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(54) **FLEXIBLE MID-SECTION FLOAT SYSTEM FOR PROTECTIVE OUTERWEAR**

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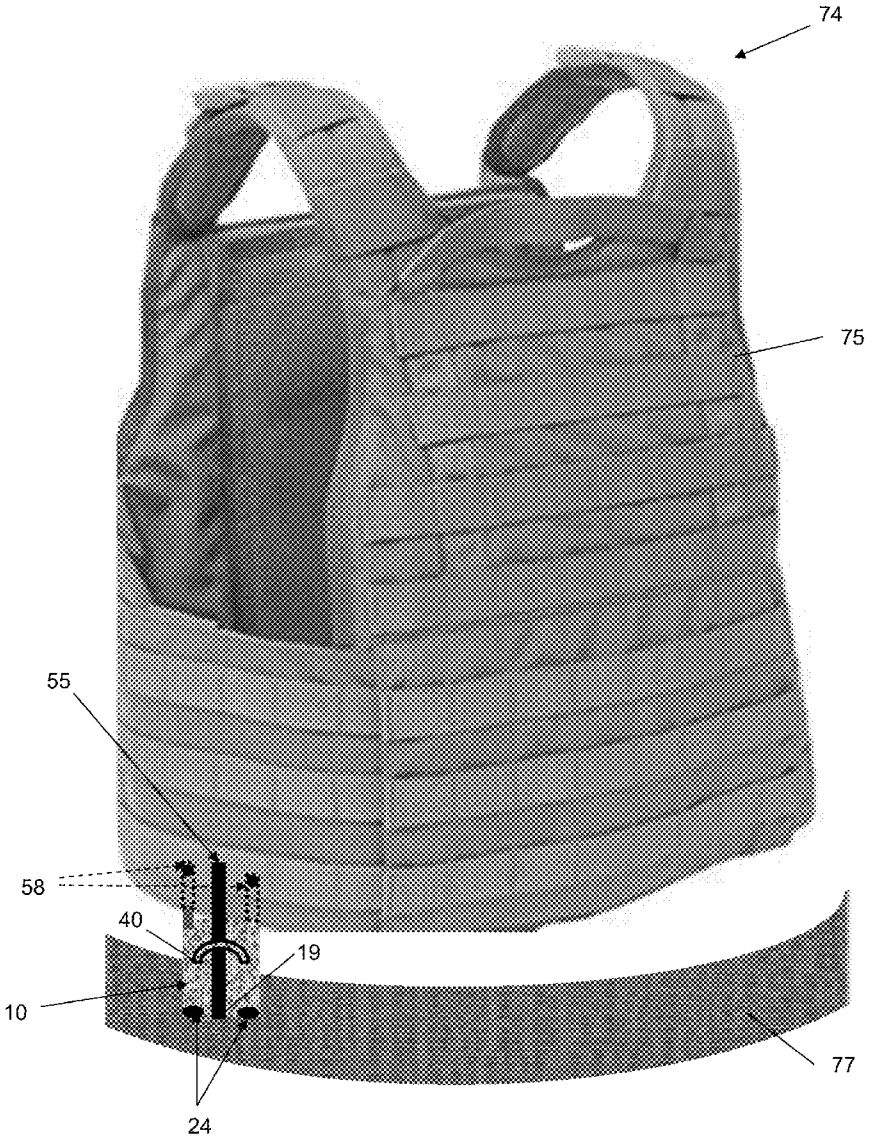
(57) **ABSTRACT**

The present invention provides, in part, a mid-section float system that can be used with protective outerwear, such as a protective, wearable carriage device, for example. The present invention also provides a quick attach/detach system for connecting belts or cumberbunds to an upper torso outerwear device. In one embodiment, the present invention includes a flexible connector having a base, a receiving strap and a spring connector component.



