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(54) MODULAR PACK SYSTEM WITH ACCESSORY COUPLERS

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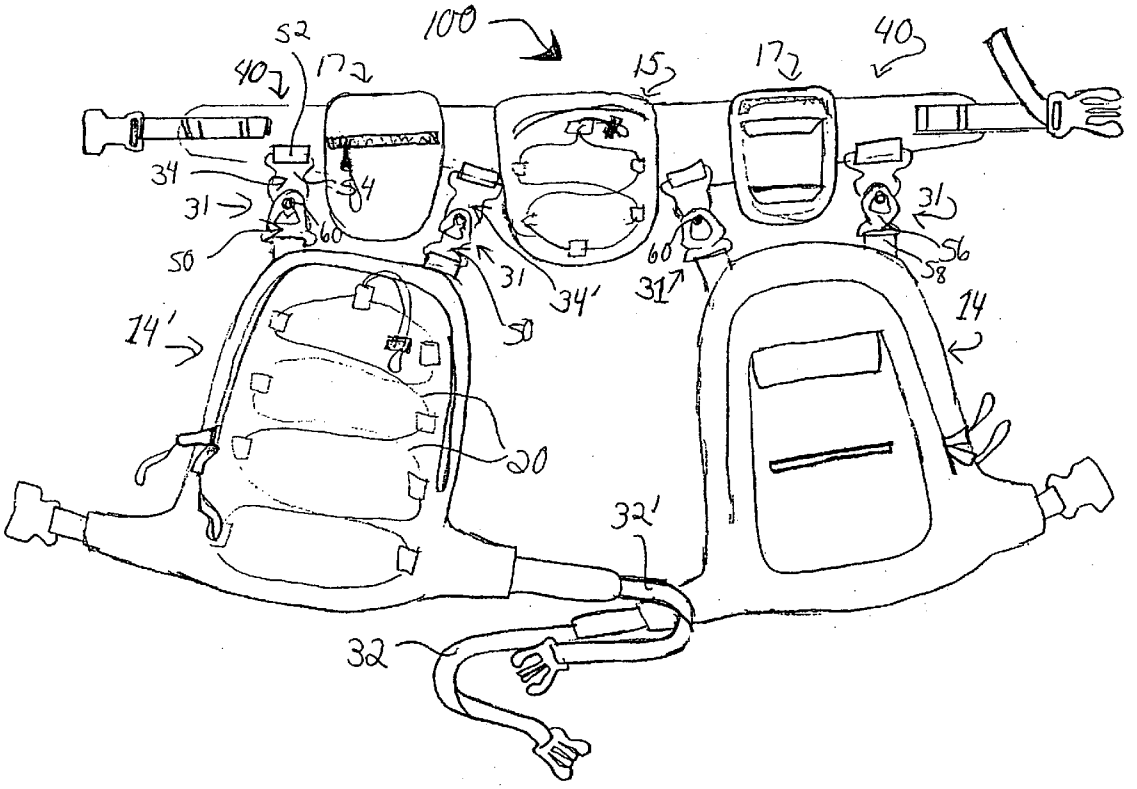
(57) **ABSTRACT**

The present disclosure details a modular pack system having a hip belt and a pack accessory. The hip belt includes an upper stay strap and a lower stay strap. The upper stay strap is secured to the hip belt, the upper stay strap forming attachment loops. A lower stay strap is secured to the hip belt below the upper stay strap. The lower stay strap forms attachment loops as well. The pack accessory includes an attachment strap and an accessory loop. The attachment strap includes a proximal end and a distal end. The proximal end of the attachment strap is secured to the pack accessory. The distal end includes a fastener thereon. The attachment strap extends transverse to the upper and lower stay straps and is routable through the upper and lower stay straps. The accessory loop is secured to the pack accessory. The accessory loop is positionable between the upper and lower stay straps such that the attachment strap is routable through the accessory loop between the upper and lower stay straps.



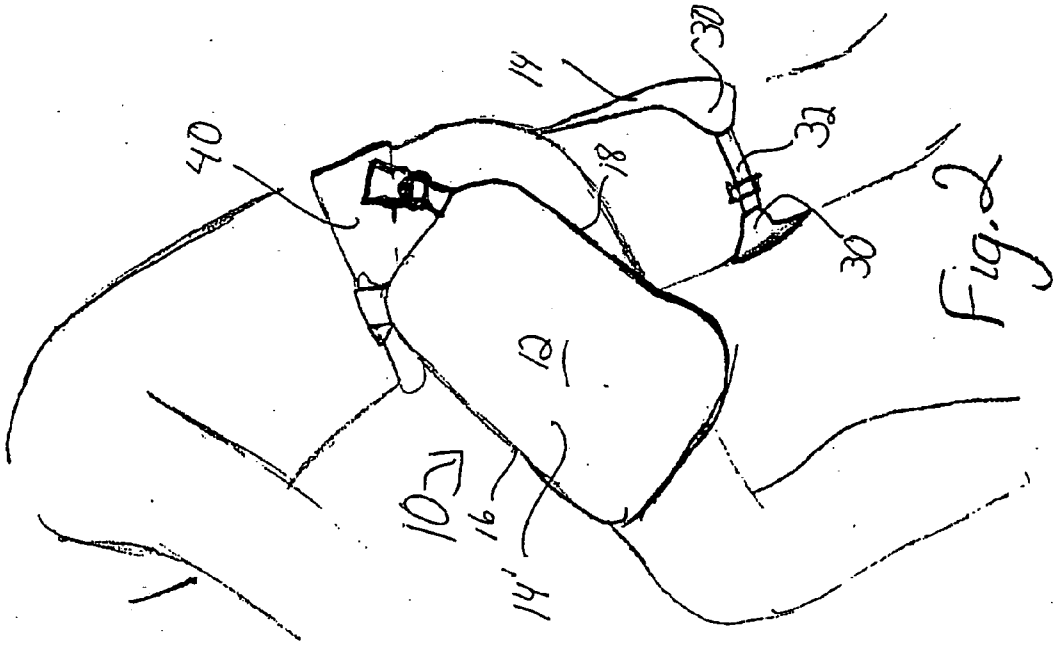


Fig. 2

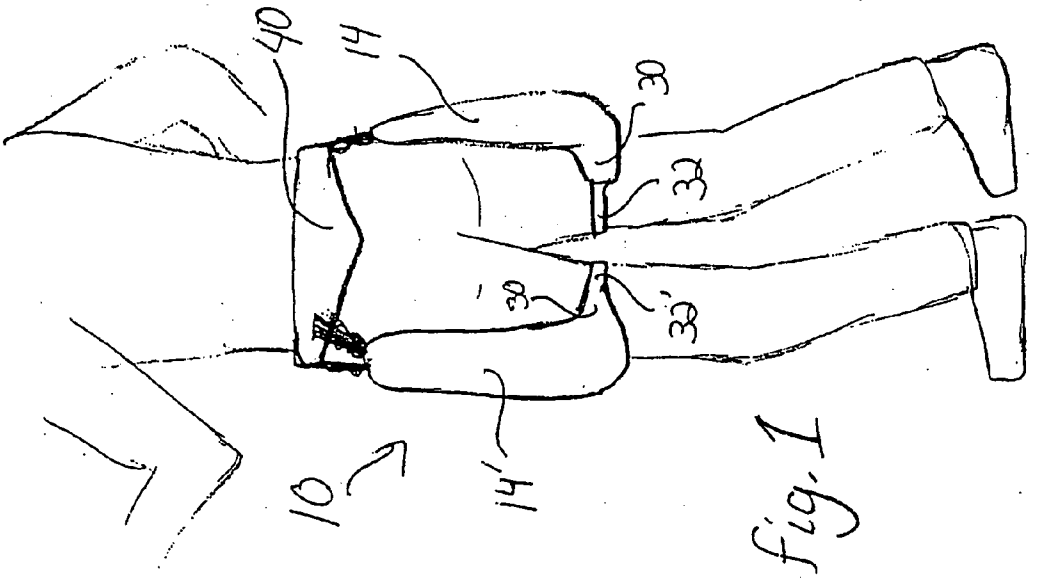


fig. 1

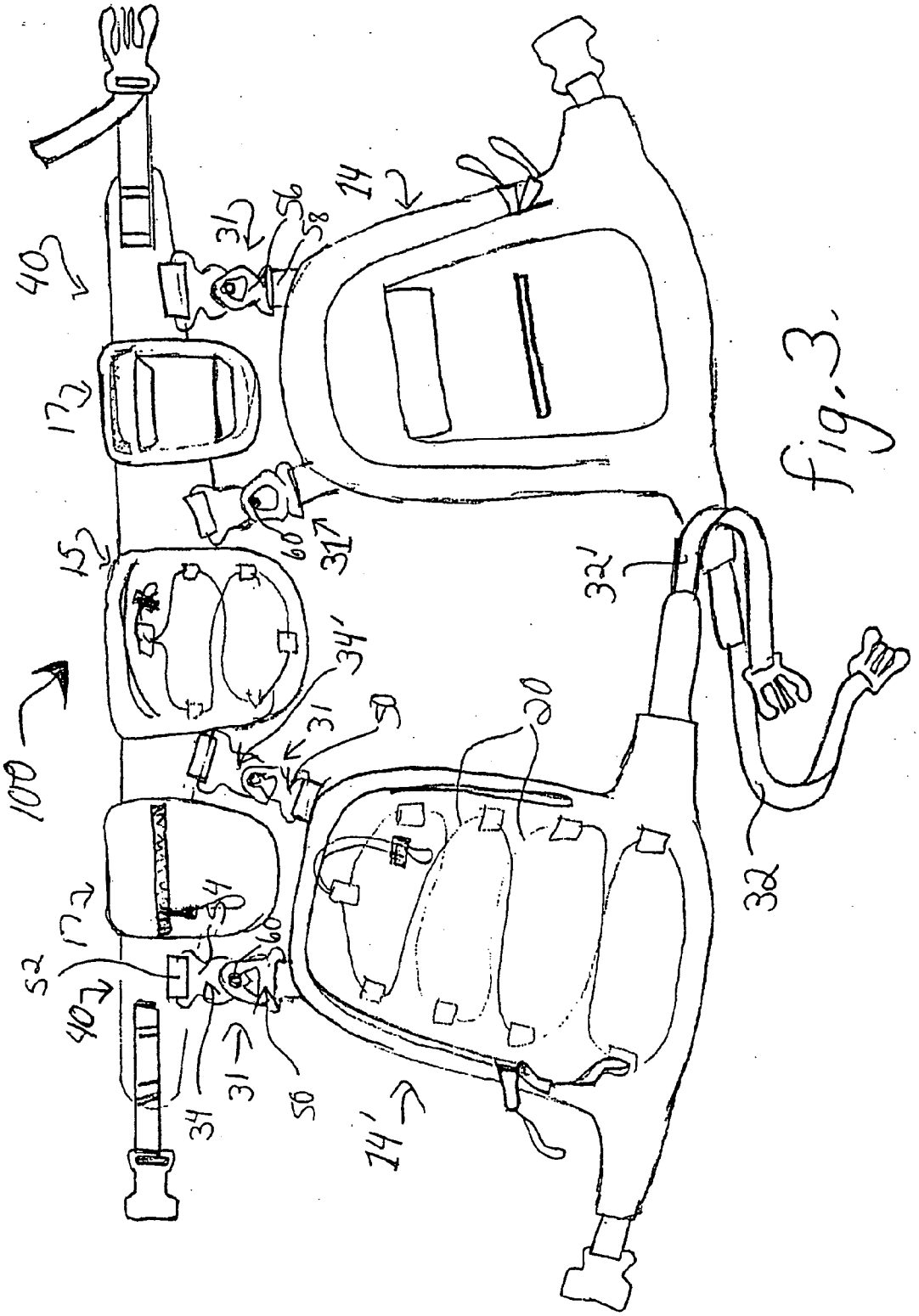


fig. 3.

