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(54) **TOURNIQUET HOLSTERS**

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(57) **ABSTRACT**

Tourniquet holsters for accessibly supporting tourniquets on supporting articles, the holsters including sleeves extending longitudinally around sleeved regions. The sleeves may define sleeve openings configured to slidably receive forward portions of tourniquets, rear walls extending laterally across portions of the sleeved regions, first side flanges extending from first sides of the rear walls, and second side flange extending from second sides of the rear walls. The first side flanges and the second side flanges may collectively define sleeve channels. Some examples may include windlass retainers configured to retain elongated windlass handles attached to the tourniquets. Some examples may include sleeves formed from a thermoplastic material including an acrylic-polyvinyl alloy.

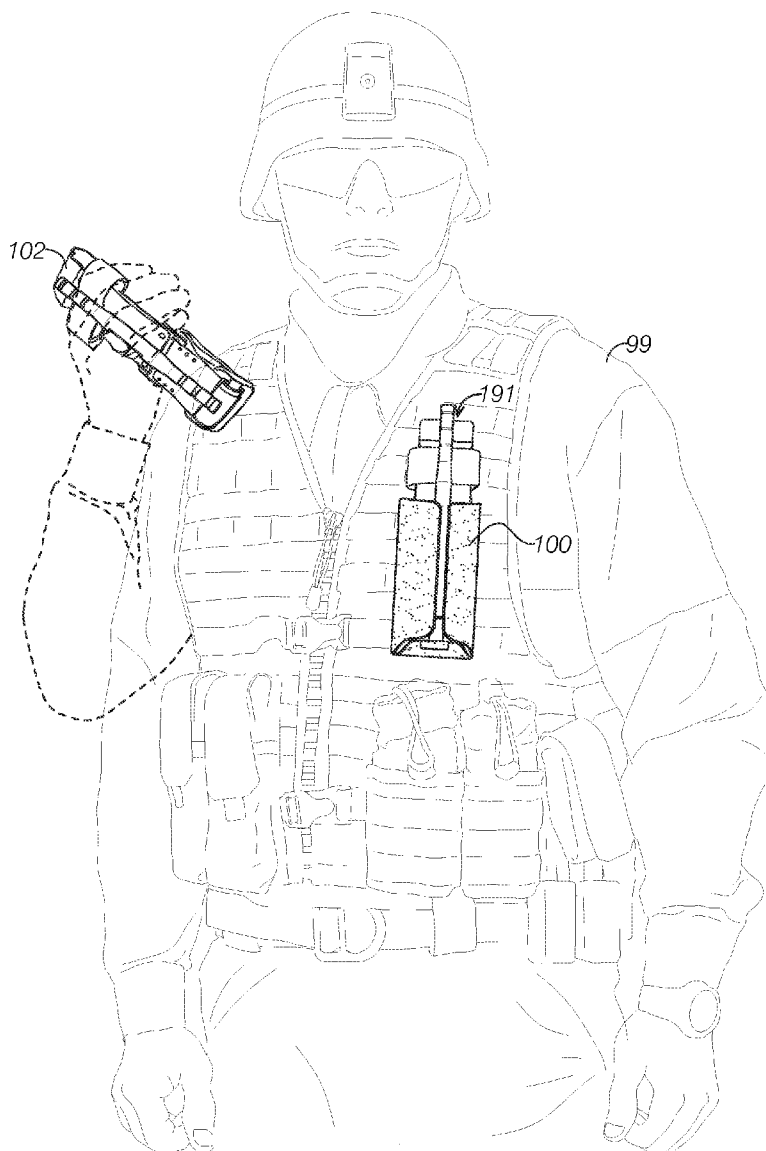




FIG.1

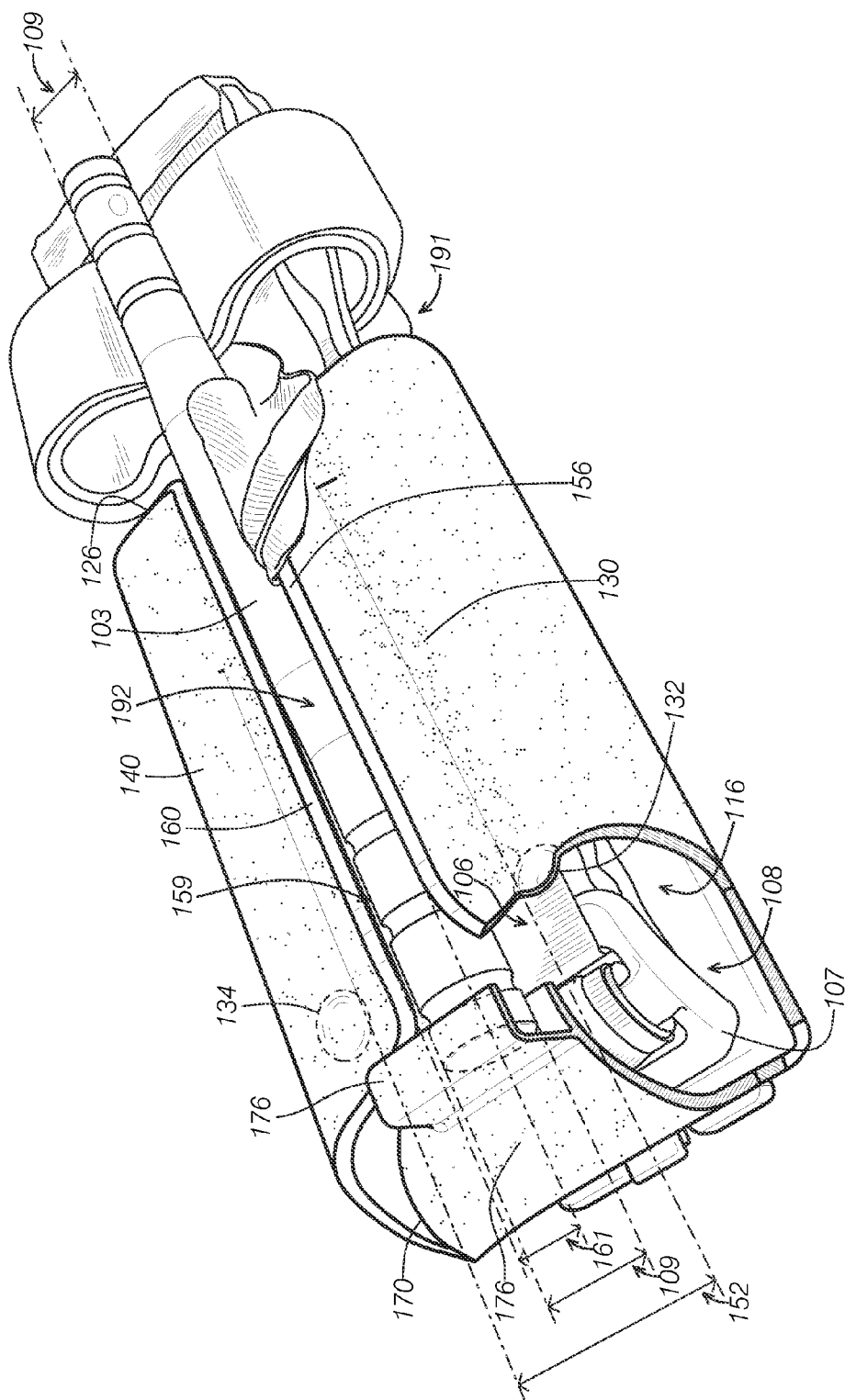


FIG. 2

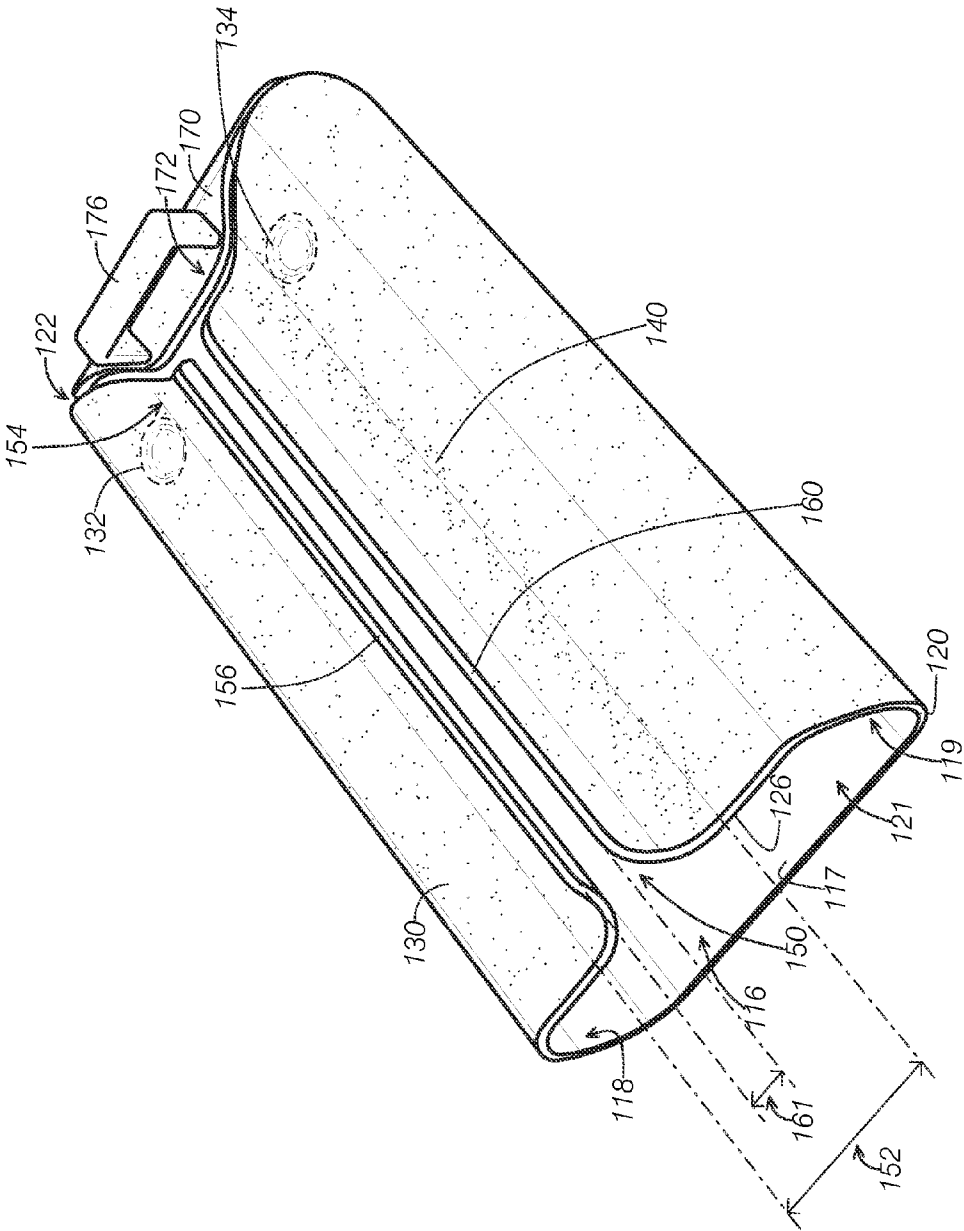


FIG.3

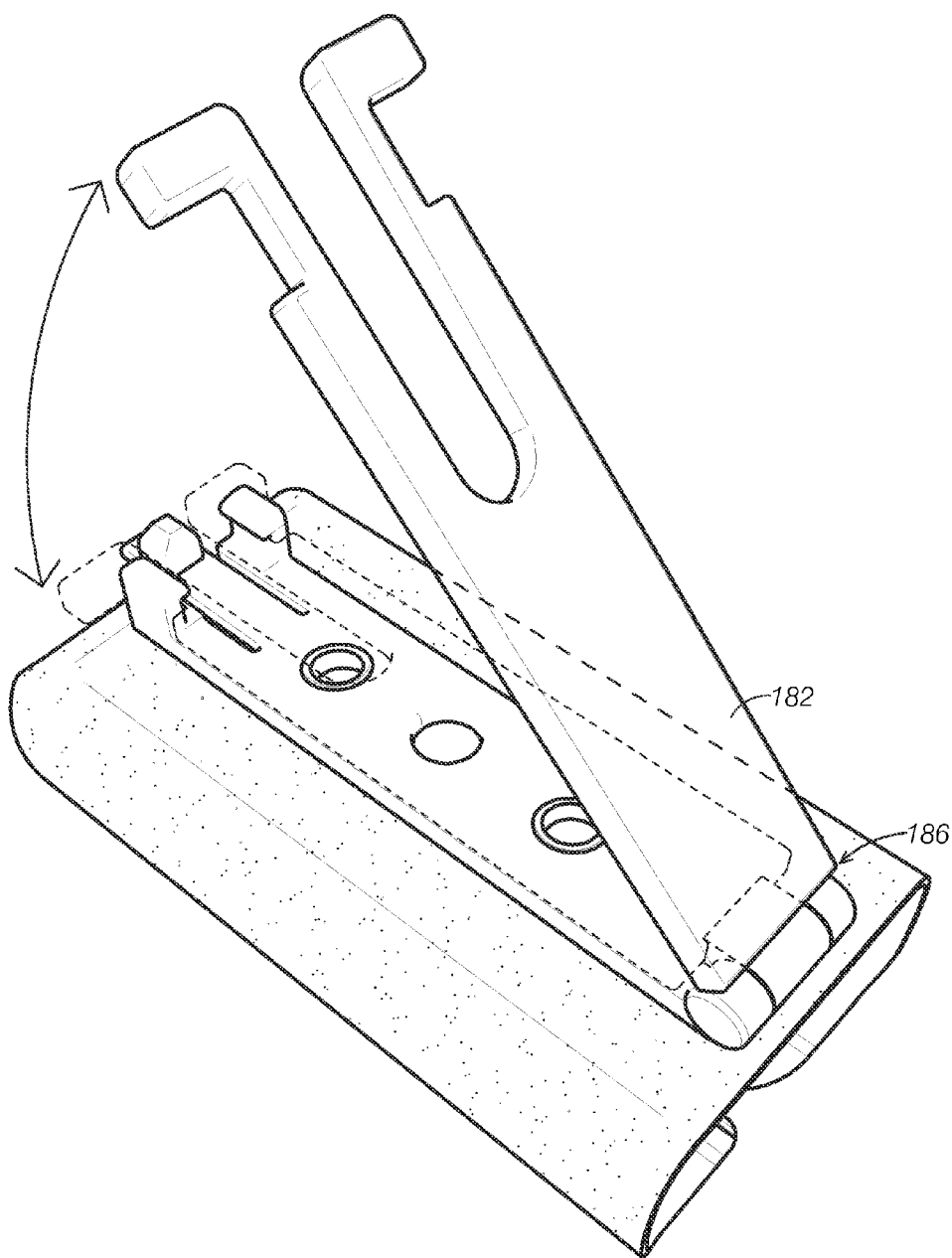


