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(54) **AUTOMATIC BUCKLE**

(57) The present invention relates to a buckle (1) to fasten together a first end (2a) and a second end (2b) of a belt (2) or two belts, comprising a female member (3,103) and a male member (4,104) respectively connected to said first end (2a) and second end (2b), wherein said male member (4,104) comprises a coupling portion (34,134) with the female member (3,103), and wherein said female member (3,103) comprises a portion (5,105) for the connection with said male member (4,104), said portion (5,105) comprising a hollow body having a longitudinal axis X, a wall (10) and a notch (17,117) in the wall (10) comprising a loop section (19,119), said loop being defined by a lower edge (22,122), by a side edge (23, 123) and by an upper edge (24,124), within said hollow body a seat (16,116) being defined for the coupling portion (34, 134) of the male member (4,104), characterised in that elastic means (14,114) are provided for in said seat (16,116), which oppose the insertion of the coupling portion (34,134) of the male member (4,104) in the seat (16,116) and further characterised in that the upper edge (24,124) of the loop section (19,119) comprises a tooth portion (25,125) for locking said portion (34,134) in a closed configuration of the buckle (1).

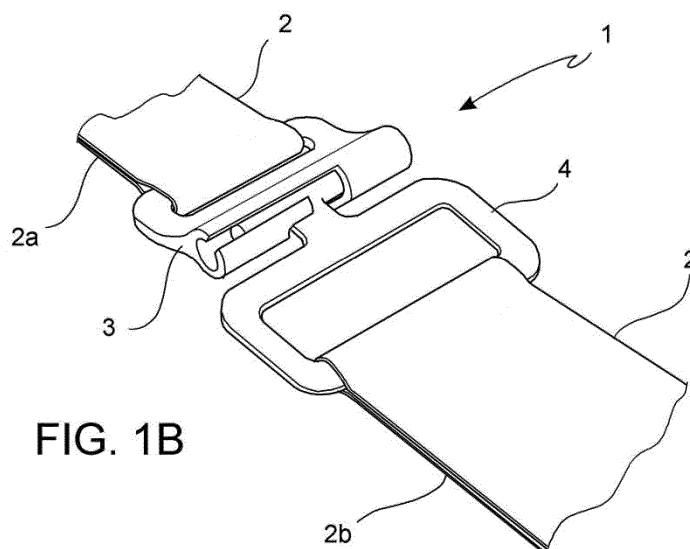


FIG. 1B

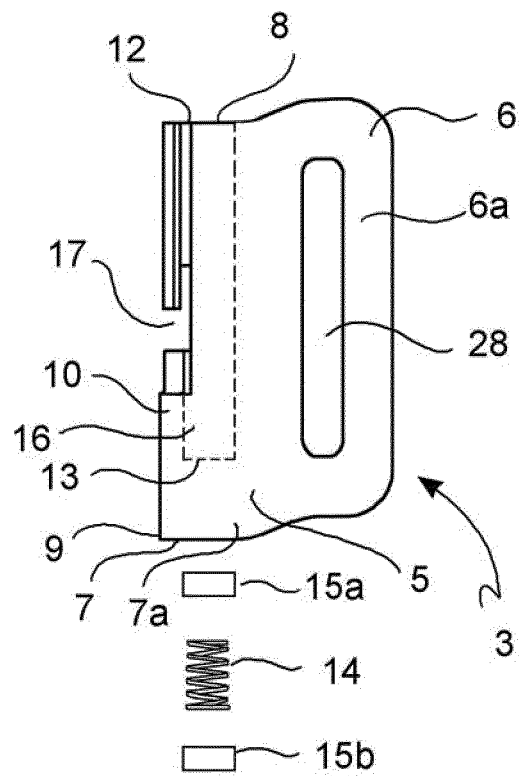


FIG. 2B

Description

[0001] The present invention relates to a buckle and, in particular, to an automatic buckle for a harness.

[0002] The use of harnesses is not limited to the field of sport, such as climbing, or more generally, mountaineering and caving, but contributes daily to the safety of workers in factories and on construction sites. Harnesses in fact, fall within the so-called individual protection devices used for jobs "at heights" with the main purpose of holding the body of the user in case of an accidental fall and to ensure stopping in safe conditions.

[0003] Devices with an increasingly simple construction are constantly designed and manufactured to make their use easy and intuitive and reduce as much as possible the possibility of their misuse.

[0004] Misuse can, in fact, be just as dangerous sometimes as non-use.

[0005] As regards harnesses, the buckle is certainly a key part. This must keep the harness closed while work is being performed and, especially, in the case of an accident.

[0006] In certain circumstances, however, it must be able to open very quickly, so as to allow the wearer to remove the harness quickly.

[0007] To such purpose, so-called automatic type buckles are preferably adopted i.e. which can be opened and closed quickly.

[0008] One buckle of the prior art is for example the one described in the document of the prior art DE 4135458 (Helmut Kothe) shown in Figure 11 (A) and (B). In particular, this buckle comprises a female member 3 in which a seat is made for the insertion of the male member 4; such latter is kept in the closed position by a locking member 10 having a tooth portion 10, on which a spring 12 acts to prevent the male member from being extracted.

[0009] The US patent application US 2011/113601 (Saint Nathanael et al) describes instead the buckle shown in Figure 11C, which comprises a female fastening element 12 and a male fastening element 14. The female element 12 in turn comprises a first member 16 and a coupling structure 18 made thereon. The male fastening element 14 is detachably connected to the female fastening element 12 and comprises a second body 24 and a rod 26. The rod 26 is placed on the second body 24 and is detachably connected to the coupling structure 18. When the rod 26 is engaged with the coupling structure 18, the first body 16 rotates relative to the second body 24. The locking of the rod, and thus of the buckle, is achieved thanks to an actuating member 34.

[0010] The German document DE 295 10652 U1 describes the fastening for a necklace shown in Figure 11D, which comprises a male portion (not shown) which can be elastically coupled to a female portion 3. The fastening does not comprise locking means.

[0011] The purpose of the present invention is therefore to provide an automatic buckle that is easy to use and which cannot be opened in any case even under

load as described in the main appended claim and, in its particular aspects, in the dependent claims, the definitions of which form an integral part of this description.

