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(71) Applicant: SPECTRUM BRANDS, INC. [US/US]; 3001
Deming Way, Middleton, WI 53562 (US).

(72) Inventor: ROMERO, Oscar; 25171 Vista Fusco, Lake
Forest, CA 92630 (US).

(74) Agent: BRUESS, Steven C.; Merchant & Gould P.C., P.O.
Box 2903, Minneapolis, MN 55402-0903 (US).

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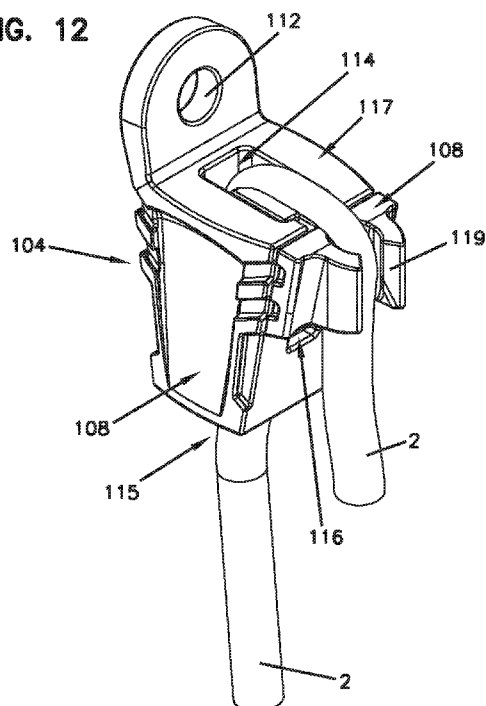
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(54) Title: ADJUSTABLE BUNGEE FASTENER

FIG. 12



(57) Abstract: The bungee fastener (4) has a tapered chute (14) that accepts a locking slider (6). A channel (16) forms an opening in a side of the body (8) thereby allowing passage of the slider (6) through the channel (16). A plurality of slider teeth (32) along a portion of the slider (6) within the tapered chute (14) may lock onto a bungee (2) when the slider (6) is slid into a locked position. The slider (6) moves along the channel (16), thereby selectively narrowing the tapered chute (14) with the slider teeth (32) as the slider (6) is slid into the locked position and enlarging the tapered chute (14) as the slider (6) is slid into the unlocked position. The bungee fastener (4,44) may include a single slider (6) or a plurality of sliders (46).

ADJUSTABLE BUNGEE FASTENER

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is being filed on 5 June 2018, as a PCT International patent
5 application, and claims priority, to the extent appropriate, to each of the following
applications: U.S. Provisional Patent Application No. 62/515,503, filed June 5,
2017, and U.S. Provisional Patent Application No. 62/576,608, filed October 24,
2017, the disclosures of each application hereby incorporated by reference in their
entirety.

10

TECHNICAL FIELD

The invention is related to the field of adjustable bungee fasteners which
allow a user to adjust the position of a bungee fastener on a cord.

15

BACKGROUND OF THE INVENTION

Ropes, straps, and cords are frequently used to secure cargo. With the
varying size of cargo and the varying location of securement points, the ropes,
straps, and cords need to be adjustable in length. In the past, this need was met by
either cutting the ropes, straps, and cords or simply tying them off.

20

With the advent of elastic cords, such as bungee cords, users have been able
to cover a variety of lengths and securement points with a single length of bungee
cord. The elasticity allows the user to stretch the cord length, which also adds to the
cord's cargo retention properties.

However, there still exists a need to further improve the bungee cord and
25 provide greater flexibility in the length and securement points. What is also needed
is a way to quickly and effortlessly adjust the bungee cord length. Finally, what is
needed is a way to infinitely adjust the securement point along the length of the
bungee cord without cutting or otherwise damaging the cord.

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SUMMARY AND OBJECT OF THE INVENTION

A bungee fastener is hereby disclosed. The bungee fastener includes a body
with a tapered chute passing through the body. A slider may slide within the body. A
clip extends from the slider by a neck. A channel forms an opening in a side of the

body, thereby allowing passage of the neck of the slider through the channel and placing the clip within the tapered chute. A plurality of slider teeth along the clip within the tapered chute may lock onto a bungee within the tapered chute when the slider is slid into a locked position.

5 The slider is accordingly configured to move along the channel, thereby selectively narrowing the tapered chute with the slider teeth as the slider is slid into the locked position. Similarly, the slider can move along the channel to selectively enlarge the tapered chute as the slider is slid into an unlocked position.

 A bungee may be placed into the tapered chute when the slider is in the
10 unlocked position. The bungee fastener may be freely moved along a length of the bungee while the slider is kept in the unlocked position. The bungee fastener can be locked onto the bungee when the slider is slid along the channel into the locked position, thereby narrowing the tapered chute and causing a pressure on the bungee by the slider teeth and the tapered chute against the bungee. The term bungee
15 includes both elastic and non-elastic rope, cords, and wires.

 In one example of the present disclosure, a bungee fastener is disclosed. The bungee fastener includes a body that has a top side and an opposite bottom side. The body defines a tapered chute that is configured to receive a cord. The bungee fastener includes a slider at least partially positioned within the tapered chute. The
20 slider is movable relative to the body within the tapered chute between the top side and bottom side of the body. The slider further includes a plurality of teeth positioned within the tapered chute.

 A variety of additional aspects will be set forth in the description that follows. The aspects can relate to individual features and to combinations of
25 features. It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the broad inventive concepts upon which the embodiments disclosed herein are based

30 BRIEF DESCRIPTION OF THE DRAWINGS

 The present disclosure will be described hereafter with reference to the attached drawings which are given as non-limiting examples only, in which:

 FIG. 1A shows a perspective view of a bungee fastener with a bungee cord in an unlocked position according to one embodiment of the present disclosure;

FIG. 1B shows a perspective view of the bungee fastener of FIG. 1A with a bungee cord in a locked position;

FIG. 2A shows a perspective view of the bungee fastener of FIG. 1A in a locked position with a hook attachment;

5 FIG. 2B shows a perspective view of the bungee fastener of FIG. 1A in an unlocked position with a carabiner attachment;

FIG. 3A shows a section view of the bungee fastener of FIG. 1A in an unlocked position;

10 FIG. 3B shows a section view of the bungee fastener of FIG. 1A in a locked position;

FIG. 4A shows a perspective view of a slider, removed from the bungee fastener of FIG. 1A;

FIG. 4B shows a side view of the slider, removed from the bungee fastener of FIG. 1A;

15 FIG. 4C shows a front view of the slider, removed from the bungee fastener of FIG. 1A;

FIG. 5A shows a perspective view of a body, removed from the bungee fastener of FIG. 1A;

20 FIG. 5B shows a side view of the body, removed from the bungee fastener of FIG. 1A;

FIG. 5C shows a front view of the body, removed from the bungee fastener of FIG. 1A;

FIG. 6A shows a perspective view of a bungee fastener according to another embodiment of the present disclosure in an unlocked position with a bungee cord;

25 FIG. 6B shows a perspective view of the bungee fastener of FIG. 6A in a locked position with a bungee cord;

FIG. 7A shows a perspective view of the bungee fastener of FIG. 6A in an unlocked position with a carabiner attachment;

30 FIG. 7B shows a perspective view of the bungee fastener of FIG. 6A in an unlocked position with a hook attachment;

FIG. 8A shows a perspective section view of the bungee fastener of FIG. 6A in an unlocked position;

FIG. 8B shows a perspective section view of the bungee fastener of FIG. 6A in a locked position;

FIG. 8C shows a side section view of the bungee fastener of FIG. 6A in an unlocked position;

FIG. 8D shows a side section view of the bungee fastener of FIG. 6A in a locked position;

5 FIG. 9A shows a perspective view of a slider, removed from the bungee fastener of FIG. 6A;

FIG. 9B shows a side view of the slider, removed from the bungee fastener of FIG. 6A;

10 FIG. 9C shows a front view of the slider, removed from the bungee fastener of FIG. 6A;

FIG. 10A shows a perspective view of a body, removed from the bungee fastener of FIG. 6A;

FIG. 10B shows a side view of the body, removed from the bungee fastener of FIG. 6A;

15 FIG. 10C shows a front view of the body, removed from the bungee fastener of FIG. 6A.

FIG. 11 shows a rear perspective view of a bungee fastener, according to one embodiment of the present disclosure, with a bungee cord in an unlocked position;

FIG. 12 shows a front perspective view of the bungee fastener of FIG. 11;

20 FIG. 13 shows a side view of the bungee fastener of FIG. 11;

FIG. 14 shows a schematic side cross-sectional view of the bungee fastener of FIG. 11, in the unlocked position;

FIG. 15 shows a schematic side cross-sectional view of the bungee fastener of FIG. 11, in the locked position;

25 FIG. 16 shows a schematic side cross-sectional view of the bungee fastener of FIG. 11, in the locked position and a bungee cord tail secured;

FIG. 17 shows a rear perspective view of the bungee fastener of FIG. 11, without a bungee cord;

30 FIG. 18 shows a front perspective view of the bungee fastener of FIG. 11, without a bungee cord;

FIG. 19A shows a perspective view of the bungee fastener of FIG. 11, without a bungee cord;

FIG. 19B shows a cutaway perspective view of the bungee fastener of FIG. 19A;

FIG. 20 shows a rear perspective view of a slider, according to one embodiment of the present disclosure;

FIG. 21 shows a front perspective view of the slider of FIG. 20;

FIG. 22 shows a side view of the slider of FIG. 20;

5 FIG. 23 shows a top view of the slider of FIG. 20;

FIG. 24 shows a bottom view of the slider of FIG. 20;

FIG. 25 shows a side view of the slider of FIG. 20; and

FIG. 26 shows another side view of the slider of FIG. 20.

In the drawings, some structural or method features may be shown in specific
10 arrangements and/or orderings. However, it should be appreciated that such specific
arrangements and/or orderings may not be required. Rather, in some embodiments,
such features may be arranged in a different manner and/or order than shown in the
illustrative figures. Additionally, the inclusion of a structural or method feature in a
particular figure is not meant to imply that such feature is required in all
15 embodiments and, in some embodiments, may not be included or may be combined
with other features.

Corresponding reference characters in the drawings indicate corresponding
parts throughout the several views. The exemplification set out herein illustrates
embodiments of the invention, and such exemplification is not to be construed as
20 limiting the scope of the invention in any manner.

DETAILED DESCRIPTION

FIGS. 1A and 1B show the bungee fastener 4 with a bungee 2 (i.e., cord)
passed through a tapered chute 14. The bungee fastener 4 is a two-piece design with
a body 8 and a slider 6. The slider may slide along a channel 16 in the body 8. The
25 channel 16 forms an opening in the side of the body 8 with a throat 18. The throat 18
is narrower than the channel 16 which prevents the slider 6 from coming out of the
channel 16.

In some examples, the bungee 2 can be of any type of cord. In some
examples, the bungee is an elastic bungee. In other examples, the bungee 2 is a rope.
30 The bungee fastener 4 allows the bungee 2 (i.e., cord) to be nonpermanently
shortened in a secure manner.

The slider 6 includes a neck 20 that fits within the channel 16 and is joined to
a clip 10. The clip 10 extends into the tapered chute 14 and applies pressure to the
bungee 2 as the slider 6 is slid down the channel 16. For example, FIG. 1A shows

the slider 6 in an unlocked position 22, which places the slider 6 proximate the throat 18 within the channel 16. When the slider 6 is in the unlocked position 22, the clip 10 may slightly contact the bungee 2, which allows the bungee 2 to be pulled through the tapered chute 14 and only requires slight adjustment of the slider 6 to lock the bungee fastener 4 into position. This allows the user to place the bungee fastener 4 anywhere along the length of the bungee 2, thereby allowing for an infinite amount of adjustability. Once the bungee fastener 4 is in the desired location along the bungee 2, the slider 6 can be slid down along the channel 16 and placed into a locked position 24 as is depicted in FIG. 1B. In the locked position 24, the clip 10 applies pressure to the bungee 2 thereby locking the bungee fastener 4 into position. The bungee fastener 4 may then be secured to a load or attachment point by using the appropriate fastener through an eyelet 12 in the body 8.

For example, FIGS. 2A and 2B show a hook attachment 26 and a carabiner attachment 28 inserted through the eyelet 12. Any other attachment may be used as well, including a screw, nail, S-hook, or the like. When using a hook attachment 26, a hook 23 may be passed through the eyelet 12. When using a carabiner attachment 28, a clasp 30 may be opened and inserted through the eyelet 12.

The tapered chute 14 works in conjunction with the clip 10 of the slider 6 as best shown in FIGS. 3A and 3B. The clip 10 includes slider teeth 32 that form a serrated edge along the length of the clip 10. The slider teeth 32 are formed with the serrations pointing upwards, toward a top side 33 of the tapered chute 14, thereby gripping the bungee as it is pulled into the tapered chute 14. The tapered chute 14 may also include tapered chute teeth 34 that assist in locking the bungee fastener 4 into position on the bungee. Also, the tapered chute 14 is tapered in width as the chute 14 extends from the top side 33 to a bottom side 35, which allows the slider teeth 32 to close off the opening as the slider 6 is slid down the channel 16. As shown in FIG. 3B, the slider 6 is in the locked position 24, which makes the width tapered chute 14 significantly smaller. When in the unlocked position 22, as shown in FIG. 3A, the bungee can pass through the body 8 within the tapered chute 14, with minimal interference from the tapered chute teeth 34. Specifically, the tapered chute 14 has a width $W1$ between the teeth 32 and the chute 14. Such a width $W1$ is equal to or greater than a width of the bungee 2. Once the bungee fastener 4 is in the desired location along the bungee, the slider 6 is moved into the locked position 24, which causes the tapered chute teeth 34 and the slider teeth 32 to exert pressure on

opposing sides of the bungee thereby locking the bungee fastener 4 into position. When in the locked position, the chute 14 has a width W2 between the teeth and the chute 14. In some examples, the width W2 is less than or equal to the width of the bungee 2. In some examples, the width W1 is greater than the width W2. In order to
5 release the bungee, the slider 6 may be slid back to the unlocked position and the bungee fastener 4 is free to slide along the bungee.

FIGS. 4A, 4B, and 4C each show different views of the slider 6. The neck 20 is shown with a stop 38. The stop 38 contacts the throat 18 of the channel 16 in the body 8 of the bungee fastener 4 (see FIGS. 3A and 3B for example). The stop 38
10 therefore prevents the slider 6 from coming out of the channel 16. The slider teeth 32 are shown as serrations, but any other geometry may be used. The slider teeth 32 are formed along the clip 10 with a tapered clip angle 36. The tapered clip angle allows some deflection of the clip 10 about the neck 20. As the slider 6 is slid down the channel 16 (see FIGS. 3A and 3B), the tapered clip angle 36 allows the slider
15 teeth to better dig into the bungee 2 and positively lock the bungee fastener 4 into position.

FIGS. 5A, 5B, and 5C show various views of the body 8 of the bungee fastener 4. A tapered chute angle 40 is shown in FIG. 5B and represents how the tapered chute 14 forms a taper that works in conjunction with the clip 10 on the
20 slider 6 to pinch the bungee 2. Also best shown in FIG. 5C is the throat 18 which extends into the channel 16. As previously discussed, the throat 18 contacts the stop 38 (best shown in FIG. 4A) to prevent the slider 6 from being removed from the channel 16.

