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Maldonado et al.

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[45] **Oct. 23, 1973**

[54] **GOLFER'S HEAD MOVEMENT RESTRAINING DEVICE RENDERED NON-RESTRAINING AT BALL IMPACT POSITION**

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[52] **U.S. Cl.** ..... **273/190 R,** 273/186 B

[51] **Int. Cl.** **A63b 69/36**

[58] **Field of Search** 273/188, 189, 190, 273/186, 187, 183

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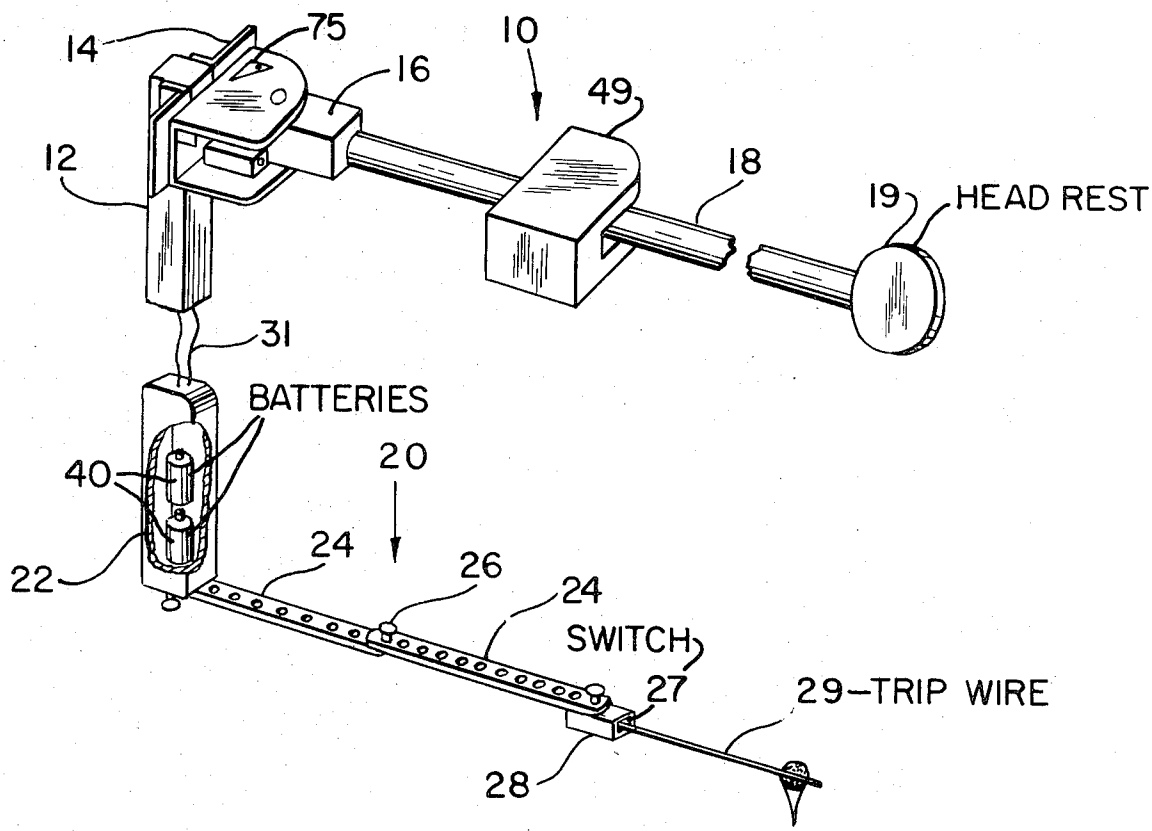
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[57] **ABSTRACT**

A vertically adjustable sport trainer restrains a golfer's head from movement until club-ball impact, sensed by an adjustable switch adjacent the ball, energizes a solenoid actuator disabling a set of engaged detents thereby permitting a head restraint mounting arm to be spring driven about a pivot pin horizontally away from a golfer.