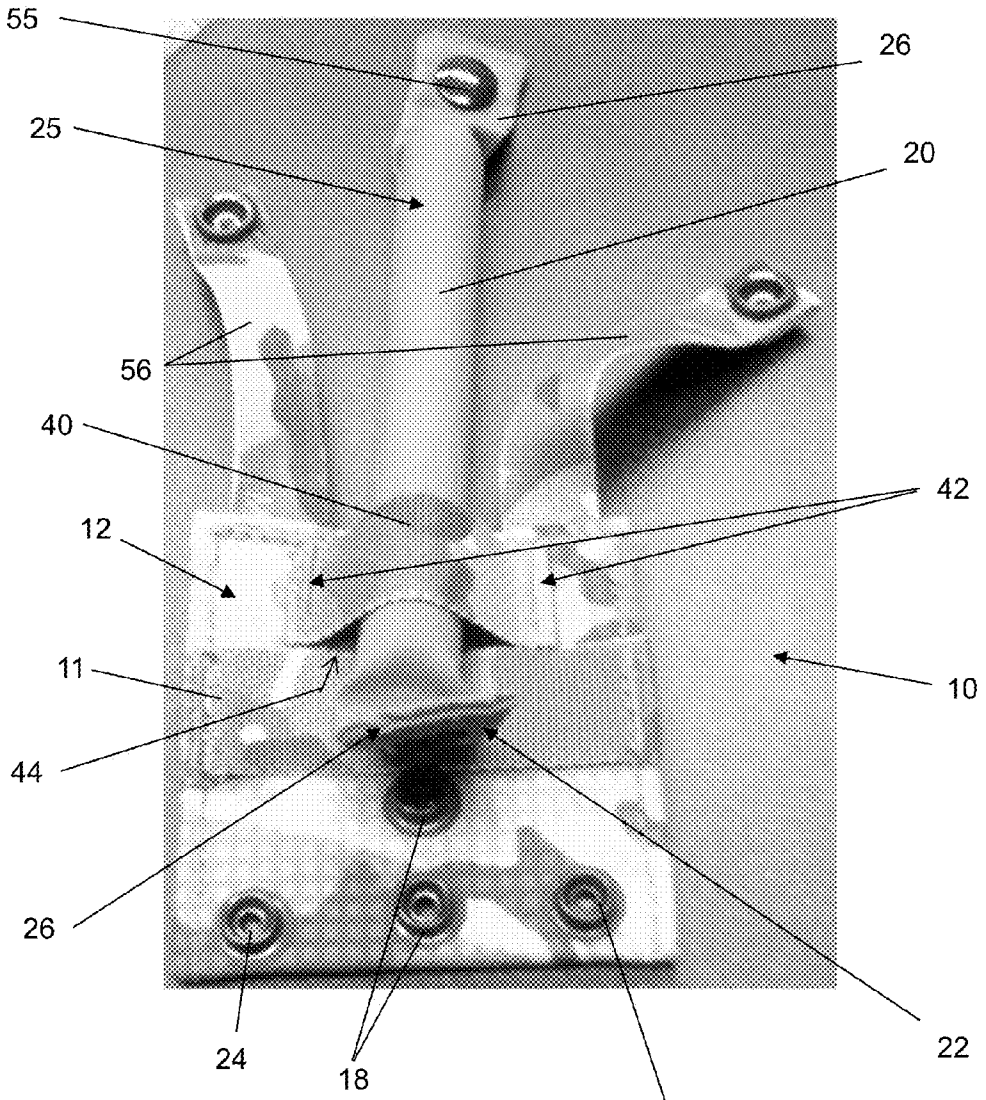


Fig. 1

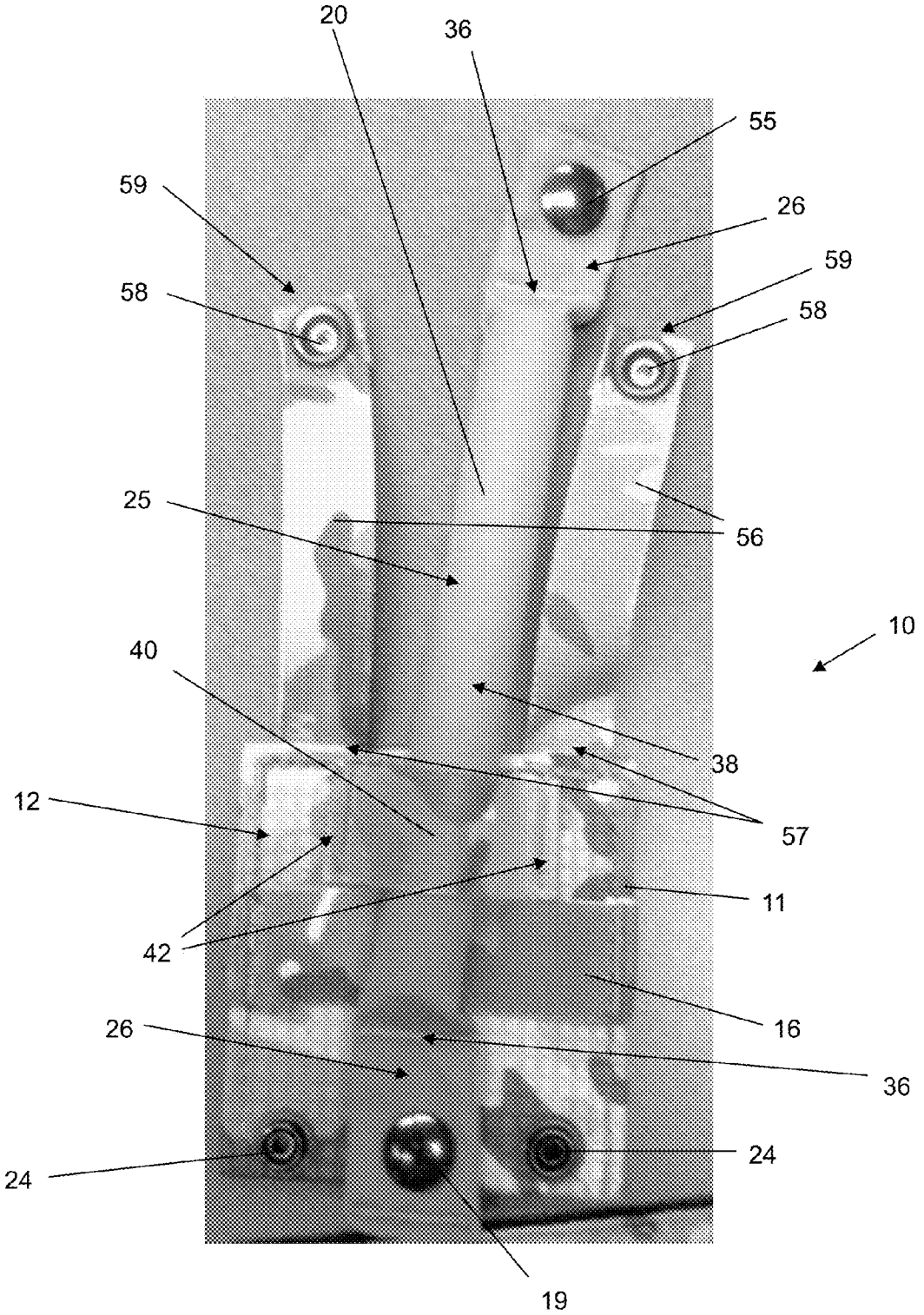


Fig. 2

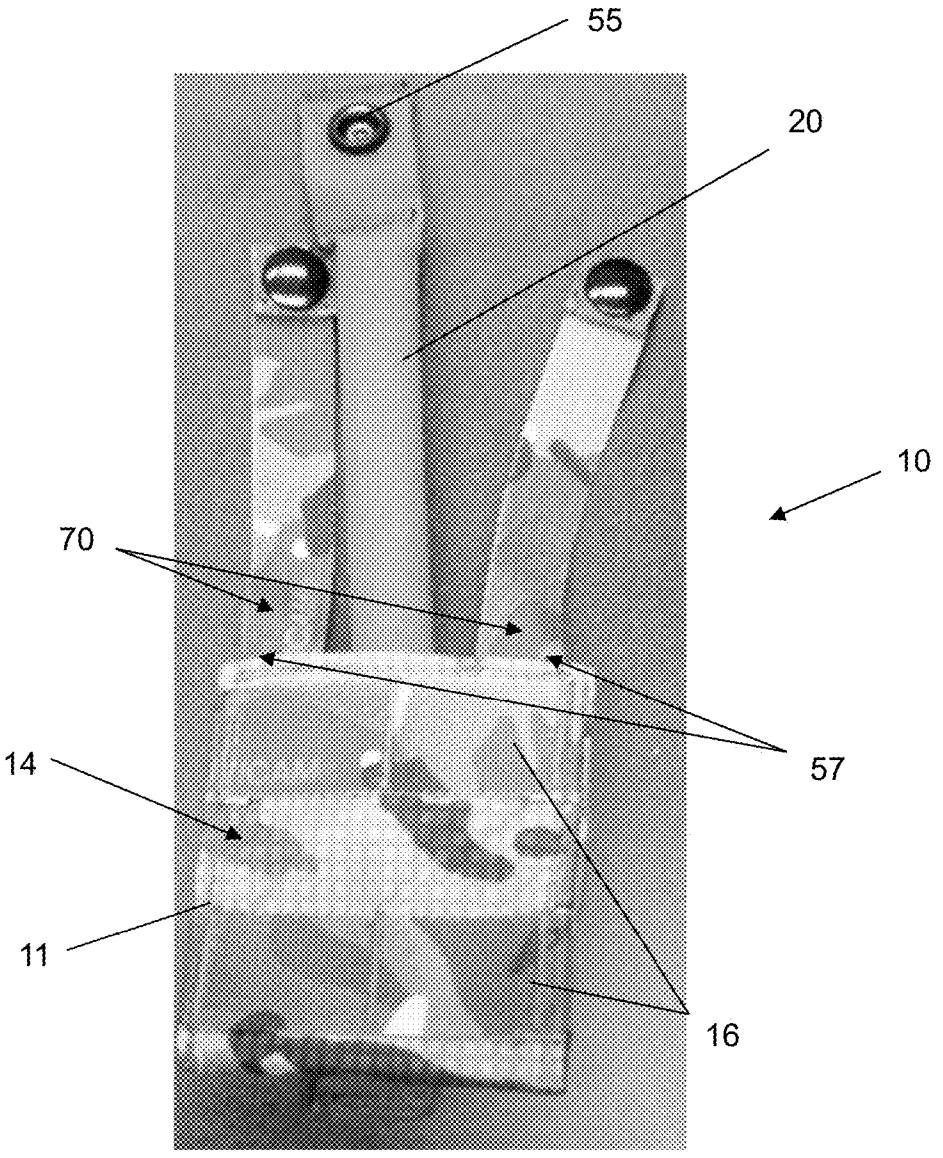


