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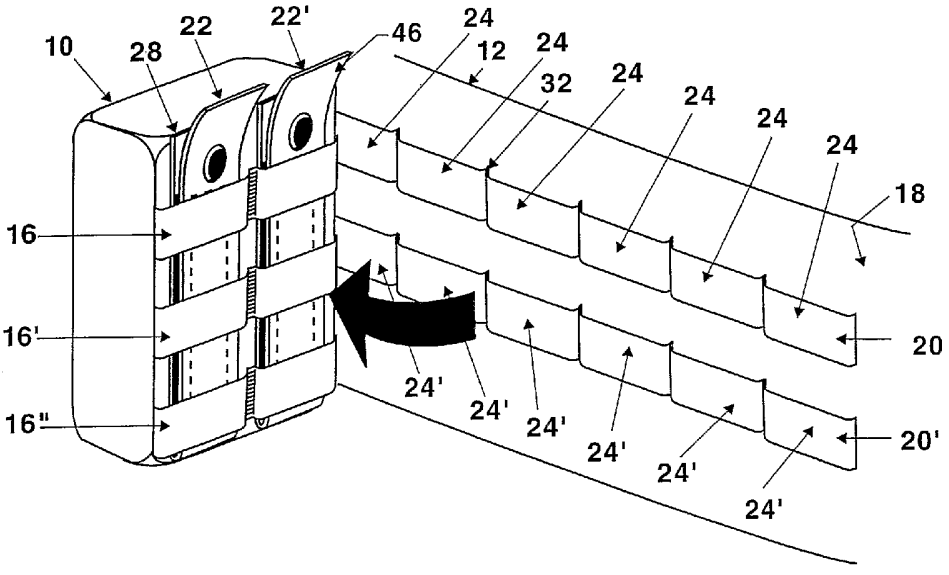
(54) Title: INTERDIGITATING QUICK RELEASE WEB FASTENER




(57) Abstract: A fastening system for attaching an article (10) to a support (12). A web fastener (22) may be attached to an article (10) at one end (28) and have a free distal end (34), distanced from the article (10). A distal portion (38) of the web fastener is stiffened and a proximal portion (36) is more flexible than the stiffened portion (38). The article (10) and support (12) each have juxtaposable webbing strips (16, 20) forming webbing channels (24, 26). The web fastener (22) is insertable through and between the juxtaposed support webbing channels (24) and article webbing channels (26) to thereby secure the mated article (10) and support (12) against relative movement. In additional embodiments connectors (42,44) are provided at the proximal (28) and distal (34) ends of the web fastener (22) to secure the relative positions thereof, and multiple support webbing channels (24), article webbing channels (26) and web fasteners (22) are provided.

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# INTERDIGITATING QUICK RELEASE WEB FASTENER

## FIELD

[0001] The subject matter disclosed and claimed is in the field of attachment systems for use in attaching pockets or other accessories to vests, belts, or other supports, using interlocking webbing, this being of particular use with clothing and individual load bearing equipment and particularly clothing and individual load bearing equipment for military use.

## BACKGROUND

[0002] Various systems have been adapted for the attachment of articles to clothing systems and load bearing equipment that utilize interlocking patterns of webbing including, for example, those disclosed in U.S Patent Nos. 5,617,582; 5,724,707; and 6,279,804.

## SUMMARY

[0003] In one aspect, there is disclosed a fastening system for attaching an article to a support. The fastening system may comprise a web fastener attached to the article at a fixed end, and having a distal free end spaced apart from the article. A distal portion of the web fastener is stiffened, and this stiffened portion is spaced apart from the article by a flexible portion of the web fastener (the flexible portion of the web fastener being more flexible than the stiffened portion of the web fastener). Connecting elements, such as the mating components of a snap fastener, may be provided at the proximal and distal ends of the web fastener.

[0004] In a first embodiment there is disclosed a fastening system for attaching an article to a support. An article webbing strip is attached to the article mounting surface of the article, and an article webbing channel is defined between the article webbing strip and the article mounting surface. A support webbing strip is attached to a support mounting surface on the support, a support webbing channel is defined between the support webbing strip and the support mounting surface. The support mounting surface is matable to the article mounting surface to juxtapose the support webbing channel and the article webbing channel when the article is attached to the support. A web fastener is provided and comprises: (a) a fixed end

attached to the article and a distal end not attached to the article, so that the web fastener extends from the fixed end to the distal end in an orientation that permits the web fastener to pass through the juxtaposed article webbing channel and support webbing channel when the article is mounted to the support; (b) a flexible portion adjacent to the fixed end; and (c) a stiffened portion that is more rigid than the flexible portion, and is spaced apart from the fixed end by the flexible portion. The stiffened and flexible portions of the web fastener are each long enough to extend through and between the juxtaposed support webbing channel and article webbing channel when the article is mounted to the support.

**[0005]** In a second embodiment there is provided an article adapted for attachment to a support comprising a support webbing channel. The article has an article webbing strip attached to an article mounting surface on the article and defining an article webbing channel with the article mounting surface, the article mounting surface being matable with the support mounting surface to juxtapose the article webbing channel with the support webbing channel when the article is attached to the support. The article also has a web fastener comprising: (a) a fixed end attached to the article and a distal end not attached to the article, with the web fastener extending from the fixed end to the distal end in an orientation that permits the web fastener to pass through and between the juxtaposed article webbing channel and support webbing channel; (b) a flexible portion adjacent to the fixed end; and (c) a stiffened portion that is more rigid than the flexible portion, and is spaced apart from the fixed end by the flexible portion. In this embodiment, the stiffened portion of the web fastener and the flexible portion of the web fastener are each long enough to extend through the juxtaposed support webbing channel and article webbing channel when the article is mounted on the support

