A modular batting system according to various embodiments can include a plurality of batting devices, comprising at least a training bat and a handle weighted bat. A plurality of elements are interchangeable between the training bat and the handle weighted bat to provide a user custom fit bat.
TRAINING SWING

WEIGHTED INSERTS

BATTING PRACTICE PRODUCT

FIG. 8C
MODULAR BAT AND SYSTEM
REFERENCE TO RELATED APPLICATION

[0001] This application is a continuation-in-part of provisional application Ser. No. 61/436,674, filed Feb. 22, 2011, which is incorporated by reference herein.

FIELD

[0002] The present teachings relate to devices and systems for a handle weighted bat.

INTRODUCTION

[0003] In baseball today the most prominent theory for efficiently hitting a baseball is the application of rotational dynamics. Rotational dynamics comprises two key batting components namely circular hand path (CHP) and torque. FIG. 6 shows a top view diagram of a batter’s circular hand path in the batter’s box where rotational dynamics are employed to hit the ball. CHP is the transfer of the body’s rotational momentum that occurs when the hands are taken in a circular path, as when swinging a bat. Torque is the force that is applied at the bat handle by the push and pull of the hands, arms and shoulders in opposite directions. The acceleration of the bat head generated from the CHP is referred to as the “Pendulum Effect.” A big part of a hitter’s bat speed is generated from the circular path of the hands (similar to swinging a ball connected to the end of a string). As long as the hitter keeps their hands in a circular path, the ball will continue to accelerate in a circle. But if the path of the hand follows a linear path, the ball on the end of the string loses angular velocity. FIG. 5 shows a top view diagram of a batter’s hand path in the batter’s box where linear batting dynamics are employed to hit the ball.

[0004] The same rationale applies when a hitter is swinging a bat. If the hands are kept in a circular path as shown in FIG. 6, the bat will continue to accelerate. But if the path of the hands follow a linear or near linear path as shown in FIG. 5, then the bat loses the circular path and the bat will loses speed. FIG. 5 shows a top view diagram of a batter’s hand path in the batter’s box where linear batting dynamics are employed to hit the ball. A batter using this linear hand path tries to compensate for this loss of bat speed by making an essential strong wrist release near the hitting zone over the plate. Note how much more linear motion the hands exhibit as the bat enters the hitting zone near home plate. The straightening of the hands during a batter’s swing occurs in most situations where a linear component is introduced into the swing path by the batter. In years past, the linear swing had been taught as the proper way to swing by many swing coaches. Even today many little leaguers, high school, semi pro and professional players are using linear dynamics in their swings. It has been found however that linear swing dynamics do not “scale up” effectively. Many young players may find success in the lower ranks of baseball using this method however they seem to hit a brick wall when they move up to the upper echelons of professional baseball where they find great difficulty hitting the 90+ MPH speed pitches. The success of the few professional players who continue to use linear dynamics in their swing is likely a result of their extraordinary athletic ability rather than the soundness of their hitting mechanics.

[0005] While rotational dynamics are considered to be the best approach to hitting effectively, many of the training and warm up batting aids do not reinforce rotational dynamics and a circular hand path in the batter’s swing. A hitter warming up using weighted sleeves and donuts is in actuality, degrading the hitter’s swing. The weight distribution of donuts and sleeves at the end of the bat negatively affects the hitter’s natural swing, pulling their hands away from the body and distorting their CHP. As a result, swinging with donuts and end-loaded bats forces the hitter into a more linear swing. This limits the amount of torque that they can generate, and as a result, slows their bat speed and ultimately reduces their power.

SUMMARY

[0006] The present invention may satisfy one or more of the above-mentioned desirable features. Other features and/or advantages may become apparent from the description which follows.

[0007] It is an object of the present teaching to provide a device, more heavily weighted at the handle, for any sports making use of a club, racket, bat, stick or similar device where swinging the device is an integral part of the game or activity. It is an object of this invention to provide a batting training aid that is weighted on at least one end to promote and reinforce a bat’s circular hand path (CHP) during the execution of their swing.

[0008] It is another object of this invention to provide a bat that is weighted in the knob and the handles such that the center of gravity of the bat is located in the lower section of the bat to promote and reinforce a circular hand path (CHP) during the execution of the swing.

[0009] It is another object of this invention to provide a modular arrangement of the training aids and bats such that the knobs, the handles and bat contact portions are interchangeable.