5 Claims, 5 Drawing Figures



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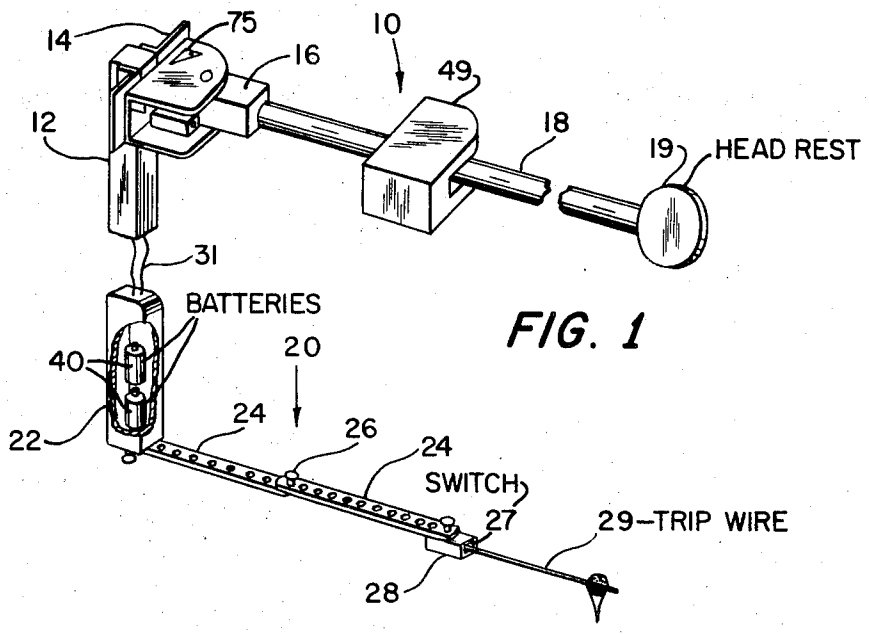


