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FOOT TRAINER WITH ADJUSTABLE ROTATION AND FRICTION MEANS

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2 Sheets-Sheet 1

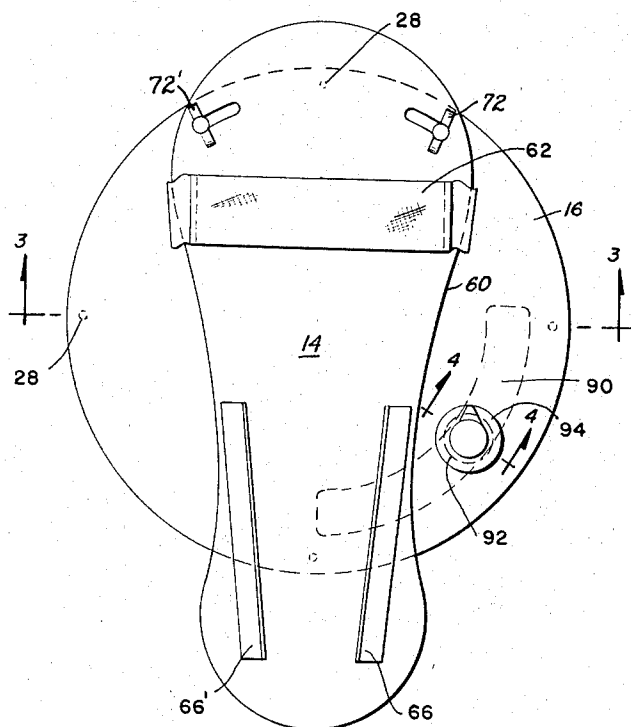
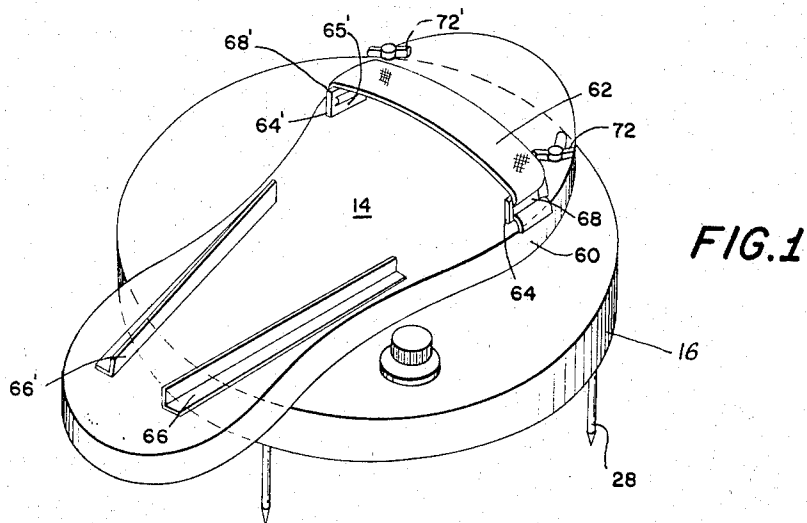


FIG. 2

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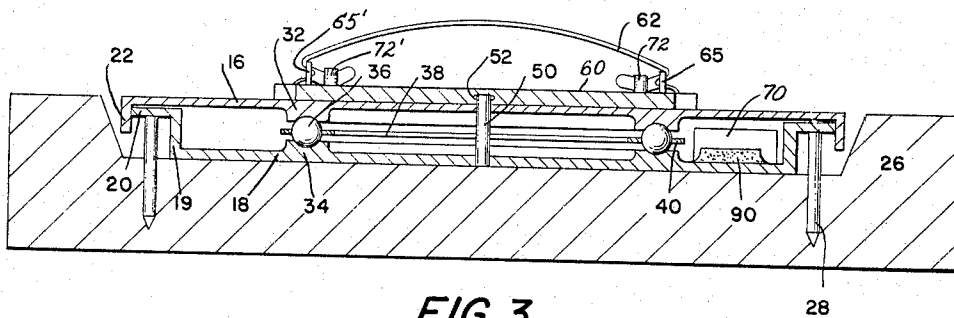