FIG.4

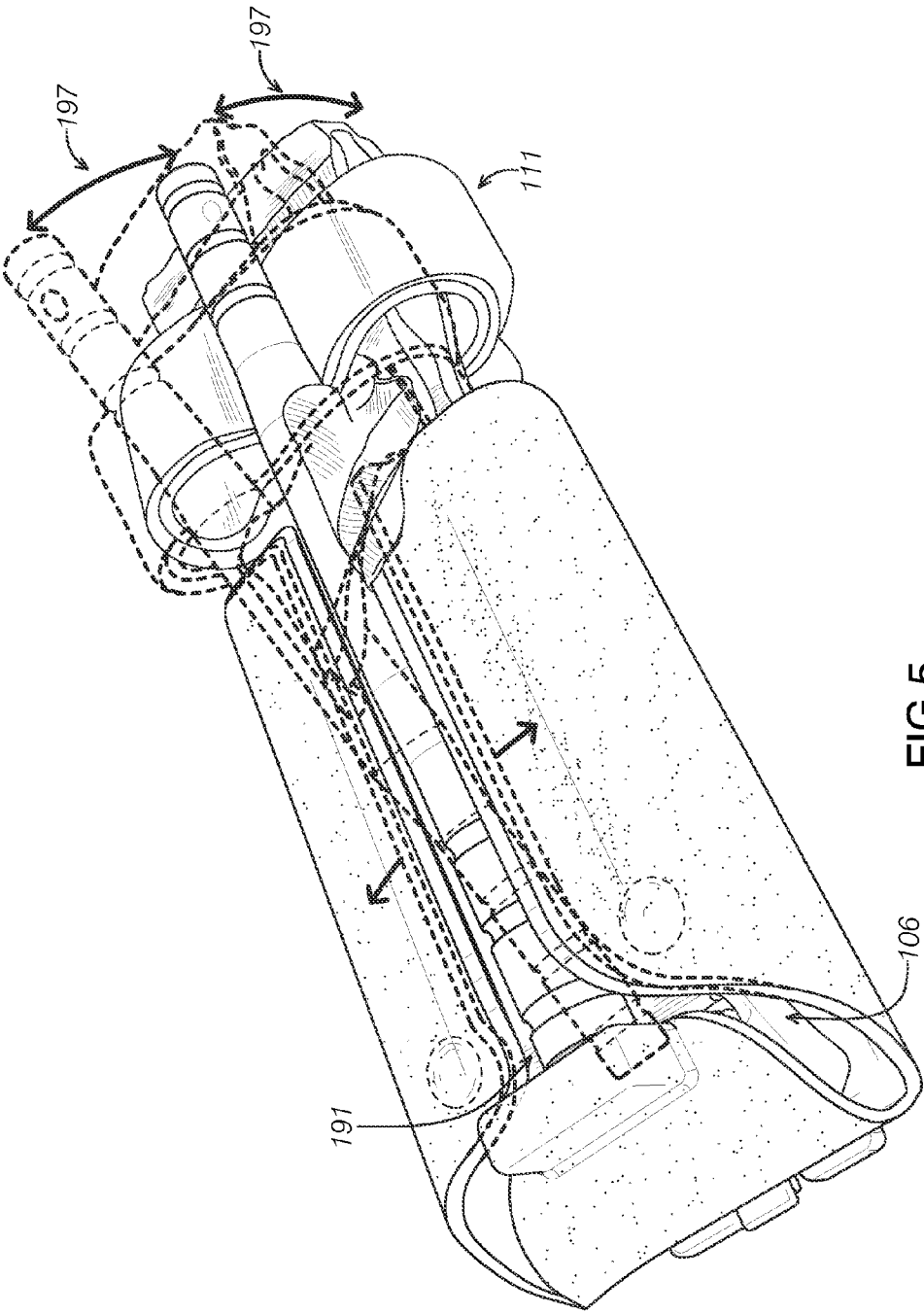


FIG. 5

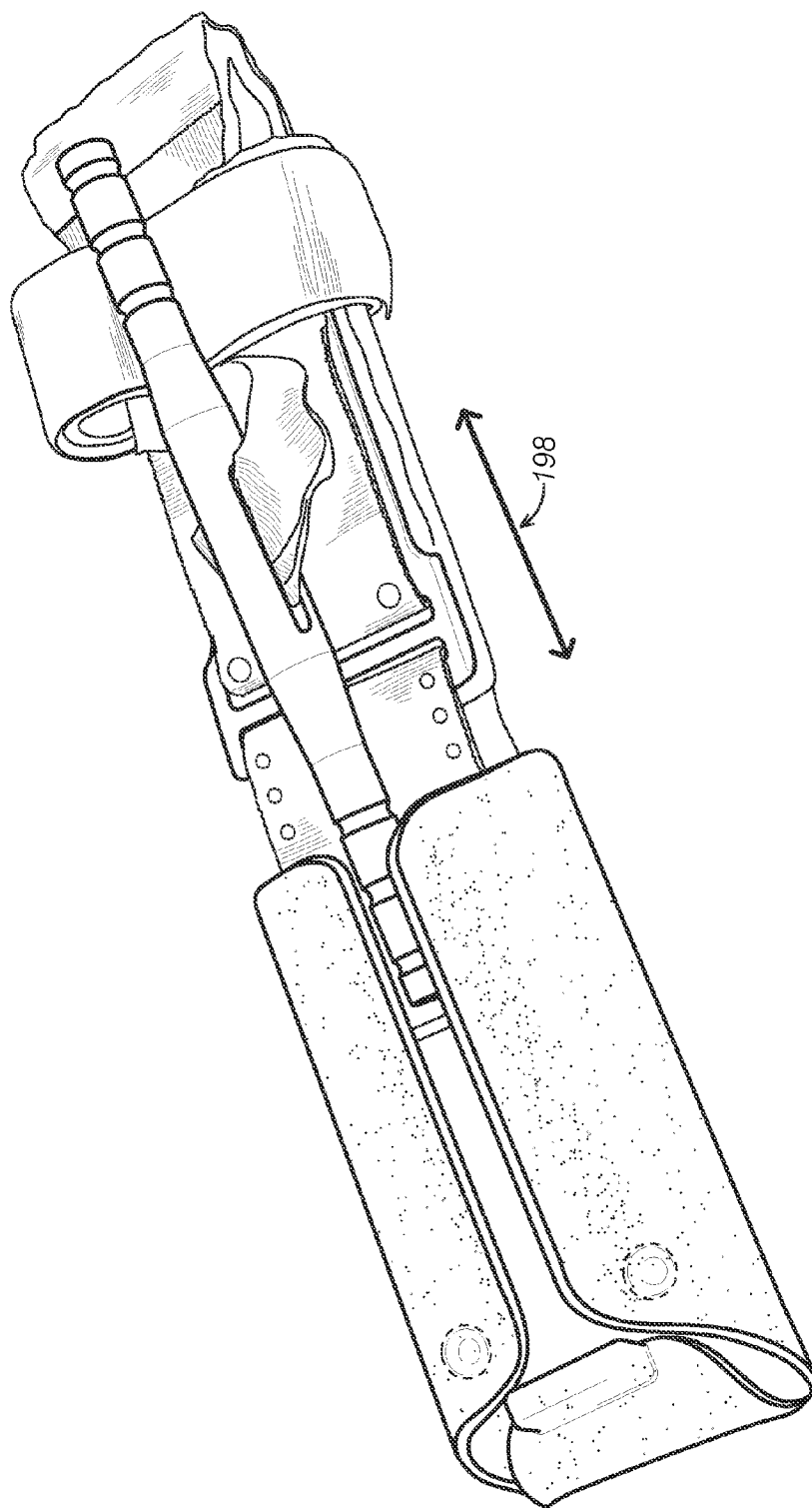


FIG. 6

TOURNIQUET HOLSTERS

BACKGROUND

[0001] The present disclosure relates generally to tourniquet holsters. In particular, tourniquet holsters configured to support windlass-type tourniquets on supporting articles for efficient storage and removal are described.

