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Torrance, CA (US)(72) Inventor: **Nathan Ryne Tacker**, Los Angeles, CA
(US)(73) Assignee: **PHANTOM WEIGHTS, LLC**(21) Appl. No.: **15/287,681**(22) Filed: **Oct. 6, 2016****Related U.S. Application Data**(60) Provisional application No. 62/238,847, filed on Oct.
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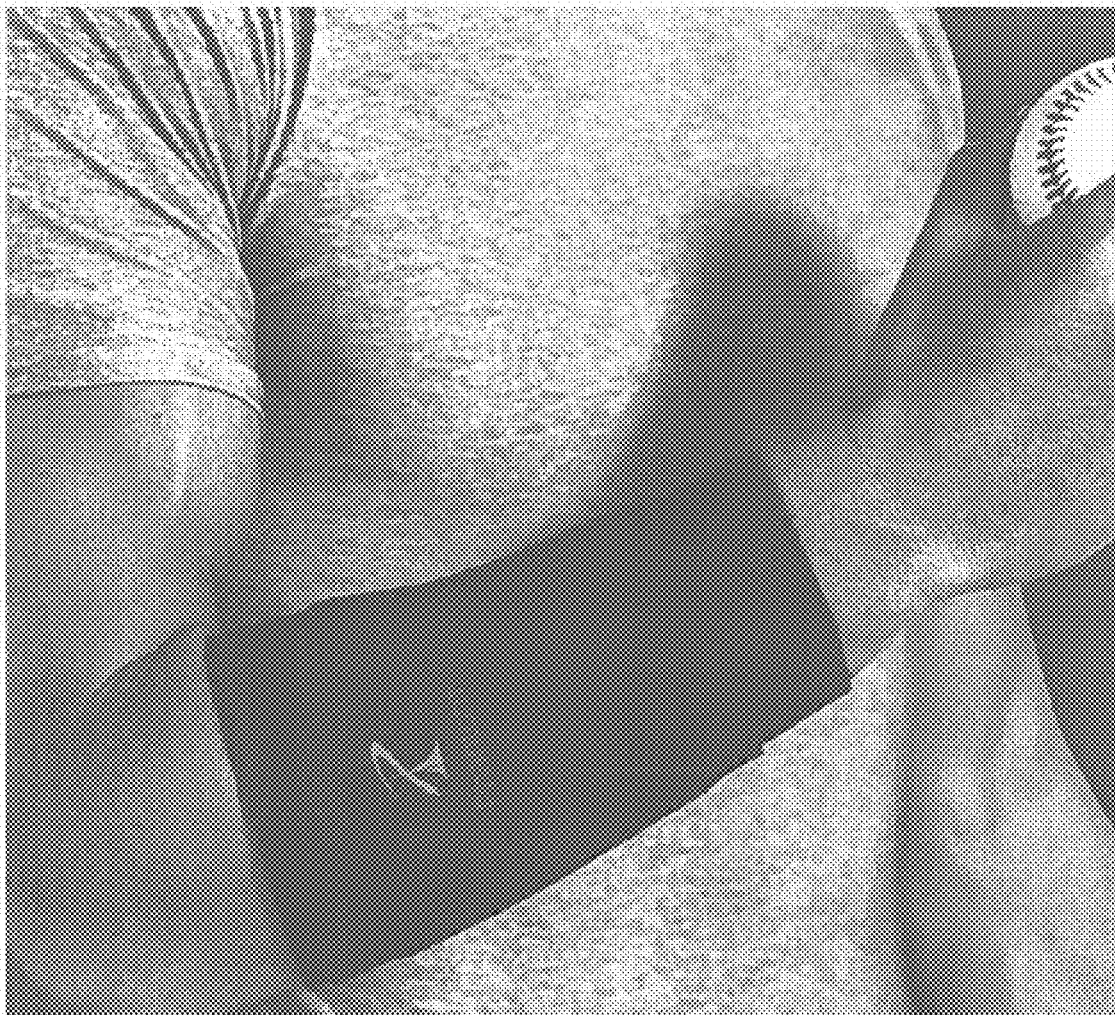
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ABSTRACT

This disclosure relates to a weighted strength training device. The device comprises a sleeve portion, a flexible weight, and a wrapping portion. The sleeve portion may flexibly form fit around an extremity of a user. The sleeve portion may include a weight pocket configured to carry a flexible weight against the extremity of the user. The weight may be configured to substantially conform to a shape of the extremity of the user while the weight is carried by the weight pocket against the extremity of the user. The wrapping portion and the sleeve portion may form a single piece. The wrapping portion may be configured to flexibly wrap around the sleeve portion, cover the pocket, and secure the flexible weight in the pocket such that the sleeve and weight are substantially prevented from sliding during activity.



