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(54) **SPORTS TRAINING KIT AND APPARATUS**

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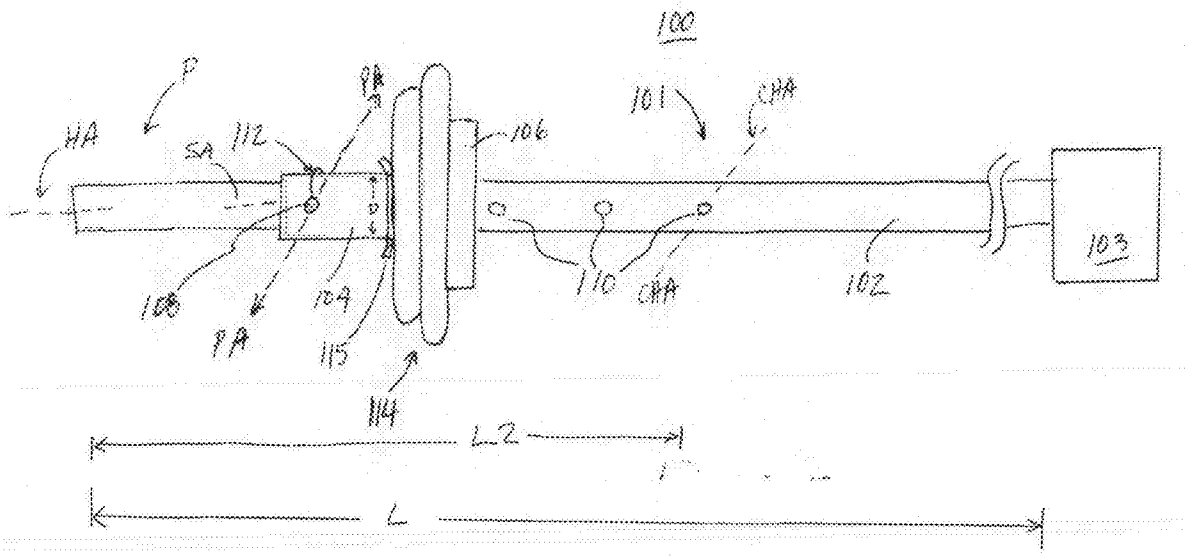
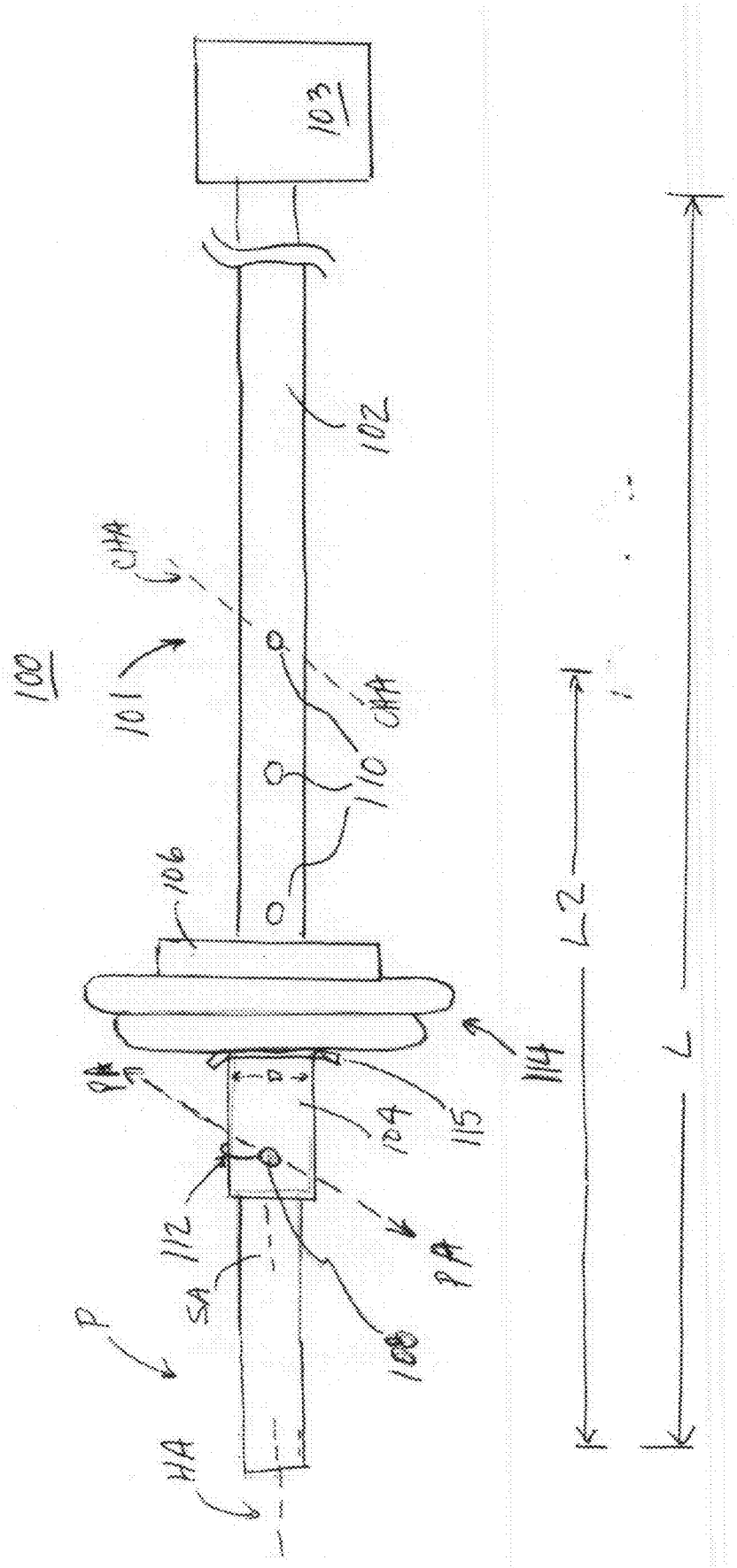
(57) **ABSTRACT**

The present invention is a training apparatus that includes a weighting device combined with a sport stick, such as a lacrosse or hockey stick, designed to secure the weighting device and other apparatus for performing sports-specific weight resistance and plyometric training.




