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(54) Buckle and fastener using the same

Schnalle und Befestigungsband mit einer solchen Schnalle

Boucle et attache utilisant celle-ci

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GB-A- 2 229 491 **US-A- 4 882 813**
US-A- 4 999 846 **US-A- 5 774 953**
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Description

Technical Field

[0001] The present invention relates to a fastener of the type comprising a band and a buckle for securing the band in a closed loop around one or more objects. At least one end of the band is secured in the buckle by means of teeth provided on the band and in the buckle; the two sets of teeth inter-engage to hold the band, as mentioned.

[0002] The present invention is especially concerned with a fastener that compresses or clamps the article or articles encircled by the band, that is to say the band is under tension in use.

Background Art

[0003] Fasteners having a buckle and a band that can be formed into a closed loop, with at least one end of the band being held by teeth within the buckle are well known, for example UK Patent No. 1,600,601. In this arrangement, the buckle includes a pair of jaws, each having inwardly-facing teeth, which engage with teeth on the top and bottom surfaces of the band.

[0004] Simple cable ties include toothed band and a passage formed at one end of the band that includes a toothed jaw projecting into the passage; the band is formed into a closed loop and one end is fed into the passage where the band teeth engage with the jaw teeth to maintain the band in the closed loop.

[0005] WO2006/040524 describes a fastener comprising a toothed band and a buckle for holding the band in a closed loop. The buckle has a pair of opposed passageways that each include teeth arranged to engage the teeth on respective ends of the band and hold the ends of the band in their respective passageways, thereby maintaining the band as a closed loop that can compress one or more articles within the looped band.

[0006] Clamps, ties and fasteners of the above type having a band and a fastening buckle can be made by injection moulding and either the band and the fastening buckle are formed as a single integral moulding or the band and the fastening buckle are formed separately as individual mouldings.

[0007] The present invention provides a buckle that together with a band forms a fastener that can be made stronger than prior art fastener.

[0008] US2006/0170559 describes a security tag for bottles that is secured around the bottle neck to prevent the tag being removed. The tag has an enclosed housing and a toothed band having two ends, one of which is fixed to the housing; the band is passed around the bottle neck and the other end of the band is fed into an opening in the housing where it engages with a ferromagnetic metal pawl to prevent it being pulled out. By placing a magnet against a specific part of the housing, the pawl is attracted to the magnet and disengages from the

toothed band, thereby allowing the free end of the band to be released from the housing and the tag removed. Such a mechanism would not work in a clamp since the tension in the band would cause the teeth and the pawl to engage tightly and so prevent the magnetic withdrawal of the ferromagnetic pawl.

[0009] US-5230541 discloses a device that encircles a pair of cabinet handles to keep them together and so prevents the cabinet from being opened by a child. The device includes a housing and a band. One end section has a latch that is specially shaped to be engaged with an opening in the housing while the second end section of the band has teeth. The band is formed into a loop and the second end is engaged within a different opening in the housing by a pawl. The pawl is biased towards the teeth of the band and so stops the band being pulled back out of the opening, while allowing the band to be pulled further into the housing. The pawl can be disengaged from the teeth by inserting a screwdriver into a slot to engage the pawl and retract it from the teeth in the band. Such a procedure would not be feasible if there were a substantial tension in the band but of course the band is not put under tension in the arrangement described. The band is made of nylon, the housing from ABS plastic and the pawl is made of CELCON (RTM) acetal resin.

[0010] WO92/06606 discloses a buckle for use with a band according to the preamble of claim 1. The buckle comprises a lock mechanism for interconnecting two flat band end portions having a lock housing mechanism at the free end thereof. The lock housing a passageway for guiding the other band end portion through the mechanism. The other of said band end portions has incremental engageable means. The guide housing having flexible arresting means for engaging the incremental engageable means. The mechanism also has finger actuatable release means to disengage the arresting means from the engageable means.

[0011] US-4882813 discloses a banding clip for holding an article with an elongated band having a plurality of teeth. The clip comprising: first and second side walls spaced apart and extending substantially parallel to each other; first band engaging means for engaging one end portion of the band. The first band engaging means having a first base portion which extends between the walls. The clip also comprises first guiding means for guiding an end portion of the band into engagement with the first band engaging means. The first guiding means comprises at least one projection which projects from at least one of said walls. The clip further comprises a second band engaging means for engaging any portion other than said one end portion of the band. The second band engaging means has a second base portion which extends between the walls. The clip further comprises second guiding means for guiding any portion of the band into engagement with the second band engaging means. The second guiding means comprises at least one projection which projects from at least one of the walls.

[0012] GB-2229491 discloses a tie assembly having a fixing block and a flexible strap. One end of which is anchored relative to the block. The block has a passage therethrough for reception of a length of the strap intermediate its free and anchored ends and at least one inwardly directed projection presenting a knife edge directed towards one end of the passage. The edge penetrates into a strap located within the passage.

mechanism has

Disclosure of Invention

[0013] The present invention provides a buckle according to claim 1.

[0014] The present invention provides also a fastener according to claim 13 having a buckle and a toothed band, which (a) can be kept in a closed loop and (b) can be held under tension by teeth in the buckle that engage corresponding teeth on the band; the teeth in the buckle are made of a different material as compared to the rest of the buckle and so can be made of a stronger and/or stiffer material that can resist forces resulting from tension in the band. This allows the rest of the buckle to be made of a flexible, more ductile material, which is suitable for its role as part of the fastener, while making the jaw teeth of stiffer, less ductile material that can withstand higher forces on them before they deform which can result in the fastener failing; such forces are exerted on the jaw teeth by the teeth on the band, which in turn result from the tension in the band and the deformation of the teeth in the buckle can result in them losing their engagement with the teeth on the band and hence the fastener failing. A biasing means is provided behind the teeth that forces the teeth down onto the band and makes for a reliable connection between the band teeth and the buckle teeth upon fitting.

[0015] The fastener of the present invention eliminates the need for an integral mechanical hinge which is present in known designs where the body and the jaw of the buckle are formed as a single moulding. The hinge allows the jaw to pivot towards and away from the band and can bias the jaw towards the band. This hinge can break if the moulding material is too stiff; on the other hand if the moulding material is not stiff enough, the teeth on the jaw can deform and release the band under the influence of tension in the band. In accordance with the present invention, there is no need to use a material for the hinge that is a compromise between the desired properties of the hinge and the desired properties of the teeth.

Brief Description of Drawings

[0016] Two embodiments of the present invention will now be described by way of example only, by reference to the accompanying drawings in which: Figures 1 to 3 are, respectively, a plan view, a side elevational view and a cross sectional view (taken along the axis A-A shown

in Figure 1) of a buckle of the first embodiment of the present invention;

Figure 4 is an enlarged detail of the sectional view of Figure 3;

Figure 5 is an enlarged view of part of the cross sectional view of Figure 4;

Figure 6 is an enlarged plan view of the first embodiment;

Figure 7 is an isometric view of a jaw of the first embodiment;

Figure 8 is a side elevation of the jaw of Figure 7; Figure 9 is a cross sectional view taken along the centre line of the jaw of Figure 7;

Figure 10 is a plan view of a buckle of the second embodiment;

Figure 11 is a sectional view taken along line C-C of Figure 10; Figure 12 is a detail of the sectional view of Figure 11;

Figure 13 is an isometric view of a jaw of the second embodiment; and

Figure 14 is a plan view of the buckle and jaw of the second embodiment, when assembled together.