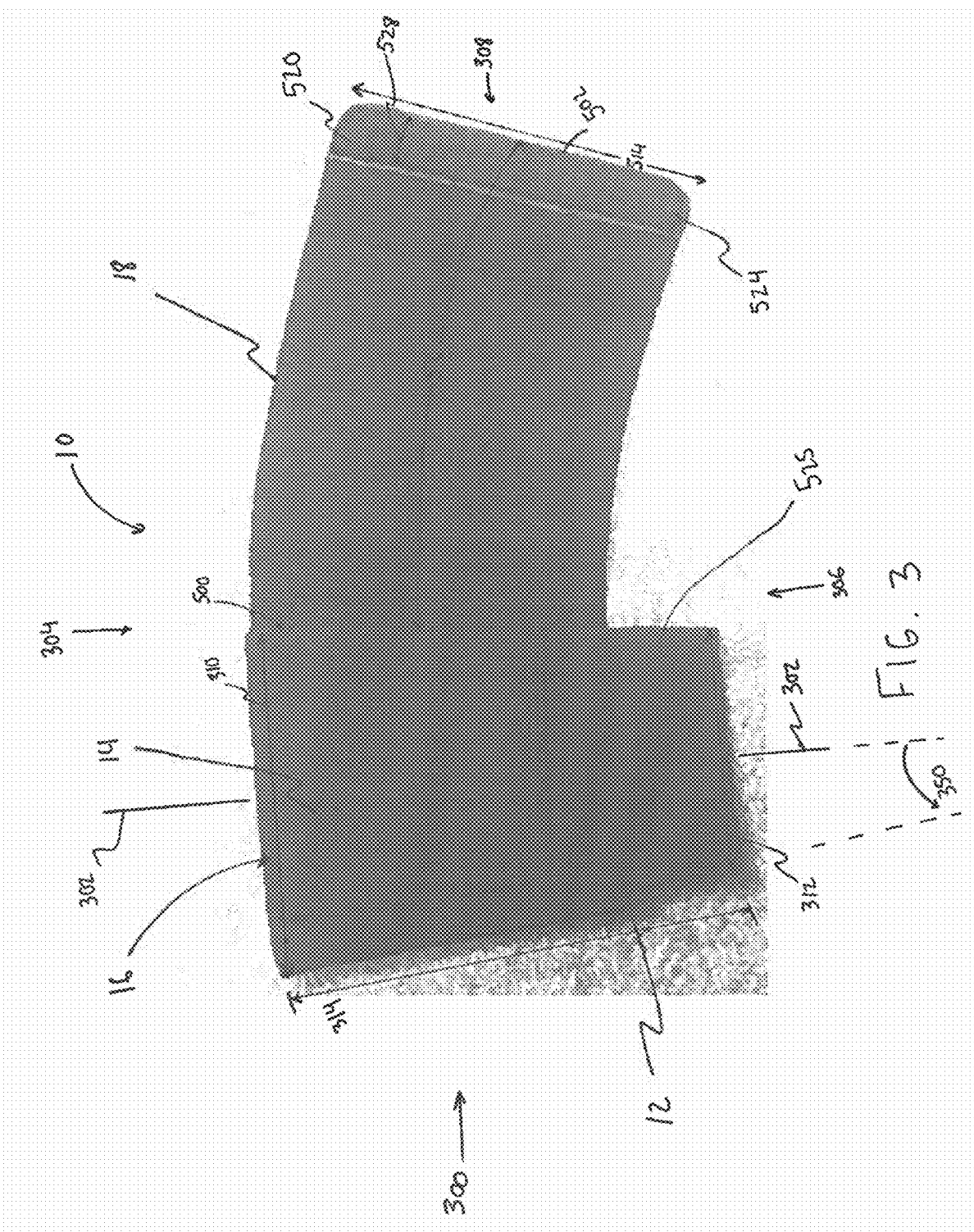


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FIG. 1



FIG. 2



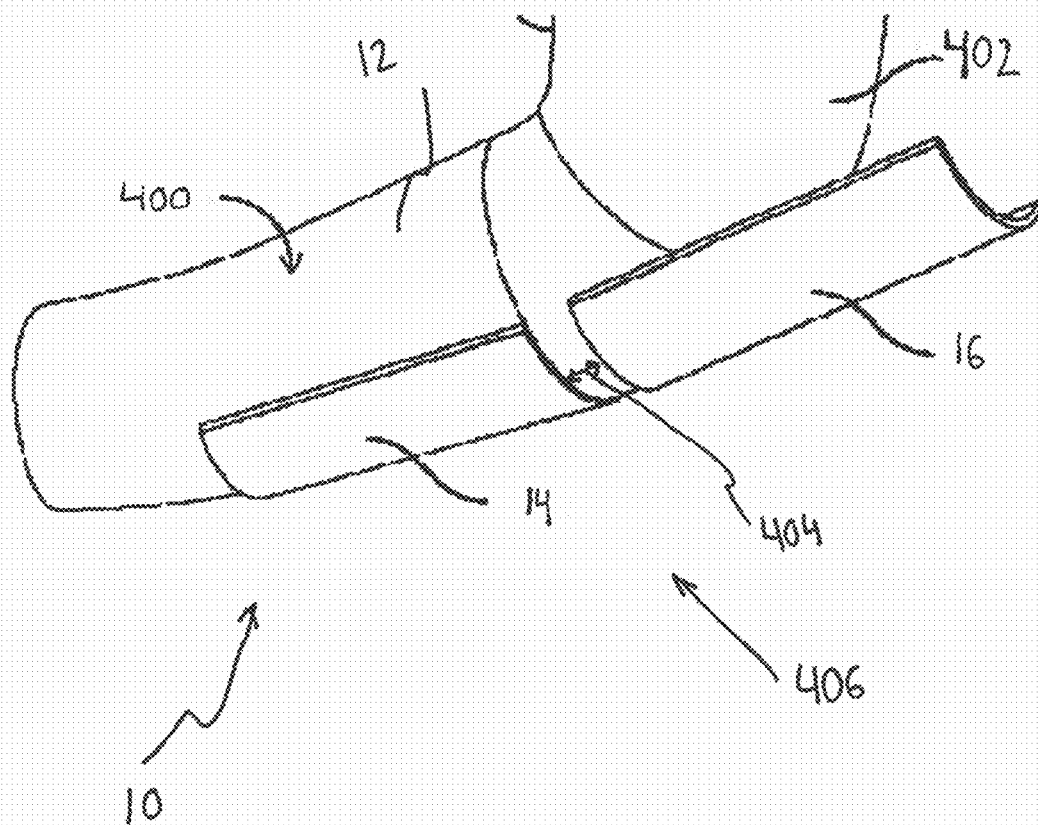
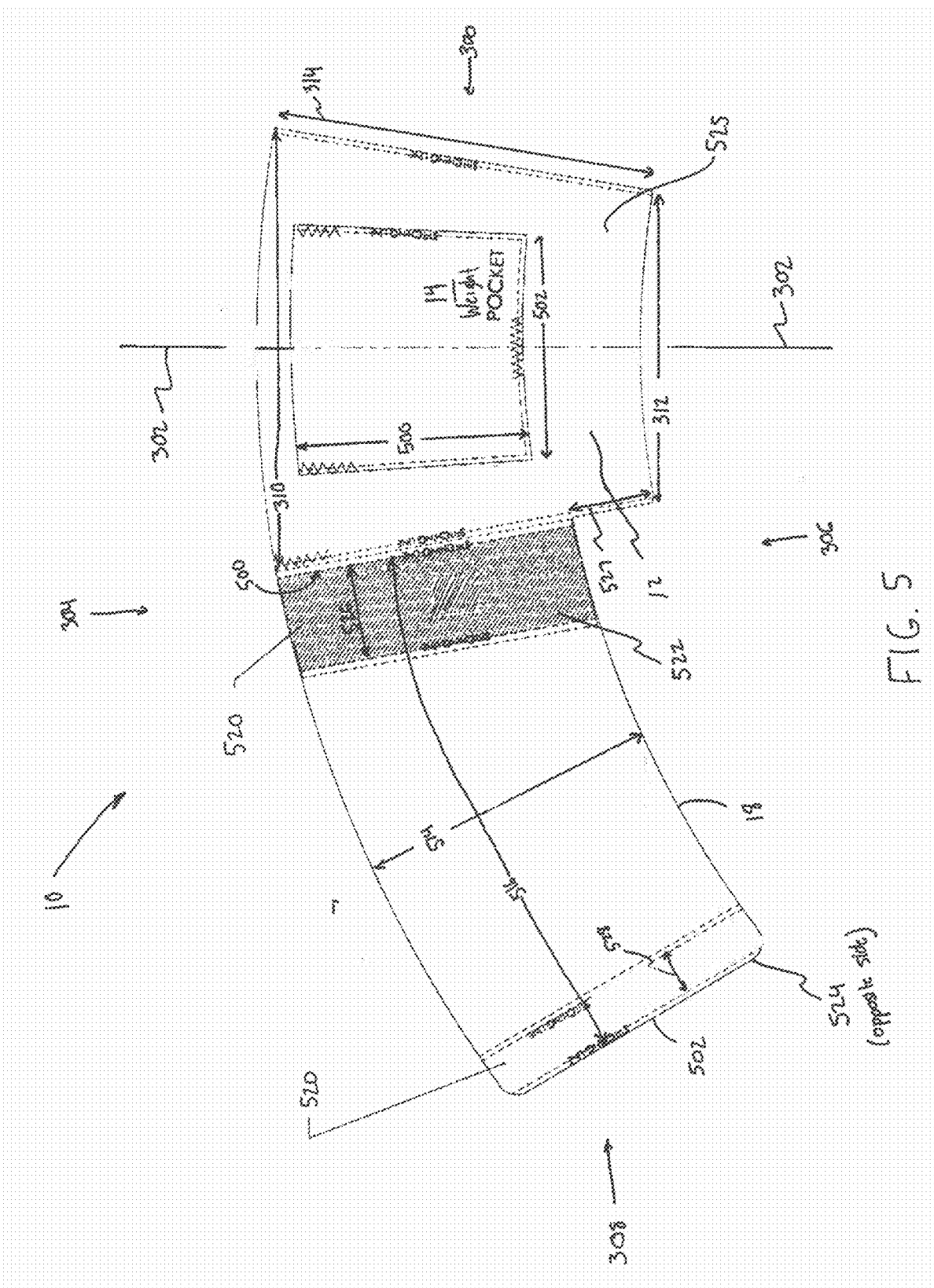
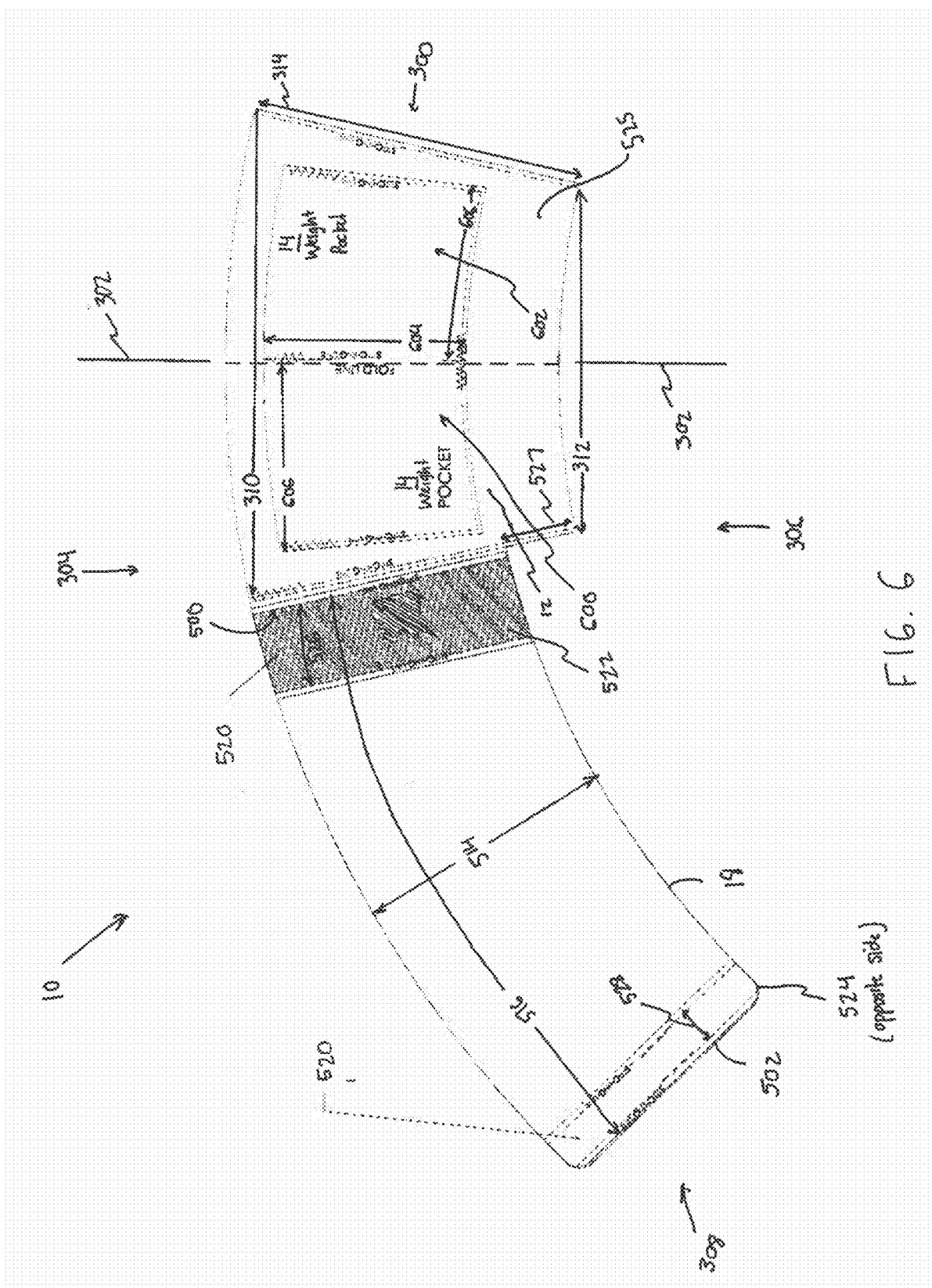
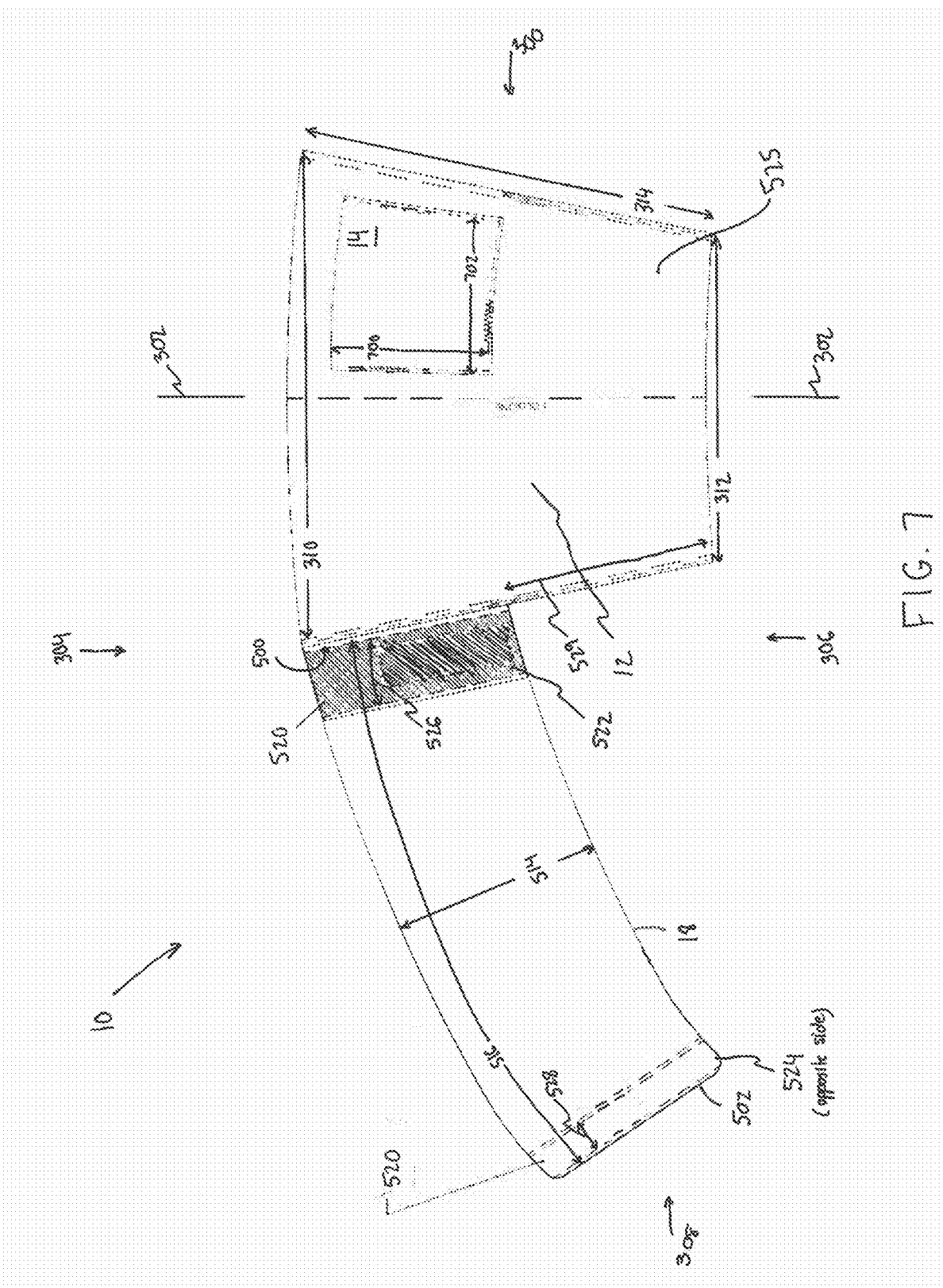


