PRACTICE, EXERCISE, AND STRENGTHENING DEVICE FOR BATTING AND SIMILAR SWINGING MOTIONS

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ABSTRACT

A device is disclosed for batting practice, by baseball players in batting practice; it can also be adapted for use by golfers, tennis players, etc., for practice and exercise in swinging other types of clubs, racquets, etc. It comprises a horizontal base, a vertical neck assembly that allows height adjustment, and a "head" component that encloses a set of "flaps" made of a stiff-but-yielding material, such as rubberized materials commonly used to make conveyor belts. Roughly a dozen to twenty rectangular segments of resistive material are mounted within the head in a generally vertical direction, from the top and bottom surfaces in the head, spaced apart from each other a suitable distance. As the end of a bat is swung through the head assembly, it encounters substantial resistance from the flaps, which generate a level of resistive force that provides good exercise.
PRACTICE, EXERCISE, AND STRENGTHENING DEVICE FOR BATTING AND SIMILAR SWINGING MOTIONS

FIELD OF THE INVENTION

[0001] This invention is in the field of mechanical devices and sporting equipment, and relates to devices that baseball players, golfers, tennis and racquetball players, and others can use to strengthen muscles and develop skills in batting or in swinging other types of clubs, rackets, etc.

BACKGROUND OF THE INVENTION

[0002] Various types of mechanical devices have been developed to help people exercise and strengthen specific muscle groups, and to practice various repetitive skills, that are useful in various types of sporting and/or leisure activities.

[0003] For purposes of describing and illustrating this invention, the discussion below will focus on baseball, and on baseball players who wish to develop, practice, and enhance their batting skills. However, this description and illustration is not intended to be limiting, and those skilled in the art will recognize that the device described herein can be adapted to helping golfers, tennis and racquetball players, and others develop muscles and skills that are used in swinging golf clubs, tennis racquets, and similar sporting devices. In addition, similar devices can be adapted and provided that will help people develop strength and skills in bowling, underhand pitching, or other activities that involve releasing a ball or other device. Accordingly, any references herein to baseball, or to batting or batting practice (and any references to any particular sport or sporting activity) are intended to be merely illustrative, and not limiting.

[0004] Terms such as “practice” and “exercise” are used interchangeably herein, since the activities described herein involve physical motion which, if practiced and repeated with sufficient frequency, will lead to both (i) strengthening of various muscles and muscle groups, and (ii) higher levels of coordination and skill. As an example, batting practice using the machines disclosed herein will help develop and strengthen numerous muscles in the arms, shoulders, chest, and neck, and will also help develop and strengthen, to an extent that would surprise many people, the coordination of those upper body muscles with additional muscles in the legs and lower abdomen that contribute substantially to power and success in skilled batters.

[0005] In addition, any references herein to any sport or sporting activity includes activities either by professional athletes, or by amateurs who play at any level, including levels that would be regarded as leisure rather than as a serious pursuit. There is no dividing line between competition and leisure, when it comes to activities such as softball, golf, tennis, bowling, or any other sport, and indeed, one of the most enjoyable aspects of all of those activities, at any level of seriousness, is the role and presence of “friendly competition”, in which any player is welcome, invited, and encouraged to practice as much as he or she wants, to buy the best equipment, to get lessons or coaching if desired, and to try to beat any and all competitors, whether friends and adversaries. Accordingly, the devices described herein are well-suited to be purchased and used in homes (such as in the homes of young athletes who aspire to collegiate or professional competition), by professional clubs or athletes, at that offer fields or other facilities to teams and leagues, at gyms, exercise clubs, and similar facilities, and in any other suitable venue or location.

[0006] With regard to batting practice for baseball players, the most widely used types of exercise and practice devices that have been developed to date fall into two main categories. One category includes pitching machines, which typically hurl a ball in a relatively consistent pathway over a plate, while the batter stands next to the plate and attempts to hit the balls that are being hurled by the machine. For both safety and convenience, this type of activity is most commonly done in a “batting cage” that uses chain-link fence and/or nets to prevent the balls that are hit from leaving an enclosed area. The other category of exercise device includes abnormally heavy bats, and weighted rings that fit around the striking portion of a bat, which are often used by batters to loosen up their muscles while they are “on deck” and waiting for their turn to bat.

[0007] Those are the only known exercise or practice devices that have been widely adopted and used by baseball players, to practice their batting skills. However, various other devices, methods, or systems are known, and merit attention. One such system, the so-called “Shortswing” system illustrated and advertised at www.shortswing.com, is a relatively lightweight system that apparently is used to teach young players how to swing a bat in an efficient arc, so it will reach the impact point as quickly as possible. That type of system can be regarded as intended mainly for teaching style and form; even though the swinging of any bat will offer at least some exercise, is not the type of “high quality” exercise that can rapidly strengthen muscles.

