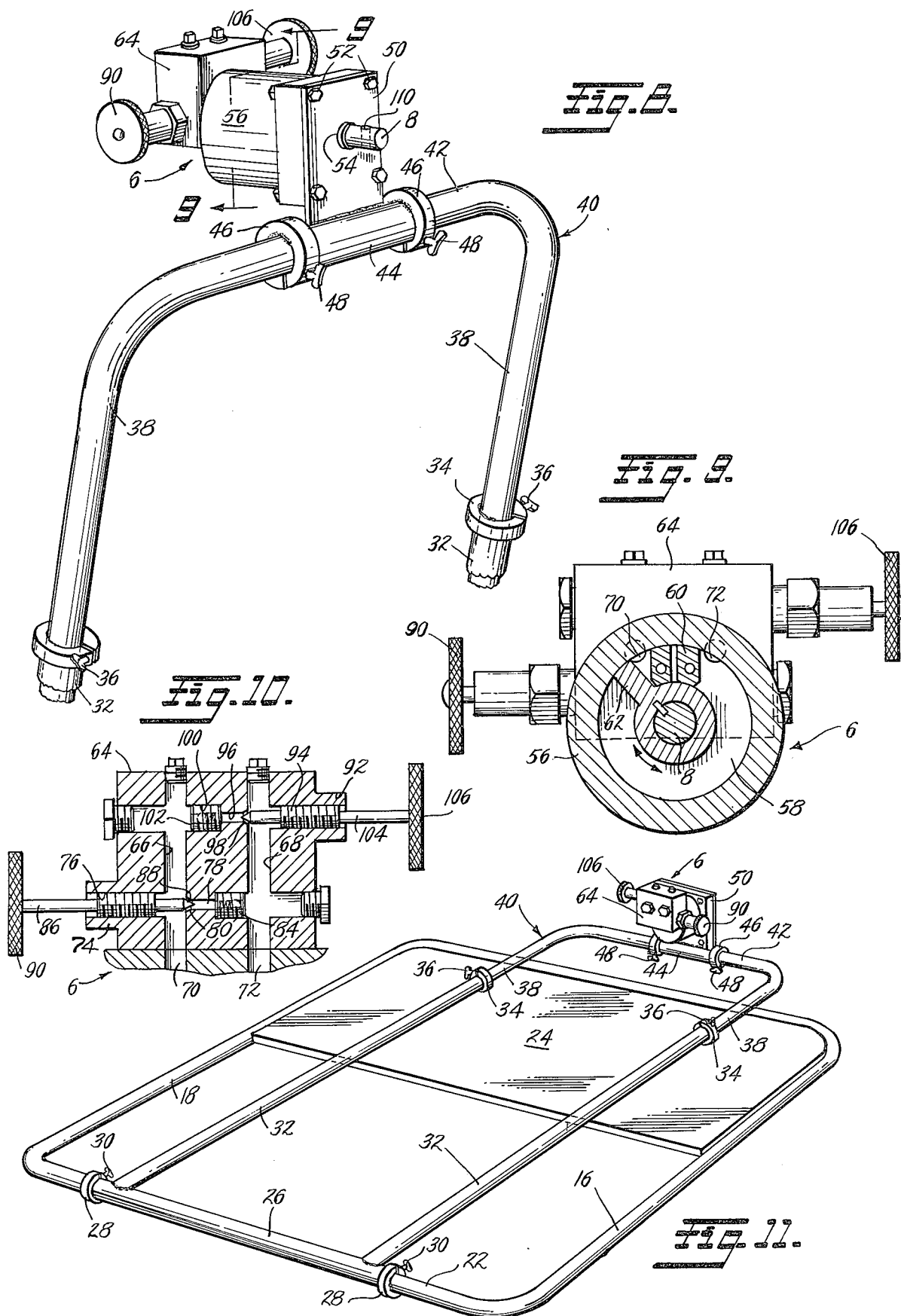


Fig. 13.

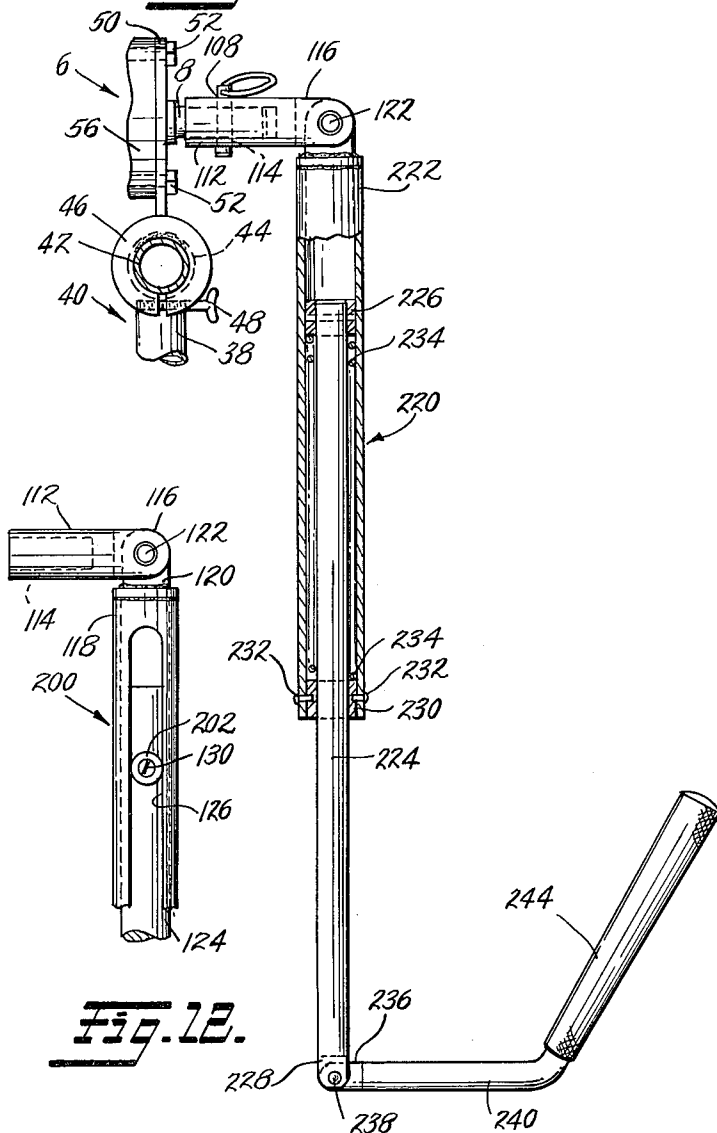
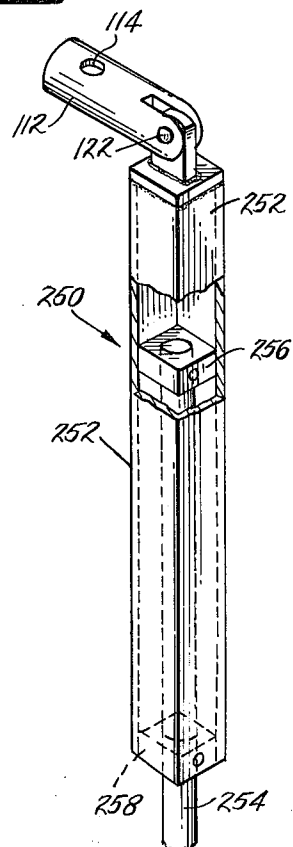


