RESISTANCE EXERCISE GARMENT

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ABSTRACT

A resistance exercise garment includes a tunnel mounted on a pant or on a lower part of a vest with a pair of resistance members extending through the tunnel. One end of each resistance member is anchored to the pant or vest near the tunnel and the other end is detachably fastened to an anchor member on a top or shirt. The exercise garment may alternatively include a reel system mounted on the pant or vest with a resistance element wrapped around a reel in the reel system. Each free end of the resistance element is detachably fastened to an anchor member on the sleeve of a top.
RESISTANCE EXERCISE GARMENT

BACKGROUND OF THE INVENTION

[0001] A particularly desirable form of exercise is the provision of a resistance exercise garment. Various forms of such garments have been suggested. The general approach used is to provide some form of stretchable elastic resilient resistance element which would be anchored at two spaced portions of the garment, such as between a limb and the body portion or torso or between limbs, such as between an arm and a leg. As a result, when the user or wearer of the garment performs an activity involving movement of the arms or legs the movement is resisted by the resistance element which is stretched during the movement and then the resistance element urges the arm and/or leg back to the unstretched condition.

SUMMARY OF THE INVENTION

[0002] An object of this invention is to provide an improved resistance exercise garment.

[0003] A further object of this invention is to provide such a garment which provides resistance elements that can be located on the garment in a generally inconspicuous manner.

[0004] A further object of this invention is to provide such a garment which includes resistance elements adjustable in their resistance characteristics.

[0005] In accordance with this invention one form of the garment may include a pants having a wide elastic waistband. A tunnel is provided below the waistband such as at the rear of the garment. A resistance cord, such as a tubing, would removably be inserted through the tunnel. The resistance cord could include a fastener for being clipped to an anchor point on the garment such as a mill or workout glove worn on the user's hand. During periods of non-use the resistance cord and mill could be placed in a pocket so as to be stored out of sight and permit the pants to be worn as a normal pants.

[0006] In another form of this invention the garment includes a shirt which preferably has long sleeves with a plurality of anchor sites located downwardly on the forearm section of the sleeve. A hand covering or engagement member, such as a glove or mitt could be detachably mounted to the free end of the sleeve to provide a further anchor site. In addition, the sleeve could include a loop across the open end which could serve as a thumb loop during use.

[0007] In still another form of this invention the resistance element could be in the form of a cord mounted around a reel located on the garment such as at the pants. The advantage of using a reel for the resistance element is that during the stretching of the limb which pulls on the resistance element, a linear force is applied regardless of the degree of stretching rather than having a progressively increasing force being applied in accordance with the increasing degree of stretching.

THE DRAWINGS

[0008] FIG. 1 is a rear elevational view of a portion of a resistance exercise garment in the form of pants.

[0009] FIG. 2 is a fragmental front elevational view of a portion of the garment shown in FIG. 1;

[0010] FIGS. 3-5 are front or rear elevational views of variations of the pants form of resistance garment;

[0011] FIG. 6 is a rear elevational view showing a resistance garment which includes a cord mounted on a reel;

[0012] FIG. 7 is a top plan view of the cord reel system of FIG. 6;

[0013] FIGS. 8-11 are front or rear elevational views of various forms of resistance exercise garments utilizing the shirt portion of the garment;

[0014] FIG. 12 is a rear elevational view showing the pants of FIG. 1 used with a top;

[0015] FIG. 13 is a front elevational view showing a garment in the form of a vest in accordance with this invention;

[0016] FIG. 14 is a rear elevational view of the vest shown in FIG. 13; and

[0017] FIG. 15 is a side elevational view showing a garment in accordance with this invention in use.

DETAILED DESCRIPTION

[0018] In general there are two basic forms of resistance clothing: (1) the resistance is permanently attached to or an integral part of the garment and (2) the resistance is partially or completely detachable from the garment. The present invention in its preferred practices is directed to clothing wherein the resistance is completely or partially detachable from the garment such as the top/shirt or vest or pant. There are many benefits of this type of arrangement including: the clothing can be more loose fitting, thus being more comfortable, easy to get in and out of and easier to size; the clothing can be more ordinary looking, thus being cheaper and easier to manufacture; by being cheaper to manufacture, the clothing can be more profitable to the manufacturer or distributor of the clothing; by being cheaper to manufacture the clothing can be priced lower and thus attract a larger market; the user can have the option of using the clothing with our without the resistance engaged, thereby providing more versatility and workout appeal; by being more ordinary or traditional looking the clothing can also have a broader market appeal and be more readily acceptable to the consumer; and the level of resistance can be changed by adjusting the length of the resistance element (e.g. tube band) or by interchanging resistance elements of different strengths.

[0019] In general, the resistance element could be of any suitable kind such as springs, elastic bands, stretch fabric, cords and fixed brake mechanisms, hydraulic or pneumatic, weights, etc. The preferred form of resistance element is an elastic band, tube or cord such as a spandex band or rubber tube. These have the advantage of being low cost and light weight.

[0020] In one form of the invention, one or more elastic tubings or bands can easily be attached and detached from the arms and/or legs and torso. In the partially detachable forms, one end of the resistance element can be permanently attached or anchored to the garment, vest, top, pant, leg or arm (or any part of the garment) while the other end is
detachable. The resistance element can be attached permanently by any suitable means. The resistance element can also be detachable or attached by any suitable means, including for example snaps, buttons, clips, hooks, hasps, post/hole, velcro, belts, straps, ties, buckles, etc.

[0021] In one form of the invention, the resistance element is a tube or band that is completely detachable from the garment. The tube or band is easily and quickly attached or detached by a hand clip on each end of the tube or band, that clips onto/off a ring or hasp permanently attached to the garment. The ring or hasp can be of any material and attached in any suitable manner, preferably the ring or hasp is a soft strong material such as nylon web that is sewn onto the garment. Thus it is soft for comfort but strong to anchor one end of the resistance element. The ring or hasp also preferably is not too wide or flat but rather more round or narrow so that it can be easily clipped onto and off. The advantage of such a system is that the resistance can be easily attached/engaged and detached/disengaged during a workout by manipulating one or more ends of the resistance element. The resistance can also be easily interchanged from one strength band/tube to another. The resistance element can also be easily removed for washing.