100
101
103
102
CHA
110
106
114
L2
L
FIGURE 1

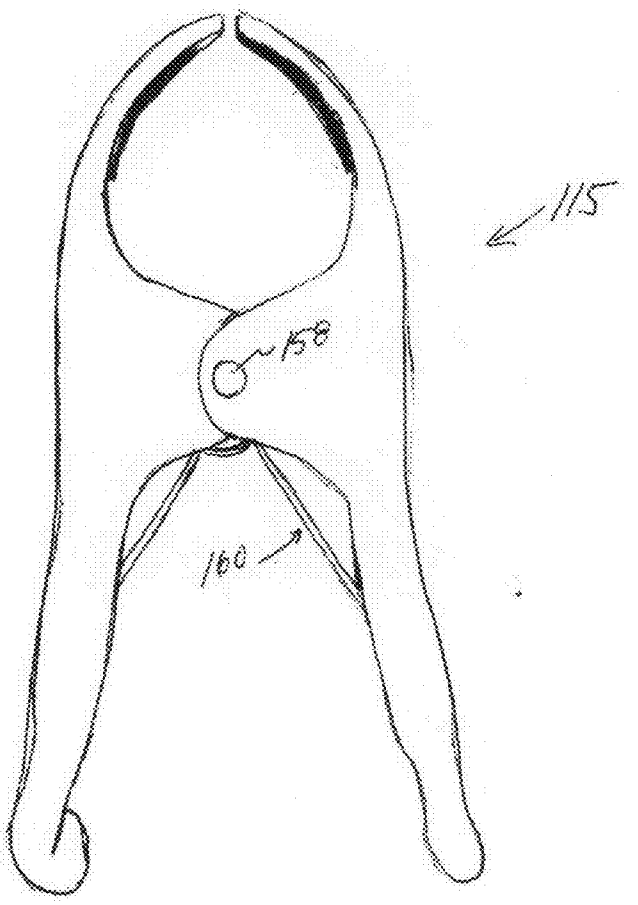


FIG. 1A

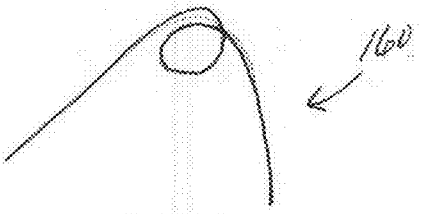


FIG. 1B

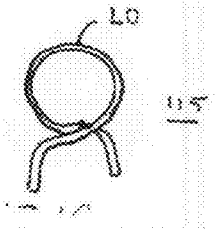


FIGURE 1C

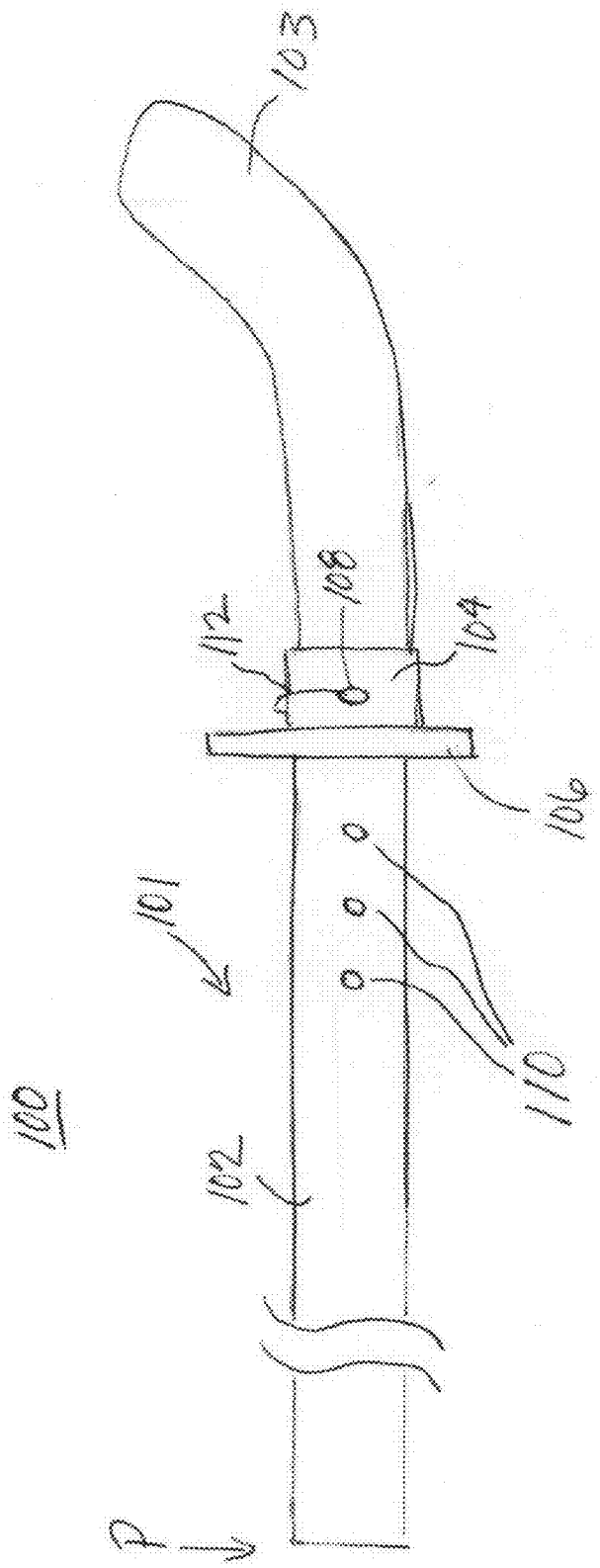


FIGURE 2A

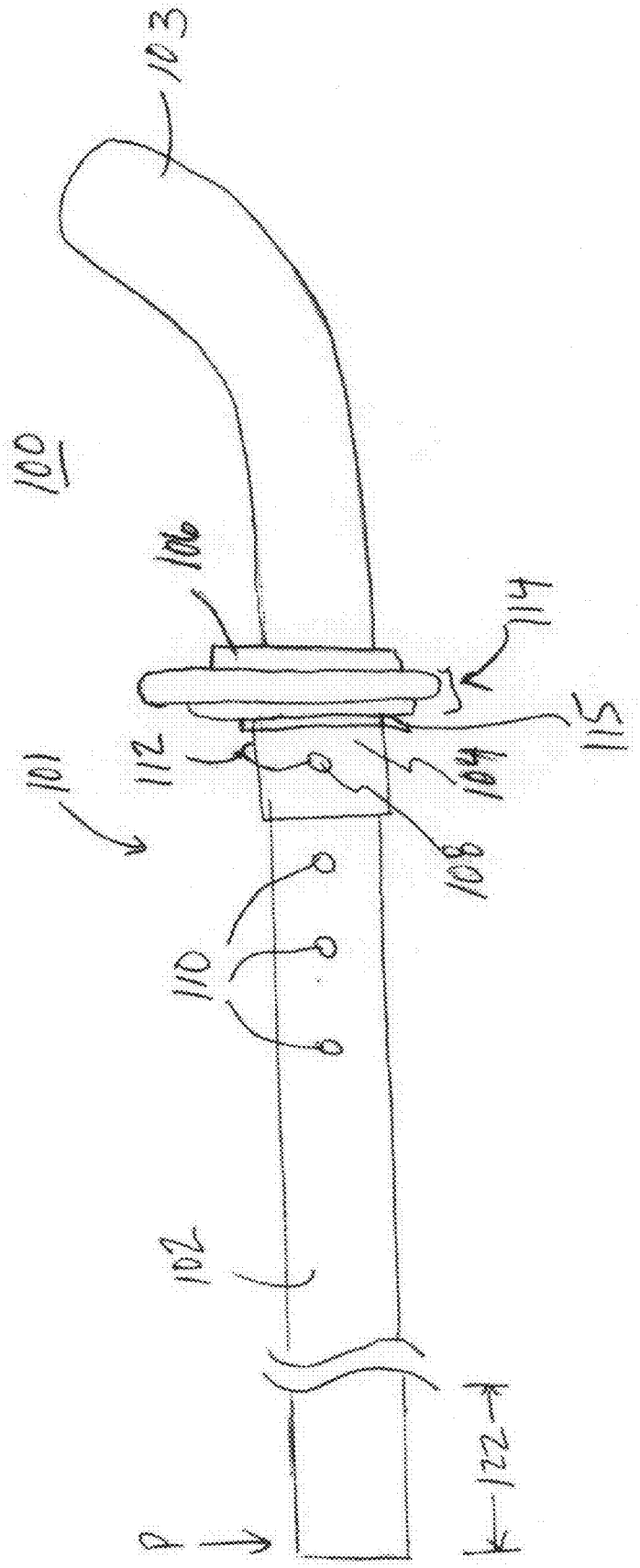
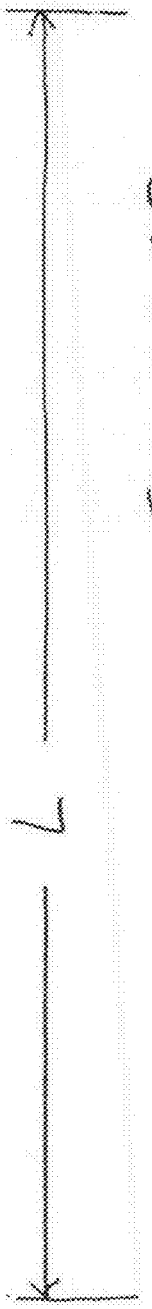