Fig. 3

Fig. 4

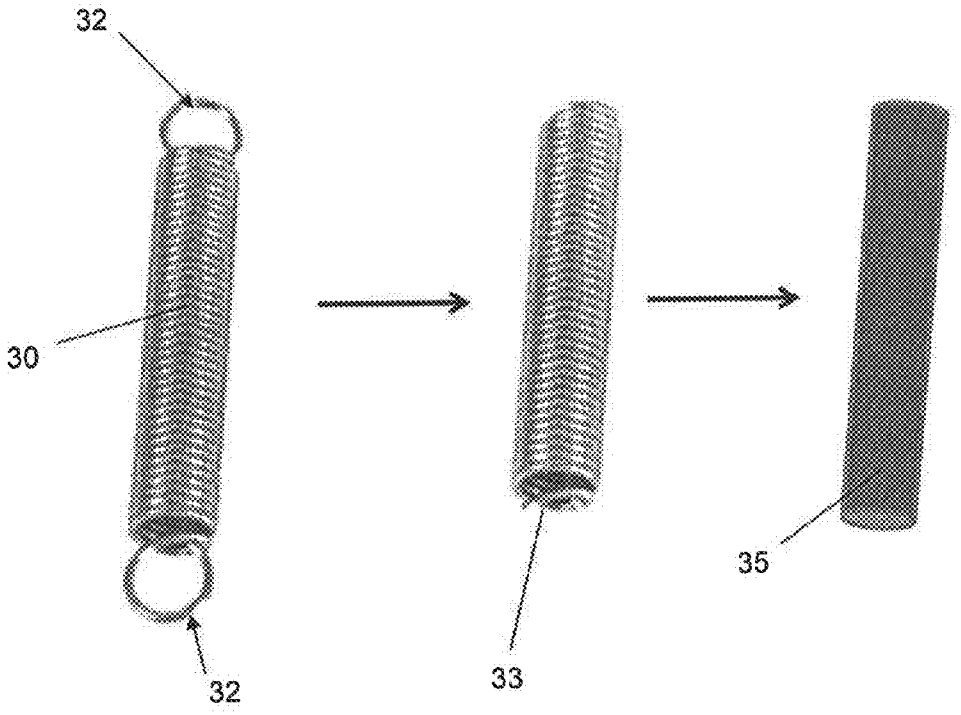
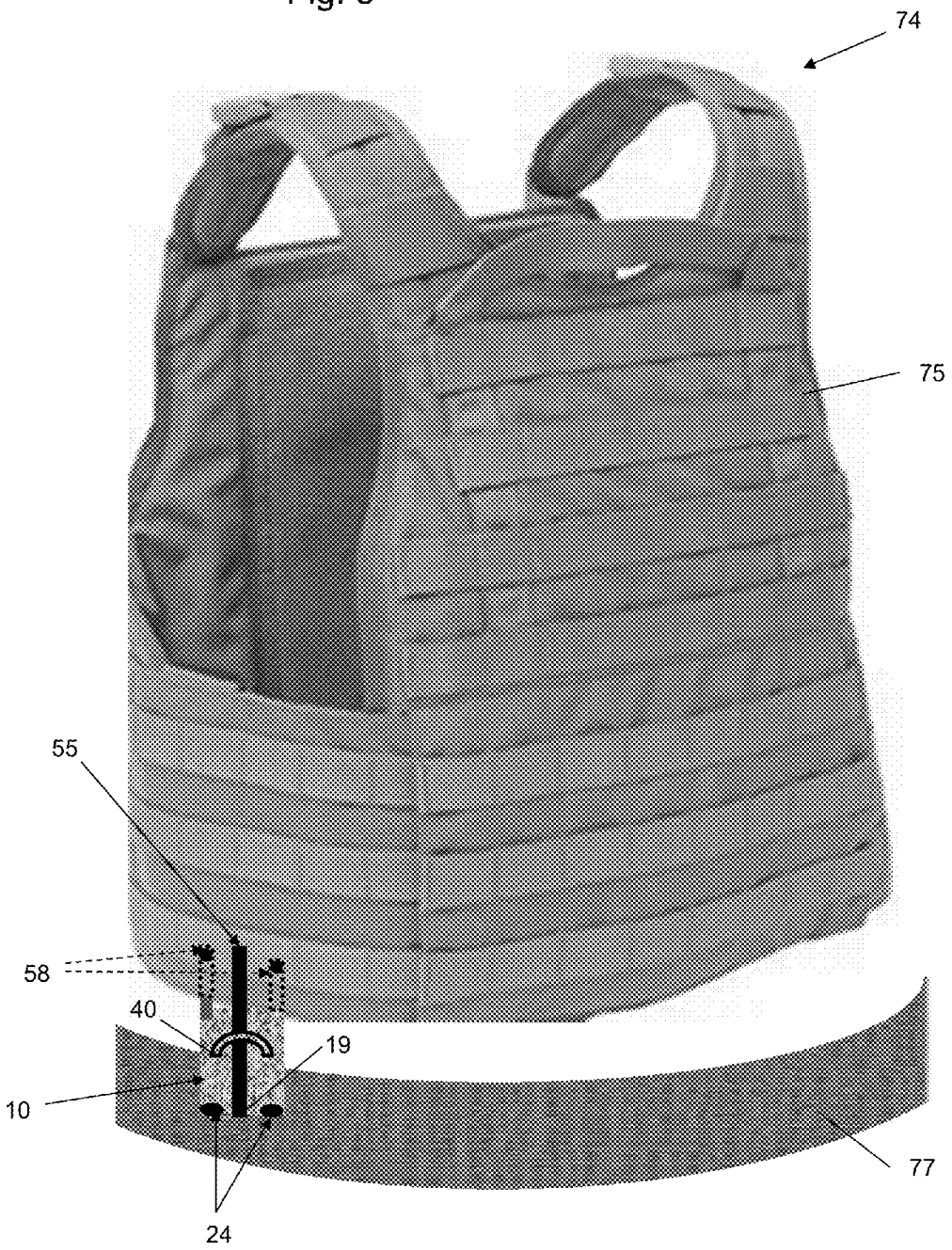


Fig. 5



FLEXIBLE MID-SECTION FLOAT SYSTEM FOR PROTECTIVE OUTERWEAR

FIELD OF THE INVENTION

[0001] The present invention pertains to armor-enhanceable, personal, wearable devices, and more particularly to a flexible mid-section float system for use with such devices.