FIG. 4







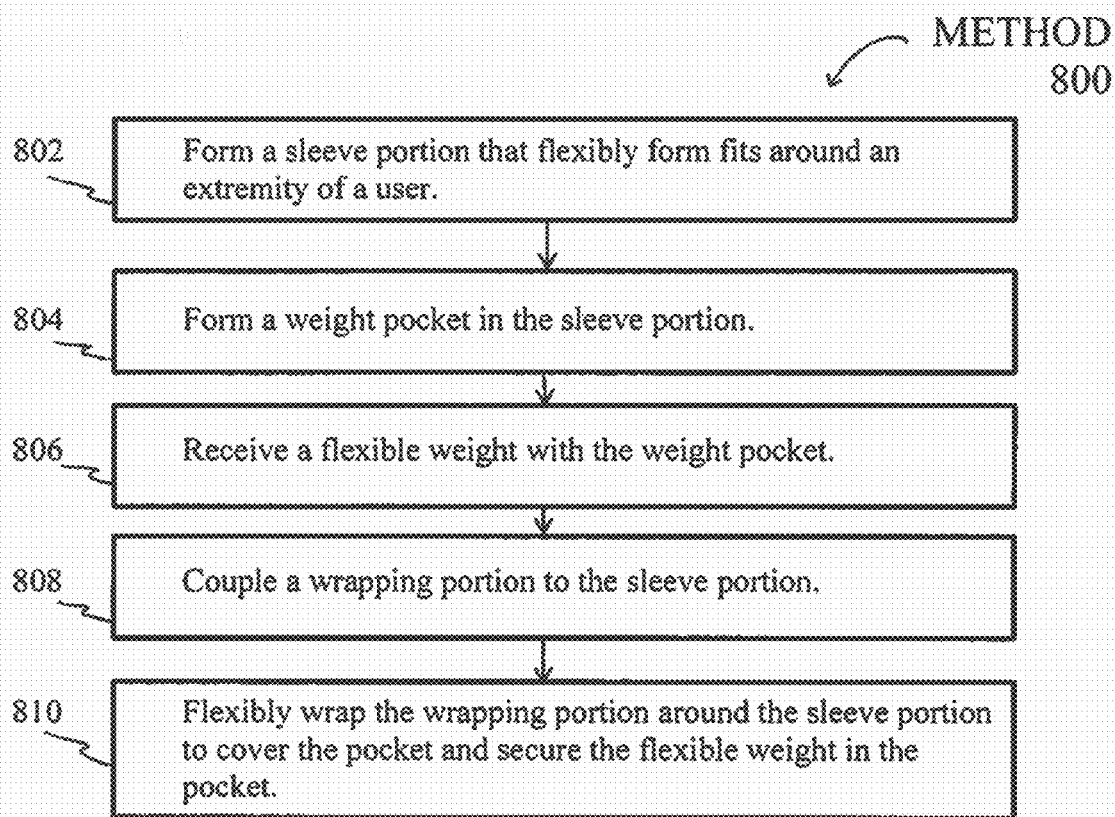


FIG. 8

MUSCLE STRENGTHENING SYSTEM AND METHOD

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the priority benefit of U.S. Provisional Patent Application No. 62/238,847 filed on Oct. 8, 2015 and entitled “MUSCLE STRENGTHENING SYSTEM AND METHOD,” which is incorporated herein by reference in its entirety.