FIG. 3

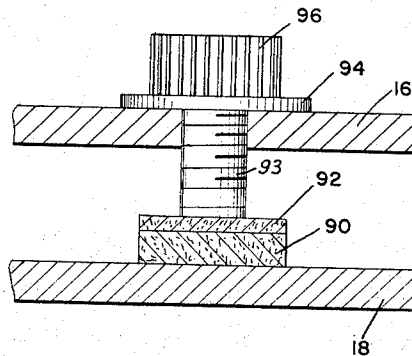


FIG. 4

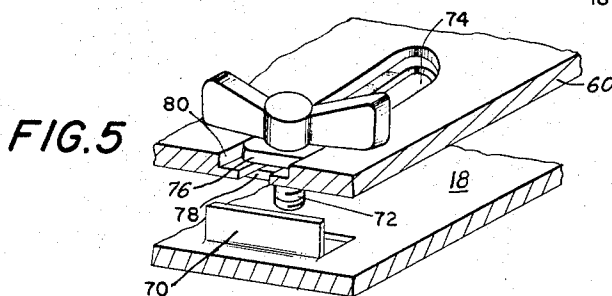


FIG. 5

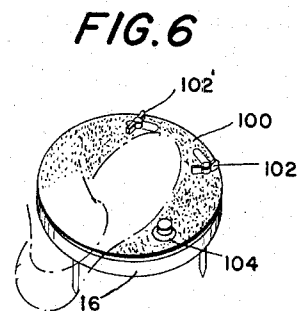


FIG. 6

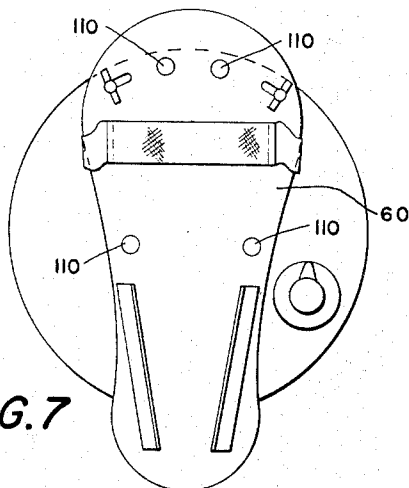


FIG. 7

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FOOT TRAINER WITH ADJUSTABLE ROTATION AND FRICTION MEANS

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ABSTRACT OF THE DISCLOSURE

The invention is a trainer for sportsmen which is designed to restrict, while guiding, the rotational movement of one of the sportman's feet. By varying the degree of rotation of the foot and varying the force required to rotate the foot, the trainer adjustably controls the foot of the sportsman during the movement of his body as in striking a golf ball or tennis ball or baseball.

This invention relates generally to the field of sports, and more particularly to those sports in which the rear foot action and pivot is essential for proper body movement and coordination. For example, in baseball, it is important for the hitter to pivot and push off the ball of the rear foot when batting, for complete utilization of the body and, consequently, proper hitting technique and form.

Proper action of the rear pivotal foot gives better body balance, necessary hip pivot, the desired shorter and straight front foot stride, and level shoulders and hips for a level swing and head restrained from excessive movement, so that the batter's eyes can better follow the ball. The desired body movement and coordination will result from proper pivoting of the rear foot, thus giving better timing and maximum power.

The common fault with a majority of hitters, especially beginners, is hitting off the front foot, thereby preventing the back foot from pivoting properly. This results in lunging forward and off timing, particularly when the speed of pitched balls changes. Off balance, which usually causes overstriding and turning of the head, results in the hitter's inability to keep his eyes on the ball.

Hitters are made, not born, through proper instructions and practice. Good hitters continue to practice hitting form to retain or improve timing and coordination, since proper hitting techniques come as a result of the proper pivoted action of the rear foot.