[0012] Further characteristics and advantages of the invention will, in any case, be more clearly comprehensible from the description given below of a preferred embodiment, made by way of a non-limiting example with reference to the appended drawings, wherein:

Figure 1 shows a perspective view of the buckle according to the invention in the open configuration (A) and the closed configuration (B);

Figure 2 shows the female member laterally (A), in an exploded view (B), with the inner abutment member in the lower position (C) and upper position (D), in cross-section not to scale (E) and from the front (F and G);

Figure 3 shows the male member in a side view (A) and in cross-section (B);

Figures 4A to 4E show the coupling steps of the male member with the female member (A, B: insertion; C: rotation; D: translation; E: locking);

Figures 5 show side views (A, B), in cross-section not to scale (C), front views (D, E) and in transparency (F, G) of the female member according to an alternative embodiment of the invention;

Figures 6 show the male member according to an alternative embodiment of the invention in a side view (A) and in cross-section (B);

Figures 7A to 7E show the coupling steps of the male member with the female member (A, B: insertion; C: rotation; D: locking) according to an alternative embodiment of the invention;

Figures 8A to 8C show particular embodiments of the invention;

Figures 9A to 9C show the locking plate of the male member (A), in a frontal cross-section (B) and in use (C);

Figure 10 shows a further particular embodiment of the invention;

Figure 11 shows buckles of the prior art.

[0013] With reference to Figure 1 mentioned above, reference numeral 1 globally denotes an automatic buckle according to the invention.

[0014] In particular, this comprises a female member 3 and a male member 4 respectively connected to a first end 2a and to a second end 2b of a belt 2.

[0015] One can easily imagine how the buckle of the invention can equally be used for the connection of the ends 2a, 2b of two separate belts.

[0016] With reference to the female member 3 shown in Figure 2A, this comprises a coupling portion 5 with the male member 4 and a connecting portion 6 to the end of the belt 2a. As shown, the coupling portion 5 comprises means for inserting the male member 4 and means for its locking.

[0017] In particular, said insertion means comprise a

substantially cylindrical hollow body which extends along a major dimension L defined between an upper end 8 and a lower end 7 and having a perimeter 9 and a wall 10.

[0018] In the present description, the terms "upper" or "up" and "lower" or "down" are to be intended as referring to the position of the buckle of the invention when in use in the configuration in which the lower end 7 faces the user feet and the upper 8 faces the user head, thereby placing the coupling portion 5 of the female member 3 in a substantially vertical position, as shown for example in the figures.

[0019] Different positions of use of the buckle are equally possible, where the orientation of the end can also be opposite or oblique to that described above; of course, in such cases, the interpretation of the terms "up" or "upper" and "lower" or "down" should be adapted accordingly.

[0020] More particularly, the hollow body comprises a longitudinal seat 16 which extends starting from the upper end 8 at an upper opening 12 for about 2/3 of the largest dimension L up to a lower inner surface 13.

[0021] At the lower inner surface 13 of the seat 16 elastic means 14 are provided.

[0022] Said elastic means 14 are contained between a fixed abutment member 15b, placed below, and a mobile abutment member 15a, placed above, with which they are operatively connected.

[0023] The fixed abutment member 15b, in particular, can be made by means of a disc or a ring attached at a lower end 7 or the lower end 7 is closed by a closure surface 7a which thus constitutes the fixed abutment member 15b.

[0024] The mobile abutment member 15a in particular is movable from a lower position (figure 2C), in which the elastic means 14 are in the loading condition, to a second upper position (figure 2D), in which the elastic means 14 are unloaded or at least partially unloaded.

[0025] Said mobile abutment member 15a further comprises an upper face which may coincide with the lower inner surface 13 of the seat.

[0026] In a preferred embodiment of the invention, said elastic means 14 are represented by a coil spring as shown in Figure 2B.

[0027] According to a preferred aspect of the invention, the seat 16 made in the female member 3 is eccentric with respect to the longitudinal axis X of the hollow body. Consequently, as shown in Figure 2E, the thickness Z of the wall 10 is not uniform along the perimeter 9 of the hollow body.

[0028] As regards the coupling portion 5, this also comprises a through notch 17, for example shown in figures 2F and 2G, made in the wall 10 of the hollow body and which connects the inner cavity 16 with the outside.

[0029] In a preferred aspect of the invention, said notch 17 comprises a loop portion 19.

[0030] In an even more preferred aspect, the notch also comprises a guide section 18 which extends longitudinally from the top opening 12 up to about halfway along

the largest dimension L of the hollow body, and thus, as far as the loop portion 19.

[0031] The guide section 18 is defined between a first longitudinal edge 20 and a second longitudinal edge 21, creating a sliding opening P.

[0032] As regards the loop section 19, this is delimited in turn by a lower edge 22, by a lateral edge 23 and by an upper edge 24.

[0033] In particular, the lower 22 and upper edges 24 delimit between them a maximum longitudinal opening W of the loop section 19.

[0034] The locking means of the male member are instead represented by an upper edge portion 24 which forms a tooth 25, which projects into the loop 19 as an extension of the second longitudinal edge 21.

[0035] Said tooth 25 therefore is made in the notch 17 in the wall of the hollow body.

[0036] In one aspect of the invention it is delimited by a lower edge 26, which creates with the edge 22 a reduced longitudinal opening W' of the loop, and by an abutment edge 21'.

[0037] In a particular aspect of the invention shown in Figure 2G, in the lower edge 22 of the loop 19 a step 27 may also be made, which has an upper edge 22' which delimits with the upper edge 24, a second reduced longitudinal opening W".

[0038] The connecting portion of the female member 3 to the end 2a of a belt 2, instead, comprises a plate portion 6a shown in figure 2A, in which a window 28 is made, through which said end 2a is made to pass, and which, folded back on itself and lastly attached by means of appropriate stitching as shown in figure 1, forms a loop 29.

[0039] The person skilled in the art may provide for alternative, but equivalent methods, to achieve the coupling of the female member 3 to the belt 2.

[0040] Figure 3A shows the male member 4.

[0041] In particular, this comprises a coupling portion to the female member 3 and a connecting portion to the end 2b of the belt 2.

[0042] In particular, the connecting portion may be a small plate 30a having an upper face 31 and a lower face 32 and comprising a window 33.

[0043] As for the female member, the connection with the belt 2 must therefore be realised by passing the end 2b of a belt through the window 33 and folding it back on itself to form a loop 35 (as shown in figure 1), later appropriately secured.