FIG. 1

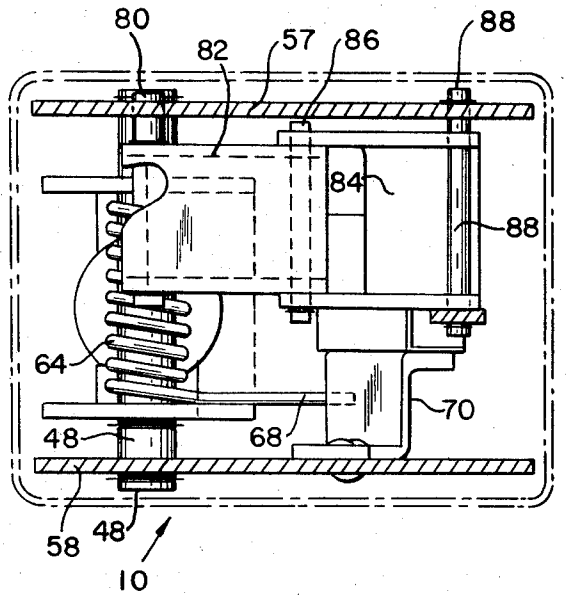


FIG. 5

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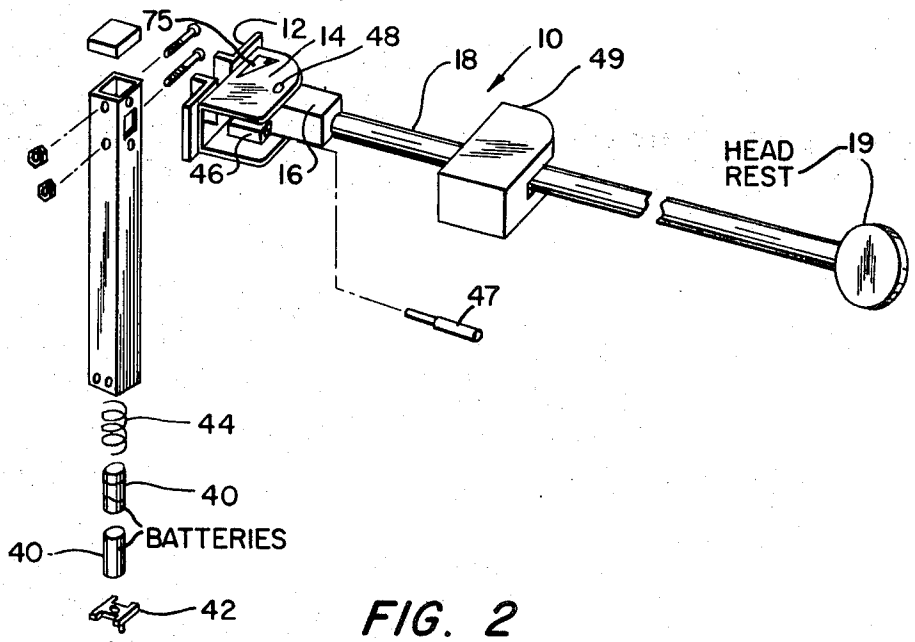
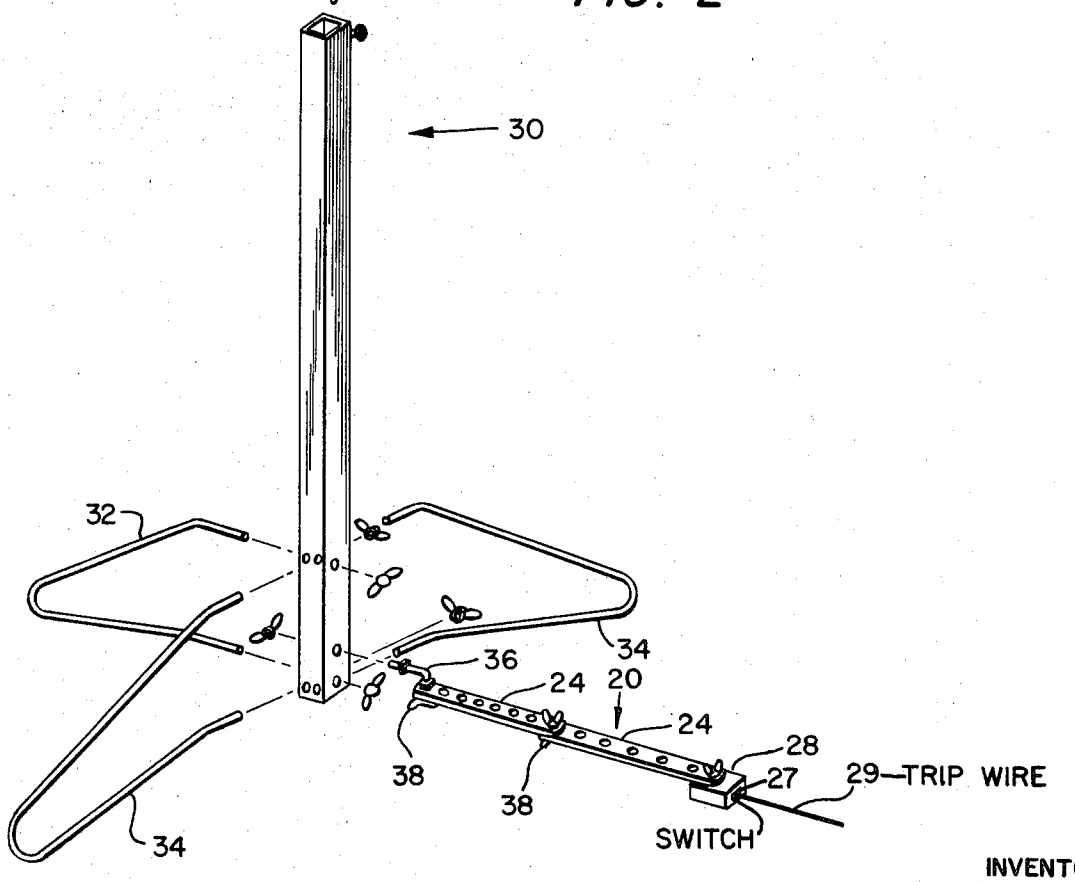
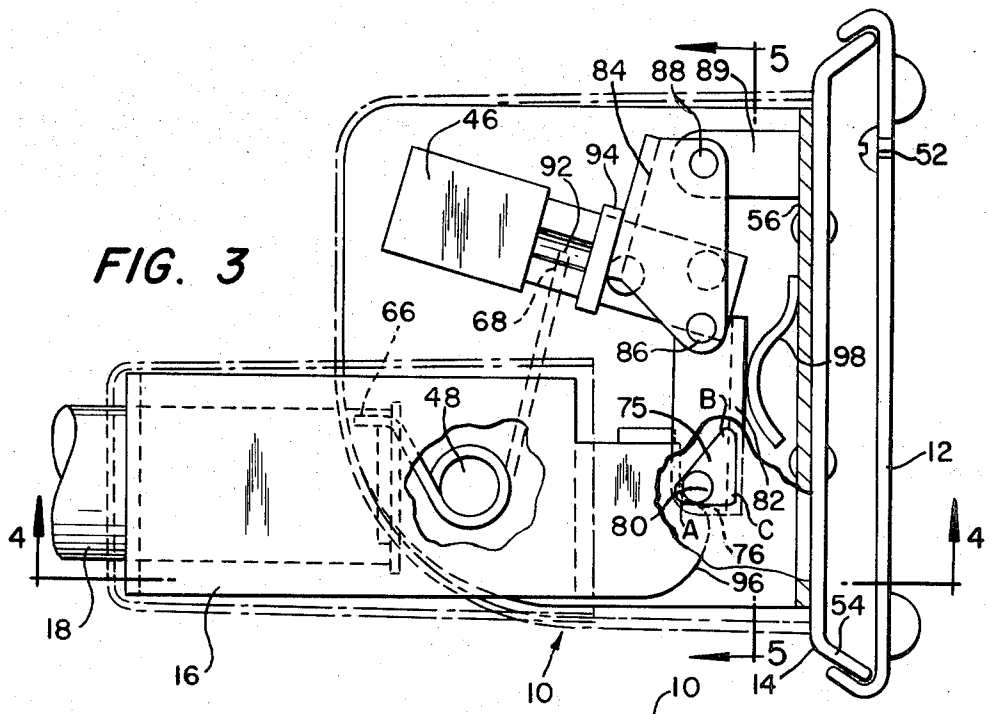