BACKGROUND OF THE INVENTION

[0002] Military and law enforcement personnel have employed armor-enhanced clothing in order to protect their bodies from gunfire, shrapnel, explosive devices and other harmful ballistic objects. For example, vests, plate carriers, backpack carriers and other upper torso outerwear devices can be enhanced with armor and can come in all shapes and sizes with a variety of optional accessories. In many instances, such devices including multiple plies of material that can be joined along edges to create openings or pockets therein. Such personal wearable devices can also include attachment subsystems such as molle panels and the like, which allow the wearer to attach equipment, gear and even other equipment holders to the device. Examples of such upper torso outerwear devices can be seen, for example, in U.S. Patent Application Publication Nos. 20120174280 to Strum et al., and 20120017347 to Strum et al., the disclosures of which are incorporated herein by reference.

[0003] However, even when such clothing is sized according to individual specifications (for example, small, medium and large), the armor-enhanced clothing does not generally fit well, gets bunched up, prohibits smooth movement, results in undesirable gaps between body and clothing, has limited contact points with the body, does not wick sweat and water away, becomes uncomfortable and even hinders the withdrawal and operation of firearms. In specific environments where a user needs to lean in one direction or another, such upper torso outerwear can become inflexible and can restrict or even prevent proper body posturing to carry out desired tasks. For example, when personnel need to lean towards a trigger-firing arm when preparing to discharge a weapon, a rigid upper torso outerwear element might lift up or "post" above the user's shoulder and towards the user's head as the user leans to one side. Such lifting may make it awkward for the user to attain a comfortable and familiar firing position, and may require the user to push down on the outerwear with his or her head to try to counter the lifting force. Such disadvantages often result in poor performance and can encourage mis-use or even non-use of these protective devices.

SUMMARY OF THE INVENTION

[0004] The present invention helps to overcome the current shortcomings and more. The present invention provides, in part, a mid-section float system that can be used with protective outerwear, such as a protective, wearable carriage device or a ballistic vest, for example. The present invention also provides a quick attach/detach system for connecting belts or cumberbunds to an upper torso outerwear device. The device of the present invention can be offered in various sizes and shapes to accommodate different user sizes. By providing a flexible extension to torso outerwear devices, the present invention overcomes any bias the outerwear may have to move or lift, thereby facilitating the user's proper and natural body positioning during use. The present invention further assists in shifting the load of any added armor off of the user's shoulders and downward onto the user's hips, which is desirable for overall comfort, wearability and ergonomics. In one embodiment, the present invention provides a flexible connector having a base, a receiving strap and a spring connector component.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. **1** is a photograph of a front side of one embodiment of the adapter device of the present invention.

[0006] FIG. **2** is a photograph of a front side of the embodiment of the adapter device of the present invention shown in FIG. **1**, with the spring element attached to the base.

[0007] FIG. **3** is a photograph showing a back side of the embodiment of the adapter device of the present invention shown in FIG. **1**.

[0008] FIG. **4** is a series of photographs of spring connector elements of the device of the present invention.

[0009] FIG. **5** is a diagram illustrating an apparatus according to one embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE PRESENT INVENTION

[0010] As shown in FIGS. **1** through **3**, one embodiment of the float device **10** of the present invention includes a base portion **11** having a front side **12** and a back side **14**. The front **12** and back **14** sides can be formed of a generally flexible canvas or other suitable material and can include sewn-in support straps **16** for improved rigidity. In one embodiment of the present invention, the base portion **11** comprises mating layers of material joined together, such as by a seam, for example.

[0011] As shown in FIGS. **1** and **2**, the front side **12** of the base portion **11** of the device **10** is provided with one or more connector elements **18** for receiving an opposing connector element **19** on the interior side **22** of an engagement end **26** of a spring connector sleeve **20**. These connector elements **18** on the front side **12** of the base portion **11** are spaced to accommodate users of different sizes. For example, the lower connector facilitates use by shorter personnel, whereas the upper connector facilitates use by taller personnel. The connector elements can be provided in a variety of forms, including hook and loop fasteners, male and female snaps, belt and buckle systems, clips and other physical connection types. The front side **12** of the device **10** is further provided with one or more supplemental connector elements **24** for connecting to a lower garment such as a cumberbund or a belt. As further shown in FIGS. **1** and **2**, the spring connector sleeve **20** includes an outer casing **25** and a pair of opposite engagement ends **26**. The outer casing and engagement ends can comprise a flexible canvas material, for example. In one embodiment of the present invention, the spring connector sleeve **20** has a substantially cylindrical body or middle portion **38**, and the opposite engagement ends **26** are substantially flat, which assists the engagement ends in providing a lower profile during use.