[0044] As regards the coupling to the female member 3, this may be achieved by means of an insert 34 for example shown in figure 3A and 3B having a longitudinal dimension M.

[0045] In one embodiment of the invention, said insert 34 is substantially bar-shaped, and has a transversal dimension (or diameter) D.

[0046] Said insert 34 is in turn connected to the connecting portion with the belt 30 by means of an intermediate portion 36.

[0047] Said intermediate portion 36 is connected to or is preferably part of the small plate 30a and is characterised by a front face 37 and a rear face 38, which delimit between them a thickness P'; the intermediate portion is further characterised by a length Q and a width Z'.

[0048] For the purposes of the present invention, said intermediate portion 36 is thus configured to fit into the guide section 18 of the female member 3 and be rotatable in the loop section 19.

[0049] As shown in Figure 3B, in fact, the thickness P' is such as to permit sliding in the space P between the longitudinal edges 20 and 21 of the notch 17, while the length Q is such as to allow the rotation in the reduced longitudinal opening W' or W'' of the loop section 19.

[0050] As regards instead the width Z', this corresponds at least to the thickness Z of the wall 10 of the hollow body of the female element 3 in the vicinity of the tooth 25.

[0051] As may be seen in Figure 4A and 4B, the connection between the two elements 3 and 4 is obtained by inserting the insert 34 in the seat 16 through the upper opening 12 and the guide section 18.

[0052] Subsequently, the insert 34 is pushed downward against the upper abutment element 15a and in contrast with the elastic means 14 over the edge 26 and, thereafter, is rotated according to the arrow indicated in figure 4C, so as to be inserted in the loop section 19.

[0053] Once the male member 4 is released (figure 4D), this is pushed upwards by the elastic means thus obtaining the locking of the buckle in the closed configuration (4E) thanks to the face 37 of the male member which comes into abutment against the edge 21' of the tooth 25.

[0054] Such tooth portion, therefore, blocks at least partially both the sliding movement and the rotation of the male member 4, respectively, along and around the longitudinal axis X.

[0055] According to the present invention, the elastic means 14 act on the male member 4 and do not act on the tooth portion 25, which in fact is fixed.

[0056] Conversely, to open the buckle 1, the user applies a certain thrust force downward on the male member 4, which will then be rotated in the direction opposite that shown by the arrow in figure 4C and extracted from the seat 16 through the upper opening 12.

[0057] With reference to Figures 5 to 7, these show an alternative embodiment of the buckle according to the present invention.

[0058] With reference to Figure 5A, the female member 103 comprises a coupling portion 105 with the male member 104 and a connecting portion 106 to the end of the belt 2a. As shown, the coupling portion 105 comprises means for the insertion of the male member and means for locking it.

[0059] More in detail, the insertion means comprise a substantially cylindrical hollow body which extends along a major dimension L' defined between an upper end 108 and a lower end 107 and which has a perimeter 109 and

a wall 110.

[0060] The hollow body further comprises a longitudinal seat 116 which extends starting from the upper end 108 at an upper opening 112 for about 2/3 of the largest dimension L' up to a lower inner surface 113.

[0061] At said surface 113 elastic means 114 are provided.

[0062] In particular, said elastic means 114 are contained between a fixed abutment member 115b, placed below, and a mobile abutment member 115a, placed above, as shown in Fig. 5B, to which they are operatively connected.

[0063] The fixed abutment member 115b can be made by means of a disc or a ring attached at a lower end 107 or the lower end 107 is closed by a closure surface 107a which thus constitutes the fixed abutment member.

[0064] The mobile abutment member 115a is movable from a lower position in which the elastic means 114 are in the loading condition, to a second upper position in which the elastic means 114 are unloaded.

[0065] When the mobile abutment element is a disc or a ring or an equivalent element, this comprises an upper face which may coincide with the lower inner surface 113 of the seat.

[0066] In a preferred embodiment, such elastic means 114 are represented by a coil spring as shown in figure 5B. According to a preferred aspect of the invention, the seat 116 made in the female member 103 is eccentric with respect to the longitudinal axis X of the hollow body. Consequently, as shown in Figure 5C, the thickness H of the wall 110 of the body is not uniform along the perimeter 109 of the hollow body.

[0067] The coupling portion 105 further comprises a notch 117, shown in figures 5D and 5E, made in the wall 110 of the hollow body, which connects the inner seat 116 with the outside; said notch 117 comprises in particular a loop section 119.

[0068] In a preferred aspect as shown in figure 5D, the notch 117 further comprises a guide section 118 which extends longitudinally from the top opening 112 for a portion up to about halfway along the largest dimension L' of the hollow body where the loop portion 119 extends.

[0069] The guide section 118 is defined between a first longitudinal edge 120 and a second longitudinal edge 121, between which a sliding space R is created.

[0070] As regards the loop section 119 instead, this is delimited by a lower edge 122, by a lateral edge 123 and by an upper edge 124.

[0071] The top 124 and bottom edges 122 define between them a maximum longitudinal opening Y of the loop section 119. The top edge 124 comprises a tooth member which further comprises a substantially "J"-shaped portion which protrudes into the loop 119 forming a secondary loop 119a.

[0072] Said tooth 125 is thus delimited by the longitudinal edge 121, by a lower edge 126, by an outer edge 121'', by an upper edge 126' and by an abutment edge 121'. Furthermore, between said lower edge 126 and the

lower edge 122 of the loop 119, a reduced longitudinal opening Y' of the loop 119 is defined.

[0073] In the configuration shown in figure 5E, the lower edge 122 of the loop 119 comprises a step 127, delimited by an upper edge 122', which with the upper edge of the loop 124, creates a second reduced longitudinal opening Y". According to this alternative embodiment, the male member 104 of the buckle is shown in figures 6A and 6B.

[0074] In particular, said member comprises a coupling portion 134 to the female member 103 and a connecting portion 130 to the end 102b of the belt 102.

[0075] As shown, the connecting portion 130 may be a small plate 130a having an upper face 131, a lower face 132 and a window 133.

[0076] As described in relation to the first embodiment, the connection of the male member 104 to the belt 2, can therefore be achieved by passing the end 2b through the window 133 and forming a loop 135, which is subsequently properly secured.

[0077] As regards the coupling portion 134 to the female member 103, this can be an insert having a longitudinal dimension l.