FIGURE 2B



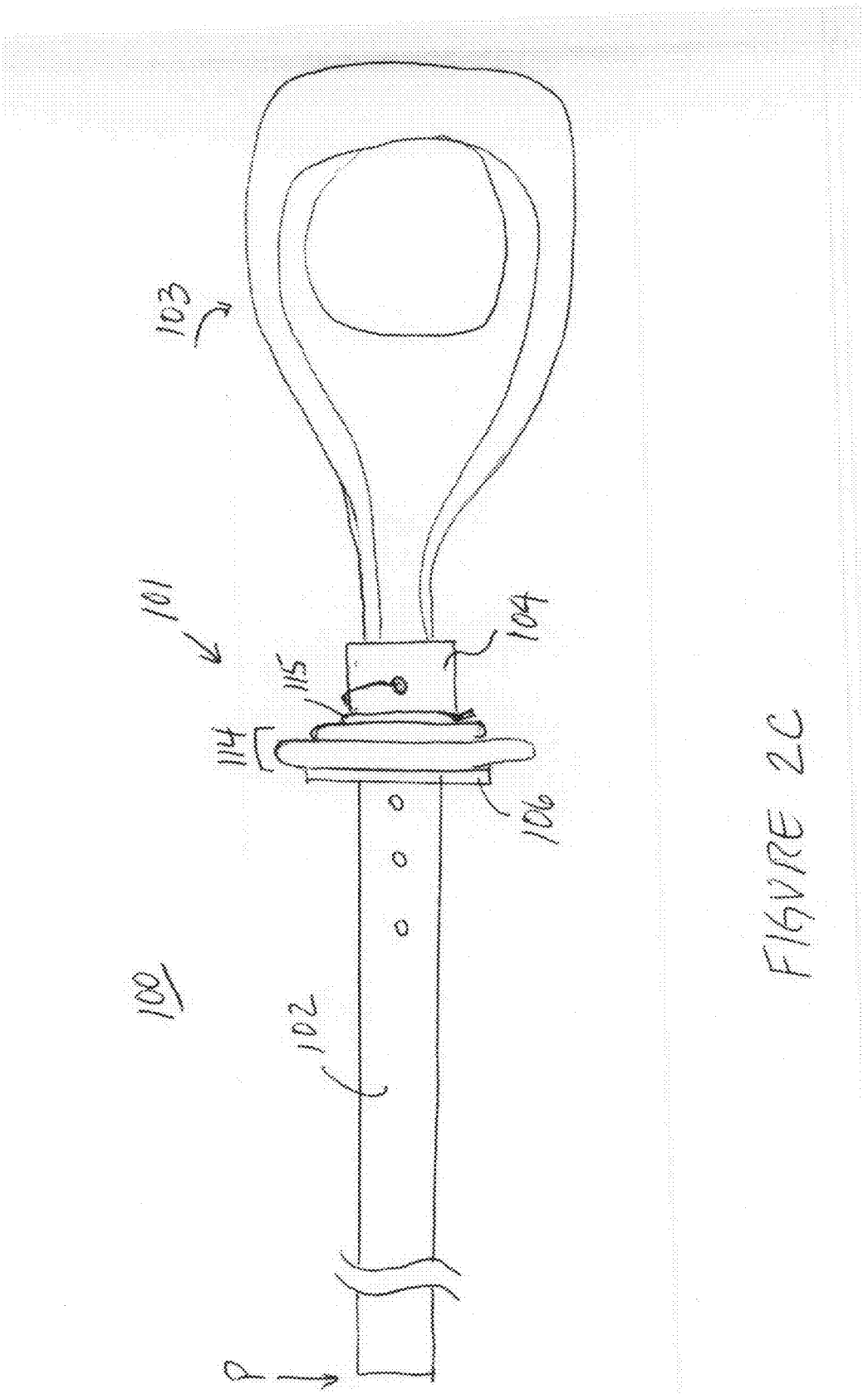


FIGURE 2C

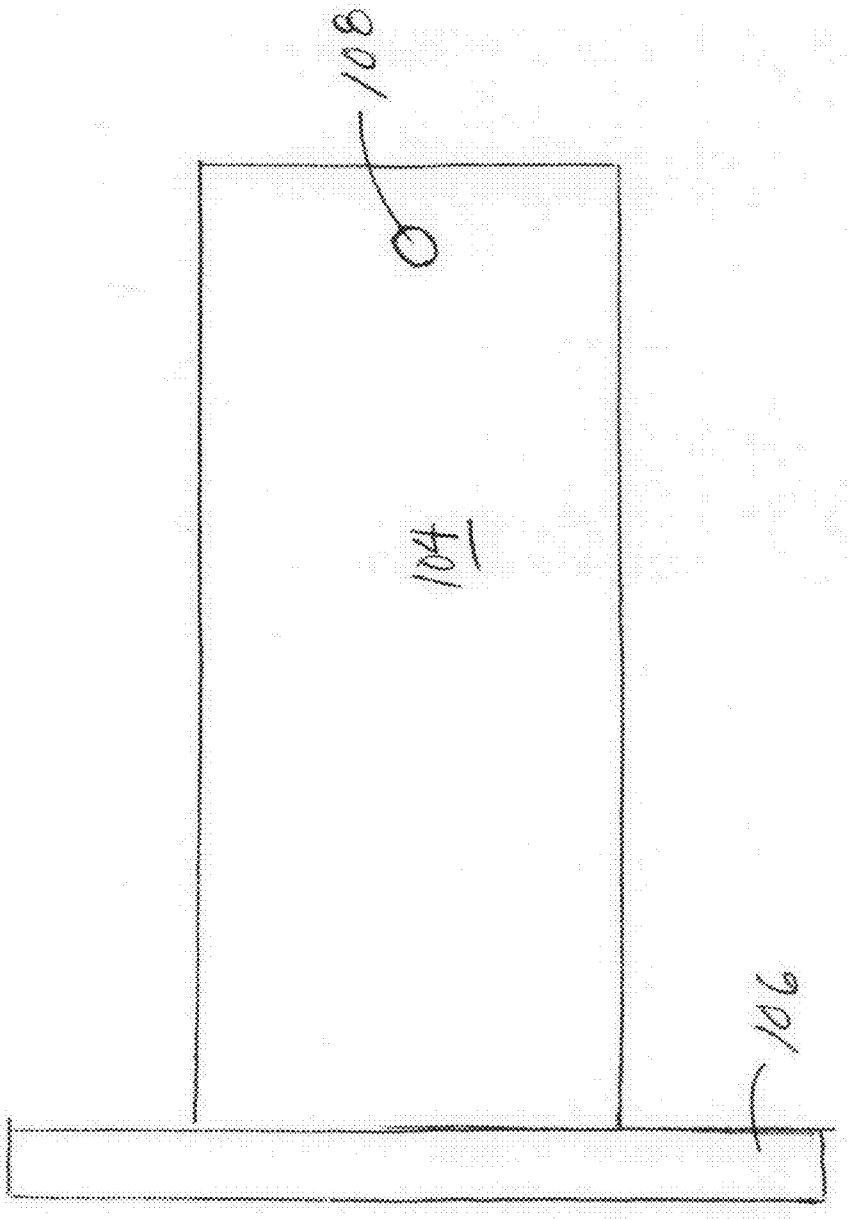


FIGURE 3

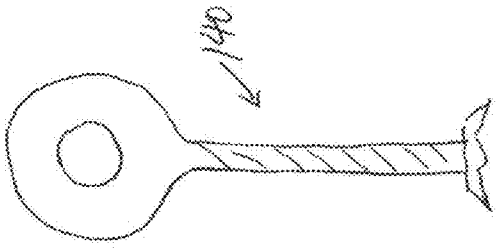


FIG. 6

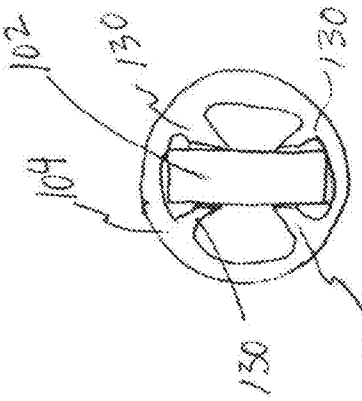


FIG. 4A

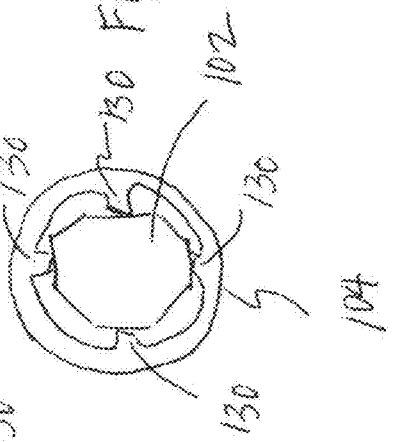


FIG. 4B

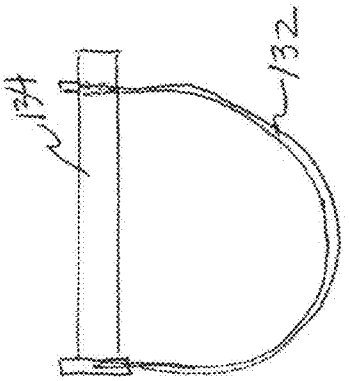


FIG. 5B

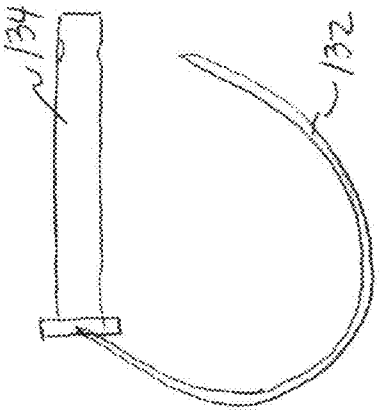


FIG. 5A

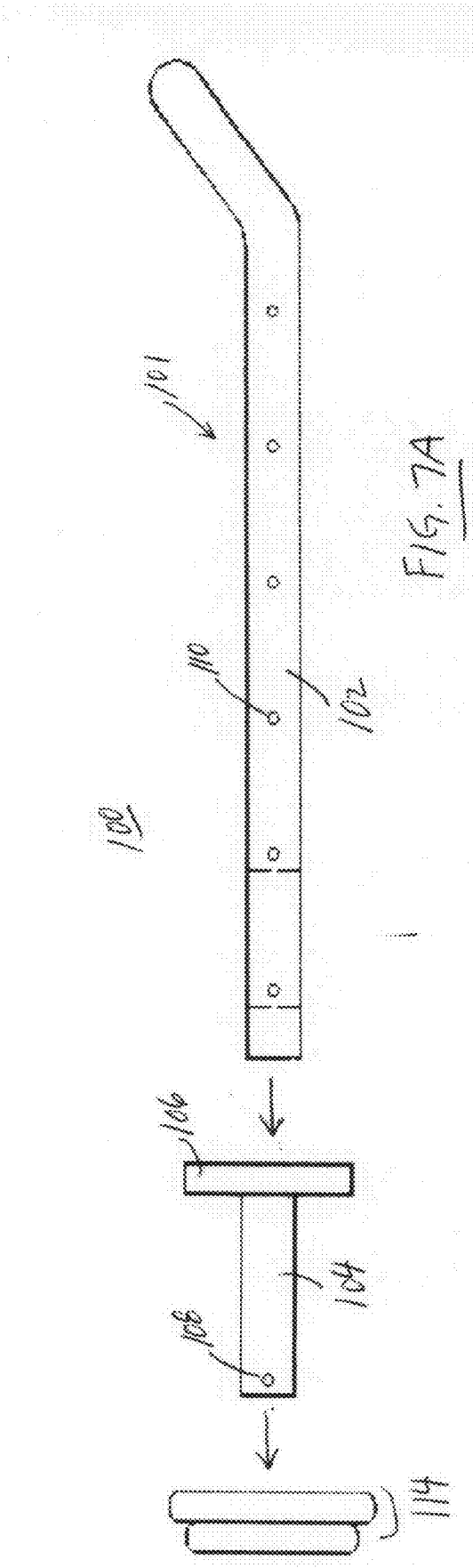


FIG. 7A

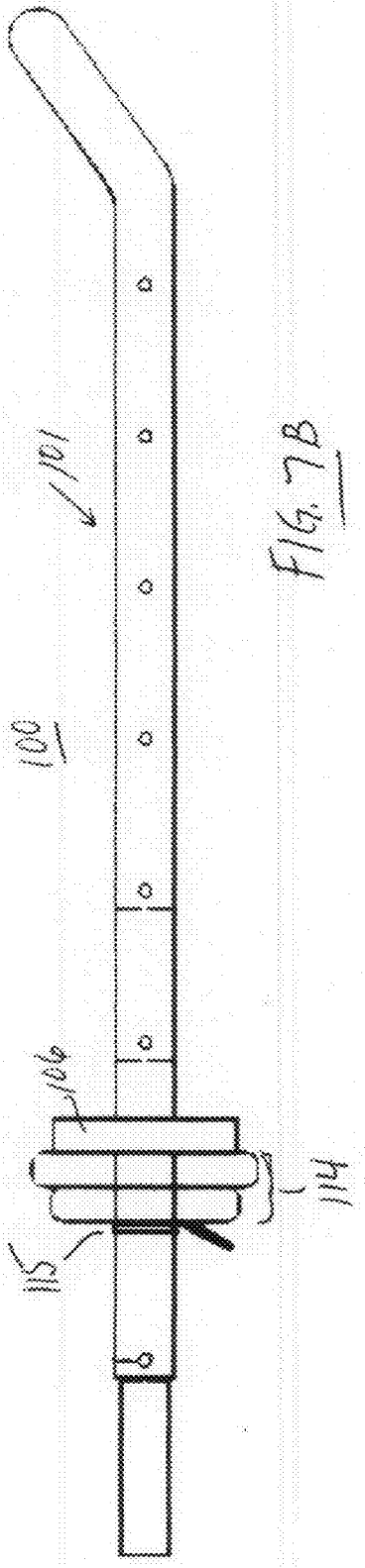


FIG. 7B

SPORTS TRAINING KIT AND APPARATUS

BACKGROUND

[0001] The present invention relates to a device for resistance training In particular, the present invention is a training apparatus that includes a weighting device combined with a sport stick, such as a lacrosse or hockey stick, designed to secure the weighting device and other apparatus for performing sports-specific weight resistance and plyometric training