[0008] In addition, some coaches have younger players use their bats to hit a is hanging from a tree or other support by a rope or chain. That approach also can provide some amount of exercise, but it is not “high quality” exercise that can rapidly strengthen muscles, and the impacts that are created when a bat actually hits a tire and bounces off can cause harmful stresses and even injuries to the wrists and forearms of young players.

[0009] Complicated cable-and-pulley systems also have been developed, to allow professional baseball players to practice and exercise swinging motions against controlled resistive forces. These can indeed provide good strengthening exercise, but they suffer from several limitations, including: (i) they typically require an exercise area that is roughly the size of an entire room; (ii) they do not allow a baseball player to move the bat at a high speed, and instead require the player to swing the bat at an artificially slow speed, which impedes the development of an overall coordinated approach that heavily involves the legs and lower abdomen; and, (iii) they are expensive, and typically can be afforded only by athletes who play in the major leagues, or by collegiate or minor league teams that must divide and allocate any practice time on such equipment among roughly 30 players.

[0010] Accordingly, one object of this invention is to disclose and provide an improved batting practice device for baseball players, which is more convenient, less expensive, and less cumbersome than previously available exercise devices.

[0011] Another object of this invention is to disclose and provide an improved batting practice device for baseball
players, which allows players to swing the bat at high speed, in a manner that exercises not just the arms, shoulders, and chest muscles, but also the leg and abdominal muscles in a coordinated manner that can help develop and enhance the complete set of strength and skills used in swinging a bat.

[0012] Another object of this invention is to disclose and provide an improved practice device that can be adapted for use by golfers, tennis players, and others who swing various types of clubs, racquets, or other devices in their sports.

[0013] These and other objects of the invention will become more apparent through the following summary, drawings, and detailed description.

SUMMARY OF THE INVENTION

[0014] A device is disclosed for use by baseball players in batting practice (and which can be adapted to enable use by golfers, tennis players, etc., for practice and exercise in swinging various other types of clubs, racquets, etc.). This device comprises: (i) a horizontal base, which preferably should be provided with wheels, skids, or other components that will enable it to be moved conveniently by one person without requiring any special equipment, but which will also provide stability during use; (ii) a vertical neck (strut, support, etc.) assembly that is adjustable, to allow any user to adjust the height of the device to any desired location; and, (iii) a “head” component that encloses a set of “flaps”, which are rectangular segments made of a stiff-but-yielding “resistive” material, such as fiber-reinforced rubberized materials commonly used to make conveyor belts. Roughly a dozen to twenty rectangular segments of resistive material are mounted within the head in a generally vertical direction, from each of the top and bottom surfaces in the head, spaced apart from each other a suitable distance. As the end of a bat is swung through the head assembly, it encounters substantial resistance from the flaps, which generate a level of resistive force that provides good exercise for a batter. A design is disclosed that ensures proper spacing of the flaps, and that allows flaps to be conveniently replaced when they become worn. Similar devices are disclosed for practicing swinging motions used in activities such as golf, tennis, etc.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 is a front (elevation) view of a batting practice device, showing a “head” assembly with an array of vertical flaps, mounted on top of an adjustable neck assembly, supported by a horizontal base assembly.

[0016] FIG. 2 is a side (elevation) view of the batting practice device, showing the curved “C-frame” that supports and encloses stiff-but-flexible rectangular flaps affixed to the top and bottom surfaces of the C-frame.

[0017] FIG. 3 is a top (plan) view of the horizontal base, showing the width of the “front” supports (which will provide stability for the device, as a bat swings through the resistive flaps in the head assembly, from right-to-left or vice-versa), and showing wheels mounted at the ends of the “back” supports, to enable the device to be conveniently tilted and wheeled to a different location whenever desired.

[0018] FIG. 4 is a top (plan) view of the head assembly, showing the C-frame extending in the top-to-bottom direction in the drawing, and showing a “clamping bar” that extends in the left and right directions beyond the main body of the C-frame, to provide a longer resistive travel path for the head of a bat that is being swung through the device.

[0019] FIG. 5 is a side (elevation) view of a clamping bar that will clamp and secure a lower flap, showing: (i) supporting brackets affixed to the C-frame; (ii) a center hole through the clamping bar, to allow a threaded rod to pass through an entire series of clamping bars; and, (iii) flanking pins on both sides of the center hole, which will pass through holes punched through the flaps.

[0020] FIG. 6 is a side (elevation) view of several clamping bars, which clamp together a series of flaps while spacing the flaps apart from each other.

[0021] FIG. 7 depicts a similar practice device mounted in a low and angled orientation, to allow golfers to practice golf swings.