FIG. 2



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FIG. 3



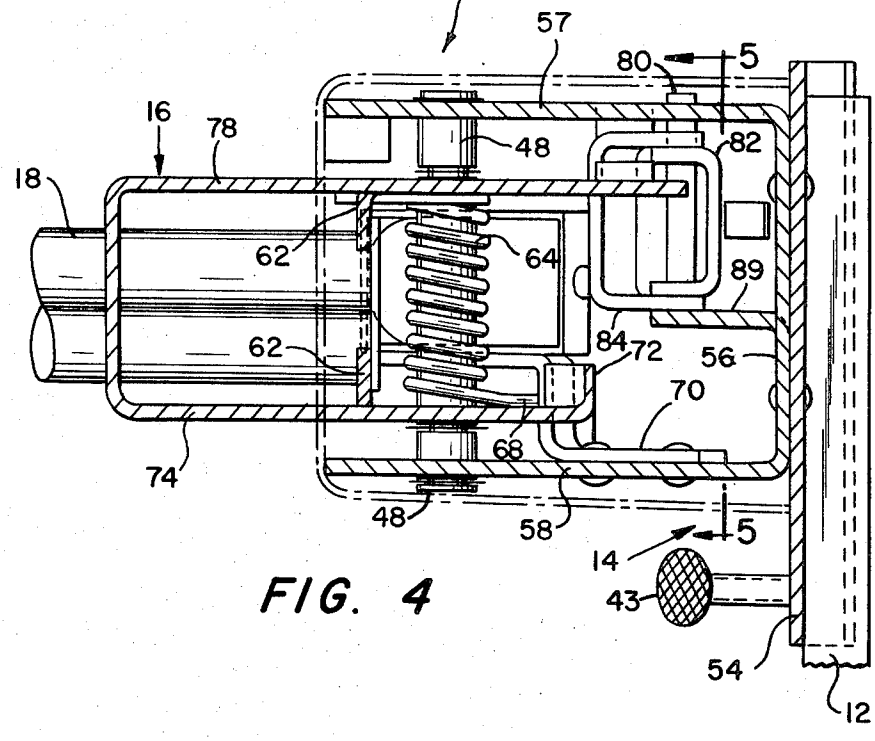


FIG. 4

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GOLFER'S HEAD MOVEMENT RESTRAINING DEVICE RENDERED NON-RESTRAINING AT BALL IMPACT POSITION

BACKGROUND OF THE INVENTION

In many sports, it is desirable that a body portion be restrained from movement until a particular time in a swing. In golf, for example, it is well known that a golfer's head should remain fixed until a club has made contact with the ball or shortly thereafter. One serious fault lies in moving the head rearward when shifting weight to the rearward foot during the back swing.

Devices have been proposed for correlating body movements or for preventing head movements during the swing. All of the devices heretofore known are either unworkable, cumbersome, or expensive to manufacture.

In typical prior art a bowl-shaped head restraint is placed over the head of a golfer. Striking a ball uncovers a photocell which controls a solenoid, releasing a vertical shaft for upward, spring-driven movement. The entire vertical shaft and rigid arm is lifted, and the bowl is removed from the golfer's head.