An alternate embodiment of a bungee fastener 44 is shown in FIGS. 6A and
25 6B. FIG. 6A shows sliders 46 in an unlocked position 62, while FIG. 6B shows the sliders 46 in a locked position 64. This alternate bungee fastener 44 includes dual sliders 46 on opposing sides of a tapered chute 54. This design provides two clips 50 within the tapered chute 54. A body 48 of the bungee fastener 44 includes the tapered chute 54 that is symmetrically formed with dual, matching tapers that allow
30 each slider 46 to move within a channel 56. Just like the previously disclosed embodiment, the slider 46 includes a neck 60 that slides within the channel 56. A throat 58 also extends away from the tapered chute 54 and contacts the sliders 46 directly, thereby preventing them from exiting the channel 56.

FIGS. 7A and 7B show the bungee fastener 44 with a carabiner attachment 68 and a hook attachment 66, respectively. A clasp 70 of the carabiner attachment 68 may be opened to allow passage through the eyelet 52 of the bungee fastener 44. Similarly, a hook 63 of the hook attachment 66 may be passed through an eyelet 52 of the bungee fastener 44. Either attachment allows the bungee fastener 44 to be affixed to a securement point.

FIGS. 8A, 8B, 8C, and 8D each show a sectional view of the bungee fastener 44 where the section is made along each channel 56. In FIGS. 8A and 8C, the sliders 46 are shown in the unlocked position 62. A tapered chute angle 80 follows the profile of the tapered chute 54 and assists to draw slider teeth 72 closer together as the sliders 46 are drawn down the channel 56. For example, FIG. 8C shows a side view of the bungee fastener 44 with the sliders 46 in the unlocked position 62 and the slider teeth 72 have ample room between them, thereby allowing a bungee 2 to freely pass through the tapered chute 54. While in this position, the bungee 2 may be slid through the bungee fastener 44 may be placed in the desired location along the bungee 2. Once in the desired location, the sliders 46 may be slid down the channel 56 and placed into the locked position 64. As shown in FIG. 8D, the distance between the slider teeth 72 is significantly smaller than shown in FIG. 8C. This is due to the tapered chute angle 80 urging the slider teeth 72 together. Also, the sliders 46 each include arm extensions 82. Each arm extension 82 from each respective slider 46 meshes with the arm extension 82 from the opposing slider 46 within the same tapered chute 54. The meshing of the arm extensions 82 help interlock the movement of the sliders 46 such that they move in tandem as the opposing slider is moved along the respective channel 56.

The arm extensions 82 are better shown in FIGS. 9A, 9B, and 9C where a single slider 46 is shown. FIG. 9C shows how the arm extensions 82 alternate on the sides of the slider teeth 72. An opposing slider 46 would essentially be a mirrored image allowing an arm extension 82 from the opposing slider 46 to fill the gaps on the sides of the slider teeth 72. These sliders 46 do not include a stop on the clip 50. Instead, this alternate embodiment includes the throat 58 on the channel that contacts the sliders 46, as best shown in FIG. 6B, thereby preventing removal of the sliders 46 when sliding them within the channel 56. The sliders 46 also have tapered clip angles 76 which allows the sliders 46 to ride within the tapered chute angle 80 of the tapered chute 54, as best shown in FIGS. 8C and 8D.

FIGS. 10A, 10B, and 10D show perspective, side, and front views of the body 48 of the alternate bungee fastener 44. As previously noted, the channel 56, throat 58, tapered chute 54, and tapered chute angle 80 for each half of the body 48 is a mirrored image on the opposing side of the body 48. This produces a
5 symmetrically shaped body 48, thereby allowing symmetrically shaped sliders 46 to be used as shown in FIGS. 9A, 9B, and 9C.

FIGS. 11-12 show a bungee fastener 104 with a bungee 2 passed through a tapered chute 114. The bungee fastener 104 is substantially similar to the bungee fastener 4 described above.

10 Like the bungee fastener 4, the bungee fastener 104 is a two-piece design with a body 108 and a slider 106 slidably disposed within a channel 116 in the body 108. The channel 116 includes a throat 118 that is narrower than the channel 116, which prevents the slider 106 from inadvertently being removed from the channel 116. The bungee fastener 104 also includes an eyelet 112 that can be used to attach
15 the bungee fastener 104 to a surface using a fastener (not shown) (e.g., a carabineer, hook, etc.).

As shown, the bungee 2 enters the chute 114 at a bottom side 115 and exits the chute 114 at a top side 117. At the top side 117, the bungee 2 is routed and secured the slider 106 via a fastener 119. In some examples, the fastener is a clip.

20 FIG. 13 shows a side view of the bungee fastener 104 in an unlocked position. Like the bungee fastener 4 described above, as the slider 106 is moved toward the bottom side 115 of the body 108 (as indicated by arrows), the slider 106 engages the bungee 2 within the chute 114 of the body 108 to prevent relative movement between the bungee fastener 104 and the bungee 2. Once the bungee 2 is
25 secured within the chute 114, the bungee fastener 104 is in a locked position.

FIGS. 14-16 show the position of the bungee 2 within the bungee fastener 104 when moving from an unlocked positioned (FIG. 14) to a locked positioned (FIGS. 15-16). Like the slider 6 described above, the slider 106 includes a plurality of teeth 132 on a wedge-shaped clip 110. The teeth 132 are configured to engage
30 with the bungee 2 within the chute 114 to lock the bungee fastener 104 to the bungee 2.

The chute 114 of the body 108 is shown to have a generally tapered construction. The chute includes a rear wall 120 and a front wall 122, oppositely positioned to one another within the chute 114. The front wall 122 includes the

channel 116 disposed therein. As such, the slider 106, specifically the clip 110, is configured to slide along the front wall 122 of the chute 114 during operation between the unlocked position and the locked position. The rear wall 120 of the chute 114 has a construction that guides the bungee 2 against the teeth 132 of the slider 106. In some examples, the rear wall 120 has a wall construction that is not straight. In some examples, the rear wall 120 is has a meandering wall construction from the bottom side 115 of the body 108 to the top side 117 of the body 108. In some examples, the rear wall 120 has a first portion 124 that slopes in a direction toward the front wall 122 as the first portion 124 extends from the bottom side 115 of the body 108 toward the top side 117 of the body 108. The first portion 124 guides the bungee 2 toward the teeth 132 of the slider 106. In some examples, the rear wall 120 can include a second portion 126 that is sloped differently from the first portion 124. In some examples, the first and second portions 124, 126 have opposite slopes.

Due to the tapered construction of the chute 114 and the wedge shape of the clip 110, the portion of the chute 114 in which the bungee 2 is positioned changes width when the slider 106 is moved between the unlocked to the locked position. When in the unlocked position, as shown in FIG. 14, the chute 114 has a width W3 between the rear wall 120 and the closest tooth 132 of the slider 106. When in the locked position, as shown in FIGS. 15 and 16, the chute 114 has a width W4 between the closest tooth 132 and the rear wall 120. In some examples, width W4 is less than width W3.

As shown in FIG. 16, once positioned in the locked position, the bungee 2 can then optionally be secured to the slider 106 via the fastener 119 disposed on the slider 106. In some examples, the fastener 119 retains the bungee 2 in an orientation so that the portion of the bungee 2 that is not positioned within the chute 114 is positioned generally parallel to the portion of the bungee 2 that is disposed within the chute 114. Such positioning causes generally a 180 degree bend in the bungee 2 adjacent the top side 117 of the body 108 that offers a set of advantages. In one example, such positioning of the bungee 2 within the fastener 119 urges engagement between the teeth 132 and the bungee 2. In another example, when secured in the fastener 119, the bungee 2 is less likely to become dislodged from the locked position, thereby increasing the clamping power of the bungee fastener 104. In other

examples still, the fastener 119 offers the user a way to store a tail 3 of the bungee 2 to prevent unwanted movement (i.e., dangling) of the tail 3.

FIGS. 17 and 18 show perspective views of the bungee fastener 104 without a bungee 2 positioned therein.

5 As shown, the slider 106 is positioned in the unlocked position within the body 108, specifically within the channel 116. The clip 110 of the slider 106 is connected with a main body 107 of the slider 106 via a neck 128. Similar to the slider 6 above, the neck 128 is configured to be slidably positioned within the channel 116 of the body 108.

10 The main body 107 of the slider 106 includes the fastener 119 disposed thereon. In some examples, the main body 107 includes a pair of arms 130 that extend away from an outer face 131 of the main body. In some examples, the arms 130 provide a grasping location for the user to interact with the slider 106 to allow the user to move the slider 106 between the locked position and the unlocked
15 position. In some examples, the arms 130 form at least a partial aperture 133. In such an example, the arms 130 and the aperture 133 together form the fastener 119. In some examples, the partial aperture 133 is configured to receive the bungee 2.

FIG. 19 shows a partial cutaway view of the bungee fastener 104. Specifically, FIG. 19 shows a blown up view of the teeth 132 of the slider 106. In
20 the depicted example, at least some of the teeth 132 have a generally curved construction. Each tooth 132 includes a tooth edge 134, a top surface 136, and a bottom surface 138. The top and bottom surfaces 136, 138 of each tooth 132 extend away from the clip 110 and intersect to form the tooth edges 134a, 134b, 134c, 134d. In some examples, the tooth edges 134 can be smooth edges. In other examples, the
25 tooth edges 134 can be serrated edges. In some examples, only a single tooth edge 134 can have a serrated or smooth edge. In some examples, the tooth edges 134 and top and bottom surfaces 136, 138 of each tooth 132 have a concave curved construction. In some examples, the tooth edges 134 can have a variety of different shapes and constructions. In some examples, the tooth edges 134 all have the same
30 tooth construction. In other examples, at least one of the tooth edges 134 has a different construction than the other tooth edges 134. In the depicted example, the lowermost tooth edge 134a, which is positioned within the chute 114 closest to the bottom side 117 of the body 108, includes a generally straight tooth edge 134a, while the other tooth edges 134b, 134c, 134d are generally curved.

FIGS. 20-21 show perspective views of the slider 106. FIG. 22 shows a side view of the slider 106. In the depicted embodiment, the clip 110 is shown to have a wedge shape. In some examples, the clip has a front wall surface 140 that is configured to mate with the front wall 122 of the chute 114. The front wall surface 140 defines a reference plane Z. The furthestmost edges of the teeth 132 from the front wall surface 140 define a reference plane Y. The reference plane Z and the reference plane Y intersect at an angle θ . Angle θ defines the wedge shape of the clip 110. In some examples, angle θ is between about 5 degrees and about 60 degrees. In other examples, angle θ is between about 15 degrees and 30 degrees.

FIG. 23 shows a top view of the slider 106. As shown, the tooth edge 134d has a radius R. In some examples, the tooth edges 134b and 134c can have the same radius R. Radius R can be of any of a wide range of radii. In some examples, the radius R is substantially similar to a radius of the bungee 2 that is to be positioned within the chute 114. In such an example, the majority of tooth edges 134 are configured to contact the bungee 2 when in the locked position, thereby increasing the clamping ability of the teeth 132.

The aperture 133 of the fastener 119 is also shown in FIG. 23. In some examples, the arms 130 form an opening 135 therebetween to allow access into the aperture 133. In some examples, the opening 135 is of a size that allows the passage of the bungee 2 into the aperture, but also of a size so that the aperture 133 retains the bungee 2 once positioned there.

FIG. 24 shows a bottom view of the slider 106. The lowermost tooth edge 134a is shown to be substantially straight while the tooth edges 134b, 134c, and 134c are shown to be substantially curved.

FIG. 25 shows a front view of the slider 106, and FIG. 26 shows a rear view of the slider 106. As shown, each tooth edge 134 is generally aligned and stacked atop adjacent tooth edges 134. In some examples, the tooth edges 134 can be misaligned.

Examples

Illustrative examples of the bungee fastener disclosed herein are provided below. An example of the bungee fastener may include any one or more, and any combination of, the examples described below.

Example 1. In combination with, or independent thereof, any example disclosed herein, a bungee fastener includes a body with a tapered chute passing through the body. The bungee fastener includes a slider that is configured for sliding engagement with the body. The bungee fastener includes a clip extending from the slider by a neck. The bungee fastener includes a channel that forms an opening in a side of the body, thereby allowing passage of the neck of the slider through the channel and placing the clip within the tapered chute. The bungee fastener includes a plurality of slider teeth along the clip within the tapered chute. The slider may be slid along the channel thereby selectively enlarging and narrowing the tapered chute with the slider teeth and clip as the slider is slid.

Example 2. In combination with, or independent thereof, any example disclosed herein, a bungee is accepted by the tapered chute when the slider is in an unlocked position, and the bungee fastener is freely moved along a length of the bungee while the slider is kept in the unlocked position.

Example 3. In combination with, or independent thereof, any example disclosed herein, the bungee fastener is locked onto the bungee when the slider is slid along the channel into a locked position, thereby narrowing the tapered chute and causing a pressure on the bungee by the slider teeth and the tapered chute against the bungee.

Example 4. In combination with, or independent thereof, any example disclosed herein, the bungee fastener is unlocked from the bungee when the slider is moved back to the unlocked position, thereby enlarging the tapered chute and releasing the pressure on the bungee from the slider teeth and the tapered chute.

Example 5. In combination with, or independent thereof, any example disclosed herein, the bungee includes both elastic and non-elastic rope, cords, and wires.

Example 6. In combination with, or independent thereof, any example disclosed herein, a bungee fastener includes a body with a tapered chute passing through the body. The bungee fastener includes a first slider that is configured for sliding engagement with the body within the tapered chute. The bungee fastener includes a first clip that extends from the first slider by a first neck into the tapered chute. The bungee fastener includes a first channel that forms a first opening in a side of the body, thereby allowing passage of the first neck of the first slider through the first channel and placing the first clip within the tapered chute. The bungee

fastener includes a plurality of slider teeth along the first clip within the tapered chute. The first slider may be slid along the channel, thereby selectively enlarging and narrowing the tapered chute with the first slider teeth and first clip as the first slider is slid.

5 Example 7. In combination with, or independent thereof, any example disclosed herein, the bungee fastener includes a second slider that is configured for sliding engagement with the body, opposite the first slider, within the tapered chute. The bungee fastener includes a second clip that extends from the second slider by a second neck into the tapered chute. The bungee fastener includes a second channel
10 that forms a second opening in a second side of the body, thereby allowing passage of the second neck of the second slider through the second channel and placing the second clip within the tapered chute. The bungee fastener includes a plurality of slider teeth along the second clip within the tapered chute. The first slider and the second slider engage one another within the tapered chute with arm extensions, and
15 each one of the first and second sliders may be slid along their respective channels, thereby selectively enlarging and narrowing the tapered chute with the first and second slider teeth.

 Example 8. In combination with, or independent thereof, any example disclosed herein, a bungee is accepted by the tapered chute when the first and second
20 sliders are in an unlocked position, and the bungee fastener is freely moved along a length of the bungee while the first and second sliders are kept in the unlocked position.

 Example 9. In combination with, or independent thereof, any example disclosed herein, the bungee fastener is locked onto the bungee when the first and
25 second sliders are slid along their respective first and second channels into a locked position, thereby narrowing the tapered chute and causing a pressure on the bungee by the slider teeth from each respective slider.

