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Fastening Device and Method for Securing a Fastening Device

Abstract

A fastening device includes: a head having: a first strap aperture; a second strap aperture; a first fastener receiving area; and a second fastener receiving area. The first strap aperture intersects the first fastener receiving area. The second strap aperture intersects the second fastener receiving area. In an embodiment, the first strap aperture and the second strap aperture each have a same shape, and the first fastener receiving area and the second fastener receiving area each have a same shape.

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Background/Summary

FIELD

[0001] The present application generally relates to a cable tie head that can be used with a strap in order to secure or fasten one or more objects.

BACKGROUND

[0002] Cable ties are most commonly injection molded from nylon or another polymer. The molding process typically requires use of one material for both the flexible cable strap and for the cable tie head into which the strap is inserted and eventually fixed. Additionally, cable ties are usually installed by hand, as individual pieces. Some continuous cable tie straps are manufactured with separate heads. These heads have fixing mechanisms similar to individual cable ties, typically provided by a barb or a pawl.

[0003] The fixing mechanism dictates that the strap can be fed in only one direction through the head. After the strap is fed through the head, the strap is tightened around one or more objects, with the fixing mechanism of the head preventing movement of the strap in the other direction through the head, keeping the one or more objects secured by the cable tie. This conventional arrangement prevents a cable strap from being fed continuously around the bundle of objects unless the pawl or barb is temporarily defeated. If the pawl or barb is not temporarily defeated, the strap must be cut to length prior to installation, which necessarily requires knowledge of the bundle size, and requires some additional strap length that is ultimately discarded. Furthermore, the presence of a pawl necessitates molding a corresponding locking feature into the cable strap, which requires secondary processing if the cable strap is formed by extrusion.

[0004] Other fastening methods (e.g., welding) are available, but these require the end of the strap to be held in place during tensioning around the bundle of objects. Tool features required to hold the strap in place are also limited in size by their temporary position inside the bundle. Furthermore, a welding operation requires specific geometry and material properties for the strap, all of which increase the associated costs of such techniques.

[0005] There is therefore a need to improve upon existing fastening methods and devices, in part by avoiding the need to mold additional features into the cable strap and/or to weld components of the fastening device.

SUMMARY

[0006] In an embodiment, the present invention provides a fastening device, comprising: a head having: a first strap aperture; a second strap aperture; a first fastener receiving area; and a second fastener receiving area, wherein the first strap aperture intersects the first fastener receiving area, and wherein the second strap aperture intersects the second fastener receiving area.

[0007] In an embodiment, the present invention provides a method of securing a fastening device, the fastening device including a strap, a first fastener, a second fastener, and a head having a first strap aperture, a second strap aperture, a first fastener receiving area, and a second fastener receiving area, the method comprising: guiding the strap through the first strap aperture; guiding the strap through the second strap aperture; securing a first portion of the strap to the head within the first strap aperture by moving the first fastener with respect to the first fastener receiving area so as to pass the first fastener through the first portion of the strap or deform the first portion of the strap with the first fastener; and securing a second portion of the strap to the head within the second strap aperture by moving the second fastener with respect to the second fastener receiving area so as to pass the second fastener through the second portion of the strap or deform the second portion of the strap with the second fastener,

[0008] In an embodiment, the present invention provides a method of securing a fastening device around at least one object, the fastening device including a strap, a first fastener, a second fastener, and a head having a first strap aperture, a second strap aperture, a first fastener receiving area, and a second fastener receiving area, the method comprising: guiding the strap through the first strap aperture; guiding the strap around the at least one object; guiding the strap through the second strap aperture; securing a second portion of the strap to the head within the second strap aperture by moving the second fastener with respect to the second fastener receiving area so as to pass the second fastener through the second portion of the strap or deform the second portion of the strap with the second fastener; tightening the strap around the at least one object; and securing a first