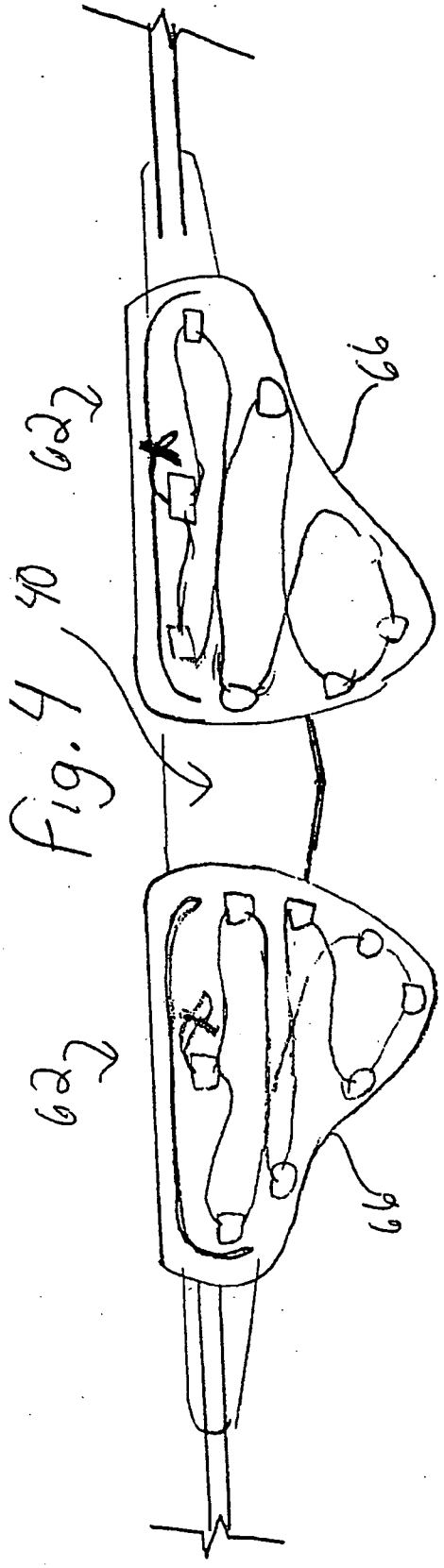


Fig. 4

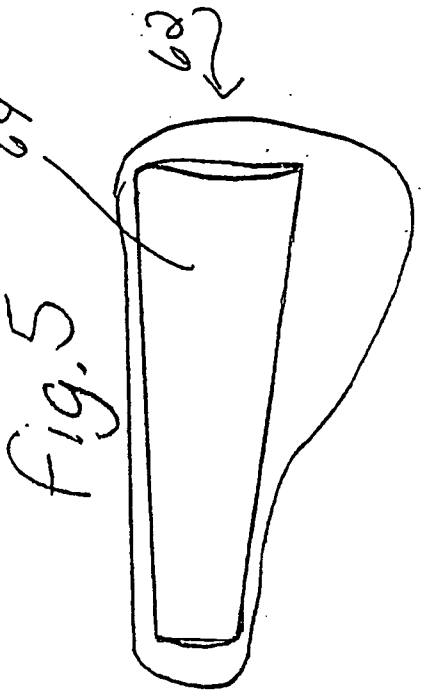


Fig. 5

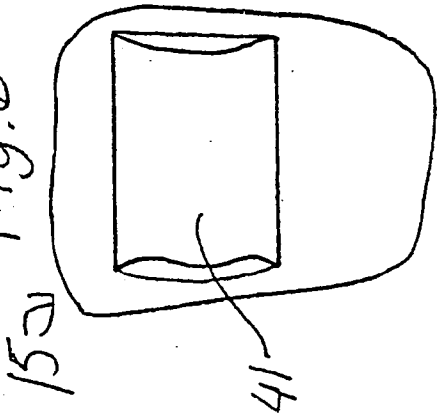


Fig. 6

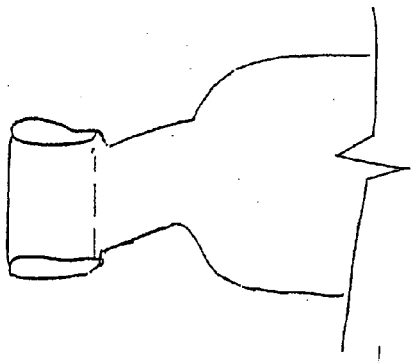


Fig. 7A

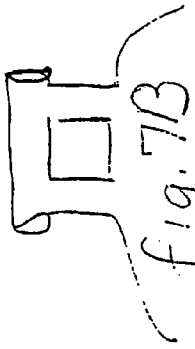


Fig. 7B

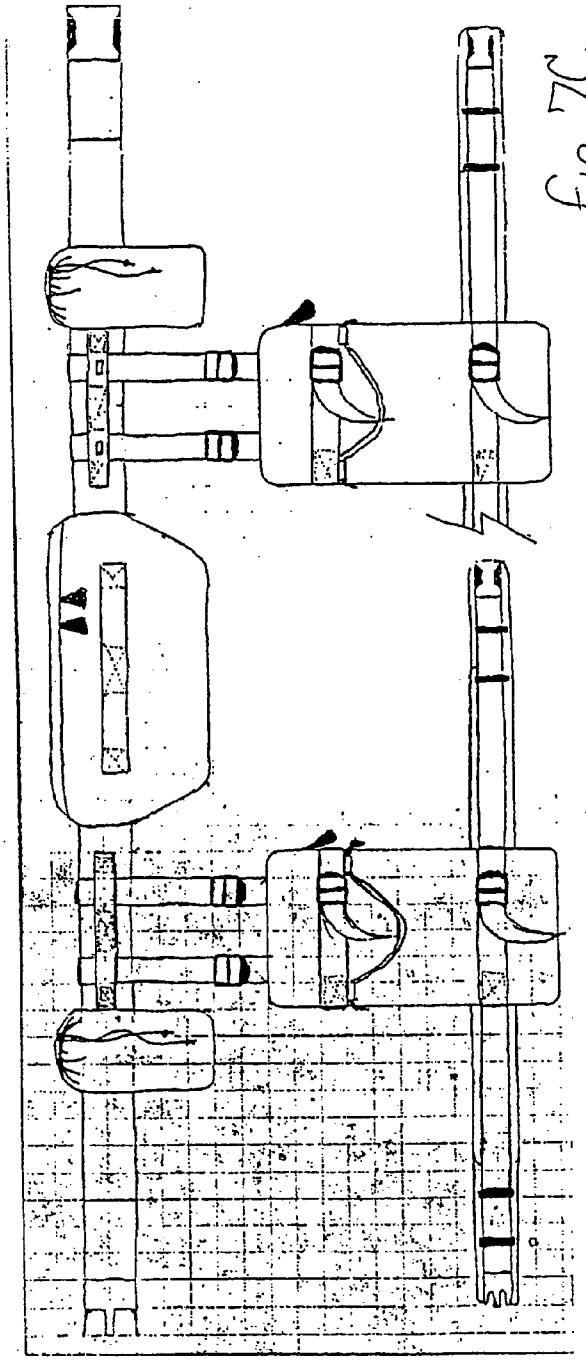


Fig. 7C

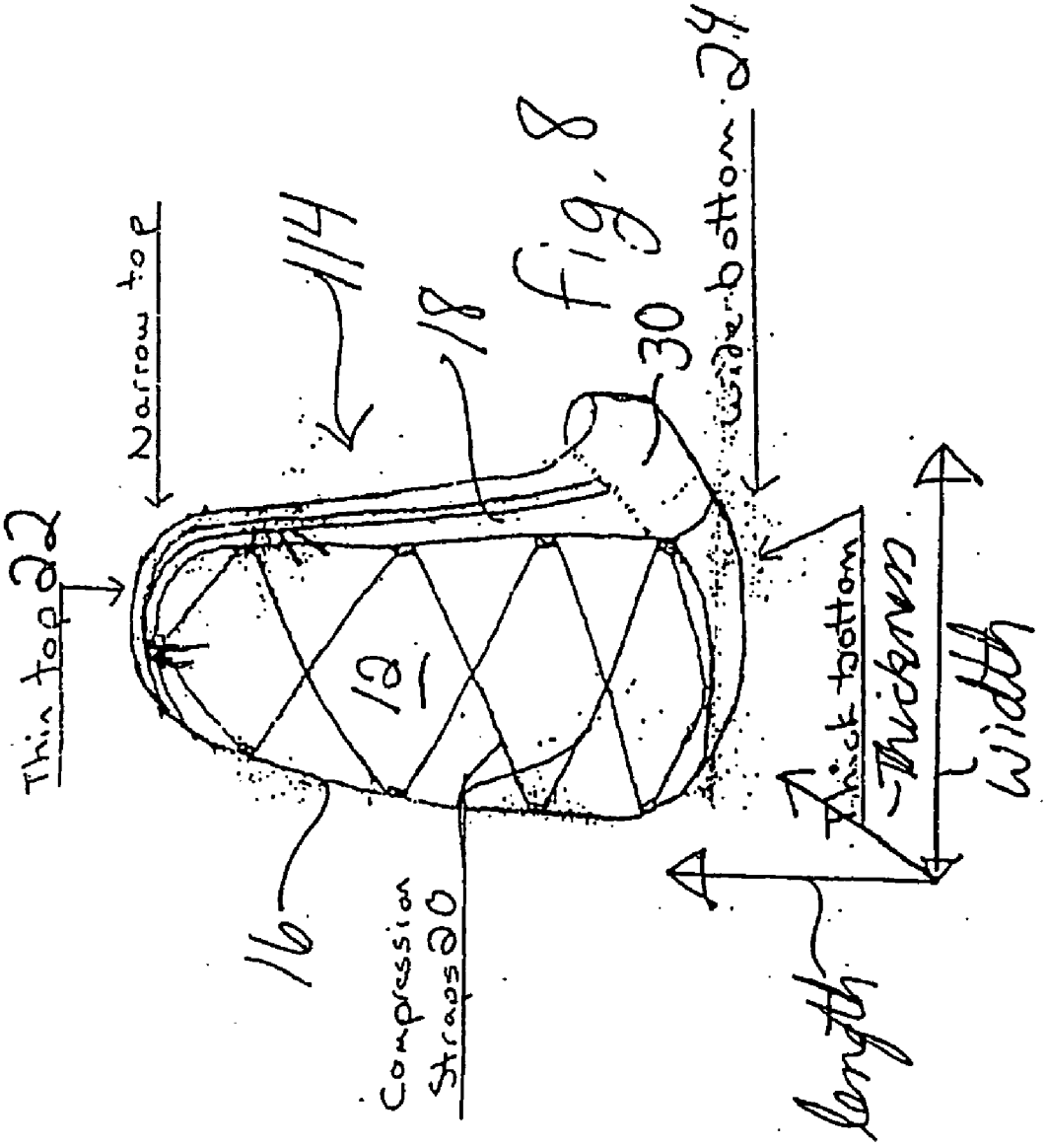


Fig. 8
114
18
30
Narrow top
Wider bottom 24
Thin top 22
121
Thick bottom
Compression Straps 20
16
Width
Length