Description of the best mode for putting the invention into operation

[0017] Referring initially to Figures 1 to 3, there is shown a fastener in the form of a tie, which includes a band 10 and a buckle 12 that are injection moulded as a single piece. The upper surface of the band carries a series of parallel teeth 11.

[0018] The band 10 is flexible and can be formed into a closed loop to bundle together two or more articles within the closed loop or to compress one or more articles within the loop. The closure of the loop is achieved by taking the end 14 of the band and feeding it into a passage 15 through an opening 16 and pushing the band end out through exit 16'. Part of the way along the passage 15, a chamber 18 is provided, the top of which is open. As will be described later, a toothed jaw can be secured within the chamber 18 so that the teeth on the jaw engage with the teeth 11 on the outer surface of the looped band 10.

[0019] More detailed sectional views of the part of the buckle around the chamber 18 are shown in Figures 4 and 5 but before describing these in detail, the jaw will be described with reference to Figures 7 to 9. The jaw 20 has a lower surface 22 that includes a set of teeth 24 that are configured to engage with the teeth 11 on the

band 10. The jaw 20 is held within the chamber 18 by means of a hinge connection that includes a pair of trunnions 26 that are separated by a ledge 27.

[0020] Referring back to Figures 4 to 6, it can be seen that, within the chamber 18, the buckle 12 includes a pair of recesses 28, each having a circular base that can accommodate the trunnions 26. Inbetween the recesses 28 there is an L-shaped resilient element 30 having a short leg 31, which is spaced above a part of the buckle 32 by a gap 34 (see Figure 5). Resilience in the longer leg 35 of the L-shaped element allows the resilient element 30 to be moved backwards.

[0021] The jaw can be fitted within the buckle by pulling the L-shaped resilient element 30 backwards (see Figure 5) to open the gap 34 and allow the ledge 27 of the jaw to locate under the shorter leg 31 and for the trunnions 26 to be located within the recesses 28. Once the resilient element 30 is released, the jaw is held captive by the above arrangement. However, it can be released by reversing the above-described operation.

[0022] When the jaw 20 is installed in the chamber 18, the trunnions 26 are located within the recesses 28 while the ledge 27 is engaged in the gap 34 between the resilient member 30 and the buckle part 32 with the top surface of the ledge 27 being engaged under the short leg 31 of the resilient element 30. With such an arrangement, the jaw 20 can pivot upwardly and downwardly within the chamber about the trunnions 26 to bring the teeth 24 on the jaw into and out of engagement with the teeth 11 in the band 10, when the band is located in the passage 15. Such upward pivoting motion causes the ledge 27 to press against the resilient element 30 and move it backwards; the resilience in the element 30 resists the upward movement of the jaw and accordingly keeps the jaw 20 in engagement with the band 10 to maintain the band in a closed loop. In addition the shape of the teeth is such that, when tension is applied to the band, the jaw is urged towards the band.

[0023] In use, the end 14 is passed through the opening 16 in the passage 15 of the buckle and out through the other end 16 of the passage. The jaw 20 pivotally held within the chamber 18 engages the band and prevents it from being moved backwards through the passage 15. As can be seen from Figures 8 and 9, the back surfaces 40 of the teeth 24 of the jaw are sloped to allow the band end 14 to be moved from end 16 to end 16 of passage 15 but the front surfaces 42 are more upright (although they do slope backwards slightly). Thus the teeth are slightly barbed. In this connection, when tension is applied to the band, the front surfaces 42 of the jaw teeth engage back surfaces of the band teeth 11 and prevent backward sliding of the band through the passage 15. These engaging surfaces on the jaw and the band have a similar slope so that they are generally parallel to each other; tension in the band and the slope on the engaging surfaces tends to draw the jaw towards the band, thereby assisting in maintaining the jaw in contact with the band, even when the band is under tension. The movement of

the jaw towards the band when the band is under tension is also brought about because the trunnions are located above the teeth so that the tension tends to cause the jaw to pivot towards the band.

[0024] One advantage of making the jaw 20 separate from the strap and buckle 10, 12 is that the jaw 20 can be made out of a strong material that is relatively inflexible so that the teeth remain in shape despite the application of substantial force derived from the tension in the band. On the other hand, the strap and buckle 10, 12 can be made of a more flexible material e.g. nylon, such as nylon 11, in order for the band and the buckle to be flexible when encircling an object. If the jaw were made of the same material as the rest of the buckle 12 and the band 10, the teeth 24 would be flexible and would not withstand such high forces without deforming. Thus, it is possible to make the fastening of the present application stronger as compared to the corresponding one-piece moulding.

[0025] The preferred materials for the buckle/band and for the jaw are as follows:

	Buckle	Teeth
	nylon 6.6	nylon 6.6 glass filled
	nylon	nylon 11 glass filled
25	nylon 11 glass filled	nylon 11 glass filled
	Acetal	Acetal glass filled

[0026] When the buckle and the teeth are both made of glass filled nylon 11, the glass loading in the jaw and teeth is greater than that of the buckle body so that the jaw and teeth are stronger than the buckle body.

[0027] Turning now to Figures 10 to 13, a second embodiment of the present application is described. In contrast to the arrangement of the first embodiment, the second embodiment has a separate band and buckle. The band is similar to a band 10 of the first embodiment but has no integral buckle. The band may be a length cut off a longer length so that the length of the band is tailored to a particular application. Since the band has no integral buckle, it must be anchored at both of its ends to the buckle and a suitable buckle is shown in Figures 10 to 12. The arrangement is similar to two back-to-back buckles as described in connection with the first embodiment. In describing the second embodiment, parts corresponding to parts of the first embodiment will be indicated by the same reference number with a prefix "1", for example, jaw 20 of the first embodiment becomes jaw 120 of the second embodiment. For comparison purposes, Figures 10 to 12 show the buckle without the jaws and the arrangement with the jaws is shown in Figure 14.

[0028] Except as described below, the two ends of the band are held in an identical way in each of the halves of the buckle. Accordingly, only the left hand side of the buckle shown in Figure 12 will be described in detail, with the understanding that the right hand side of the buckle operates in a similar way.

[0029] As with the first embodiment, the buckle has a

passage 115 extending between an entrance 116 and an end of the passage 116. Part of the way along the passage 115, a chamber 118 is provided in which a jaw is pivotally secured; the jaw is shown in Figure 13 and is held in the chamber 118 in the manner already described in connection with the first embodiment. Thus, the jaw is biased into the chamber 118 by resilient element 130 and the teeth on its lower surface engage with the teeth on the upper surface of the band, when located in the passage 115. The jaw 120 has the same configuration as the jaw 20 shown in Figures 7 to 9 with the exception that the teeth 124 extend all the way to the edge of the jaw and are of a slightly different shape. However, the means of connecting the jaw to the buckle via trunnions 126 and ledge 127 is identical to that of the first embodiment and the description will therefore not be repeated. As can be seen from Figure 12 the buckle has recesses 128 for accommodating the trunnions and a resilient element 130 for engaging the ledge 127 and allowing it to pivot upwardly within the chamber 118 so that the jaw can ride over the teeth of the band.