[0002] Athletes who perform in certain sports that require the use of sticks, such as hockey or lacrosse, that require bursts of energy and rapid response times, benefit from a exercise training that results in improved functioning of the nervous system. Plyometrics is such a training method that results in increased speed or force of muscle contractions, useful for fast, powerful movements. Typical plyometric training involves producing a first, rapid muscle lengthening movement, followed by a short rest period, then producing a second, muscle shortening movement.

[0003] Training typically involves the use of free weights, or specially-designed weight machines. Commercially available weight machines of the type useful for plyometric training are large, expensive, and have a large footprint, making them unportable. Athletes are required to go to a specific location to have access to such machines. It also creates a psychological distance between the work-out equipment and the sports equipment. Ideal athlete training includes both an enhanced psychological connection with the sport and sport equipment, as well as physical improvement.

[0004] An athlete who uses a standard, commercially-available hockey or lacrosse stick, generally cannot use that stick to perform plyometric training or resistance training, because it is necessary to include weights in performing the muscle shortening movement in particular. The shape of sports sticks varies, and there is no convenient, available, or safe method for adding weight to such sticks.

[0005] In addition to the physical and skill benefits of such an apparatus, training with such an apparatus also delivers psychological benefits by bringing the athletes' motivation, commitment, and connection to the sport into the resistance training program. This psychological component cannot be duplicated through the use of conventional training equipment, such as free weights or traditional resistance training. There is a mindful connection to the sport through the use of equipment specific to that sport, because it enables athletes to train using the tools of their game. Such a connection also would allow athletes in rehabilitation facilities to benefit from such an apparatus.