[0002] Known tourniquet storage devices are not entirely satisfactory for the range of applications in which they are employed. For example, many existing devices store tourniquets in ways that are difficult to access quickly and easily. For example, many conventional devices define non-rigid structures that provide little structural support when a user removes a stored tourniquet. Tourniquet removal may be a clunky process as a result.

[0003] For example, many conventional tourniquet storage devices define cloth pouches that substantially envelop stored tourniquets. The cloth construction provides insufficient stability when a user attempts to retrieve the tourniquet from the pouch. As a result, users may tumble the tourniquet during retrieval. In tactical situations, small delays like this may result in injury or death. Further, because the pouches cover such a substantial portion of the tourniquet, users must often grip tourniquets awkwardly when removing them, resulting in even further delay.

[0004] Further, the prevalence of standard tourniquet designs in tactical applications, such as the military, provides an opportunity to tailor tourniquet storage devices to these designs and improve tourniquet storage and retrieval. Conventional tourniquet designs often fail to seize on this opportunity in any meaningful way.

[0005] For example, the Combat-Application-Tourniquet® is a standard design of a tourniquet commonly used in the United States Armed Forces. Because of the widespread use of this particular design, storage devices that provide improved storage and removal would, in effect, improve tourniquet usage over the entire United States Armed Forces.

[0006] Thus, there exists a need for tourniquet holsters that improve upon and advance the design or known tourniquet storage devices. Examples of new and useful tourniquet holsters relevant to the needs existing in the field are discussed below.

SUMMARY

[0007] The present disclosure is directed to tourniquet holsters for accessibly supporting tourniquets on supporting articles, the holsters including sleeves extending longitudinally around sleeved regions. The sleeves may define sleeve openings configured to slidably receive forward portions of tourniquets, rear walls extending laterally across portions of the sleeved regions, first side flanges extending from first sides of the rear walls, and second side flange extending from second sides of the rear walls. The first side flanges and the second side flanges may collectively define sleeve channels. Some examples may include windlass retainers configured to retain elongated windlass handles attached to the tourniquets. Some examples may include sleeves formed from a thermoplastic material including an acrylic-polyvinyl alloy.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a perspective view of a user removing a tourniquet from a first example of a tourniquet holster showing in phantom lines the user holding the tourniquet in a removed position.

[0009] FIG. 2 is a perspective view of the tourniquet and the tourniquet holster shown in FIG. 1.

[0010] FIG. 3 is a perspective view of the tourniquet holster shown in FIGS. 1 and 2.

[0011] FIG. 4 is a rear perspective view of the tourniquet holster shown in FIGS. 1 and 2.

[0012] FIG. 5 is a perspective view of the tourniquet and the tourniquet holster shown in FIGS. 1 and 2 showing in phantom lines the position of the tourniquet as a user applies a first example of a removal force,

[0013] FIG. 6 is a perspective view of the tourniquet and the tourniquet holster shown in FIGS. 1 and 2 showing in phantom lines the position of the tourniquet as a user applies a second example of a removal force.

DETAILED DESCRIPTION

[0014] The disclosed tourniquet holsters will become better understood through review of the following detailed description in conjunction with the figures. The detailed description and figures provide merely examples of the various inventions described herein. Those skilled in the art will understand that the disclosed examples may be varied, modified, and altered without departing from the scope of the inventions described herein. Many variations are contemplated for different applications and design considerations; however, for the sake of brevity, each and every contemplated variation is not individually described in the following detailed description.

[0015] Throughout the following detailed description, examples of various tourniquet holsters are provided. Related features in the examples may be identical, similar, or dissimilar in different examples. For the sake of brevity, related features will not be redundantly explained in each example. Instead, the use of related feature names will cue the reader that the feature with a related feature name may be similar to the related feature in an example explained previously. Features specific to a given example will be described in that particular example. The reader should understand that a given feature need not be the same or similar to the specific portrayal of a related feature in any given figure or example.

[0016] With reference to FIGS. 1-6, a first example of a holster for supporting a tourniquet on a supporting article, holster 100, will now be described. Holster 100 includes a sleeve 120, a first retention member 156, a second retention member 160, and a fastener 182. FIG. 1 illustrates holster 100 removably storing a tourniquet 102 while supported on a supporting article 99. In particular, holster 100 is supported on a MOLLE-compatible combat vest. In phantom lines, FIG. 1 also illustrates the user holding tourniquet 102 after removing it from a stored position 191 within holster 100.

[0017] Although FIG. 1 illustrates holster 100 attached to a combat vest, supporting articles may define any common piece of apparel or equipment, particularly those used in a military context. For example, supporting articles may define belts, shirts, pants, or other clothing items to which fastener 182 may attach. In some examples, items not attached to a user's person, such as baggage, vehicles, or combat equipment, could also serve as supporting articles.

[0018] As FIG. 1 illustrates, holster 100 allows for a method of removing tourniquet 102 from holster 100, allowing the user to access tourniquet 102 in a less error-prone manner than afforded by many conventional tourniquet hold-

ers. By allowing easier access to tourniquet 102, holster 100's improvements may reduce injury or save lives, particularly in military contexts.

[0019] As FIG. 2 illustrates, tourniquet 102 defines a windlass-type tourniquet commonly used in tactical contexts, such as military combat. Tourniquet 102, specifically, is similar to tourniquets marketed under the brand Combat-Application-Tourniquet®, and is commonly used in combat applications. As FIG. 2 shows, tourniquet 102 includes a strap, an actuator including an elongated windlass handle 103 configured to tighten the strap when rotated, and a rigid buckle 107 positioned on a forward portion 108 of tourniquet 102. As FIG. 2 illustrates, windlass handle 103 defines a windlass handle width 109.