[0030] The far ends 116 of the two passages 115 differ slightly from one another. As shown in Figure 11, the right hand passage 115 ends in an upright wall 152 so that the end of a band pushed into the right hand passage abuts the wall 152 and cannot extend into a chamber 150. There is no corresponding wall in the left hand passage 115 and so the end of the band can be pushed into chamber 150.

[0031] In use, the jaws are fixed in chamber 118, as shown in Figure 14 and one end of the tooth band (not shown) is pushed into the right hand passage 115, see Figure 11. It is pushed right up to the end wall 152 and is held within the passage 115 by the action of the teeth 124 on the jaws 120 engaging corresponding teeth on the outer surface of the band. Then, the band is formed into a closed loop around one or more objects and the free end is fed through entrance 116 of the left hand passage 115 and the end is fed through the passage into chamber 150. The end of the band that projects into chamber 150 can be grasped to apply tension to the band, optionally using a tool as shown in WO 2006/040524.

[0032] The teeth on the band used with the buckle of Figures 10 to 14 do not have a barbed shape but rather the teeth have a square or rectangular profile and the teeth on the jaw are similarly shaped (see Figure 13); asymmetric teeth on the band are not favoured in these circumstances since, although they may increase the resistance to the teeth at one end of the band from being pulled out from the buckle, the same shaped teeth will reduce the equivalent resistance at the other end of the band.

[0033] As the leading end of the band is pushed into a passage 115, 116 and the first tooth on the band engages the rearmost tooth on the jaw. Because the jaw pivots about the trunnions 126, which are located above the passage 115 or 116, this causes the jaw to pivot upwardly

and allow the leading end of the band to be pushed into the passage. However when an attempt is made to pull the band out of the passage, the interaction between the teeth on the jaw and the teeth on the band tends to move the jaw in the opposite direction about the trunnions and so the jaw resists this motion.

[0034] A cover may be used to close the chamber 150.

[0035] Apart from the use of the separate jaws and body in the buckle, the buckle and band may be substantially as described in WO 2006/040524, the contents of which are incorporated herein by reference.

[0036] The possible materials to the buckle and for the jaws are as follows:

15	Buckle/tie body	Teeth
	nylon 6.6	nylon 6.6. glass filled
	nylon 11	nylon 11 glass filled
	Acetal	Acetal glass filled
20	Polypropylene	Polypropylene glass filled

Claims

1. A buckle (12) for use with a band (10) to form a fastener configured to compress or clamp an article or articles encircled by the band (10), the band (10) having a first (14) and a second end and teeth (11) provided on at least the first end (14) and for use in holding the band (10) in a closed loop, the buckle (12) comprising a body, a jaw (20) that is connected to the body and that carries at least one tooth (24) for engaging the teeth (11) on the first end (14) of the band (10) and thereby holding the first end (14) of the band (10) when formed in a closed loop, and wherein the buckle body comprises a passage (15) for holding an end of the band (10), the body and the jaw (20) being separate components and made of different materials, **characterised in that** the jaw (20) is resiliently biased towards the passage (15).
2. A buckle (12) as claimed in claim 1, in which the jaw (20) is resiliently biased towards the passage (15) by a spring that is integral with the buckle body.
3. A buckle (12) as claimed in either of claims 1 and 2, wherein the jaw (20) is made of a material with a greater stiffness and/or strength than the material from which the body is made.
4. A buckle (12) as claimed in any preceding claim, wherein the jaw (20) and the body are each made of a different moulded plastics material.
5. A buckle (12) as claimed in any preceding claim, wherein the jaw (20) and the at least one tooth (24) that it carries are made of plastics material, e.g. nylon, such as nylon 6.6, nylon 11, or acetal or poly-

propylene containing at least one stiffening and/or strengthening reinforcement, e.g. glass.

6. A buckle (12) as claimed in any preceding claim, wherein the body is made of plastics material, e.g. nylon, such as nylon 6.6, nylon 11, or acetal or polypropylene that optionally includes at least one reinforcement material, e.g. glass.
7. A buckle (12) as claimed in claim 4, wherein the body and the jaw (20) are both made of the same base plastics material, e.g. nylon, such as nylon 6.6, nylon 11, or acetal or polypropylene, and the jaws (20) include at least one reinforcement material, e.g. glass, or a greater loading of the reinforcement material.
8. A buckle (12) as claimed in any preceding claim, wherein the jaw (20) is pivotally connected to the body, e.g. via a hinge, to enable the jaw (20) to be lifted away from the passage (15) when a band (10) is pushed into the passage (15).
9. A buckle (12) as claimed in claim 7, wherein the jaw (20) comprises trunnions (26) that are pivotally held in recesses (20) in the body and form a hinge to enable the jaw (20) to be lifted away from the passage (15) when a band (10) is pushed into the passage (15).
10. A buckle (12) as claimed in any of claims 7 to 9, wherein the at least one tooth (24) is of square or rectangular cross section.
11. A buckle (12) as claimed in any preceding claims, wherein the at least one tooth (24) on the jaw (20) is barbed and has a first surface (40) that slopes so as to ride over the band teeth (11) as the band (10) is pushed into the buckle (12) and a second surface (42) that slopes to forces the jaw (20) into closer engagement with the band (10) when tension in the band (10) tends to pull the band (10) out of the buckle (12).
12. A buckle (12) as claimed in any preceding claims, wherein the body comprises a second jaw that is connected to the body and that carries at least one tooth for engaging teeth (11) on the second end of the band (10) and thereby holding the second end of the band (10) when formed in a closed loop, wherein the second jaw and the at least one tooth it carries are made of a material that is different to the material of the body, and optionally wherein the second jaw has the features specified in any of claims 1 to 11 for the first jaw.
13. A fastener comprising a buckle (12) as defined in any preceding claim and a band (10) having a first (14) and a second end and teeth (11) provided on

at least the first end (14), the fastener being configured to compress or clamp an article or articles encircled by the band (10).

- 5 14. A fastener as claimed in claim 13 when dependent on any of claims 1 to 11, wherein the band (10) is integral with the buckle (12).
- 10 15. A fastener as claimed in claim 13 when dependent on claim 12 or claim 13, wherein the band (10) is separable from the buckle (12) and has teeth (11) at its first (14) and second ends.