Besides requiring complex and expensive apparatus, many foot pounds of energy are required for accelerating an entire structure upward against the force of gravity. Equipment which easily may be reset is slow in operation, and only slight movement is produced. The movement of the bowl and arm creates a misalignment braking force between the sliding concentric tube members. A high compression spring of great driving power is required if a meaningfully quick removal of the head restraint is produced. A high compression spring makes resetting of the device very difficult if not impossible by golfers having insufficient weight or strength to effect the resetting. Moreover, the simple upward motion of the head restraint does not carry the head restraint out of club range for all golfers, especially novices who are just learning their swings.

The possibility of damage to hands, clubs and trainer is present.

These and other problems remain with devices which are known in the prior art.

SUMMARY OF THE INVENTION

It has been found that an improved swing training result is obtained when a temporary body restraint is immediately and rapidly moved at a high acceleration away from the body-restraining position at a predetermined point in a swing. In a golf swing, for example, it is important that a head restraint move away from the head quickly upon impact of a club and a ball. The movement must be sufficiently quick to avoid unnecessary and undesirable head restraint after impact.

It has been found that the most desirable restraint withdrawal movement is in the opposite direction of ball flight following impact.

The body restraint of the present invention swings about a pivot away from the body at a predetermined point in the swing. As compared with prior art devices, the trainer of the present invention is relatively uncomplex and inexpensive to build and install. Heretofore unattainable results are achieved using the structure which is more simple, less expensive, quicker to respond, easier to reset, and more capable of movement in a desired direction than apparatus of the prior art.

The broad objectives of the invention are accomplished by providing a sport training device for positioning against a body and for repositioning away from the body during a movement associated with a sports activity, which device has a support, a pivot connected to the support, and an arm connected to the pivot. Operating means mounted between the support and the arm move the arm from a first position adjacent a body to a second position away from a body. Control means connected to the operating means start the operating means to effect a movement from the first position to the second position.

The operating means in one form of the invention is driving means mounted between the support and the arm for driving the arm about the pivot toward the second position. Holding means connected to the support and to the arm holds the arm in the first position. Release means is connected to the holding means for disabling the holding means, thus permitting the driving of the arm toward the second position. Control means, for example, a power valve, which is inclusive of an electric switch, is connected to the release means for operating the release means.

In one construction of the invention the driving means is a torsion spring having a bend around the pivot and having one end connected to the support and having a second end connected to the arm. The holding means comprises a first detent on the arm and a second detent movably mounted on the support for movement between a first position in engagement with a first detent and a second position away from the first detent. The release means comprises an actuator connected to the second detent and operable upon actuation to disable the second detent. The control means is a source of power, for example, electrical power, and a supply line connected between the source of power and the actuator. A valve or an off-on switch in the supply line controls the application of the source of power through the supply line to the actuator, which may be a solenoid. The switch has a sensing means or a trip, for example, a wire, which extends into the path of a sporting object swung by a person whose body is in contact with the arm.

The power source may be hydraulic or pneumatic, in which cases the valves are hydraulic or pneumatic valves. The power source may be a spring or raised weight, in which case the valve is a known mechanism for applying the available power to the actuator.

In a preferred form the pivot is vertically oriented, and the arm swings horizontally from the first position to the second position. The broad objectives of the invention are achieved by an arm which moves at any angle.

In a preferred embodiment, a golf training device prevents movement of a golfer's head until impact of a golf club with a target, usually a golf ball or a practice ball. The device comprises an upstanding support, a pivot pin connected to the support near an upper portion thereof, an arm connected to the pivot pin, and a head rest connected to the arm remote from the pivot pin. A torsion spring is bent around the pivot pin and is connected to the arm and to the support for moving the arm and head rest away from a first golfer's head-engaging position to a second position away from a golfer's head. A first detent is connected to the arm, and a second detent is connected to the support. The detents are engaged when the head rest is adajcent the

golfer's head. An actuator means is connected to the second detent for disabling the detents and permitting the spring to drive the arm to the second position. A supply line is connected to the actuator, and a source of power is connected to the supply line. A valve in the supply line controls application of power from the source to the actuator. The valve has means to sense a golf club in a position normally associated with impact of a golf ball to operate the valve and to thereby operate the actuator, permitting the spring to drive the arm and head rest to the second position.