portion of the strap to the head within the first strap aperture by moving the first fastener with respect to the first fastener receiving area so as to pass the first fastener through the first portion of the strap or deform the first portion of the strap with the first fastener.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 shows a fastening device according to the present disclosure in a perspective view;
[0010] FIG. 2 shows the fastening device of FIG. 1 in a front view;
[0011] FIG. 3 shows the fastening device of FIG. 1 in a top view;
[0012] FIG. 4 shows the fastening device of FIG. 1 in a front cross-sectional view;
[0013] FIG. 5 shows the fastening device of FIG. 1 in a side cross-sectional view;
[0014] FIG. 6 shows the fastening device of FIG. 1 and a strap being used to secure a plurality of objects, with two fasteners not passing through the strap;
[0015] FIG. 7 shows the fastening device of FIG. 1 and a strap being used to secure a plurality of objects, with one of two fasteners passing through the strap;
[0016] FIG. 8 shows the fastening device of FIG. 7 in a front cross-sectional view;
[0017] FIG. 9 shows the fastening device of FIG. 1 and a strap being tightened around a plurality of objects, with one of two fasteners passing through the strap;
[0018] FIG. 10 shows the fastening device of FIG. 1 and a strap being tightened around a plurality of objects, with two fasteners passing through the strap;
[0019] FIG. 11 shows the fastening device of FIG. 10 in a front cross-sectional view;
[0020] FIG. 12 shows the fastening device of FIG. 10 after the strap has been tightened around a plurality of objects and cut to length;
[0021] FIGS. 13-14 show front views of various fasteners according to the present disclosure;
[0022] FIG. 15 shows an alternative fastening device according to the present disclosure in a front view;
[0023] FIG. 16 shows the fastening device of FIG. 15 in a top view;
[0024] FIG. 17 shows the fastening device of FIG. 15 in a perspective view;
[0025] FIG. 18 shows the fastening device of FIG. 15 and a strap for securing one or more objects, with two fasteners not passing through the strap; and
[0026] FIG. 19 shows a chain comprising a plurality of the fastening device of FIG. 15 connected to one another.

DETAILED DESCRIPTION

[0027] To overcome the problems associated with the prior art, the present application describes a cable tie head for use with a continuous cable tie strap. The word “continuous” in the context of the present application means a strap that is typically wound on a large roll, such that the total length of strap on the roll is capable of being used with a very large number of heads (e.g., hundreds or even thousands of heads). A continuous strap is in contrast to the straps of prior art cable ties, which are typically only long enough to be used with a single head.

[0028] The head of the present application allows a continuous strap to be fed therethrough, secured at one end of the strap, then tensioned around a bundle of objects, and secured at another portion of the strap. Pre-installed fasteners or pins, usually two thereof, secure the strap to the head. In this manner, it is not necessary to mold typical securement features into the strap. Welding operations are also not required.

[0029] In general, the cable tie head is for use with a continuous thin strap. The head can include two apertures through which the strap is fed. The apertures generally match the shape of the strap, albeit with slightly larger dimensions to allow the strap to enter the apertures more easily. The head can have two fasteners pre-installed in fastener receiving areas or holes in the head.

[0030] In operation, the strap is fed through one aperture and around one or more objects, then into the second aperture. A first fastener is then driven through the strap, optionally to a positive stop in the head, thus securing that end of the strap with respect to the head. The strap may then be tensioned around the one or more objects, after which the second fastener is also driven through the strap, optionally to a positive stop in the head, securing the other end of the strap to the head, and securing the one or more objects to each other and/or the head. As an alternative to driving the fasteners through the strap, the fasteners may also deform the strap (e.g., into a cavity), without puncturing a hole through the strap. Any excess portion of the strap may then be cut off and discarded.

[0031] The head is arranged with two apertures side by side. This arrangement allows the strap to be fed through each aperture and two portions of the strap to be permanently secured separately, without requiring temporary fixing means. A side-by-side arrangement in general allows for easier manipulation of the strap and the head in comparison to other aperture arrangements such as a top-and-bottom arrangement. The side-by-side arrangement also allows the head to have as small a height as possible, which facilitates a tighter securing of objects by the fastening device.

[0032] The fasteners of the fastening device are typically pre-installed but do not protrude into either aperture. Thus, the strap can feed through each aperture without interference from a barb or from a pawl, contrary to the prior art. Nor must such fixing devices be temporarily defeated while feeding the strap through the head. In addition, there is no need to deflect a barb or pawl out of the way to lock the strap in place as there is with a standard cable tie, avoiding limits on the available length of strap. The present invention is therefore capable of being used with a continuous strap. Moreover, the present invention allows for a more precise length of strap to be used, as the strap length does not need to be decided in advance of securing the one or more objects. This cuts down on waste and cost.