15 Patentansprüche

- 20 1. Schnalle (12) zur Verwendung mit einem Band (10) zum Bilden eines Befestigungselements, das ausgebildet ist, einen oder mehrere von dem Band (10) umgebene Gegenstände zusammenzudrücken oder festzuklemmen, wobei das Band (10) ein erstes (14) und ein zweites Ende und Zähne (11) aufweist, die an mindestens dem ersten Ende (14) vorgesehen sind und zur Verwendung beim Halten des Bandes (10) in einer geschlossenen Schleife, wobei die Schnalle (12) einen Körper, eine Klemmbacke (20) aufweist, die an dem Körper verbunden ist und mindestens einen Zahn (24) zum Eingriff mit den Zähnen (11) an dem ersten Ende (14) des Bandes (10) trägt und dadurch das erste Ende (14) des Bandes (10) hält, wenn in einer geschlossenen Schleife gebildet, und wobei der Schnallenkörper einen Durchgang (15) zum Halten eines Endes des Bandes (10) aufweist, wobei der Körper und die Klemmbacke (20) getrennte Bauteile sind und aus verschiedenen Materialien bestehen, **dadurch gekennzeichnet, dass** die Klemmbacke (20) elastisch in Richtung zum Durchgang (15) vorgespannt ist.
- 25 2. Schnalle (12) gemäß Anspruch 1, wobei die Klemmbacke (20) elastisch zum Durchgang (15) mittels einer Feder, die einstückig mit dem Schnallenkörper ist, vorgespannt ist.
- 30 3. Schnalle (12) gemäß einem der Ansprüche 1 und 2, wobei die Klemmbacke (20) aus einem Material mit einer größeren Steifigkeit und/oder Festigkeit als das Material, aus dem der Körper gebildet ist, besteht.
- 35 4. Schnalle (12) gemäß einem der vorhergehenden Ansprüche, wobei die Klemmbacke (20) und der Körper jeweils aus einem unterschiedlichen geformten Kunststoffmaterial besteht.
- 40 5. Schnalle (12) gemäß einem der vorhergehenden Ansprüche, wobei die Klemmbacke (20) und der mindestens eine Zahn (24), den sie trägt, aus Kunst-
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- 50
- 55

stoffmaterial bestehen, z. B. Nylon, wie z. B. Nylon 6.6, Nylon 11 oder Acetal oder Polypropylen, das mindestens eine Versteifung und/oder Verstärkung, z. B. Glas aufweist.

6. Schnalle (12) gemäß einem der vorhergehenden Ansprüche, wobei der Körper aus Kunststoffmaterial besteht, z. B. Nylon, wie z. B. Nylon 6.6, Nylon 11 oder Acetal oder Polypropylen, das optional mindestens ein Verstärkungsmaterial, wie z. B. Glas aufweist.
7. Schnalle (12) gemäß Anspruch 4, wobei der Körper und die Klemmbacke (20) beide aus demselben Ausgangskunststoffmaterial, z. B. Nylon, wie z. B. Nylon 6.6, Nylon 11 oder Acetal oder Polypropylen bestehen und die Klemmbacken (20) mindestens ein Verstärkungsmaterial, z. B. Glas, oder eine größere Beschickung mit dem Verstärkungsmaterial aufweisen.
8. Schnalle (12) gemäß einem der vorhergehenden Ansprüche, wobei die Klemmbacke (20) schwenkbar, z. B. über ein Gelenk mit dem Körper verbunden ist, um zu ermöglichen, dass die Klemmbacke (20) von dem Durchgang (15) weggehoben wird, wenn ein Band (10) in den Durchgang (15) geschoben wird.
9. Schnalle (12) gemäß Anspruch 7, wobei die Klemmbacke (20) Drehzapfen (26) aufweist, die schwenkbar in Ausnehmungen (20) in dem Körper gehalten sind und ein Gelenk bilden, um zu ermöglichen, dass die Klemmbacke (20) von dem Durchgang (15) weggehoben wird, wenn ein Band (10) in den Durchgang (15) geschoben wird.
10. Schnalle (12) gemäß einem der Ansprüche 7 bis 9, wobei der mindestens eine Zahn (24) einen quadratischen oder rechteckigen Querschnitt aufweist.
11. Schnalle (12) gemäß einem der vorhergehenden Ansprüche, wobei der mindestens eine Zahn (24) auf der Klemmbacke (20) Widerhaken aufweist und eine erste Fläche (40) hat, die schräg abfällt, um über die Bandzähne (11) zu laufen, wenn das Band (10) in die Schnalle (12) gedrückt wird, und eine zweite Fläche (42), die schräg abfällt, um die Klemmbacke (20) in näheren Eingriff mit dem Band (10) zu drücken, wenn eine Spannung in dem Band (10) dazu tendiert, das Band (10) aus der Schnalle (12) zu ziehen.
12. Schnalle (12) gemäß einem der vorhergehenden Ansprüche, wobei der Körper eine zweite Klemmbacke aufweist, die mit dem Körper verbunden ist und mindestens einen Zahn zum Eingriff mit den Zähnen (11) an dem zweiten Ende des Bandes (10) trägt und dadurch das zweite Ende des Bandes (10)

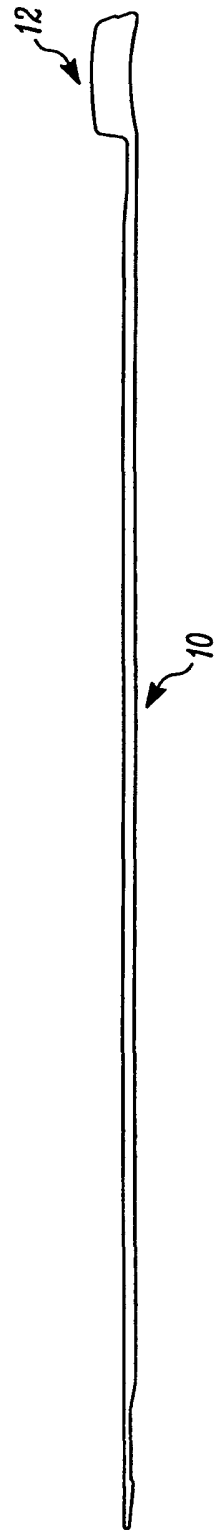
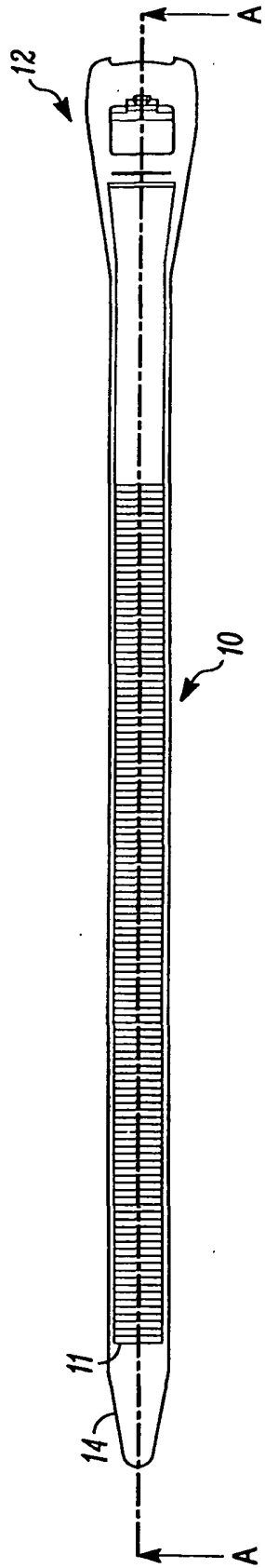
hält, wenn in einer geschlossenen Schleife gebildet, wobei die zweite Klemmbacke und der mindestens eine Zahn, den sie trägt, aus einem Material bestehen, das von dem Material des Körpers verschieden ist, und wobei optional die zweite Klemmbacke die in einem der Ansprüche 1 bis 11 für die erste Klemmbacke angegebenen Merkmale aufweist.