FIELD

[0002] This disclosure relates to a weighted strength training device worn by a user during athletic activity. The device comprises a sleeve portion, a flexible weight, and a wrapping portion.

BACKGROUND

[0003] Recreational and professional athletes seek effective and rapid training/strengthening techniques to enhance their play. Baseball players, for example, have used the following to try to increase throwing strength: 1) weighted balls that are heavier than the normal baseballs used in everyday play; 2) performance enhancing drugs; 3) therabands; 4) Jobe exercises and 5) weightlifting. (It should be noted that athletes in other sports also use these exercises.) While all seem plausible practices to increase muscle strength, a closer examination shows the limitations of these techniques. In particular, those training methods may cause more harm than good or may not directly translate to effectively strengthening the correct muscles.

[0004] Weighted balls (e.g., for baseball, football, basketball, etc.) are becoming rapidly more popular. However, the use of weighted balls poses the threat of injury and may adversely affect throwing mechanics, for example. In the throwing motion, one leads with the elbow. Adding weight to the ball increases the stress placed on the Ulnar Collateral Ligament (UCL) and labrum. This added stress can cause or accelerate failure of the UCL and/or labrum and can cause strains or tears in one or both of the ligaments. Also, weighted balls can confuse the autonomic nervous system (ANS). Consequently, when a player switches back to a normally weighted ball, the player may no longer have a consistent release point, for example. Another insufficiency is the fact that weighted balls only add resistance to the accelerating portion of the throwing motion. Once the ball leaves the hand, there is no added resistance to help strengthen the muscles used in the deceleration portion of the throwing motion, which can also be important in gaining velocity.

[0005] Therabands, Jobe exercises, and weightlifting are all used to increase an athlete's strength or assist in keeping an athlete healthier. However, none of these directly transition to functional strengthening the muscles used during the sport-specific activity (e.g., throwing a ball in baseball). These techniques do not tend to directly add the strength needed to throw a ball faster. Weight lifting can cause muscles to become tight and tense because they are not actively strengthened. For sport-specific training, incorrect weight lifting can actually inhibit effective play.

[0006] “Performance enhancing” drugs and supplements (often illegal) are used by athletes in to attempt to enhance their performance during competition. Some of the potential

risks associated with these drugs are liver damage, increased risk of heart disease and heart attack, among others. Furthermore, these drugs and supplements tend to enhance the muscle strengthening regimen the athlete is using, thus sometimes reinforcing ineffective strengthening programs.

[0007] Overall, these prior training devices and/or methods are ineffective, insufficient, detrimental to mechanics, and/or are even dangerous.

SUMMARY

[0008] One aspect of the present disclosure relates to a weighted strength training device worn by a user during athletic activity. The weighted strength training device is configured to functionally train the specific muscles used while performing an athletic activity without compromising mechanics. The device comprises a sleeve portion, a flexible weight, a wrapping portion, and/or other components. In some implementations, the sleeve portion may be configured to flexibly form fit around an extremity of the user. For example, the sleeve portion may form a flexible tube that flexes around the extremity of the user when the sleeve portion is moved into a desired position on the extremity of the user. In some implementations, the sleeve portion may be worn around an arm of the user between a wrist and an elbow of the user, around a leg of the user between an ankle and a knee of the user, around a leg of the user between the knee and the hip of the user, and/or in other locations.

[0009] The sleeve portion may include a weight pocket configured to removably carry the flexible weight against the extremity of the user. The weight pocket may be located on an outer side of the sleeve portion and/or in other locations such that the weight pocket does not irritate skin of the user and/or otherwise interfere with athletic activity. In some implementations, the sleeve portion may include two or more weight pockets.

[0010] The flexible weight may be configured to substantially conform to a shape of the extremity of the user while the flexible weight is carried by the weight pocket against the extremity of the user. Weight that is thin, flexible, and conforms to the extremity of the user helps prevent the weight and sleeve from slipping down during activity, and/or functions in other ways. In implementations where the sleeve portion is worn between the wrist and the elbow of the user, the flexible weight may have a weight/mass and/or dimensions (e.g., length, width, thickness, etc.) that are different than the flexible weight in implementations where the sleeve portion is worn between the ankle and the knee of the user. In some implementations, the flexible weight may be formed by two or more individual flexible weights carried by two or more individual weight pockets. In some implementations, the masses described above may be a total mass formed by two or more individual flexible weights carried by two or more weight pockets. In some implementations, the flexible weight comprises a series of two or more flexible weights having incrementally different masses, wherein the series of two or more flexible weights are used interchangeably by the user in the weight pocket(s) during athletic activity.

[0011] The wrapping portion may be coupled to the sleeve portion such that the wrapping portion and the sleeve portion form a single piece. The wrapping portion may help secure the weight so the weight does not cause the sleeve to slide (e.g., up or down the extremity of the user) during activity and/or at other times. The wrapping portion may be config-

ured to flexibly wrap around the sleeve portion, cover the pocket, and secure the flexible weight in the pocket. The wrapping portion may cover the weight pocket entirely. The wrapping portion may be coupled to the sleeve portion along a first end of the wrapping portion. The wrapping portion may stretch around the sleeve portion to form a layer around the sleeve portion. A second end of the wrapping portion may removably couple with the first end via a hooking mechanism included on the first end and the second end to maintain the wrapping portion in a stretched position. In some implementations, the hooking mechanism may include Velcro and/or other removable coupling mechanisms. In some implementations, the wrapping portion may flexibly wrap around the sleeve portion, cover all and/or substantially all of the weight pockets, and secure the flexible weights in the pockets.

[0012] Another aspect of the disclosure relates to a method for forming a weighted strength training device worn by a user during athletic activity. The method comprises forming a sleeve portion that flexibly form fits around an extremity of the user, forming a weight pocket in the sleeve portion configured to removably carry a flexible weight against the extremity of the user; receiving, with the weight pocket, the flexible weight, the flexible weight configured to substantially conform to a shape of the extremity of the user while the flexible weight is carried by the weight pocket against the extremity of the user; coupling a wrapping portion to the sleeve portion such that the wrapping portion and the sleeve portion form a single piece; and flexibly wrapping the wrapping portion around the sleeve portion to cover the pocket and secure the flexible weight in the pocket.

[0013] In some implementations, the method may include coupling the wrapping portion to the sleeve portion along a first end of the wrapping portion, stretching the wrapping portion around the sleeve portion to form a layer around the sleeve portion, and removably coupling a second end of the wrapping portion with the first end via a hooking mechanism included on the first end and the second end to maintain the wrapping portion in a stretched position.

[0014] In some implementations, the method may include forming a second weight pocket in the sleeve portion, receiving a second flexible weight with the second weight pocket, and flexibly wrapping the wrapping portion around the sleeve portion to cover both pockets and secure both flexible weights in the pockets.

[0015] These and other objects, features, and characteristics of the system and/or method disclosed herein, as well as the methods of operation and functions of the related elements of structure and the combination of parts and economies of manufacture, will become more apparent upon consideration of the following description and the appended claims with reference to the accompanying drawings, all of which form a part of this specification, wherein like reference numerals designate corresponding parts in the various figures. It is to be expressly understood, however, that the drawings are for the purpose of illustration and description only and are not intended as a definition of the limits of the invention. As used in the specification and in the claims, the singular form of “a”, “an”, and “the” include plural referents unless the context clearly dictates otherwise.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. 1 illustrates a weighted strength training device worn by a user between a wrist and an elbow of the user during athletic activity.