[0010] In the following description, certain aspects and embodiments will become evident. It should be understood that the invention, in its broadest sense, could be practiced without having one or more features of these aspects and embodiments. It should be understood that these aspects and embodiments are merely exemplary and explanatory and are not restrictive of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The skilled artisan will understand that the drawings described below are for illustrative purposes only. The drawings are not intended to limit the scope of the present teachings in any way.

[0012] FIG. 1 shows a typical baseball bat and the designated parts that form the bat structure;

[0013] FIG. 2 shows a typical baseball bat where a weighted donut is attached to the bat barrel for batter warm up and practice swings;

[0014] FIG. 3A shows a practice and warm up bat with weighted knobs and handles in accordance with the present teachings;

[0015] FIG. 3B shows an alternative practice and warm up bat with weighted knobs and handles in accordance with the present teachings;

[0016] FIG. 3C shows an alternative practice and warm up bat with weighted knobs and handles in accordance with the present teachings;

[0017] FIG. 4A shows a bat including a weighted knob and handle in accordance with the present teachings;
FIG. 4B shows an alternative embodiment of a bat including a weighted knob and handle in accordance with the present teachings;

FIG. 4C shows yet another alternative embodiment of a bat including a weighted knob and handle in accordance with the present teachings;

FIG. 5 shows a top view diagram of a batter’s hand path in the batter’s box where linear batting dynamics are employed to hit the ball;

FIG. 6 shows a top view diagram of a batter’s circular hand path in the batter’s box where rotational dynamics are employed to hit the ball;

FIG. 7 shows a modular practice and warm up bat with interchangeable components in accordance with the present teachings;

FIG. 8A shows a modular handle weighted bat with interchangeable components in accordance with the present teachings;

FIG. 8B shows another exemplary embodiment of a modular handle weighted bat with interchangeable components in accordance with the present teachings;

FIG. 8C shows another embodiment of a practice bat and a handle weighted bat with interchangeable knob-hand weighted inserts in accordance with the present teachings;

FIG. 9 illustrates an exemplary embodiment of an attachment mechanism for attaching the knob and weight inside the handle to a bat in accordance with the present teachings; and

FIG. 10 is an exemplary embodiment illustrating the modular handle weighted bat being fitted with different sized weights.

DETAILED DESCRIPTION OF VARIOUS EMBODIMENTS

Reference will now be made to various embodiments, examples of which are illustrated in the accompanying drawings. However, these various exemplary embodiments are not intended to limit the disclosure. On the contrary, the disclosure is intended to cover alternatives, modifications, and equivalents.

Throughout the application, description of various embodiments may use “comprising” language, however, it will be understood by one of skill in the art, that in some specific instances, an embodiment can alternatively be described using the language “consisting essentially of” or “consisting of.”

For purposes of better understanding the present teachings and in no way limiting the scope of the teachings, it will be clear to one of skill in the art that the use of the singular includes the plural unless specifically stated otherwise. Therefore, the terms “a,” “an” and “at least one” are used interchangeably in this application. Unless otherwise indicated, all numbers expressing quantities, percentages or proportions, and other numerical values used in the specification and claims, are to be understood as being modified in all instances by the term “about.”

Various embodiments described herein provide a batting training aid that is weighted on at least one end to promote and reinforce a batter’s circular hand path (CHP) during the execution of their swing. Various embodiments provide a bat that is weighted in the knob and the handles such that the center of gravity of the bat is located in the lower section of the bat to promote and reinforce a circular hand path (CHP) during the execution of the swing.

Various embodiments provide a modular arrangement of the training aids and bats such that the knobs, the handles and bat contact portions are interchangeable.

In various embodiments, the weighted handle device can be employed to train and enhance performance in sports and activities beyond baseball. The device can be employed in any sport making use of a club, racket, bat, stick or any similar handheld device, wherein swinging the device is an integral part of the game or activity. Softball, golf, tennis, cricket, badminton, hockey, lacrosse, field hockey, racket ball, squash, jai alai, etc. are examples of sports which can make use of the devices described herein. Beyond sports, the devices can be applied to a host of occupational medical/rehabilitation and general fitness application.

FIG. 1 shows a diagram of the basic elements of a typical baseball bat 100. The knob 10 is located at a first end of the bat to prevent the batter’s hands from sliding off the bat during a hard swing. Adjacent the knob is the bat handle 20 where the batter grips and holds the bat while executing a swing. The barrel 30 is adjacent the handle and it is the surface that strikes the ball. End cap 40 defines the second end of the bat. The center of gravity CG of the bat is located in the barrel element since it has the largest concentration of mass.