[0022] FIG. 8 depicts a practice device having a tubular or spherical head affixed to a grip used in a golf club.

[0023] FIG. 9 depicts a practice device having a tubular head affixed to a grip used in a tennis racquet.

DETAILED DESCRIPTION

[0024] Referring to the drawings, callout number 100 in FIG. 1 refers to a batting practice device according to the present invention. Device 100 can be regarded as comprising three main subassemblies, referred to herein as base 200, neck 300, and head 400. The head 400 is also referred to in the claims as a “frame assembly”, since it provides a frame that holds the movable flaps, and since some practice devices (such as the practice device for golfers, shown in FIG. 7) will not sit on top of a neck or other vertical component.

[0025] Any of various terms can be used to describe various components and subassemblies herein. As examples, base 200 can also be called a foundation, support, or similar terms, neck 300 can also be called a strut, tube, riser, or similar terms, and head 400 can also be called a box, enclosure, actuator, etc., and the base 200 and neck 300 can be collectively referred to as a stand, support, etc. The choice of specific terms for such components or subassemblies is not important, so long as the reader or user understands the design of the system, and the roles and interactions of its components.

[0026] The elevation view in FIG. 1 is regarded as the front view, since it depicts the front of the device, as seen by a batter standing in front of it (in other words, a batter would be standing at the bottom of the picture, if the device is oriented as shown in the plan view drawings of FIGS. 3 and 4). The arrows near left end 402 and right end 404 of the head assembly 400 indicate the directions a bat will travel, when swung by left-handed and right-handed batters. The elevation view of device 100 shown in FIG. 2 is from the left side, and shows left end 402 and right end 404 of the head assembly 400. It should be noted that FIG. 1 shows the head assembly at a lowered (or retracted) height, for storage or for a batter who wishes to practice a low swing, while FIG. 2 shows the head assembly at a raised (or extended, elevated, etc.) height.

[0027] In the system illustrated in FIGS. 1 and 2, the height of a “strike line” 498 (i.e., the horizontal line or region where the tips of the lower flaps 482 and upper flaps 484 closely approach) can be adjusted from a minimum of about
36 inches, to a maximum of about 54 inches. If desired, a player or team can purchase additional units having different height ranges, to help batters practice swinging at lower pitches. If units that provide relatively low “strike line” heights are used, they generally should be angled in a manner that places the front of the box higher up than the back of the box, to accommodate for the downward angle of a bat being swing in a lower arc. This can be done by either permanently affixing the head at such an angle, or by providing a tilt adjustment mechanism that operates about an axis that travels between the left and right ends of the head assembly 400.

[0028] As shown in FIG. 3, base 200 comprises two front legs 210 and 220, and two rear legs 230 and 240 (other numbers or arrangements can be used, if desired). Those legs (given that name because they rest on the ground) can also be called arms (since they are generally horizontal), bars, or other terms. All four legs can be made of steel or any other selected material with a suitable combination of substantial weight, strength, and stability. Any and all steel components other than bolts, screws, nuts, etc., preferably should be painted, and any bolts, screws, nuts, etc, preferably should be made of galvanized, stainless, or similar grades of steel, to protect against corrosion, since these devices are likely to be left outside on at least some occasions. The legs presumably should have a tubular, square, or rectangular cross-sectional shape, because those shapes are readily available and inexpensive, and because they are enclosed and generally will not collect or hold water (which can cause rusting) if the device is left outside and is rained on or becomes wet from dew, sprinklers, etc.

[0029] Left front leg 210 is provided with an optional hinge 212 and locking mechanism 214, which enables end 216 of leg 210 to be unlocked and then rotated into the position shown by dotted lines 218. In a similar manner, right front leg 220 uses hinge 222 and locking mechanism 224 to enable rotation of end 226 into the position shown by dotted lines 228. This or similar means for retracting the two front legs 210 and 220 can render it more convenient to roll the device through a doorway or gate.

[0030] It must be understood that substantial lateral stresses and forces will be imposed on the head 300, each time a relatively strong athlete swings a bat at high speed, through the resistive lower flaps 482 and upper flaps 484 that are mounted in the head assembly 400. Accordingly, the device preferably should be movable by one person without assistance, yet it must also have sufficient mass, weight, strength, and stiffness to minimize motion and travel of the device (and in particular the head assembly 400) when a person uses the device, by swinging a solid movable object through the flaps in a way that will exert substantial and even large forces on the flaps. Accordingly, testing of prototypes has indicated that stand components made of steel having a cross-sectional thickness of about 1/8 inch can provide a stand that has sufficient strength and weight to give it stability, while also allowing it to be conveniently moved and used without damaging grass, gym floors, etc.