[0022] The resistance level can be changed by the addition of one or more band/tube (i.e. multiple bands/tubes). This allows for different levels of resistance while using a band/tube of one standard strength.

[0023] Where the resistance elements are used in connection with the top or shirt portion of the garment, one form of resistance element would be a band or tube having a hand clip on each end. Each end of the band/tube would then be clipped to a ring/hasp on each arm. The band/tube would run in back of the user, and apply resistance on the forward swing. The band/tube would not be sewn to the garment but could slide freely in a fabric tunnel. When not in use, the band/tube could retract into the fabric tunnel for a neat appearance and out of sight storage.

[0024] In a preferred form of the invention there are two bands/tubes, one for each arm. Each band/tube has a clip at each end, one end is clipped to a ring/hasp on the back of the garment in the fabric tube and the other end is clipped to the arm. Thus each arm has a dedicated resistance element that has a better anchor point and resistance elements of different strength can be matched to each arm. Each resistance element can be adjusted in length for a more comfortable swing and/or to alter the level of resistance.

[0025] A plurality of clips/rings in the back allows the band/tube to be attached at different points and thus can also adjust the level of resistance and the comfort of the swing range of motion. The lower half of the top in a preferred practice on the invention is long with elastic/spandex panels that anchor the top around the hips and lower abdomen and also flatten the mid-belly section. This is a preferred form since the pull of the arm swing tends to make the top ride up on the hips.

[0026] A preferred form of pant is one which uses suspenders and has a wide elastic/spandex top or waist portion to help anchor the pants over the hips and also to flatten the mid-section.

[0027] In a preferred practice of the invention the resistance structure is semi or partially detachable. Any type of structure can be used to adjust the garment width wise or length wise together. Preferably the garment (top and/or pant) is adjusted width wise to change the tension or strength of the resistance bands. The structures used to adjust/tension the resistance can be of any suitable kind such as straps, velcro, loops, hook/loop, hasp, hasp/loop, buttons, belt, buckles, drawstrings, strap and buckle, snaps, etc. Straps and snaps are particularly advantageous.

[0028] Another aspect of this invention is to provide a method of producing and varying the performance by changing one or more of the following variables:

[0029] (1) GARMENT DESIGN—the number of pieces and type of pieces worn (top and/or pant); the strength of resistance; the angle of resistance relative to the muscle range of motion; the stretch of resistance, ability of resistance to stretch over the entire length of motion; integrity of anchor points, the less the anchor point for the resistance element moves the stronger the resistance will be; size—if too large there will be too much slack and performance can be reduced, but if too small then a compression effect takes place and the performance can be reduced.

[0030] (2) TECHNIQUE—the best technique is normal motion and range. Technique is usually a modified version of natural motion to take full advantage of the resistance; technique emphasizes a full range of motion to increase the distance of exertion against resistance; the technique includes a level of exertion that is high enough to take full advantage of the resistance in the garment.

[0031] (3) USER—The strength of the garment should be matched to the strength of the user; training the user over time to use the proper form results in taking advantage of the resistance design; training the user to work hard exerts the user against the resistance and maximizes a workout benefit.

[0032] One of the features of this invention is the structures that anchor the resistance eliminating slack and tensioning the resistance while also helping make the garment easy to size and to wear and to take on and off. The following are effective structures for anchoring the resistance element. A glove, mitt or thumb/finger loop or a loop could be used. Wrist wraps can also be helpful. The anchor structure could have rows of snaps on the forearm, wrist and/or hand structure thereby permitting both adjustability and detachability of the resistance element. A tapered sleeve could be used to anchor the sleeve in the forearm area. In addition, an elastic wrist band would be helpful. A short sleeve would help insure tension and anchor pressure. A non-flexible ring below or preferably above the elbow can be used to anchor the resistance element. The resistance element preferably runs under the elbow so that when the arm is bent, the elbow moves into the resistance and helps to make another anchor point when the forearm is moved in a backward direction. A short strong resistance band that runs under the elbow and to the wrist or hand that puts resistance on the forearm/hand/ wrist when they are moved in a backward direction helps anchor and tension the upper part of the arm, shoulders, back and chest. In addition, the following structures are effective such as a non-flexible ring above the elbow, the inside of the ring could be padded to reduce rubbing and to add comfort. The resistance bands can run across the back and chest and down the arms. Straps, hooks and loops, buttons, velcro strap, straps and snaps, belt and buckles, drawstrings, adjustable buckles and straps, straps and buttons, etc. could be
used to pull each side of the top together thereby increasing the tension/resistance on the upper body. These structures can be on one or more of the backside and front of the garment. Having an elastic portion at the waist also helps anchor the top. Drawstrings at the waist further help anchor the top as well as a wide elastic waist and a belt at the waist. Straps that pull against the abdominal panel of the top help anchor the top. Snaps toward the bottom side of the top that can be snapped into snaps in the pants anchor and tension the top. This can also be done with also male/female types of attachment structure such as hook/loop, velcro, etc.

The following structures are effective to anchor and tension the leg: snaps on the side or back/front of the pant that snap into the top at various levels; a drawstring at the waist; an elastic waist; a wide/elastic waist cut; snaps or other means that can be used to draw the sides or legs of the pant together; a non-flexible ring above or below the knee; stretch resistance that runs down the leg; stirrup or half-sock that connects to the leg of the pant; a resistance band(s) that is short and strong that draws the lower leg/foot backwards toward the thigh and puts resistance in the lower leg when it is swung/moved forwardly; an elastic band that runs from the outside of the knee and preferably below it across the buttocks or above or below the buttocks to the opposite hip side and even around to the front abdominal panel where it is anchored permanently or passes through a loop and pulls back on each side of the abdominal panel. This flattens the stomach area while at the same time producing an inward and backward tension on the leg that is also at a lower angle that is very effective in making the leg work harder; and a tensioning strap or band that runs from one leg of the garment to the other leg of the garment to preclude an inwardly directed pressure that also provides resistance to the forward motion of the leg. A preferred form of these structures is when they are detachable or semi-detachable so that they provide adjustable positions to vary the amount of tension/resistance and also help in making the garment comfortable to wear, easy to size and take on and off.