[0017] FIG. 2 illustrates the weighted strength training device worn by the user between an ankle and a knee of the user during athletic activity.

[0018] FIG. 3 illustrates components of the device in an unwrapped position.

[0019] FIG. 4 illustrates the device worn on a forearm of a user.

[0020] FIG. 5 illustrates a “small” implementation of the device worn on the forearm of the user.

[0021] FIG. 6 illustrates a “large” implementation of the device worn on the forearm of the user.

[0022] FIG. 7 illustrates an implementation of the device worn on the leg (calf) of the user.

[0023] FIG. 8 illustrates a method for forming a weighted strength training device worn by a user during athletic activity.

DETAILED DESCRIPTION

[0024] FIG. 1 and FIG. 2 illustrate a weighted strength training device **10** worn by a user during athletic activity, during physical therapy, while performing training and/or strengthening rehabilitation exercises, and/or at other times. Weighted strength training device **10** is configured to functionally train the specific muscles used while performing an athletic activity without compromising mechanics. Device **10** may be worn on an extremity (e.g., arm, leg, etc.) of the user, and/or in other locations. In some implementations, device **10** may be worn around an arm of the user (e.g., as shown in FIG. 1) between a wrist and an elbow of the user, around a leg of the user (e.g., as shown in FIG. 2) between an ankle and a knee of the user, and/or in other locations. Device **10** may be configured such that one or more flexible weights may be strategically worn by the user via device **10** to strengthen the user while limiting stress on joints and/or not interfering with natural mechanics of an athletic motion. Device **10** may be configured for training various athletic motions (e.g., running, throwing motions, kicking motions, swinging motions, jumping motions, etc.). Device **10** may be configured such that a user's muscles are strengthened during the athletic activity by placing the muscles under a small but strategically located stress while the muscles are executing the user's desired motion. Device **10** may be configured such that the one or more weights are positioned to put stress on the user's muscles during athletic activity so that the muscles can be actively strengthened without placing an undue amount of stress on a user's ligaments, joints, and/or other portions of a user's body.

[0025] Muscles are adapted to control and move the natural weight of the user's body. When added weight is introduced, the muscles must overcome this added weight to achieve the same result as when the weight was not there. Active strengthening may include putting the muscles under stress (e.g., via device **10**) during physical activity (e.g., during running, throwing, kicking, swinging, jumping, etc.). The muscles are broken down and then, when repaired, are naturally stronger, thus producing higher quality and more powerful athletic movements. Device **10** may be configured such that when adding weights to strengthen a motion, the mechanics of the motion do not substantially change

because of the placement of the weights, amount of weight, geometry of the weights, a way the weights are secured, and/or other factors. By way of several non-limiting examples, a user may wear device **10** while throwing a baseball, throwing a football, shooting a basketball, spiking or setting a volleyball, hitting a tennis ball, hitting a golf ball, running sprints, jumping hurdles, doing the long jump, swimming, punching, kicking and/or while performing other athletic activities and/or other motions.

[0026] In some implementations, device **10** is configured such that the weight is positioned on the arm/leg of the user in a natural position for the body. For example, the weight may be positioned proximate to the large muscle groups of an area of the body (e.g., the large muscle group of the lower arm, calf). Weights may be placed so that the user is able to go through “natural” motions of an athletic activity. Device **10** may be configured such that it does not restrict the user’s natural mechanics when performing the athletic activity. Device **10** may be configured such that the weight strengthens the specific muscles used during the activity because device **10** facilitates training in a manner identical to, and/or substantially similar to normal training. Device **10** may be configured such that it is substantially not necessary for the user to change body movement to compensate for the weight.

[0027] In some implementations, device **10** may be used in programs for muscle rehabilitation, strengthening and recovery in addition to and/or instead of use during athletic activity. Many rehabilitation programs use functional exercises, such as throwing a ball or other functional exercises to help patients recover from injuries or disease. Such exercises may aid in reducing and/or reversing muscle atrophy and may increase bone density. Device **10** may be used during the rehabilitation program when performing functional exercises. Because device **10** may be configured so that it does not interfere with the natural mechanics of the functional exercises, device **10** may facilitate the allowance of more stress applied to the muscles of the user without compromising the form of rehabilitation exercises. This may allow the exercises to be performed with proper form, but with increased stress, making the exercises more effective.

[0028] By way of example, but not limitation, a throwing motion may be repeated using a weighted arm sleeve to strengthen the shoulder. The activity may be performed with or without the additional weight of a ball in the user’s hand. The repetitive activity, done with a therapeutically effective weight and number of repetitions, may aid in recovering strength in an injured shoulder, for example. It should be noted that many of the examples used herein are baseball and/or throwing based examples. This is not intended to be limiting. Device **10** may be used as described herein for any for any athletic activity and/or other activities.

[0029] As shown in FIG. 3, device **10** includes a sleeve portion **12**, a weight pocket **14**, a flexible weight **16** (inside weight pocket **14**), a wrapping portion **18** and/or other components. FIGS. 1 and 2 show device **10** in a wrapped position. FIG. 3 illustrates device **10** in an unwrapped position. In some implementations, the user may unwrap device **10**, move device **10** into a desired position (e.g., on a forearm and/or a calf of the user), insert flexible weight **16** into weight pocket **14** (and/or insert flexible weight **16** before moving device **10** into position), stretch wrapping portion **16** around sleeve portion **12** and weight pocket **14**,

secure wrapping portion **16** in a wrapped position (shown in FIGS. 1 and 2), and then begin athletic activity.

[0030] In some implementations, sleeve portion **12** may be configured to flexibly form fit around an extremity of the user. For example, sleeve portion **12** may form a flexible tube that flexes around the extremity of the user when sleeve portion **12** is moved into a desired position on the extremity of the user. As described above, sleeve portion **12** may be worn around an arm of the user between a wrist and an elbow of the user, around a leg of the user between an ankle and a knee of the user, around the leg of the user between the knee and hip of the user, and/or in other locations. In some implementations (e.g., whether worn on an arm or a leg), sleeve portion **12** may have a thickness of up to about 3 mm. In some implementations, sleeve portion **12** may have a thickness between about 1 mm and about 3 mm. In some implementations, sleeve portion **12** may have a thickness of about 2 mm. In implementations where sleeve portion **12** is worn around the arm of the user between the wrist and the elbow of the user, sleeve portion **12** does not extend to an upper arm (e.g., between the elbow and the shoulder) of the user. A minimal amount of weight used between the elbow and shoulder during training showed very little to no effect when tested and reviewed by therapists, bio-mechanists and orthopedists. Using heavy weight in this area would compromise the user’s mechanics when throwing or swinging. Also, additional material (e.g., neoprene) of sleeve portion **12** worn on and/or around the elbow joint (for example) of the user may be bulky and restrict natural movement of the user.

[0031] As shown in FIG. 3, sleeve portion **12** may be located at a first end **300** of device **10** (e.g., with device **10** in an unwrapped position). Sleeve portion **12** may have a length **314** extending along a first axis **302** (e.g., along the arm and/or the leg of the user) from a second end **304** (e.g., worn on an upper part of the forearm or calf near the elbow or knee) to a third end **306** (e.g., worn on a lower part of the forearm or calf toward the wrist or ankle) of device **10**. The tube formed by sleeve portion **12** may be tapered with the diameter of the tube decreasing from second end **304** toward third end **306** such that sleeve portion **12** has a first diameter **310** at second end **304** and a second diameter **312** at third end **306**. In implementations where sleeve portion **12** is worn on the forearm of the user, length **314** may be up to about 9 inches. In some implementations, length **314** may be between about 5 inches and about 9 inches. In some implementations, length **314** may be about 7 inches. In some implementations, first diameter **310** may be up to about 6 inches. In some implementations, first diameter **310** may be between about 3 inches and about 6 inches. In some implementations, first diameter **310** may be about 4-5 inches. In some implementations, second diameter **312** may be up to about 5 inches. In some implementations, second diameter **312** may be between about 2 inches and about 5 inches. In some implementations, second diameter **312** may be about 3-4 inches.