[0031] The ends 216 and 226 of the front legs 210 and 220 should be at least several feet apart from each other, when both legs are fully extended as illustrated in FIG. 3, and they can be provided with either or both of two types of components that can help stabilize the device 100 during use: (i) soft rubber pads 202, as shown in FIG. 2, which will help minimize any movement either outdoors or indoors, and/or (ii) holes 214 that will allow spikes to be driven through the front legs 210, if desired, when the device is resting on grass or dirt. Various other means can also be used to prevent the device from jumping, shifting, drifting, or otherwise traveling during use; as one example, various types of rubberized mats (such as the types of mats that are often used to prevent a washing machine from traveling across a floor during a high-speed spin cycle) can be placed beneath a practice device, and such mats can be large enough to allow the batter to stand on the mat as well.

[0032] Unless a device 100 is going to be permanently affixed to the ground, rear legs 220 preferably should be provided with wheels 222 (or casters, ball rollers, etc.), to allow the device to be conveniently moved without requiring special equipment or an entire crew or team. Such wheels can be made from a rubberized material that will act in a manner similar to the rubber pads 212, to help minimize any motion and travel of the device during use. If desired, wheels with locking devices can be provided.

[0033] Transport of the device from one location to another can be facilitated by placing a handle 406 (such as a rod, a short segment of pipe, etc.) near the top and back of the “C-frame” 410. As indicated in FIG. 2, C-frame 410 was given that name because it generally has the shape of a letter “C” when looked at from the end; alternately, it can be referred to as a U-frame, since it has the shape of a letter U that is lying on its side, with straight horizontal segments (rather than rounded end segments, as occur in a letter C) flanking the opening. Regardless, handle 406 can either pass between two flat plates 412 and 414 that form the left and right sides or ends of C-frame 410, or it can extend outwardly, beyond the flat plates 412 and 414, if desired.

[0034] Within base 200, front legs 210 and rear legs 220 can be welded or otherwise securely affixed to a vertical pipe 310 that forms the lower component of neck assembly 300. Vertical pipe 310 (also called lower pipe 310, since it provides the lower component of neck assembly 300) is shown by a circular cross-section in the plan (top) views of FIGS. 3 and 4, and in a side view in FIGS. 1 and 2. It receives and encloses a smaller (upper) pipe 320, in a manner that allows the height of the head assembly 400 to be adjusted. A suitable height-adjusting mechanism can be provided by any or all of several mechanisms. For example, FIG. 2 illustrates a threaded rod 330 that is affixed to the base 200 and the lower pipe 310; this rod passes through a large internally-threaded nut or plate 332 which is welded to the bottom of smaller (upper) pipe 320. Therefore, rotation of the upper (smaller) pipe 320 causes the threaded nut or plate 332 to travel upward or downward on the threaded rod 330, thereby adjusting the height of the upper (smaller) pipe 320 and of the entire head assembly 400. Pin 340 is inserted into aligned holes in pipes 310 and 320, after the head 400 has been adjusted to a desired height, to prevent any subsequent rotation during use.

[0035] The height-adjusting mechanism using threaded rod 330 and nut 332 requires the entire head assembly 400 to be rotated in a complete circle, multiple times, to alter its height between fully retracted and fully extended positions. This adjustment means will be preferred by some users, since it provides a simple and inexpensive mechanism that
enables a person to adjust the height of a relatively heavy head assembly without requiring assistance, and without having to lay the entire device down on the ground and then lift it up again. If a widely-spaced threading is used for rod 330 and nut 332, and if the rod and nut are kept properly greased (such as once each year), height adjustment can be carried out quickly by using a rapid twirling motion for the head assembly. However, alternate systems can be provided if desired, such as a lever-type “jack” mechanism, pins that will pass through aligned holes, etc.

[0036] At the top of neck assembly 300, a securing mechanism is provided that allows both: (i) detachment of the head assembly 400, for storage, transportation, or other handling; and, (ii) tilting of the head assembly, if desired. This can be accomplished in various ways, such as: (i) providing a first (or main) attachment pin 422 that will engage accommodating holes that pass through the C-frame 410 and the upper end of upper pipe 320, and (ii) providing a second (or tilt-adjustment) pin 424 that will pass through a hole in the upper end of upper pipe 320, and through a semi-circular plate 426 that has been welded to the bottom of the C-frame 410 and that is provided with a series of closely-spaced holes, arranged in an arc that allows tilting of the head assembly, as illustrated.

[0037] C-frame 410 is shown in a side (end) view in FIG. 2, and in a plan view in FIG. 4. It can be fabricated in any suitable manner that satisfies its operating requirements. One preferred mode of construction uses a steel plate, which can be a simple rectangle, or which can be cut (while still flat) into a shape that provides wider segments at the two ends of the plate, to provide longer and more secure support for support brackets 452-458 which will be used to secure the multiple clamping bars 460. Any suitable means (such as stamping, laser cutting, etc.) can be used for shaping the plate that is used to make C-frame 410 or any other metal plate.