Fig. 12.

Fig. 14.



GOLF EXERCISER DEVICE

This application is a continuation-in-part of copending application Ser. No. 169,701, filed Aug. 6, 1971, and now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to devices for use by a golfer to exercise the muscles of the human body used while playing golf. More particularly, it relates to an improved golf exerciser device incorporating a hydraulic torque resistance unit, and designed for use in exercising different selected muscles in a manner that simulates the way in which the muscles are worked while playing golf.

2. Description of the Prior Art

A person who plays golf frequently desires to exercise and strengthen the muscles of the body utilized in that sport, at times when not actively engaged in the sport itself. For example, the businessman who finds it possible to play golf only once every few weeks may nevertheless want to keep in physically sound condition for playing the game, and for this purpose may want to engage in physical exercises at a gymnasium, or at his home or office.

It is known that particular sets of muscles in the body are associated with particular physical movements used in playing golf. Thus, to be effective, physical exercise should treat those muscles associated with a desired movement, and exercise that does not do this is of limited value. For example, the muscles that may be well developed from exercising with heavy weights are not the same as those required to produce a smooth and powerful golf swing, and thus weight lifting is of little benefit to improving one's physical condition for playing golf.

It is of course possible for a golfer to exercise the body muscles off the golf course merely by repeatedly swinging a golf club, say at a driving range, or elsewhere. While the working of the muscles in this way is of benefit, more is needed if the golfer is to improve the power of his swing. Specifically, if the power of the golf swing is to be improved, then the muscles should be exercised against a resistance force that will work them harder than is true during the making of a simple golf stroke. Further, to provide for progressive improvement in the power of the golf swing, the resistance force should be adjustable to compensate for the ability and level of development of the golfer.

Finally, I have found that for maximum effectiveness golf exercises should not only work all the principal sets of muscles used to play golf against a suitable resistance force, but they should work those muscles in a manner similar to the way they are used in making a golf swing. For example, in working the arm and shoulder muscles the exercises should simulate the progressive but very smooth build-up of force that occurs from the top of the backswing to the striking of the ball with the club head.

Obviously, not all of these desirable exercise objectives can be achieved merely by swinging a golf club. Rather, a device is required that can be used by the golfer, one that will allow the golfer to freely and fully move the different principal body muscles to accurately simulate the manner in which they are moved during an actual golf swing, and which will provide an

adjustable resistance force that is smoothly applied, and which directly simulates the pattern of force build-up and decay that occurs during a golf swing. There is no known available exerciser device possessing all of these characteristics.

It should be noted that while no prior device is known that possesses all the characteristics I have found to be necessary for a truly effective golf exerciser, over the years there have been many devices proposed for use by golfers to help them improve their game. For example, there are those devices designed to train the golfer to swing a club along a certain path, typical of which are the devices shown in U.S. Pat. Nos. 2,299,781, 2,328,408, 2,448,904, 3,319,963, and 3,604,712. In each of these patents a mechanical linkage arrangement of some sort is utilized, to which a golf club is fastened. The mechanism is designed to induce the golfer to swing along a preferred path, the purpose of the devices being to help the golfer acquire a given swing pattern. While all of these inventions are more or less useful for their intended purpose, they do little if any more to exercise the muscles used in playing golf than occurs by the simple swinging of a golf club at home, or at a driving range. The devices uniformly lack any means to generate an adjustable resistance force, let alone a resistance force of the type I have found to be necessary for effective golf exercises.

A second category of prior art inventions for use by golfers is represented by the swing training devices of U.S. Pat. Nos. 2,472,065 and 3,614,108, both of which include mechanical means of the friction type to generate a resistance force against which a golfer swings. In both of these patents the motions of the golfer are limited to those motions occurring while the hands are engaging a golf club, an arrangement which while exercising some of the necessary body muscles used in a golf swing, does not give optimum results for certain other muscles, such as those in the lower body used in rotating the torso. Further, because the golfer's swing motions are tightly constrained by the devices to follow a predetermined set path, even affected muscles receive limited exercise. Because of the limited muscle groups upon which they are effective, and the limited exercise possible of those muscles due to motion constraints, and because they use a friction-type resistance unit, neither of these two devices can satisfy the characteristics I have found necessary in an exerciser for golfers if maximum benefits are to be obtained.