[0032] In implementations where sleeve portion **12** is worn on the calf of the user, length **314** may be up to about 12 inches. In such implementations, length **314** may be between about 8 inches and about 12 inches. In such implementations, length **314** may be about 9-11 inches. In such implementations, first diameter **310** may be up to about 8 inches. In such implementations, first diameter **310** may be between about 4 inches and about 8 inches. In such imple-

mentations, first diameter **310** may be about 5.75-6.75 inches. In such implementations, second diameter **312** may be up to about 6 inches. In such implementations, second diameter **312** may be between about 3 inches and about 6 inches. In such implementations, second diameter **312** may be about 3.75-4.75 inches.

[0033] In some implementations, sleeve portion **12** may have a taper angle **350** that approximates a taper angle of the extremity of the user (e.g., leg or arm) where the user wears sleeve portion **12**. It should be noted that the dimensions described herein are not intended to be limiting. Strength training device **10** may have any dimensions that allow it to function as described herein.

[0034] Sleeve portion **12** may include weight pocket **14** configured to removably carry flexible weight **16** against the extremity of the user. Weight pocket **14** may be located on an outer side of sleeve portion **12** and/or in other locations such that weight pocket **14** does not irritate skin of the user and/or otherwise disrupt the user during athletic activity. In some implementations, weight pocket **14** may be sized to substantially prevent movement of flexible weight **16** within weight pocket **14**. In some implementations, weight pocket **14** may be formed and/or lined with a material to prevent or reduce movement of flexible weight **16** within weight pocket **14**. In some implementations, sleeve portion **12** may include two or more weight pockets **14**. Weight pockets **14** on sleeve portion **12** may be sized and/or placed as needed and/or desired, and various weight pockets **14** on the same sleeve portion **12** may accommodate different sizes of flexible weights **16**.

[0035] FIG. 4-7 illustrate example implementations of device **10** and weight pocket **14**. FIG. 4 illustrates device **10** worn on a forearm **400** of a user **402**. Weight pocket **14** is configured to removably carry flexible weight **16** against forearm **400** of user **402**. Weight pocket **14** may be located on an outer side **406** of sleeve portion **12** and/or in other locations such that weight pocket **14** does not interfere with user **402** during athletic activity.

[0036] FIG. 5 illustrates a “small” implementation of device **10** worn on the forearm of the user. FIG. 6 illustrates a “large” implementation of device **10** worn on the forearm of the user. “Small” and “large” may refer to and/or provide an indication of diameter **310** and diameter **312** described above, and/or other dimensions of device **10**. For example, in the “small” implementation of device **10** diameter **310** may be about 4 inches and diameter **312** may be about 3 inches. In the “large” implementation of device **10** diameter **310** may be about 5.25 inches and diameter **312** may be about 3.75 inches.

[0037] FIG. 5 illustrates a single weight pocket **14** positioned so that it is approximately centered on first axis **302** toward second end **304**. In some implementations single weight pocket **14** shown in FIG. 5 may have a length **500** of up to about 5 inches. In some implementations, length **500** may be between about 3 inches and about 5 inches. In some implementations, length **500** may be about 4.125 inches. In some implementations, single weight pocket **14** may have a width **502** of up to about 5 inches. In some implementations, width **502** may be between about 3 inches and about 5 inches. FIG. 6 illustrates a first **600** and a second **602** weight pocket **14** positioned such that a centerline between the two pockets lies substantially along first axis **302**. Pockets **600** and **602** may be located toward second end **304** along first

axis **302**. Pockets **600** and **602** may have a length **604** of about 4.125 inches and a width **606** of about 4 inches, for example. In some implementations, width **502** and width **606** may taper in a way that corresponds to the taper of sleeve portion **12**.

[0038] FIG. 7 illustrates an implementation of device **10** worn on the leg (calf) of the user. FIG. 7 illustrates a single weight pocket **14** positioned on sleeve portion **12** so that it is approximately centered between first axis **302** and first end **300**. Single weight pocket **14** shown in FIG. 7 may have a length **700** of about 4.125 inches and a width **702** of about 4 inches, for example. In some implementations, width **702** may taper in a way that corresponds to the taper of sleeve portion **12**. In some implementations, weight pocket(s) **14** (e.g., weight pockets **14** shown throughout the figures, not just weight pocket **14** shown in FIG. 7) may have a wall thickness of up to about 4 mm. In some implementations, the wall thickness may be between about 1 mm and about 4 mm. In some implementations, the wall thickness may be about 2 mm. It should also be noted that the number and position of weight pocket(s) **14** shown in FIG. 4-7 is not intended to be limiting. Sleeve portion **12** may include any number of weight pockets positioned in any location which allows device **10** to function as described herein.

[0039] Flexible weight(s) **16** may be configured to substantially conform to a shape of the extremity of the user while flexible weight **16** is carried by weight pocket **14** against the extremity of the user. Weight that is thin, flexible, and conforms to the extremity of the user helps prevent the weight and sleeve from slipping down during activity, and/or functions in other ways. For example, as shown in FIG. 4, flexible weight **16** may wrap around an arm or a leg of the user while flexible weight **16** is in weight pocket **14**. Flexible weight **16** may be positioned on the back of the user's forearm proximate to the elbow, on the back of a user's calf, and/or in other locations when device **10** is worn by the user.

[0040] In general, flexible weight **16** may have any weight (e.g., mass) and/or dimensions that allow device **10** to function as described herein. However, weights that are too heavy and/or too large may disrupt mechanics of an athletic motion performed by the user during athletic activity. In implementations where sleeve portion **12** is worn between the wrist and the elbow of the user, flexible weight **16** may have a weight/mass of about up to about 6 oz. In such implementations, the weight/mass may be between about 2 oz and about 6 oz. In such implementations, the weight/mass may be about 4 oz. In such implementations, flexible weight **16** may have a length of up to about 4 inches. In such implementations, the length may be between about 3 inches and about 4 inches. In such implementations, the length may be about 3.5 inches. In such implementations, flexible weight **16** may have a width of up to about 4 inches. In such implementations, the width may be between about 3 inches and about 4 inches. In such implementations, the width may be about 3.5 inches. In such implementations, flexible weight **16** may have a thickness of up to about 0.5 inches. In such implementations, the thickness may be between about 0.1 inches and about 0.5 inches. In such implementations, the thickness may be about 0.25 inches.

[0041] In implementations where the sleeve portion is worn between the ankle and the knee of the user, flexible weight **16** may have a weight/mass of about up to about 6 oz. In such implementations, the weight/mass may be between about 2 oz and about 6 oz. In such implementations, the

weight/mass may be about 4 oz. In such implementations, flexible weight **16** may have a length of up to about 4 inches. In such implementations, the length may be between about 3 inches and about 4 inches. In such implementations, the length may be about 3.5 inches. In such implementations, flexible weight **16** may have a width of up to about 4 inches. In such implementations, the width may be between about 3 inches and about 4 inches. In such implementations, the width may be about 3.5 inches. In such implementations, flexible weight **16** may have a thickness of up to about 0.5 inches. In such implementations, the thickness may be between about 0.1 inches and about 0.5 inches. In such implementations, the thickness may be about 0.25 inches. As described above, these dimensions are not intended to be limiting. Device **10** (including flexible weight **16**) may have any dimensions that allow it to function as described herein.

[0042] In some implementations, flexible weight **16** may comprise a series of two or more flexible weights **16** having incrementally different masses, wherein the series of two or more flexible weights **16** are used interchangeably by the user in weight pocket(s) **14** during athletic activity. In some implementations, the total weight/mass of flexible weight **16** may be (equally and/or unequally) distributed between one or more flexible weights **16** (e.g., carried by one or more weight pockets **14**), and/or other portions of device **10**.

[0043] In some implementations, flexible weight **16** may be formed from one or more of polymeric materials, metallic materials, ceramic materials, and/or other materials. In some implementations, flexible weight **16** may be coated and/or otherwise covered with a coating and/or other layer of material to allow flexible weight **16** to be more easily slipped into a weight pocket **14** of device **10**. For example, in some implementations, flexible weight **16** may be surrounded by Lycra and/or other smooth materials to make flexible weight **16** easier to insert in a weight pocket **14**. As another example, flexible weight **16** may be formed from a thermoplastic elastomer with a granulated iron powder mix. In some embodiments, flexible weight **16** may be formed from about 60% thermoplastic elastomer and about 40% granulated iron powder. These percentages are not intended to be limiting. The present application contemplates forming flexible weight **16** with anything from about 1% to about 99% thermoplastic elastomer, and correspondingly about 1% to about 99% granulated iron powder (e.g., 90% thermoplastic elastomer/10% granulated iron powder, 50% thermoplastic elastomer/50% granulated iron powder, 10% thermoplastic elastomer/90% granulated iron powder, etc.) such that flexible weight **16** functions as described herein.