[0020] Many features of holster 100 are specifically configured to complement features of Combat-Application-Tourniquets®. For example, holster 100 is sized to snugly fit a Combat-Application-Tourniquet®, storing the tourniquet in a space efficient and secure fashion. Further, holster 100 is sized to expose a portion of a secured Combat-Application-Tourniquet® when stored. A user may grip this exposed portion 111 and remove the tourniquet from holster 100.

[0021] Holster 100 also includes several features designed for Combat-Application-Tourniquet®'s windlass handle. Some of these features allow the often cumbersome windlass handle to be elegantly stored and released. By designing holster 100 around Combat-Application-Tourniquets® standard design, holster 100 provides improved performance compared to many conventional tourniquet storage devices when used in conjunction with Combat-Application-Tourniquets®.

[0022] As shown in FIGS. 1 and 2, sleeve 120 extends longitudinally around a sleeved region 116. Sleeve 120 is configured to retain tourniquet 102 in sleeved region 116 in a stored position 191. As FIG. 3 shows, sleeve 120 defines a sleeve opening 126, a rear wall 117, a first side flange 130, a second side flange 140, a sleeve channel 150, a third flange 170, a first dimple 132, and a second dimple 134. Sleeve 120 defines a substantially rigid construction. Specifically, sleeve 120 is formed from a thermoplastic material including an acrylic-polyvinyl alloy. While sleeves are not specifically required to share sleeve 120's rigidity, sleeve 120's rigid structure provides holster 100 with structural support as tourniquet 102 is removed. This structural support prevents tourniquet 102 from becoming entangled with holster 100 during removal, thereby making it easier for users to remove tourniquet 102.

[0023] As FIG. 3 illustrates, rear wall 117 extends laterally across a portion of sleeved region 116 from a first side 118 to a second side 119. As FIG. 3 further illustrates, first side flange 130 extends from first side 118 of rear wall 117 and second side flange 140 extends from second side 119 of rear wall 117. As FIG. 3 illustrates, rear wall 117, first side flange 130, and second side flange 140 collectively enclose sleeved region 116 extending from a first sleeve end 121 to a second sleeve end 122.

[0024] As FIGS. 2 and 5 illustrate, sleeve opening 126 opens to sleeved region 116. Sleeve opening 126 is sized to slidably receive forward portion 108 of tourniquet 102 and retain tourniquet 102 in sleeve 120 in stored position 191. As FIG. 2 shows, exposed portion 111 of tourniquet 102 typically extends out of sleeve opening 126 and beyond sleeved

region 116 when tourniquet 102 is in stored position 191. Exposed portion 111 provides sufficient surface area for a user to readily grip.

[0025] As FIG. 2 illustrates, sleeved region 116 is sized to snugly retain tourniquet 102, often with four sides of tourniquet 102 engaged with sleeve 120's interior surface. In some cases, sleeved region 116 may engage buckle 107 when forward portion 108 is received in sleeved region 116, allowing buckle 107 to anchor tourniquet 102 within sleeved region 116. Similarly, buckle 107 may guide forward portion 108 as it is inserted in sleeved region 116.

[0026] As FIG. 3 shows, first side flange 130 and second side flange 140 collectively define sleeve channel 150. As FIG. 3 illustrates, sleeve channel 150 is routed from first sleeve end 121 to second sleeve end 122 and defines a sleeve channel width 152 complementarily configured with windlass handle width 109 to enable windlass handle 103 to pass through. In the illustrated example, sleeve channel width 152 is greater than windlass handle width 109, allowing windlass handle 103 to easily pass.

[0027] Sleeve channel 150 is not, however, specifically required to be wider than windlass handle width 109. For example, some examples may include flexible side flanges may compensate for the reduced sleeve channel width and allow windlass handle 103 to pass through sleeve channels with a width narrower than its own. Indeed, examples including a reduced sleeve channel width may better secure the windlass handle in place.

[0028] As FIG. 3 illustrates, third flange 170 projects from rear wall 117 proximate second sleeve end 122 to a third flange end 172 proximate first sleeve end 121. As FIGS. 2 and 3 illustrate, third flange 170 includes a blocking protuberance 176. As FIG. 2 shows, third flange 170 is configured to restrict forward portion 108 from sliding beyond second sleeve end 122 by abutting forward portion 108 when tourniquet 102 is fully inserted into sleeved region 116. As FIG. 2 illustrates, third flange 170 is also curved along a portion of its length to better compliment the contours of tourniquet 102, thereby preventing forward portion 108 of tourniquet 102 from moving vertically within sleeved region 116.

[0029] As FIGS. 2 and 3 illustrate, blocking protuberance 176 defines a rigid projection projecting from the exterior of third flange 170 away from sleeved region 116. Blocking protuberance 176 is substantially aligned with windlass handle 103 when tourniquet 102 is received in sleeved region 116. By aligning with windlass handle 103, blocking protuberance 176 restricts windlass handle 103 from unintentionally sliding further than desired when tourniquet 102 is received in sleeve 120. As FIG. 3 illustrates, blocking protuberance 176 may include a notch, into which windlass handle 103 may be inserted to further restrict its unintentional movement.

[0030] As FIGS. 2 and 3 illustrate, first dimple 132 protrudes from first side flange 130 into sleeved region 116. Similarly, second dimple 134 protrudes from second side flange 140 into sleeved region 116. Both dimples resist tourniquet 102 from unintentionally moving within sleeved region 116. This reduces the likelihood of tourniquet 102 inadvertently exiting holster 100 when stored. In some examples, the portions of first dimple 132 and second dimple 134 projecting into sleeved region 116 may be vertically aligned with buckle 107 when the forward portion 108 is received by holster 100. Aligning the dimples with buckle 107 may further restrict buckle 107 from passing through sleeved

region 116 and better anchor forward portion 108 of tourniquet 102 near second sleeve end 122.