13. Befestigungselement mit einer Schnalle (12), wie in einem der vorhergehenden Ansprüche definiert, und einem Band (10) mit einem ersten (14) und einem zweiten Ende und Zähnen (11), die an mindestens dem ersten Ende (14) vorgesehen sind, wobei das Befestigungselement ausgebildet ist, um einen Gegenstand oder Gegenstände, der oder die von dem Band (10) umgeben ist bzw. sind, zusammenzudrücken oder festzuklemmen.
14. Befestigungselement gemäß Anspruch 13, wenn abhängig von einem der Ansprüche 1 bis 11, wobei das Band (10) einstückig mit der Schnalle (12) ist.
15. Befestigungselement gemäß Anspruch 13, wenn abhängig von Anspruch 12 oder Anspruch 13, wobei das Band (10) von der Schnalle (12) trennbar ist und Zähne (11) an seinem ersten (14) und zweiten Ende aufweist.

30 Revendications

1. Boucle (12) destinée à une utilisation avec une bande (10) pour former une fixation configurée pour compresser ou pincer un article ou des articles cerclé (s) par la bande (10), la bande (10) ayant une première (14) et une deuxième extrémité et des dents (11) prévues sur au moins la première extrémité (14) et destinées à une utilisation pour maintenir la bande (10) en une boucle fermée, la boucle (12) comprenant un corps, une mâchoire (20) qui est connectée au corps et qui porte au moins une dent (24) pour un engagement avec les dents (11) sur la première extrémité (14) de la bande (10) et ainsi maintenir la première extrémité (14) de la bande (10) lorsqu'elle est formée en une boucle fermée, et dans laquelle le corps de boucle comprend un passage (15) pour contenir une extrémité de la bande (10), le corps et la mâchoire (20) étant des composants séparés et constitués de matériaux différents, **caractérisée en ce que** la mâchoire (20) est poussée de façon résiliente vers le passage (15).
2. Boucle (12) selon la revendication 1, dans laquelle la mâchoire (20) est poussée de façon résiliente vers le passage (15) par un ressort qui est intégré avec le corps de boucle.
3. Boucle (12) selon l'une ou l'autre des revendications

- 1 et 2, dans laquelle la mâchoire (20) est constituée d'un matériau avec une rigidité et/ou une résistance supérieure(s) au matériau duquel le corps est formé.
4. Boucle (12) selon une quelconque revendication précédente, dans laquelle la mâchoire (20) et le corps sont chacun constitués d'un matériau plastique moulé différent. 5
5. Boucle (12) selon une quelconque revendication précédente, dans laquelle la mâchoire (20) et l'au moins une dent (24) qu'elle porte sont constituées d'un matériau plastique, par exemple un nylon, tel qu'un nylon 6.6, un nylon 11, ou un acétal ou un polypropylène contenant au moins un renfort de rigidité et/ou de résistance, par exemple du verre. 10 15
6. Boucle (12) selon une quelconque revendication précédente, dans laquelle le corps est constitué d'un matériau plastique, par exemple un nylon, tel qu'un nylon 6.6, un nylon 11, ou un acétal ou un polypropylène qui inclut facultativement au moins un matériau de renfort, par exemple du verre. 20
7. Boucle (12) selon la revendication 4, dans laquelle le corps et la mâchoire (20) sont tous les deux constitués du même matériau plastique de base, par exemple un nylon, tel qu'un nylon 6.6, un nylon 11, ou un acétal ou un polypropylène, et les mâchoires (20) incluent au moins un matériau de renfort, par exemple du verre, ou une charge supérieure du matériau de renfort. 25 30
8. Boucle (12) selon une quelconque revendication précédente, dans laquelle la mâchoire (20) est connectée de façon pivotante au corps, par exemple par l'intermédiaire d'une charnière, pour permettre que la mâchoire (20) soit soulevée à l'écart du passage (15) lorsqu'une bande (10) est poussée dans le passage (15). 35 40
9. Boucle (12) selon la revendication 7, dans laquelle la mâchoire (20) comprend des tourillons (26) qui sont maintenus de façon pivotante dans des renforcements (20) dans le corps et forment une charnière pour permettre que la mâchoire (20) soit soulevée à l'écart du passage (15) lorsqu'une bande (10) est poussée dans le passage (15). 45
10. Boucle (12) selon l'une quelconque des revendications 7 à 9, dans laquelle l'au moins une dent (24) a une section transversale carrée ou rectangulaire. 50
11. Boucle (12) selon de quelconques revendications précédentes, dans laquelle l'au moins une dent (24) sur la mâchoire (20) comporte un ardillon et a une première surface (40) qui part en pente de façon à recouvrir les dents (11) de bande lorsque la bande (10) est poussée dans la boucle (12) et une deuxième surface (42) qui part en pente pour forcer la mâchoire (20) en un engagement plus étroit avec la bande (10) lorsqu'une tension dans la bande (10) tend à faire sortir la bande (10) de la boucle (12). 55
12. Boucle (12) selon de quelconques revendications précédentes, dans laquelle le corps comprend une deuxième mâchoire qui est connectée au corps et qui porte au moins une dent pour engager des dents (11) sur la deuxième extrémité de la bande (10) et ainsi maintenir la deuxième extrémité de la bande (10) lorsqu'elle est formée en une boucle fermée, dans laquelle la deuxième mâchoire et l'au moins une dent qu'elle porte sont constituées d'un matériau qui est différent du matériau du corps, et facultativement dans laquelle la deuxième mâchoire a les caractéristiques spécifiées dans l'une quelconque des revendications 1 à 11 pour la première mâchoire.
13. Fixation comprenant une boucle (12) selon une quelconque revendication précédente et une bande (10) ayant une première (14) et une deuxième extrémité et des dents (11) prévues sur au moins la première extrémité (14), la fixation étant configurée pour compresser ou pincer un article ou des articles cerclé(s) par la bande (10).
14. Fixation selon la revendication 13 lorsqu'elle dépend de l'une quelconque des revendications 1 à 11, dans laquelle la bande (10) est intégrée à la boucle (12).
15. Fixation selon la revendication 13 lorsqu'elle dépend de la revendication 12 ou de la revendication 13, dans laquelle la bande (10) est séparable de la boucle (12) et a des dents (11) à ses première (14) et deuxième extrémités.