It is thus necessary if a player is to become expertise in such sports, to be taught the proper use of the rear foot, which in turn, leads to the proper desired hitting form.

This invention is therefore concerned with an apparatus for teaching proper rear foot pivot primarily for baseball as well as other various sports such as softball, golf, tennis or any sport where the rear foot pivot action is essential or desired. This will become apparent from the following specification and attached drawings which describe the invention in terms of a baseball form training apparatus.

The object of this invention is to provide an apparatus to teach proper player form for sports. This device can be used indoors or outdoors, with or without a platform.

Another object of this invention is to describe a device

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which may readily be used by individuals, as well as large groups of players, such as by a professional club, or by amateur groups such as Little League, etc., as part of their ordinary training.

My invention is illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view of a preferred form of this invention, illustrating the back foot stance training device;

FIG. 2 is a plan view of said back foot stance training device, looking from the top thereof;

FIG. 3 is a cross-sectional side view of the back foot stance training device, taken along the sectional lines 3-3 of FIG. 2;

FIG. 4 is an enlarged cross-section view of the tension adjustment means, taken along the sectional lines 4-4 of FIG. 2;

FIG. 5 is an enlarged perspective view of the angle adjustment means used to vary the maximum angular displacement of the training device with the upper plate deleted to clarify the operation thereof;

FIG. 6 is a plan view of a modification of the foot support, illustrating a heavy textured matting surface that may be utilized to support spikes on a shoe to simulate actual playing conditions;

FIG. 7 is a plan view of a modified form of this invention showing that holes for spikes may be provided on the foot support section of the training device;

FIG. 1 illustrates a preferred form of the invention for use by a baseball player. This assembly comprises two sections, base support section 12 and back foot support 14 which is rotatable on base support section 12.

The rotatable relationship between base support section 12 and back foot support 14 is more clearly illustrated in FIG. 3. FIG. 3 is a cross-sectional view of the entire housing assembly, and shows that the base support section 12 is comprised of an upper plate 16 and a lower plate 18, which are preferably made of steel. As further illustrated in FIG. 3, plate 18 has an upward right angle flange section 19 and an outward right angle flange section 20 extending therefrom. Extended right angle flange section 22 of plate 16 thereby securely fits around the entire periphery of plate 18. This secure fit seals the inner section as defined by the lower plate 18 and upper plate 16 and their associated fitted flanges and keeps dirt, or whatever surface base support section 12 is buried in from getting into the inner section.

As illustrated further in FIG. 3, the assembly is buried in the ground to a level at which the top of plate 16 is at the level of ground surface 26. Thus, the relative positions of the feet in normal play are simulated by this apparatus. Spikes 28 are attached, either through welding or other mechanically equivalent means, to the flange section 20 of lower plate 18 at 90° intervals. Thus, there are four spikes 28. These spikes extend into the earth, and securely hold the base support section 12 so that it does not change its position when being used.

As further illustrated in FIG. 3, plates 16 and 18 define radial indentations 32 and 34 which are fitted oppositely from each other, that support a series of ball bearings 36 evenly spaced throughout the radial distance of the indentations. A rim-plate 38 is provided with cut-outs 40 to fit around ball bearings 36 and hold them securely in place between plates 16 and 18. Center shaft 50 supports the assembly 10, and is fitted into bore 52

of back foot support 14, which is rigidly fixed by screws or any equivalent mechanical means to upper plate 16 and rotates therewith.

FIGS. 1 and 2 illustrate the foot support means 14 which is used to support the back foot as the device is being used. The back foot support 14 consists of a base 60 which is preferably cut out in the form of an enlarged shape of a human foot. The base 60 is symmetrical along its longitudinal axis so as to accommodate both left and right feet, depending upon the batter. Belt 62 is used to keep the toe part of the foot in the desired secure position. As illustrated in FIG. 1, belt 62 is adjustable on either its right or left side, to accommodate a left or right handed batter, and is made of an elastic material which gives way slightly as the position of the foot changes as the device is being used.