**[0006]** In a third embodiment there is described a method for connecting an article to a support by inserting a web fastener through and between juxtaposed webbing channels. The method comprises providing a fastening system itself comprising an article webbing strip attached to an article mounting surface on the article, thereby defining an article webbing channel between the article webbing strip and the article mounting surface. The article further comprises a support webbing strip attached to a support mounting surface on the support, thereby defining a support webbing channel between the support webbing strip and the support mounting surface. The support mounting surface is matable to the article mounting surface to juxtapose the support webbing channel and the article webbing channel when the

article is attached to the support. The article also comprises a web fastener comprising: (a) a fixed end attached to the article and a distal end, so that the web fastener extends from the fixed end to the distal end in an orientation that permits the web fastener to pass through the juxtaposed article webbing channel and the support webbing channel when the article is mounted to the support; (b) a flexible portion adjacent to the fixed end; and (c) a stiffened portion that is more rigid than the flexible portion, and is spaced apart from the fixed end by the flexible portion. The stiffened portion of the web fastener and the flexible portion of the web fastener are each long enough to extend through and between the juxtaposed support webbing channel and article webbing channel when the article is mounted to the support.

**[0007]** In a further embodiment there is disclosed a fastening system for attaching an article to a support. The system comprises: (a) two article webbing strips attached to an article mounting surface on the article and defining a plurality of article webbing channels between the article webbing strips and the article mounting surface; (b) two support webbing strips attached to a support mounting surface on the support, defining a plurality of support webbing channels between the support webbing strips and the support mounting surface, the support mounting surface being matable to the article mounting surface to juxtapose ones of the support webbing channels and ones of the article webbing channels when the article is attached to the support; and, (c) two web fasteners. Each web fastener comprises: (i) a fixed end attached to the article and a distal end, so that the web fastener extends from the fixed end to the distal end in an orientation that permits the web fastener to pass through a juxtaposed article webbing channel and the support webbing channel when the article is mounted to said support; (ii) a flexible portion adjacent to the fixed end; (iii) a stiffened portion that is more rigid than the flexible portion, and is spaced apart from the fixed end by the flexible portion; and (iv) a snap fastener, mating parts of the snap fastener being positioned to connect the distal end of the web fastener proximate to the fixed end. The stiffened portion of the web fastener and the flexible portion of the web fastener are each long enough to extend through and between a plurality of juxtaposed support webbing channels and article webbing channels when the article is mounted to a support.

**[0008]** In further embodiments the stiffened portion of the web fastener further comprises a distal connecting element, that distal connecting element being connectable to a proximal connecting element proximate the first end of the webbing strap.

**[0009]** In still further embodiments, the article disclosed further comprises more than one article webbing channel, more than one web fastener, or more than one article webbing channel and more than one web fastener.

**[0010]** In still further embodiments the article comprises two article webbing channels, those two article webbing channels being generally mutually parallel; the support comprises two support webbing channels, those two support webbing channels being generally mutually parallel; and the stiffened portion of the web fastener is adapted to extend through and between ones of the support webbing channels and ones of the article webbing channels to thereby restrain relative movement of the article and the support

**[0011]** In still further embodiments, the support may be an article of clothing or may be individual load bearing equipment and the article may be a pocket, a holster, a gun support or a holder.

**[0012]** In still further embodiments, the embodiments disclosed above are provided as part of a military kit.

**BRIEF DESCRIPTION OF THE DRAWINGS**

**[0013]**

FIG1 is a perspective view of a support and article of a first embodiment.

FIG 2 is a perspective view of an article of the first embodiment showing the web fastener partly inserted.

FIG 3 is a perspective view of an article of the first embodiment showing the web fastener fully withdrawn.

FIG 4 is a cross sectional view of the mated article and support of the first embodiment.

FIG 5 is a lateral view of the mated article and support of the first embodiment.

FIG 6 shows an intermediate step in disengagement of the article and support of the first embodiment illustrated in FIG 5.

FIG 7 shows a final step in disengagement of article from support of the first embodiment illustrated in FIGS 5 and 6.

FIG 8 shows the structure of a web fastener of the first embodiment.

FIG 9 shows a cross sectional view of a second embodiment.

FIG 10 shows a perspective view of the embodiment illustrated in FIG 9.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0014]** The first embodiment is illustrated with reference to Figures 1-7. Each of article 10 and support 12 has an associated mounting surface whereon are mounted webbing strips. Article 10 has an associated article mounting surface 14 whereon are mounted generally parallel article webbing strips 16, 16', 16"and support 12 has a support mounting surface 18 whereon are mounted generally parallel support webbing strips 20, 20'. Two web fasteners 22, 22' are vertically interwoven with mutually juxtaposed horizontal article webbing strips 16, 16', 16" and support webbing strips 20, 20'. Support webbing strips 20 and underlying support mounting surface 18, describe therebetween a number of generally parallel support webbing channels 24. Support webbing strip 20' and underlying support mounting surface 18 describe therebetween a further series of generally parallel support webbing channels 24' which are generally aligned with corresponding support webbing channels 24. Support webbing channels 24 and 24' are themselves generally perpendicular to the support webbing strips 20, 20'. Similarly article webbing strips 16, 16', 16" and underlying support mounting surface 18 describe therebetween article webbing channels 26, 26', 26'' generally perpendicular to the orientation of the article webbing strips 16, 16', 16''.

**[0015]** As best illustrated in Figure 4, when article mounting surface 14 is mated to support mounting surface 18, support webbing strips 20, 20' and article webbing strips 16, 16' 16" are interdigitated, thereby juxtaposing article webbing channels 26, 26' 26" and support webbing channels 24, 24'. Web fastener 22 passes from its fixed end 28 at point of attachment 30 on the article mounting surface 14 through article webbing channel 26, then through support webbing channel 24, then through another article webbing channel 26', then through another support webbing channel 24', and into article webbing channels 26''. The juxtaposition of article webbing channels 26, 26', 26" and support webbing channels 24, 24' is necessary for the web fastener 22 to be inserted through and between them to thereby restrain relative movement of the support mounting surface 18 and the article mounting surface 14. Such juxtaposition does not require the snug interdigitation of the support webbing channels and the article webbing channels, so long as the basic interlacing of the

web fastener 22 with the support webbing channels 24 and article webbing channels 26, is accomplished.