 Example 10. In combination with, or independent thereof, any example disclosed herein, the bungee fastener is unlocked from the bungee when the first and
30 second sliders are moved back to the unlocked position, thereby enlarging the tapered chute and releasing the pressure on the bungee from the slider teeth.

 Example 11. In combination with, or independent thereof, any example disclosed herein, the bungee includes both elastic and non-elastic rope, cords, and wires.

Example 12. In combination with, or independent thereof, any example disclosed herein, the arm extensions interlock the first and second sliders such that movement of the first slider along the first channel urges the second slider to likewise move along the second channel.

5 Example 13. In combination with, or independent thereof, any example disclosed herein, a bungee fastener includes a body that has a top side and an opposite bottom side, the body defining a tapered chute that is configured to receive a cord. The bungee fastener includes a slider at least partially positioned within the tapered chute. The slider is movable relative to the body within the tapered chute
10 between the top side and bottom side of the body. The slider includes a plurality of teeth positioned within the tapered chute.

 Example 14. In combination with, or independent thereof, any example disclosed herein, the slider includes a clip body and a main body. The clip body extends from the main body by way of a neck, and the clip body is positioned within
15 the tapered chute.

 Example 15. In combination with, or independent thereof, any example disclosed herein, the slider is at least partially positioned within a channel defined by the body in a wall of the tapered chute. The channel is sized and shaped to receive the neck of the slider.

20 Example 16. In combination with, or independent thereof, any example disclosed herein, the plurality of teeth are disposed on the clip body, and when the slider is moved relative to the body, a width of the tapered chute is selectively enlarged or narrowed by way of the teeth.

 Example 17. In combination with, or independent thereof, any example
25 disclosed herein, at least one of the plurality of teeth has a generally curved construction, and the at least one of the plurality of teeth has a radius.

 Example 18. In combination with, or independent thereof, any example disclosed herein, at least one of the plurality of teeth has a generally straight construction, and the at least one of the plurality of teeth has a radius.

30 Example 19. In combination with, or independent thereof, any example disclosed herein, the tapered chute has a front wall and a rear wall. The front wall is configured to contact the slider.

 Example 20. In combination with, or independent thereof, any example disclosed herein, the rear wall has at least one portion that is sloped toward the front

wall as the portion extends from the bottom side of the body toward the top side of the body.

Example 21. In combination with, or independent thereof, any example disclosed herein, the slider includes a fastener positioned outside of the tapered chute. The bungee fastener is configured to receive and secure a portion of a cord.

Example 22. In combination with, or independent thereof, any example disclosed herein, the slider includes a pair of arms that define a partial aperture. The aperture is sized and shaped to receive a portion of a cord.

The various embodiments described above are provided by way of illustration only and should not be construed to limit the claims attached hereto. Those skilled in the art will readily recognize various modifications and changes that may be made without following the example embodiments and applications illustrated and described herein, and without departing from the true spirit and scope of the following claims.

15

CLAIMS

WHAT IS CLAIMED IS:

- 5 1. A bungee fastener comprising:
 a body with a tapered chute passing through the body;
 a slider configured for sliding engagement with the body;
 a clip extending from the slider by a neck;
 a channel forming an opening in a side of the body, thereby allowing passage
10 of the neck of the slider through the channel and placing the clip within the tapered
 chute; and
 a plurality of slider teeth along the clip within the tapered chute;
 wherein the slider may be slid along the channel thereby selectively
 enlarging and narrowing the tapered chute with the slider teeth and clip as the slider
15 is slid.
2. The bungee fastener according to claim 1, wherein a bungee is accepted by
 the tapered chute when the slider is in an unlocked position, and the bungee fastener
 is freely moved along a length of the bungee while the slider is kept in the unlocked
20 position.
3. The bungee fastener according to claim 2, wherein the bungee fastener is
 locked onto the bungee when the slider is slid along the channel into a locked
 position, thereby narrowing the tapered chute and causing a pressure on the bungee
25 by the slider teeth and the tapered chute against the bungee.
4. The bungee fastener according to claim 3, wherein the bungee fastener is
 unlocked from the bungee when the slider is moved back to the unlocked position,
 thereby enlarging the tapered chute and releasing the pressure on the bungee from
30 the slider teeth and the tapered chute.
5. The bungee fastener according to claim 2, wherein the bungee includes both
 elastic and non-elastic rope, cords, and wires.
- 35 6. A bungee fastener comprising:

a body with a tapered chute passing through the body;
a first slider configured for sliding engagement with the body within the tapered chute;
a first clip extending from the first slider by a first neck into the tapered chute;
5 a first channel forming a first opening in a side of the body, thereby allowing passage of the first neck of the first slider through the first channel and placing the first clip within the tapered chute; and
a plurality of slider teeth along the first clip within the tapered chute;
10 wherein the first slider may be slid along the channel, thereby selectively enlarging and narrowing the tapered chute with the first slider teeth and first clip as the first slider is slid.

7. The bungee fastener according to claim 6, further comprising:
15 a second slider configured for sliding engagement with the body, opposite the first slider, within the tapered chute;
a second clip extending from the second slider by a second neck into the tapered chute;
a second channel forming a second opening in a second side of the body,
20 thereby allowing passage of the second neck of the second slider through the second channel and placing the second clip within the tapered chute; and
a plurality of slider teeth along the second clip within the tapered chute;
wherein the first slider and the second slider engage one another within the tapered chute with arm extensions, and wherein each one of the first and second
25 sliders may be slid along their respective channels, thereby selectively enlarging and narrowing the tapered chute with the first and second slider teeth.

8. The bungee fastener according to claim 7, wherein a bungee is accepted by the tapered chute when the first and second sliders are in an unlocked position, and
30 the bungee fastener is freely moved along a length of the bungee while the first and second sliders are kept in the unlocked position.

9. The bungee fastener according to claim 8, wherein the bungee fastener is locked onto the bungee when the first and second sliders are slid along their

respective first and second channels into a locked position, thereby narrowing the tapered chute and causing a pressure on the bungee by the slider teeth from each respective slider.

5

10. The bungee fastener according to claim 9, wherein the bungee fastener is unlocked from the bungee when the first and second sliders are moved back to the unlocked position, thereby enlarging the tapered chute and releasing the pressure on the bungee from the slider teeth.

10

11. The bungee fastener according to claim 8, wherein the bungee includes both elastic and non-elastic rope, cords, and wires.

12. The bungee fastener according to claim 7, wherein the arm extensions
15 interlock the first and second sliders such that movement of the first slider along the first channel urges the second slider to likewise move along the second channel.

13. A bungee fastener comprising:
a body having a top side and an opposite bottom side, the body defining a
20 tapered chute that is configured to receive a cord; and
a slider at least partially positioned within the tapered chute, the slider being movable relative to the body within the tapered chute between the top side and bottom side of the body, the slider further including a plurality of teeth positioned within the tapered chute.

25

14. The bungee fastener of claim 13, wherein the slider includes a clip body and a main body, wherein the clip body extends from the main body by way of a neck, and wherein the clip body is positioned within the tapered chute.

30 15. The bungee fastener of claim 14, wherein the slider is at least partially positioned within a channel defined by the body in a wall of the tapered chute, the channel being sized and shaped to receive the neck of the slider.

16. The bungee fastener of claim 13, wherein the plurality of teeth are disposed on the clip body, and wherein, when the slider is moved relative to the body, a width of the tapered chute is selectively enlarged or narrowed by way of the teeth.

5 17. The bungee fastener of claim 13, wherein at least one of the plurality of teeth has a generally curved construction, and wherein the at least one of the plurality of teeth has a radius.

18. The bungee fastener of claim 13, wherein at least one of the plurality of teeth
10 has a generally straight construction, and wherein the at least one of the plurality of teeth has a radius.

19. The bungee fastener of claim 13, wherein the tapered chute has a front wall and a rear wall, the front wall being configured to contact the slider.

15

20. The bungee fastener of claim 19, wherein the rear wall has at least one portion that is sloped toward the front wall as the portion extends from the bottom side of the body toward the top side of the body.

20 21. The bungee fastener of claim 13, wherein the slider includes a fastener positioned outside of the tapered chute, wherein the bungee fastener is configured to receive and secure a portion of a cord.

22. The bungee fastener of claim 21, wherein the slider includes a pair of arms
25 that define a partial aperture, wherein the aperture is sized and shaped to receive a portion of a cord.

30

FIG. 1B

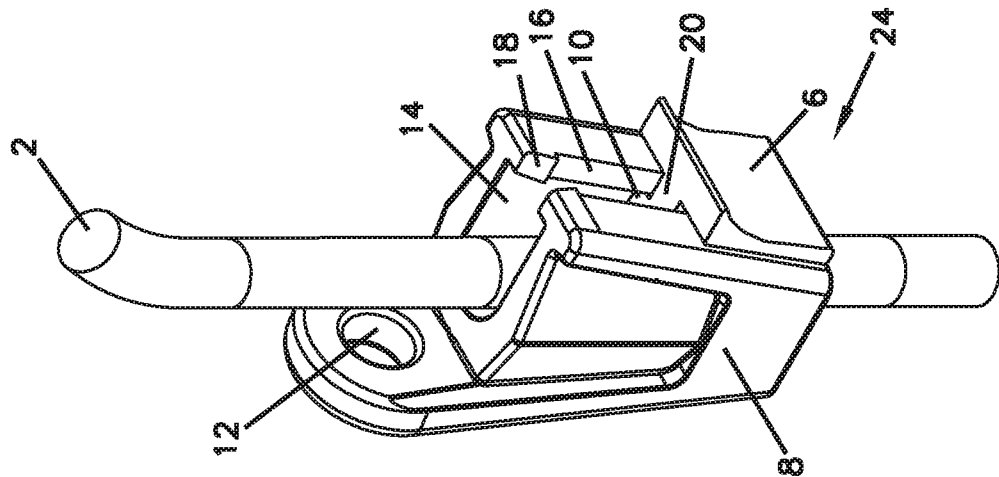


FIG. 1A

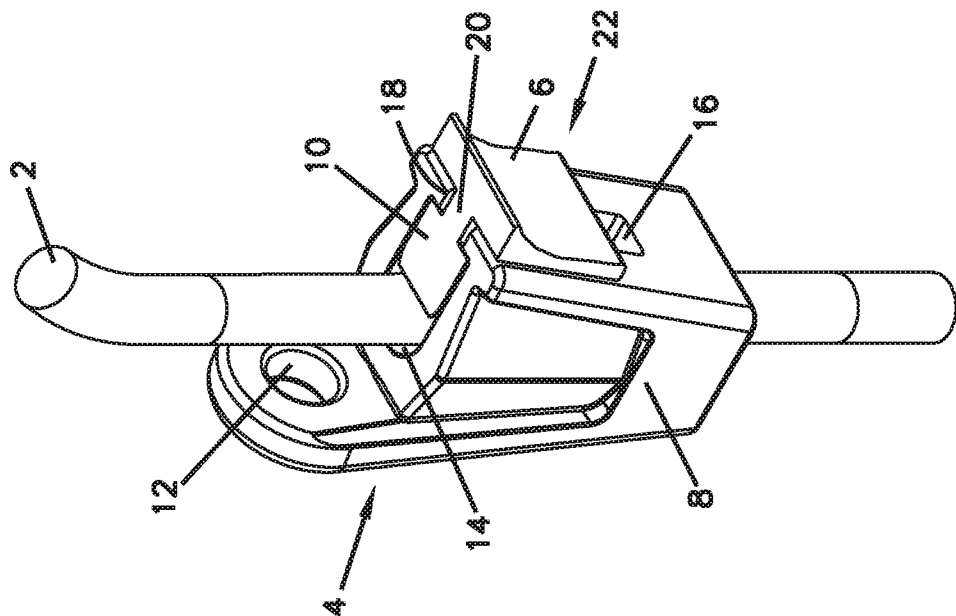


FIG. 2B

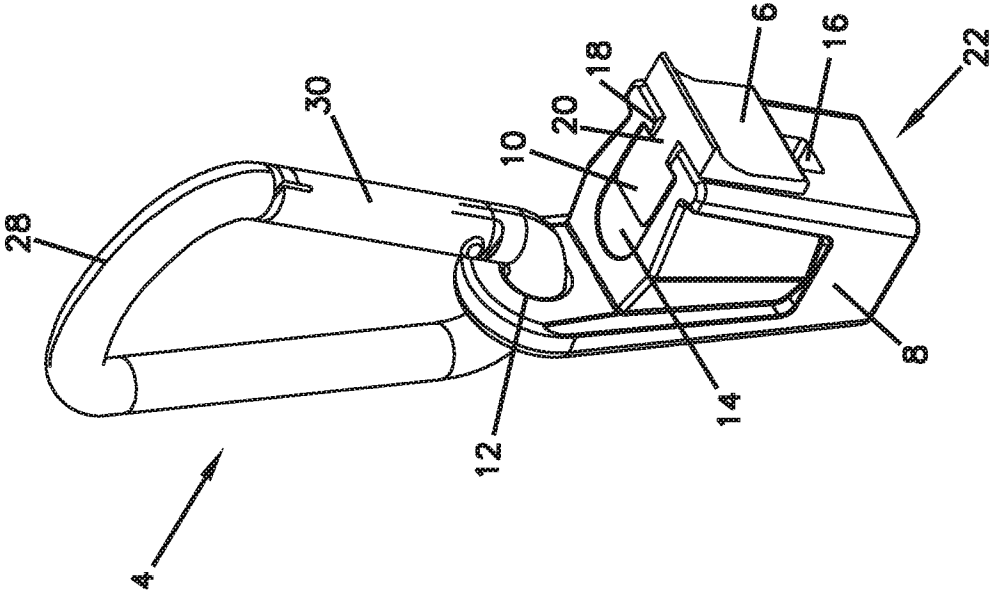
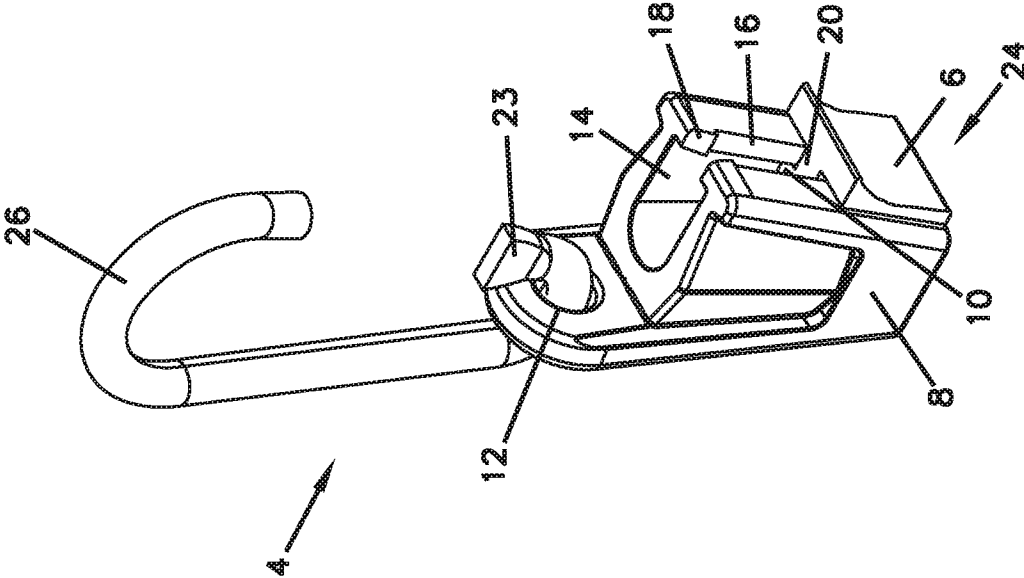
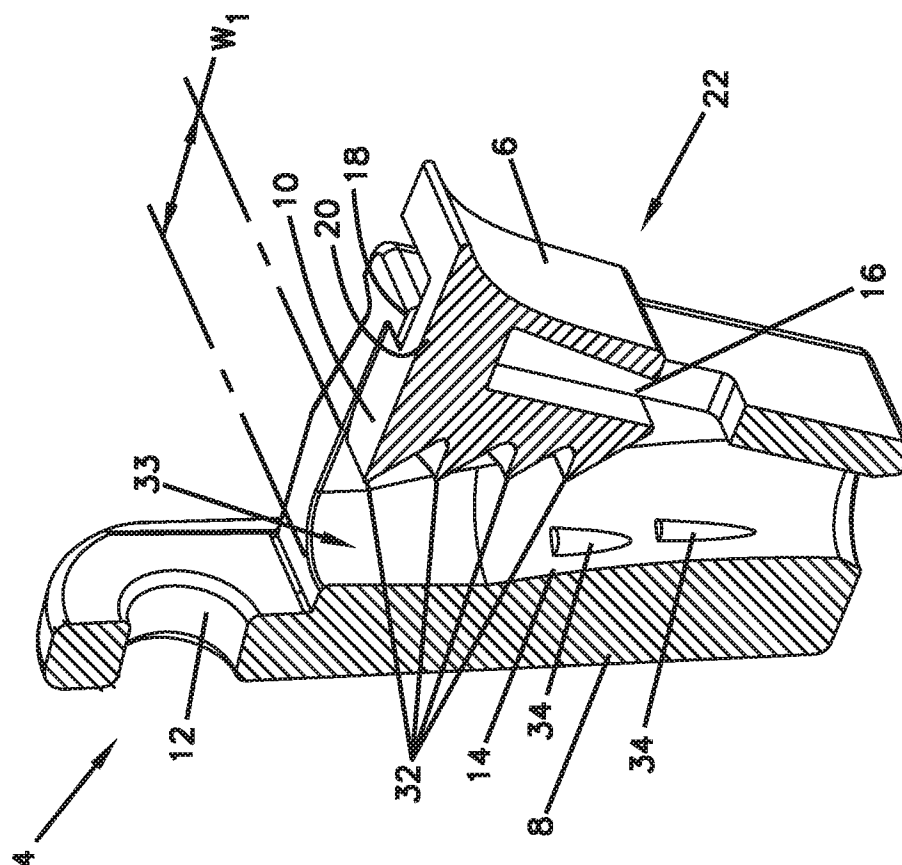