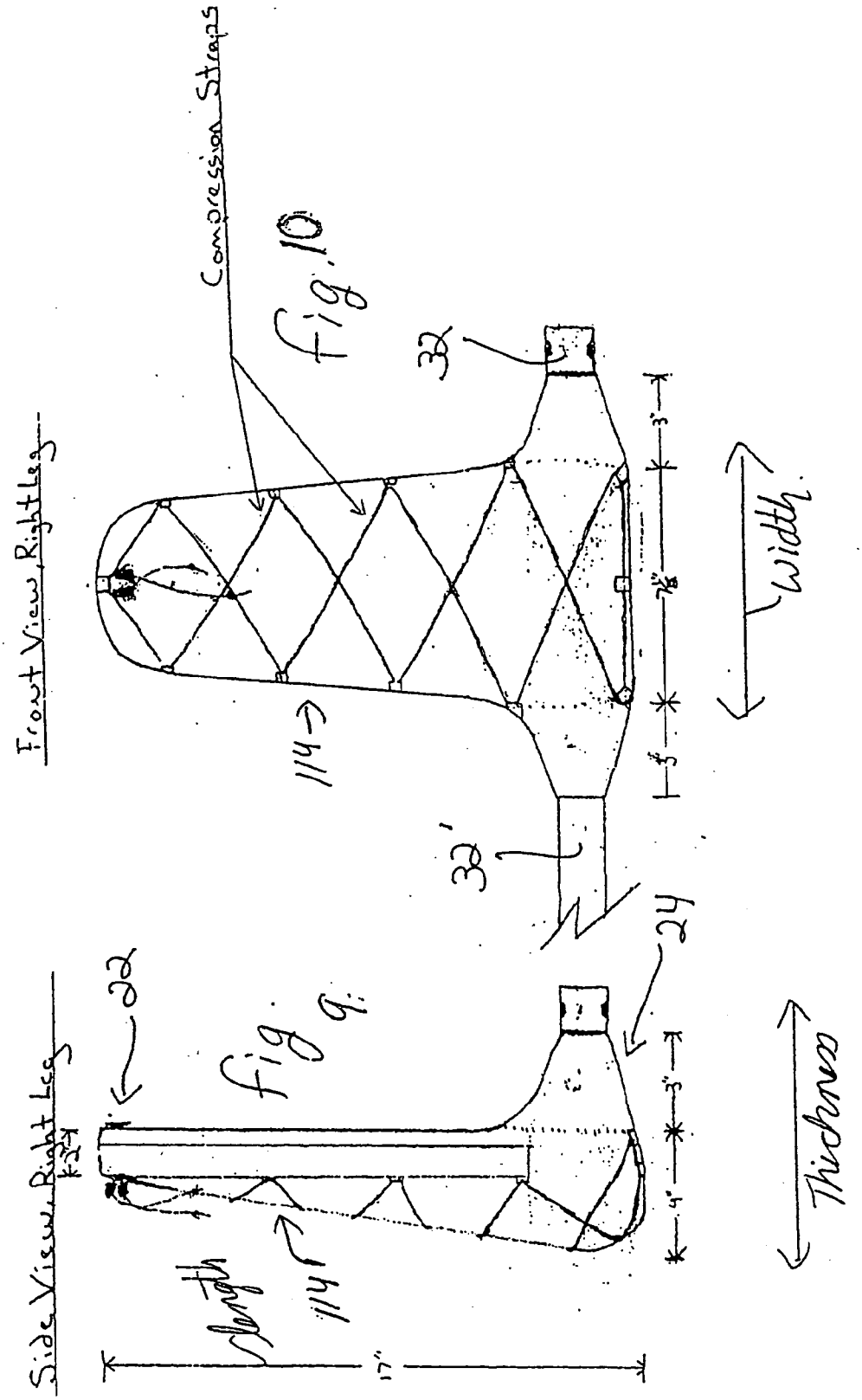

Front View, Right Leg
Compression Straps
32
114
32'
24
3"
3"
2½"
3"
width
Side View, Right Leg
22
24
114
17"
length
4"
3"
Thickness

Fig. 10

Fig. 9

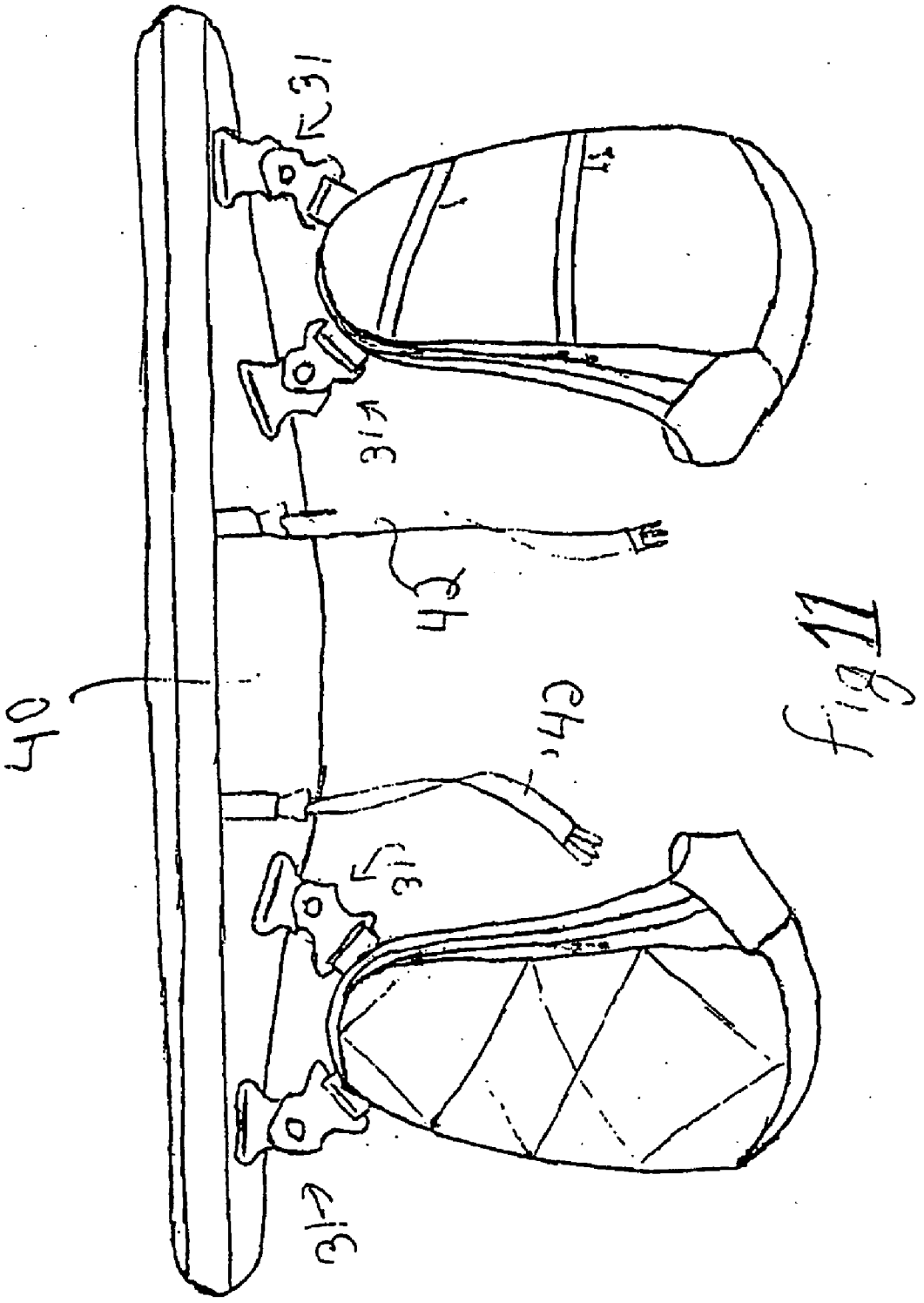


Fig 11

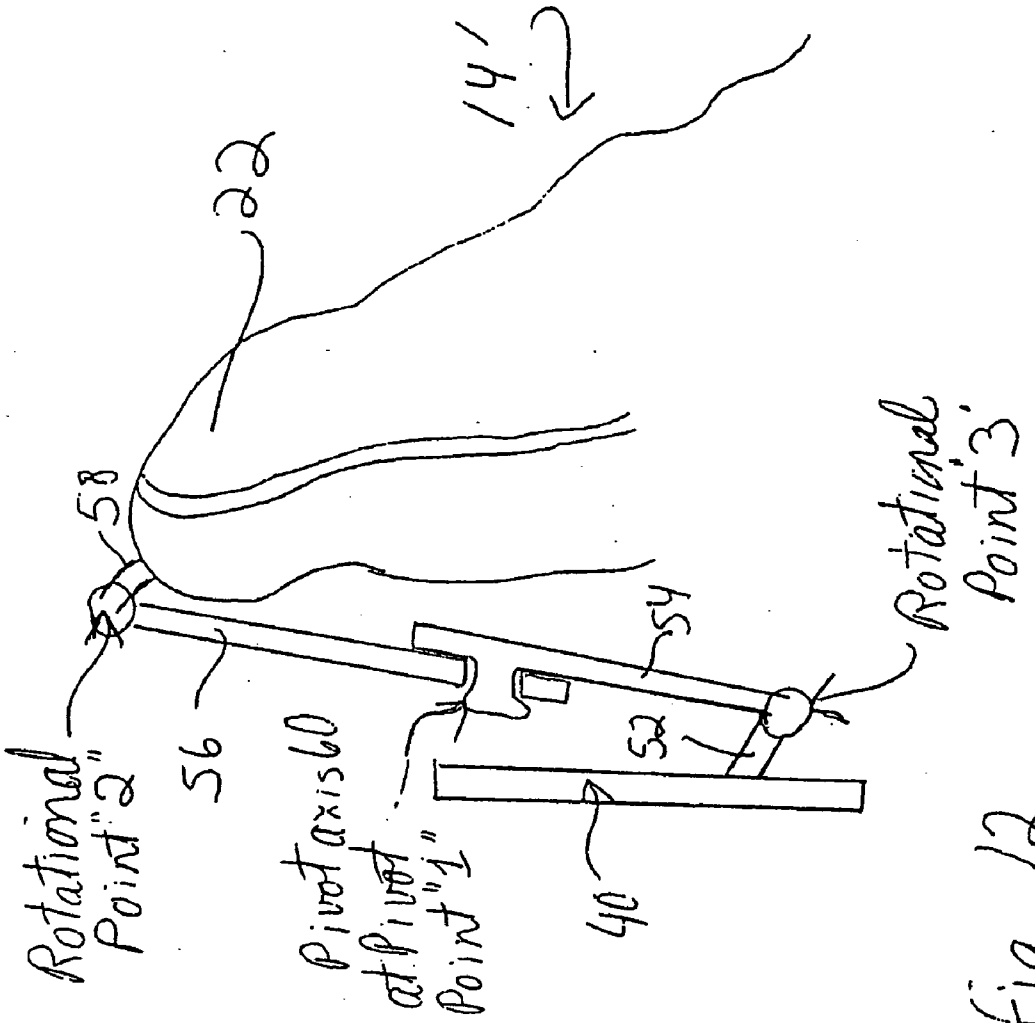

14'
22
58
54
Rotational Point "3"
Rotational Point "2"
56
Pivot axis 60 at Pivot Point "1"
52
40