[0038] After it has been laser-cut or otherwise shaped, plate 430 is formed into a semi-rounded shape. Heat can be used, if desired, but cold-forming machines known as “press brake” machines can also be used, usually with lower energy and overall costs, if multiple units are being manufactured. The rounded plate can be referred to as having a C-shape (since the opening will be horizontal rather than vertical) or a U-shape (since the two ends of the opening will be straight rather than rounded). This semi-rounded plate is welded to left and right vertical flanking plates 412 and 414.

[0039] Testing of prototypes that were designed for adults has indicated that, to provide adequate strength and stability without making the device too top-heavy, most of the steel parts in a device 100 generally should have thicknesses of about 0.5 inch. However, any plate thickness can be altered, if desired, especially in practice devices being built for children or young teenagers, females, etc., provided that the goals and operating requirements of these practice devices are properly understood and met.

[0040] A suitable design and arrangement for a mechanism that can hold stiff-but-flexible flaps is shown in FIGS. 2, 5, and 6. In this arrangement, which is illustrative rather than limiting, the four support brackets are designated as top front bracket 452, top rear bracket 454, lower front bracket 456, and lower rear bracket 458, all shown in FIG. 2. Alternatively, a single top bracket and a single lower bracket could be used, if front and rear engagement means (such as rectangular channels, as shown) are provided on each of the top and bottom brackets.

[0041] A closer side (elevation) view of a clamping bar 460 mounted on the lower end of the C-frame 410 is provided in FIG. 6, which also shows a lower flap 482, lower front bracket 456, and lower rear bracket 458. To reduce manufacturing costs, and to minimize any risk of confusion when a set of flaps is being replaced, all upper and lower clamping bars preferably should use identical designs, and should be interchangeable, with the exception of two clamping bars that will be positioned in the upper center and lower center locations, which can have holes drilled through them so they can be securely and permanently affixed to C-frame 410.

[0042] Clamping bar 460 (which has a square cross-section, as shown in FIG. 6) has a center hole or orifice 462 that has been drilled, laser-cut, or otherwise created through both of its side walls, as indicated in FIG. 7. The holes, which will be aligned in all clamping bars used in a head assembly, will allow a lower threaded rod 472 (shown in FIG. 1) to pass through all of the lower clamping bars. An upper threaded rod 474 is also shown in FIG. 1, passing through all of the upper clamping bars.

[0043] FIG. 6 depicts a side (elevation) view of a series of lower clamping bars, showing a lower flap 482 that are held in place by two identical clamping bars 460. Each clamping bar has two protruding pins 464 (which can be provided by rivets, by welding, by threaded bolts that engage threaded holes that are created in the side walls of the clamping bars, etc.) in one side wall 465, and two holes or orifices 466 that pass through opposing side wall 467. Therefore, when a series of clamping bars 460 are lined up and secured to each other, the two pins that protrude from one clamping bar will fit into the two accommodating holes of the adjacent clamping bar. As indicated in FIGS. 5 and 6, this allows each set of two pins to pass through two aligned holes that have been punched, stamped, or drilled through each flap (a third hole which passes through each flap will also allow an upper lower threaded rod 472 or 474 to also pass through the flap.

[0044] Accordingly, since two pins and a threaded rod (all in a linear alignment, with the pins flanking the threaded rod, as shown in FIG. 5) will pass through each flap, these three affixing and securing components will securely hold the flap in position and prevent it from rotating or otherwise drifting or traveling, even though each flap will be subjected to repeated blows and deflections, wherever the batting practice device is being used. Accordingly, each flap will have both a fixed portion (i.e., the portion of the flap that is immobilized between two clamping bars, indicated by call-out number 482F in FIG. 6), and at least one movable portion (indicated by call-out number 482M in FIG. 6). Accordingly, the claims refer to a plurality of “flexible components” (exemplified by rubberized flaps made of conveyor belt material, in the embodiment disclosed herein), with each flexible component “having at least one fixed portion and at least one movable portion, said flexible components made of material that will yield but that will resist displacement when a solid movable object is swung, by a person using the device, in a manner that contacts and displaces said flexible components”.

[0045] At one end of the head assembly 400, each threaded rod (lower rod 472 or upper rod 474) will pass
cleanly and without obstruction through a slightly enlarged smooth hole. At the opposed end of the head assembly 400, each threaded rod will engage a threaded nut (which can be provided by a non-affixed wingnut, which can be easily replaced if it becomes worn, or by a threaded machined hole or any other internally-threaded engagement means). This will allow each threaded rod to be used as a reversible clamping mechanism, during initial installation of a set of flaps, or during replacement of a set of worn flaps.