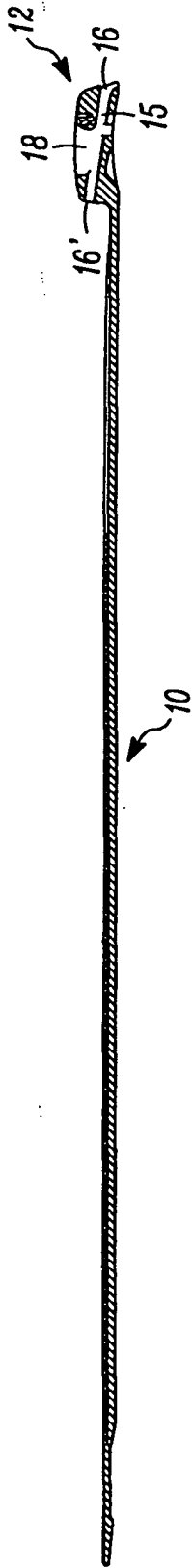


FIG. 3

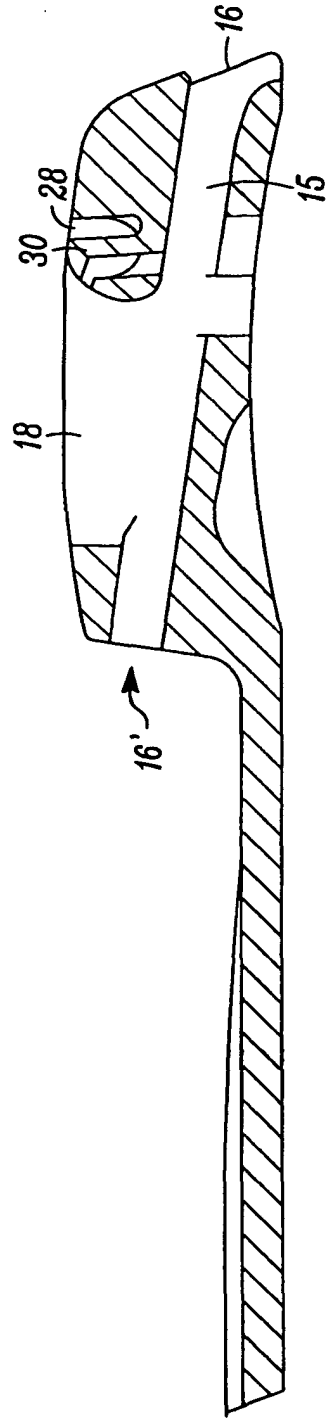


FIG. 4

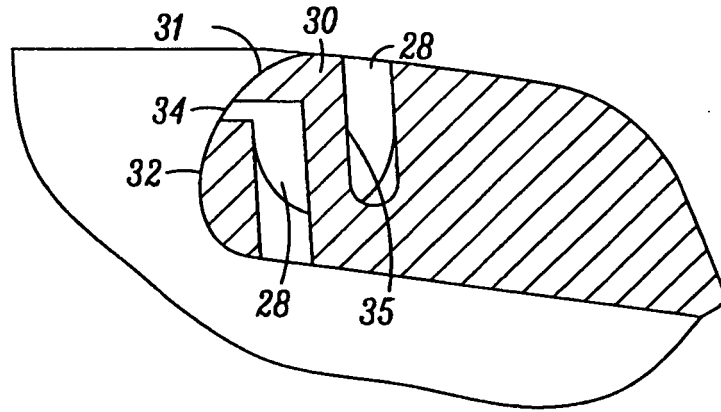


FIG. 5

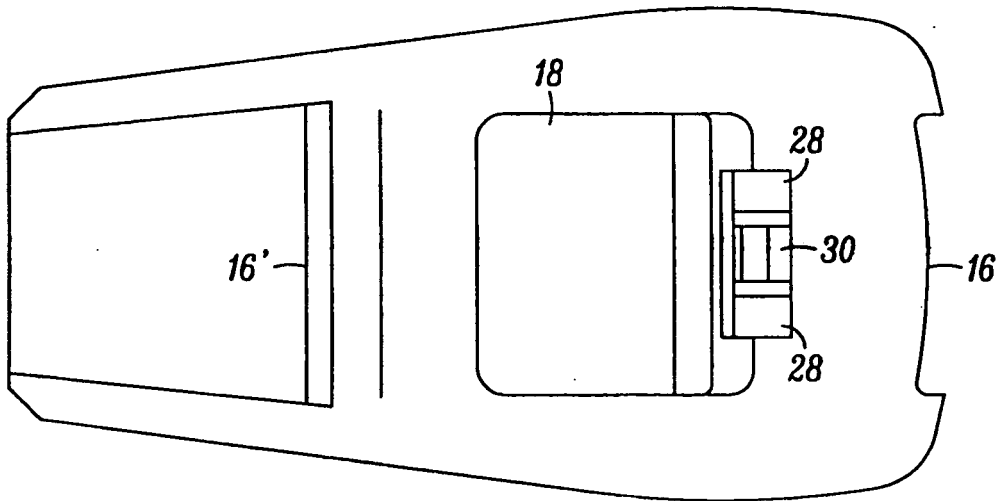


FIG. 6

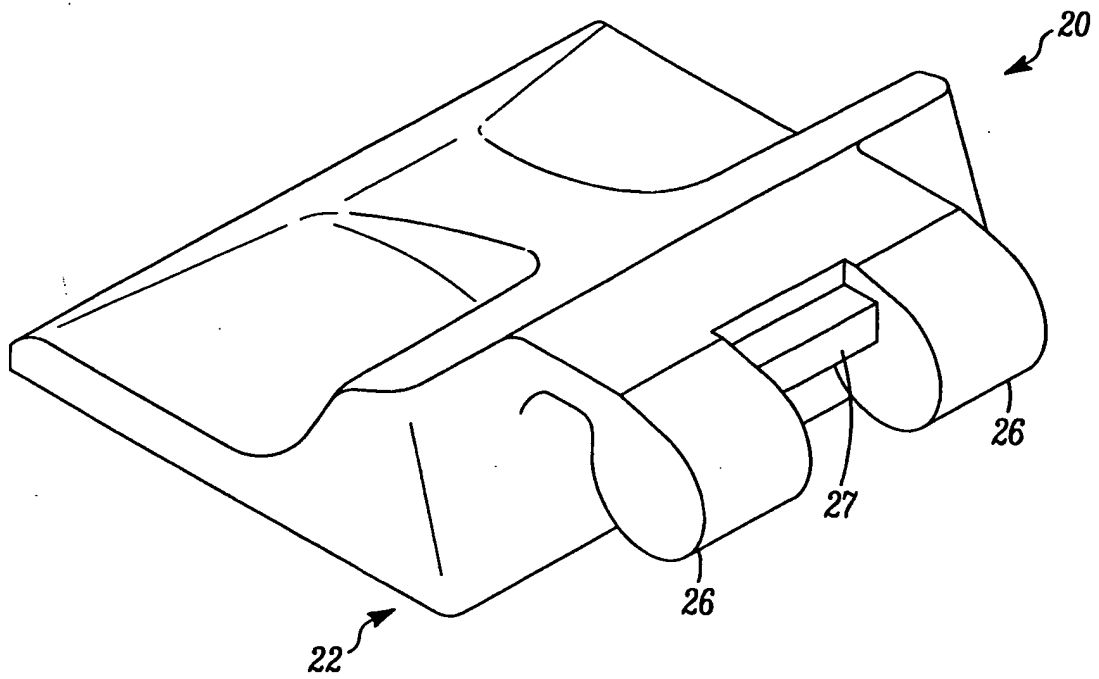