[0006] Thus, there remains a need for the lacrosse and hockey athlete, among others, to perform sports-specific resistance exercises with equipment used in the respective sports. There is a need for equipment that makes it possible for the athlete to perform the following resistance exercises: weighted movements; plyometrics; and rubber tubing resistance movements using the equipment specific to their sport.

SUMMARY

[0007] The present invention is a sports training kit, for use in particular by athletes in training, or in physical therapy following injury in a sport that requires use of some sort of sport stick, such as hockey, lacrosse, and others. The inventive kit includes a sport instrument, having an elongated handle extending a distance L from a proximal end to an end effector at a distal end, and a weight support assembly having a tubular sleeve extending about a central axis from a first end to a second end, which tubular sleeve includes an annular flange, and an locking pin. The elongated handle includes a grip portion extending a predetermined distance L**2** from the proximal end, and which is substantially uniform in cross-section.

[0008] The grip portion of the handle includes a plurality of spaced apart cross-holes extending through the handle transverse to the handle axis. In a preferred embodiment, the length of the grip portion is the distance from the proximal end of the handle to the distal-most handle cross-hole. The end effector is, for example, the blade of a hockey stick or the basket of a lacrosse stick.

[0009] The tubular sleeve of the weight support assembly extends about a central axis from a first end to a second end. It has a cylindrical out surface, with a diameter D, that extends about the central axis. The sleeve further includes a central void region, defined by an inner surface extending about the central axis, having a cross-section adapted to overfit the cross-section of the grip portion. The sleeve further includes an annular flange positioned near the first end of the sleeve, that extends radially from the outer sleeve surface. A cross-hole extends through the sleeve near the second end and along a pin axis intersecting the central axis. This cross-hole is of sufficient diameter such that when this sleeve cross-hole is aligned with a cross-hole on the instrument handle, it forms a single hole through which an elongated pin may be passed to secure the sleeve onto the handle. The elongated pin has a length greater than D and a cross-section adapted to fit within the sleeve cross-hole and the handle cross-hole.

[0010] In an embodiment of the invention, the handle cross-holes are uniformly spaced. The kit may further include at least one annular weight, each of the annular weights having a circular central void region with a diameter greater than D and adapted to overfit the outer surface of the tubular sleeve. In alternative embodiments, the handle cross-section is rectangular, octangular, round, oval, or other geometric shapes.

[0011] The tubular sleeve inner surface may include a plurality of flexible fins extending inward from the inner surface. The kit may further comprise a clamp adapted to be removably affixed to the outer surface of the tubular sleeve.

DESCRIPTION OF THE DRAWINGS

[0012] The foregoing and other objects of this disclosure, including the various features thereof, may be more fully understood from the following description, when read together with the accompanying drawings in which:

[0013] FIG. **1** is a side plan view of an embodiment of the kit of the present invention.

[0014] FIG. **1**A is a front plan view of a clamp of the kit of the present invention.

[0015] FIG. **1**B illustrates a detail of the spring metal loop of the clamp of FIG. **1**A.

[0016] FIG. **1**C illustrates an alternative clamp for use with the kit of the present invention.

[0017] FIG. **2**A is a side plan view of a hockey stick kit of the present invention, having the flange portion of the tubular sleeve extending toward the proximal, curved end of the hockey stick.

[0018] FIG. **2**B is a side plan view of a hockey stick kit of the present invention, having the flange portion of the tubular sleeve extending toward the distal, handle end of the hockey stick, and further having Olympic-style weight plates.

[0019] FIG. **2**C is a side plan view of an embodiment of a lacrosse stick kit of the present invention.

[0020] FIG. **3** is a side plan view of an embodiment of the tubular sleeve of the invention.

[0021] FIG. **4**A is an end view of the tubular sleeve of a hockey stick embodiment of the invention, showing the flexible friction fins.

[0022] FIG. **4**B is an end view of the tubular sleeve of a lacrosse stick embodiment of the invention.

[0023] FIG. **5**A is a side plan view of a lockpin of the inventive kit, in a first, open position.

[0024] FIG. **5**B is a side plan view of a lockpin of the inventive kit, in a second, closed position.

[0025] FIG. **6** is a side plan view of an eye-hook in an embodiment of the inventive kit.

[0026] FIG. **7**A is an exploded view of an embodiment of the inventive kit.

[0027] FIG. **7**B is a side plan view of the kit of FIG. **7**A in assembled form.

DETAILED DESCRIPTION

[0028] The present invention is a sports training kit, having a specially-designed sports instrument, such as a stick used in stick-related sports, and a weight support assembly. The training kit of the present invention is designed to provide training of the type necessary for strength, speed, and agility, such as plyometric, resistance, and strength training.

[0029] An embodiment of the inventive training kit **100** is shows in FIG. **1**. In that illustrated embodiment, the kit **100** includes a sports instrument **101**, shown as a stick instrument having an elongated handle **102** extending a length L along a handle axis HA from a proximal end to an end effector **103** at its distal end. The end effector **103** can be, for example, a blade where the sports instrument **101** is a hockey stick, or can be a "basket" where the sports instrument **101** is a lacrosse stick. In FIG. **1**, the end effector is illustrated schematically by block **103**. The proximal end includes a grip portion **120** that extends along handle axis HA from the proximal end some predetermined distance D. The grip portion **120** has a substantially uniform cross-section.

[0030] The kit **100** has a tubular sleeve **104** extending along sleeve axis SA that is slidably fit over the handle **102**. With the sleeve **104** in place over handle **102**, the sleeve axis SA is substantially coaxial with handle axis HA. The tubular sleeve **104** has a cylindrical outer surface with diameter D and includes a sleeve cross-hole **108** extending through the sleeve along a pin axis PA transverse to sleeve axis SA.

[0031] The sleeve **104** includes an annular flange **106** extending radially outward with respect to sleeve axis SA. The flange **106** may be formed integral with the tubular sleeve **104**, or may be affixed about the outer cylindrical surface of the tubular sleeve **104** by means of mechanical, heat, UV, chemical or other welding. The flange **106** may be made from any metal, rigid plastic, or other materials having predetermined weight and strength, as described in further detail below.

[0032] The handle **102** includes one or more instrument cross-holes **110** bored through the handle **102** in the grip portion **120**. The cross-holes may be uniformly spaced or positioned to optimize the position of the weight assembly for specific training needs. The spacing between cross-holes **110** must be sufficient to maintain the uncompromised structural integrity of the handle **102**. The cross-holes **110** alternatively may be positioned along the same cross-hole axis CHA relative to other cross-holes **110**, as illustrated in FIG. **1**, or may be along different cross-hole axes relative to other instrument cross-holes **110**. The bore size of these cross-holes **110** must be of sufficient diameter to accommodate a locking pin **112** without compromising the structural strength of the handle **102**.