Belt buckle adjusting means 64 and 64' are secured to either side of base 60 and provide for adjustment of the belt 62 by either a left or right handed player. It consists of base members 65 and 65' having pivotally supported cylindrical elements 68 and 68', respectively, around which belt 62 is wound inwardly and then outwardly. This is more fully illustrated in FIG. 3. The bottom portion of buckle adjusting means 64 and 64' which are located directly below pivotally supported elements 68 and 68' are jagged so that when the belt is set to the desired position, it will not slip back. By slightly lifting the belt 62 away from the jagged buckle edges, it may slide around rotating elements 68 and 68' to set itself to a new position as desired.

Complementary guide means 66 and 66' are mounted on base 60 to guide and position the heel of the foot thereon. As shown in FIGURES 1, 2 and 7, guide means 66 and 66' comprise two coacting L-shaped members that diverge from the back portion to the front portion of base 60, and therefore function to accommodate different foot sizes.

As illustrated in FIGS. 2 and 5, back foot support 14 is adjustably rotatable in relation to base support section 12. More particularly, since base 60 is fixed to top plate 16, it is rotatable with respect to bottom plate 18. The degree of free rotation is fixed by stops 70 and 70', which coact with bolts 72 and 72', respectively, and which protrude from the bottom plate 18 (FIG. 5). FIGURE 5 thus shows that stop 70 protrudes from bottom plate 18, to coact with adjustably positionable bolt 72 to fix the degree of clockwise rotation. It is mounted to the right of center of assembly 10 (FIGURE 3). A similar arrangement (not shown) of stop 70' and bolt 72' to fix the degree of counter-clockwise rotation is mounted to the left of center of assembly 10. In this regard, the arrangement comprising stop 70' and bolt 72' has not been illustrated to clarify the drawings in view of the similar structure and function of corresponding elements identified by the same identification numbers. However, the location of bolt 72' to the left of center of assembly 10 is shown in FIGURE 1. Thus, components identified by the prime (') designation in conjunction with an identification number are structurally and functionally similar to the corresponding elements identified by the same identification number; for example, stops 70 and 70' are structurally and functionally similar.

Upper plate 16 is not shown in FIGURE 5, in order to clarify the operation of stop 70 and bolt 72. Thus, the operation of the angular adjusted means is shown in FIGURE 5 with relation to stop 70, bolt 72, slot 74, guide plates 76 and 78, and groove 80. A similar arrangement comprising the corresponding elements identified by the same identification numbers and having the prime (') designation (stop 70', bolt 72', slot 74', guide plates 76' and 78' and groove 80') is provided to the left of center of the assembly to adjust the degree of counter-clockwise rotation. Bolt 72 and 72' are mounted through base 60 of the back foot support 14, as shown in FIGURES 3 and 5 and extend through the top plate 16

through slots 74 and 74' respectively. The position of bolts 72 and 72' in slots 74 and 74' are adjustable. This adjustability is obtained by providing guide plate sets 76 and 78, and 76' and 78', on opposite sides of base 60 of the back foot support 14, to hold bolts 72 and 72' respectively in secure position.

Guide plates 78 and 78' contain a bore which is threaded to fit the threaded portions of bolts 72 and 72' respectively. When it is desired to change the amount which the back foot support section 14 may be freely rotated, the bolt 72 or 72' is merely loosened from guide plate 78 or 78', and moved to the desired position along groove 80 or 80', respectively. When the desired position which will give the desired angular displacement is obtained, it is again locked into place. As noted from FIG. 3, bolts 72 and 72' are wing-nut type bolts.