The invention in its various practices have great utility in that the garment can be easily and inexpensively adapted to all types of clothing, particularly non-elastic garments such as traditional cotton jerseys and sweat pants. The invention converts regular clothing into resistance workout gear with a minimum of expense. In this aspect of the invention, the clothing is primarily a base fabric which is non-elastic and the resistance comes from one or more elastic bands or straps that can be permanently attached to the garment but are preferably partially or completely detachable. A preferred form is an elastic band/strap whose length can be adjusted by means of a buckle or other suitable fastener. The ends of the bands/straps are attached to a side of a top or to the leg of a pant. Any attachment structure can be used such as snaps, velcro, hook/loop, buttons, drawstring, clips, etc. By adjusting the length of the elastic strap or band the user can attain the correct strength of resistance over the range of motion for the arms or legs. Anchor points for the arms, wrists or hands include gloves, mitts, thumb/thumb loops, elastic wrist, tapered elastic forearm, elastic wrist, drawstrings at the waist, a belt and snaps that snap to the pants. Anchor structure for the pants include an elastic waist, drawstrings, a belt, buckle, suspenders and snaps that snap to the top. An elastic portion below the knee and a sock, half-sock or stirrup can be used on the pant. In one practice of the invention the top has an elastic strap whose length can be adjusted by a buckle or a series of snaps. Each end is hooked or sewn to a hasp, the hasps are wide apart on each side of the top, preferably on the back top half of the top. The strap/strap runs left to right or horizontally. The wider the hasps are apart the larger the range of adjustment for the resistance can be. Preferably a completely detachable band/strap is used so that a stronger or weaker elastic strap can be interchanged as the user prefers.

The invention can be practiced where the garment could be marketed as a conversion kit that is sewn into a garment but preferably the garment is manufactured with the resistance system already built in. A preferred form for the pant is a partially or completely detachable elastic band/strap. The ends of which attach to the pant leg, preferably just below the buttocks and preferably above the knee. By adjusting the length of the strap/strap the user can get an acceptable level of resistance over the length of his/her particular stride. The pant has a high elastic waist that has one or more drawstrings. Both the top and the pant can have an elastic abdominal panel that helps to flatten, support and shape the abdominal region. The pant preferably has a half-sock or stirrup for the foot. The stirrups for the foot and the glove, mitt, thumb/thumb loop can be elastic or non-elastic.

An advantage of the invention is that it makes the garment easy to size, have a broader range of styles and be more comfortable. In addition the pant, top or other garment portion that has attachment structure for the band/strap provides the ability to have the resistance element detachable or to be semi-detachable or even permanently attached to the garment.

The invention can be practiced at various types of resistance elements such as springs, elastic bands, elastic cords and elastic rubber tubing. An advantage of such tubing is that the tubing has a stretch characteristic where it can stretch the full length of an arm or leg swing but completely recovers to its original length, thus the tubing provides resistance over the entire range of motion. The tubing is also strong so it can be stretched repeatedly without breaking. The tubing can be manufactured or provided in different lengths, colors, strengths, diameters and wall thickness. The length allows for different sizes of people and arm/leg swings. The strength allows or fits people of different muscular strength and can provide a progressive exercise system. The color can be for style and/or strength differentiation. For example, one color may be used to indicate a high strength tubing, while a contrasting color could indicate a lower strength tubing. The tubing has a means of attachment/detachment on each end, preferably a finger clip that can easily and quickly clip on and off by hand. One end of the tubing attaches to the garment and serves as the anchor/ base that is pulled against when the arm/leg swings. The other end of the tubing attaches directly or indirectly to an arm/hand/wrist or leg/ankle/foot. The tubing can attach by any suitable structure including loops, clips, rings, snaps, hooks, gloves, mitts.

A particularly advantageous arrangement is where the resistance system of a pant or short can be independent of the shirt or top. In the independent mode the tubing is clipped onto the pant loops, preferably on opposite sides of the arm or leg being swung. Each tube crosses over each other in the back to reach the opposite arm. A fabric tunnel
can be used to conceal or contain the tubing for a neater appearance or style. The tunnel also serves to position the tubing vertically and/or horizontally. The other end of the tubing has a means to attach to the hand or arm means such as a loop, snap, glove or grip can be used. Preferably a stretchable mitt is used that has a ring to which a finger clip at the end of the tube can attach. The mitt distributes the pressure from the elastic tube comfortably over the entire hand and permits an open loose grip so that the hand will not cramp or tire. This greatly facilitates ease of swinging over and over without fatigue. An open or loose grip also promotes lower blood pressure and lets the muscles of the arm relax. In this way the open or loose grip promotes a loose natural swing that helps the whole body to coordinate and a natural swing exercise that is very comfortable yet very effective. When not in use the mitts can be quickly and easily disengaged by the finger clip and stored in a pocket on the pants.

[0039] FIGS. 1-2 illustrate one embodiment of this invention wherein the resistance is provided in a pant 10. As shown therein, the pant 10 has a wide elastic waist 12 at its upper end which could extend about three inches downwardly from the upper edge. A pocket 14 is provided preferably in the rear portion on the pant immediately below the waistband 12. A fabric tunnel 16 is positioned below the waist at the rear as far down from the waist but not so far as to interfere with sitting. The lower the tunnel 16, the more naturally the arm can swing with a less bent position and a greater range of motion. As illustrated, the resistance elements are in the form of a pair of tubings 18,18. One end of each tubing 18 is anchored to a loop 20 in the front or side of the pant as shown in FIG. 2. The tubing then extends through the tunnel 16 and exits from the opposite side of the pant. The second tubing would likewise be mounted to a loop at the front or side of the pant and extend through the tunnel 16 where it would crisscross with the first tubing.