[0078] As for example shown in the figure, the insert may have a bar shape characterised by a diameter N.

[0079] Said insert 134 is in turn connected to the connecting portion 130 by an intermediate portion 136.

[0080] Said intermediate portion 136 is connected to or is preferably an integral part of the small plate 130a and comprises a front face 137 and a rear face 138, which delimit between them a thickness V.

[0081] The intermediate portion 136 is characterised by a length K and a width T.

[0082] According to this embodiment, in the vicinity of the insert 134 the intermediate portion 136 comprises further locking means with the female member 103, which may for example be represented by the pin 139 in figure 6A.

[0083] Said further locking means are in particular intended to be inserted in the secondary loop 119a of the female member 103.

[0084] The pin 139, in fact, has a length K', a width T', an abutment surface 137' and a thickness V', so that the intermediate portion 136 at the pin 139 has a total thickness V".

[0085] Said intermediate portion 136 is therefore configured to respectively insert and rotate in the guide section 118 and in the loop section 119 of the notch 117 of the female member 103.

[0086] In fact, the thickness V" of the pin and V of the intermediate portion are such as to allow the insertion into the notch 117.

[0087] Moreover, the length K is such as to allow rotation in the loop 119.

[0088] As regards instead the width T, this corresponds at least to the thickness H of the wall 110 of the hollow body of the female member 103 at the tooth 125 (see figure 5C). In particular, as can be seen in Figure 7A, the

connection between the two elements 103 and 104 is obtained firstly by inserting the insert 134 in the seat 116 through the upper opening 112 and the guide section 118.

[0089] Subsequently, as shown in Figure 7B, the insert is pushed downward against the upper abutment element 15a and in contrast with the elastic means 114 until beyond the edge 126; it is then rotated in the direction of the arrow indicated in Figure 7C, so as to be inserted in the loop section 119.

[0090] Once the male member 104 has been released, this is pushed upwards by the elastic means 114 thus obtaining the locking of the buckle in the closed configuration (figure 7D).

[0091] Conversely, the user can open the buckle 1 by applying a certain thrust force downward on the male member 104, which will then be rotated in the direction opposite that shown by the arrow in figure 7C and then extracted from the seat 116 through the upper opening 112.

[0092] For the purposes of the present invention, the intermediate portion 136 of the male member may comprise more than one medium, such as the pin described, for interlocking with the female member 103.

[0093] According to a further embodiment of the invention, the female element 3, 103 further comprises safety means to prevent the accidental opening of the buckle 1.

[0094] Such safety means may be represented for example by a leaf 39 such as that shown in Figure 8A.

[0095] In particular, said leaf 39 comprises a constraint edge and an abutment edge 41, which define a leaf width J. The leaf 39 comprises a lower profile 42 and an upper profile 43 which define between them a length U. According to the present invention, the safety leaf may operate in different ways.

[0096] For example, it may be hinged by means of the constraint edge 40 to the longitudinal edge 20 of the guide section 18, so as to remain free to rotate in the direction indicated by the arrow in Figure 8A between a closed (8A) and an open position (8B).

[0097] Alternatively, the leaf 39 may be fixed to the female member 3, 103 by interlocking at the edges 20 and 21 and/or to one or more edges of the loop 19.

[0098] In this case, the leaf 39 will be preferably made of elastic material, such as rubber.

[0099] In a first preferred aspect (Figure 8A), said width J is such as to reduce at least partially, and preferably totally, the opening P.

[0100] In this way the escape of the insert 34, 134 from the seat insert 16, 116 is advantageously prevented.

[0101] In a second aspect, instead, the width J is such as to prevent the rotation of the male member 4, 104 in the opening direction of the buckle 1.

[0102] In another aspect shown in Figure 8C, the leaf 39 is configured to prevent the downward movement of the male member 4, 104.

[0103] In a further embodiment, the buckle 1 of the present invention further comprises auxiliary constraint means of the male member 4, 104 to the end of the belt 2b.

[0104] As shown for example in Figures 9A and 9B, a small plate 44 may be provided for of a substantially rectangular shape, having a major dimension E and a minor dimension G, an upper face 45 and a lower face 46.

[0105] The small plate 44 further comprises two windows 47, 48 preferably mutually parallel and of a substantially elongated shape, separated by a separation portion 49.

[0106] In a preferred aspect, said small plate 44 has dimensions corresponding to the plate portion 30,130 of the male member 4,104 so that, when overlapping each other, the two windows 47,48 of the small plate 44 are at the window 33,133 of the male member 4, 104.

[0107] As shown in Figure 9C, according to this alternative embodiment of the invention, the male member 4,104 is connected to the end 2b of a belt 2 by passing the webbing from the bottom upwards first through the window 33, 133 of the small plate 30,130 and then through the window 48; the webbing is then made to pass astride the separation portion 49 and subsequently from the top downwards respectively through the window 47 and the window 33,133 of the small plate 30,130, thereby forming a loop which is fixed to said end 2b by suitable safety stitching.

[0108] This way, the movement or rotation of the male member 4,104 is advantageously reduced or even prevented.

[0109] In an even further embodiment, the buckle 1 of the invention further comprises means of protection in order to avoid stresses on the male member 4,104.

[0110] As shown for example in Figure 10, a shell 50 may be provided placed at the lower end 7 of the hollow body of the female member 3,103.

[0111] Said shell 50 preferably is substantially plug-shaped and even more preferably has a shape corresponding to the cross-section of the body 5 of the female member at the lower end 7.

[0112] As shown in Figure 10, said plug 50 in practice extends the length L, L' of the female member 3,103 creating a prolonged lower end 7'.

[0113] This way, when the buckle 1 is closed and the male member 4,104 is in the locked position, its lower edge 30a is aligned with the prolonged lower end 7'.

[0114] Advantageously, therefore, in the case of shocks or stresses of the buckle, upward thrust movements of the male member 4,104, such as to cause the opening of the buckle and thereby place the user in a situation of danger, are prevented.

[0115] Preferably, said shell 50 is integral with the hollow body of the female element or 3,103 or can be made in an elastomeric material or rubber, as an insert fitting into the lower end 7 of the body.

[0116] From the above description of the automatic buckle for a harness according to the present invention, the advantages introduced compared to the prior devices are evident.