FIG. 2A



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மேல்

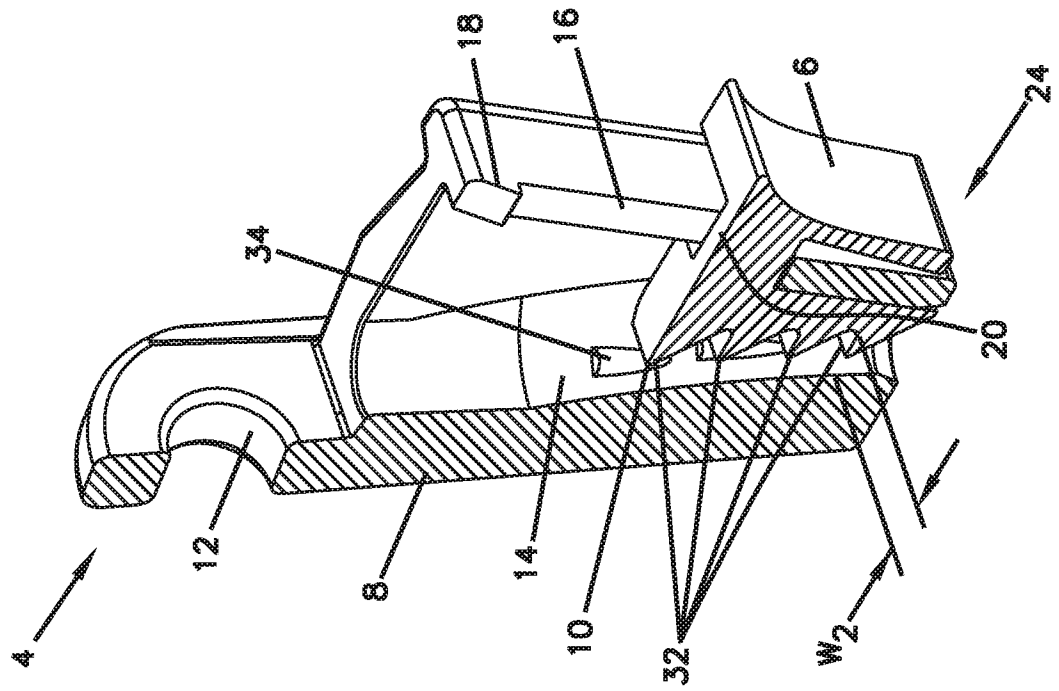


FIG. 4C

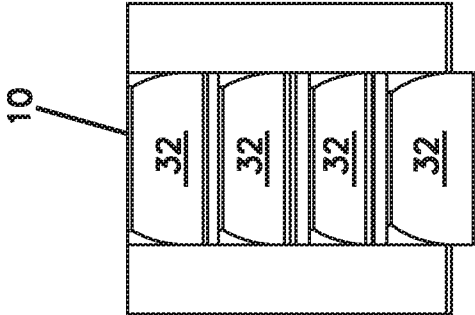


FIG. 4B

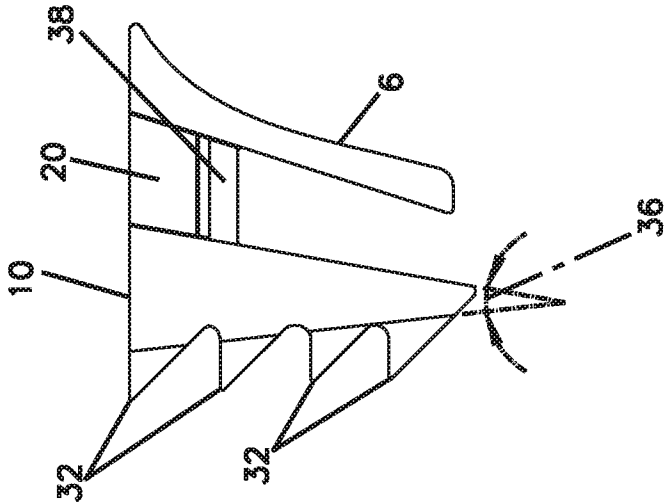


FIG. 4A

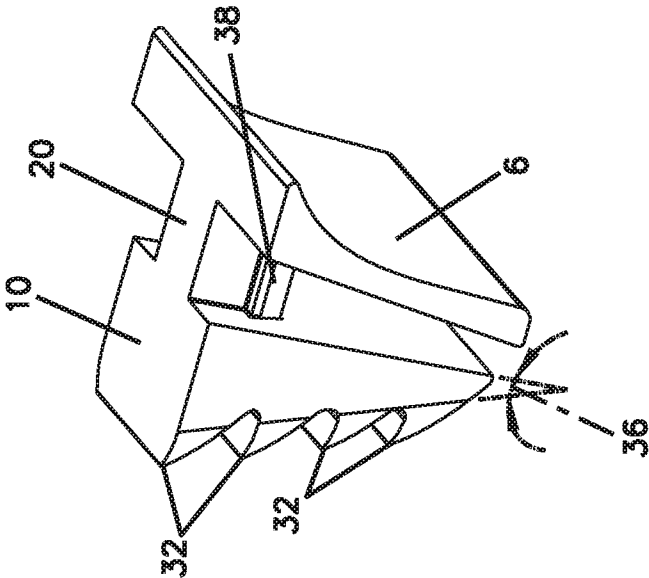


FIG. 5C

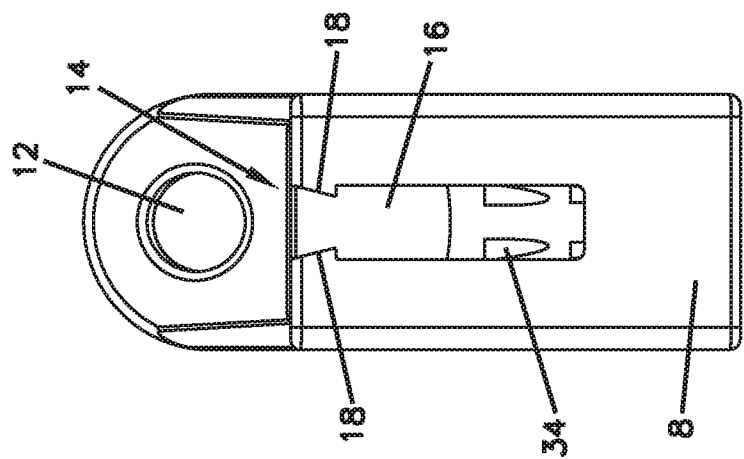


FIG. 5B

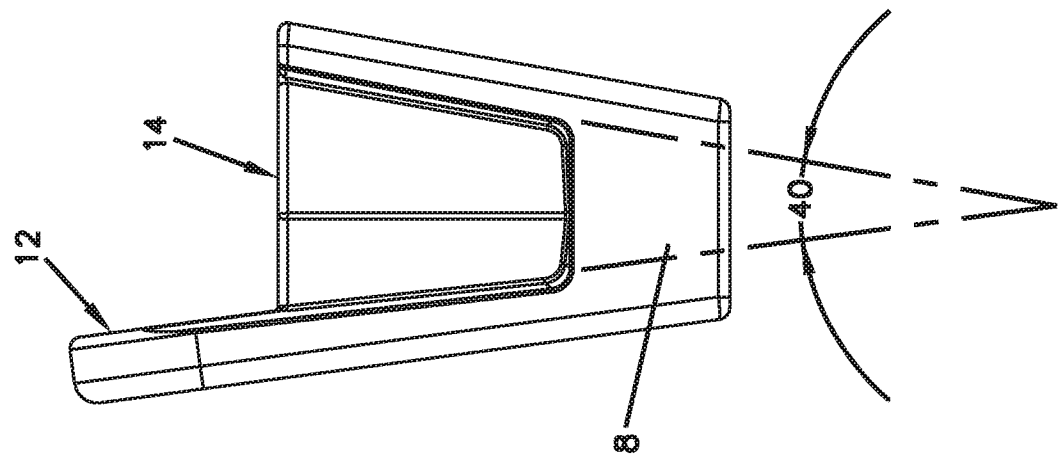


FIG. 5A

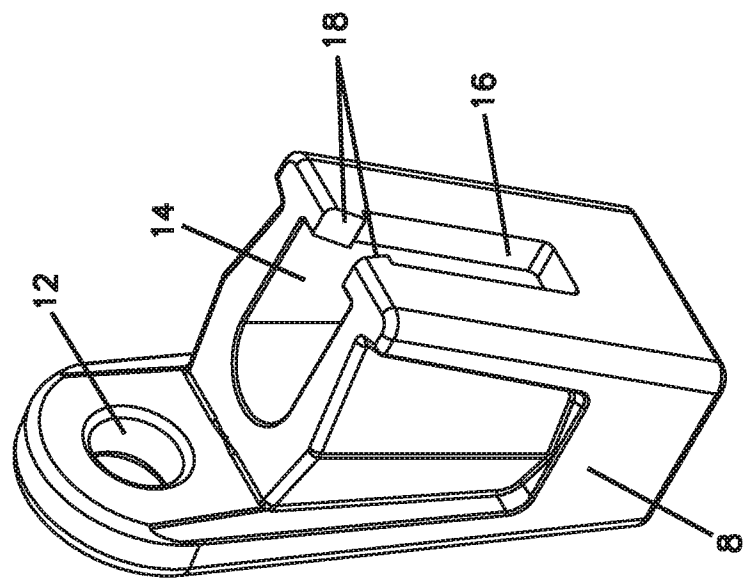


FIG. 6B

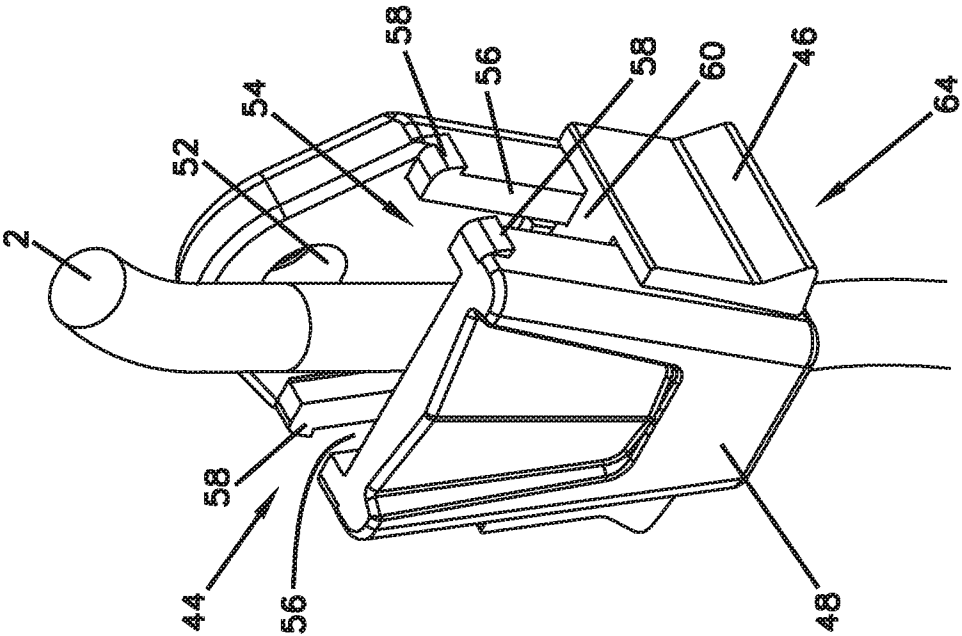
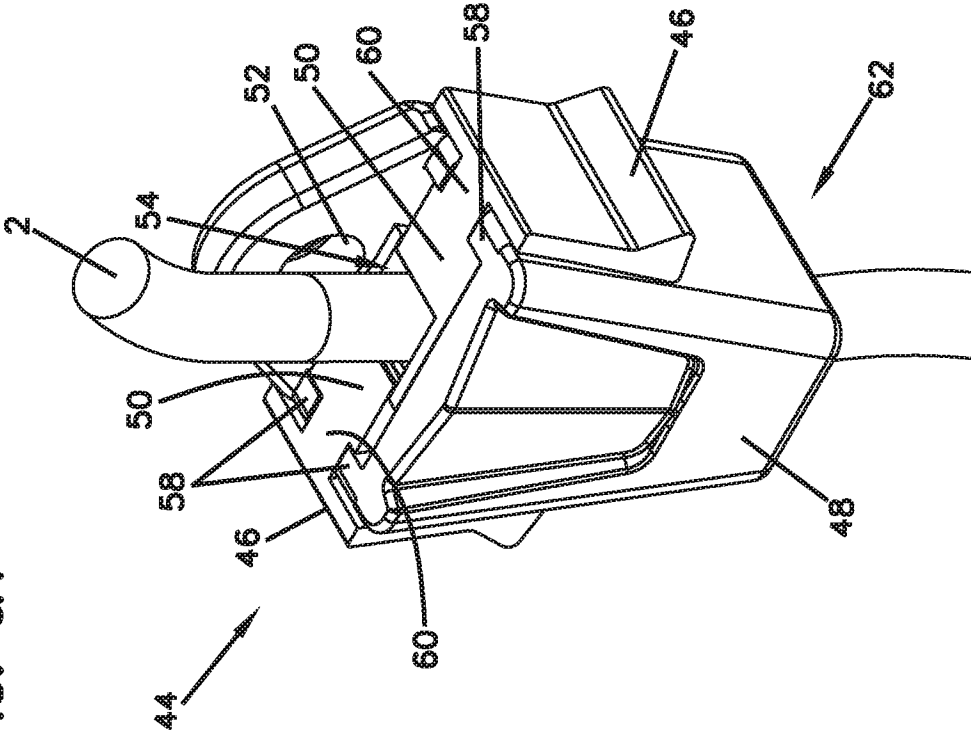