Fig 12

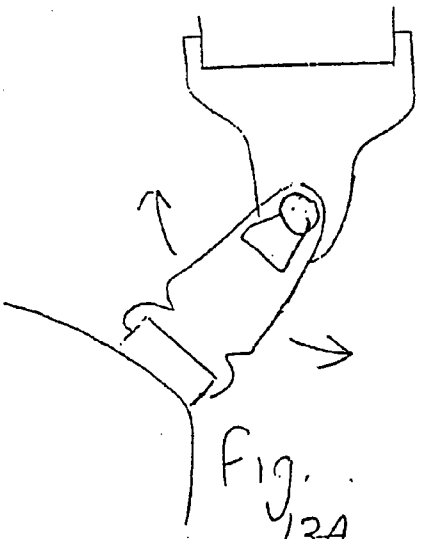


Fig. 13A

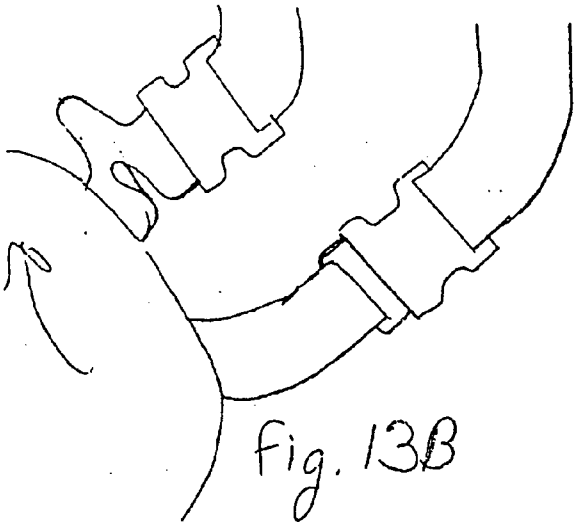


Fig. 13B

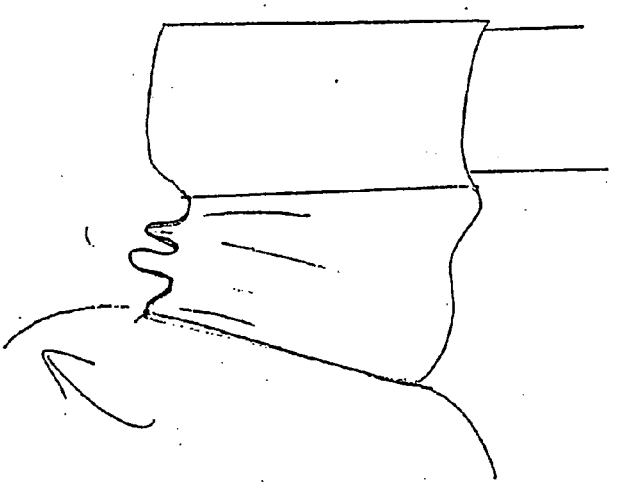


Fig 13C

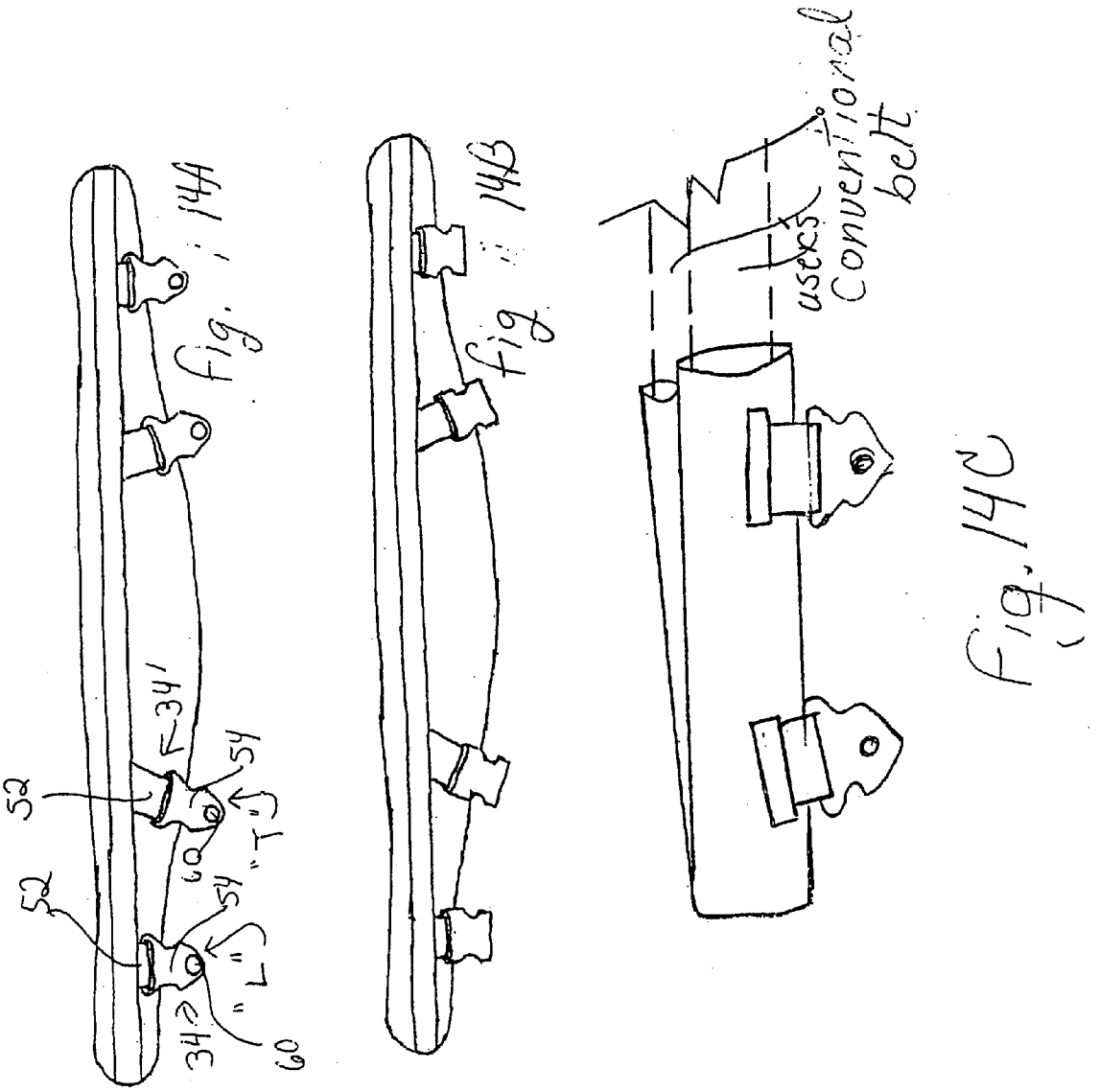


Fig. 14A
Fig. 14B
Fig. 14C
users conventional belt
52
52
54
54
60
"T"
"L"
34
34'