FIG. 1 illustrates in solid lines each of the tubings to extend from a respective end of the tunnel 16. As illustrated, a mitt 22 is clipped to the free end of each tubing 18. Mitt 22 could have no specific finger structure or could have a thumb portion or could have an opening 23 through which the thumb can extend. FIG. 1 shows in phantom the wearer's arm 24 with the mitt 22 on the arm and with the tubing 18 in its extended or stretched condition. With the arrangement shown in FIGS. 1-2 the arm can swing back and fully engage the resistance on the forward swing to get the maximum exercise benefit of pulling the resistance tubing 18 forward over the greatest swing range of motion.

[0040] During conditions of non-use the tubing and mitts could be stored in pocket 14. If desired, the tubing could also be stored in tunnel 16.

[0041] Pocket 14 can take any suitable form such as by being completely open or by being closed in any manner. FIG. 1 illustrates the pocket to be selectively opened and closed by a zipper. If desired, however, other structures such as a flap could be used. The pocket is illustrated as being on the rear of the pant, pocket 14 however could be at any other location including being a front pocket, a side pocket, and/or could be located on the leg at either the front or back.

[0042] Pocket 14 may also be located on the inside of the pant. Where the garment includes a shirt or top or vest, the pocket may be located on the inside or outside of the shirt, top or vest at any suitable location. The preferred location is at the waist or on the leg outside of the mid-thigh to give a cleaner wrinkle free appearance.

[0043] A slit or loop may be provided at each end of tunnel 16 so that the clip 28 at the free end of each cord or tubing 18 could be held in place in the non-use condition when the tubing is retracted to its unstretched condition and housed completely within the tunnel 16. In such case the tubing 18 would be of a length no longer than the length of tunnel 16.

[0044] In order to use a correct length of tubing, generally a 12-24 inch long tubing would be used. The attachment point would be in front of the side midline which is where the loop 20 would be located to act as an anchor. As a result the cord or tubing would be taut or tensioned when it exists at the mid-buttocks position. In this way, the arm 24 will be working against resistance over the full range of the forward swing for an optimum workout.

[0045] FIG. 1 illustrates a particularly advantageous form of clip 26 mounted to each end of the tubing 18. As illustrated the clip 26 includes a resilient tongue 28 which would be urged toward making contact with the outwardly extending seat 30 of the clip 26. Tongue 28 could be manually depressed to provide access to the open space within the clip thereby permitting the clip to be mounted to either the loop 20 or a loop 32 on mitt 22.

[0046] The use of tubing as the resistance element is particularly advantageous in that rubber tubing, for example, is strong and is stretchable while reliably tending to return to its unstretched condition. The tubing could be provided in multiple lengths in accordance with an exercise program wherein different lengths could be used to offer different resistance values.

[0047] Tunnel 16 is preferably made of a fabric material to completely conceal the resistance elements 18 such as during conditions of non-use if elements 18 are stored in tunnel 16. A main function of tunnel 16, however, is as a guide for the resistance elements so that they pass through the tunnel and then extend to a movable part of the garment such as the arm/sleeve or the hand engagement member (mitt/glove/loop) where the resistance element is anchored. Where the guide use of the tunnel is primarily intended without use of its concealing feature, the tunnel could be made from a more open material such as an open mesh or could be of skeletal form. The tunnel is preferably at least three inches and more preferably at least five or six or seven inches long. Broadly, however, the tunnel could be formed by a single or a series of narrow and/or variably wide loops similar to conventional loops on pants.

[0048] As shown in FIG. 3 the pant 10 could also include other anchor sites such as loops 34 near the bottom of each leg portion of the pant. Other anchor locations are shown in FIG. 3 such as loops 36 near the waist. Such additional anchor locations could be used for attachment of resistance elements in place of or in addition to the resistance elements previously described with respect to FIG. 1-2.

[0049] FIG. 3 also shows the provision of stirrups 35 at the bottom of each leg which would be used to anchor the leg portion in place to restrain the leg from moving upward in reaction to the pulling of the resistance element 18 on loop 34.
[0050] As shown in FIG. 3 the resistance element 18 could extend from loop 34 to some anchor point on the arm. Alternatively or in addition, a resistance element may be secured to loop 34 at the bottom of the leg to loop 36 at the waist or a resistance element may be extend from loop 36 at the waist to an anchor point on the arm.

[0051] FIG. 4 shows a further variation wherein the leg portions of the pants are secured together by a strap 38 that extends through buckles 40 on each leg for adding further restraint to the user during the walking or running motion of the user. In addition to the use of the previously described resistance elements. As shown in FIG. 4 the strap 38 is provided with a series of holes to adjust the effective length of the strap 38 spanning the buckles or loops 40. Strap 38 may be elastic so that it can stretch and return towards its original size or may be non-elastic to remain of a fixed length.

[0052] Strap 38 thus adjusts the tension on the legs creating more resistance as it is shortened. When not in use strap 38 can be stored in the back of the leg in an embodiment where one end of strap 38 is permanently anchored, by snapping it onto itself. Preferably however, strap 38 is folded and can be stored in a pocket or tunnel such as pocket 14 or tunnel 16.

[0053] A further advantage of the arrangement shown in FIG. 4 is that the strap 38 puts resistance on the legs in two basic ways. One way is by pulling the legs together, thus the legs have to work against an inward pulling force as they go forward. In addition, the strap exerts a backward force on the leg as it moves forward.

[0054] FIG. 5 shows a variation of the arrangement shown in FIG. 4 where one end of strap 42 is permanently anchored to one of the legs. The strap 42 is then wrapped around the other leg and is secured itself by fastener 44. The effective length of strap 42 could be varied by using a plurality of spaced fasteners 44 so that whichever fastener is selected will control the effective length of strap 42.

[0055] It is to be understood that the various practices of the invention in connection with a pant or also with a top or shirt could be done where that portion of the garment is an outer garment, an inner garment worn below an outer garment or is the only garment.