FIG. 6A



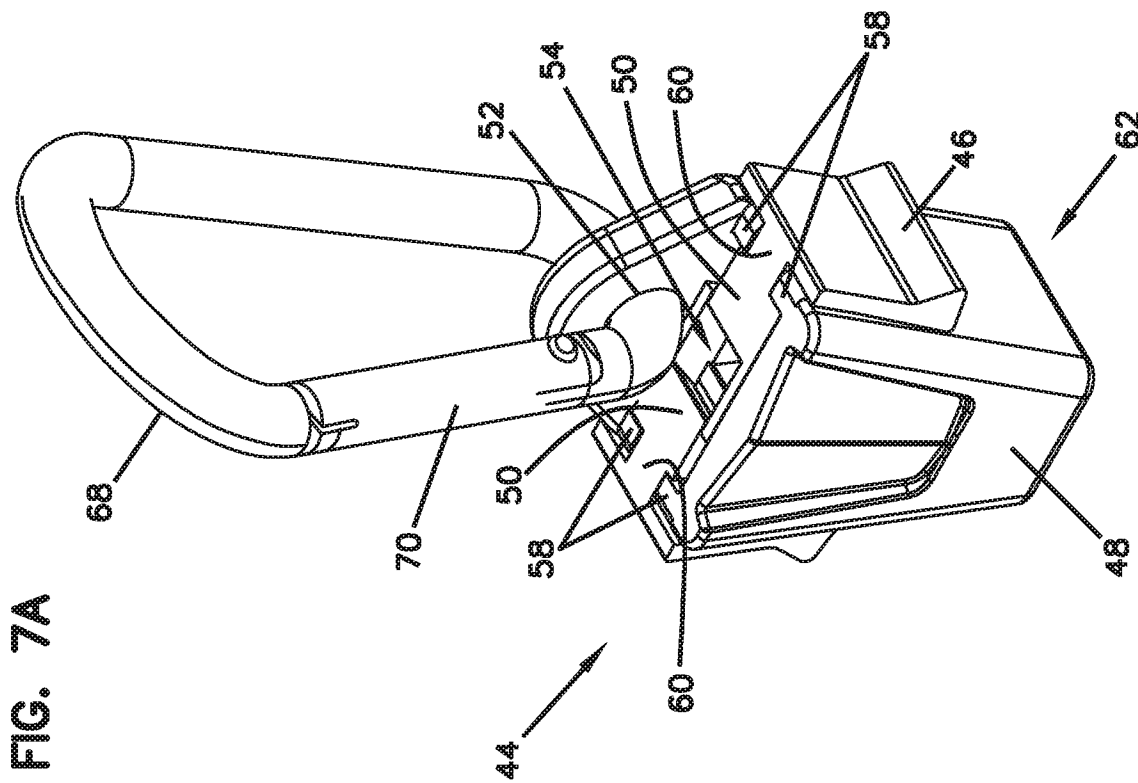
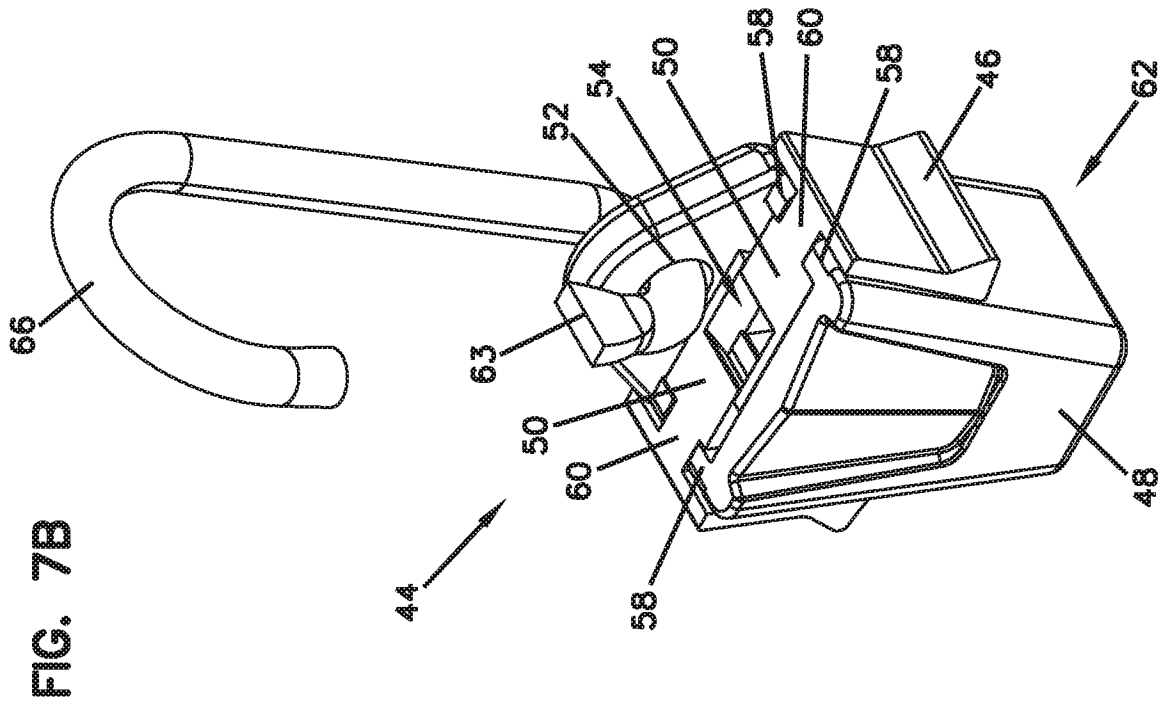