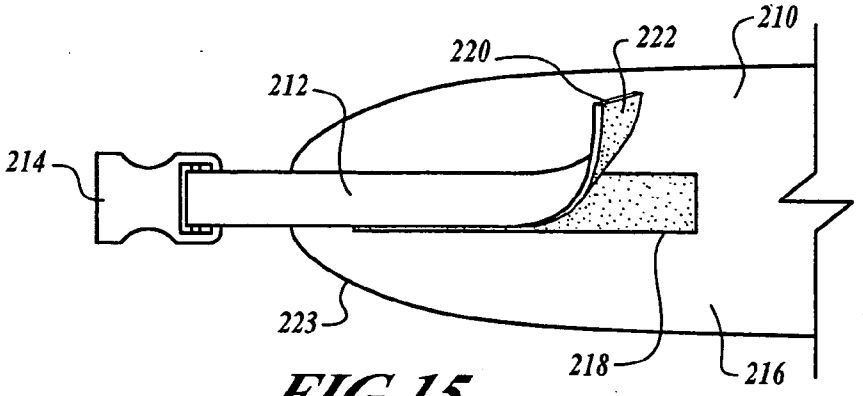


FIG.15

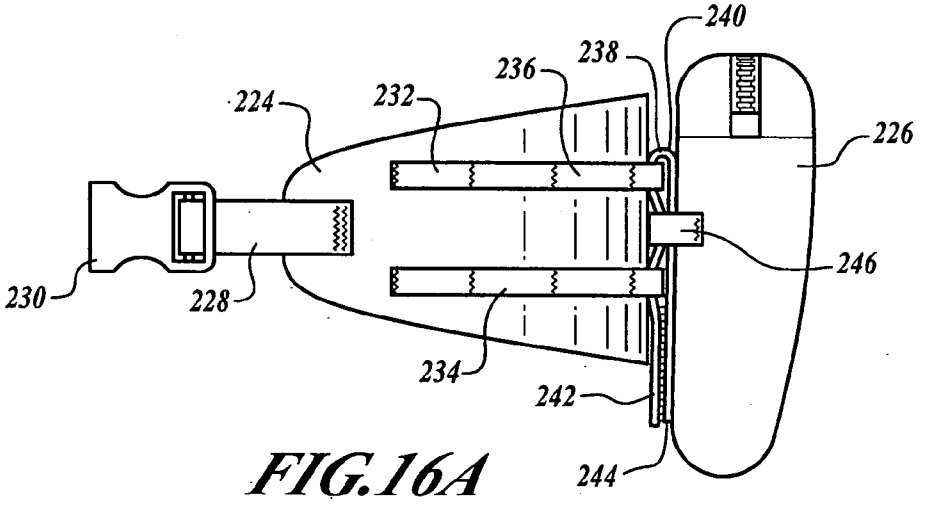


FIG.16A

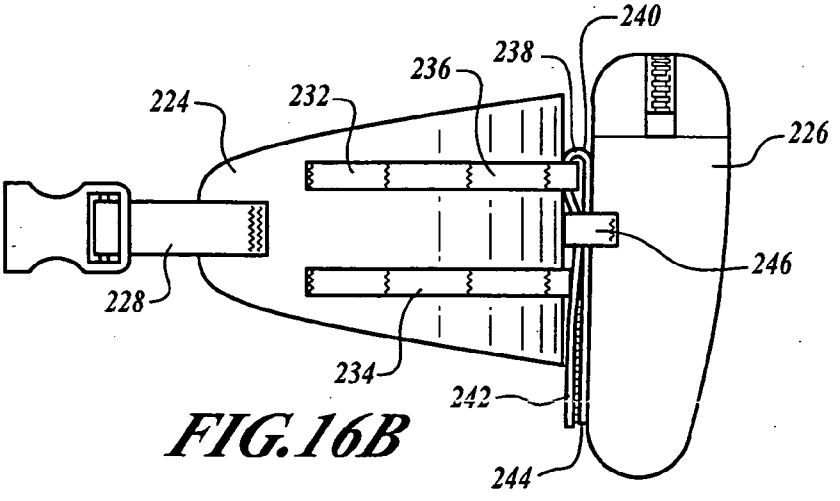


FIG.16B

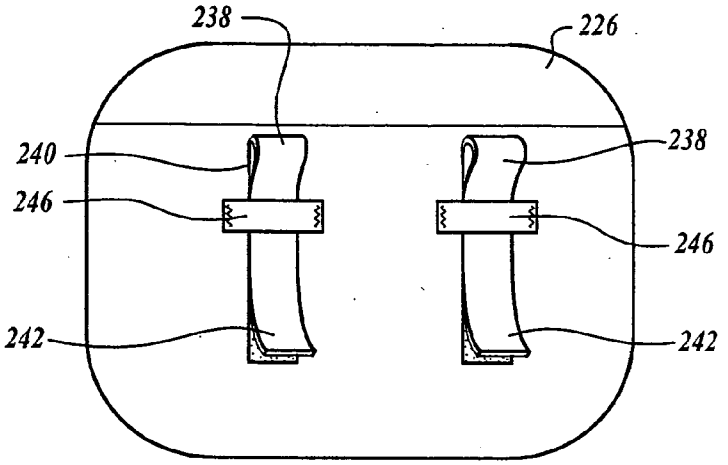


FIG.16C

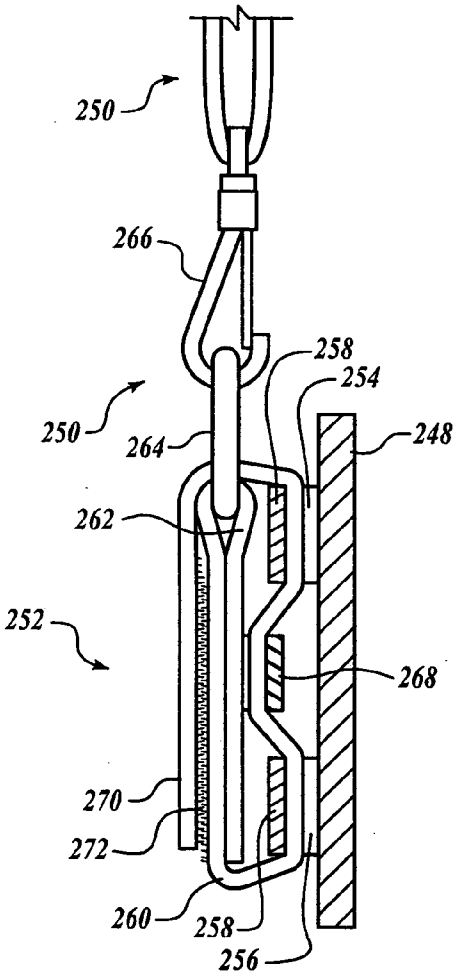


FIG.17A

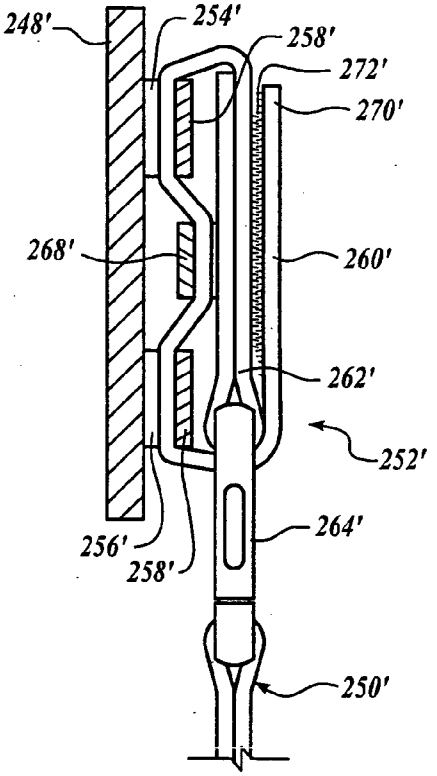


FIG.17B

MODULAR PACK SYSTEM WITH ACCESSORY COUPLERS

PRIORITY CLAIM

[0001] This application is a continuation-in-part of co-pending application Ser. No. 09,927,433 filed Aug. 10, 2001, which claims priority of prior, co-pending application Ser. No. 60/224,445, filed Aug. 10, 2000. Both prior applications are herein incorporated by this reference.

FIELD OF THE INVENTION

[0002] This invention relates generally to packs for recreational, sport, hunting, and exercise use, which are used to carry supplies or possessions that are needed on a hike, ride, walk, horseback ride, etc. More specifically, the invention relates to accessory coupler systems for securing bags or other accessories to a belt or other pack harness system.

BACKGROUND OF THE INVENTION

[0003] Many backpacks have been developed for carrying equipment, food, and personal items during hiking, walking, climbing, and other outdoor sports and recreational activities. The term "backpacking" has become nearly synonymous with hiking while carrying supplies and equipment on one's back. The technique of carrying supplies/equipment in a backpack has many drawbacks, however. The backpack moves the user's center of gravity upwards and backwards, which tends to throw the user off-balance and makes many activities clumsy, difficult, and sometimes even dangerous. The backpack attaches a large, weighty object in back of the user, which, when the user is moving quickly, can create unpredictable forces on the user. For example, wearing a backpack while climbing or hiking over steep or difficult terrain greatly increases the chance of the user falling. Further, the pleasure of hiking, running, climbing, biking, horseback riding, and other activities is diminished if the user must be more conscience of his motions and his balance due to a backpack.

[0004] Attempts at pack systems for the leg have been made, but none offer the efficiency, comfort, and safety of the present invention during a wide variety of outdoor activities, including hiking, running, horseback riding, and skiing. Clem (U.S. Pat. No. 4,848,624) discloses a "Thigh Mountable Small Modular Pack System with Demountable Interchangeable Pouches." The Clem device is a rectangular, rigid box structure, with several compartments and lids. Clem discloses a single buckled strap for surrounding a user's conventional belt, or a waist belt that integrally extends from the device. The Clem device has a rectangular, planar back plate that does not conform to the user's thigh. The present inventor believes the angular, rectangular, and thick shape of the Clem device would cause discomfort to the user's leg and would cause discomfort to the user's arm when the arm swings back and forth, thus making any but the most sedentary use impractical and uncomfortable. Berman (U.S. Pat. No. 4,303,187) discloses a "Multiple Pocket Clothing Accessory," which includes a single, broad upper portion of cloth extending integrally from the pocket and around a user's conventional belt.

[0005] Modular pack systems necessarily involve coupling bags or other accessories to a pack or harness system. Attachment methods to date have sometimes been cumbersome or insecure. An attachment system should be easy to use while firmly coupling the accessory to the harness, whether a belt or back harness or pack. Buckles can securely couple accessories, but are rigid and, thus, nonconforming to the user. Therefore, they can be uncomfortable in certain situations. Buckle rigidity also relates to toughness. A buckle may break when impacted with a hard object or when excessively bent. It may be difficult to snuggly secure an accessory with a buckle attachment in some attachment arrangements. Buckles or other such attachment devices may also not allow a multitude of attachment positions for an accessory, as a receiver buckle may have to be attached at each optional buckle location. Buckles can also be expensive.

[0006] Thus a need exists for a flexible coupler system that allows snug, secure attachment of accessory items, such as bags, with multi-position options on a belt or other harness. The system should also be lightweight, durable, and comfortable with low cost of construction and ease of use.

SUMMARY OF THE INVENTION

[0007] The present invention provides an attachment device for securing an accessory to a pack system having a first stay loop. The attachment device includes a first strap and an accessory loop. The first strap is secured to the accessory. The first strap is flexible and has a width sufficiently narrowed to be insertable through the first stay loop. The accessory loop is secured adjacent to the first strap. The accessory loop is positionable adjacent the first stay loop. The first strap is routed through the first stay loop and through the accessory loop for attachment of the accessory to the pack system.

[0008] In one preferred aspect of the invention, the first strap includes a proximal end secured to the accessory and a distal end. The attachment system further includes a releasable fastener secured to the distal end of the first strap. In one preferred embodiment, the releasable fastener is a hook and loop fastener. The releasable fastener is securable to the accessory after being routed through the accessory loop. The first strap overlaps back on itself after passing through the stay loop and the accessory loop.

[0009] In one aspect of the invention, the pack system includes a second stay loop. In this embodiment, the first strap is routed through the second stay loop after being routed through the accessory loop. Preferably, the second stay loop is spaced from the first stay loop. In a further aspect of the invention, the attachment device further includes a second strap and a second accessory loop. As with the first, the second strap is secured to the accessory. The second strap is flexible and has a width sufficiently narrowed to be insertable through the second stay loop. The second accessory loop is secured adjacent the second strap. A second accessory loop is positionable adjacent a second stay loop. The second strap is routed through the second stay loop and through the second accessory loop for attachment of the accessory to the pack system.

[0010] The invention may also be summarized as being a modular pack system having a hip belt and a pack accessory. The hip belt includes an upper stay strap and a lower stay strap. The upper stay strap is secured to the hip belt, the upper stay strap forming attachment loops. A lower stay strap is secured to the hip belt below the upper stay strap.

The lower stay strap forms attachment loops as well. The pack accessory includes an attachment strap and an accessory loop. The attachment strap includes a proximal end and a distal end. The proximal end of the attachment strap is secured to the pack accessory. The distal end includes a fastener thereon. The attachment strap extends transverse to the upper and lower stay straps and is routable through the upper and lower stay straps. The accessory loop is secured to the pack accessory. The accessory loop is positionable between the upper and lower stay straps such that the attachment strap is routable through the accessory loop between the upper and lower stay straps.

[0011] In a further aspect of the invention, the attachment strap is looped back onto itself and held with the fastener at the distal end thereof. The pack accessory may have a buckle or ring secured to the proximal end of the attachment strap. In one embodiment, the accessory is a bag secured to the proximal end of the attachment strap. In such an embodiment, the distal end of the attachment strap is releaseably fastened to the bag after extending through the accessory loop.

[0012] In a preferred embodiment of the invention, the modular pack includes a second attachment strap and a second accessory loop. Similar to the first attachment strap and accessory loop, the second attachment strap includes a proximal end and a distal end. The proximal end of the second attachment strap is secured to the pack accessory. The distal end includes a fastener thereon. The attachment strap extends transverse to the upper and lower stay straps and is routable through the upper and lower stay straps. A second accessory loop is secured to the pack accessory as well. The second accessory loop is positionable between the upper and lower stay straps such that the attachment strap is routable through the second accessory loop between the upper and lower stay straps.

[0013] A further feature of the invention includes a hip belt having an elongate member, a first strap, and a buckle. The elongate member has sufficient length to extend along a user's back and hips. The elongate member includes first and second ends, an inner side, and an outer side. The first strap has a proximal end and a distal end. The proximal end is secured to the first end of the elongate member. The distal end has a hook and loop material thereon. The buckle slidably engaged with the first strap. The elongate member includes a hook and loop material secured to the inner side of the first end thereof. The material is engageable with the distal end of the first strap. Thus, pressure between the elongate member and the user securely holds the first strap in place.