The use of a friction resistance unit, I have found, is undesirable in exercising a golfer's muscles, for two principal reasons. First, an inherent characteristic of a friction unit is that the initial movements thereof are usually jerky, a condition that can also frequently exist during the complete operating cycle of such a device. This tendency toward at least occasional jerkiness mitigates against the desirable goal of a smoothly applied resistance force, can interfere with the proper training and strengthening of the muscles, and thus can produce inconsistencies in the resultant golf stroke pattern.

The second principal fault that I have found with friction resistance units is that they deliver their maximum resistance force at the beginning of a cycle, which is the opposite of what occurs during a golf stroke. During a golf swing the golfer begins with the club in an elevated position and at rest. Then the body muscles are utilized to slowly and smoothly apply force, as the club is placed in motion and moved through the downswing. It is inherently impossible for a friction-type resistance

unit to simulate this manner of applying force, and thus exercising with a friction resistance unit does not truly simulate the patterns that muscles are moved through during a golf swing.

Another problem with a friction-type resistance unit is that it is difficult to adjust the resistance force with accuracy, and to predict the pattern of the force during the whole exercise cycle.

The benefits to be obtained by a golfer from exercising with a device having the characteristics I have set forth are obvious, and cannot be obtained by exercising with swing training devices such as those which are the subject of the cited U.S. patents, for the reasons given. There is thus need for an exercise device having said characteristics, and it is to fulfill that need that the golf exercise device of the present invention is proposed.

SUMMARY OF THE INVENTION

The present golf exerciser device is adaptable for exercising against a resistance force any of the several different sets of muscles used for playing golf, the value of the resistance force being adjustable to suit the needs of the beginning golfer as well as the different progressive stages of development of the more proficient athlete. It comprises a hydraulic resistance unit, an adjustable support stand for mounting the hydraulic resistance unit above shoulder height, and a pair of interchangeable handles that together make it possible to effectively exercise with freedom of movement all of the principal muscle groups utilized in playing golf. Unlike the devices of the cited prior U.S. patents, the present invention is designed specifically not to place constraints on the golfer's swing, so that full exercising of the muscles can occur; it is a golf muscle exerciser, not a golf swing training device.

In order to obtain maximum effectiveness in exercising the muscles utilized by a golfer, I have found that the resistance unit must be chosen to simulate the force build-up and decay patterns occurring during a golf swing, and that it must provide for a very smooth application of resistance torque. With respect to the first of these requirements, the resistance unit must be capable of offering a minimum of resistance at the beginning of a golf swing motion, where the club would be in a rest position at the top of the backswing, and of offering progressively and smoothly increasing resistance as the speed and force of the body movements increase during the downswing motions. I have discovered that these characteristics can be achieved in a practical golf exerciser device only through the use of a hydraulic resistance unit.

The hydraulic resistance unit can be any one of several different designs, wherein an operating shaft is moved to reduce the volume of a chamber containing a hydraulic fluid, the chamber being provided with a port through which the hydraulic fluid is forced as the volume of the chamber is reduced. In the invention the chamber port is provided with a valve, which can be adjusted to provide a selected, fixed size orifice for the escaping hydraulic fluid. With this arrangement, when the operating shaft is operated slowly the hydraulic fluid will at first flow with relative ease through the selected, fixed size orifice. But as the speed of the operating shaft is increased the selected, fixed size orifice will restrict the flow of the hydraulic fluid, producing a progressively increasing pressure in the chamber and thus progressively increasing resistance torque on the operating shaft.

It is evident that such a hydraulic resistance unit will produce the operating characteristics set forth as required for the optimum results from a golf exerciser according to the invention, characteristics that cannot be attained with any known friction or mechanical resistance unit. In the preferred embodiment of the invention the resistance unit is constructed to provide resistance torque in both directions of movement of the operating shaft, valves being provided in both directions to provide for the setting of the resistance torque at a desired value.

The support stand of the invention is designed to be foldable for storage, and includes a member to which the hydraulic resistance unit is mounted with its operating shaft inclined downwardly toward where a golfer using the device stands, the support stand being adjustable to provide for proper positioning of the resistance unit. The handles of the invention are then attached to the operating shaft, and by their use the golfer applies force to the operating shaft against resistance torque generated by the hydraulic resistance unit.

It has been found that in order to provide for full exercising of all the principal sets of muscles utilized for playing golf, it is necessary to employ two handles of different design. The first handle is generally L-shaped and terminates in a single hand grip, and is utilized to exercise the muscles of the hands, arms and shoulders; it allows for unrestricted swing plane and swing arc motions, and unrestricted hand-cocking motions, all in sharp contrast to the golf swing training devices of the prior U.S. patents cited herein. The second handle is generally T-shaped, with hand grips at its opposite ends, and is utilized to exercise the legs and the muscles of the torso and hips. The handles are designed for easy mounting on the operating shaft of the resistance unit by a simple pin arrangement, and together define a handle means that when used with the resistance unit of the invention will provide optimum freedom of movement and benefit to a golfer in fully exercising the golf muscles.

It is the principal object of the present invention to provide an exerciser device which is useful by golfers who are interested in exercising and strengthening all the principal muscle groups normally used while playing golf.

Another object is to provide a golf exerciser device which will allow the golfer substantially complete freedom in making the movements of the body commonly associated with a good golf swing.

Yet another object is to provide a golf exerciser device wherein the golfer exercises against a resistance force generated by a resistance unit, the unit producing a resistance force that corresponds to the force build-up and decay patterns actually occurring during a normal golf swing.