In FIG. 2, a typical weighted bat 200 is shown where a weighted donut 50 is attached to the barrel section 30. With the added weighted donut 50 the center of gravity of the weighted bat is now closer to the end cap 40 when compared to the typical bat 100 shown in FIG. 1. This positioning of the center of gravity CG near the end cap tends to pull the bat away from the body of the hitter during the swing. This particular motion is contrary to the desired motion of the circular hand path as shown in FIG. 6 which is considered to be the most efficient swing for hitting a baseball.

The handle weighted devices according to the present invention can be configured having various configurations depending upon the user’s specific application. In some embodiments, the handle weighted device is configured having a barrel similar in size, shape, and proportion to conventional bats. In other embodiments, the handle weighted device is configured having a rod-shaped configuration having at least one weighted end for use as a training bat. The devices can be designed and manufactured according to conventional bat or training bat methods. In various embodiments, the handle weighted device can be configured having a walled shell with a completely hollow core or at least one hollow interior section of the core. In other embodiments, the handle weighted device can be configured having a solid core formed from a solid piece of material or filled, such as with foam or an insert, such as a metal, plastic or composite material.

In some embodiments, the handle weighted device can be made of a single material, such as aluminum, plastic, wood, or the like. The bat can be made, for example, of an all metal, such as aluminum, construction design or an all wood bat. In some embodiments, the handle weighted device can be made of more than one type of material such as, aluminum, plastic, wood, or a composite material. For example, the handle weighted device can be made of a hybrid construction wherein a portion of the device consists of one material and another portion consists of a different material. The device can be designed as a hybrid bat comprising a half metal and half wood composition. In some embodiments, the handle
weighted device can be designed based upon the needs of a specific player. The weighted handle device can also be designed according to specific regulations of a governing sports body regarding equipment design for professional players, amateur players, collegiate players, or Little League players.

[0038] The wall or walls of the handle weighted device may be made of various known materials. In some embodiments, the wall or walls may be made of a single material, or a combination of materials. In some embodiments, the wall or wall may be made of a single layer material or multiple layers of materials. In some embodiments, the wall or walls may be configured having a uniform wall thickness. In other embodiments, the wall or walls may be configured with varying wall thickness.

[0039] The handle weighted device can be manufactured as a single-piece design or it may comprise plural pieces. During the manufacturing process, a single-piece design can be constructed, for example, with varying wall thickness formed within different sections of the device. In this example, the heaviest portion of the device can be configured as the handle having a thicker, denser shaft construction than the middle and end portion formed having a thinner, lighter construction. In other embodiments, the handle weighted device can be manufactured comprising two or more pieces. In a multiple-piece design example, a heavy handle construction can be initially fabricated and then attached to the device. For example, to provide an added weight in the handle, a heavy alloy such as steel may be included within the handle to form the heavy handle construction which can then be attached, by one or more various methods, to an aluminum-constructed mid and end section. Those having skills in the art would understand that other metals and alloys, such as varying grades of steel, iron, magnesium, titanium, copper, and graphite, can be used in the heavy handle construction. In lieu of or in addition to the metal or alloy, other weighting material, such as sand, ball bearings, water, stones or other viscous material, may be inserted into the heavy handle as additional filler or as the weighting component.

[0040] In comparison to a traditional bat, which typically weighs no more than 33 ounces, the handle weighted devices according to the present teachings can be configured such that a substantial weight is added in the handle, which causes the total weight of the bat to be approximately 40, 50, 60, 70, or 80 ounces. The largest concentration of mass is located in the handle. The devices can also range in length from 28 to 34 inches. Thus, the devices can be manufactured having several different weight options from which the user can test and select the appropriate batting configuration that is the best for the user. The weighted bat can be manufactured having, for example, five different weight options 40, 50, 60, 70, or 80 ounces at various lengths. The following tables demonstrate exemplary length and weight combinations for the training bat and the weighted bat.