[0014] In one preferred aspect of the invention, a second strap is provided having a proximal end and a distal end. The proximal end is secured to the second end of the elongate member. The distal end has a hook and loop material thereon with the elongate member second end having a mating hook and loop material.

[0015] The hip belt thus described further may include a stay strap secured to the outer side of the elongate member. A stay strap forms loops thereon with the hip belt further having an accessory coupler. The accessory coupler includes an attachment strap and an accessory loop. The attachment strap is dimensioned to extend through the stay loops. The attachment strap extends through the accessory loop after passing through at least one stay loop.

[0016] As will be readily appreciated from the foregoing summary, the invention provides a modular pack system for attachment of accessories thereto. A system includes couplers which are flexible and secure, but can be easily released as desired or release of the accessory or for modification of the system attachment locations.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The preferred and alternative embodiments of the present invention are described in detail below with reference to the following drawings, wherein:

[0018] **FIG. 1** is a rear perspective view of one embodiment of the invented modular bag system on a user;

[0019] **FIG. 2** is a side perspective view of the embodiment of **FIG. 1**, wherein the left thigh bag of the system is pivoted to the front with the leg of the user;

[0020] **FIG. 3** is a plan view of another embodiment of a modular bag system, including right and left thigh bags, right and left small side bags, and a rear bag, all on one embodiment of an invented hip belt, wherein the system is unattached from a user and flattened-out for viewing;

[0021] **FIG. 4** is an alternative embodiment of the invented modular bag system, including a hip belt and two side bags with contoured shape, wherein the system is unattached from a user and flattened-out for viewing;

[0022] **FIG. 5** is a rear view of the back surface of the right side bag of **FIG. 4**, showing a loop for sliding-on to the belt;

[0023] **FIG. 6** is a rear view of the back surface of the rear, center bag of the embodiment of **FIG. 3**, showing a loop for sliding-on to the belt;

[0024] **FIG. 7A** is a rear view of an alternative thigh bag, with a single loop at its top for sliding-on to a hip belt, and a flexible extension between the loop and bag;

[0025] **FIG. 7B** is a rear view of an alternative thigh bag, with a single loop for sliding onto the hip belt, and two flexible extensions from the loop to the bag;

[0026] **FIG. 7C** is a front view of an alternative system according to the invention, wherein each thigh bag has two flexible straps that each connect independently to the belt;

[0027] **FIG. 8** is a perspective view of one narrow- and thin-topped bag, according to the invention, including compression straps;

[0028] **FIG. 9** is a side perspective view of the bag embodiment of **FIG. 8**;

[0029] **FIG. 10** is a front view of the bag embodiment of **FIGS. 8 and 9**;

[0030] **FIG. 11** is a perspective view of an alternative bag system according to the invention, including two thigh bags and two center rear straps;

[0031] **FIG. 12** illustrates one embodiment of a pivot-axis connector that also includes a flip-up features;

[0032] **FIG. 13A** illustrates one embodiment of a pivot-axis connector;

[0033] **FIG. 13B** illustrates one embodiment of a two flexible-strap connector;

[0034] **FIG. 13C** illustrates one embodiment of a single flexible-strap connector;

[0035] **FIG. 14A** illustrates one embodiment of a hip belt, with snap-on pivot-axis style connectors;

[0036] **FIG. 14B** illustrates another embodiment of a hip belt, with snap-together buckle, flexible-strap connectors;

[0037] **FIG. 14C** illustrates another embodiment of a hip belt, which is a belt sleeve with connectors portions, wherein a conventional belt may be slid into the belt sleeve;

[0038] **FIG. 15** is a side-elevational view of a hip belt with an adjustment strap;

[0039] **FIG. 16A** is a side-elevational view of a hip belt with an accessory bag attached;

[0040] **FIG. 16B** is a side-elevational view of a hip belt with an accessory bag attached;

[0041] **FIG. 16C** is a rear-elevational view of the accessory bag of **FIGS. 16A and 16B**;

[0042] **FIG. 17A** is a side-elevational view of a coupler of the present invention with the attached hip belt in cross section; and

[0043] **FIG. 17B** is a side-elevational view of a coupler of the present invention with the attached hip belt in cross section.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0044] Referring to the drawings, there are shown preferred, but not the only, embodiments of the invented leg pack system **10**. Preferably, the leg pack system includes bags and carried objects that are positioned substantially between the waist and the knee, and not below the knee. Preferably, the leg pack system includes bags and carried objects at both sides of the user, substantially equally distributed between right and left side, and optional small bags and objects on the back or the front.

[0045] As illustrated in **FIG. 1**, a preferred modular leg pack system **10** comprises a right thigh bag **14** and left thigh bag **14'**, on a hip belt **40** that is fastened around the user's waist or upper hips. The thigh bags **14, 14'** extend from a few inches below the belt to a few inches above the knees, and wrap part way around the legs. Each bag has a strap **32, 32'** fastened around the leg above the knee, with the leg strap **32, 32'** fasteners easily reachable by the user from the front.

[0046] **FIG. 2** illustrates the leg pack system **10** in use and how the thigh bags **14, 14'** pivot relative to the hip belt **40** to move with the user's legs. As discussed later in this Detailed Description, the connection means for the thigh bags **14, 14'** preferably includes a pivot feature, which may comprise a connector with a pivot axis or a connector that is flexible and sized for allowing a bag to swing/pivot in a plane generally parallel to the belt, that is, to swing/pivot with the leg. In **FIG. 2**, the left leg and left thigh bag are pivoted so fat forward that the leading pivotal connection of the thigh bag is both pivoted and rotated up against the belt, as schematically portrayed in **FIG. 12**.

[0047] In **FIGS. 1 and 2**, one may see a left thigh bag **14'** front surface **12**, and leading side **16** and trailing side **18**. The thigh bags **14, 14'** may optionally include a thin and narrow top end **22** and a thicker and wider bottom end **24** (see **FIGS. 8-10**). Leg strap support panels **30** extend out from the bag, perpendicular to the length of the bag. The leg straps **32, 32'** extend out from the support panels **30**, and may each have a thin, curved-to-leg contour quick-release buckle. The panels **30** tend to provide a secure attachment point, plus they prevent the strap **32, 32'** from sagging down the leg. With panels **30**, a firm, sure, and predictably-placed leg strap system provides comfortable and effective connection to the leg above the knee.

[0048] In **FIG. 3**, there is shown a modular bag system **100** according to the invention, which shows two thigh bags **14, 14'** a center rear bag **15**, and two small side bags **17**. The two thigh bags **14, 14'** are connected by a connector means that includes two connectors **31** made of upper portions **34, 34'** and bottom portions **50** that connect together, in a quickly-attachable and quickly-releasable manner. Each connector **31** may include a pivot axis **60**, which in the preferred embodiment, comprises the bottom portion **50** rotating around the protrusion on the upper portion onto which the bottom portion snaps.

[0049] **FIG. 3** (and also **FIGS. 14A and 14B** to good advantage) illustrate the position and preferred angle of two upper portions of connectors **34, 34'** on a hip belt **40**. Preferably, the leading upper portion **34** extends generally downward vertically from the belt when it is on the user, that is, generally perpendicular to the length of the belt. The trailing upper portion **34'** is preferably non-parallel to the leading upper portion **34**, that is, preferably angled toward the leading upper portion **34** (toward the user's front when in use). The preferred angle is in the range of about 25-45 degrees relative to parallel to the leading portion **34** (or, that is, about 65 to 45 down from the longitudinal axis of the belt), but other angles may be optimal for various bags and users. This preferred angled connector provides an attachment point for the bag which tends to position the bag properly on the thigh, and which allows the bag to easily pivot forward during use.

[0050] The leg straps **32, 32'** of the thigh bags in **FIG. 3** are shown to have their lengths substantially located on the trailing sides of the bags. This way, the straps **32, 32'** can extend around the inside of the leg to near the front of the leg, for easy fastening by the user. The leg strap support panels **30**, in effect, allow a firmer (compared to the leg straps), thin and flat structure to extend out from the bottom of the bag for a total coverage for bag and panels of about 180 degrees around the leg. Because of the firm panels, which flex in one direction (around the surface of the leg) the leg straps do not sag or shift, and excessive tightening of the leg strap around the leg is unnecessary.

[0051] The rear center bag **15** in **FIG. 3** slides onto the belt **40** by means of its rear loop **41** on its back surface, which is illustrated in **FIG. 6**. This loop may be substantially the same length as the width of the bag **15**, because this rear bag need not, and preferably does not, pivot relative to the hip belt.

[0052] The small side bags **17** also slide onto the belt **40** by means of rear loop (not shown). The side bags **17** are preferably sized to slide over, and fit between, the upper portions **34, 34'** of the connectors. The upper portions **34, 34'** may be flipped up against the main body of the belt to move out of the way of the bag **17** loop, and, when the bag **17** is

in place between the upper portions **34**, **34'**, the upper portions may be flipped down for use with thigh bags **14**. The connectors may then serve to hold the small side bags in place along the length of the belt.

[**0053**] As illustrated in **FIG. 3**, right and left bags do not necessarily need to be identical, and the modularity of the invented system allows the bags to be switched or changed or eliminated. Balancing the size and number of bags between right and left is certainly desirable, for ease of movement, safety, and to prevent off-balance walking or damage to muscles or joints. However, the accessory features may be changed, for example, a left thigh bag with outer compression straps **20**, and a right thigh bag without compression straps but with multiple outer pockets. A left side bag may include a main zippered pocket, while the right side bag may include multiple outer flaps/pockets. Preferably, no matter what style the various bags are, they include easily assessable openings, which the user may reach without removing or loosening the belt **40**.

[**0054**] In **FIG. 4** is shown an embodiment including a hip belt **40** with two mirror image contoured side bags **62**. These side bags slide onto an end of the belt by means of an elongated, tapered sleeve **64** on the back surface of each bag **62**, shown in **FIG. 5**. The contoured lower perimeter **66** of the bag **62** and its small leading end allow free and comfortable movement of the leg, while the larger trailing end positioned at the rear of the upper thigh, out of the way of the leg swing, provides packing volume.

[**0055**] A user may find the invented bag system advantageous in walking, jumping, and climbing. The thigh packs move naturally with the user's legs, without shifting and wobbling. Center of gravity is kept low and centered between left and right (assuming the user has properly packed the thigh bags to about the same weight), in fact, slightly lowered below the natural center of gravity for a person. One can see that the total volume of pack capacity in the invented system is quite large, sufficient for most sporting, recreational, and day-long activities. With the easy assess provided to the bags, it is to access the thigh bags and side bags and the contents of the bags without taking the bags off of the belt, and without any twisting of the body. Therefore, many activities may be comfortably and conveniently undertaken with the pack system, and with the invented leg pack system rather than a conventional backpack system, even biking, skiing, running, or other sports become easy again.

[**0056**] As suggested in **FIGS. 1 and 2**, the construction of the thigh bags, and their connection to the hip belt, are preferably adapted for easy and smooth pivoting relative to the belt. This may be done by various connectors, for example, the pivot-axis style pivoting connectors shown in **FIG. 1-3**, **11**, **12**, **13**A, and **14**A, or the flexible style pivoting connectors shown in **FIGS. 7A-7C**, **13**B, **13**C and **14**B.