[0031] As FIG. 2 illustrates, first retention member 156 extends from first side flange 130 into sleeve channel 150 to partially restrict the windlass handle from exiting sleeved region 116 via sleeve channel 150. Similarly, second retention member 160 extends from second side flange 140, spaced from first retention member 156. As FIG. 2 illustrates, second retention member 160 extends into sleeve channel 150 to cooperatively, with first retention member 156, restrict windlass handle 103 from exiting sleeved region 116 via sleeve channel 150. As FIG. 3 illustrates, the end of first retention member 156 and the end of second retention member 160 taper toward one another to define a retention channel 159.

[0032] As FIG. 2 illustrates, retention channel 159 is configured to restrict windlass handle 103 from exiting sleeved region 116 via retention channel 159. As FIG. 2 illustrates, retention channel 159 is narrower than both windlass handle width 109 and sleeve channel width 152. This restricts a received portion 192 of windlass handle 103, which, is disposed within sleeve channel 150, from inadvertently releasing. In typical cases, windlass handle 103 rests in sleeve channel 150 on the strap of tourniquet 102 when stored, thereby restricting entry into the rest of sleeved region 116. Further, windlass handle 103 is engaged with the retention members, restricting its release from sleeve channel 150. Because first retention member 156 and second retention member 160 taper to a retention channel width less than windlass handle width 109, windlass handle 103 is restricted from inadvertently entering sleeved region 116 through sleeve channel 150 via retention channel 159.

[0033] As FIG. 4 illustrates, fastener 182 is attached to the exterior of rear wall 117 opposite sleeved region 116. Fastener 182 is configured to attach to supporting article 99, thereby allowing a user to retain holster 100 in a position where he can easily access tourniquet 102.

[0034] As FIG. 4 shows, fastener 182 defines a clamp with a top 186 substantially aligned with sleeve opening 126. The clamp allows holster 100 to be secured to clothing items or equipment that define an opening through which the movable portion of the clamp may be inserted. In particular, this disclosure contemplates pairing fastener 182 with webbing common on military apparel. For example, fastener 182 may be complementarily configured with PALS webbing commonly included on MOLLE gear commonly used in military applications.

[0035] As FIGS. 5 and 6 illustrate, a user may remove tourniquet 102 by applying a removal force 198 to tourniquet 102. FIG. 5 illustrates a first example of a removal force. In applying the force, the user grips exposed portion 111 of tourniquet 102 and pulls the exposed portion away from rear wall 117 to apply a torque to tourniquet 102. This simultaneously applies a windlass releasing force to windlass handle 103, causing the retention members and/or the side flanges to flex and allow windlass handle 103 to pass through retention channel 159. Because both retention members taper inward toward one another as they approach retention channel 159, they serve to guide windlass handle 103 in the appropriate direction as it is pulled out of sleeved region 116 through sleeve channel 150. By continuing to pull exposed portion 111 away from rear wall 117, the user continues to remove tourniquet 102 as the strap of tourniquet 102 rubs against first side flange 130 and/or second side flange 140. Because tour-

niquet 102's strap is flexible, tourniquet 102 continues to release quite easily from sleeved region 116, even as sleeve 120 partially restricts its path.

[0036] Further, because windlass handle 103 has been at least partially released through retention channel 159, windlass handle 103 does not hinder the remainder of tourniquet 102 from being removed. Even when windlass handle 103 remains partially disposed within retention channel 159, it wedges the retention members apart from one another and allows the remainder of windlass handle 103 to pass through retention channel 159 with little resistance.

[0037] Providing this elegant method of releasing windlass handle 103 from sleeved region 116 clearly distinguishes holster 100 from many conventional tourniquet storage devices. In many conventional devices, an elongated windlass handle must be removed from an opening at the top of the storage device, along with the rest of the tourniquet. In many examples, the windlass handle often becomes entangled within the storage device unless the whole tourniquet is removed straight through the device's opening. This often leads to delay and frustration. In many cases, such delay or frustration may lead to injury or death. This potential entanglement may also reduce users' confidence in their equipment, further reducing the equipment's effectiveness.

[0038] As FIG. 6 illustrates, however, holster 100 fully supports slidingly removing tourniquet 102 by applying a removal force to tourniquet 102 directed vertically out of sleeved region 116. In fact, holster 100 defines a smooth, rigid interior surface that allows tourniquet 102 to slide out of sleeved region 116 more easily than in many conventional tourniquet storage devices. Indeed, this disclosure specifically contemplates that examples of tourniquet holsters made of a rigid thermoplastic material including an acrylic-polyvinyl alloy provide improved sliding removal over many conventional tourniquet storage devices, even absent the channels designed to store and release windlass handles.

[0039] Although holster 100 is specifically designed to complement Combat-Application-Tourniquets®, other examples could easily be configured to accommodate other tourniquet varieties. Indeed, this disclosure considers adapting holster features to compliment a standard tourniquet design an important part of the inventive subject matter. Likewise, holster 100 is not specifically limited to use with Combat-Application-Tourniquet® branded tourniquets.

[0040] Although holster 100 includes two flange-styled retention members, many examples may achieve similar results using a single retention member. In examples including a single flange-styled retention member, the single retention member can extend over a greater portion of sleeve channel 150 than illustrated in FIGS. 1-6 to compensate for the lack of an opposing retention member. Additionally or alternatively, retention-members that do not share first retention member 156's and second retention member 160's flange style may be used to retain windlass handle 103 in sleeve channel 150. For example, retention members may define projections, such as nubs, bars, bosses, or other shapes, that project into retention channel 159.