<table>
<thead>
<tr>
<th>Training Bat</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>32</td>
<td>50</td>
</tr>
<tr>
<td>34</td>
<td>60</td>
</tr>
<tr>
<td>36</td>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weighted Bat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
</tr>
<tr>
<td>28</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>30</td>
</tr>
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</tbody>
</table>

[0041] The weighted devices in accordance with the present teachings may be configured having a variety of differing configurations, weights and weight attachment mechanisms. For example, a steel weight, due to its density of approximately 7,850 kg/m³, can be included to add a substantial weight in the bat handle in some embodiments. However, in other embodiments, aluminum having a density of approximately 2,712 kg/m³ or another material may be included rather than steel. In such embodiments, the substitution of aluminum being less dense than steel may require a larger weight with a different shape depending upon the desired weight.

[0042] Other sections of the weighted device, such as the end cap and the knob, may also be configured to accommodate specific design points. In some embodiments, the end cap may be removable to provide access to the internal core of the device and then securely reattached. The end cap may be made of any material capable of being associated with the barrel of the handle weighted device, such as metals, plastics, composite materials, or the like. In other embodiments, the end cap may be manufactured as an integral part of the device.

[0043] In lieu of or in addition to the weighted handle, the knob may be made of a weighting material. Such knobs can be made of various metal or alloy construction and may be solid or hollow with varying wall thickness. In other embodiments, the knob can be constructed of a hollow or lighter material and the weighting material included only in the knob. In some embodiments, the knob can be configured similar to a traditional baseball bat knob. In other embodiments, the knob can be designed having decorative features of various sizes and shapes, such as a flare, ball, or disk design, that allow the user to comfortably grip the handle and swing the handle weighted device.

[0044] The attachment of the weighted handle to the knob will be configured to securely stabilize the weight and maintain the integrity of the device, because the heaviest portion of the device will be located in the handle. The handle weighted device in accordance with the present teachings may use a variety of differing configurations so as to securely attach the weighted handle to the knob. For example, in some embodiments, the handle and knob can be manufactured as a single, integral component. In other embodiments, the handle and the knob can be manufactured as separate components fas-
tensed by an attachment mechanism, for example, by a pin-connection, a screw connection, a ratchet screw connection, or any adhesive means. The attachment mechanisms can be further secured in the handle by using an adhesive or sealant. These attachment configurations are exemplary and non-limiting. When using the separate handle and knob embodiment, to assemble the components before use, the end cap may be removed, in some embodiments, to provide access to the hollow internal core. The heavy weighted material or weighted insert can be inserted inside the core and securely fastened to the handle by way of an attachment mechanism. The end cap is then replaced. In other embodiments, the weight can be inserted into the hollow core through the handle end and surrounded by additional filler material, if needed. In both embodiments, the user can select the amount of additional weight to be inserted into the device.

FIG. 3A shows an exemplary embodiment of a dual handle weighted warm up and practice bat having a symmetrical design, in accordance with the present teachings, where the bat includes two weighted knobs 360a and 370a at opposite ends of bar 310a, for use as a training bat. Weights 380a and 390a are mounted inside bar 310a at the handle portions adjacent each weighted knob 360a and 370a. Note, due to the weight distribution, in this example, the center of gravity CG of the training device is located at the midpoint of bar 310a. The weighted end members or knobs 360a and 370a can be constructed in a variety of materials and construction. The knobs can be constructed of steel, aluminum and a variety of other metals or alloys. It is also contemplated that the knob elements can be constructed in a hollow configuration where materials like sand, ball bearings, water, stone or other viscous materials can be placed in the knobs. This configuration of the knob element may apply to all of the knob components of the handle weighted bats in accordance with the present teaching. The rod member 310a can be made of a one piece construction with varying wall thickness where the handle portions may be thicker and more rigid than the center portion of the rod 310a being made of thinner and lighter construction. The length of the handle weighted bat can be of any desired length that is suitable to the user. The weights 380a and 390a in the handle can include but are not limited to steel of various grades, iron, magnesium, titanium, graphite or any other comparable material. The construction of the weights 380a and 390a can apply to all other products that use weights in the handle elements in accordance with the present teachings.

In comparison to FIG. 3A, the exemplary embodiment of FIG. 3B illustrates an alternative symmetrical design of a dual handle training bat 300b including a single non-uniform weight 380b provided within an internal core 350b inside the bar 310b of the bat extending from a first end 365b of the training bat 300b to a second end 375b. A weighted handle 360b can be provided attached to the first end 365b, and a weighted handle 370b can be provided attached to the second end 375b. The non-uniform weight 380b is adapted to fit slidably within the internal core 350b. The internal thickness of the diameter of the bar 310b is configured having a non-uniform diameter to compliment the non-uniform shape of the weight 380b. The example in FIG. 3B shows the bar 310b having two different internal diameters, d1 and d2. Interchanging the non-uniform weight 380b can be used to shift the center of gravity (CG) of the training bat. The non-uniform dual handle bat 300b can be configured having several differing interchangeable weights with differing structures or geometries that can be inserted into and removed from the training bat to shift the center of gravity (CG) of the training bat. In some embodiments, the bat may include weighted knobs 360b, 370b attached at each respective end of the non-uniform weight 380b.