[0056] FIGS. 6-7 show a further practice of the invention wherein one or more reels are utilized with a resistance mechanism such as a friction brake to effect the resistance. In this embodiment a cord or line or tube 46 is pulled forward by the arm and resistance is applied to the reel 48 which is preferably adjustable in its resistance mechanism. The reel resistance is desirable in that it has a more linear or constant resistance over the range of arm/leg movement. Ordinary elastic resistance has a non-linear resistance curve so that the resistance increases as the elastic resistance element is stretched. This means that there is the greatest resistance at the end of the range of motion where the arm/leg (limb) is at the greatest mechanical disadvantage which can be undesirable. The reel system shown in FIGS. 6-7 is particularly advantageous from the standpoint of economics and simplicity. In this system a common cord 46 is wrapped around a reel 48 with each free end anchored to a limb. The cord 46 is pulled by one arm or leg as it is extended/swung forward and then by the opposite arm or leg. In this way the cord 46 is being wound on the reel as the one limb is in a back swing while the cord is being unwound as it is pulled off the reel on the forward swing motion.

[0057] An adjustable resistance can be applied to the reel/cord by a knob 50 (FIG. 7) which could be of any suitable size and shape and which can be turned by hand to tighten a spring that applies pressure on the reel/cord. A brake pad 52 or other suitable mechanism can be used to apply pressure or drag to the rotation of the reel/cord. The reel is preferably positioned behind the exerciser in the low center of the back of the pant 10 in the sacral area. In this position the arm can swing backward naturally with less bend of the elbow and completely backwards. This allows for a more natural swing and a larger range of motion that starts behind the exerciser. Thus the swinging motion is one in which the hand is relaxed, the arm swings down and behind the exerciser.

[0058] The reel 48 is preferably mounted on a rigid backing 54 that can be a square or rectangular or other suitable shape. The back piece 54 has a center post or shaft 56 on which the reel 48 is rotationally mounted. The rigid back piece can be placed in a back center pant pouch/pocket that properly positions the reel and also anchors the reel when it is pulled. Resistance pads 58 mounted outwardly on each side of the reel 48 work in conjunction with brake pad 52 to adjust the amount of friction against the rotating movement of the reel 48 in accordance with the tightening of adjusting knob 50.

[0059] When not in use the reel system can be carried in the pocket in the general area of the use location or in any other suitably located pocket 60 and/or can be removed for washing the pant or can be carried in another carry pack that is preferably out of the way such as on the leg. The reel is mounted on the post 56 by the turn knob 50 which screws down on the threaded end of the post 56. The back reel pocket for backing 54 can have slits on each side to permit the cord to pass through and be attached to the hand by means of a thumbloop or mitt as later described. Each end of the cord 46 can have a clip 26 to easily detach/attach the hand engagement structure such as a loop on a hand engagement member such as a mitt or glove. The hand engagement member and its loop can be stored in a pant pocket when not in use as previously described. Where the reel is stored in a pocket, the pocket is preferably padded such as padded reel pocket 60 on one of the legs.

[0060] It is to be understood that the specific description and illustration of the reel system herein is meant to be exemplary in the preferred practice of this invention using a reel system. What is intended is that a rotatable reel or pulley should be used with the cord or resistance element mounted around the rotatable member so as to provide linear resistance in response to an exerciser's limb being moved to pull or permit the retraction of the resistance element or cord. Preferably the reel mechanism has some form of adjustable tensioning structure such as the previously described brake pad and adjustable knob. Preferably a spring (not illustrated) would also be mounted on the post 56 to urge the various components of the reel mechanism into contact with each other in a known manner.

[0061] Although FIGS. 6-7 show the preferred practice of the invention wherein the reel system is provided on the pant, the invention may also be practiced where the reel
system is on the top or shirt or on a vest in addition to or instead of being on the pant. In general the reel system would be used where there is a first garment member having limbs and the reel system would be on a second garment member (pant, top or vest) preferably near the waist, such as in the mid-buttocks region below the waist.

[0062] In use of the reel system the resistance element 46 would be wound around the reel 48 with its free ends exposed so that each free end may be secured by fastener 26 to an anchor point on another part of the garment such as on the sleeves of a shirt or top. Thus when the arms are swung the resistance element 46 would move back and forth by being wound and unwound on the reel in response to the swinging motion. By adjusting the brake, additional resistance could be provided in a control manner.

[0063] FIGS. 8-11 show variations of the invention wherein the resistance structure is provided on the front or on the rear of a top or shirt 70. For exemplary purposes FIG. 8 illustrates the front of the shirt to have a tunnel 72 preferably made of a soft fabric. Each arm or sleeve 74 is provided with a loop or ring 76 which could be mounted to a reinforced non-flexible band 78. A hasp 80 is mounted inside of tunnel 72. Each resistance element 18 would be secured to the hasp 80 and then extend through the tunnel to be secured by a hook or fastener 77 to a respective loop 76 on arm 74. As noted, although FIG. 8 illustrates the resistance arrangement to be on the front of the shirt, the resistance arrangement could alternatively be on the back. FIG. 8 also shows the bottom of the top or shirt to have a wide elastic waist band 82. During periods of non-use the resistance elements 18 would be detached from the loop, hasp, hook or other anchor member 76 and would retract completely into tunnel 72.

[0064] FIG. 9 shows a variation wherein the shirt or top 70 includes a buckle or other anchor member 84 on each arm 74. As illustrated, a first resistance element 86 is permanently mounted to the torso portion of top 70 and its free end extends to its detachable securement to anchor member 84. A second resistance element 88 is detachable or permanently mounted at one end to its anchor member 84. The free end of second resistance element 88 includes fastening structure for selective mounting to the fastening structure 90 which extends transversely across first resistance element 86. As a result it is possible to adjustably select the location where the free end of resistance element 88 would be mounted to the first resistance element 86. Conversely, the adjustable mounting structure could be on resistance element 88 in addition to or instead of being on first resistance element 86.