[0117] First of all, the device is particularly easy, simple and intuitive to use.

[0118] Therefore, its use by a mountaineer or worker is even safer, since less prone to error.

[0119] Also, it is easy to see how the device can be readily opened with one hand.

[0120] Thanks in part to the auxiliary means of constraint of the male member to the end of the belt, its movement along the connection loop with the belt is advantageously prevented or completely blocked, allowing a more comfortable and safer use.

[0121] Even the locking plate of the rotation of the insert in the opening direction of the buckle prevents it from sliding out and opening the buckle.

[0122] A further advantage is represented by the fact that the automatic buckle of the invention does not comprise actuation members for closing/opening, which could break or be unintentionally operated, as in some of the buckles of the prior art.

[0123] Lastly, the shell prevents accidental impact of the buckle during work or sports, from causing the opening of the buckle.

[0124] A person skilled in the art may make numerous modifications and variations to the embodiments described above of the device according to the invention, replacing elements with others functionally equivalent so as to satisfy specific and contingent requirements while remaining within the sphere of protection of the following claims.

Claims

1. A buckle (1) to fasten together a first end (2a) and a second end (2b) of a belt (2) or two belts, comprising a female member (3,103) and a male member (4,104) respectively connected to said first end (2a) and second end (2b), wherein said male member (4,104) comprises a coupling portion (34,134) with the female member (3,103), and wherein said female member (3,103) comprises a portion (5,105) for the connection with said male member (4,104), said portion (5,105) comprising a hollow body having a longitudinal axis X, a wall (10) and a notch (17,117) in the wall (10) comprising a loop section (19,119), said loop being defined by a lower edge (22,122), by a side edge (23, 123) and by an upper edge (24,124), within said hollow body being defined a seat (16,116) for the coupling portion (34,134) of the male member (4,104),

characterized in that elastic means (14,114) are provided for in said seat (16,116), which oppose the insertion of the coupling portion (34,134) of the male member (4,104) in the seat (16,116) and further **characterized in that** the upper edge (24,124) of the loop section (19,119) comprises a tooth member (25,125) for locking said portion (34,134) in a closed configuration of the buckle (1).

2. The buckle (1) according to the preceding claim,

wherein said tooth member (25,125) comprises a longitudinal edge (21,121), a lower edge (26,126), and an abutment edge (21', 121') of the coupling portion of the male member (34,134).

3. The buckle (1) according to the preceding claim, wherein said tooth member (25,125) further comprises a "J"-shaped portion defined by an outer edge (121") and an upper edge (126'), which give rise to a secondary loop (119a).
4. The buckle (1) according to any one of the preceding claims, wherein said notch further comprises a guide portion (18,118) defined between the first longitudinal edge (20) and a second longitudinal edge (21) defining a sliding opening P.
5. The buckle (1) according to any one of the preceding claims, wherein said hollow body comprises an upper opening (12,122) for the insertion of the coupling portion (34,134) of the male member (4,104) into the seat (16,116) through said guide portion (18,118).
6. The buckle (1) according to any one of the preceding claims, wherein said elastic means (14,114) are operatively connected with a movable abutment member (15a, 115a).
7. The buckle (1) according to the preceding claim, wherein said elastic means (14, 114) are represented by a coil spring.
8. The buckle (1) according to any one of the preceding claims, wherein said lower edge (22,122) of the loop comprises a step (27, 127) having an upper edge (22', 122').
9. The buckle (1) according to any one of the preceding claims, wherein, in said body, the seat (16,116) is eccentric with respect to the longitudinal axis X.
10. The buckle (1) according to any of the preceding claims, wherein the female member (3,103) comprises a connecting portion (6,106) at the end of a belt (2a or 2b), which portion (6,106) comprises a small plate-shaped portion (6a, 106a) having a window (28,128) for the passage of said end (2a or 2b).
11. The buckle (1) according to any one of the preceding claims, wherein the male member (4,104) comprises a connecting portion at the end of a belt (2a or 2b), which portion comprises a small plate-shaped portion (30,130) having a window (33,133) for the passage of said end (2a or 2b).
12. The buckle (1) according to any one of the preceding claims, wherein the coupling portion of the male member (4,104) to the female member (3,103) com-

prises an insert (34,134) so configured as to insert in the seat (16,116) of the female member (3,103).

13. The buckle (1) according to the preceding claim, wherein said insert (34,134) inserts into the seat (16,116) through said upper opening (12,112) and said guide portion (18,118).
14. The buckle (1) according to any one of the preceding claims, wherein the male member (4,104) comprises an intermediate portion (36,136) between the portion for the coupling to the female member (34,134) and the connecting portion to the end (2a or 2b) of a belt, which is configured to insert in the guide section (18,118) of the notch (17,117) and to be able to rotate in the loop section (19,119).
15. The buckle (1) according to the preceding claim when dependent from any one of the claims 3 to 14, wherein said intermediate portion (36,136) further comprises means (139) for the further locking with the female member (3,103).
16. The buckle (1) according to the preceding claim, wherein said means (139) are represented by a pin, which is intended to insert into said secondary loop (119a) in abutment against the abutment edge (21', 121').
17. The buckle (1) according to any of the preceding claims, further comprising safety means to prevent the accidental opening of the buckle (1) when it is closed.
18. The buckle (1) according to the preceding claim, wherein said safety means are represented by a member (39) that partially or completely reduces the opening P of the guide portion of the notch (18,118).
19. The buckle (1) according to the preceding claim, wherein said member (39) can be secured by fitting to the notch (17,117).
20. The buckle (1) according to any of the preceding claims, further comprising auxiliary constraint means of the male member (4,104) to the end of the belt (2a,2b).
21. The buckle (1) according to the preceding claim, wherein said auxiliary constraint means comprise a small plate (44) having a major dimension (E), a minor dimension (G), an upper face (45) and a lower face (46), a first window (47) and a second window (48) separated from each other by a partitioning portion (49), so that when said small plate is superposed on the plate-shaped portion of the male member (30, 130) the windows (47,48) of the small plate and of the male member (33,133) correspond.

22. The buckle (1) according to any one of the preceding claims, further comprising means (50) for protecting the male member (4,104) against stresses represented by a shell connected with the lower end (7) of the female member (3,103) such as to produce an elongated lower end (7') of said female member.