In a useful form of the invention, the apparatus is constructed in two main sections. The first section has a support which is a mounting member configured for mounting on a wall or post. Preferably, a second member is relocatable vertically on the mounting member to adjust the head rest to the height of a golfer's head. The second member carries the pivot pin and arm. The second major portion of the structure is the switch which is contained in a box with a sensing device extending outward from the box. An adjustable holder connects the box to an anchoring device which may be in turn connected to the ground, to a wall, or to a post. Thus, the adjustment of the switch and sensor to the appropriate position for intercepting a golf club is provided. It is convenient to mount the power supply, which in this case is two dry cell batteries, in the switch box and to run a wire from the switch box along the adjustable holder to the anchoring device then upward to the support and then outward to the solenoid-actuator.

Alternatively, the structure may be unitary. A vertical post, extensible for height adjustment, supports both the swingable arm and the switch box. In that configuration, the power supply, that is batteries or a rectifier, may be mounted within the post. Either the swingable arm or the switch holder or both are adjustable to provide the correct horizontal distance between the head rest and the swing sensing extension on the switch.

In a preferred embodiment of the retaining and release mechanism, the swingable arm extends through the pivot toward the wall or post and terminates in an arcuate cam. In the reset direction, the distance between the cam surface and pivot increases to a maximum and then abruptly terminates in a shoulder which extends toward the pivot. When reseting the arm, a cam pin rides up on the cam surface and then falls into the shoulder, holding the arm in position.

The cam pin is held by one of two hinged links. One end of the first link is pivoted in the support. The cam pin is mounted in the remote free end of the second link. Preferably, the cam pin is constrained by a guide for movement in a predetermined space. A solenoid acts on the first link, so that the cam pin in the second link is held in extension against the shoulder on the arm. As the solenoid is actuated by a switch, the holding function of the cam pin is deactivated, and the arm swings under the pressure of the spring, carrying the head away from the golfer's head.

The solenoid may push against the first link by spring pressure until the plunger of the solenoid is withdrawn. Thereupon the torsion spring drives the arm, moving the cam pin before the shoulder until the combined action of the links and cam pin guide the cam pin out of the shoulder's path.

In another embodiment, the first link is connected to the solenoid plunger so that withdrawing the solenoid plunger positively withdraws the first link, the second link and the cam pin, permitting the torsion spring to drive the arm and shoulder past the cam pin.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a preferred golf trainer embodiment of the invention.

FIG. **2** is an exploded view of a self-contained post mounted embodiment of the invention.

FIG. **3** is a detail plan view of a release mechanism as viewed from the top of FIG. **1.**

FIG. **4** is a side elevational detail of the release mechanism cut along line **4—4** and viewed from the bottom of FIG. **3.**

FIG. **5** is an end elevation of the release mechanism cut along line **5—5** and viewed from the right side of FIGS. **3** and **4.**

DETAILED DESCRIPTION OF THE DRAWINGS

With reference to FIG. **1,** the invention is described by way of a preferred embodiment in which the sport training device is depicted as a golf swing trainer.

The trainer is made of two major portions. An upper portion **10** has a wall mount member **12** and a support member **14,** which is vertically adjustable on wall mount **12** for adjustment to the height of a golfer's head in the proper swing stance. The wall mount **12** may be permanently attached to a convenient wall or to a post erected for the purpose. A vertical pivot pin is mounted in support member **14,** and a cam yoke **16** is mounted on the pin. Arm **18** is rigidly connected to the cam yoke **16,** so that the arm and cam yoke swing together upon release. A head rest **19** is positioned on arm **18** at the rear side of a golfer's head, opposite the direction of ball travel. Head rest **19** has two major functions. First, it prevents rearward movement or turning of the golfer's head during the back swing and forward swing. Second, once the head rest has been adjusted to the proper height, it is an indicator of the proper head position in a stance for addressing a ball.

The lower portion of the training apparatus is generally indicated by the numeral **20.** An anchor **22** is provided for mounting the trainer at the bottom of a wall or post near the ground. A switch holder is made of two extensible members **24,** which are secured in a fixed position by a wing nut **26** after the switch housing **28** enclosing a switch **27** and trip wire **29** have been placed in the desired position. Trip wire **29** is positioned adjacent the tee right beneatht the golf ball, so that the wire will be tripped at the point of impact when the club hits the ball. The tripping of wire **29** activates switch **27,** completing an electrical circuit through conductors **31** to activate a solenoid in support member **14** of upper portion **10.** The activation of the solenoid releases cam yoke **16** and arm **18** to swing the head restraint rearwardly under the power of a torsion spring.