FIG. 8B

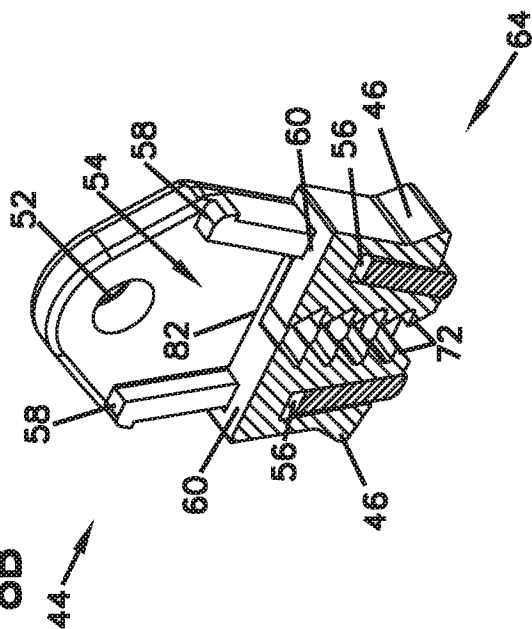


FIG. 8D

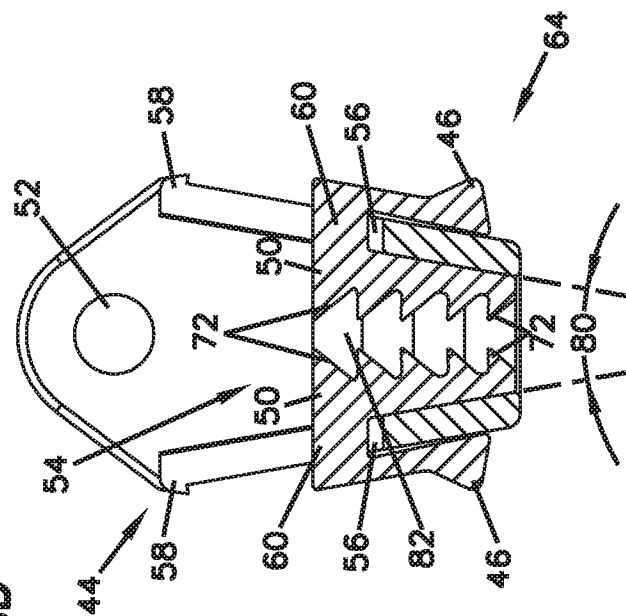


FIG. 8A

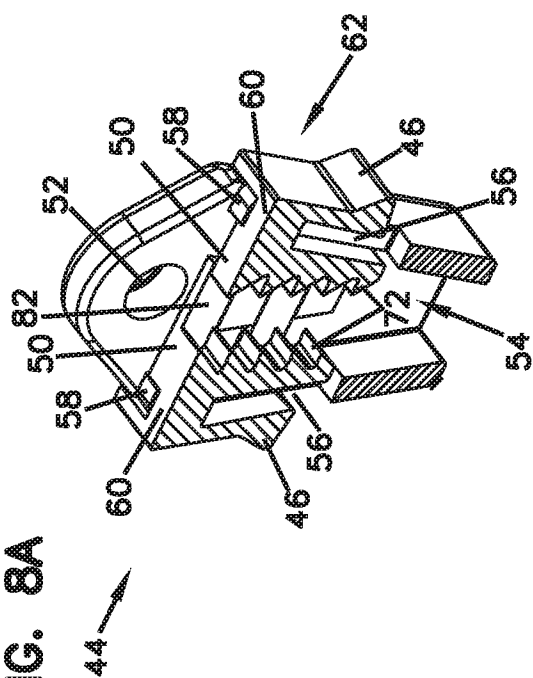


FIG. 8C

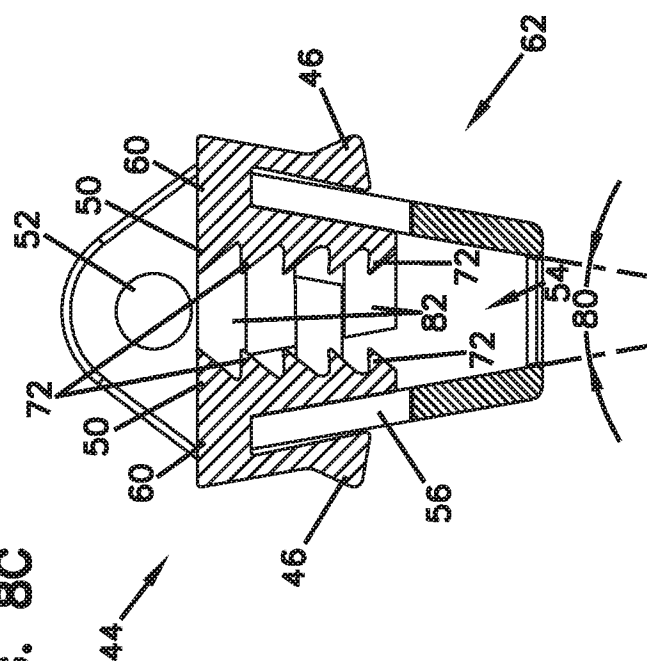


FIG. 9A

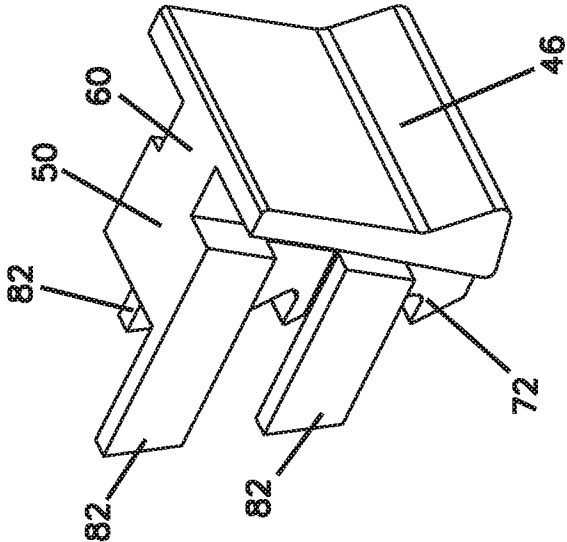


FIG. 9B

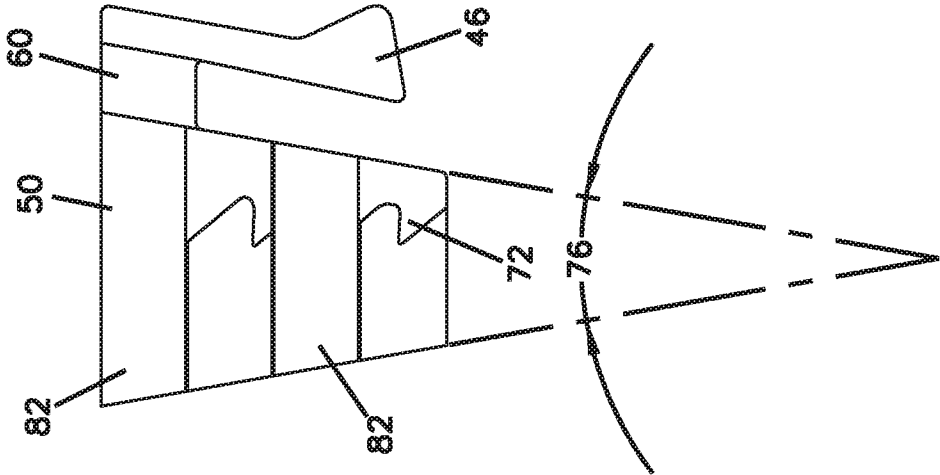


FIG. 9C

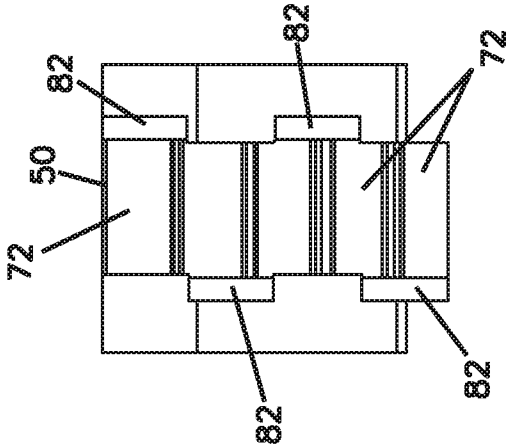


FIG. 10C

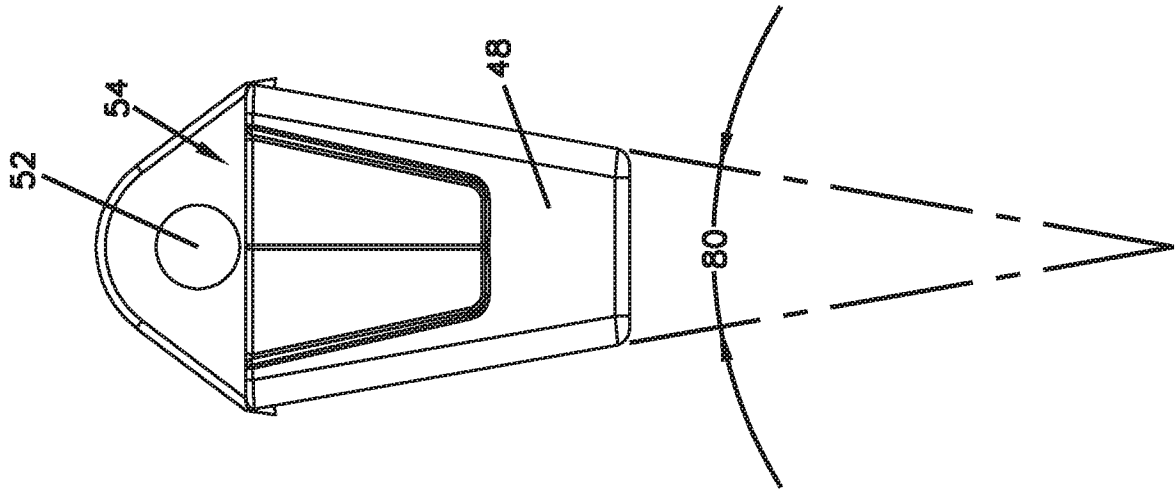


FIG. 10B

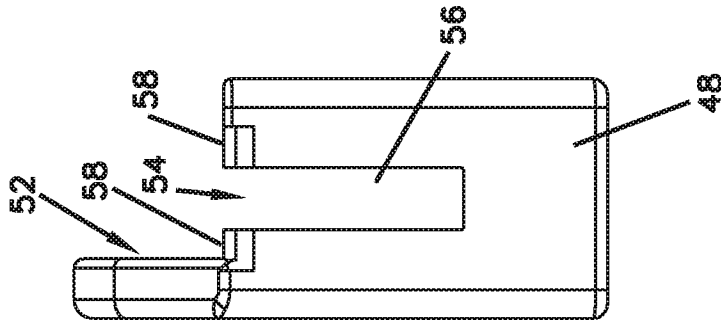
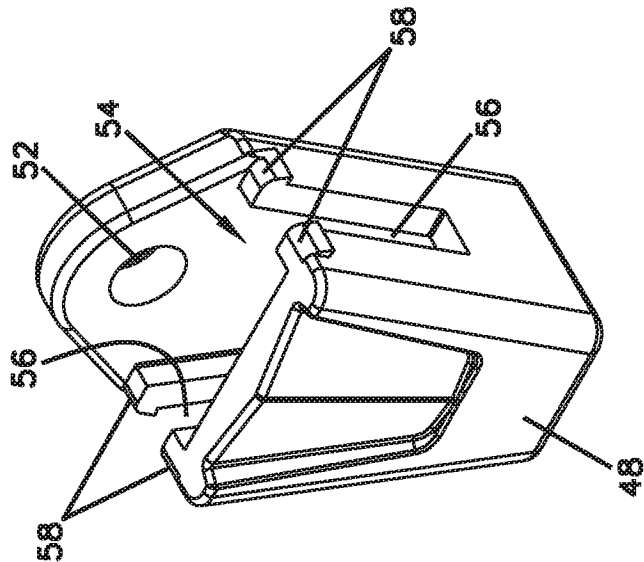


FIG. 10A



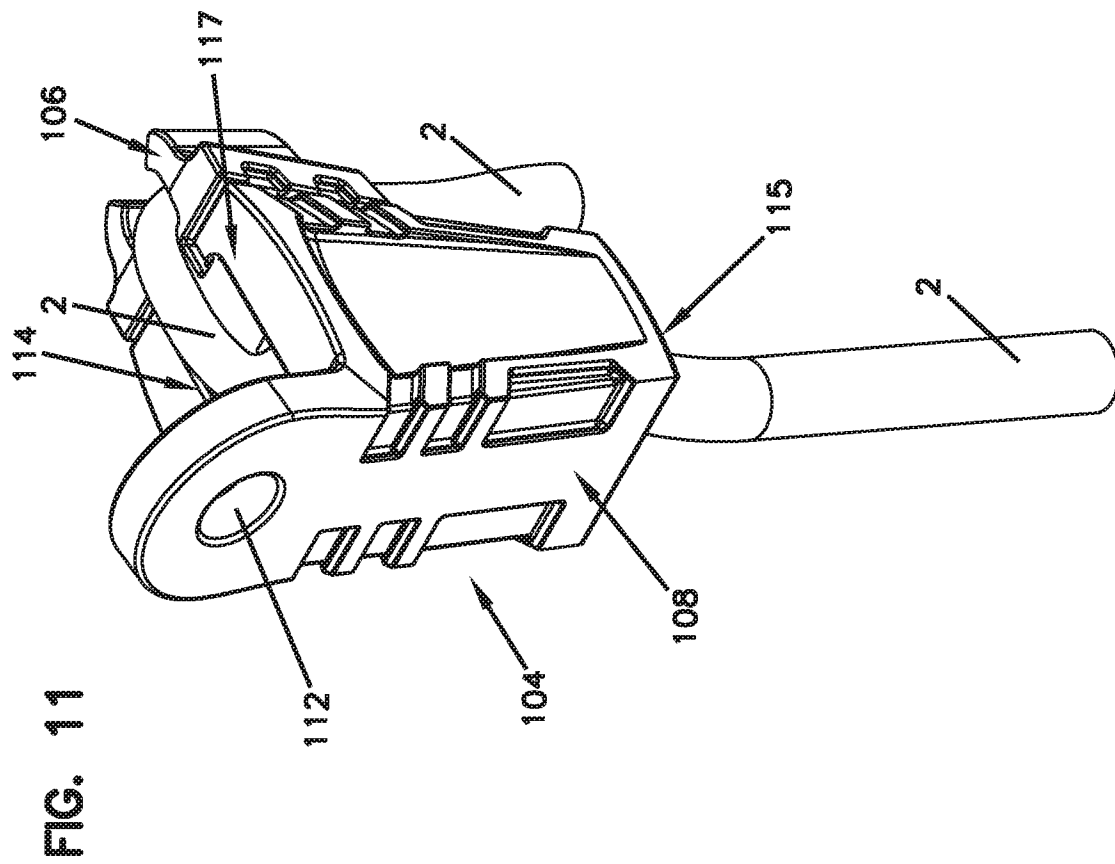
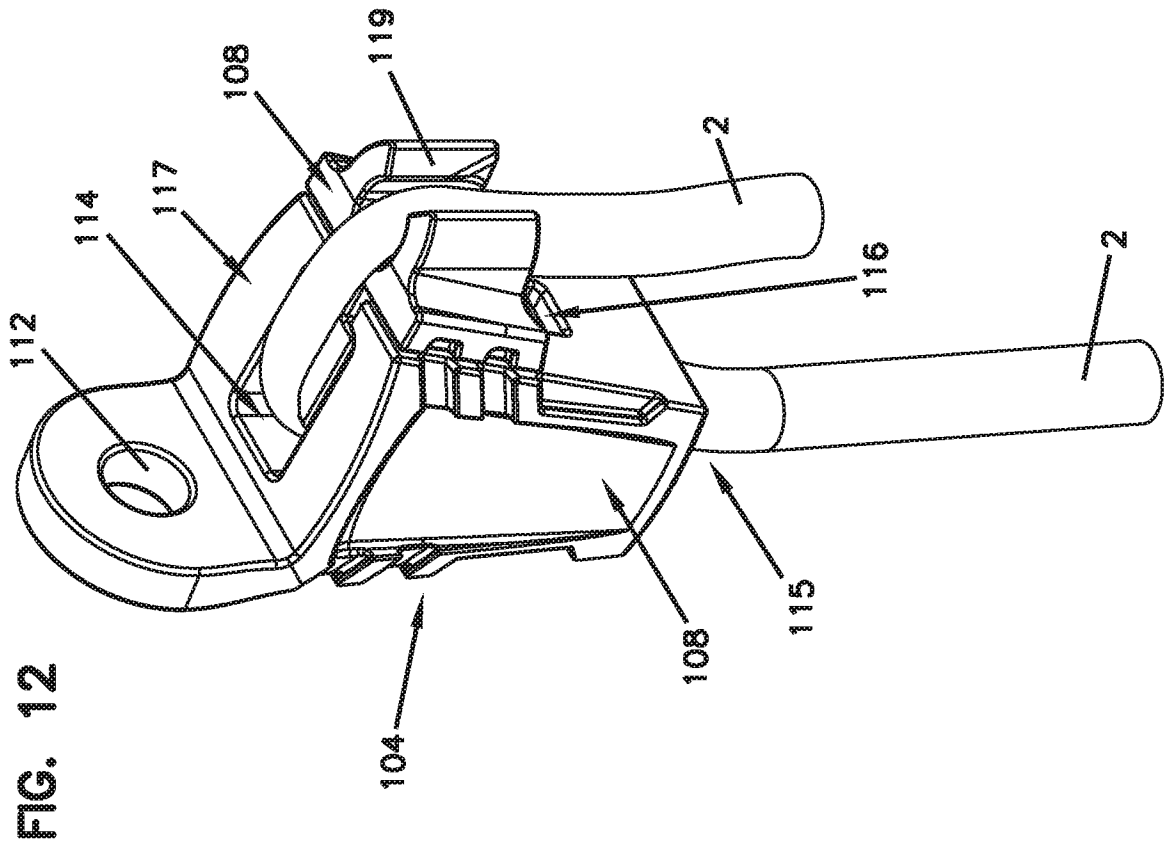