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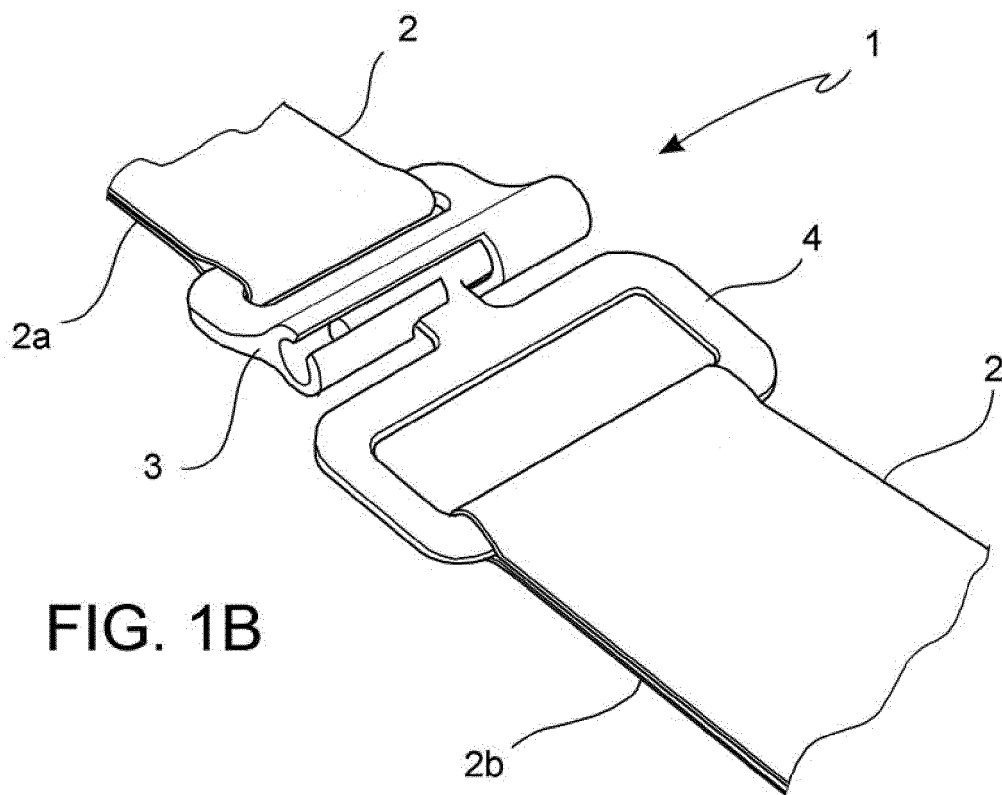
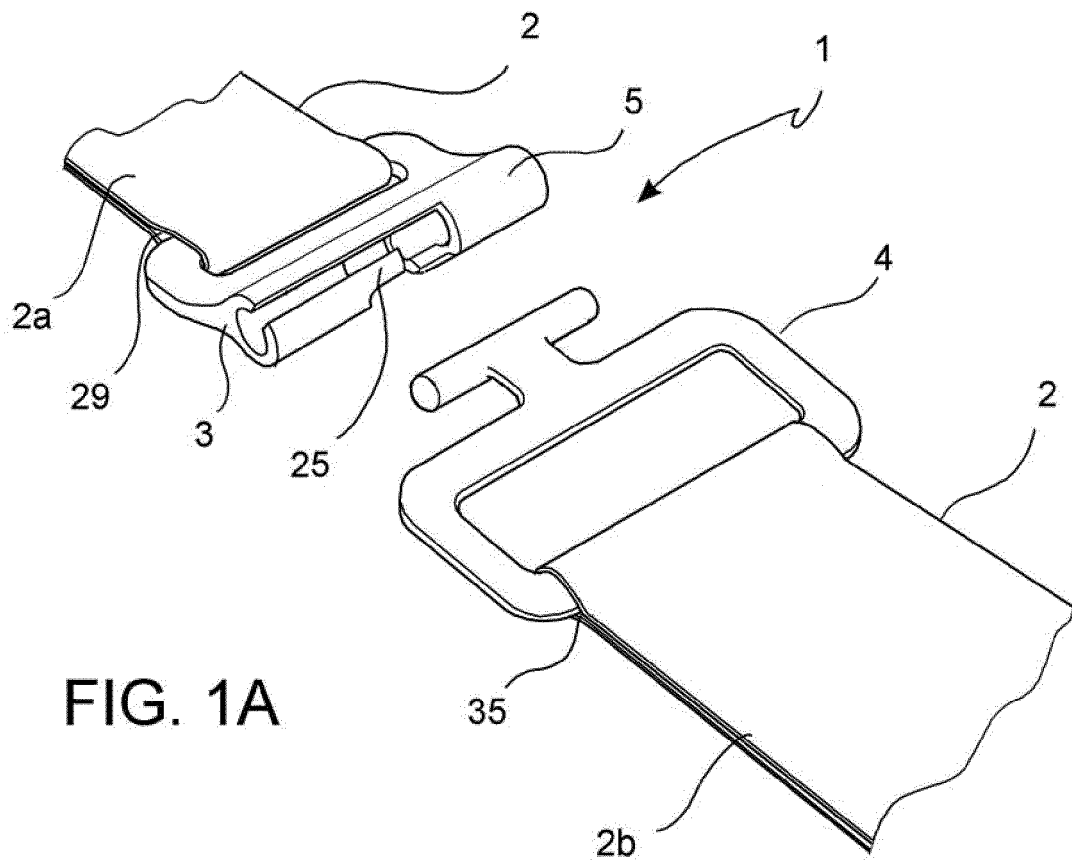
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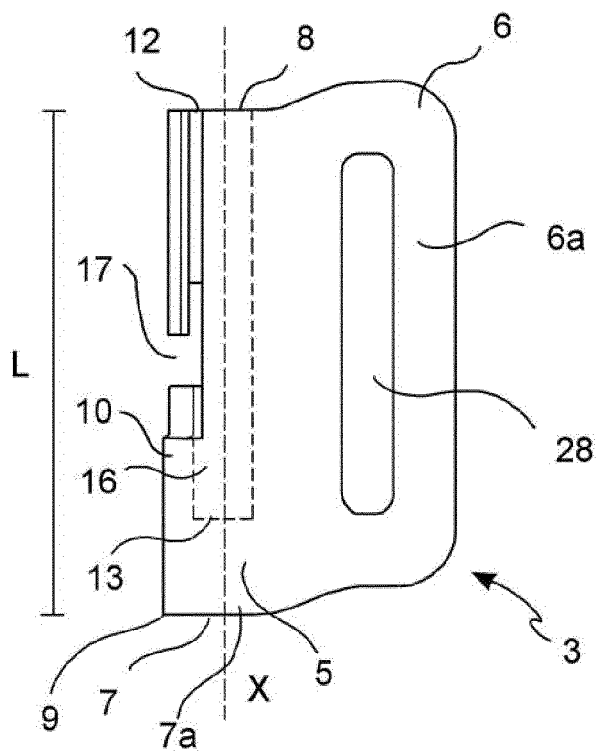