[0033] The head may have different configurations, at least some of which are suitable for injection molding. In one configuration, a majority of the features, including the strap apertures, are oriented in one direction, but the fastener receiving areas or holes are made during injection molding using retractable cores. Consequently, the fastener receiving areas are round and are generally perpendicular to the aperture direction. In this manner, the fasteners are held on all sides during assembly of the fastening device. In another configuration, the fastener receiving areas are shaped so the head may be injection molded without any side action. In this configuration, the strap's tension as it is pulled through the head helps hold the fasteners in place, while tension in the other direction is not required. Features may be built into the head to allow it to be held in place by an installation tool without introducing an outside retainer into the bundle of objects. In any configuration, the head is suitable for molding multiple heads onto a continuous chain, which may be fed into an installation tool that can dispense and cut off heads as needed.

[0034] The fasteners or pins may be of a standard drive-rivet configuration, with or without spiral retention ribs. The fasteners may include a blunt tip to deform the strap while the strap is in the aperture. Alternatively, the fasteners may be shaped with a pointed tip for puncturing the strap while the strap is in the aperture, providing a positive locking feature. The fastener receiving areas are sized so that the fasteners may be driven to a positive stop such that the end of each fastener is contained within the head.

[0035] FIGS. 1-12 show details of one embodiment of a head 4 of a fastening device 2 according to the present application. Head 4 has a first strap aperture 6, a second strap aperture 8, a first fastener receiving area 10, and a second fastener receiving area 12. As shown more particularly in FIGS. 1 and 4-5, first strap aperture 6 intersects first fastener receiving area 10, and second strap aperture 8 intersects second fastener receiving area 12. The indication of a particular component as a “first” or “second” is arbitrary, and not intended to be limiting. For example, either one of the strap apertures could be first strap aperture 6. Moreover, either one of the fastener receiving areas could be first fastener receiving area 10.

[0036] As shown in FIGS. 1-5, 8 and 11, first strap aperture 6 and second strap aperture 8 can each have a same shape. Moreover, first fastener receiving area 10 and second fastener receiving area 12 can also each have a same shape. It is also contemplated, however, that first strap aperture 6 and second strap aperture 8 can have a different shape, and that first fastener receiving area 10 and second fastener receiving area 12 can also each have a different shape.

[0037] In an embodiment, first strap aperture 6 is perpendicular to and intersects the first fastener receiving area 10. Additionally, second strap aperture 8 is perpendicular to and intersects second fastener receiving area 12. “Perpendicular” in this sense generally means that the two components are at approximately or exactly a right angle or 90° with respect to one another.

[0038] Head 4 has a top side 24, a bottom side 26 opposite top side 24, a first lateral side 28, and a second lateral side 30 opposite first lateral side 28. First strap aperture 6 and second strap aperture 8 can extend between first lateral side 28 and second lateral side 30. First fastener receiving area 10 and second fastener receiving area 12 can extend between top side 24 and bottom side 26. As with the terms “first” and “second,” the terms “top,” “bottom,” and “lateral” can also be arbitrary. For example, head 4 could be rotated 180° about an axis extending through first strap aperture 6 and second strap aperture 8, causing what was previously top side 24 to become bottom side 26. In this sense, the terms “top” and “bottom” are used to indicate opposite sides of head 4, while the terms “first lateral” and “second lateral” are used to indicate other opposite sides of head 4.

[0039] As shown in FIG. 6, fastening device 2 can include a strap 14. Strap 14 is insertable into first strap aperture 6 and second strap aperture 8. In an embodiment, first strap aperture 6 and second strap aperture 8 each have a shape that corresponds to a cross-section of strap 14, as shown more particularly in FIGS. 4 8, and 11, which configuration facilitates insertion of strap 14 into first strap aperture 6 and second strap aperture 8.

[0040] Fastening device 2 may also include a first fastener 16 disposed, or pre-installed, in first fastener receiving area 10, and a second fastener 18 disposed, or pre-installed, in second fastener receiving area 12. First fastener 16 and second fastener 18 may be identical components.