**[0016]** In the illustrated embodiment, the webbing strips are attached to their respective mounting surfaces by stitching. The dimensions of the article webbing channels are determined by the depth 33 of the article webbing strips 16, and the positioning of vertical rows of stitching 32 which divide the article webbing strips along their length. The support webbing channels 24 are similarly defined. Although stitching is one way to secure the webbing strips to their respective surfaces and define the webbing channels, a range of suitable alternatives are incorporated in alternative embodiments and include but are not limited to adhesives, studs, heat sealing, interweaving, unitary fabrication of surface and its associated webbing strip and the like. Similarly, other means to form the necessary channels are possible, such as pre fabricated channels, loops and the like.

**[0017]** In some embodiments, web fastener 2 comprises a fixed end 28, a distal end 34, a flexible portion 36 and a stiffened portion 38 distal to the fixed end 28 and separated therefrom by the flexible portion 36. Flexible portion 36 has a length 37, and stiffened portion 38 has a length 39. Over at least a part of its length 39 the stiffened portion 38 is substantially less flexible than flexible portion 36 because of the provision of a stiffener 40. Fixed end 28 of web fastener 22 is attached to article 10 at attachment point 30 on article mounting surface 14. Webbing strip 16 comprises a stiffener 40, such as a stiff plastic material sewn to webbing strip 16. Many alternative methods for providing this difference in flexibility are encompassed in alternative embodiments, including the use of different materials, such as wood, metal or plastic stiffening elements, the incorporation of the stiffening element in the interior or the web fastener 22, and the use of different materials to fabricate the flexible and stiffened portions of the web fastener 22.

**[0018]** In some embodiments web fastener 22 folds back on itself, so that the stiffened portion 38, bearing a distal connector element 42, returns back through the series of article and support webbing channels 24,26 so that distal connector element 42 associated with stiffened portion 38 can be engaged with proximal connector element 44, close to the fixed end 28 of web fastener 22. In this embodiment the proximal connector element 44 is located on the web fastener 22 close to its fixed end 28 but other locations, including locations

directly on the article mounting surface 14 may be used so long as these are proximate the fixed end 28 of the web fastener 22. The distal connector 42 may be positioned along the length of the stiffener 40, or slightly distal thereto as illustrated, and the stiffened portion 38 may extend distal to the distal connector 42 with the distal end 34 of the web fastener 22 forming a tab or other structure 46 grippable by a user. In the illustrations the proximal 44 and distal connectors 42 are the mating parts of a snap fastener but numerous suitable alternative connectors are encompassed by alternative embodiments, these include but are not limited to pins, VELCRO™, hooks and eyes, clips, zippers and the like.

**[0019]** In various embodiments the proximal 44 and distal 42 connectors may be so positioned that they can be properly opposed and connected to thereby restrain the movement of the stiffened portion

**[0020]** Stiffener 40 facilitates the insertion of web fastener 22 through the article webbing channels 26 and support webbing channels 24. As shown in Figures 5 through 7, the embodiments provide for the quick release of article 10 from support 12, by disengaging connecting elements 42 and 44, and pulling on the tab 46 at distal end 34 of web fastener 22 so that the flexible portion 36 of web fastener 22 rolls back along itself to disengage article 10 from support 12, as ultimately illustrated in Figure 7. Assembly of the fastening system is accomplished by reversing the process. The article mounting surface 14 and the support mounting surface 18 are placed in mating opposition, so that article webbing channels 26 are juxtaposed to support webbing channels 24. Stiffener 40 facilitates the insertion of the web fastener 22 through and between article webbing channels 26 and support webbing channels 24 to thereby restrain the opposed article mounting surface 14 and support mounting surface 18 against relative movement. Engagement of proximal 44 and distal 42 connectors prevents accidental withdrawal of the web fastener 22.

**[0021]** In a second embodiment illustrated in Figures 9 and 10, web fastener 22 comprises a loop 50 formed by attachment of distal end 34 to article mounting surface 14. This facilitates the quick and easy withdrawal of the web fastener 22 from its interlocking position and the disengagement of article 10 from support 12 by a user who simply inserts a finger or suitable object into loop 50 and pulls with sufficient force to disengage the proximal 42 and distal 44 connectors and withdraw web fastener 22 from the juxtaposed webbing channels.

**[0022]** In a third embodiment the article 10 with its associated webbing is provided separately and for attachment to any suitably modified support.

**[0023]** In a fourth embodiment the fastening system is incorporated into a military kit.

**[0024]** Although various embodiments of the invention are disclosed herein, many adaptations and modifications may be made within the scope of the invention in accordance with the common general knowledge of those skilled in this art. Such modifications include the substitution of known equivalents for any aspect of the invention in order to achieve the same result in substantially the same way. For instance, in the embodiment described and illustrated, the article 10 is a pocket but it will be understood that with adjustments that will be readily apparent to those skilled in the art, the system and method described herein may be applied to the attachment of all manner of articles including but not limited to pouches, covers, holsters, gun supports, pads, shields, panels, load carrying supports or other holders, and the like. Similarly, whilst in the illustrated embodiment the support envisaged is a belt, the same method and system may be applied to directly mount articles on all manner of clothing and other types of flexible and non-flexible support including but not limited to jackets, pants, boots, headgear, tents, tarpaulins, covers, screens, vests, harnesses, load bearing equipment and particularly individual load bearing equipment such as backpacks and carrying harnesses and the like. Although in the embodiment illustrated two support webbing strips and three article webbing strips are provided, this is not essential. At least one webbing strip must be provided on each of the article and the support. Additional webbing strips may be employed provided that resulting article webbing channels can be readily juxtaposed with corresponding support webbing channels. The nature and magnitude of any necessary adjustments will be readily apparent to, and readily achieved by, those skilled in the art.