[0012] As shown in FIG. **4**, the spring connector sleeve **20** houses a coil spring **33** made of steel or other suitable material having a suitable rigidity and the ability to return to its original form after compression, bending or other typical function. In one embodiment of the present invention, the coil spring **33** for use with the present invention is formed by trimming off attachment ends **32** of a standard coil spring **30**, as shown in FIG. **4**. In a further embodiment of the present invention, the

spring is encapsulated in a rubber sleeve **35** prior to being inserted in the spring connector sleeve **20**. In a specific embodiment of the present invention, the coil spring **33** is approximately three (3) to six (6) inches in length with a diameter of approximately one-half (½) to three-quarters (¾) of an inch. The rubber sleeve around the coil spring provides a protective surface that is sufficiently flexible to flex with the spring during operation. As shown in FIGS. **1** and **2**, the spring connector sleeve **20** can retain the spring **33** therein through the use of seams **36** at either end of the spring. The seams **36** form the internal end of each engagement end **26** on the spring connector sleeve **20**. The engagement ends **26** are substantially flat as opposed to the middle portion **38** of the spring connector sleeve **20** that houses the spring **33**, which is substantially cylindrical in shape to match the shape of the spring.

[0013] As shown in FIGS. **1** and **2**, the front side **12** of the base **11** of the present invention also includes a receiving strap **40** secured at its ends **42** to the front side **12** of the device so as to form a slot or opening **44** between the strap and the front side of the base. The spring connector sleeve **20** is slidably maintained within the opening **44** by the strap **40** and the front side **12** of the base **11**. When assembled, the receiving strap retains the middle portion **38** of the sleeve **20** in order control the range of motion of the device **10** during operation.

[0014] As shown in FIG. **3**, the back side **14** of the device **10** can be provided without external attachments, which ensures that there are no elements that might extend towards the wearer's body and injure or annoy the wearer during operation. As shown in FIGS. **1** through **3**, the spring connector sleeve can include a snap or other connector element **55** at the engagement end **26** opposite the engagement end connected to the front side **12** of the base **11**. This snap or other connector element **55** is used to secure the device to an external device such as a torso outerwear device as described hereinafter. As further shown in FIGS. **1** through **3**, the device of the present invention can provide secondary straps **56** extending from a top edge **57** for attachment to the external device. Straps **56** can be secured to and/or proximate the top edge **57** of the base portion **11** at one end **70** and can be provided with snaps or other connector elements **58** at a free end **59** for secure attachment to the torso outerwear device. It will be appreciated that different connector items can be employed other than snaps, such as hook and loop connectors, clips, belts and/or belt systems or other types of connectors. In one embodiment of the present invention, the strap connector elements **58** face a first direction, and the connector element **55** of the free engagement end of the spring connector sleeve **20** faces a second direction that is substantially inapposite to the first direction. In this way, the spring connector sleeve can connect to an outer surface of an external device, while the secondary straps **56** can connect to the inner surface of the same external device. As the straps **56** are of a substantially thin profile, their connection on the inside of a device such as a torso outerwear device will facilitate a comfortable fit for the wearer of the device.

[0015] In operation, a user of the present invention may typically install a first torso outerwear device such as a vest, for example, and a second outerwear device, such as a belt, for example, on his or her body prior to donning the float apparatus of the present invention. An exemplary vest **75** and belt **77** are shown in the FIG. **5** embodiment of an apparatus **74** according to one embodiment of the present invention. Once the external components **75**, **77** are secured, the flexible connector device **10** can be secured in several places about the user's torso, including by connector elements **19**, **24**, **55** and **58**, as described above. In one deployment example of the present invention, two float devices are employed, with one adapter at each side of the user's body. In another deployment example of the present invention, three float devices are employed, with one adapter at each side of the user's body and one adapter at a position near the sacrum point of the user's back. In a further deployment example of the present invention, four float devices are employed, with two on each side of the user's body. Once installed, the device of the present invention will be securely retained adjacent the personal wearable device.