[0041] The disclosure above encompasses multiple distinct inventions with independent utility. While each of these inventions has been disclosed in a particular form, the specific embodiments disclosed and illustrated above are not to be considered in a limiting sense as numerous variations are possible. The subject matter of the inventions includes all novel and non-obvious combinations and subcombinations of

the various elements, features, functions and/or properties disclosed above and inherent to those skilled in the art pertaining to such inventions. Where the disclosure or subsequently filed claims recite “a” element, “a first” element, or any such equivalent term, the disclosure or claims should be understood to incorporate one or more such elements, neither requiring nor excluding two or more such elements.

[0042] Applicant(s) reserves the right to submit claims directed to combinations and subcombinations of the disclosed inventions that are believed to be novel and non-obvious. Inventions embodied in other combinations and subcombinations of features, functions, elements and/or properties may be claimed through amendment of those claims or presentation of new claims in the present application or in a related application. Such amended or new claims, whether they are directed to the same invention or a different invention and whether they are different, broader, narrower or equal in scope to the original claims, are to be considered within the subject matter of the inventions described herein.

1. A tourniquet holster for accessibly supporting a tourniquet on a supporting article, the holster comprising:

- a sleeve extending longitudinally around a sleeved region, the sleeved region extending from a first sleeve end to a second sleeve end, the sleeve defining:
 - a sleeve opening proximate the first sleeve end, the sleeve opening configured to slidably receive a forward portion of the tourniquet;
 - a rear wall extending laterally across a portion of the sleeved region from a first side to a second side;
 - a first side flange extending from the first side of the rear wall; and
 - a second side flange extending from the second side of the rear wall, the first side flange and the second side flange collectively defining a sleeve channel routed from the first sleeve end to the second sleeve end.

2. The holster of claim 1, wherein:

- the tourniquet includes an elongated windlass handle defining a windlass handle width; and
- the sleeve channel defines a sleeve channel width complementarily configured with the windlass handle width to enable the windlass handle to pass through the sleeve channel.

3. The holster of claim 2, further comprising a retention member extending from the first side flange into the sleeve channel to partially restrict the windlass handle from exiting the sleeved region via the sleeve channel.

4. The holster of claim 3, wherein:

- the retention member defines a first retention member and further comprising a second retention member extending from the second side flange into the sleeve channel to cooperatively, with the first retention member, restrict the windlass handle from exiting the sleeved region via the sleeve channel; and
- the first retention member and the second retention member define a retention channel between them, the retention channel defining a retention channel width that is narrower than the sleeve channel width.

5. The holster of claim 4, wherein the first retention member and the second retention member taper toward one another along a tapered portion of their lengths to restrict the windlass handle from entering the sleeved region via the retention channel.

6. The holster of claim 5, wherein the first retention member is resilient and selected to flex when a user applies a removal force to the tourniquet against the first retention member.

7. The holster of claim 1, wherein the sleeved region frictionally and resiliently engages the tourniquet to inhibit the tourniquet from exiting the sleeved region.

8. The holster of claim 1, wherein the sleeve defines a third flange projecting from the rear wall proximate the second sleeve end to a third flange end, the third flange being configured to restrict the forward portion of the tourniquet from sliding beyond the second sleeve end by abutting the forward portion of the tourniquet when fully inserted into the sleeved region.

9. The holster of claim 8, wherein the third flange is curved toward the first sleeve end.

10. The holster of claim 8, wherein:

- the tourniquet includes an elongated windlass handle; and
- the third flange includes a blocking protuberance aligned with the windlass handle when the tourniquet is received in the sleeved region.

11. The holster of claim 1, further comprising a fastener attached to the rear wall opposite the sleeved region, the fastener configured to attach to the supporting article.

12. The holster of claim 11, wherein the fastener defines a clamp.

13. The holster of claim 11, wherein the fastener defines a top substantially aligned with the sleeve opening.

14. The holster of claim 1, wherein the sleeve is substantially rigid.

15. The holster of claim 14, wherein the sleeve is formed from a thermoplastic material including an acrylic-polyvinyl alloy.

16. The holster of claim 1, wherein the sleeve defines a dimple protruding into the sleeved region.

17. The holster of claim 16, wherein the dimple protrudes from the first side flange.

18. The holster of claim 1, wherein:

- the sleeve is sized to engage a supporting portion of the tourniquet when the tourniquet has been slidably received by the sleeve to retain tourniquet in a stored position; and
- an exposed portion of the tourniquet extends beyond the sleeved region when the tourniquet is stored in the stored position, the exposed portion being large enough for a user to readily grip.

19. A tourniquet holster for supporting a tourniquet on a supporting article, wherein the tourniquet includes an elongated windlass handle, the holster comprising:

- a sleeve extending longitudinally around a sleeved region, the sleeved region extending from a first sleeve end to a second sleeve end, the sleeve defining:
 - a sleeve opening proximate the first sleeve end, the sleeve opening configured to slidably receive a forward portion of the tourniquet; and
 - a sleeve channel extending from the first sleeve end toward the second sleeve end, the channel defining a sleeve channel width sized to receive a received portion of the windlass handle; and

a retention member connected to the sleeve proximate the channel, the windlass retainer configured to restrict the windlass handle from releasing from the sleeve channel when the received portion of the windlass handle is at least partially disposed in the channel.

20. A tourniquet holster, the holster comprising:
a sleeve extending longitudinally around a sleeved region,
the sleeved region extending from a first sleeve end to a
second sleeve end, the sleeve defining a sleeve opening
proximate the first sleeve end, the sleeve opening con-
figured to slidably receive a forward portion of a tour-
niquet;

wherein:

the sleeve is formed from a thermoplastic material
including an acrylic-polyvinyl alloy; and

the sleeve is sized to engage a supporting portion of the
tourniquet when the tourniquet has been slidably
received by the sleeve to retain tourniquet in a sub-
stantially upright stored position.

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