FIG. 7

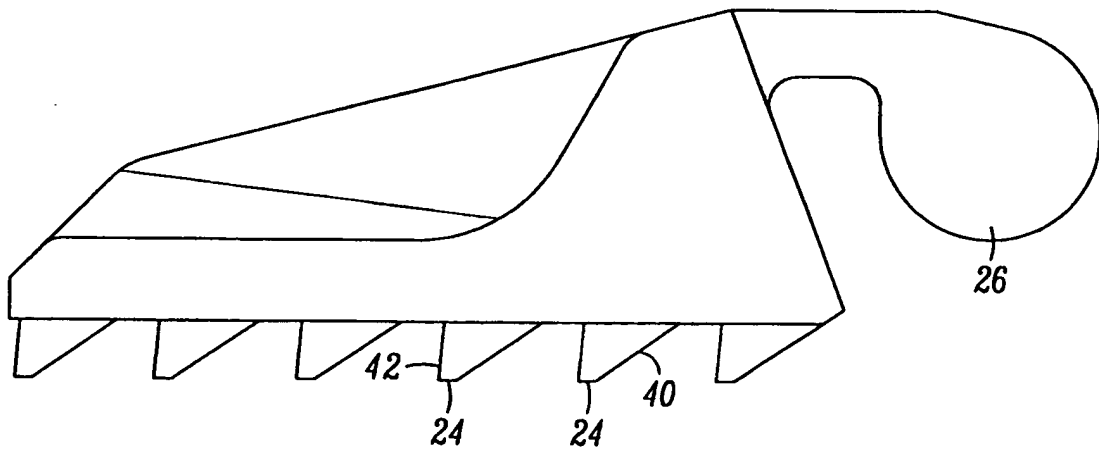


FIG. 8

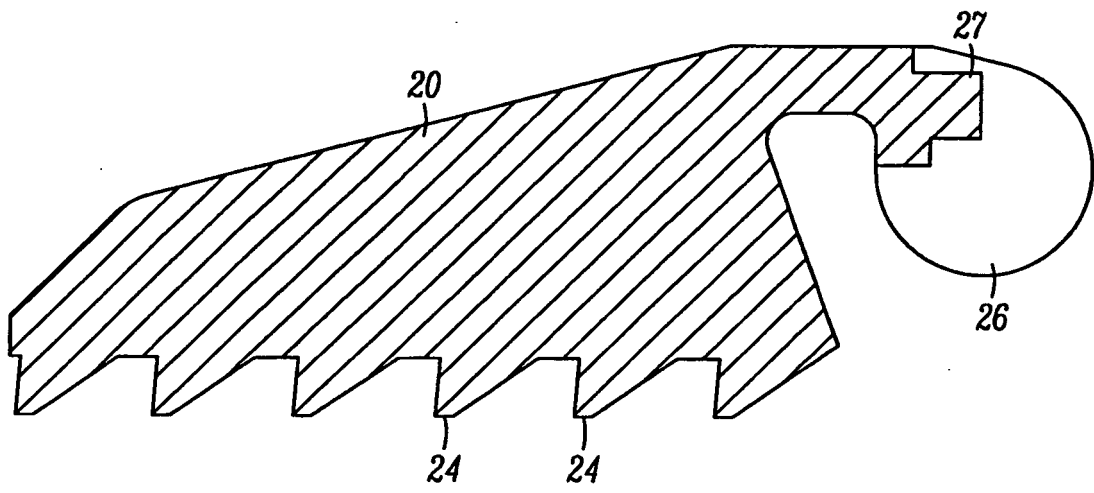


FIG. 9

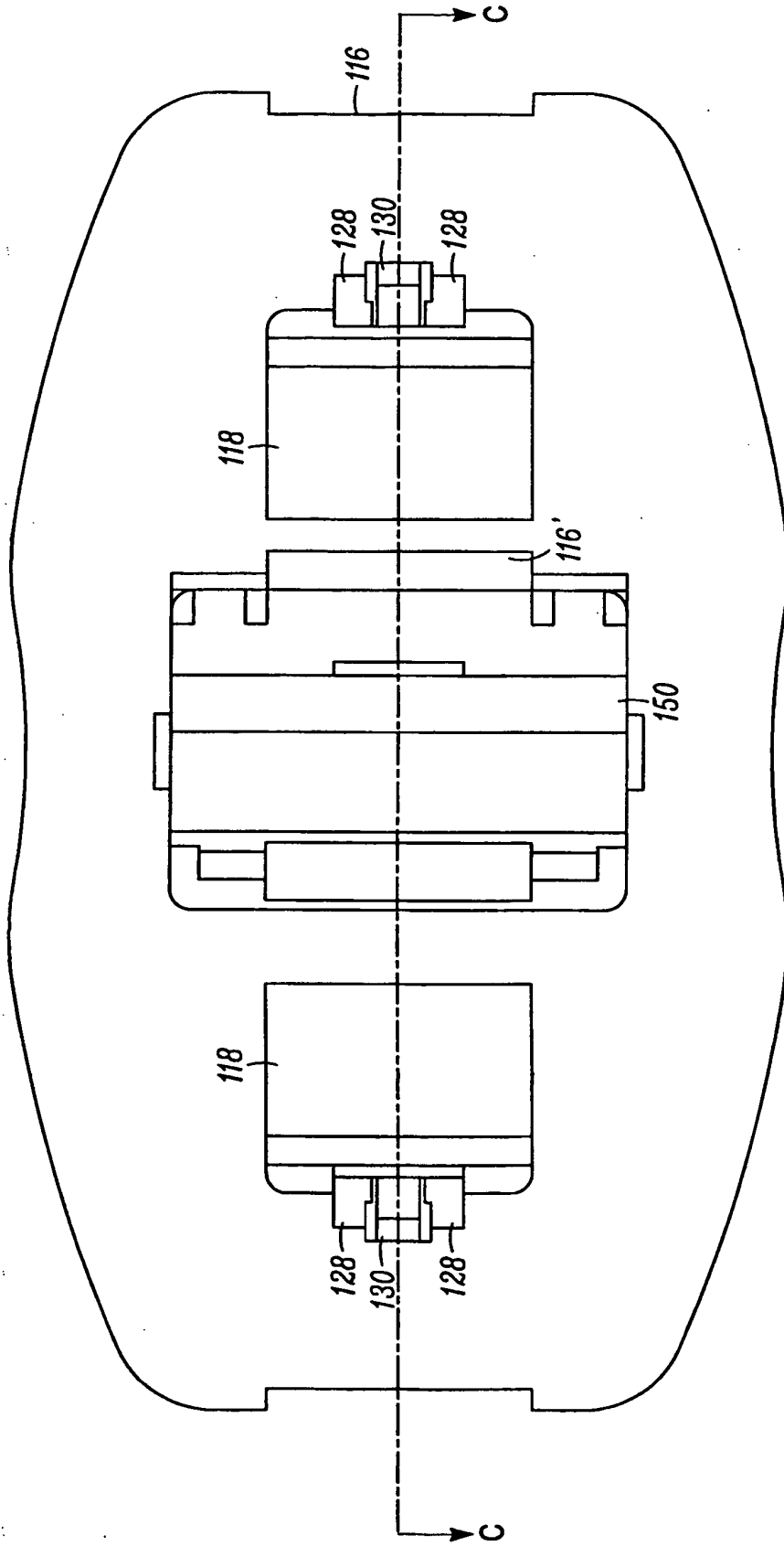


FIG. 10

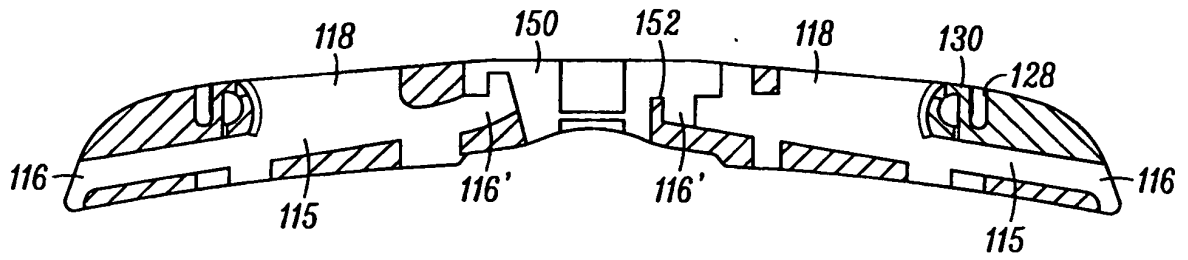


FIG. 11