A still further object of the invention is to provide a pair of handles for a golf exerciser, which together make it possible for the golfer to forcefully exercise all of the principal muscle groups associated with making a proper golf swing.

It is also an object of the invention to provide a golf exerciser of the type described, which can be economically constructed, and which can be folded for storage.

Other objects and many of the attendant advantages of the present invention will become readily apparent from the following Description of the Preferred Embodiments, when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a pictorial view of the golf exerciser device of the invention, with a first embodiment of the L-shaped handle attached thereto;

FIG. 2 is a pictorial view of the golf exerciser device of FIG. 1, but with the T-shaped handle attached thereto, a golfer being shown in phantom lines utilizing the device to exercise the muscle groups of the lower body;

FIG. 2A is a pictorial view of a golfer making a normal golf stroke, and when compared with FIG. 2 shows how the T-shaped handle is effective to help a golfer simulate the body twisting movements involved in playing golf;

FIG. 3 is an enlarged, perspective view of the L-shaped handle of FIG. 1;

FIG. 4 is an end elevation of the device of FIG. 1 with a golfer shown thereon in phantom lines, illustrating the use of the L-shaped handle;

FIG. 5 is a pictorial view of a golfer engaged in the backswing movement of a normal golf stroke, and when compared with FIG. 4 illustrates how the golf exerciser of the invention is effective to allow the golfer to directly simulate the motions involved in an actual golf stroke;

FIG. 6 is an end elevational view similar to FIG. 4, but with the golfer in a follow-through position;

FIG. 7 is a pictorial view of a golfer actually engaged in a follow-through movement, and when compared with FIG. 6 further illustrates how the present invention is effective to allow the golfer to simulate the actual movements in a golf stroke;

FIG. 8 is an enlarged pictorial view of the hydraulic resistance unit of the invention, mounted on the support stand;

FIG. 9 is a transverse sectional view, taken on the line 9—9 of FIG. 8;

FIG. 10 is a schematic view of the valve arrangement employed in the hydraulic resistance unit;

FIG. 11 is a pictorial view of the golf exerciser device in a folded position, for storage;

FIG. 12 is an enlarged, fragmentary view of a modification of the L-shaped handle;

FIG. 13 is an enlarged view of a second modification of the L-shaped handle, and showing the pin arrangement for connecting the handle means to the operating shaft of the hydraulic resistance unit; and

FIG. 14 is an enlarged, fragmentary view of yet another embodiment of the L-shaped handle.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1–11 of the drawings, the golf exerciser device of the invention is indicated generally at 2, and comprises a foldable supporting stand 4, a hydraulic resistance unit 6 supported above shoulder height by the stand 4 and including an operating shaft 8, and handle means comprising an L-shaped handle 10 and a T-shaped handle 12. The supporting stand 4 is preferably fabricated from cylindrical tubing, and includes a base frame 14 comprising side members 16 and 18, a front member 20, and a raised rear member 22, the front portion of the base frame 14 carrying a platform 24 upon which a golfer using the device 2 stands to perform exercises therewith.

A cylindrical sleeve 26 is rotatably received on the rear tubular base member 22, the opposite ends thereof

having split annular clamping collars 28 welded in abutment thereto to provide a friction clamping arrangement to secure the sleeve 26 to the rear member 22, the collars 28 being welded to the sleeve 26 over only a portion of their periphery spaced from the split therein. Bolts 30 extend through tangential, threaded bores in the split portions of the annular clamping collars 28, and function when tightened to tighten the annular collars 28 to thereby frictionally secure the sleeve 26 to the rear tubular base member 22. Obviously, if desired set screws or another clamping arrangement could be substituted for the friction collar securing means just described.

Welded to the cylindrical sleeve 26 inwardly of the annular friction clamping collars 28 are the lower ends of cylindrical posts 32, the upper end of each post 32 carrying a split annular friction clamping collar 34 thereon like the split clamping collar 28, each friction clamping collar 34 including an operating bolt 36. Received in the posts 32 are the outer ends of the parallel legs 38 of a U-shaped bracket 40, the bracket 40 also including a cylindrical cross-bar 42. The elevation of the cross-bar 42 above the base frame 14 is easily adjusted merely by loosening the friction clamping collars 34, moving the bracket 40 to the desired position, and then re-securing the clamping collars 34.

A cylindrical mounting sleeve 44 is carried by the cross-bar 42, the opposite ends thereof carrying thereon split annular clamping collars 46 fitted with operating bolts 48 for frictionally clamping the sleeve 44 in a desired rotational position to the cross-bar 42. Welded to the mounting sleeve 44 is a mounting plate 50 to which the hydraulic resistance unit 6 is attached by bolts 52, the mounting plate 50 having an opening 54 therein through which the operating shaft 8 of the resistance unit projects.

The hydraulic resistance unit 6, as has been mentioned, can be constructed in several different manners, provided the resultant unit is capable of satisfying the characteristics it has been discovered are required for the present invention. Specifically, the hydraulic resistance unit according to the invention must be designed to offer progressively and smoothly increasing resistance torque, as the speed of the operating shaft is progressively increased. Moreover, the resistance torque generated by the unit must be adjustable. It is also preferred that the resistance unit be capable of generating resistance torque in both directions, and that resistance torque in both directions be adjustable.

The hydraulic resistance unit 6 shown in the drawings is capable of meeting the characteristics just described, and includes a main body 56 having a cylindrical chamber 58 therein through which the operating shaft 8 extends axially. The wall of the chamber 58 has a vane 60 fixed thereto, and the operating shaft 8 carries a similar but moveable vane 62 therein. Rotation of the operating shaft 8 will cause the moveable vane 62 to rotate within the chamber 58, from one side of the fixed vane 60 to the other.