In the embodiment shown in FIG. **2,** elements which are similar to elements in FIG. **1** have similar numbers.

In FIG. **2** a post **30,** which may be a square metal tube, supports the upper portion **10** of the golf trainer and its lower portion **20.** Heavy wire legs extend through apertures in the lower post and are held by wing nuts. Leg **32** extends straight outward from the tube, and legs **34** are bent in the direction of lower trainer portion **20** to form a tripod base for post **30.** Lug **36** extends through apertures in lower portion of the post and is fastened by a wing nut in the same man-

ner as the legs. Switch holders 24 are adjustable in position by wing nuts 38 so that switch 27 is held in the proper position.

The switch housing 28 may hold batteries to supply electrical power in either of the embodiments of FIG. 1 and FIG. 2. It is especially convenient to mount the batteries in the post 30 in the embodiment of FIG. 2. Similarly, it is preferable to mount the power supply batteries in the anchor 22 of the embodiment shown in FIG. 1.

In the FIG. 2 embodiment batteries 40 are supported on a battery contact 42 centrally positioned within post 30. Spring 44 presses the batteries against the contact. Wires 31 complete the circuit between the batteries, switch 27 and solenoid 46. In a well known manner, a single wire may be used, and the interconnected metallic parts may serve as ground.

As shown in the upper portion of FIG. 2, a mounting member 12 is connected to the post by nuts and bolts. The mounting member may be relocatable on the post, or the post may be vertically adjustable in a well known telescoping manner. Support member 14 is connected to member 12 in a manner which permits easy vertical adjustment between the members. Cam yoke 16 is pivoted on pivot pin 48, which is vertically mounted in support member 14. Plunger 47 of solenoid 46 is moved toward the illustrated exploded position by operation of the power source and switch, to release cam yoke 16 for pivoting about pin 48 and for carrying arm 18 and head rest 19 out of contact with the golfer's head. Cover 49 slides over support member 14, completing the assembly.

FIGS. 3, 4 and 5, illustrate the mechanism in a preferred form of the invention such as shown in FIG. 1. Plate 12 is mounted on a wall by screws 52. Support member 14 comprises a slide 54, which is vertically movable within wall mount 12, and a thumb screw 43 for fixing the slide 54 in the desired vertical position. Support member 14 further comprises a U-shaped support plate 56 having an upper horizontal flange 57 and a lower horizontal flange 58. Pivot pin 48 is mounted vertically between the flanges.

Cam yoke 16 is fixed to the inner end of arm 18. Tabs 62 are bent inwardly from upper and lower horizontal flange surfaces of the cam yoke 16 to aid in holding the upset end of tubular arm 18. A torsion spring 64 has several turns around pivot pin 48. The upper end 66 of spring 64 rests against the forward edge of the tab 62 which is bent downward from the upper flange of cam yoke 16. The opposite end 68 of spring 64 rests against a solenoid mount 70, which is firmly attached to the upper side of the lower flange 58 on support member 14. Since end 68 is fixed, end 66 of spring 64 tends to push the cam yoke 16 and arm 18 rearwardly, or counterclockwise as viewed in the plan view, FIG. 3.

As shown in FIG. 4, the upward bent end 72 of lower cam yoke flange 74 intercepts the lower spring end 68 as the arm and cam yoke are driven to the full rearward position, arresting the arm and cam yoke against further movement by the spring.

The cam yoke and arm are held in cocked position by cooperation of a detent shoulder 76 on the upper flange 78 of cam yoke 16 and a cam pin 80. Pin 80 is supported in the free end of a pair of links 82 and 84 which are hinged by an interconnecting pin 86. Link 84 is supported by cam support pin 88, which is held between upper flange 57 of support member 14 and tab 89 which is bent outward from the back of U-shaped member 56.

As best shown in FIG. 4, the two links are generally U-shaped, opening in opposite directions. As best shown in FIG. 3 solenoid 46 has a plunger 92 with an enlarged end 94 which resiliently bears against link 84 in the de-energized condition of the solenoid. Being held in that position, link 84 holds link 82 extended, so that cam pin 80 rests against the detent shoulder 76 of the cam yoke. In that position cam pin 80 occupies point A of the triangular opening 75 located in the upper flange 57 of the support member 14.