FIG. 2A

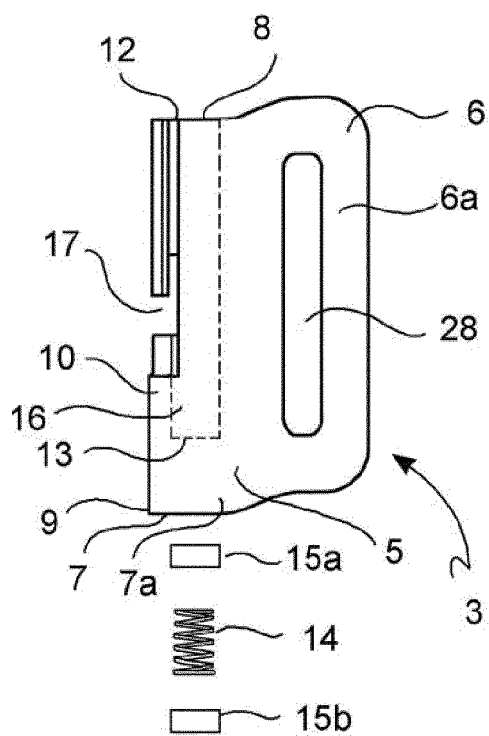


FIG. 2B

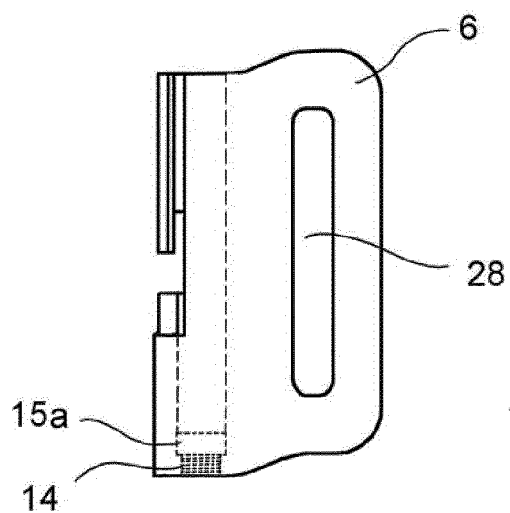


FIG. 2C

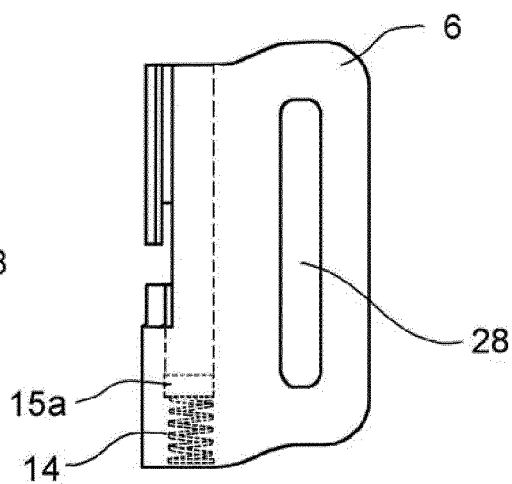


FIG. 2D

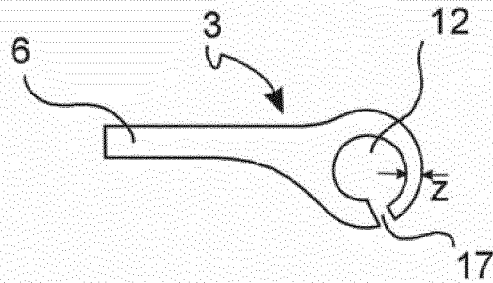