[0044] Weight pocket(s) **14** may be configured such that flexible weights **16** may be positioned so that the athletic activity does not place undue stress on joints of the user (e.g., as shown in FIG. 5-7). The amount of stress on a joint may be proportional to a distance at which a force is applied. Thus, the further away a flexible weight **16** is from a joint, the more stress the joint will undergo moving flexible weight **16**. In some implementations, flexible weight **16** may be placed such that performing an athletic activity with flexible weight **16** targets the flexor muscles of the forearm (e.g., when device **10** is worn on the forearm of the user). In this example, flexible weight **16** may be placed on a posterior portion of the forearm. Flexible weight **16** may be substantially centered on the back of the forearm (e.g., as shown in FIG. 4) and/or may be positioned to the medial or lateral side. Weight pocket **14** may be configured such that flexible

weight **16** is not placed on the anterior of the forearm as such placement may inhibit bending of the arm and/or may interfere with the user's natural athletic motion. In some implementations, weight pocket **14** may be configured such that flexible weight **16** may be placed in other locations including the anterior portion and/or medial sides of the arm. Regardless of placement, flexible weight(s) **16** may be positioned and/or the amount of weight/mass selected so that flexible weight(s) **16** do not interfere with the natural motion of the user's body when performing the athletic activity. That is, the flexible weights **16** may be selected and/or device **10** configured so that the user does not have to change the form his or her natural motions during athletic activity.

[0045] To reduce stress on the elbow, weight pocket **14** may be configured such that flexible weight **16** is placed so that the center of mass of flexible weight **16** (and/or multiple flexible weights **16**) falls at or near the upper $\frac{1}{2}$ of the forearm, at or near the upper $\frac{1}{3}$ of the forearm of the user, and/or in other locations. In some implementations, weight pocket **14** may be configured such that significant (e.g., enough weight to cause strengthening of the muscles of the arm) weight is not placed at or near the lower $\frac{1}{3}$ of the forearm near the wrist because the benefits of placing weight here do not outweigh the risks or possible bad habits that may occur. For example, weight on the wrist area of the user may be detrimental to the mechanics of some athletic motions such as throwing a baseball. For baseball in particular, the body can confuse itself into redefining a release point (when the ball leaves the hand) to account for the added weight. Not only are the throwing mechanics potentially compromised, but the added stress on the elbow and shoulder joints may be increased (e.g., because weights on the wrist area cause more force to be applied to the user's arm at a greater distance away from the joints). However, in some non-baseball implementations for example, weight may be placed proximate to the user's wrist.

[0046] As shown in FIG. 3 and FIG. 5-7, wrapping portion **18** may be coupled to sleeve portion **12** such that wrapping portion **18**, sleeve portion **12**, weight pocket(s) **14**, and/or other components of device **10** form a single piece. In some implementations, wrapping portion **18**, sleeve portion **12**, and/or other components of device **12** may be formed from a single unitary panel of material and/or from multiple panels of material. In some implementations, wrapping portion **18**, sleeve portion **12**, weight pocket **14**, and/or other components of device **10** may be formed from multiple individual panels of material that are stitched and/or otherwise coupled together.

[0047] Wrapping portion **18** may be configured to flexibly wrap around sleeve portion **12**, cover weight pocket **14**, and secure flexible weight **16** in weight pocket **14**. Wrapping portion **18** may help secure weight **16** so weight **16** does not cause sleeve portion **12** to slide (e.g., up or down the extremity of the user) during activity and/or at other times. In some implementations, wrapping portion **18** may cover weight pocket **14** entirely. Wrapping portion **18** may be configured to wrap in a clockwise or a counter-clockwise direction around sleeve portion **12**. Wrapping portion **18** may be coupled to sleeve portion **12** along a first end **500** of wrapping portion **18**. Wrapping portion **18** may stretch around sleeve portion **12** to form a layer around sleeve portion **12**. Wrapping portion **18** may stretch around sleeve portion **12** to form a layer around sleeve portion **12** such that a portion **525** of sleeve portion **12** protrudes from under-

neath the layer formed by wrapping portion 18. In implementations that include multiple weight pockets 14 and/or multiple flexible weights 16, wrapping portion 18 may flexibly wrap around sleeve portion 12, cover all and/or substantially all of the weight pockets 14, and secure the flexible weights 16 in weight pockets 14.

[0048] A second end 502 of wrapping portion 18 (e.g., located at a fourth end 308 of device 10) may removably couple with first 500 end via a hooking mechanism 520 included on first end 500 and second end 502 to maintain wrapping portion 18 in a stretched wrapped position. In some implementations, hooking mechanism 520 may be and/or include Velcro, buttons, a zipper, and/or other removable coupling mechanisms. For example, as shown in FIG. 5-7, hooking mechanism 520 includes a Velcro loop portion 522 and a Velcro hook portion 524. In some implementations, loop portion 522 may be located at or near first end 500 and may have a width 526 of up to about 3 inches. In some implementations, width 526 may be between about 1 inch and about 3 inches. In some implementations, width 526 may be about 2 inches. Velcro hook portion 524 may be located on an opposite side of wrapping portion 18 relative to loop portion 522 at or near second end 502. In some implementations, hook portion 524 may have a width 528 of up to about 2 inches. In some implementations, width 528 may be between about 0.5 inches and about 2 inches. In some implementations, width 528 may be about 1 inch.

[0049] Wrapping portion 18 may have an arcuate shape and/or other shapes. Wrapping portion 18 may have a length 514 extending along first axis 302 (e.g., along the arm and/or the leg of the user) from second end 304 toward a third end 306 of device 10. Wrapping portion 18 may have a width 516 extending from first end 500 to second end 502. In some implementations, width 516 may decrease from second end 304 toward third end 306 such that width 516 of wrapping portion 12 corresponds to the changing diameter (e.g., 310, 312) and/or taper angle 350 (FIG. 3) of sleeve portion 12. In implementations where device 10 is worn on the forearm of the user, length 514 may be up to about 6 inches. In such implementations, length 514 may be between about 5 inches and about 6 inches. In such implementations, length 514 may be about 5.5 inches. In such implementations, width 516 may range from about 12 inches at second end 304 to about 10 inches toward third end 306, for example. In such implementations, portion 525 of sleeve portion 12 that protrudes from underneath the layer formed by wrapping portion 18 may have a length 527 of up to about 2 inches. In such implementations, length 527 may be between about 1 inch and about 2 inches. In such implementations, length 527 may be about 1.5 inches. In implementations where device 10 is worn on the calf of the user (FIG. 7), length 514 may be up to about 6 inches. In such implementations, length 514 may be between about 5 inches and about 6 inches. In such implementations, length 514 may be about 5.5 inches. In such implementations, width 516 may range from about 14 inches at second end 304 to about 12 inches toward third end 306, for example. In such implementations, portion 525 of sleeve portion 12 that protrudes from underneath the layer formed by wrapping portion 18 may have a length 529 of up to about 5 inches. In such implementations, length 529 may be between about 3 inches and about 5 inches. In such implementations, length 529 may be about 4 inches. In some implementations (e.g., whether worn on an arm or a leg), wrapping portion 18 may

have a thickness of up to about 3 mm. In some implementations, wrapping portion 18 may have a thickness between about 1 mm and about 3 mm. In some implementations, wrapping portion 18 may have a thickness of about 2 mm. (Again here, these dimensions are not intended to be limiting.)

[0050] In some implementations, sleeve portion 12, weight pocket 14, wrapping portion 18, and/or other portions of device 10 may be formed from a resilient material and/or other materials. The resilient material may be and/or include a neoprene compression fabric and/or other materials. In some implementations, sleeve portion 12, weight pocket 14, wrapping portion 18, and/or other portions of device 10 may be formed from flexible material that is form fitting. Compression fabric materials that are and/or include neoprene may provide compression while allowing fluid motion during use. Additionally, these materials may keep muscles warm during use, reducing fatigue and preventing and/or reducing delayed onset muscle soreness. In some implementations, sleeve portion 12, weight pocket 14, wrapping portion 18, and/or other portions of device 10 may be formed from different materials. Different materials for individual components of device 10 may be selected based on desired material properties for an individual component. In some implementations, sleeve portion 12, weight pocket 14, wrapping portion 18, and/or other portions of device 10 may be formed from neoprene L foam with Neospan (lycra) fabric coupled to the foam on both sides, and/or other materials.