When the switch is tripped, energizing solenoid 46, plunger 92 is pulled back, allowing the pressure of torsion spring 64 to drive the swing arm 18, the cam yoke 16 and detent 76. The latter pushes cam pin 80 ahead of it. The cam pin travels along the hypotenuse of the triangular shaped opening to point B, out of the path of shoulder 76. Consequently the arm is permitted to swing to its fullest extension.

Solenoid 46 is again de-energized, and plunger 92 again pushes on the linkage so that the pin 80 moves toward point C. As the swing arm is manually pulled back into position, pin 80 rides up along the cam surface 96 until it drops behind shoulder 76. Weak leaf spring 98 helps to urge the second link to carry cam pin 80 from point C to the reset position A.

The apparatus is adjusted to the proper golfer's stance with the head rest 19 at the rear side of the golfer's head. The head rest constrains the golfer's head against movement during the backswing and during the first part of the foreswing until impact with the ball and the trip wire 29. The trip wire activates solenoid 46, pulling in the plunger. The links are then free to move so that the torsion spring pushes cam pin 80 ahead of shoulder 76. The slope of the triangular opening carries the pin away from shoulder 76, and the swing arm continues to its full rearward deactivated extension. At the same time microswitch 28 returns to normal, the plunger is released and moves outward against link 84, again extending cam pin 80. When swing arm 18 is manually moved back into the reset position, cam pin 80 automatically moves into position behind shoulder 76 on cam yoke 16. Thus, the device is simple reset ready to use again.

In an alternate preferred form of the invention, solenoid 46 is replaced by a solenoid with a plunger which extends upon activation. Spring 98 is replaced by a foam pad spring. An opening in the walls 54 and 56 behind the pad allows cam 84 to push the pad partially through the opening, when the solenoid is activated to move the links and to draw cam pin 80 to point B.

In another embodiment also illustrated by FIG. 3, the first link 84 is connected to the solenoid plunger 92 so that withdrawing the solenoid plunger positively withdraws the first link 84, the second link 82 and the cam pin 80, permitting the torsion spring 64 to drive the arm 18 and shoulder 76 past the cam pin 80.

That which is claimed is:

1. A golf training device for preventing rearward movement or turning of a golfer's head until impact of a golf club with a target ball comprising an upstanding support, a vertically oriented pivot pin connected to the support near an upper portion thereof, an arm connected to the pivot pin, a head rest connected to the arm remote from the pivot pin, a torsion spring connected to the arm and to the support for moving the

arm and head rest horizontally away from a first golfer's head engaging position adjacent the rear side of a golfer's head, opposite the intended direction of ball travel, to a second position away from a golfer's head, first and second disengageable detents, the first detent being connected to the arm and the second detent being connected to the support, the detents being engaged when the head rest is adjacent the golfer's head, and actuator means connected to one of the detents for disengaging the detents and permitting the spring to drive the arm to the second position, a supply line connected to the actuator, a source of power connected to the supply line and a valve in the supply line for controlling application of power from the source to the actuator, the valve having means to sense a golf club in a position normally associated with impact of a golf ball to operate the valve and to thereby operate the actuator, permitting the spring to drive the arm and head rest to the second position.

2. The device of claim **1** wherein the support comprises a support plate having an upper horizontal flange and a lower horizontal flange, wherein the pivot comprises a pivot pin vertically mounted between the upper and lower horizontal flanges, and wherein the arm comprises a cam yoke pivoted on the pivot pin.

3. The device of claim **2** wherein the first detent comprises a shoulder on the cam yoke, and wherein the second detent comprises first and second pivotally interconnected links, one of which is connected to the actuator.

4. The device of claim **3** wherein a guide is formed by an opening in one of the horizontal flanges and wherein the second detent further comprises a cam pin connected to one of the pivotally interconnected links and constrained to move in a predetermined space by the guide.

5. The device of claim **1** wherein the support comprises a wall mounting member and a second support member which is vertically adjustable along the wall mounting member, a pivot pin support extending outward from the second member, and wherein the pivot comprises a pivot pin vertically mounted in the pivot pin support, a detent pivot pin connected to the pivot pin support and wherein the second detent comprises first and second pivotally interconnected links, one of which is connected to the actuator.

* * * * *