Attached to the main body 56 of the hydraulic resistance unit 6 is a valve body 64, having a pair of parallel supply passages 66 and 68 therein that are respectively in alignment with supply ports 70 and 72 in the rear wall of the main body 56, the supply ports 70 and 72 opening into the chamber 58 on opposite sides of the fixed vane 60. A first flow control passage 74 intersects both of the supply passages 66 and 68, and includes a threaded outer portion 76 that leads to the passage 66,

a reduced diameter portion 78 that leads from a tapered seat 80 in the passage 66 toward the passage 68, and an enlarged threaded portion 82 that contains a check valve 84 that allows free flow from the supply passage 66 toward the supply passage 68, and no flow in the opposite direction. A needle valve 86 is threaded into the outer passage portion 76, and is fitted with a tapered nose 88 on its inner end of a taper mating with that of the seat 80, and a control knob 90 on its outer end.

The supply passages 66 and 68 are also connected by a second intersecting flow control passage 92 disposed parallel to the passage 74, but constructed in an opposite manner. The flow control passage 92 includes a threaded, enlarged outer portion 94 that leads to the supply passage 68, a reduced diameter portion 96 that leads from a tapered seat 98 in the passage 68 towards the passage 66, and an enlarged threaded portion 100 containing a check valve 102 that allows free flow from the passage 68 into the passage 66, but none in the opposite direction. A needle valve 104 with a knob 106 thereon is received in the threaded outer passage portion 94. It is readily seen that by adjusting the two control knobs 90 and 106 the size of the constricting orifices connecting the passages 66 and 68 can be adjusted, from zero up to a maximum opening where free flow occurs.

When in use the operating chamber 58, the supply ports 70 and 72, the supply passages 66 and 68, and the interconnecting portions of the passages 74 and 92 are filled with hydraulic operating fluid. Thereafter, assume that the operating shaft 8 is rotated in a counter-clockwise direction from the position shown in FIG. 9. When such rotation occurs, the volume of the chamber defined between the moveable vane 62 and the fixed vane 60 will be reduced, with the result that operating fluid will be forced through the supply port 72 into the supply passage 68. The check valve 84 will prevent the flow of fluid from the passage 68 to the passage 66, and thus all flow will occur through the constrictive orifice defined between the needle valve 104 and its seat 98. Fluid flowing through said orifice will enter the supply passage 66, and will then pass into the operating chamber 58 on the rear side of the moveable vane 62.

The setting of the needle valve 104 will determine the nature of the resistance torque created by the hydraulic resistance unit 6, in the example being described. It is assumed that the needle valve 104 will be set to provide an initial orifice opening of a given size. During the initial application of force to the operating shaft 8 operating fluid will flow with relative ease from the supply passage 68 to the supply passage 66, and little resistance force will be generated. As the amount of force applied to the operating shaft 8 increases, during the increase in speed of the golfer's backswing, the orifice will progressively meter fluid flow, and pressure will begin to build up in front of the moveable vane 62 because of this metering. This action will occur smoothly and progressively, with the progressive application of force and in proportion thereto. The result will be the generation of resistance torque that responds to the force build-up and decay pattern found in a golfer's swing.

The knob 106 is initially set to satisfy the needs of the golfer utilizing the device, and thereafter is effective to produce identical resistance force patterns for corresponding applications of force to the operating shaft 8. The other control knob 90 is set to provide a desired

resistance torque in the opposite direction. If relatively free movement in the opposite direction is desired, then the knob 90 is merely rotated to fully open its needle valve 86. It will also be seen that by providing for the generation of resistance torque in both directions, the resistance unit 6 is readily adaptable to both right-hand and left-hand golfers.

It should be pointed out that the use of hydraulic resistance units for exercise devices is not totally new, as is indicated by U.S. Pat. No. 3,495,824, for example. In that patent a hydraulic resistance unit is shown for use in muscular rehabilitation or kinestherapy. However, until my discovery of the ideal characteristics required for golf exerciser resistance unit, and that a hydraulic resistance unit is the only kind of resistance unit capable of meeting those characteristics, nowhere has a hydraulic resistance unit been utilized to meet the peculiar needs of a golfer desiring to properly exercise and strengthen the muscle sets used to play golf.

When using the golf exerciser 2 of the invention the supporting stand 4 is adjusted to place the hydraulic resistance unit 6 at above the shoulder height of the person using the device, and the angle of inclination of the operating shaft 8 is properly adjusted. Then either of the two handles 10 or 12 comprising the handle means of the golf exerciser is attached to the operating shaft 8 by a pin 108, the shaft 8 having an opening 110 for receipt of the pin.

Turning now to the two handles 10 and 12 comprising the handle means of the invention, the L-shaped handle 10 in FIGS. 1-11 includes a cylindrical connecting collar 112 having a transverse opening 114 therein for receipt of the attaching pin 108, and which terminates in a bifurcated end portion 116. The longer leg of the L-shaped handle 10 is telescopically constructed for free sliding movement and includes a tubular housing 118 having a projection 120 thereon that is received in the bifurcated end portion 116, and which is pivotally secured thereto by a pin 122. Freely slidably received within the lower end of the housing 118 is the longer leg of an L-shaped member 124, the housing 118 having a longitudinal slot 126 therein, and an elongated key 128 being slidably received in the slot 126 and being secured to the member 124 by a screw 130. The key 128 prevents the member 124 from separating from and rotating within the housing 118, while allowing free sliding movement of the L-shaped handle 10 over the length of the slot 126 to vary the length thereof during a golf swing-like movement.

The outer end of the normally projecting short leg 132 of the L-shaped member 124 has a bracket 134 mounted thereon by a bearing 136, whereby said bracket 134 is free to rotate about the axis of said leg 132. The outer end of the bracket 134 is bifurcated, and receives the outer end portion of a hand grip 138. The hand grip 138 is pivotally secured to the bracket 134 by a pin 140, and the free end thereof is shaped like the grip portion of a golf club, and is intended to be grasped by the user in the same manner as a golf club.