[0041] It is envisioned that first fastener 16 and second fastener 18 are disposed in first fastener receiving area 10 and second fastener receiving area 12, respectively, during manufacture of fastening device 2. As such, when fastening device 2 ultimately arrives in the hands of an end user, the end user does not have to install any fasteners 16, 18 into any fastener receiving area 10, 12. To accomplish this pre-installation, fasteners 16, 18 may be arranged with, for example, a press fit or tolerance fit with respect to fastener receiving areas 10, 12.

[0042] When first fastener 16 and second fastener 18 are disposed in first fastener receiving area 10 and second fastener receiving area 12, respectively, first fastener 16 is not disposed within first strap aperture 6 and second fastener 18 is not disposed within second strap aperture 8. This arrangement allows strap 14 to be more easily inserted into first strap aperture 6 and second strap aperture 8, as progress of strap 14 through those locations is not impeded in any way by fasteners 16, 18 protruding therein.

[0043] The present invention also involves a method of securing fastening device 2, as shown more particularly in the context of FIGS. 6-12. Fastening device 2 includes strap 14, first fastener 16, second fastener 18, and head 4. Head 4, in turn, has first strap aperture 6, second strap aperture 8, first fastener receiving area 10, and second fastener receiving area 12.

[0044] The method includes guiding strap 14 through first strap aperture 6 and guiding strap 14 through second strap aperture 8. The method also includes securing a first portion 14a of strap 14 to head 4 within first strap aperture 6 by moving first fastener 16 with respect to first fastener receiving area 10 so as to pass first fastener 16 through first portion 14a of strap 14 or deform first portion 14a of strap 14 with first fastener 16, as shown in FIGS. 7-9. The method further includes securing a second portion 14b of strap 14 to head 4 within second strap aperture 8 by moving second fastener 18 with respect to second fastener receiving area 12 so as to pass second fastener 18 through second portion 14b of strap 14 or deform second portion 14b of strap 14 with second

fastener **18**, as shown in FIGS. **10-12**.

[0045] It is envisioned that the guiding of strap **14** through first strap aperture **6** must take place prior to securing first portion **14a** of strap **14** to head **4** within first strap aperture **6**, otherwise there would be no strap **14** present in first strap aperture **6** to secure. Similarly, it is also envisioned that the guiding of strap **14** through second strap aperture **8** must take place prior to securing second portion **14b** of strap **14** to head **4** within second strap aperture **8**.

[0046] It is also envisioned that second portion **14b** of strap **14** can be secured to head **4** within second strap aperture **8** either before or after first portion **14a** of strap **14** is secured to head **4** within first strap aperture **6**. In other words, and as discussed herein, usage of the terms “first” and “second” is arbitrary, as the method involves guiding portions of strap **14** into the two strap apertures **6, 8**, then thereafter securing those portions of strap **14** to head **4** using fasteners **16, 18**.

[0047] The method can also include passing strap **14** around at least one object **20** to be secured after guiding strap **14** through first strap aperture **6** and before guiding strap **14** through second strap aperture **8**, as shown in FIGS. **6-7, 9-10**, and **12**. Furthermore, after passing strap **14** around at least one object **20**, the method can include tightening strap **14** around at least one object **20**, as shown in FIGS. **9-10**.

[0048] If desired, after securing second portion **14b** of strap **14** to head **4** within second strap aperture **8**, the method can include severing strap **14**, as shown in FIG. **12**. In this manner, any portion of strap **14** that is not needed by fastening device **2** to secure at least one object **20** can be severed from strap portions **14a, 14b**, which are fixed with respect to head **4**.

[0049] FIGS. **13-14** show exemplary fasteners **16, 18** that can be used with fastening device **2**. As discussed herein, fasteners **16, 18** may be of a standard drive-rivet configuration, with spiral retention ribs (as shown in FIG. **14**) or without spiral retention ribs (as shown in FIG. **13**).

Fasteners **16, 18** may include a blunt tip, as shown in FIG. **14**, to deform strap **14** while strap **14** is in strap apertures **6, 8**. Alternatively, fasteners **16, 18** may be shaped with a pointed tip, as shown in FIG. **13**, for puncturing through strap **14** while strap **14** is in strap apertures **6, 8**, providing a positive locking feature,

[0050] FIGS. **15-19** show another embodiment of head **4** of the present invention. In this embodiment, first fastener receiving area **10** and second fastener receiving area **12** are each open on at least one lateral side **28, 30** of head **4**. As an example, first fastener receiving area **10** could be open on first lateral side **28** of head **4**, while second fastener receiving area **12** could be open on second lateral side **30** of head **4**, second lateral side **30** being opposite first lateral side **28**. This alternative embodiment of head **4** is equally capable of being used in the method of the present invention.