Installation and/or replacement of the flaps can be facilitated by securely affixing (by welding or bolting) a single upper clamping bar, and a single lower clamping bar, to its mounting brackets. For convenience and to make installation easier, the center clamping bar in each of the lower and upper arrays preferably should be affixed to the mounting brackets, while the other clamping bars in both arrays are allowed to move. In mechanical systems, this ability to move, when an installation or replacement procedure is being carried out, is often called “floating.” However, this “floating” movement occurs only for a brief period, during an installation or replacement procedure. At all other times, the clamping bars that “float” are held in a fixed position (with respect to the head assembly) by clamping pressure that is exerted by a threaded rod. When the threaded rod is tightened, to complete the installation or replacement of a set of flaps, the tightening of the rod will secure all of the “floating” clamping bars to the center clamping bar. The center clamping bar can be referred to as an “anchoring” bar, since it will not move (with respect to the head assembly), because it has been bolted or welded to front and rear support brackets, which in turn have been bolted or welded to the upper and lower ends of the C-frame 410.

When conventional conveyor belt material (as seen in a typical grocery store) is used, good results have been provided by using flaps having total heights of about 8.5 inches (with about 3/4 inch of that height held tightly between clamping bars and the remaining 7/75 in exposed), and with widths (this dimension can also be referred to as their depth) of about 6".

The upper and lower flaps can be punched, stamped, laser-cut, or otherwise formed from a selected material having a desired balance of stiffness, flexibility, and resiliency. In tests done to date, entirely suitable flaps have been created from material that was manufactured for conveyor belts. A variety of materials made for different types and grades of conveyor belts are commercially available, and any such materials can be tested and evaluated, to determine their suitability for use as described herein. Conveyor belt materials made entirely of steel or other metallic links (as commonly used in manufacturing and industrial operations) are not preferred for use herein, since they would exert high levels of abrasion that would rapidly damage a practice bat. Instead, preferred materials that will cause lower levels of abrasion and wear are offered by conveyor belt materials that are commonly used in retail and similar settings, comprising a coating and/or imregnating layer made of a pliable rubber-type material (usually made of a synthetic polymer), which covers a layer or matrix of woven or knitted fibers (usually made of nylon, polyester, or similar synthetic materials).

It also should be noted that conveyor belt materials having different thicknesses are available, and their stiffness varies substantially, based on thickness as well as materials. Accordingly, if desired, thinner flaps with less resistance can be used on either or both of the ends of an array of flaps, while thick flaps with maximum stiffness can be used in the middle. Still more variations in stiffness can be provided by various means such as, for example: (1) by varying the widths (depths) of one or more flaps, since a wider flap will be stiffer and create more resistance than a thinner flap; (2) by making one or more types of cuts or grooves in a flap, such as by using a sawblade (which will remove material) or knife blade (which will not remove material) to cut a resistive flap lengthwise into two halves, or into three or more “fingers”; and, (3) by creating flaps that have tapered, angled, or other “reduced” shapes (rather than “full” rectangular shapes) in their movable portions.

It should also be noted that: (i) flaps can be installed as double or even triple sets, between any two adjacent clamping bars, and (ii) they can be provided with varying lengths, to create a curved or arced strike line.

The arrays of upper and lower flaps will not be directly connected to each other, instead, in one preferred arrangement, their upper tips of the lower flaps, and the lower tips of the upper flaps, preferably should approach each other, as closely as practial but without overlapping, since overlapping ends would generate additional abrasion and wear within the flaps themselves. This arrangement will create a “swing path” that will allow a bat head to travel through the head assembly 400, at any speed the batter can generate, and in a manner that generates the least resistance when the batter successfully aims and directs the bat into the exact vertical center of the head assembly 400.

However, even when the resistive pressure is minimized, by the batter successfully “hitting” the exact vertical center of the head assembly 400, that resistive pressure will still be very substantial, and it will provide a good and useful form of exercise, practice, and development not just for specific muscle groups, but also for the proper coordination of numerous different muscle groups that must all work together to provide a truly powerful and effective swing.

If desired, the tips of some or all of the flaps can be painted, dipped into a white or colored dye, or otherwise treated to provide a better visual target for the batter to swing at. The exact spot the batter will try to hit can be referred to by terms such as “the sweet spot”. If the batter misses “the sweet spot” only slightly, the flaps will offer somewhat greater resistance; if the batter misses it by a larger distance, he or she will hit the upper or lower flaps closer to their rigidly clamped bases, which will cause an unpleasant and in some cases even painful jolt of the handle. Accordingly, this “feedback” mechanism will offer a powerful incentive for anyone using this type of practice machine to concentrate and focus on controlling the vertical position of the bat’s swing path.