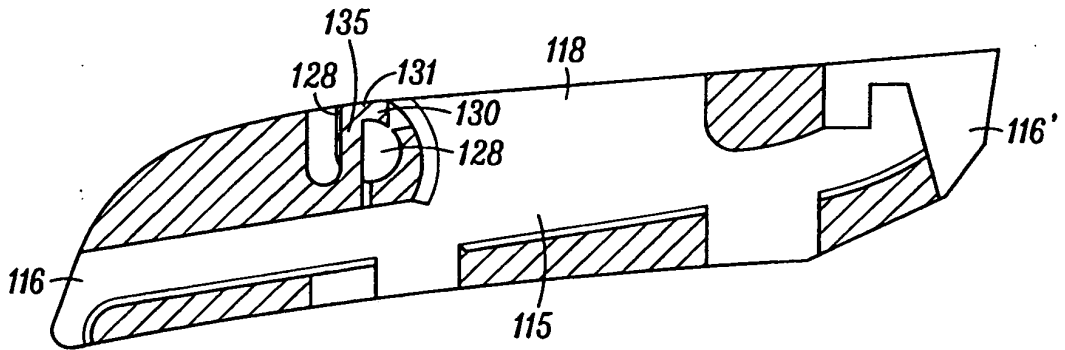


FIG. 12

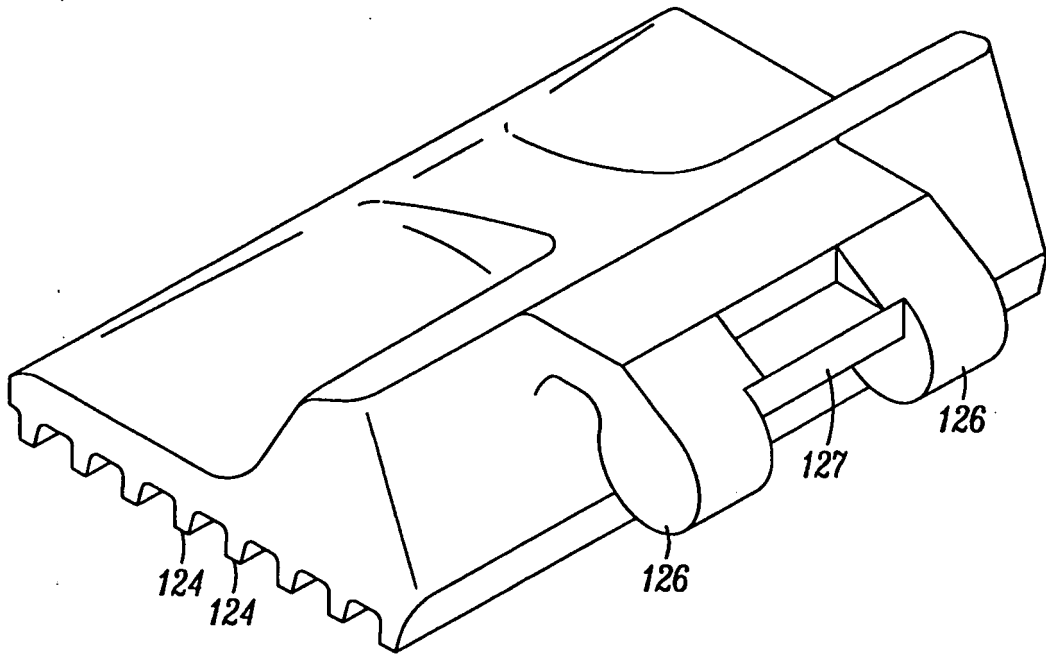


FIG. 13

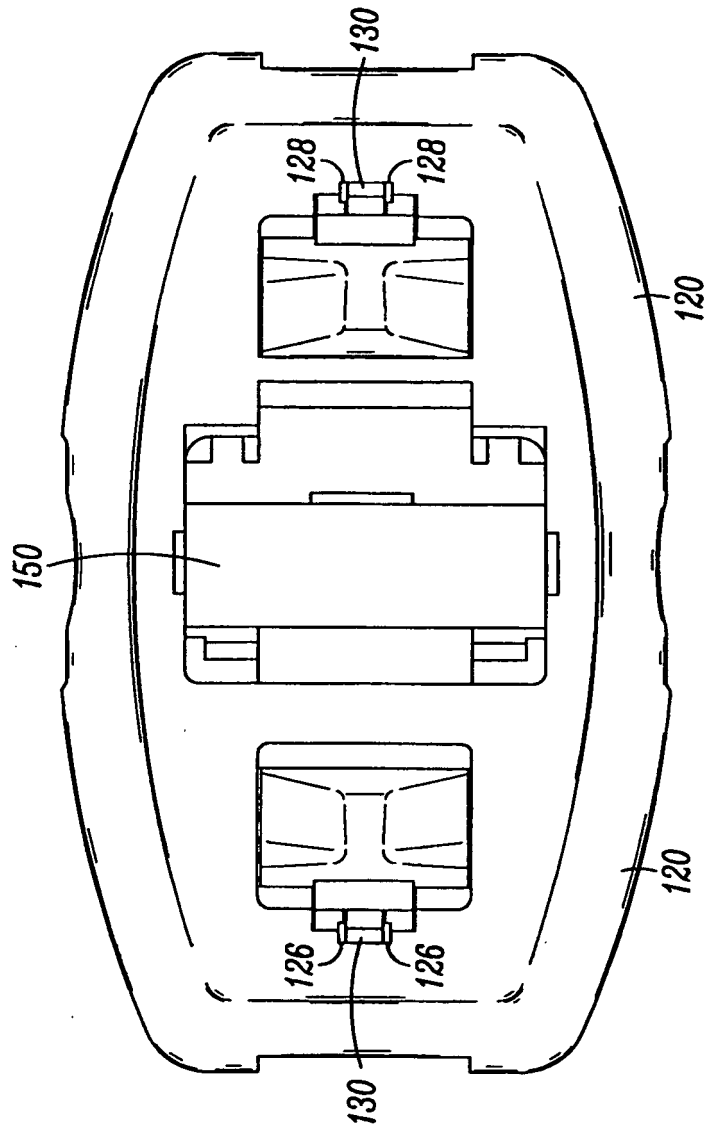


FIG. 14

REFERENCES CITED IN THE DESCRIPTION

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