[0047] The exemplary embodiment of FIG. 3C illustrate a training bat 300c having an asymmetrical design, wherein the weight of one end differs from the weight of the other end. In this embodiment, the first end 360c of bar 310c comprises a heavy weighted end and the second end 370c comprises a light weighted end or a non-weighted end. The weighted end knob 360c can be configured to resemble a conventional baseball bat and knob. The light weighted or non-weighted end 370c can be configured to flare out into a handle grip 385c. The flared shape of the handle grip 385c provides a more comfortable feel and aids the user while performing warm up stretches, like windmill stretches, to loosen the user's muscles and reduce the risk of injuries.

[0048] FIG. 9 demonstrates, by way of example, that the knob elements 360 and 370 can be removed and replaced by way of a threaded element 311 that connects the handle 310 to weights 380 or 390. In some embodiments, the bat may include knobs or weighting elements having differing weights, positioned at each end of the rod. The weights can be changed to increase or decrease the weights as desired. This flexibility enables the training device to be easily reconfigured so that the CG can be moved closer to one of the weighted handles 380 or 390 which in turn can further improve the tendency of the batter to follow the desired circular hand path and improve his hitting ability.

[0049] FIG. 4A shows a handle weighted bat 400a having a removable and replaceable weighted knob element 412a, a handle element 413a that houses a weight 415a and a barrel element 414a terminating in an end cap 416a. In this example, the CG is located at the end of the handle element 413a which greatly enhances the batters ability to follow the desired circular hand path of FIG. 6. With both the concentration of weight 415a in the handle 413a and the weighted knob 412a at one end of the bat, this introduces resistance to wrist release which acts to inhibit an essential element of the linear hitting dynamics and enhances the circular hand path. In this embodiment, the handle weighted bat 400a can be constructed of aluminum or steel and the knob 412a can be constructed in accordance with the training device of FIG. 3. The weight elements can also be constructed in accordance with the training device depicted in FIGS. 3A-3C. The weighting element in FIG. 4A is shown having a relatively short length that does not extend into a tapering portion of the barrel of the bat 400a. Thus, to provide the substantial weight required in the handle when such shorter weights are selected, the weighting element is selected from one or more high density metal or alloy such as steel.

[0050] In comparison to FIG. 4A, the exemplary embodiment of FIG. 4B illustrates the selection of a weighting element 418b, consisting of aluminum which is less dense than steel, but configured having substantially the same weight as steel in FIG. 4A inserted within a handle weighted bat 400b. When using a less dense material such as aluminum in comparison to steel, in order to obtain the desired substantial weight in the handle, the weighting element may be selected from a metal or alloy having measurements and configurations different from a more dense material. In comparison to FIG. 4A, the weighting element 418b is configured as a longer weight that extends into the tapered barrel section 420b and
having a fluted end portion 422b that slightly flares outward corresponding to the configuration of the tapered barrel section 420b. Thus, the length and the shape of the aluminum weighting elements, in this embodiment, may be selected depending upon the additional weight desired to be added.

[0051] The attachment of the weighted handle to the knob will be configured to securely stabilize the substantial weight and maintain the integrity of the device, because the heaviest portion of the device will be located in the handle. In the exemplary embodiment of Fig. 4B, a screw connection 424b is provided as a weight attachment mechanism in the handle weighted bat 400b. For example, to assemble weighting element 418b into bat 400b, use end cap 426b is removed, and the weighting element 418b is inserted into the hollow core 430b of the bat and attached within the handle 422b using the screw connection 424b. End cap 426b is securely reattached to close the end of the bat.