[**0057**] In the pivot-axis style connector (best depicted in **FIGS. 3 and 14**A), the upper portion **34**, **34'** of the connector comprises a webbing upper strap **52** and a rigid, generally planar, top snap-together rigid member **54**. The bottom portion **50** of the connector comprises the rigid, generally planar, bottom snap-together member **56** and a short flexible bottom strap **58**. Upper strap **52** is sewn to the hip belt near the bottom edge of the belt, as shown in the drawings, and looped through the elongated slot in top member **54**. The bottom strap **56** is sewn to the top of the thigh bag and looped through the elongated slot in bottom member **56**. Both the leading connector (L) and the trailing connector (T) preferably have similar construction, but may be installed on the belt at different angles, as discussed above. The leading connector (L) hangs generally straight downward, and the trailing connector (T) is angled slightly forward toward the leading connector. This helps with strength and durability of the connector system, as the two connectors therefore form a V-shape with the top of the bag at the point of the V. Also, this provides good aesthetics for the connectors relative to the curvature of the bottom edge of the belt.

[**0058**] Preferably, snap-together, rigid members **54** and **56** feature a pivot axis **60** near the center of the connector. Members **54** and **56** releaseably connect together, in this embodiment, by one member having an aperture sliding over the pivot axis "post" on the other member, like a "suspender and button hook" system. When connected together, the two members lie in generally a single plane, or in two very close parallel planes in the preferred embodiment, which is/are herein referred to as the "pivot plane(s)". Because of the placement of the hip belt on the user's body, arid the connector's position relative to the belt, the pivot plane(s) is parallel to the plane of the outer thigh or clothing on the thigh. The two members **54** and **56** pivot relative to each other in that pivot plane(s), typically with the bottom member **56** pivoting around the post of the top member **54**. In addition, as may be seen particularly in the movement of the leading connector (L), the flexible straps or the seem between the flexible straps and the belt and the bag may bend, to allow the rigid connector to flip upwards against the belt, thus allowing the bag to comfortably move up higher against the belt when the leg is far forward (see **FIGS. 1 and 12**, for example). With these actions of pivoting and flipping-up, the connectors provide greatly improved action for the bag, and greatly improved durability and comfort, compared to what would result from simply a strap of webbing connecting the bag to the belt. This way, the webbing straps or other extension member(s) of the connector do not twist or bend. As stated above, a few inches of strap is desired to place the bag at about 2.5-3 inches from the bottom edge of the belt, but the strap is not needed for pivoting. In fact, the bottom rigid member **56** could be directly sewn/attached to the bag, without a strap **58**, in such away that the bottom rigid member **56** can rotate relative to the bag. Or, the top rigid member **54** could be directly sewn/attached to the belt, in such a way that the top rigid member **54** can rotate relative to the belt. For sake of clarity, herein the term "pivot" is used to describe the action of the connection that allows the connector (or part of the connector) to swing in a plane generally parallel to the belt surface (and the outer thigh and clothing surface), and the term "rotate" is used to describe the action of the connector as it flips up at point **3** in **FIG. 12**, and the action of the top of the bag relative to the connector at point **2** in **FIG. 12**. Thus, one may see that preferably each top connector includes three axis of pivoting/rotation, wherein typically two (points **2** and **3** in **FIG. 12**) are transverse (normal) to the main connector pivot (point **1** in **FIG. 12**).

[**0059**] The preferred pivot axis **60** is a protruding button or knob that extends out from the upper connector on the belt, combined with an aperture in the lower connector that snaps around/onto, and pivots at least 90 degrees (and

preferably more) around, the protruding button/knob. The protruding button/knob, and, therefore, the pivot axis extends horizontally and laterally out from the belt generally at the side of the user.

[0060] In use, when the leg is moved from a completely vertical position, the thigh pack travels with it. The pivot connectors typically pivot forward at the pivot axis, and, then, as the leg movement reaches farther forward, the leading connector flips up, as described above. When the leg returns to the vertical position and then a rearward position, the connector flips down and pivots at the pivot axis in the opposite, rearward direction.

[0061] It should be noted that other pivotal connectors may be used besides the ones shown in the Figures, and the pivot axis does not necessarily need to be in the center of the connector, but may be nearer the bag or nearer the belt, for example. Preferably, but not always necessarily, the pivot-axis style upper connector portions are substantially rigid, which helps prevent the bag from riding tip on the leg, and helps prevent the bag wobbling.

[0062] The flexible-pivot style of connector is illustrated by examples in **FIGS. 7A, 7B, 13**B, and **13**C. Instead of rigid, pivoting connectors forming a pivot axis, the flexible straps shown in these Figures may serve to flex, and, therefore, to allow the thigh bag to pivot relative to the belt. Two flexible straps are preferred for this style of connector, wherein each strap is independently attached to the belt or wherein the multiple straps are attached to a single loop that extends around the belt. The embodiment of **FIG. 7A and 13C** illustrates a single loop around the belt and a single flexible strap to the bag. Preferably, for security and load-spreading, either multiple flexible straps or a wider single flexible strap is preferred.

[0063] **FIGS. 8-10** illustrate a thigh bag **114** with a narrow and thin top, which is preferred by some users. This narrow- and thin-topped bag does not significantly interfere with arm motion even during more extreme activities.

[0064] A hydration unit, jacket, or other items may be held on the hip belt central rear section, for example, in the tightenable rear straps **42** on either side of center, shown in **FIG. 11**. A hydration unit reservoir may be attached to the centrally-located rear straps **42** and the hydration tube may be clipped to the front chest of the user.

[0065] Padding is preferably included in the back wall of the bag and in the leg strap support panels, as this adds some rigidity to the bag, and comfort for the user. The resulting back wall (also referred to as the "back plane" of the bag) is preferably generally planar, with enough flexibility that it can flex around the curvature of the thigh, preferably all along the length of the bag. This curvature contributes to the bag fitting closely to the thigh and movement naturally with the leg without wobble or other movements relative to the leg that would unbalance the user.

[0066] **FIG. 14C** illustrates that a "hip belt" according to the invention may include, in some embodiments, a sleeve that slides onto a conventional belt. This serves, in effect, as an adapter to make a conventional belt usable as a hip belt for the invented bag system. Preferably, the sleeve includes means for securing the sleeve to the conventional belt, either by friction, by fasteners, or other anchoring systems.

[0067] **FIG. 15** illustrates a side elevational view of a portion of a hip belt **210** of the present invention that includes an adjustable belt attachment strap **212**. More completely, hip belt **210** includes a belt attachment strap **212**, a buckle **214**, an inner side **216**, and an outer side (not shown). Hip belt **210** may be used as part of the harness system of a backpack, hip pack, leg packs, or other harness system. The elongate portion of hip belt **210** surrounds the waist of the user and may be fastened thereabout with buckle **214** attached to a complimentary buckle on the other end thereof (not shown).

[0068] The width of hip belt **210** is sufficient to comfortably secure the load around the waist of the user and may be contoured to the hips of the user. Hip belt **210** may include padding therein with a more rugged outer shell such as a thick nylon fabric.

[0069] Belt attachment strap **212** is preferably constructed of nylon webbing material. The belt attachment strap **212** includes a proximal end **218** fixedly secured to inner side **216** of hip belt **210**. Strap **212** also includes a distal end **220**. A hook and loop fastener **222** is secured to the inner sides of belt attachment strap **212** such that the sides may be secured together. Alternatively, half of the hook and loop fastener **222** may simply be secured to a first end **223** of the inner side **216** of hip belt **210** with the opposite hook and loop fastener secured to the inside of belt attachment strap **212** such that they may be joined together. Since the belt attachment strap **212** is secured to the inner side **216** of hip belt **210**, pressure between inner side **216** and the user helps secure the position of belt attachment strap **212** with the hook and loop fastener **222**. The hook and loop fastener **222** is very secure in sheer and would not have any tendency to be pulled off due to the compression around the hips or waist of the user. Thus, a quick and easy adjustment of the position of buckle **214** is provided by simply releasing buckle **214** and releasing the pressure of hip belt **210** about the waist of the user such that distal end **220** of attachment strap **212** can be pulled away from proximal end **218** to release the hook and loop fastener for repositioning. Note that buckle **214** is slidably secured to belt attachment strap **212** such that repositioning allows buckle **214** to move along belt attachment strap **212** for adjustment purposes. Other fasteners, such as snaps, may alternatively be used.

[0070] Referring now to **FIGS. 16A through 16C**, an accessory coupler of the present invention will now be discussed. A pack belt **224** is provided. Pack belt **224** may be similar to hip belt **210** discussed above. Pack belt **224** includes a flexible outer shell with inner padding to be secured about the waist and hips of a user. Pack belt **224** may be part of a larger pack system such as a backpack or may be for use with an accessory bag **226**, leg bags, or other accessory item. A belt strap **228** with a buckle **230** is provided at the first and second ends of pack belt **224** to secure the belt about the waist of the user. An adjustment mechanism may be used such as is known in the art or such as that discussed above in connection with **FIG. 15**. Belt strap **228** is preferably constructed of a non-stretch nylon webbing material. Buckle **230** is preferably of molded plastic.

[0071] Pack belt **224** includes upper and lower stay straps **232** and **234** that provide stay loops **236**. Upper and lower stay straps **232** and **234** are preferably constructed of nylon

webbing material in elongate straps that extend along the length of pack belt **224**, the upper stay strap spaced above the lower stay strap. Stay loops **236** are created by stitching upper and lower stay straps at intervals along their length so as to create stay loops **236**. Accessory straps may pass under loops **236** top to bottom or bottom to top between stay straps **232** and **234** and the outer side of pack belt **224**. Stay loops **236** are preferably snug against the outer side of pack belt **224**, but alternatively, could be provided with extra strap material such that they bulge outwardly from pack belt **224**.

[**0072**] Accessory bag **226**, as shown in the illustrations of **FIGS. 16A through 16C** is simply for illustrative purposes. Any accessory with the coupling system described herein falls within the present invention. Accessory bag **226** may be used to hold various items that the user wishes to carry. Thus, the shape and dimensions of accessory bag **226** or other accessory that may include such a coupling system depend upon the use for which the bag or holder is contemplated. For example, accessory bag **226** may also include external pockets for a water bottle, ammunition, tools, or other uses. Alternatively, the coupling system may be secured to a loop or sleeve for holding tools or other items.

[**0073**] The coupling system of accessory bag **226** includes an accessory attachment strap **238** having a proximal end **240** and a distal end **242**. Proximal end **240** is fixedly secured to the back side of accessory bag **226**. In the preferred embodiment, such fixed attachment is by stitching of the webbing material of accessory attachment strap **238** to the back side of bag **226**. The underside of the distal end **242** of attachment strap **238** includes a hook and loop fastener **244**. A mating hook and loop fastener is also secured to the back side of bag **226** for engagement therewith. An accessory loop **246** is also provided, fixedly attached to the back side of bag **226**. In the preferred embodiment, accessory loop **246** is secured beneath the proximal end **240** of attachment strap **238**. Accessory loop **246** preferably extends transverse to the longitudinal axis of accessory attachment strap **238** and is stitched so as to provide a sleeve through which distal end **242** of attachment strap **238** may extend. By extending distal end **242** through accessory loop **246**, a loop is created between the fixed attachment of proximal end **240** of attachment strap **238** and accessory loop **246**. As seen in **FIG. 16C**, two accessory attachment straps and accessory loops are preferably used on the back side of bag **226** for stable attachment of the bag to pack belt **224**.