FIGS. 2 and 5 illustrate the tension adjustment means which is another important part of this invention. The tension adjustment means comprises a braking type material 90 affixed to the bottom plate 18. As illustrated in FIG. 2, the braking material 90 extends for a radial distance of 90°, because the maximum displacement of the back foot support section 14 is 45° in either direction, or a total of 90°. A corresponding braking material 92 in a circular form is attached to shaft 93. Shaft 93 is threaded to fit the threads of plate 16 through which it extends, and is rotated by knob 96. Knob 96 selects the desired tension value, which, respectively, is indicated along the periphery of indicator 94 as indicated in FIG. 2. Thus, for example, if a strong player is to use the device, the tension will be set very high because he will have a lot of force behind him. On the other hand, if for example, a Little League player is to use the device, the tension adjustment means would be loosened to offset his relatively weak power. The purpose of the tension adjustment means is to simulate actual playing conditions, in which the ground provides a friction force which counteracts the body force as the foot is rotated.

FIG. 6 represents a modification of this invention in which the back foot support section 14 is deleted. This modified form of my invention is smaller than the device illustrated in FIG. 1, and, as illustrated, accommodates only the front or toe portion of the player's foot. A plastic mat-like material 100 is affixed to plate 16. This material closely simulates the resistance which the surface of the ground, more particularly a grass playing field, exerts on a player wearing spikes. The purpose of this modification is that a player may use the device, without removing his spiked shoes, and simulate actual playing conditions. The material is of such a type that it resumes its original shape after the spikes are removed after use by a player. The rest of the device is as explained heretofore, in that angular adjustment means 102 and 102' and tension adjustment means 104 comprise part of this modified form of my invention. It will be apparent from reference to FIGS. 1, 2, 3, 6 and 7 that the same concept of FIG. 6 might be applied to the species of FIGS. 1, 3 and 7. For example, the turntable plate shown in FIG. 6 may be sufficiently large to accommodate the entire foot of the player.

FIG. 7 represents a further modification of this invention in which the base 60 additionally comprises holes and/or indentations 110 to fit the spikes of a baseball player's shoes. Thus, the player's back foot will be firmly held in position, as he practices batting. The indentations or holes are exaggerated, so that they may fit different size shoes.

The preferred form of my invention, as heretofore described, works in the following way.

The baseball player desiring to use the pivot training device to practice batting, and more particularly to learn the best position of the feet during the batting swing, will merely place his foot on the back foot support section 14. The foot he places on said support section will depend on whether he is a left or right-handed batter. Belt 62 will

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then be adjusted to provide the proper toe support for the particular size foot. The adjustable angular displacement means will be adjusted to give the desired angular displacement, a range of up to 45° in either direction. The tension adjusting control 96 will then be adjusted to vary the friction between brake linings 92 and 90 and thus the friction and/or tension exerted by said brake linings. Indicator 94, for example, may be scaled in terms of pounds of the individual player. The more weight and/or power of the player, the greater tension must be exerted by the linings 92 and 90 to counteract the force of the player.

FIG. 2 indicates the initial starting position. Assuming that the player is a right-handed batter, he will swing and move his foot so that the back foot support section 14 will move counter-clockwise. As the player's foot moves, during the period of this swing, his heel will be able to be raised from the support means because nothing is keeping it down. The raising of the heel of the foot towards the completion of the swing is necessary to obtain power and follow through. However, the belt 62 will keep the toe in proper position, i.e. on the surface of the back foot support.

The advantage of this invention is that it may be used by a wide group of people to simulate actual playing conditions. It is completely variable in that it accommodates players with different foot sizes, as well as different ability as regards power. Furthermore, the player may adjust the angular displacement of his swing, as regards back foot displacement, to determine just what angular displacement gives him the most powerful and accurate swing.

Whereas the aforementioned description has described the species of FIGS. 1, 2, 3, 6 and 7, it will be apparent to those skilled in the art that the turntables of the respective species may comprise spike engaging patterns in lieu of the mat shown in FIG. 6 or of the shoe engaging element 14 of FIG. 1. In the FIG. 6 species a pattern having plural depressions corresponding to the player's toe spikes could be employed; whereas in the other species a pattern having plural depressions corresponding to the spike projections of the entire foot might be employed.