FIG. 13

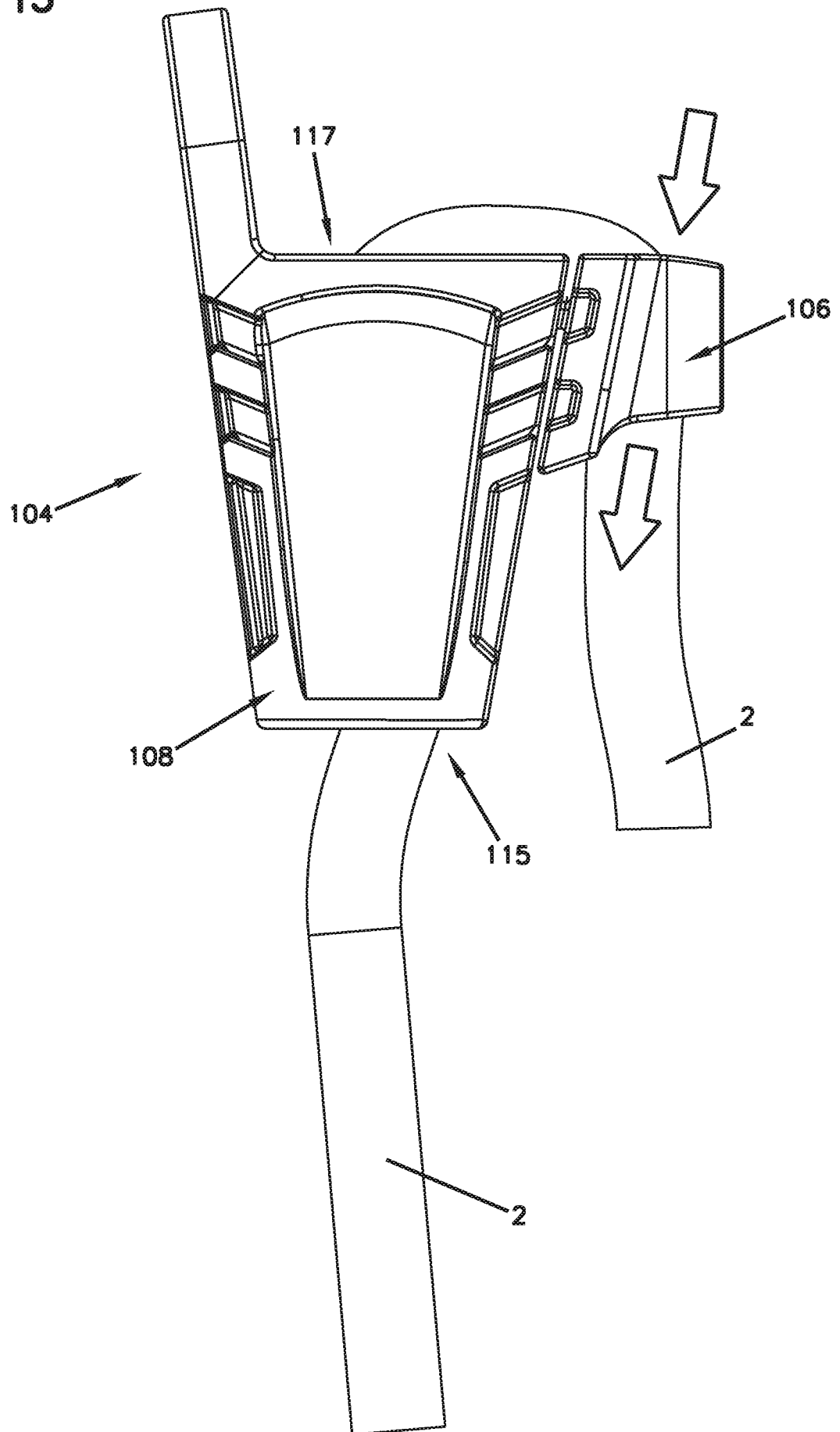


FIG. 14

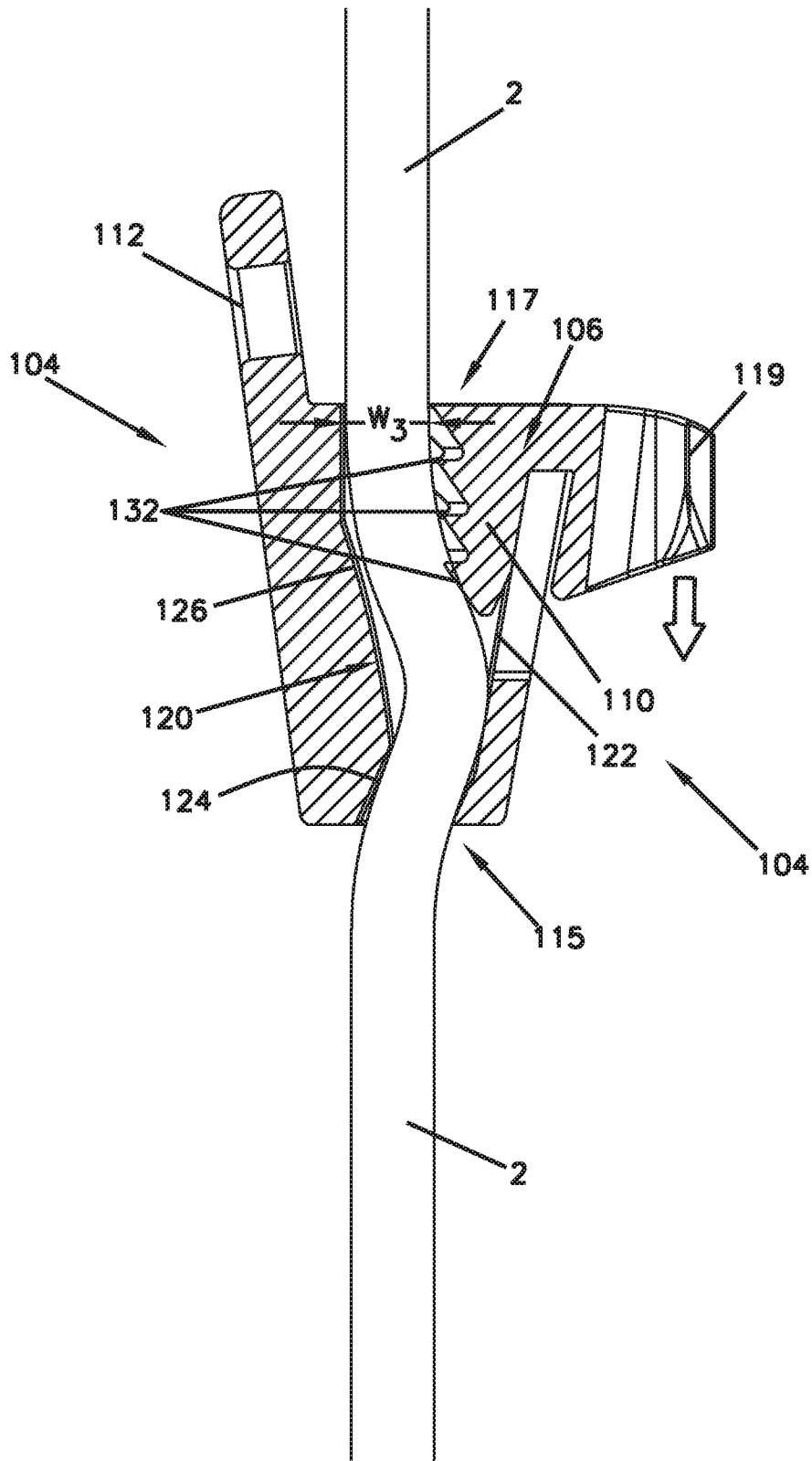


FIG. 15

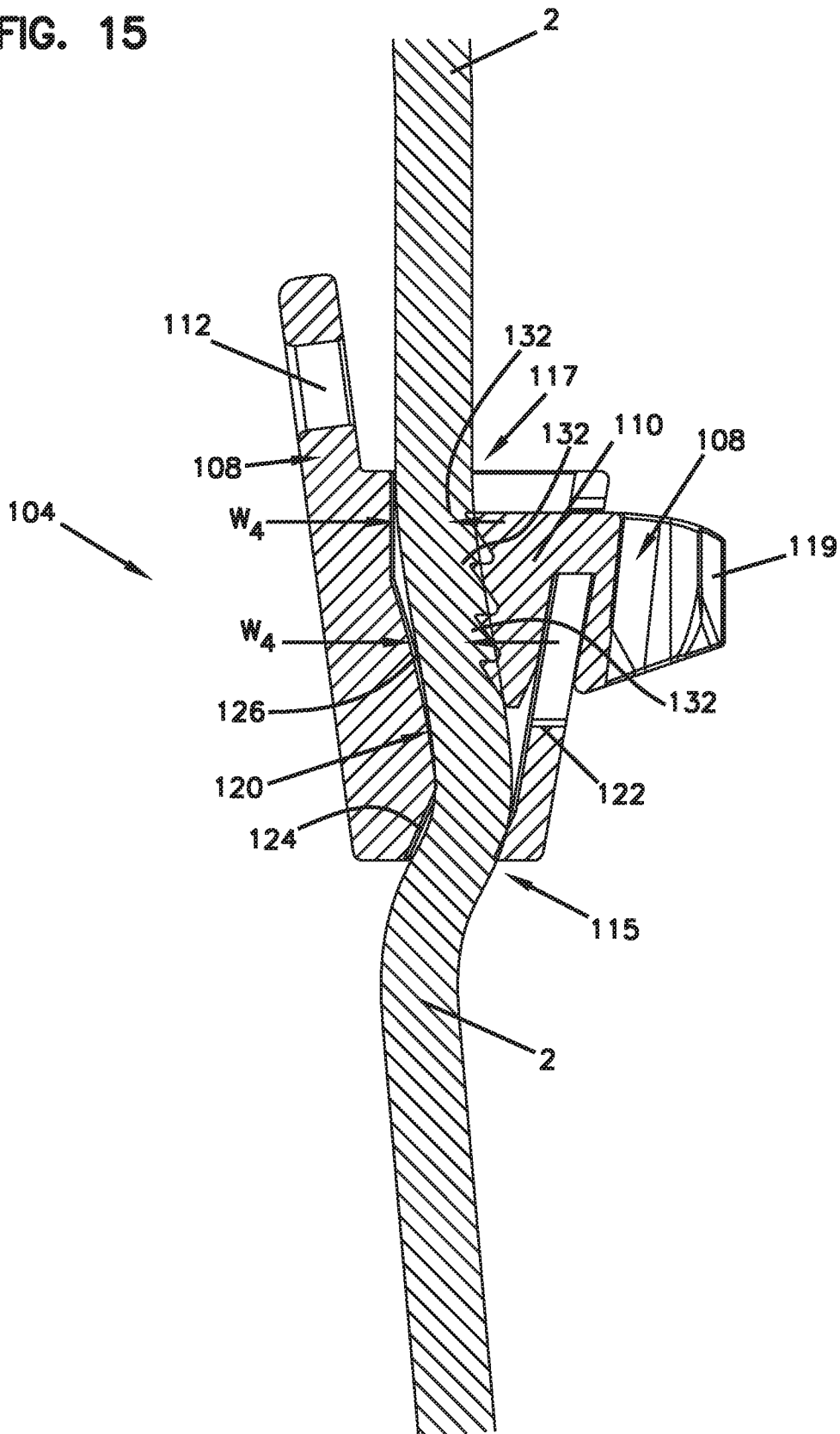


FIG. 16

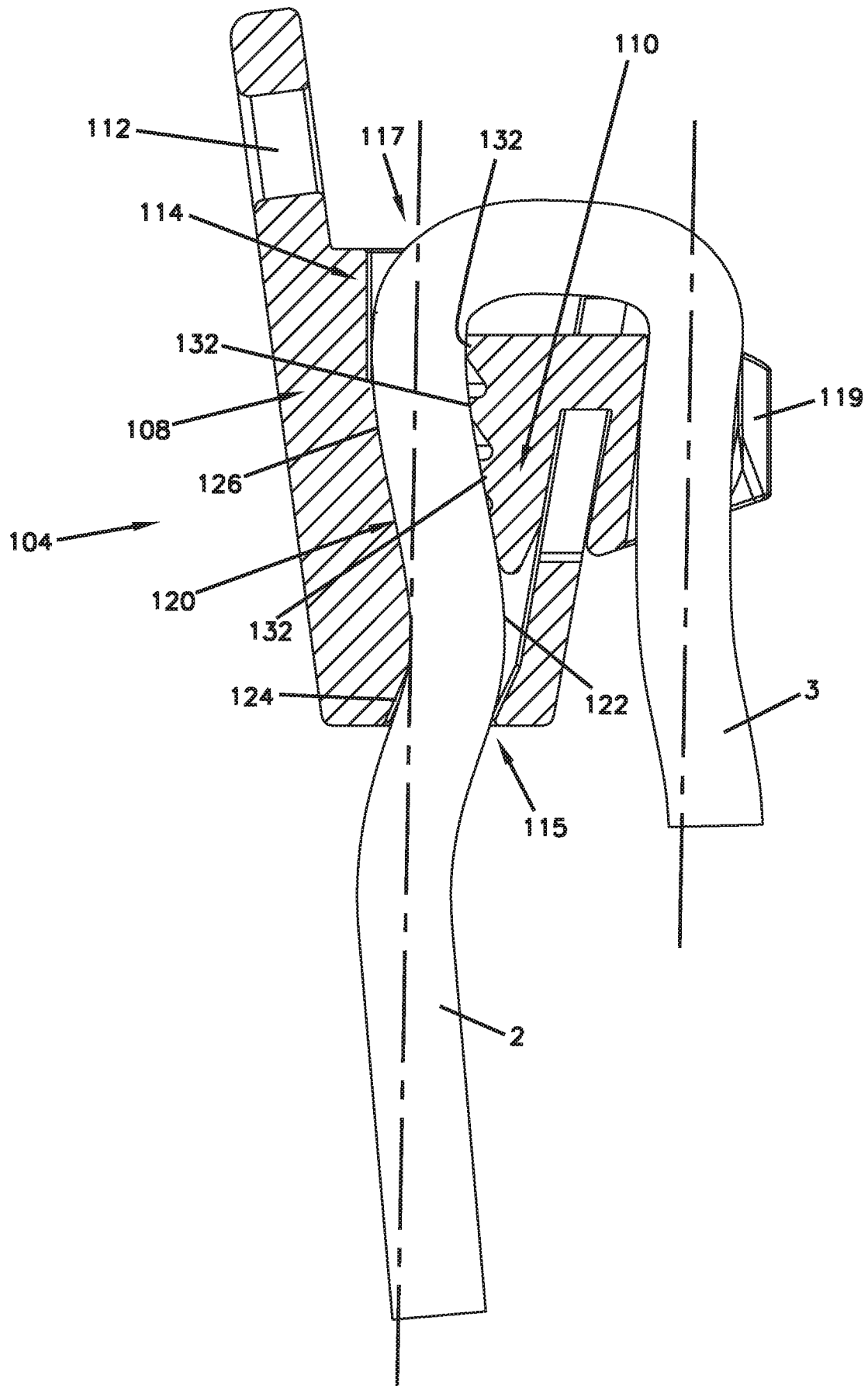


FIG. 18

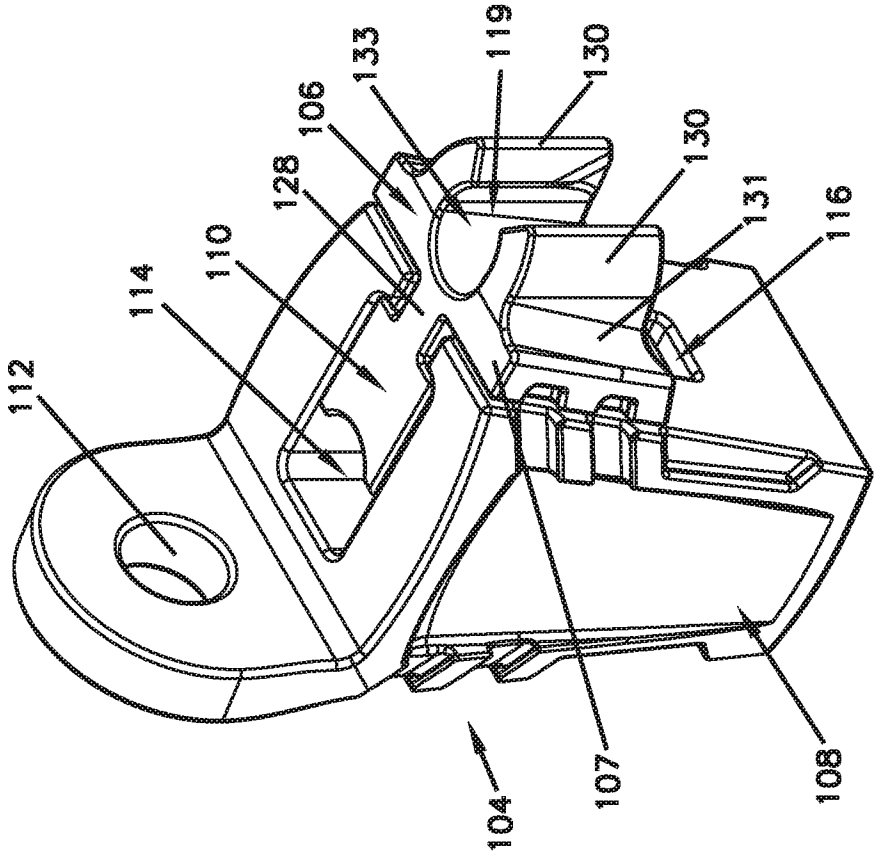


FIG. 17

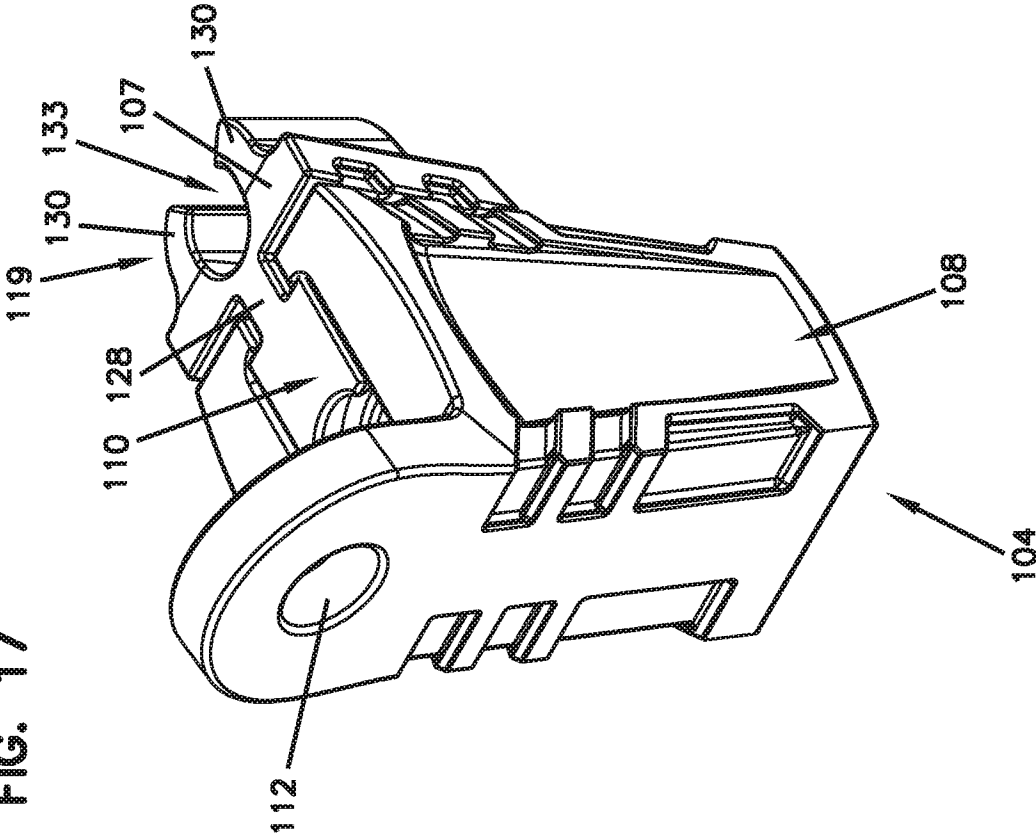


FIG. 21

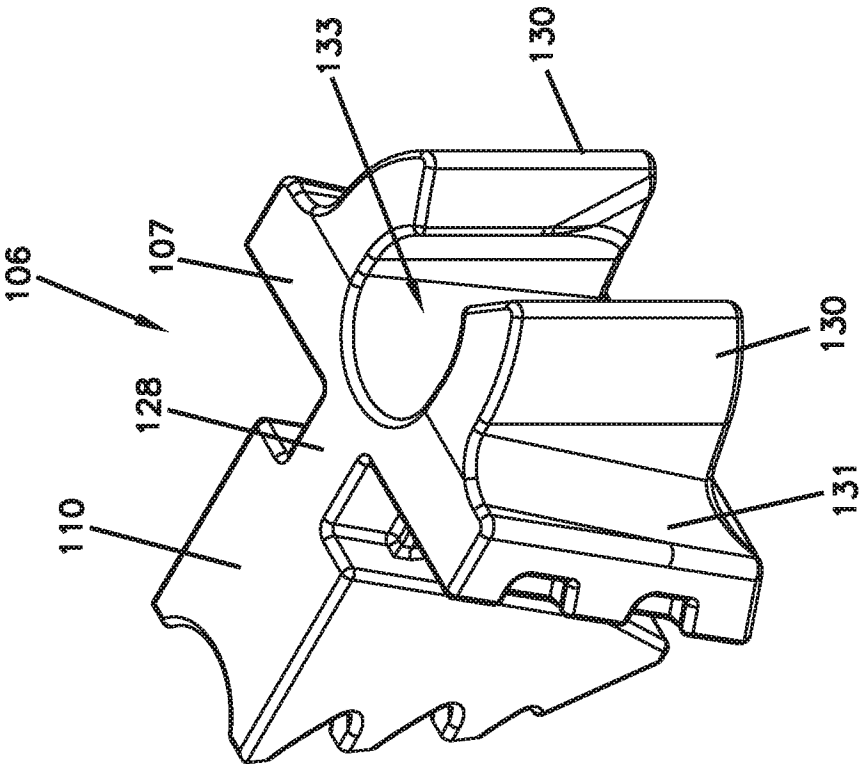


FIG. 20

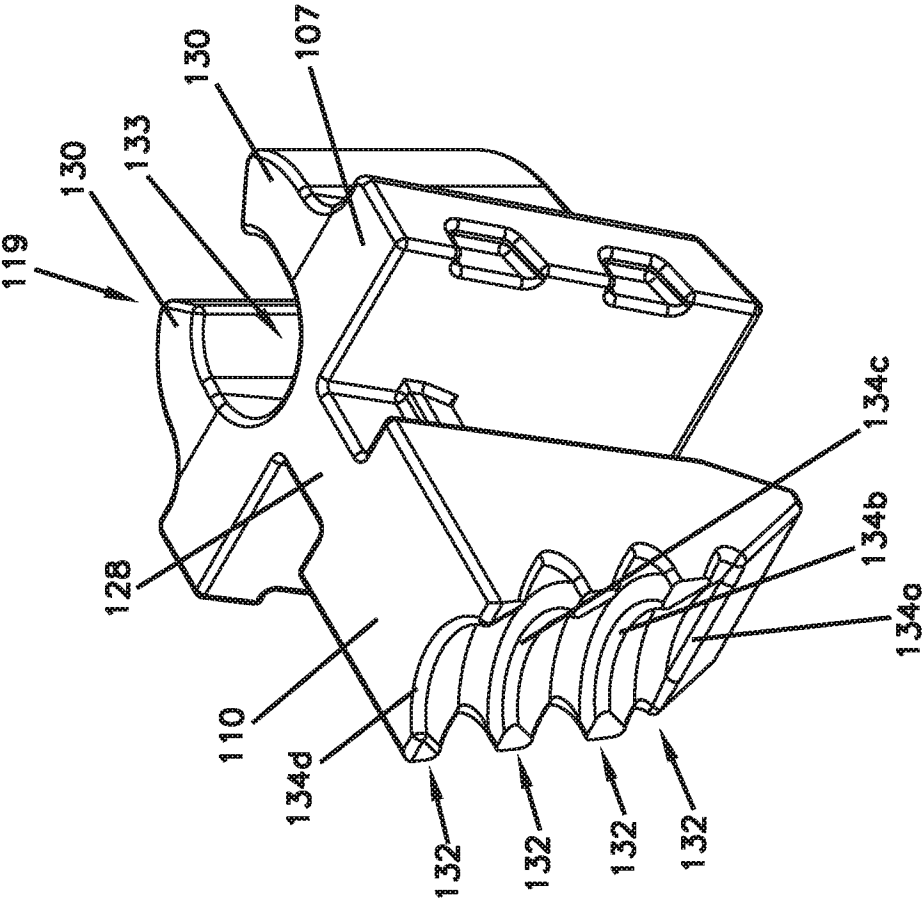


FIG. 22

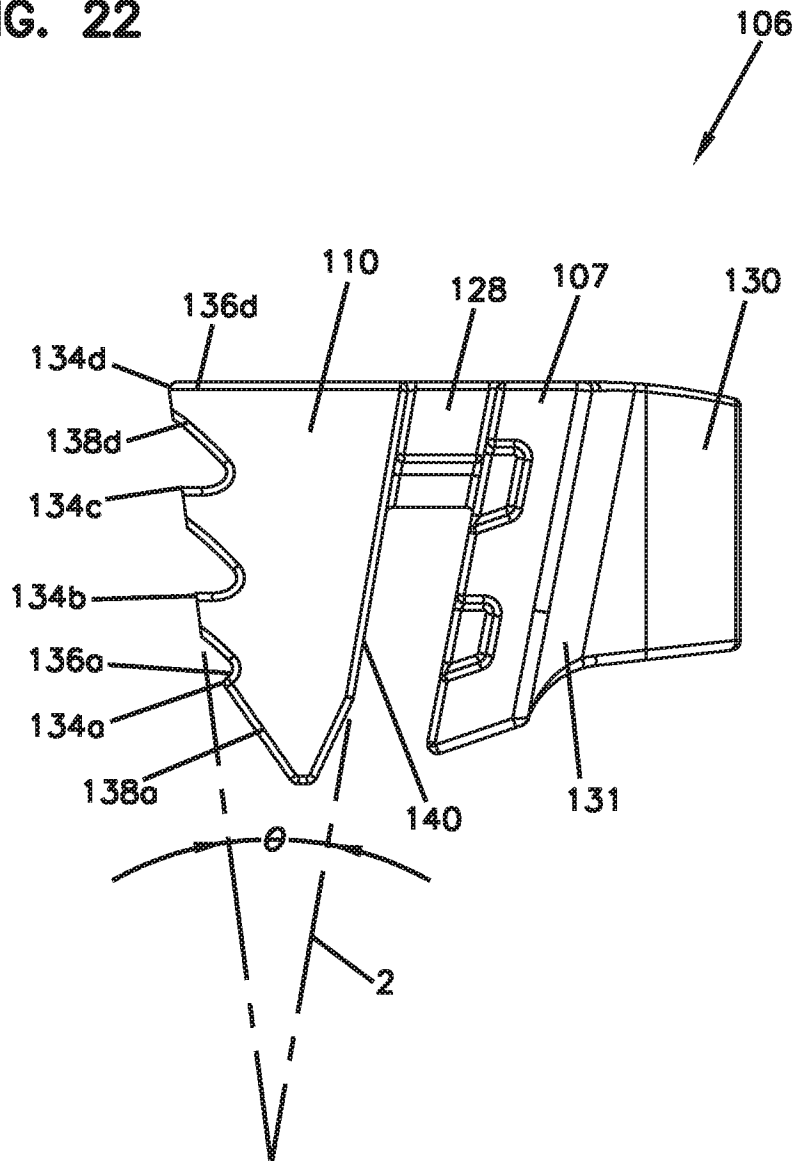


FIG. 23

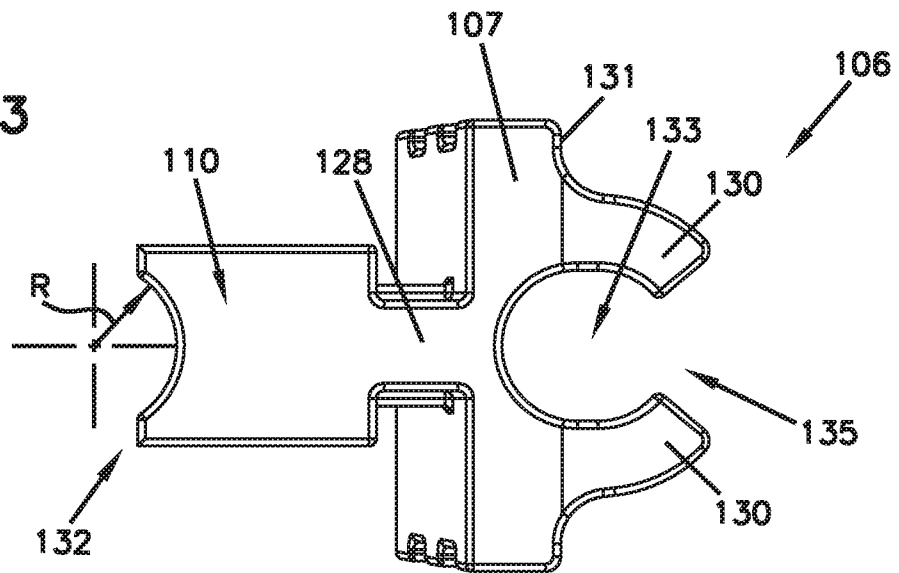


FIG. 24

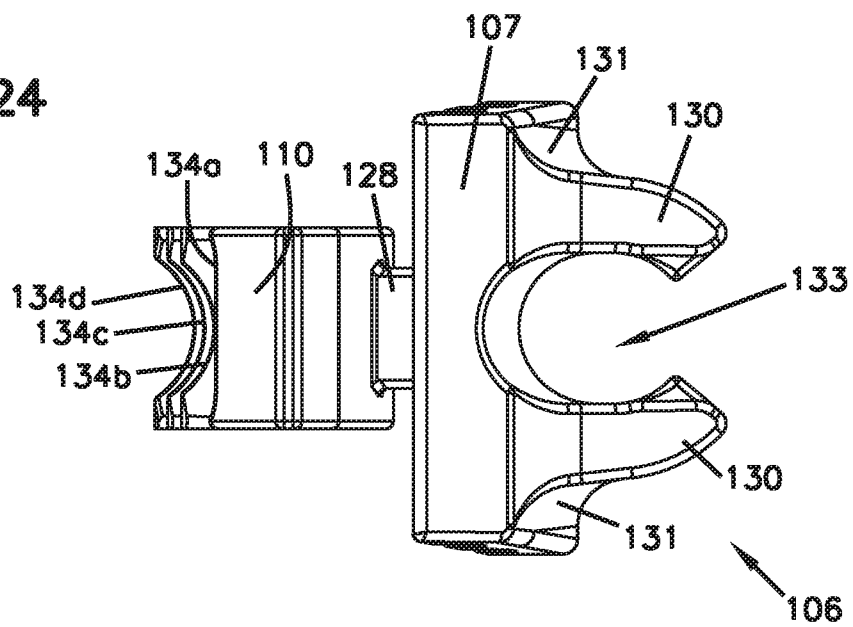


FIG. 25

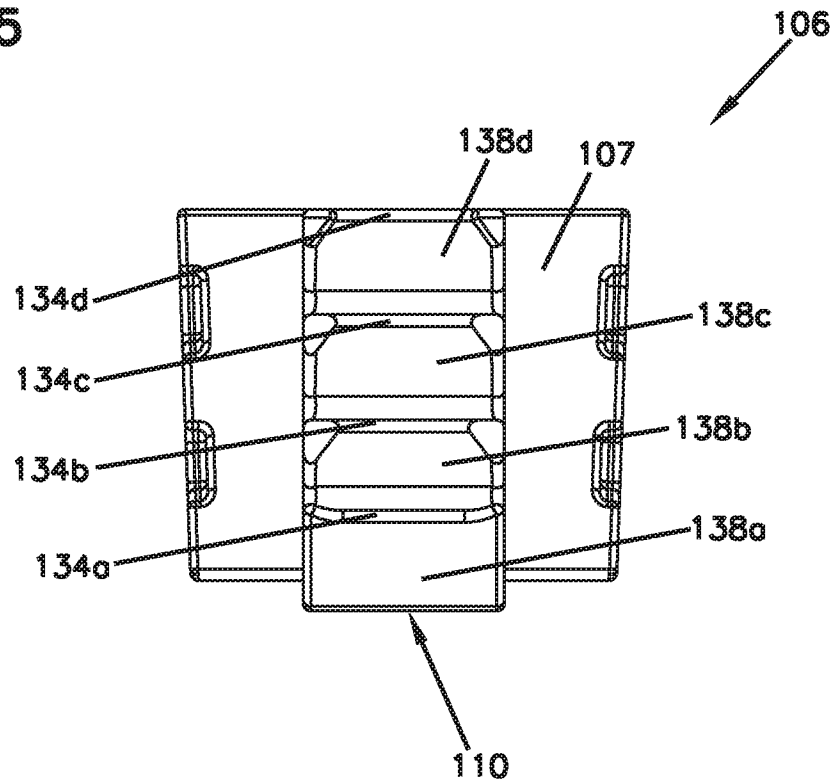
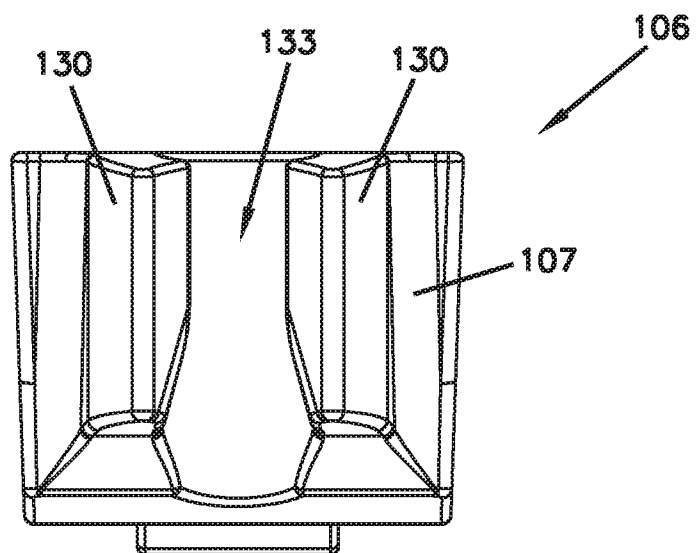


FIG. 26



INTERNATIONAL SEARCH REPORT

International application No

PCT/US2018/036110

A. CLASSIFICATION OF SUBJECT MATTER INV. A44B11/10 F16G11/00 ADD.				
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) A44B F16G				
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 practicable, search terms used) EPO-Internal, WPI Data				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	US 6 546 600 B1 (LYONS JOHN [US]) 15 April 2003 (2003-04-15)	1-6, 13-16, 18-22		
A	abstract; figures 1-8 column 2, line 50 - column 4, line 2 -----	7-12		
X	EP 2 607 747 A2 (NIFCO TAIWAN CORP [TW]) 26 June 2013 (2013-06-26) abstract; figures 1-15 paragraph [0013] - paragraph [0037] -----	1-6, 13-19		
X	US 2 200 895 A (RIO CLARENCE J) 14 May 1940 (1940-05-14) page 1, column 1, line 49 - page 2, column 1, line 19; figures 1-6 ----- -/--	1-6, 13-16, 18,19		
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.				
* Special categories of cited documents : <table border="0"> <tr> <td> "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
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Date of the actual completion of the international search 28 August 2018		Date of mailing of the international search report 06/09/2018		
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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2018/036110

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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