It is thus seen that the hand grip 138 is rotatable about the axis of the short leg 132 of the L-shaped member 124, and pivotable about the pin 140. As is obvious, the rotatable mounting bracket 134 makes it possible for the pivot plane of the hand grip 138 to rotate. The resultant arrangement gives to the golfer substantially full freedom when using the L-shaped handle to move his hands and wrists in the same manner as when making a golf stroke.

If a golfer is to be free to fully simulate the peculiarities of his own golf swing, then an exercise device should provide for three principal movement characteristics: (1) an unrestricted swing plane motion, (2) unrestricted hand-cocking motions, and (3) an unrestricted swing arc motion. The L-shaped handle 10 of the invention is designed to provide all three of these characteristics, a feature which has not heretofore been found in devices to be used by golfers that attempt to provide for simulation of golf swing movements.

Of the three described desirable golf swing movement characteristics, an unrestricted swing plane motion and unrestricted hand-cocking motions are most important, especially the latter. Unless the hands and wrists are provided substantially total freedom of movement, the movements of a golf swing cannot be simulated. In the L-shaped handle 10 such unrestricted hand-cocking motions are largely provided for by having the hand grip 138 mounted both for rotation, and for pivoting motion. The swing plane for different golfers, and during different portions of a golf stroke by a golfer, will often vary, and thus if the golfer is to have the freedom to simulate his normal golf swing patterns provision must be made to accommodate varying swing planes. This is done in the invention by having the upper end of the L-shaped handle 10 pivotally mounted to the operating shaft 8, and the hand grip 138 pivoted to the lower end of the L-shaped member 124.

The final characteristic freedom desired for a golf swing is that of swing arc length, or the path traced by the hands. The radius of the arc will vary from golfer to golfer, and usually will change during different portions of a golf stroke. In the invention the freely longitudinally moveable longer leg of the L-shaped handle provides the needed freedom. While this feature is not absolutely essential, its presence in the present invention helps ensure that every golfer using the exerciser 2 will be free to perform the full range of motions normally associated with a golf swing and thereby obtain completely effective exercise of the golf muscles.

The L-shaped handle 10 of the invention, as shown in FIGS. 4 and 5, and FIGS. 6 and 7, is designed to place no constraints on the swing. To the contrary, it allows a golfer 142 substantially full freedom to substantially simulate the normal movements occurring when he makes a golf stroke. Looking first at FIG. 5, wherein the golfer 142 is mid-way in a backswing, it is seen by looking at the comparable FIG. 4 that the golfer 142 is able to freely simulate the same movements when working out on the golf exerciser 2, with his feet implanted on the platform 24. Similarly, FIGS. 6 and 7 show the comparison between the follow-through portions of the simulated (FIG. 6) and the actual (FIG. 7) golf stroke. The hydraulic resistance unit 6, as has been described, generates a resistance force proportional to the force and speed of the different portions of the golf swing, and does so smoothly. In FIG. 4a resistance force is being generated on the backswing, which is a matter of choice in the invention.

I have found that while the L-shaped handle 10, in conjunction with the unique characteristics of the hydraulic resistance unit 6, is highly effective in providing exercise to certain muscle groups used in playing golf, particularly the hand, wrist, and arm muscles, it is less effective in properly exercising the leg muscles, and those of the middle and lower body used to twist the torso. These latter muscle groups are regarded by many golf professionals as being the most important from the

standpoint of developing a powerful golf stroke, and thus particular attention needs to be paid thereto.

The reason why the L-shaped handle, and the normal golf stroke it allows to be simulated, are not fully effective in exercising the latter group of muscles is due in part to the fact that the muscles of this group are more powerful than the muscle groups of the arms and shoulders. Further, if the golfer tries to exert sufficient force to exercise his legs and mid-section while using the L-shaped handle 10, or any other handle which is gripped at arms length, he cannot transfer enough of the force through his extended arms to the handle to exercise his legs and mid-section effectively because of the leverage provided by his extended arms. If the golf exerciser 2 is to be effective in fully exercising all of the principal muscle groups of the body used to make a golf swing, therefore, the handle means of the invention must include a handle that will be effective with the mid-section and lower body muscles, especially those of the legs used in twisting the torso. Such a handle is the T-shaped handle 12.

The T-shaped handle 12 includes a collar 144 that is receivable on the operating shaft 8, and which is securable thereto by the pin 108. Welded to the collar 144 to lie generally in the same plane as the axis of the collar is a generally U-shaped member 146, the legs of the U-shaped member being symmetrically disposed about the axis of the collar 144, and terminating in aligned grip portions 148. In use, the supporting stand 4 is adjusted, as has been said, until the resistance unit 6 is positioned above shoulder height of the golfer 142, and so that the golfer can stand beneath the T-shaped handle 12 with his hands grasping the aligned grips 148. The U-shaped member 146 allows the golfer 142 to position himself with the axis of his body in general alignment with the axis of the operating shaft 8, said aligned axes forming a T with an imaginary line connecting the aligned grips 148, whence comes the name of the handle 12 as being T-shaped. The golfer exercises by rotating his body about said aligned axes, in a twisting movement that simulates the movements of the legs and torso during the making of a golf stroke as shown in FIG. 2A. Obviously, other arrangements than the U-shaped member 146 can be utilized, to provide the necessary T configuration.