In addition, since pitchers deliberately vary the heights of their pitches, to cover the entire strike zone (and to “nibble” around the outer edges of the strike zone, hoping batters will swing at pitches out of the strike zone), a control mechanism can be provided if desired, which will alter the height of the head assembly 400 between swings. This type of control system, which can cause the “sweet spot” to move up and down unpredictably between swings, can help a batter practice the skill of carefully focusing on adjusting the
height of his or her swing, in response to where the head assembly has moved, before each swing. This type of control system can be provided by, for example, a small electric motor that controls rotation of a rotary gear (the “pinion” gear) in a “rack and pinion” gear system, which will place a linear gear (the “rack”) on either the upper or lower component of a telescoping vertical neck. The electric motor that causes the head assembly to move up and down can be under the control of either: (i) an automatic detector, which can cause the head assembly to move up or down, each time a bat swings through the head assembly and causes a detector to be triggered, or (ii) a foot switch, which can be operated by a batter who is practicing, or by a coach who is watching the batter and offering guidance.

If desired, either or both of the two “sides” (or “ends”) of a head assembly 400 can be provided with surfaces or replaceable fixtures that are made of, or covered by, a rubberized or other non-rigid material. Such surfaces or fixtures also can be angled and/or curved, in a manner that provides a funnel-type entryway that will help direct a poorly-aimed bat into the desired path. These devices can help minimize damage to practice bats, and to practice devices; they can also help these devices be used with greater confidence and frequency by people with beginning levels of skill, and by batters who wish to become switch hitters, who can bat from either side of the plate depending on whether a pitcher they are facing is left-handed or right-handed.

FIG. 7 depicts a practice device 600 for golfers, having a head assembly 610 mounted on a low base 620. Since golf device 600 needs to be as close to the ground as possible, it does not contain a vertical neck assembly or component, and base 620 is provided with stakes 622 that can be driven directly into grass or soft ground. Base 620 also can be provided with a height adjustment mechanism on one side, to allow the angle of the device 600 to be adjusted, to accommodate golfers of different heights and clubs with different lengths.

If this type of device is used for practicing golf swings, a modified practice club should be provided, as illustrated by practice club 900, in FIG. 9. Practice club 900 has a cylindrical or spherical head 902, affixed to a conventional golf club shaft 904, which has a golf grip 904 at the end that is held by the user. Head 902 is mounted on shaft 904 in a centered position, rather than in an offset manner as used in actual golf clubs, to ensure that head 902 will pass smoothly and properly through the flaps in device 600 without generating unwanted torque and twisting motions in shaft 904 or grip 906.

As known by any golfer, the “sweet spot” of a golf club sits roughly 1 to 2 inches “above” the center of the shaft. If the shaft of a gold club is swung directly at a golf ball, the “foot” or “heel” of the club (or the “hoozle”, which is the interface where the shaft attaches to the club) would strike the ball, causing a bad hit often referred to as “shanking” the ball.

To accommodate that “offset” factor, a circle of paint or dye can be painted on the exposed surfaces of the “upper” flaps of the golf practice head assembly 610, or a white plastic ball 612 having the same diameter as a golf ball can be affixed just above the upper flaps of the head assembly, by means of a clip or extension, as illustrated in FIG. 8. Either means can be used to depict a golf ball sitting roughly 1 to 2 inches “above” the ideal travel path for the shaft 904 and head 902 of practice club 900. This will allow a golfer to practice a proper swing, which will cause shaft 904 to pass about 1 to 2 inches “below” golf ball 612.

Alternately or additionally, a single row of flaps, rather than two rows of flaps, can be used in a golf practice device. If a single row of flaps is used, various orientations of the flaps can be provided, if desired, for use with either (i) normal golf clubs having conventional striking heads, or (ii) practice clubs having modified heads designed for interacting with such flaps rather than for striking golf balls. As examples, a single row of flaps that are secured along their bottom edges (causing them to point in a generally upward but angled orientation), or along their back edges (causes them to point generally toward the golfer’s hands and chest), can be evaluated for such use with either conventional golf clubs, or modified practice clubs.

FIG. 9 illustrates a “practice racquet” 940 for a tennis player. Practice racquet 940 comprises a cylindrical, spherical, or otherwise rounded head 942, affixed to a shaft or neck 944 that has a conventional 946 grip as found on tennis racquets (this type of grip typically uses a generally rectangular shape, with the four corners beveled to an extent that creates a semi-octagonal cross-section, which is then wrapped with a helical strap of leather or synthetic material). This type of practice racquet 940 can allow a tennis player use the same type of exercise device 100 used by batters (as shown in FIGS. 1-5) to exercise: (i) specific arm, shoulder, and chest muscles that are used in forehand and/or backhand strokes, and (ii) larger coordinated interactions that enable the feet, legs, and abdomen, when properly positioned and used, to add more power and speed to forehand and backhand swings.