[0052] In Fig. 4C, a ratchet screw-pin connection 424c is provided as an example of another weight attachment mechanism included in the handle weighted bat 400c. The screw ratchet assembly 424c is provided for mating and screwing the weight into the handle. The ratchet assembly 432c further includes a pin lock 432c that functions as a lock and a release button. During attachment of the weight, the pin 432c can be engaged to assist with locking the weight into position relative to the handle and to prevent rotational movement of the weight. To remove the weight from the handle, the pin can be disengaged to release the weight and the weight can be unscrewed and removed from the handle. The ratchet screw-pin connection illustrates a locking pin system comprising a single pin. However, it would be understood that the use of other configurations, such as a two-pin or three-pin locking systems, are within the scope of the present teachings. Further, the attachment mechanisms depicted in Figs. 4B and 4C are exemplary and non-limiting.

[0053] The various embodiments of the bats described according to the present teachings can be made more versatile in a modular format that will allow the user to increase or decrease the unit weight of the bat by swapping handle inserts of varying sizes. The inserts can be made of iron, stainless steel, a combination thereof, or any other practice metal or alloy construction and can be replaceably fastened into the end of either the training bat or weighted bat, for example, with a screw thread feature, a friction/suction element, or through a snap on/in design.

[0054] In Fig. 7, a modular alternative embodiment of the dual handle weighted training bat 500 is shown having weighted removable and interchangeable knobs 517 and 518, removable and interchangeable length handles 519 and 520, removable and changeable weights 521 and 524 and interchangeable length rod 523. While threaded connections are shown between the modular elements of the training bat, those having skill in the art would understand that other means to provide releasable connections between these elements are contemplated. The various potential configurations due to the interchangeability of the training bat provides the ability to custom fit the training bat according to the swing adjustment needs of each potential customer.

[0055] In Fig. 8A, a modular alternative of the handle weighted bat 600 is shown having weighted removable and interchangeable knob 624, an interchangeable length handle 625, an interchangeable weight 626, an interchangeable barrel 627 having an end cap 628. As with the modular dual handle training bat 500 the threaded connections are shown between the modular elements of the handle weighted bat 600 but other means to provide releasable connections between these elements are also contemplated. The flexibility of the potential configurations between the modular elements of the handle weighted bat 600 provides the ability to custom fit the bat according to the swing adjustment needs of potential customers. The handle member 625 can be constructed of aluminum, steel, graphite, or any other suitable material. The barrel element 627 can be constructed of aluminum, wood or any other material approved for use in a baseball bat.

[0056] In Fig. 8B, a modular bat 700 is shown where the barrel 729 has a smaller diameter than the barrel 627 in Fig. 8A. A knob element 730 is smaller than the knob 624 in Fig. 8A. Handle weight 732 is longer than the weight 626 shown in Fig. 8A. All of the bat elements shown in FIGS. 8A and 8B are designed to be interchangeable by compatible connection means to expand the customizing ability of the batting system.

[0057] The exemplary embodiment of Fig. 8C illustrates another embodiment of the training bat 750 that includes interchangeable knob-and-handle weighted inserts 752a, 752b, 752c, wherein the knob is manufactured as an integral part of the weighted inserts. The knob-and-handle weighted inserts 752a, 752b, 752c can be manufactured having various weights, lengths or sizes. In the example shown in Fig. 8C, the knob-and-handle weighted inserts are shown having various lengths, which can be interchanged to vary the handle weight of the training bat 750. The knob-and-handle weight inserts are usable in both the training bat 750 and the weighted bat 760. Thus, the knob-and-handle weighted inserts 752a, 752b, 752c can also be interchangeably inserted into the weighted bat 760.

[0058] FIG. 10 provides an alternative system for changing the weights that mounted within the weighted bat handle or the dual handle training bat. While the handle weights can be installed within the modular training bat and the modular bat, FIG. 10 shows a more flexible system that may make replacing the handle weights more convenient. In FIG. 10, a sleeve arrangement 810 that slides onto and along a rod 834 provided within the bat's handle 833 is shown. The sleeve arrangement 810 may include at least one sleeve element 835, 836 that functions as spacers to securely position the handle weight 837 at a desired location along the rod 834. The batting system 800 may include a weighted knob 832 that has an extension 832a that has a threaded female surface inside this extension. A rod element 834 has first and second end portions having male threaded portions that engage the female threads of knob extension 832a at the first end and the second end of rod 838 engages a female fitting secured at the end of handle 833. Alternatively, the second end 838 of rod 834 can be arranged to engage a female fitting mounted in the barrel element 840. Sleeve elements 835 and 836 are designed to slide over the first and second threaded end portions of rod 834. Handle weight 837 is also designed to slide over the first and second threaded portions of rod 834. The sleeves 835 and 836 and the handle weight 837 can be arranged along rod 834 in the handle 833 as follows. The selected weight and its location along the handle member 833 are first determined. The length of sleeve members 835 and 836 are selected so that the weight element 837 is positioned in the desired position along the length of rod 834. The sleeves are also designed with a wall diameter that will abut the extension 832a of knob member 832. When the sleeves 835 and 836 and the weight
837 are in place as shown in FIG. 10 and the knob 832 is tighten, it will compress the sleeves and weights together to provide a secure mounting of the weight 837 in handle 833. It should be noted that if desired a weight of sufficient length could be mounted in handle 837 without any sleeves if the weight is long enough to engage the knob extension 832a. It may also be desirable to use only one sleeve to properly locate the weight 837 in handle 833.