[0065] FIG. 10 shows a further practice of this invention wherein the top 70 is provided with anchor structure at the lower portion thereof near the waist. As illustrated the top has a side slit 92 at each location of the anchor structure so as to conceal the anchor structure, such as a loop or hasp 94. The resistance element 96 would pass through the slit and be secured to the anchor member 94. The opposite end of the resistance element 96 would then be anchored to another part of the garment. In the illustrated embodiment, each sleeve 98 includes a plurality of longitudinally spaced anchor members such as hasps or loops 100 to provide for the adjustment of the location where the resistance element 96 would be anchored to the sleeve 98. These anchor locations 100 could also be provided on gloves or mitts such as later described with regard to FIG. 11. The sleeves, at least in the portion where the anchor members 100 are located, can be made of an elastic material.

[0066] FIG. 11 shows a further practice of this invention wherein the top 70 is provided with a plurality of anchor members 102 along the torso portion of the front and/or back of the top. Each arm 104 is provided with further anchor members such as a loop or other anchor member 106 being on a non-flexible reinforcement webbing or band 108 and anchor members 110 being mounted at spaced locations along each sleeve 104. In addition, each sleeve may terminate in a thumb-loop 112. Further, sleeve 104 may include a plurality of securing members such as snaps 114 for detachable securement of a mitt or glove 22 of the type shown in FIG. 1. Mitt 22 would have complementary securing members or snaps 116 to be detachably mounted to the end of sleeve 104. The anchor members 110 are preferably located on a reinforcement strip 118 secured to sleeve 104, similarly the snaps 114 are on a reinforcement strip 120. Resistance elements 122 are provided wherein each resistance element would be secured between a spaced pair of anchor members. For example, FIG. 11 illustrates one end of each resistance element 122 to be mounted to an anchor member 102 on the torso with the opposite end secured to one of the anchor members 110 on the sleeve. The resistance members could be mounted to other torso anchor members 102 and to other anchor members such as 106 on the non-flexible webbing 108 or to the anchor member 32 on mitt 22. Preferably both of the resistance elements 122 are secured to the same anchor member. The invention however can be practiced where each resistance element is secured to a different anchor member on the torso and likewise to a different anchor member on the sleeve or mitt.

[0067] As illustrated in FIG. 11 the lower portion of the shirt or top could include an elastic bottom or waist area 124. A pocket 126 could be located in the waist area or in any other location of the garment so that various parts such as the resistance elements or mitts could be stored out of sight during periods of non-use. The pocket 126 could be closed by a zipper 128 or could be closed in any other manner or could even be permitted to remain open.

[0068] The thumb loop 112 could be used to prevent the sleeve from riding upwardly during use of the top 70. Alternatively, the mitt 122 could serve that same function. Where the mitt is used, the thumb loop 112 could be folded inside the lower end or wrist area of each sleeve. If desired, the mitt could be permanently attached to its respective sleeve at the wrist area and could be folded inside the sleeve when not in use and then folded back outside to be accessible. In such version portions of the mitt would be free of attachment to the sleeve so as to provide an open area into which the hand may be inserted. As illustrated in FIG. 11 and also particularly in FIG. 1, the mitt may be formed with a thumb opening 23 so that the thumb may extend outward of the mitt as best illustrated in FIG. 1.

[0069] The mitt 22 can be formed of a stretchable material such as spandex similarly the thumb loop 112 can be formed of the same material. By use of the mitt or thumb loop it is possible to have a natural swing where the hand is relaxed thereby avoiding hand cramps and providing a better exercise of the muscles. The open handed relaxed grip is possible through the use of the glove mitt or loop, the swing
preferably taken would be one which would be a swinging downward and then behind the body and back.

[0070] FIG. 11 also shows the provision of fasteners such as snaps 130 which could be used for engagement for complementary fasteners on a pant so that the entire garment would comprise both a shirt and a pant. Where used with a pant, resistance elements could extend from the pant to the various anchor members of FIG. 11.

[0071] FIG. 12 illustrates a form of shirt or top 70 similar to that of FIG. 11 used with the pant 10 of FIG. 1. In this illustrative practice of the invention, for aesthetic reasons, the top would not have any anchor members on its torso or any anchor members on the upper portion of the sleeve similar to anchor members 106. It is to be understood however that the invention could be practiced where such anchor members are utilized. In the illustrated practice shown in FIG. 12 however, the only anchor members are the set of forearm anchor members 110 and the anchor member 32 on the hand engagement member 22A. When the shirt shown in FIG. 12 is used with the pant 10, the shirt may also be of more simplified construction than that shown in FIG. 11 in that it is not necessary to have a pocket or a wide waist band on the shirt since the wide waist band and the pocket are provided on the pant.

[0072] While various figures illustrate the hand engagement member to be loop 112 or a mitt 22, FIG. 12 illustrates the hand engagement member to be a glove 22A having an anchor member or loop 32. It is particularly advantageous for glove 22A to be a work glove of generally known construction which could be fingerless and wherein loop 32 could be used for attachment of rubber members as conventionally done in workout practices. Thus, the same loop 32 could also be used as an anchor member for a resistance element when used with one of the garments of this invention.

[0073] FIGS. 13-14 illustrate a further practice of this invention wherein the resistance features are incorporated in a vest 140 which can be worn with a variety of clothing and the clothing does not have to be especially designed except where necessary to accommodate the resistance structure. As illustrated the arms in the vest 140 are open to allow for free swinging motion of the user’s arms. The vest 140 is illustrated as having a lower portion 142 which extends below the waist. This provides a number of benefits. For example, a low front belt 144 could be adjustably connected between a pair of anchor members or loops 146 by having the belt 144 extend through the anchor members 146 with the free ends 148 of the belt secured together, such as by Velcro® fasteners, providing a tightening which tends to flatten or support the abdomen. In addition, such low front belt 144 would function to resist rotation from the back and forth pulling of the elastic resistance elements 150. Further, a low back 142 below the waist permits the resistance elements, such as cords 150, to be placed in a lower position for a longer, more natural arm swing.

[0074] Vest 140 would also preferably be in the form of a padded body that keeps the back and forth motion of the cords or resistance elements 150 from chaffing, particularly the upper buttocks and at the side of the waist. In addition, the vest 140 could be provided with any suitable number of pockets 152 at any suitable locations which could be used for storing various articles, such as the hand attachment members (mitts, gloves, loops), the resistance cords, and personal items of the user such as watches, keys, coins, glasses, etc. It is to be understood that the feature of having padded areas could be incorporated in the various practices of this invention at any desired location on the clothing to prevent chaffing and rubbing from the back and forth motion of the resistance cords.