[0051] FIG. 8 illustrates a method 800 for forming a weighted strength training device worn by a user during athletic activity. The operations of method 800 presented below are intended to be illustrative. In some implementations, method 800 may be accomplished with one or more additional operations not described, and/or without one or more of the operations discussed. Additionally, the order in which the operations of method 800 are respectively illustrated in FIG. 8 and described below is not intended to be limiting.

[0052] At an operation 802, a sleeve portion that flexibly form fits around an extremity of a user may be formed. The sleeve portion may form a flexible tube that flexes around the extremity of the user when the sleeve portion is moved into a desired position on the extremity of the user. In some implementations, the sleeve portion may be worn around an arm of the user between a wrist and an elbow of the user, around a leg of the user between an ankle and a knee of the user, and/or in other locations. Operation 802 may be performed by a sleeve portion that is the same as or similar to sleeve portion 12 (shown in FIG. 3 and described herein).

[0053] At an operation 804, a weight pocket may be formed in the sleeve portion. The weight pocket may be configured to removably carry a flexible weight against the extremity of the user. The weight pocket may be located on an outer side of the sleeve portion and/or in other locations such that the weight pocket does not irritate skin of the user during athletic activity. In some implementations, the sleeve portion may include two or more weight pockets. Operation 804 may be performed by a weight pocket that is the same as or similar to weight pocket 14 (shown in FIG. 3 and described herein).

[0054] At an operation 806, the flexible weight may be received with the weight pocket. The flexible weight may be configured to substantially conform to a shape of the extrem-

ity of the user while the flexible weight is carried by the weight pocket against the extremity of the user. In some implementations, the flexible weight may comprise a series of two or more flexible weights having incrementally different masses, wherein the series of two or more flexible weights are used interchangeably by the user in the weight pocket(s) during athletic activity. In some implementations, two or more of the weights may be used at the same time (e.g., one weight per pocket in implementations with multiple pockets). Operation **806** may be performed by a weight pocket that is the same as or similar to weight pocket **14** (shown in FIG. **3** and described herein).

[0055] At an operation **808**, a wrapping portion may be coupled to the sleeve portion. The wrapping portion may be coupled to the sleeve portion such that the wrapping portion and the sleeve portion form a single piece. The wrapping portion may be coupled to the sleeve portion along a first end of the wrapping portion. The wrapping portion may stretch around the sleeve portion to form a layer around the sleeve portion. A second end of the wrapping portion may removably couple with the first end via a hooking mechanism included on the first end and the second end to maintain the wrapping portion in a stretched position. In some implementations, the hooking mechanism is Velcro and/or other removable coupling mechanisms. Operation **808** may be performed by a wrapping portion that is the same as or similar to wrapping portion **18** (shown in FIG. **3** and described herein).

[0056] At an operation **810**, the wrapping portion may be wrapped around the sleeve portion to cover the weight pocket and secure the flexible weight in the weight pocket. The wrapping portion may cover the weight pocket entirely. In some implementations, the wrapping portion may flexibly wrap around the sleeve portion, cover all and/or substantially all of the weight pockets, and secure the flexible weights in the pockets. Operation **810** may be performed by a wrapping portion that is the same as or similar to wrapping portion **18** (shown in FIG. **3** and described herein).

[0057] Although the system(s) and/or method(s) of this disclosure have been described in detail for the purpose of illustration based on what is currently considered to be the most practical and preferred implementations, it is to be understood that such detail is solely for that purpose and that the disclosure is not limited to the disclosed implementations, but, on the contrary, is intended to cover modifications and equivalent arrangements that are within the spirit and scope of the appended claims. For example, it is to be understood that the present disclosure contemplates that, to the extent possible, one or more features of any implementation can be combined with one or more features of any other implementation.

What is claimed is:

1. A weighted strength training device worn by a user during athletic activity, the device comprising:

a sleeve portion configured to flexibly form fit around an extremity of the user, the sleeve portion including a weight pocket configured to removably carry a flexible weight against the extremity of the user;

the flexible weight, the flexible weight configured to substantially conform to a shape of the extremity of the user while the flexible weight is carried by the weight pocket against the extremity of the user; and

a wrapping portion coupled to the sleeve portion such that the wrapping portion and the sleeve portion form a

single piece, the wrapping portion configured to flexibly wrap around the sleeve portion, cover the weight pocket, and secure the flexible weight in the weight pocket.

2. The device of claim **1**, wherein the wrapping portion is coupled to the sleeve portion along a first end of the wrapping portion, wherein the wrapping portion stretches around the sleeve portion to form a layer around the sleeve portion, and wherein a second end of the wrapping portion removably couples with the first end via a hooking mechanism included on the first end and the second end to maintain the wrapping portion in a stretched position.

3. The device of claim **2**, wherein the hooking mechanism is Velcro.

4. The device of claim **1**, wherein the weight pocket is located on an outer side of the sleeve portion such that the weight pocket does not irritate skin of the user during athletic activity.

5. The device of claim **1**, wherein the wrapping portion covers the weight pocket entirely.

6. The device of claim **1**, further comprising a second weight pocket included in the sleeve portion and a second flexible weight, wherein the wrapping portion flexibly wraps around the sleeve portion, covers both pockets, and secures both flexible weights in the pockets.

7. The device of claim **1**, wherein the sleeve portion forms a flexible tube that flexes around the extremity of the user when the sleeve portion is moved into a desired position on the extremity of the user.

8. The device of claim **1**, wherein the sleeve portion is worn around an arm of the user between a wrist and an elbow of the user.

9. The device of claim **8**, wherein the flexible weight has a mass of about 4 oz.

10. The device of claim **8**, wherein the flexible weight has a length of about 3.5 inches, a width of about 3.5 inches, and a thickness of about 0.25 inches.

11. The device of claim **1**, wherein the sleeve portion is worn around a leg of the user between an ankle and a knee of the user.

12. The device of claim **11**, wherein the flexible weight has a mass of about 4 oz.

13. The device of claim **11**, wherein the flexible weight has a length of about 3.5 inches, a width of about 3.5 inches, and a thickness of about 0.25 inches.

14. The device of claim **1**, wherein the sleeve portion and the wrapping portion are formed from a resilient material.

15. The device of claim **1**, wherein the flexible weight comprises a series of two or more flexible weights having incrementally different masses, wherein the series of two or more flexible weights are used interchangeably by the user in the weight pocket during athletic activity.

16. The device of claim **1**, wherein the flexible weight is formed from a polymeric material.

17. The device of claim **1**, wherein the flexible weight has material properties including an elastic modulus configured to facilitate movement of the flexible weight to substantially conform to the shape of the extremity of the user while the flexible weight is carried by the weight pocket against the extremity of the user.

18. A method for forming a weighted strength training device worn by a user during athletic activity, the method comprising:

forming a sleeve portion that flexibly form fits around an extremity of the user,
forming a weight pocket in the sleeve portion configured to removably carry a flexible weight against the extremity of the user;
receiving, with the weight pocket, the flexible weight, the flexible weight configured to substantially conform to a shape of the extremity of the user while the flexible weight is carried by the weight pocket against the extremity of the user;
coupling a wrapping portion to the sleeve portion such that the wrapping portion and the sleeve portion form a single piece; and
flexibly wrapping the wrapping portion around the sleeve portion to cover the weight pocket and secure the flexible weight in the weight pocket.

19. The method of claim **18**, further comprising coupling the wrapping portion to the sleeve portion along a first end of the wrapping portion, stretching the wrapping portion around the sleeve portion to form a layer around the sleeve portion, and removably coupling a second end of the wrapping portion with the first end via a hooking mechanism included on the first end and the second end to maintain the wrapping portion in a stretched position.

20. The method of claim **18**, further comprising forming a second weight pocket in the sleeve portion, receiving a second flexible weight with the second weight pocket, and flexibly wrapping the wrapping portion around the sleeve portion to cover both pockets and secure both flexible weights in the pockets.

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