[0033] The sleeve cross-hole **108** preferably is positioned at the end of the sleeve opposite the flange **106**. This preferred position leaves room for multiple weights to be used at one time (i.e., weight plates may be stacked). Alternatively, a small sleeve section may be extended from the other side of the flange, having a sleeve cross-hole, to move the weights to the opposite side of the sleeve. The bore size of the sleeve cross-hole **108** must be at least as great as the diameter of the instrument cross-holes **110** to enable proper alignment of the sleeve cross-hole **108** with each of the instrument cross-holes **110** to allow a user to move the sleeve **104** along the handle **102** to position the sleeve **104** in the desired position for training In an alternate embodiment, the sleeve **104** may include more than one sleeve cross-hole **108** to provide even greater selections for placement of the sleeve **104** on the handle **102** or to accommodate more than one locking pin **112**. If multiple sleeve cross-holes **108** are included, they must be sufficiently spaced to maintain the structural integrity of the sleeve element **104**.

[0034] When assembled, as shown in FIG. **1**, the sleeve cross-hole **108** aligns with one of the set of instrument cross-holes **110**. The elongated portion of a locking pin **112** then is positioned through the aligned cross-holes **108** and **110** to secure the sleeve **104** at a desired position along on the handle **102**. In the illustrated embodiment of the kit **100**, a set of one or more weights **114** may further be positioned along the sleeve **104**, between the annular flange **106** and the locking pin **112**. A clamp **115** is disposed on the outer cylindrical surface of sleeve **104** in a position to secure the weights **114** against the flange **106**.

[0035] An exemplary clamp **115** is illustrated in FIG. **1**A. The illustrated clamp **115** is manufactured from a metal or a durable hard plastic material, and includes two complementary handle portions **150***a* and **150***b*, each having an upper concave portion **152***a*, **152***b* and a lower straight portion **154***a*, **154***b*. At least a portion of each upper concave portions **152***a*, **152***b* includes a rubber lining **156**. When assembled, the upper concave portions **152***a*, **152***b* form a central void having a diameter D2 that is approximately equal to the diameter D of the tubular sleeve **104**. The handle portions **150***a*, **150***b* are pivotally joined about pivot pin **158**. A spring metal loop **160**, shown in detail in FIG. **1**B, is positioned between the interior surfaces of the lower straight portions **154***a*, **154***b*, held in place by pivot pin **158**. As pressure is applied by a user gripping the lower straight portions **154***a*, **154***b*, it applies opposing pressure to the spring metal loop **160**, causing the upper concave portions **152***a*, **152***b* to move away from each other. In this manner, the clamp **115** may be positioned about the tubular sleeve **104**, between the sleeve cross-hole **108** and any weights **114** that may be included in the kit.

[0036] In the alternative, clamp **115** is exemplified by spring clamp **115** illustrated in FIG. **1**B. The illustrated clamp **115** is made of a spring metal loop LO. By biasing the distal ends of the loop toward each other, the diameter of the loop increases to allow fitment over the cylindrical surface of

sleeve **104**, and upon release, resilient lead decreases to clamp to the cylindrical surface. In other embodiments, at different clamps may be used.

[0037] FIG. **2**A is an alternative embodiment of the inventive kit **100**. As shown, the kit comprises a hockey stick shaped sports instrument **101**. As shown, the hockey stick instrument **101** includes a handle **102** with an end effector **103** being a blade, at its distal end. Several cross-holes **110** extend along the length of the handle **102**, with the aligned cross-holes **108** and **110** positioned close to the distal end of the handle. The flange **106** and clamp **115** support weights **114** providing the desired weighted effect when the kit **100** is swung in the style of a hockey player. In the embodiment of FIG. **2**A, the weights are near the end effector **103** As the kit **100** is swung through the typical range of motion for a hockey player, the user may experience different forms of training, depending on the nature of the specific use of the kit.

[0038] FIG. **2**B is an alternative embodiment of the inventive kit **100**, also showing the hockey stick shaped sports instrument **101**. In this illustrated embodiment, the handle **102** of the instrument includes a series of cross-holes **110**, however in the embodiment of FIG. **2**B, the tubular sleeve **104** is positioned on the handle **102** such that the sleeve cross-hole **108** is aligned with an handle cross-hole **108** near the proximal end P of the handle, away from the end effector **103**. In the illustrated embodiment, flange **106** is positioned toward the distal end of the handle and supports one or more weights **114**, such as Olympic weights, that are slidingly positioned over the tubular sleeve **104**, held against the flange **106** clamp **115**. The locking pin **112** holds the tubular sleeve **104** in position. The position of the flange **106** is determined by the hand position (i.e., where the user grips the stick), and the desired direction of resistance. The flange **106** preferably is positioned to optimize resisted movement and safety. The flange **106** also may be positioned to optimize the locations of weighted resistance and to reduce the number of required cross-holes.

[0039] FIG. **2**C shows an alternative embodiment of the inventive kit **100**. In this embodiment, the sport instrument **101** is configured in the shape of a lacrosse stick with an octagonal cross-section handle **102** and a lacrosse "basket" end effector **103**. In this illustrated kit **100**, the weights assembly is positioned near the end effector **103**, with the flange **106** being closest to end effector **103**, with the aligned cross-holes **108** and **110** secured by the locking pin **112** near the end effector **103**. Clamp **115** holes the weights **114** against flange **106**. The illustrated embodiment includes a set of Olympic weights **114**, but alternative embodiments may include just a weighted annular flange **106** without weights.

[0040] In each embodiment, the inclusion of a set of one or more cross-holes **108** in the handle **102** enables the tubular sleeve **104** to be fixedly positioned along the length of the handle, to be secured closer to either the grip (proximal end P) or the end effector **103**, as desired. By selectively configuring the location of the tubular sleeve **104** along the handle **102**, a user may modify and effect the nature and type of training for which the kit **100** is used.

[0041] Although the present illustrations only show a hockey stick and a lacrosse stick configuration for the sports instrument **102** element of the inventive kit, other sticks and configurations may be used in the kit as necessary for other desired sports training, such as baseball bats, tennis racquets, and the like.