[0075] The vest 140 can be used in connection with any suitable type of resistance structure, such as any of the previously described structures. FIG. 13 illustrates the vest 140 to have a zipper longitudinally down its front to permit the vest to be easily worn or removed. Any other type of fastening structure could also be used. If desired, the vest could also be a pull on type vest having no opening structure along its front.

[0076] FIG. 14 illustrates the resistance structure to be similar to that shown in FIG. 1 wherein a tunnel 154 is provided on the rear or back of the vest with the elastic cords 150 exiting from holes 156 at each end of the tunnel 154. Clips 158 similar to the clips 26 are provided at each end of the one or more cords 150. The clips are secured to an anchor member on a limb of the user. As illustrated in FIG. 14, the clips are secured to a suitable hand engagement member 160 which could be a mitt or glove or loop. Although not illustrated the resistance system would preferably include a pair of cords 150 which would cross within the tunnel 154 similar to the structure shown in FIG. 1.

[0077] The practices of the invention, particularly where a vest is used, can incorporate resistance structure to function in conjunction with the resistance elements to maximize the benefits of the garment. For example, the vest or other garment members (i.e., pants, top/shirt) can be provided with weights or other forms of resistance in conjunction with the resistance elements. Where weights are used the weights could be permanently mounted such as by being sewn into the vest. Preferably the weights would be removable by being placed in pockets so that the number, location and total weight amount could be varied.

[0078] The invention provides for an improved method of exercising with the use of resistance clothing or garments that uses the arms more vigorously with the resistance. This is illustrated, for example, in FIG. 15 wherein there is use of a full range of motion for the arms 162, both backwards and forwards. The arm motion could be enhanced with a modified arm swing that has more arc than a regular arm swing since the arm/hand swings back inward and then behind the body instead of simply back and forth. The use of a loose open grip is permitted by such structure as the thumb loop, hand loop, mitt or rings on the waist, forearm or sleeve of a top. With the invention it is possible for the user to use a longer leg swing/stride to counterbalance the long arm swing. The side to side motion of the user is permitted because the movement of the arms is in a more pronounced arc.

[0079] In practice of the invention an exercise program could be used which consists of one or more of the following parts to produce much superior aerobic results during exercise by utilizing the upper body with resistance thereby involving the entire body in an improved manner in the exercise. Such exercise program could include first a slow warmup period wherein there is a swinging of the arms in opposition to the resistance in a one for one rhythm/cycle.
with the legs in less than a full range of motion for both the arms and legs. There would then be a faster period wherein the swinging of the arms with resistance is in a one to one rhythm or cycle with the legs in a full range of motion for the arms and legs. Next, there would be very fast period of high intensity wherein the swinging of the arms with resistance is in a one to one rhythm cycle with the legs in less than the full range of motion of the legs, but near the full range of motion for the arms. The exercise program could include special structure to allow for a loose open grip to relax the muscles of the hand/arm as they work against the resistance; thus, promoting a more natural and more comfortable arm swing which reduces clamping and lets the exerciser work out longer periods. Such structure includes the hand loops, thumb loops, mitts, gloves, rings/loops on the forearm/waist of the top. The invention could also include special attachment structure that can be operated easily by hand such as a clip 26 that can be easily or quickly engaged and disengaged and that also firmly holds the resistance structure while being strong enough so as not to break with repeated stress repetitions.

[0080] An advantage of the wide elastic waist band provided preferably on the pant but alternatively on the shirt or vest is to function as an abdominal support which flattens the abdominal area while the user is performing a resistance workout thereby maximizing the benefit of the garment. The provision of such structure as tunnels and pockets will also permit the garment to have a more normal appearance in that it provides a location to store various detachable components of the garment such as the resistance members and the hand engagement members. The garment can be used with a pant and/or a top and/or vest in combination or separately from each other. The garment can be used where the pant and/or top is an undergarment, an outer garment or the sole garment or where for example, one of the pant or top is an outer garment while the other is an undergarment or a sole garment.

[0081] The top and/or the pant and particularly the pant may include abdominal support structure of the type disclosed in co-pending application Ser. No. 10/781,406 filed Feb. 18, 2004, all of the details of which are incorporated herein by reference thereto. Such abdominal support structure could be enhanced by including weight loss features. For example, a weight loss inducing material, such as moisture management material or wickaway material, could be placed directly against in contact with the skin of the user to wick away moisture and accelerate heat transfer. Such material could be a lining against the skin or the entire garment and at least desired portion of the garment could be made of such material. Preferably such material is located at one or more or all of the following areas: waist, hips, buttocks (butt), thigh and the upper and lower abdomen (stomach). The garment could be sweat pants, shorts or otherwise conventional long pants.

[0082] Where abdominal support structure is used the abdominal support structure could be on either the outside or the inside of the garment such as the pant. The use of the elastic waist area avoids the need for any drawstrings, thus avoiding marks or depressions being formed in the user through the user of the garment.

[0083] The invention could be broadly practiced where each of a pair of resistance elements is anchored at one end to the garment preferably in the general torso section near the waist and then the resistance elements extend through the guide structure, such as a tunnel or loop or ring preferably at the back of the garment. Each resistance element is anchored at its other end to a moving part (e.g. limb) of the garment such as a sleeve/arm or hand engagement member.

[0084] Each resistance element may be permanently/non-detachably secured at one or both anchor sites. Preferably, however, one or more preferably both ends are detachably connected to a respective anchor member.

[0085] Based on the above guidelines, the invention could be broadly practiced where a single anchor member (e.g. loop or ring) is centrally located at the front near the waist area of the torso portion of the garment, such as on a pant near the waist area. A single guide member (e.g. tunnel/loop/ring) would be centrally located at the back of the pant near the waist area. Two resistance elements would be anchored at one end to the common anchor member at the front of the pant. The resistance elements would wrap around the pant to extend through the common guide member and then would be anchored to the respective anchor members on the moving part (limbs) of the garment.