Although I have described my invention for particular use by a baseball player, it may also be used in other sports, for example, golf. Thus, when taking a swing at a golf ball my invention may be utilized to obtain correct rear foot pivot action for proper body movement and coordination. That is, it is designed for use in sports where the position of the rear foot changes angularly when playing, for example, when taking a swing at a ball. The adjustable angular displacement and tension enable a player to determine the pivot action which will give him optimum power and coordination. After forming the proper hitting habits through continued use of this invention, he will then be able to translate them to the actual playing field.

Having described my invention, I claim the following:

1. A training device to teach the proper pivot and action of the back foot when hitting a baseball which comprises:

- (A) an housing consisting of a fixed lower plate and an upper plate in rotatable relationship with said fixed lower plate;
- (B) means to mount said housing securely in a dug-out portion of the ground with the top surface of the upper plate being at ground level;
- (A1) foot support means mounted to said upper plate and designed to accommodate the left foot or a right foot, depending upon the player;
- (A1a) guide means mounted on said foot support means to guide the position of a player's heel on said foot support means;
- (A1b) toe securing means to secure the toe portion of

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the foot of the player to said foot support means, said toe securing means being adjustable to accommodate different foot sizes;

(C) angular adjustment means to vary the angle of rotation of said top plate and its affixed foot support means with respect to said lower plate, in either direction, the range of said angular displacement being up to 45° in either the clockwise or counterclockwise direction;

(D) tension adjustment means, to vary the friction force between said upper and lower plates, according to the power of the individual player.

2. The training device of claim 1 wherein said tension adjustment means comprises a braking lining affixed to both said upper plate and said lower plate, which contact each other as the upper plate is rotated, said brake lining attached to said upper plate being adjustable with respect to said lower plate brake lining, to thereby vary the friction between the two, and thus vary the force required to rotate said upper plate with respect to said lower plate.

3. The training device of claim 1, wherein said angular adjustment means comprises a stop attached to said lower plate, a groove defined by said foot support means and said upper plate, a bolt adjustably positioned within said groove so as to hit said stop on said lower plate at different degrees of confinement according to the setting of said bolt within said groove.

4. A training device to teach the proper pivot and action of the back foot when hitting a baseball which comprises:

(A) an housing consisting of a fixed lower plate and an upper plate in rotatable relationship with said fixed lower plate;

(B) means to mount said housing securely in a dug-out portion of the ground with the top surface of the upper plate being at ground level;

(C) a matted plastic material affixed to said upper plate which resumes its original shape after spikes are removed from it, to accommodate spikes on sport shoes to simulate actual playing conditions;

(D) angular adjustment means to vary the angle of rotation of said top plate and its affixed back foot support means with respect to said lower plate, in either direction, the range of said angular displacement being between 40 and 45° in either the clockwise or counterclockwise direction;

(E) tension adjustment means, to vary the friction force between said upper and lower plates, according to the weight and desired speed and rotation of the individual.

5. A pivot position trainer for use in sports, comprising:

(A) an housing, including a lower section and an upper section, said lower section being in fixed relationship to said upper section and said upper section being in rotatable relation with said lower section, said upper section comprising:

(1) a plate upon which is attached:

(1a) a foot support, said foot support including:

(1a1) means to guide and position the heel of a foot mounted on said back foot support;

(1a2) means to support the toe of the foot in secure position on said back foot means;

(2) means to adjust the angular displacement of said upper section relative to said lower section;

(3) tension means disposed between the respective sections to vary the tension as said upper section is rotated by the foot of the user, said tension means being adjustable by varying the force of friction between two brake linings, one of which is connected to said upper section and

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the other of which is connected to said lower section.

6. The device of claim 5, wherein said back foot support comprises a symmetrical foot shape member, and wherein said guide means for said heel comprises two L-shaped members which are divergent from the back of said foot shaped member towards the front of said foot-shaped member to accommodate different foot sizes, and wherein said toe support means comprises an elastic type material.

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