[0042] FIG. **3** shows a side plan view of the tubular sleeve **104** in combination with the annular flange **106** of the inventive kit. The sleeve cross-hole **108** is positioned toward the opposite end of the sleeve **104** from the flange **106**. In alternative embodiments, the cross-hole **108** may be otherwise positioned along the length of the sleeve **104** to optimize leverage and strength when the kit includes Olympic or other such weight elements. The tubular sleeve **104** may be manufactured from any structurally strong material, such as solid plastic, metal, fiberglass, graphite, and others generally available. The tubular sleeve **104** may be pressure molded or form molded to achieve the desired diameter and internal shape.

[0043] In an illustrative embodiment, as shown in FIG. **3**, as designed for use with a 7 inch hockey stick, the tubular sleeve **104** has a length of 4.75 inches and a diameter of 1.875 inches. The illustrated flange **106** is 0.25 inches thick, with a diameter of 3.875 inches. The tubular sleeve cross-hole **108** is positioned 0.5 inches from the end of the sleeve. While this is an illustrated embodiment, other dimensions and distance ratios may be used depending on the length of the sports instrument, manufacturing materials, the nature of the training for which the kit will be used, and the like.

[0044] As shown in cross-section in FIGS. **4**A and **4**B, the inner bore of the sleeve **102** may include one or more resilient fins **130** that extend inwardly from the interior surface of the bore of the sleeve and adapted to resiliently press against the handle **102** when positioned within the sleeve **104**. FIG. **4**A shows a handle of a (rectangular) hockey stick shaped sports instrument **101**, with the fins **130** resiliently pressing against the surface of that substantially rectangular-shaped handle. FIG. **4**B shows a handle of a lacrosse stick shaped sports instrument **101**, with the fins **130** similarly resiliently pressing against the surface of that substantially octagonal cross-section handle **102**. Material used to manufacture the sleeve **104** must have sufficient flexibility of the fins **130** to enable the instrument **101** to be slidably inserted into the tubular sleeve **104**, and yet retain sufficient rigidity to hold the sleeve securely on the instrument. Examples of such materials include solid plastic, metal, fiberglass, graphite, and others generally available.

[0045] The illustrated inventive kit **100** further includes a locking pin **112** of the type commonly known and generally commercially available. The preferred locking pin **112** of the inventive kit **100**, such as that shown in FIGS. **5**A and **5**B, includes a pin **134** of rigid material having a diameter no greater than the diameter of the cross-holes **108** and **110**, such that the pin **134** can pass through holes **108** and an aligned one of holes **110**. A first end of an encircling portion **132** is pivotally coupled to one end of pin **134**. A second end of portion **132** is adapted to be releasably captured by the other end of pin **134**. The encircling portion **132** is pivotally attached to one end of the pin **134**, such that it can swing open to encircle an item, as shown in FIG. **5**A, which in this case is the tubular sleeve **104** positioned about the handle **102**, then move back to a closed position to capture pin **134** and lock sleeve **104** into place along handle **102**, as shown in FIG. **5**B. Locking pins are manufactured from generally commercially available strong, rigid materials, such as metal or cured plastics.

[0046] The kit **100** of the present invention may also include one or more eye-hooks **140**, such as the type shown in FIG. **6**. The eye-hook **140** may be securely attached along the length and to the handle **102** (preferably near the distal end), or directly to the tubular sleeve **104**. The eye-hook may be

included to enable a user to add resistance training, by use of a length of rubber or other elasticized material which can be coupled at one end to the eye hook and add its other end, to an external anchor point.

[0047] FIGS. **7**A-**7**B illustrate assembly of the inventive kit **100**. As shown, the sports instrument handle **102** includes a plurality of cross-holes **110**. The tubular sleeve **104**, having an attached annular flange **106**, is slidably positioned on the handle **102**. The resilient, inwardly extending fins (not shown) allow the sleeve **104** to move onto the instrument **102**, but provide resistance to removal once the sleeve is in position. In some embodiments, weights **114** are then added onto the sleeve **104**, followed by clamp **115**. The cross-holes **108** and **110** are aligned, and the locking pin **112** is positioned through the aligned cross-holes to secure the entire kit **100**.

[0048] While the preferred embodiments of the present invention have been shown and described herein, it will be obvious that such embodiments are provided by way of example only. Numerous variations, changes and substitutions will occur to those of skill in the art without departing from the invention herein. Accordingly, it is intended that the invention be limited only by the spirit and scope of the appended claims.

What is claimed is:

1. A sports training kit, comprising:

A. a sports instrument including:

i. an elongated handle extending a distance L from a proximal end to a distal end thereof along a handle axis, wherein said handle has a substantially uniform cross-section grip portion extending from said proximal end, and wherein said grip portion includes a plurality of spaced apart cross holes extending through said grip portion transverse to said handle axis, and

ii. an end effector extending from said distal end,

B. a weight support assembly including:

i. a tubular sleeve extending about a central axis from a first end to a second end and having:

a. a cylindrical outer surface having a diameter D and extending about said central axis,

b. a central void region defined by an inner surface extending about said central axis, wherein said central void region has a cross-section adapted to overfit said cross-section of said grip portion,

c. an annular flange near said first end of said sleeve, and extending from said outer surface radially with respect to said sleeve axis,

d. a cross-hole extending through said sleeve near said second end and along a pin axis intersecting said central axis, and

ii. an elongated pin having a length greater than D and having a cross-section adapted to fit within said cross hole in the said sleeve and said cross holes in said handle.

2. A sports training kit according to claim **1** wherein said cross-holes in said handle are uniformly spaced.

3. A sports training kit according to claim **1** further comprising at least one annular weight, each of said annular weights having a circular central void region having a diameter greater than D and adapted to overfit said outer surface of said sleeve.

4. A sports training kit according to claim **1** wherein said cross-section of said handle is rectangular.

5. A sports training kit according to claim **4** wherein said inner surface includes a plurality of flexible fins extending inward from said inner surface.

6. A sports training kit according to claim **4** wherein said handle and said end effector have the form of a hockey stick.

7. A sports training kit according to claim **1** wherein said cross-section of said handle is octangular.

8. A sports training kit according to claim **7** wherein said inner surface includes a plurality of flexible fins extending inward from said inner surface.

9. A sports training kit according to claim **7** wherein said handle and said end effector have the form of a lacrosse stick.

10. A sports training kit according to claim **1** further comprising a clamp adapted to be removably affixed to said outer surface of said tubular sleeve.

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