In FIG. 2 the golfer 142 is shown using the T-shaped handle 12 to exercise the mid-section and leg muscles against the hydraulic resistance unit 6, in a body-rotating movement like that of the golfer shown in FIG. 2A. By comparing FIG. 2 with FIG. 2A in particular, and also with FIGS. 5 and 7, it is seen that the device of the invention allows the golfer 142 to simulate the torso-twisting motions utilized in making a golf swing while performing the strengthening exercises, a feature not known to be possible with any known exerciser device. Because the golfer 142 is able to keep the arms close to the body when using the T-shaped handle 12 the problems associated with the extended arms arrangement required when using the L-shaped handle 10 are avoided, and the golfer is able to exert great stress on the strong muscles of the legs and the lower body. The setting of the hydraulic resistance unit 6 will usually be changed to provide greater resistance when using the T-shaped handle 12, than for the L-shaped handle 10.

The combination of the two handles 10 and 12, then, is seen to provide the golfer with the opportunity to fully exercise all of the principal sets of body muscles utilized when playing golf, to a degree not possible in

the past. As a result, the importance and value of the present invention become readily apparent. It should be noted that while the invention is particularly designed to exercise the muscles used to play golf, it can be useful for athletes playing a sport like baseball, too, where body movements are somewhat similar. The T-shaped handle 12, in particular, would be of use to exercise a baseball player; while the L-shaped handle would give a baseball player limited exercise, it cannot fully simulate a baseball swing.

It is of course to be understood that modifications are possible, without departing from the invention. For example, FIGS. 12-14 show three different modifications of the L-shaped handle 10, each modification still retaining the same ability to provide the three freedom of movement characteristics as described for the L-shaped handle 10 itself. Referring first to FIG. 12, the L-shaped handle 200 therein utilizes the same collar 112, housing 118, and L-shaped member 124 as the handle 10 of FIGS. 1-11. However, the elongated key 128 is replaced with a rotatable roller element 202, to further facilitate free sliding movement of the L-shaped handle.

In FIG. 13 a different L-shaped handle arrangement is shown at 220, wherein a cylindrical housing 222 receives a rod 224 having a cylindrical collar 226 on its upper end, and a bifurcated lower end 228. A collar 230 is secured within the lower end of the housing 222 by pins 232 and acts as a stop to prevent withdrawal of the rod. A coil spring 234 is placed between the collars 226 and 230, and functions to return the L-shaped handle 220 from an extended to a collapsed condition.

A bracket 236 is pivoted to the bifurcated lower end of the rod 224 by a pivot pin 238, and has the outer end of a cylindrical rod 240 mounted thereon. The rod 240 has a bend mid-way its length, and a hand grip 244 is formed on the bent portion, which extends at an angle of about 45° from the axis of the main portion of the rod 240. The L-shaped handle 220 is capable of providing the same three motion characteristics as the L-shaped handle 10. In this embodiment, no rotary connection at the grip 244 is needed to provide free hand and wrist movements, the freely rotatable members 222 and 224 providing adequate freedom of movement. The ability of the rod 224 to freely rotate in the housing 222 has the added benefit of alleviating any tendency to bind during free telescopic movements of the members.

In FIG. 14 yet another variation of the L-shaped handle is shown at 250, wherein a rectangular housing 252 is shown pivoted by a pin 122 to the collar 112. The upper end of a rod 254 is received in the housing 252 for free sliding movement, and has a rectangular collar 256 on its upper end. A similar rectangular collar 258 is secured in the lower end of the housing 252, and forms a stop. If desired, the spring 234 of the L-shaped handle 220 can be utilized in the handle 250, and the lower end of the rod 254 has a grip secured thereto in the manner of the handle 10.

Obviously, many other modifications and variations of the invention are possible. As has been mentioned, the support stand 4 of the invention is designed so that the golf exerciser device 2 can be folded for storage, when not in use. The device is shown so folded in FIG. 11, wherein it is seen that such is then substantially flat, so that it can be stored in a minimum of space. When fully erected, the device 2 is firmly held in place by the golfer 142 himself, standing on the platform 24.

I claim:

1. An exercise device for use by golfers to exercise and strengthen all of the principal muscle groups utilized in making a golf swing, comprising: a hydraulic resistance unit including an operating shaft, and designed to produce resistance torque smoothly and in proportion to the speed of the operating shaft; support means for supporting said hydraulic resistance unit generally at or above shoulder height of a golfer using said device; and force transmitting means attachable to said operating shaft, and arranged to be engaged by said golfer for transmitting muscular force to said operating shaft, said force transmitting means comprising: a generally L-shaped handle attachable at its upper end to said operating shaft generally at shoulder height, and including grip means on its lower end that is graspable by said golfer, said L-shaped handle being mainly used for exercising the hands, arms and upper body muscles; and a cross-bar member that is attachable at the middle portion thereof to said operating shaft above shoulder height for rotation about a downwardly directed axis of rotation, and including means on the opposite ends thereof engageable by said golfer, said cross-bar member being mainly used for exercising the legs and lower body muscles, said L-shaped handle and said cross-bar member being attached alternatively to said operating shaft, and together providing for full exercising of all the principal muscle groups utilized in playing golf.

2. An exercise device as recited in claim 1, wherein said L-shaped handle is arranged to provide for substantially free wrist and hand movements by a golfer utilizing said device, to perform a simulated golf stroke.

3. An exercise device as recited in claim 2, wherein additionally said L-shaped handle is arranged to provide for substantially unrestricted swing plane motion by said golfer.

4. An exercise device as recited in claim 1, wherein said L-shaped handle is arranged to provide for substantially unrestricted swing arc motion by said golfer.

5. An exercise device as recited in claim 1, wherein said cross-bar member has a configuration allowing the golfer to place the longitudinal axis of his head and body in general alignment with said axis of rotation of said cross-bar member.

6. An exercise device as recited in claim 1, wherein said support means comprises: a base; platform means carried by said base, and upon which said golfer stands; telescopically adjustable uprights on said base, and connected at the upper end thereof by a cross member; and bracket means mounted on said cross member for supporting said hydraulic resistance unit.