Single-Row Flaps; Bowling Practice Devices

Similar devices can be developed and adapted for other similar uses. As one example, this type of device can be used to help bowlers exercise and practice their handling of bowling balls. Such devices can be sized and adapted for use with standard bowling balls, having conventional finger holes, so bowlers can practice with actual balls, in ways that exercise their hands and fingers. Alternately or additionally, practice devices can also be used with modified practice balls, having a rod-type, molded, or other type of hand grip that can provide a tighter and more secure grip, enabling a bowler to exercise and practice longer (developing more strength and coordination in arm, shoulder, chest, and abdominal and leg muscles) without being limited by excessive tiring and fatigue of the hand and fingers. Such practice balls can be provided with any desired diameter.

The use of such devices in bowling exercises and practice also points out another option that deserves mention, involving C-frames or other types of head assemblies that contain only one row of flaps, rather than two. This can enable a bowler to move a practice ball through a swing path that is closer to the bowler’s hip and leg than could be provided by a head assembly having two symmetric rows of flaps; this can enable a bowler to practice a normal and natural swing that closely emulates the normal and comfortable arc of a bowling ball during use.

If desired, a row of narrow-diameter cylindrical rollers with rubberized surfaces (or other comparable
devices) can be positioned inside the head assembly, to help establish and define the swing path that a bowling ball or practice ball will travel through. Such rollers can be freely rotating, if desired, or they can be designed to resist rotation, either to a fixed desired level, or to an adjustable level (such as by using a wingnut or similar device to tighten or loosen a bar or plate that can press against a surface of each roller, thereby hindering free rotation of the roller in a manner that can be quickly and conveniently adjusted as desired). In this manner, resistive rollers can provide a useful and balanced accompaniment for a row of flaps.

[0065] Thus, there has been shown and described a new and useful class of devices for allowing skilled athletes, new beginners, and anyone at any level of skill between those two ends of the continuum, to practice various types of athletic skills that involve swinging a device (including but not limited to baseball bats, golf clubs, and tennis racquets). Although this invention has been exemplified for purposes of illustration and description by reference to certain specific embodiments, it will be apparent to those skilled in the art that various modifications, alterations, and equivalents of the illustrated examples are possible. Any such changes which derive directly from the teachings herein, and which do not depart from the spirit and scope of the invention, are deemed to be covered by this invention.

1. A device for improving strength and skill in swinging motions, comprising:
   a. a plurality of flexible components, each flexible component having at least one fixed portion and at least one movable portion, said flexible components made of material that will yield but that will resist displacement when a solid movable object is swung, by a person using the device, in a manner that contacts and displaces said flexible components;
   b. a frame assembly that supports said flexible components in a manner that holds said fixed portions of said flexible components in a secure and non-moving manner while allowing displacement of said movable portions of said flexible components; and,
   c. means for positioning said frame assembly and said flexible components at a height and orientation that enables a person to swing a solid movable object through a swing pathway that causes displacement of said flexible components, wherein the device has sufficient mass, weight, strength, and stiffness to minimize motion and travel of said frame assembly when a person using the device swings a solid movable object in a manner that contacts and displaces said movable portions of said flexible components.

2. The device of claim 1, wherein said flexible components comprise flexible flaps.

3. The device of claim 2, wherein said flexible flaps are made of rubberized material.

4. The device of claim 4, wherein the rubberized material is of a type normally used to make conveyor belts.

5. The device of claim 1, wherein said frame assembly establishes an upper row of flaps and a lower row of flaps, and wherein said upper row extends downward from said frame assembly and said lower row extends upward from said frame assembly in a manner that causes portions of the flexible components in said upper row to closely approach portions of the flexible components in said lower row, thereby creating a pathway, between said upper row and said lower row, that will generate a desirable level of resistance when a person using the device swings a solid movable object through said pathway.

6. The device of claim 5, wherein said frame assembly allows (i) worn flexible components to be removed from the frame assembly, and (ii) unworn flexible components to be installed in the frame assembly.

7. The device of claim 1, sized and designed for use by a person holding a baseball bat.

8. The device of claim 1, sized and designed for use by a person practicing a tennis swing using a swingable device comprising (i) a handle portion with a size and shape used in a tennis racquet, and (ii) a striking component with a size and shape designed to pass through the device of claim 1 with a desirable level of resistance.

9. The device of claim 1, sized and designed for a person practicing a golf swing using a device comprising (i) handle and shaft components as used in a golf club, and (ii) a striking component having a size and shape that are designed to pass through the device with a desirable level of resistance.

10. The device of claim 9, wherein said frame assembly is designed to be affixed directly to a ground surface.

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