[**0074**] The spacing of accessory attachment strap **238** and accessory loops **246** is such that they may be conveniently engaged with stay loops **236** of upper and lower stay straps **232** and **234**. As seen in **FIG. 16A**, accessory attachment strap **238** may be extended through a stay loop **236** of upper stay strap **232**. After which accessory attachment strap **238** extends through accessory loop **246** and then through a stay loop **236** of lower stay strap **234**. After extending through lower stay strap **234**, distal end **242** may be secured to the back side of accessory bag **226** with hook and loop fastener **244**. Thus, accessory bag **226** is held secure to pack belt **224**. Note that by extending accessory attachment strap **238** through accessory loop **246**, accessory bag **226** is more securely held to pack belt **224**. Thus, if an outward force is applied to accessory bag **226** away from pack belt **224**, attachment strap **238** is unlikely to simply slide out of stay loops **236** since separation of hook and loop fastener **244** is not as easily accomplished with accessory loop **246** holding the strap in place. Thus, the hook and loop fastener **244** must more substantially be separated in sheer which is more difficult than simply pulling it apart by applying a force normal to the surfaces. Thus, in an alternate embodiment, an additional accessory loop **246** may also be secured to accessory bag **226** below lower stay strap **234**.

[**0075**] Further, in an alternate attachment arrangement, shown in **FIG. 16B**, lower stay strap **234** may be bypassed with distal end **242** simply attaching to hook and loop fastener **244** after extending through accessory loop **246**.

[**0076**] As mentioned above, this attachment system described in **FIGS. 16A through 16C** may be used for bags or other devices to securely hold an accessory to pack belt **224**. Furthermore, the system may be used with other harness systems than pack belt **224**. For example, stay loops **236** could be provided on shoulder straps to secure an accessory to the front or back of such straps.

[**0077**] The basic coupler system of the present invention is further set forth in alternate embodiments shown in **FIGS. 17A and 17B**. In **FIG. 17A**, a strap extends upwardly from a coupler. This may be a suspender or shoulder strap, for example. In **FIG. 17B**, a pack accessory is suspended downwardly from a coupler **252'**. Such pack accessory may be a leg pack, for example.

[**0078**] Referring first to **FIG. 17A**, a hip belt **248** is provided similar to that described above in connection with **FIGS. 16A and 16B**. Hip belt **248** includes a covering and a padding for surrounding the waist of a user. A pack accessory **250** is to be attached to hip belt **248** with a coupler **252**.

[**0079**] Hip belt **248** includes an upper stay strap **254** and a lower stay strap **256**. Stay straps **254** and **256** form attachment loops **258** extending longitudinally around at least a portion of hip belt **248** in a manner similar to that described above in connection with **FIGS. 16A and 16B**. Thus, stay straps **254** and **256** are preferably constructed of nylon webbing material that is stitched at intervals around hip belt **248** to form attachment loops **258**. The straps are separated vertically, but preferably run generally parallel one to another.

[**0080**] A coupler **252** with a coupler strap **260** is provided for securing the pack accessory **250** to hip belt **248**. Coupler strap **260** includes a proximal end **262** with a ring **264** attached thereto. Ring **264** provides a place to which a clip **266** may be attached for securement of pack accessory **250**. A coupler loop **268** is secured near proximal end **262**, but runs transverse to the longitudinal axis of coupler strap **260** such that a portion of coupler strap **260** may extend therethrough as it is looped around. The distal end **270** folds on to the back side of proximal end **262** and the two are secured together with a hook and loop fastener **272**. Thus, the overall configuration of coupler strap **260** in combination with coupler **268** form somewhat of a "figure 8" or a "B" shape.

[**0081**] The attachment of coupler **252** to hip belt **248** will now be described. Distal end **270** of coupler strap **260** is threaded up through lower stay strap **256**, through coupler loop **268** than through upper stay strap **254**. Coupler strap **260** extends through attachment loops **258** on upper and lower stay straps **254** and **256**. Distal end **270** of coupler strap **260** is then looped through ring **264** and laid against

proximal end **262** such that both sides of hook and loop fastener **272** engage each other, one side being secured to proximal end **262** while the other side is secured to distal end **270**.

[**0082**] A force may be applied on ring **262** by clip **266** from accessory **250**. However, the load is sufficiently secure due to the looping of coupler strap **260**. Any force on distal end **270** of coupler strap **260** is in sheer, which hook and loop fastener **272** is quite adequate to deal with.

[**0083**] **FIG. 17B** illustrates an alternate inverted use of coupler **252'**. Please note that that the looping of coupler strap **260'** is essentially the same as that described above in connection with **FIG. 17A** except that it starts with attachment loop **258'** of upper stay strap **254'** such that it extends from top to bottom rather than from bottom to top. Note that in **FIG. 17B**, the numbering is essentially the same as that for **FIG. 17A** except for the use of the prime symbol after each number. In this instance, a buckle **264'** is used in place of ring **264** for securement of a pack accessory below hip belt **248'**. Such pack accessory may be a leg bag or the securement of the lower end of a backpack. Once again, the forces on coupler **252'** are such that the Velcro attachment is sufficient to withstand the sheer forces involved once coupler strap **260'** is properly looped about attachment loops **258'** and coupler loop **268'**.

[**0084**] Please note that all of the embodiments described herein take advantage of the fact that the fastener that secures the straps together is strong in sheer. Thus, combined with the coupler loops and the attachment loops a secure flexible attachment is achieved that is inexpensive to manufacture, durable, and easy to use. The user can simply pull the distal end of the coupler strap away from the proximal end to separate the hook and loop fastener after which the strap can be pulled out from the attachment loops and the coupler loop. The positioning is then possible on a different area of the pack belt or harness system.

[**0085**] While preferred embodiments of the invention have been illustrated and described, as noted above, many changes can be made without departing from the spirit and scope of the invention. For example, the couplers may be used to attach items other than bags, such as equipment to be carried. Alternatively, fasteners other than the "hook and loop" variety may be used. Accordingly, the scope of the invention is not limited by the disclosure of the preferred embodiment. Instead, the invention should be determined entirely by reference to the claims that follow.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An attachment device for securing an accessory to a pack system having a first stay loop, the attachment device comprising:

a. a first strap secured to the accessory, said first strap being flexible and having a width sufficiently narrow to be insertable through the first stay loop;

b. an accessory loop secured adjacent said first strap, said accessory loop being positionable adjacent the first stay loop; and further

c. wherein said first strap is routed through said first stay loop and through said accessory loop for attachment of the accessory to the pack system.

2. The attachment device of claim 1, wherein said first strap includes a proximal end secured to the accessory and a distal end, the attachment system further comprising a releasable fastener secured to the distal end of said first strap.

3. The attachment device of claim 2, wherein said releasable fastener comprises a hook and loop fastener.

4. The attachment device of claim 2, wherein said releasable fastener is securable to the accessory after being routed through said accessory loop.

5. The attachment device of claim 2, wherein said releasable fastener is securable to said first strap after being routed through said accessory loop, said first strap forming a loop overlapping back on itself.

6. The attachment device of claim 5, wherein the pack system includes a second stay loop, and further wherein said first strap is routed through the second stay loop after being routed through said accessory loop.

7. The attachment device of claim 2, wherein the pack system includes a second stay loop, and further wherein said first strap is routed through the second stay loop after being routed through said accessory loop.

8. The attachment device of claim 1, wherein the pack system includes a second stay loop, and further wherein said first strap is routed through the second stay loop after being routed through said accessory loop.

9. The attachment device of claim 1, wherein the pack system has a second stay loop spaced from said first stay loop, said attachment device further comprising:

a. a second strap secured to the accessory, said second strap being flexible and having a width sufficiently narrow to be insertable through the second stay loop;

b. a second accessory loop secured adjacent said second strap, said second accessory loop being positionable adjacent said second stay loop; and further

c. wherein said second strap is routed through said second stay loop and through said second accessory loop for attachment of the accessory to the pack system.

10. A modular pack comprising:

a. a hip belt having:

i. an upper stay strap secured to said hip belt, said upper stay strap forming attachment loops; and

ii. a lower stay strap secured to said hip belt below said upper stay strap, said lower stay strap forming attachment loops; and

b. a pack accessory having:

i. an attachment strap with a proximal end and a distal end, said proximal end of said attachment strap being secured to said pack accessory, said distal end having a fastener thereon, said attachment strap extending transverse to said upper and lower stay straps and being routable through said upper and lower stay straps; and

ii. an accessory loop secured to said pack accessory, said accessory loop being positionable between said upper and lower stay straps such that said attachment strap is routable through said accessory loop between said upper and lower stay straps.

11. The modular pack of claim 10, wherein said attachment strap is looped back onto itself and held with said fastener at said distal end thereof.

12. The modular pack of claim 11, wherein said pack accessory comprises a buckle secured to said proximal end of said attachment strap.

13. The modular pack of claim 11, wherein said pack accessory comprises a ring secured to said proximal end of said attachment strap.

14. The modular pack of claim 10, wherein said accessory comprises a bag secured to said proximal end of said attachment strap.

15. The modular pack of claim 14, wherein said distal end of said attachment strap is releaseably fastened to said bag after extending through said accessory loop.

16. The modular pack of claim 10, further comprising:

a. a second attachment strap with a proximal end and a distal end, said proximal end of said second attachment strap being secured to said pack accessory, said distal end having a fastener thereon, said attachment strap extending transverse to said upper and lower stay straps and being routable through said upper and lower stay straps; and

b. a second accessory loop secured to said pack accessory, said second accessory loop being positionable between said upper and lower stay straps such that said attachment strap is routable through said second accessory loop between said upper and lower stay straps.

17. The modular pack of claim 10, wherein said hip belt further comprises an adjustable attachment strap and a buckle for securing said hip belt about the waist of a user, said strap having a hook and loop fastener material secured thereon, a mating hook and loop fastener material being secured to an inner side of said hip belt, pressure on the inner side of said hip belt adding to the secure attachment of said hook and loop material to keep said attachment strap securely in place during use.

18. A hip belt comprising:

a. an elongate member having a length sufficient to extend along a user's back and hips, said elongate member having first and second ends, an inner side, and an outer side;

b. a first strap having a proximal end and a distal end, said proximal end being secured to said first end of said elongate member, said distal end having a hook and loop material thereon;

c. a buckle slidably engaged with said first strap; and further

d. wherein said elongate member includes a hook and loop material secured to said inner side of said first end of said elongate member, said material being engageable with said distal end of said first strap, pressure between said elongate member and the user securely holding said first strap in place.

19. The hip belt of claim 18, further comprising a second strap having a proximal end and a distal end, said proximal end being secured to said second end of said elongate member, said distal end having a hook and loop material thereon; said elongate member second end having a mating hook and loop material thereon.

20. The hip belt of claim 18, further comprising a stay strap secured to said outer side of said elongate member, said stay strap forming loops thereon; said hip belt further comprising an accessory coupler comprising:

a. an attachment strap dimensioned to extend through said stay loops; and

b. an accessory loop, through which said attachment strap extends after passing through at least one stay loop.

* * * * *