7. An exercise device as recited in claim 6, wherein said uprights are arranged to be foldable upon said base, and said bracket means is adjustable for thereby adjusting the angle of inclination of said resistance unit operating shaft.

8. An exercise device for use by golfers to exercise and strengthen all of the principal muscle groups utilized in making a golf swing, comprising: a hydraulic resistance unit including an operating shaft, and designed to produce resistance torque smoothly and in proportion to the speed of the operating shaft; support means for supporting said hydraulic resistance unit at or above shoulder height of a golfer using said device; and handle means attachable to said operating shaft, and arranged to be gripped by a golfer standing before said hydraulic resistance unit in an address position for transmitting muscular force to said operating shaft, said

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handle means comprising: an L-shaped handle attachable at its upper end to said operating shaft, including a grip on its lower end that is grasped in both hands with the arms extended; and a T-shaped handle that is attachable at the free end of the center leg of the T to said operating shaft, and including grips at the opposite ends of the cross-bar of the T that are grasped by the hands with the arms unextended and close to the body, said L-shaped and said T-shaped handles being attached alternatively to said operating shaft, and together providing for full exercising of all the principal muscle groups utilized while playing golf.

9. An exercise device as recited in claim 2, wherein said L-shaped handle is arranged to provide for substantially free wrist and hand movements by a golfer utilizing said device, to perform a simulated golf stroke.

10. An exercise device as recited in claim 3, wherein additionally said L-shaped handle is arranged to provide for substantially unrestricted swing plane motion by said golfer.

11. An exercise device as recited in claim 4, wherein additionally said L-shaped handle is arranged to provide for substantially unrestricted swing arc motion by said golfer.

12. An exercise device as recited in claim 2, wherein said T-shaped handle has a configuration allowing the golfer to place the axis of his body in general alignment with the axis of said operating shaft.

13. An exercise device for use by golfers to exercise and strengthen all of the principal muscle groups utilized in making a golf swing, comprising: a hydraulic resistance unit including an operating shaft, and designed to produce resistance torque smoothly and in proportion to the speed of the operating shaft; support means for supporting said hydraulic resistance unit above shoulder height of a golfer using said device, said support means including: a base; platform means carried by said base, and upon which said golfer stands; telescopically adjustable uprights on said base, and connected at the upper end thereof by a cross member; and bracket means mounted on said cross member for supporting said hydraulic resistance unit, said bracket means being adjustable for thereby adjusting the angle of inclination of said resistance unit operating shaft; and handle means attachable to said operating shaft, and arranged to be gripped by a golfer standing before said hydraulic resistance unit in an address position for transmitting muscular force to said shaft.

14. An exercise device as recited in claim 9, wherein said uprights are arranged to be foldable upon said base.

15. An exercise device for use by golfers to exercise and strengthen the muscles utilized in making a golf swing, comprising: a resistance unit including an operating shaft, and means designed to produce resistance torque in response to the rotation of said operating shaft; support means for supporting said resistance unit generally at shoulder height of a golfer using said device; and handle means including a head portion connectable to said operating shaft, said handle means further including an upper portion connected with said head portion, a lower portion having grip means on the lower end thereof, and means providing a freely slidable and rotatable connection between said upper and lower handle portions to thereby make the distance between said grip means and said operating shaft freely

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variable, thus providing for substantially free and unrestricted swing arc motion by a golfer positioned in front of said resistance unit grasping said grip means in an address position, and utilizing said device to simulate a golf swing.

16. An exercise device as recited in claim 11, wherein said lower portion of said handle means is rotatable about the longitudinal axis thereof, and said grip means is attached to the lower end of said lower handle portion by a pivot joint which allows said grip means to pivot in a plane passing through said longitudinal axis of said lower handle portion.

17. An exercise device for use by golfers to exercise and strengthen the leg and lower body muscles utilized in making a golf swing, comprising: a resistance unit including an operating shaft, and designed to produce resistance torque in response to the rotation of said shaft; support means for mounting said resistance unit above head height of a golfer using said device, with said operating shaft in a downwardly inclined position; and a T-shaped handle, the free end of the center leg of said T being connectable to said operating shaft, and the opposite ends of the cross-bar of said T having grips thereon that can be grasped at shoulder height by a golfer standing in front of said resistance unit in a golf address position, for exercising said leg and lower body muscles by twisting said body about the axis of the golfer's body.

18. An exercise device as recited in claim 17, wherein said T-shaped handle has a configuration that allows said golfer to position the axis of his body in general alignment with the axis of said operating shaft.

19. An exercise device for use by golfers to exercise and strengthen the leg and torso muscles utilized in making a golf swing, comprising: a resistance unit including an operating shaft, and means designed to produce resistance torque in response to the rotation of said shaft; support means for supporting said resistance unit generally above shoulder height of a golfer using said device, standing with his torso inclined in a golf stance; and a cross-bar member connectable at its middle portion to said operating shaft generally above shoulder height of said standing golfer and rotatable about a downwardly directed axis by said standing golfer to effect rotation of said operating shaft, the opposite ends of said cross-bar member having means thereon engageable by said standing golfer for transmitting muscular force to said operating shaft concurrently from the opposite sides of said golfer's torso when the golfer twists his body back and forth about the longitudinal axis thereof.

20. An exercise device as recited in claim 19, wherein said cross-bar member has a configuration allowing the golfer to place the longitudinal axis of his head and body in general alignment with said downwardly directed axis of rotation.

21. An exercise device as recited in claim 19, wherein said cross-bar member has a short leg secured centrally thereto, said short leg being connectable to said operating shaft.

22. An exercise device as recited in claim 21, wherein said opposite end means on said cross-bar member engageable by said golfer comprise grip means graspable by said golfer with the hands.

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