[0086] A variation of the above broad practice would be to permanently anchor, such as by sewing or other means, one end of the resistance element to the front or side of the pant and/or to use a separate guide member for each resistance element or to use a single common guide member. A further variation would be to anchor each resistance element at locations spaced from each other and spaced from the guide member(s). Such anchor locations could be at the front or at the side or even at the back of the pant. The anchoring could be a permanent connection to the pant or could be a detachable connection to a separate anchor member. Preferably when the resistance elements extend through a common guide member, the resistance elements cross each other within the guide member.

[0087] It is to be understood that various features described in various embodiments could be used in other embodiments in accordance with the invention. Thus, for example, various structure illustrated and described as being at the top of the pant could be at the bottom of the shirt or vest and vice versa. Other variations include modifying the garment for use by a person having a missing or disabled limb where only one limb would thereby be used in the exercise.

What is claimed is:
1. A resistance exercise garment having a torso section, said torso section terminating in an open waist, a tunnel located at and transversely across a portion of said torso section, said tunnel being open at both ends, at least one resistance members, said resistance member being inserted into said tunnel and having one end located outside of said tunnel and an opposite end anchored to said torso section, and said one end having a fastener for detachable attachment to an anchor member at a location on a movable part of said garment whereby said resistance member is stretched during movement of said movable part of said garment by the wearer.
2. The garment of claim 1 wherein there are a pair of said resistance members.
3. The garment of claim 1 wherein said torso section is part of a pant having legs, each of said resistance members
being attached to said pant outside of and near a respective open end of said tunnel, and said tunnel being in the rear of said pant below said open waist.

4. The garment of claim 3 including a pocket in said pant.

5. The garment of claim 3 including anchor members secured to the bottom of said legs of said pant and to the general waist area of said pant.

6. The garment of claim 3 including a strap secured to and spanning each of said legs of said pant.

7. The garment of claim 3 including a top, and a plurality of said anchor members provided on said top.

8. The garment of claim 7 including further resistance members extending from a torso portion of said top to a sleeve portion of said top.

9. The garment of claim 3 wherein said open waist of said torso section comprises a wide elastic waist.

10. The garment of claim 3 wherein said garment includes a top having a pair of arms, and said anchor member is provided on each arm of said top.

11. The garment of claim 10 wherein a plurality of said anchor members being on each of said arms.

12. The garment of claim 11 including a hand engagement member for each arm of said top, and one of said anchor members being on each of said hand engagement members.

13. The garment of claim 12 wherein each of said arms terminates in an open wrist portion through which the user’s arm may extend, a thumb loop spanning said wrist portion, and said thumb loop being said hand engagement member.

14. The garment of claim 13 wherein said resistance members are hollow tubings, each of said tubings being detachably attached to an anchor member outside of and near said tunnel, each of said tubings extending through said tunnel and being attached at its other end to an anchor member on said top, said open waist of said torso section being a wide elastic waist for providing abdominal support, a pocket located on said pant between said elastic waist and said tunnel, and each of said ends of said tubing being attached to a respective anchor member by a fastener having a manually depressable tongue generally disposed against a seat.

15. The garment of claim 2 wherein said torso section is part of a vest to be worn over a top, and said tunnel being at the rear of said vest.

16. The garment of claim 15 including weights mounted in said vest.

17. The garment of claim 1 wherein said resistance members is a hollow tubing.

18. The garment of claim 1 including a hand engagement member for being worn on the hand of a user, and said anchor member being on said hand engagement member.

19. The garment of claim 18 wherein said hand engagement member is a mitten.

20. The garment of claim 18 wherein said hand engagement member is a workout glove.

21. The garment of claim 18 wherein said hand engagement member is a loop at the end of a sleeve on a top.

22. The garment of claim 1 including an abdominal support section at said open waist of said torso section.

23. A resistance exercise garment comprising a first garment member having a torso section and a pair of limbs and a second garment member having a torso section, a reel system mounted to said torso section of said second garment member, said reel system comprising a rotatable reel, a resistance member having a pair of free ends, said resistance member being mounted around said reel, each of said free ends having a fastener, an anchor member on said limbs, and each of said fasteners being attachable to a respective one of said anchor members.

24. The garment of claim 23 wherein said resistance system includes adjustable friction structure for resisting the free rotation of said reel.

25. The garment of claim 23 wherein said reel system includes a post, said reel being rotatably mounted on said post, said friction structure including a brake pad disposed against said post, and an adjustable knob rotatably mounted on said post for being moved toward and away from said brake pad to control the resistance created by said brake pad.

26. The garment of claim 23 wherein first garment member is a top and said limbs are sleeves, and said anchor members are mounted to said sleeves.

27. The garment of claim 23 wherein said resistance member is a hollow tubing.

28. The garment of claim 23 wherein said first garment member is a top and said limbs are sleeves, said second garment member being a pant, and said reel system being mounted on said torso section of said pant.

29. The garment of claim 28 wherein reel system is mounted to the rear of said pant.

30. The garment of claim 23 wherein said second garment member is a vest, and said reel system being mounted to the rear of said vest.

31. A resistance garment comprising a pant having a front and a back and a circumferential waist, said garment including two moving limbs, hollow open ended guide structure on said back of said pant in the general area of said waist, two resistance elements, each of said resistance elements having two ends, one end of each of said resistance elements being anchored to said general area of said waist spaced from said guide structure, each of said resistance elements being wrapped partially around said general area of said waist and extending completely through said guide structure, and the other end of each said resistance elements being anchored to a respective one of said limbs.

32. The garment of claim 31 including a single anchor member mounted to said front of said pant, and said one end of each of said resistance elements being connected to said single anchor member.

33. The garment of claim 32 wherein said guide structure is a single guide member.

34. The garment of claim 31 wherein said one end of each of said resistance elements is connected to a separate anchor member.

35. The garment of claim 34 wherein said guide structure is a single guide member.

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