[0051] FIG. **19** shows a chain **22** that comprises a plurality of the alternative embodiment of head **4**, although the original embodiment of head **4** could also be used in chain **22**. In this configuration, chain **22** may be fed into an installation tool that can dispense and cut off individual heads **4** as needed.

[0052] Variations on the previously described method are also possible. For example, a method of securing fastening device **2** around at least one object **20** can include guiding strap **14** through first strap aperture **6**, guiding strap **14** around at least one object **20**, and guiding strap **14** through second strap aperture **8**. Thereafter, a user of fastening device **2** can secure second portion **14b** of strap **14** to head **4** within second strap aperture **8** by moving second fastener **18** with respect to second fastener receiving area **12** so as to pass second fastener **18** through second portion **14b** of strap **14** or deform second portion **14b** of **14** strap with second fastener **18**. Next, the user could tighten strap **14** around at least one object **20**. After tightening strap **14** around at least one object **20**, the user could then secure first portion **14a** of strap **14** to head **4** within first strap aperture **6** by moving first fastener **16** with respect to first fastener receiving area **10** so as to pass first fastener **16** through first portion **14a** of strap **14** or deform first portion **14a** of strap **14** with first fastener **16**.

[0053] Other sequence variations of securing fastening device **2** are also possible and within the

scope of the present application. For example, as noted above, the designation of a particular component or set of components as “first” or “second” is arbitrary, such that, in practice, a user could insert strap **14** into second strap aperture **8** first, even though that strap aperture is the “second” strap aperture. Moreover, the steps of the methods described herein are not limited to any particular order, other than strap **14** needing to be guided into a strap aperture (e.g., first strap aperture **6** or second strap aperture **8**) before strap **14** can be secured with respect to that particular strap aperture. In other words, a user of fastening device **2** could secure second fastener **18** to head **4** first, then secure first fastener **16** to head **4** second.

[0054] While the invention has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive. It will be understood that changes and modifications may be made by those of ordinary skill within the scope of the following claims. In particular, the present invention covers further embodiments with any combination of features from different embodiments described above and below. Additionally, statements made herein characterizing the invention refer to an embodiment of the invention and not necessarily all embodiments.

[0055] The terms used in the claims should be construed to have the broadest reasonable interpretation consistent with the foregoing description. For example, the use of the article “a” or “the” in introducing an element should not be interpreted as being exclusive of a plurality of elements. Likewise, the recitation of “or” should be interpreted as being inclusive, such that the recitation of “A or B” is not exclusive of “A and B,” unless it is clear from the context or the foregoing description that only one of A and B is intended. Further, the recitation of “at least one of A, B and C” should be interpreted as one or more of a group of elements consisting of A, B and C, and should not be interpreted as requiring at least one of each of the listed elements A, B and C, regardless of whether A, B and C are related as categories or otherwise. Moreover, the recitation of “A, B and/or C” or “at least one of A, B or C” should be interpreted as including any singular entity from the listed elements, e.g., A, any subset from the listed elements, e.g., A and B, or the entire list of elements A, B and C.

LIST OF REFERENCE NUMERALS

[0056] **2** fastening device [0057] **4** head [0058] **6** first strap aperture [0059] **8** second strap aperture [0060] **10** first fastener receiving area [0061] **12** second fastener receiving area [0062] **14, 14a, 14b** strap, first strap portion, second strap portion [0063] **16** first fastener [0064] **18** second fastener [0065] **20** object(s) [0066] **22** chain [0067] **24** top side of the head [0068] **26** bottom side of the head [0069] **28** first lateral side of the head [0070] **30** second lateral side of the head

Claims

1. A fastening device, comprising: a head having: a first strap aperture; a second strap aperture; a first fastener receiving area; and a second fastener receiving area, wherein the first strap aperture intersects the first fastener receiving area, and wherein the second strap aperture intersects the second fastener receiving area.
2. The fastening device of claim 1, wherein the first strap aperture and the second strap aperture each have a same shape, and wherein the first fastener receiving area and the second fastener receiving area each have a same shape.
3. The fastening device of claim 1, wherein the first strap aperture is perpendicular to and intersects the first fastener receiving area, and wherein the second strap aperture is perpendicular to and intersects the second fastener receiving area.
4. The fastening device of claim 1, wherein the head has a top side, a bottom side opposite the top side, a first lateral side, and a second lateral side opposite the first lateral side, wherein the first strap aperture and the second strap aperture extend between the first lateral side and the second lateral side, and wherein the first fastener receiving area and the second fastener receiving area

extend between the top side and the bottom side.