**[0025]** The connecting elements employed in the embodiments illustrated are the parts of a snap fastener but a range of alternatives will be readily apparent to those skilled in the art including VELCRO™, various hook and eye arrangements, the use of multiple snap fasteners on one web fastener and any other releasable connector elements, likewise, alternate positionings for the connectors are possible and are envisaged. Unsuitable types of connector

and unsuitable positions therefore, will be readily discerned and avoided by those skilled in the art.

**[0026]** Numeric ranges are inclusive of the numbers defining the range. The word "comprising" is used herein as an open-ended term, substantially equivalent to the phrase "including, but not limited to", and the word "comprises" has a corresponding meaning. As used herein, the singular forms "a", "an" and "the" include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to "a thing" includes more than one such thing. Citation of references herein is not an admission that such references are prior art to the present invention. The term "flexible" is synonymous with "un-stiffened", the term "web fastener" includes a "webbing strip" adapted to serve that purpose. The term "similar" applied to any relative quantitative or qualitative representation indicates that this can vary without resulting in a change of the basic function to which it is related. The degree of variance permissible will depend on context and application but will be readily apparent to those skilled in the art in any given situation. Likewise the terms "substantially" and "generally" as used herein may be applied to modify any quantitative representation that can permissibly vary without resulting in a change in the basic function to which it is related. The word "juxtaposed" indicates that the elements referred to are positioned in such alignment to each other as is necessary to achieve the basic object for which such relative positioning is required as illustrated by the various embodiments presented herein.

**[0027]** All publications, including but not limited to patents and patent applications, cited in this specification are incorporated herein by reference as if each individual publication were specifically and individually indicated to be incorporated by reference herein and as though fully set forth herein. The subject matter claimed includes all embodiments and variations substantially as hereinbefore described and with reference to the examples and drawings.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE RIGHT OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A fastening system for attaching an article to a support, the fastening system comprising:

(a) an article webbing strip attached to an article mounting surface on said article, defining an article webbing channel between said article webbing strip and said article mounting surface;

(b) a support webbing strip attached to a support mounting surface on said support, defining a support webbing channel between said support webbing strip and said support mounting surface, said support mounting surface being matable to said article mounting surface to juxtapose said support webbing channel and said article webbing channel when said article is attached to said support; and,

(c) a web fastener comprising:

(i) a fixed end attached to said article and a distal end not attached to said article, so that said web fastener extends from said fixed end to said distal end in an orientation that permits said web fastener to pass through the juxtaposed said article webbing channel and said support webbing channel when said article is mounted to said support;

(ii) a flexible portion adjacent to said fixed end; and

(iii) a stiffened portion that is more rigid than said flexible portion, and is spaced apart from said fixed end by said flexible portion,

wherein said stiffened portion of said web fastener and said flexible portion of said web fastener are each long enough to extend through and between the juxtaposed said support webbing channel and said article webbing channel when said article is mounted to said support.

2. The fastening system of claim 1 wherein said stiffened portion of said web fastener further comprises a distal connecting element, said distal connecting element being connectable to a proximal connecting element proximate said first end of said webbing strap.

3. The fastening system of claim 2 wherein:

(a) said article comprises two said article webbing channels, said two said article webbing channels being generally mutually parallel;

(b) said support comprises two said support webbing channels, said two support webbing channels being generally mutually parallel; and

(c) said stiffened portion of said web fastener is adapted to extend through and between ones of said support webbing channels and ones of said article webbing channels to thereby restrain relative movement of said article and said support

4. The fastening system of claim 3 further comprising two said web fasteners.

5. The fastening system of claim 4 wherein said support is an article of clothing and said article is a pocket, a holster, a gun support or a holder.

6. The fastening system of claim 4 wherein said support is individual load bearing equipment and said article is a pocket, a holster, a gun support or a holder.

7. A military kit comprising the fastening system claimed in claims 1, 4, 5 and 6.

8. An article adapted for attachment to a support comprising a support webbing channel, said article comprising:

(a) an article webbing strip attached to an article mounting surface on said article and defining an article webbing channel with said article mounting surface, said article mounting surface being matable with the support mounting surface to juxtapose said article webbing channel with the support webbing channel when said article is attached to the support

(b) a web fastener comprising:

(i) a fixed end attached to said article and a distal end not attached to said article, said web fastener extending from said fixed end to said distal end in an orientation that permits the web fastener to pass through and between said juxtaposed said article webbing channel and said support webbing channel;

(ii) a flexible portion adjacent to said fixed end; and

(iii) a stiffened portion that is more rigid than the flexible portion, spaced apart from said fixed end by said flexible portion

wherein said stiffened portion of said web fastener and said flexible portion of said web fastener are each long enough to extend through the juxtaposed support webbing channel and said article webbing channel when said article is mounted on the support

9. The fastening system of claim 8 wherein said stiffened portion of said web fastener further comprises a distal connecting element, said distal connecting element being connectable to a proximal connecting element proximate said first end of said webbing strap.

10. The article of claim 9 wherein said article further comprises:

(a) more than one said article webbing channel; or

(b) more than one said web fastener; or

(c) more than one said article webbing channel and more than one said web fastener

11. The fastening system of claim 9 wherein said support is an article of clothing and said article is a pocket, a holster, a gun support or a holder

12. The fastening system of claim 9 wherein said support is individual load bearing equipment and said article is a pocket, a holster, a gun support or a holder.