[0059] Other embodiments of the disclosure will be apparent to those skilled in the art from consideration of the specification and practice of the teachings disclosed herein. It is intended that the specification and examples be considered as exemplary only. For example, the weighted handle device can be used to train and enhance performance in a variety of sports and activities. For example, softball products can include practice swing clubs of varying weights with knobs at one or both ends for use by Little League, scholastic, amateur, professional and recreational players, as well as practice bats of various weights, constructions, and designs as appropriate for the level of play. Golf products can include practice clubs of varying weights to assist with stretching exercises, and weighted grips can be incorporated into the design of the competition and recreational golf club sets. Tennis, badminton, squash and racket ball products can include practice swing clubs of varying weights fitted with sport specific grip designs and training buckets for use in practice play. Hockey, lacrosse, field hockey products can include practice sticks of varying weights for use in training drills. Martial arts products can include hand held devices of varying weights for use in various martial arts systems that utilize weapons and other implements as part of forms training. General fitness products can include non-sports specific swing devices of varying weights and designs which can be used as a part of stretching, flexibility, therapy, strengthening or rehabilitation systems.

1-18. (canceled)

19. A modular batting system, comprising:
   a plurality of batting devices, comprising at least a training bat and a handle weighted bat; and
   a plurality of elements interchangeable between the training bat and the handle weighted bat to provide a user custom fit bat.

20. The system of claim 18, wherein the plurality of interchangeable elements comprises at least one of a weighted removable and interchangeable knob, a removable and interchangeable length handle, a removable and interchangeable weight, and an interchangeable length rod.

21. The system of claim 19, wherein:
   the training bat comprising:
   an elongated tube having a first end and a second end and providing a hitting portion;
   a first weighted knob and a first weighted handle training bat assembly attached to the first end; and
   a second weighted knob and a second weighted handle training bat assembly attached to the second end; and the handle weighted bat, comprising:
   a handle portion;
   a tubular barrel defining a bat hitting portion extending from the handle portion to an outer end opposite the handle portion;
   an end cap provided at the outer end; and
   a weighted knob and a weighted handle bat assembly including at least one weighting element provided at the handle portion.

22. The system of claim 21, further comprising a sleeve arrangement containing one or more interchangeable weight elements and configured to be removably insertable into each of the weighted handles to vary the weight of the weighted knob and weighted handle training bat assembly or the weighted knob and weighted handle bat assembly.

23. The system of claim 21, wherein the plurality of interchangeable elements comprises a non-uniform weight.

24. The system of claim 23, wherein the training bat comprises a wall thickness of varying thickness surrounding the non-uniform weight.

25. The system of claim 23, wherein the handle weighted bat comprises a wall thickness of varying thickness surrounding the non-uniform weight.

26. The system of claim 21, wherein a weighting material provided in the plurality of interchangeable elements is selected from the group consisting of steel, iron, magnesium, titanium, copper, and graphite.

27. The system of claim 26, wherein the plurality of interchangeable elements has a configuration selected based upon a density of the weighting material.

28. The system of claim 21, further comprising an attachment mechanism provided to attach the plurality of interchangeable elements to at least one of the training bat and the handle weighted bat.

29. The system of claim 28, wherein the attachment mechanism is selected from at least one of a pin connection, a screw connection, a ratchet screw connection and an adhesive means.

30. The system of claim 21, wherein the end cap is configured to be removably attached to the barrel to provide access to an internal core of the barrel to enable attachment of at least one of the plurality of interchangeable elements within the handle portion.

31. The system of claim 21, wherein the handle portion is configured to be removably attached to the barrel to provide access to an internal core of the barrel to enable attachment of the at least one of the plurality of interchangeable elements within the handle portion.

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