[0016] It should be understood that the foregoing description and examples are only illustrative of the present invention; the optimum dimensional relationships for the parts of the invention, including variations in size, materials, shape, form, function and the manner of operation, assembly and use, are deemed readily apparent to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention. Thus, various alternatives and modifications can be devised by those skilled in the art without departing from the invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications, and variances that fall within the scope described above.

1. An apparatus, comprising:
a base having a front side and a back side;
a receiving strap having a first end and a second end, with the first and second ends being secured to the front side of the base and forming an opening between the strap and the front side of the base; and
a spring connector sleeve housing a coil spring, with the sleeve being slidably maintained within the opening.

2. The apparatus of claim **1** wherein the spring connector sleeve has a body portion, a first end and a second end, with the body portion being substantially cylindrical, and with the first and second ends being substantially flat.

3. The apparatus of claim **2** wherein each the first and second ends of the spring connector sleeve includes a connector element for receiving an opposing connector element, and wherein the front side of the base further includes an opposing connector element for the first end connector element.

4. The apparatus of claim **3** wherein the front side of the base includes a plurality of opposing connector elements for the first end connector element.

5. The apparatus of claim **1** wherein the front side of the base includes one or more connector elements for receiving an external device opposing connector element.

6. The apparatus of claim **1** wherein the base has a top edge, and further including at least one strap secured proximate to the top edge of the base.

7. The apparatus of claim **6** wherein the strap has a free end and further includes a connector element secured near the free end.

8. The apparatus of claim **3** wherein the base has a top edge and at least one strap secured proximate the top edge, wherein the strap has a free end with a connector element secured near the free end, and wherein the strap connector element faces a first direction, and further wherein the connector element of the second end of the spring connector sleeve faces a second direction that is substantially inapposite to the first direction.

9. A method of forming a flexible connection for outerwear elements, comprising:

providing an apparatus comprising a base having a front side and a back side;

providing a receiving strap with a first end and a second end;

securing the first and second ends of the receiving strap to the front side of the base so as to form an opening between the strap and the front side of the base;

inserting a coil spring within a spring connector sleeve;

and slidably maintaining the spring connector sleeve within the opening.

10. The method of claim **9** wherein the spring connector sleeve has a substantially cylindrical body portion and substantially flat first and second ends.

11. The method of claim **10** wherein each the first and second ends of the spring connector sleeve is provided with a connector element for receiving an opposing connector element, and wherein the front side of the base further is provided with an opposing connector element for the first end connector element.

12. The method of claim **9** wherein the base has a top edge and at least one strap secured proximate to the top edge, wherein the strap has a free end and further includes a connector element secured near the free end.

13. An apparatus, comprising:

a first torso outerwear device;

a second torso outerwear device; and

a flexible connector for connecting the first torso outerwear device to the second torso outerwear device, the connector comprising:

a base having a front side and a back side;

a receiving strap having a first end and a second end, with the first and second ends being secured to the front side of the base and forming an opening between the strap and the front side of the base; and

a spring connector sleeve housing a coil spring, with the sleeve being slidably maintained within the opening.

14. The apparatus of claim **13** wherein the spring connector sleeve has a body portion, a first end and a second end, with each the first and second ends of the spring connector sleeve includes a connector element for receiving an opposing connector element, and wherein the front side of the base further includes an opposing connector element for the first end connector element.

15. The apparatus of claim **14** wherein the front side of the base includes a plurality of opposing connector elements for the first end connector element.

16. The apparatus of claim **14** wherein the second torso outerwear device includes at least one opposing connector element, and wherein the front side of the base includes one or more connector elements for receiving the at least one second torso outerwear device opposing connector element.

17. The apparatus of claim **14** wherein the first torso outerwear device includes at least one opposing connector element for receiving the connector element of the second end of the spring connector sleeve.

18. The apparatus of claim **14** wherein the base has a top edge and at least one strap secured proximate to the top edge, wherein the strap has a free end and further includes a connector element secured near the free end and for receiving an opposing connector element.

19. The apparatus of claim **18** wherein the first torso outerwear device includes at least one opposing connector element for receiving the connector element of the at least one strap.

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