13. A method for connecting an article to a support by inserting a web fastener through and between juxtaposed webbing channels, said method comprising providing a fastening system comprising:

(a) an article webbing strip attached to an article mounting surface on said article, defining an article webbing channel between said article webbing strip and said article mounting surface;

(b) a support webbing strip attached to a support mounting surface on said support, defining a support webbing channel between said support webbing strip and said support mounting surface, said support mounting surface being matable to said article mounting surface to juxtapose said support webbing channel and said article webbing channel when said article is attached to said support; and,

(c) a web fastener comprising:

(i) a fixed end attached to said article and a distal end, so that said web fastener extends from said fixed end to said distal end in an orientation that permits said web fastener to pass through the juxtaposed said article webbing channel and said support webbing channel when said article is mounted to said support;

(ii) a flexible portion adjacent to said fixed end; and

(iii) a stiffened portion that is more rigid than said flexible portion, and is spaced apart from said fixed end by said flexible portion,

wherein said stiffened portion of said web fastener and said flexible portion of said web fastener are each long enough to extend through and between the juxtaposed said support webbing channel and said article webbing channel when said article is mounted to said support.

14. The fastening system of claim 13 wherein said stiffened portion of said web fastener further comprises a distal connecting element, said distal connecting element being connectable to a proximal connecting element proximate said first end of said webbing strap.

15. The method of claim 14 wherein:

(a) said article comprises two said article webbing strips;

(b) said support comprises two said support webbing strips; and

(c) said stiffened portion length is suitable to extend through and between a plurality of interdigitating said support webbing channels and said article webbing channels

16. The method of claim 14 further comprising providing two said web fasteners.

17. The method of claim 16 wherein said support is an article of clothing and said article is a pocket, a holster, a gun support or a holder

18. The method of claim 16 wherein said support is individual load bearing equipment and said article is a pocket, a holster, a gun support or a holder.

19. A fastening system for attaching an article to a support, the fastening system comprising:

(a) two article webbing strips attached to an article mounting surface on said article, defining a plurality of article webbing channels between said article webbing strips and said article mounting surface;

(b) two support webbing strips attached to a support mounting surface on said support, defining a plurality of support webbing channels between said support webbing strips and said support mounting surface, said support mounting surface being matable to said article mounting surface to juxtapose ones of said support webbing channels and ones of said article webbing channels when said article is attached to said support; and,

(c) two web fasteners, each said web fastener comprising:

(i) a fixed end attached to said article and a distal end, so that said web fastener extends from said fixed end to said distal end in an orientation that permits said web fastener to pass through a juxtaposed said article webbing channel and said support webbing channel when said article is mounted to said support;

(ii) a flexible portion adjacent to said fixed end; and

(iv) a stiffened portion that is more rigid than said flexible portion, and is spaced apart from said fixed end by said flexible portion,

(v) a snap fastener, mating parts of said snap fastener being positioned to connect said distal end of said web fastener proximate to said fixed end

wherein the stiffened portion of a said web fastener and the flexible portion of a said web fastener are each long enough to extend through and between a plurality of said juxtaposed said support webbing channels and said article webbing channels when said article is mounted to said support.

Fig. 1

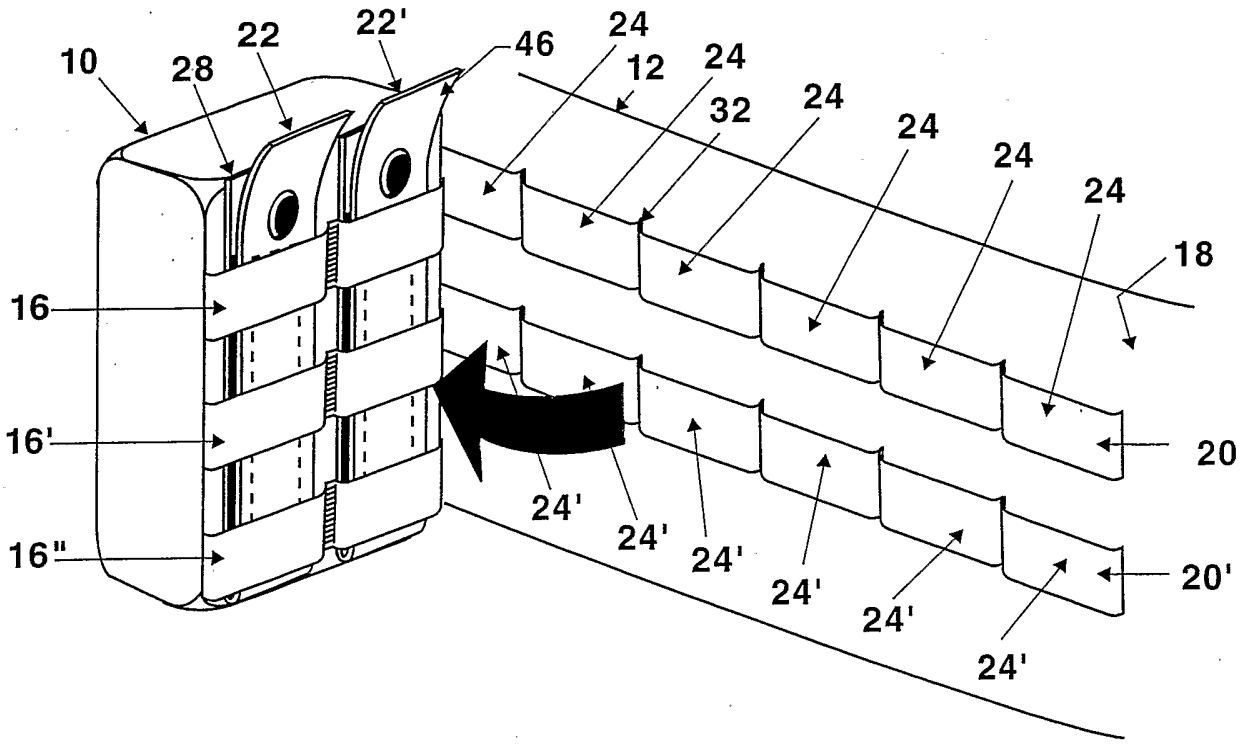
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Fig. 2