5. The fastening device of claim 1, further comprising: a strap insertable into the first strap aperture and the second strap aperture, the first strap aperture and the second strap aperture each having a shape that corresponds to a cross-section of the strap.

6. The fastening device of claim 1, further comprising: a first fastener disposed in the first fastener receiving area; and a second fastener disposed in the second fastener receiving area.

7. The fastening device of claim 6, wherein the first fastener is press fit with respect to the first fastener receiving area, and wherein the second fastener is press fit with respect to the second fastener receiving area.

8. The fastening device of claim 6, wherein the first fastener is not disposed within the first strap aperture, and wherein the second fastener is not disposed within the second strap aperture.

9. The fastening device of claim 1, wherein the first fastener receiving area and the second fastener receiving area are each open on at least one lateral side of the head.

10. The fastening device of claim 9, wherein the first fastener receiving area is open on a first lateral side of the head, and wherein the second fastener receiving area is open on a second lateral side of the head, the second lateral side being opposite the first lateral side.

11. A method of securing a fastening device, the fastening device including a strap, a first fastener, a second fastener, and a head having a first strap aperture, a second strap aperture, a first fastener receiving area, and a second fastener receiving area, the method comprising: guiding the strap through the first strap aperture; guiding the strap through the second strap aperture; securing a first portion of the strap to the head within the first strap aperture by moving the first fastener with respect to the first fastener receiving area so as to pass the first fastener through the first portion of the strap or deform the first portion of the strap with the first fastener; and securing a second portion of the strap to the head within the second strap aperture by moving the second fastener with respect to the second fastener receiving area so as to pass the second fastener through the second portion of the strap or deform the second portion of the strap with the second fastener.

12. The method of claim 11, further comprising: passing the strap around at least one object to be secured after guiding the strap through the first strap aperture and before guiding the strap through the second strap aperture.

13. The method of claim 12, further comprising: after passing the strap around the at least one object, tightening the strap around the at least one object.

14. The method of claim 11, wherein the first strap aperture and the second strap aperture each have a same shape, and wherein the first fastener receiving area and the second fastener receiving area each have a same shape.

15. The method of claim 11, wherein the first strap aperture is perpendicular to the first fastener receiving area, and wherein the second strap aperture is perpendicular to the second fastener receiving area.

16. The method of claim 11, wherein the head has a top side, a bottom side opposite the top side, a first lateral side, and a second lateral side opposite the first lateral side, wherein the first strap aperture and the second strap aperture extend between the first lateral side and the second lateral side, and wherein the first fastener receiving area and the second fastener receiving area extend between the top side and the bottom side.

17. The method of claim 11, wherein the first strap aperture and the second strap aperture each have a shape that corresponds to a cross-section of the strap.

18. The method of claim 11, wherein the first fastener receiving area and the second fastener receiving area are each open on at least one lateral side of the head.

19. The method of claim 18, wherein the first fastener receiving area is open on a first lateral side of the head, and wherein the second fastener receiving area is open on a second lateral side of the head, the second lateral side being opposite the first lateral side.

20. A method of securing a fastening device around at least one object, the fastening device

including a strap, a first fastener, a second fastener, and a head having a first strap aperture, a second strap aperture, a first fastener receiving area, and a second fastener receiving area, the method comprising: guiding the strap through the first strap aperture; guiding the strap around the at least one object; guiding the strap through the second strap aperture; securing a second portion of the strap to the head within the second strap aperture by moving the second fastener with respect to the second fastener receiving area so as to pass the second fastener through the second portion of the strap or deform the second portion of the strap with the second fastener; tightening the strap around the at least one object; and securing a first portion of the strap to the head within the first strap aperture by moving the first fastener with respect to the first fastener receiving area so as to pass the first fastener through the first portion of the strap or deform the first portion of the strap with the first fastener.