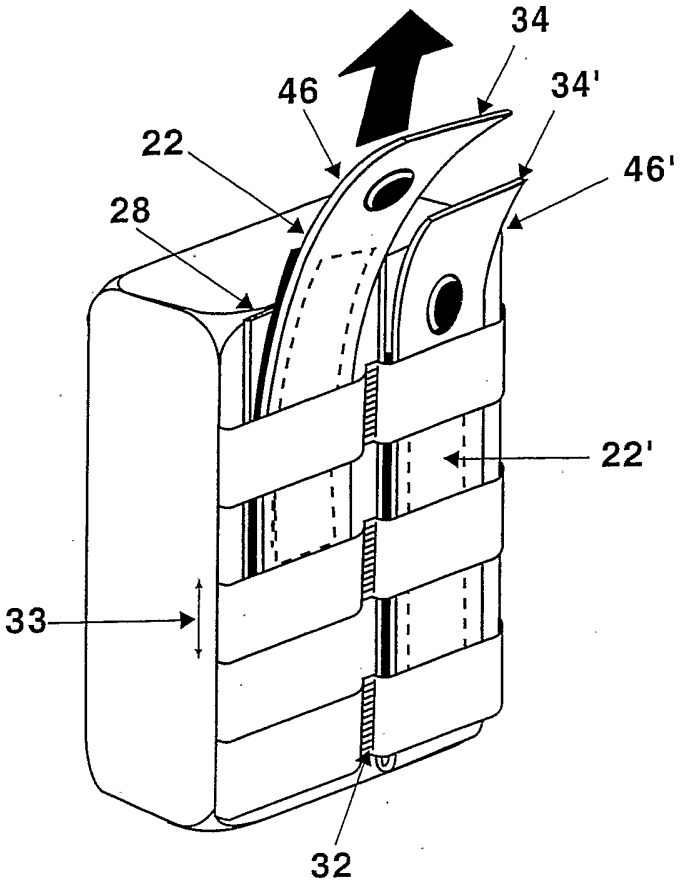



Fig. 3

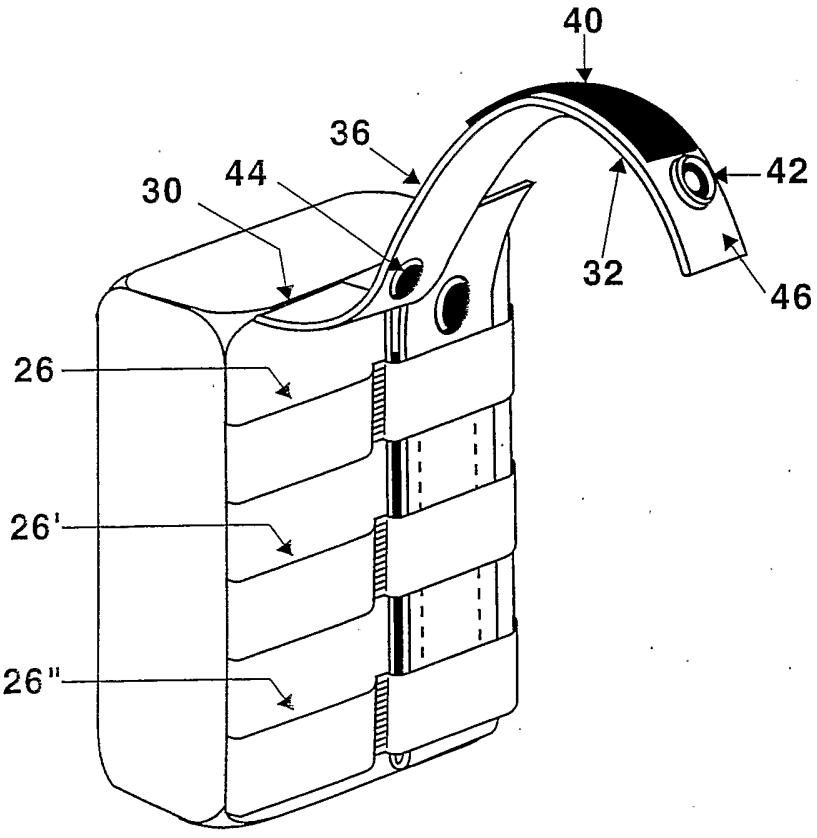


Fig. 4

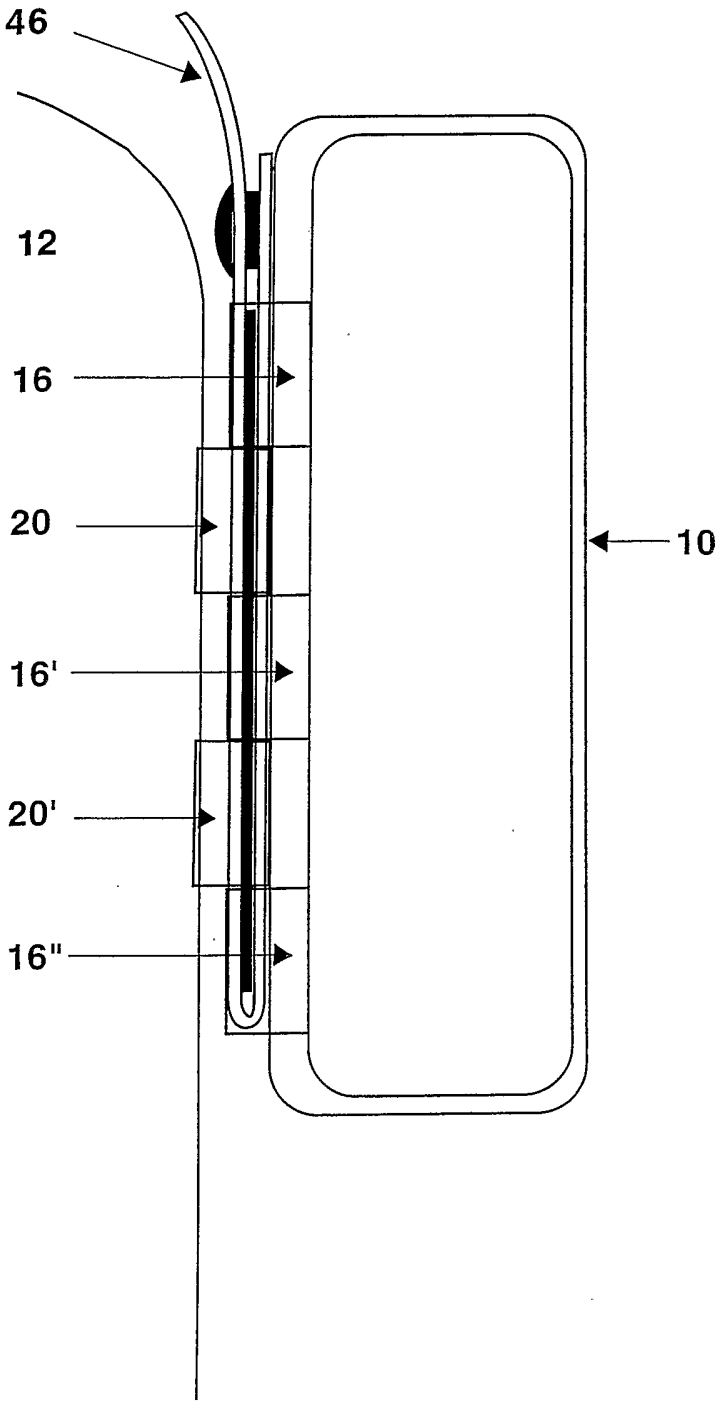


Fig. 5

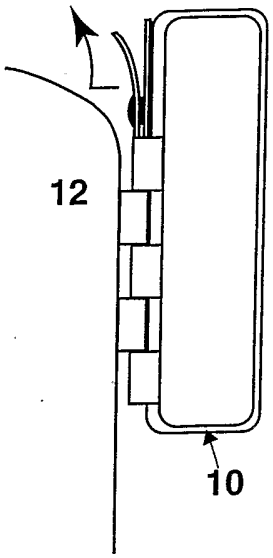





Fig. 6

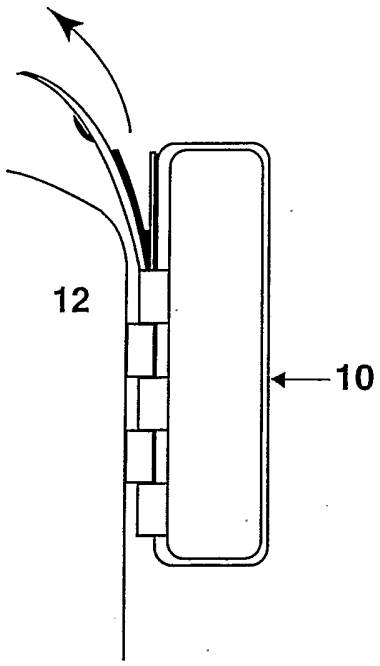



Fig. 7

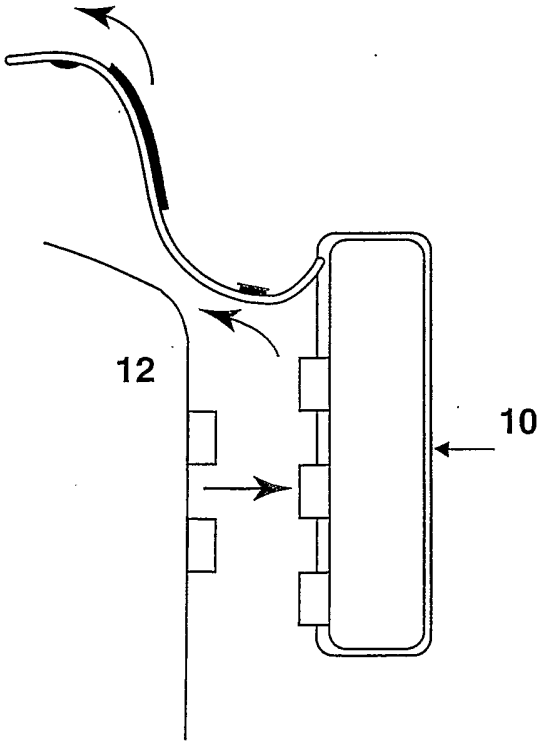


Fig. 8

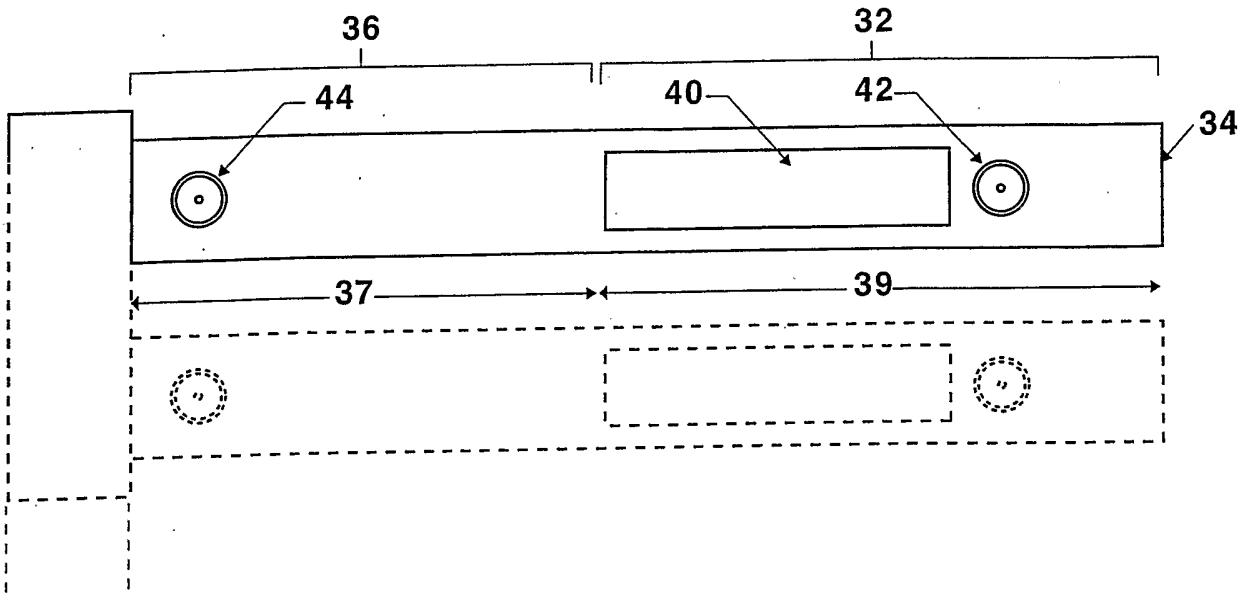


Fig. 9



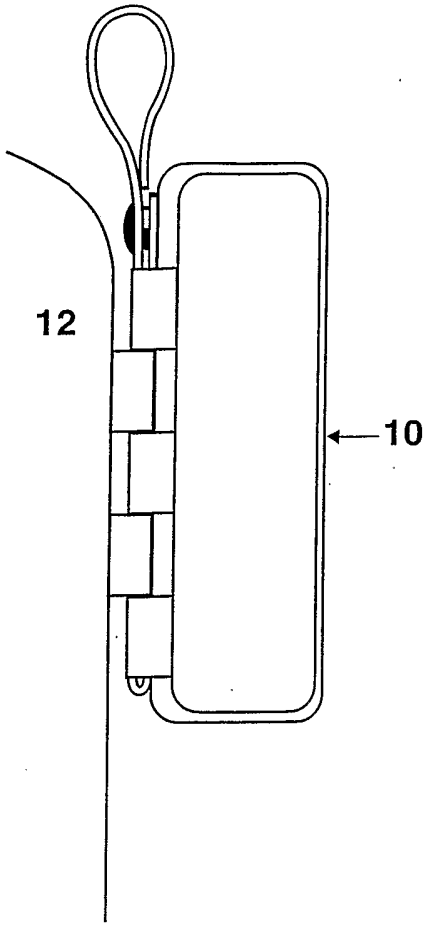
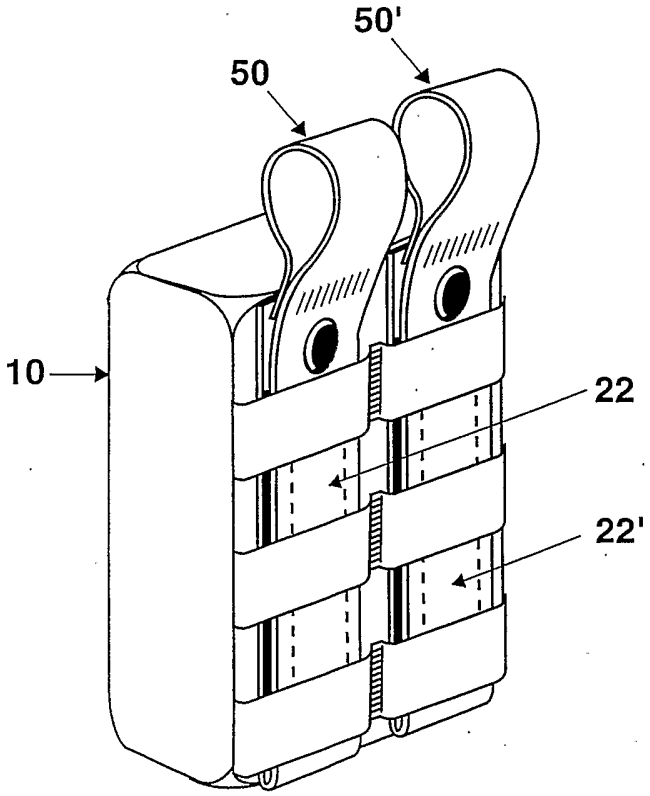



Fig. 10



# INTERNATIONAL SEARCH REPORT

International Application No
PCT/CA2004/000888

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A45F5/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A45F A41D A41F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| Y | US 5 724 707 A (KIRK)<br>10 March 1998 (1998-03-10)<br>cited in the application<br>column 4, line 23 - line 27; figures 1-4 | 1,7,8,13 |
| Y | US 5 259 093 A (D ANNUNZIO)<br>9 November 1993 (1993-11-09)<br>column 4, line 53 - column 5, line 22;<br>figures 8,9,22-24 | 1,7,8,13 |
| A | US 6 279 804 B1 (GREGG RON)<br>28 August 2001 (2001-08-28)<br>cited in the application | |
| A | US 842 498 A (SCHMIDT)<br>29 January 1907 (1907-01-29) | |

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 8 October 2004 | 18/10/2004 |

| Name and mailing address of the ISA | Authorized officer |
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| European Patent Office, P.B. 5818 Patentlaan 2<br>NL – 2280 HV Rijswijk<br>Tel. (+31–70) 340–2040, Tx. 31 651 epo nl,<br>Fax: (+31–70) 340–3016 | Coniglio, C |

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International Application No
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| US 6279804 B1 | 28-08-2001 | NONE | |
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