FIG. 2E

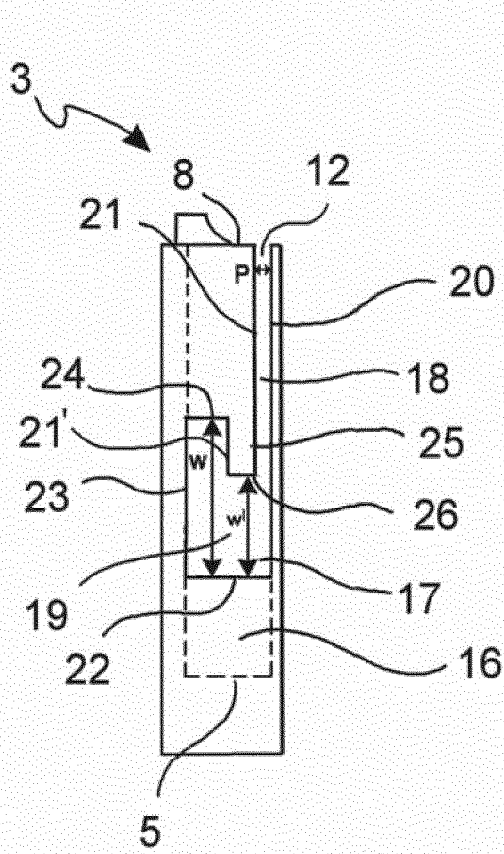


FIG. 2F

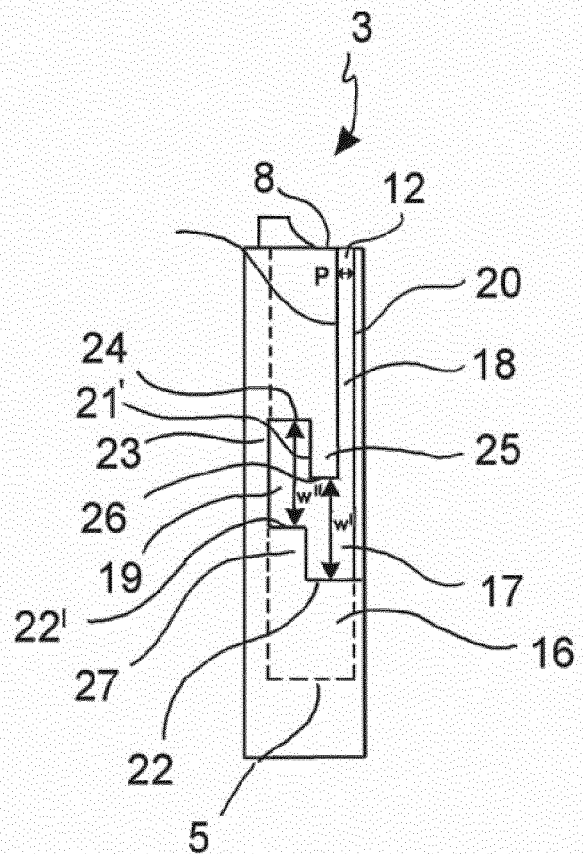


FIG. 2G

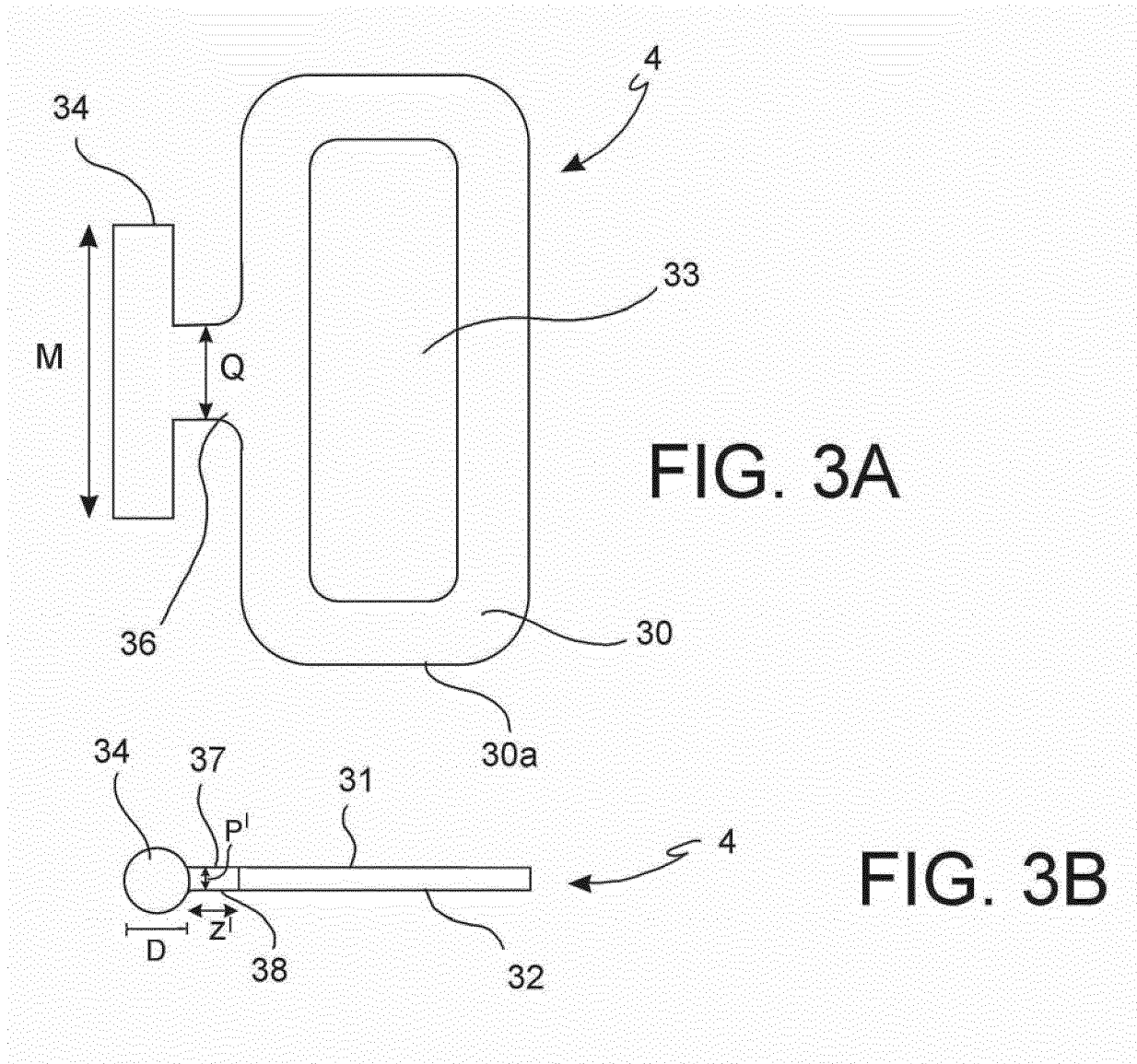


FIG. 4A

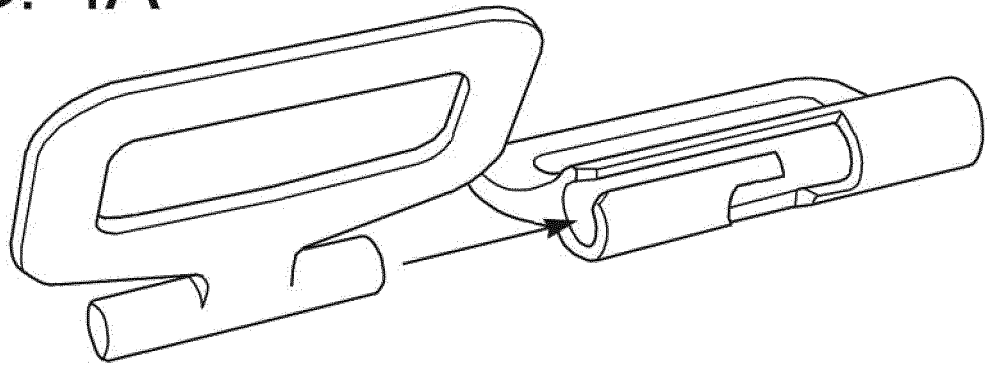


FIG. 4B

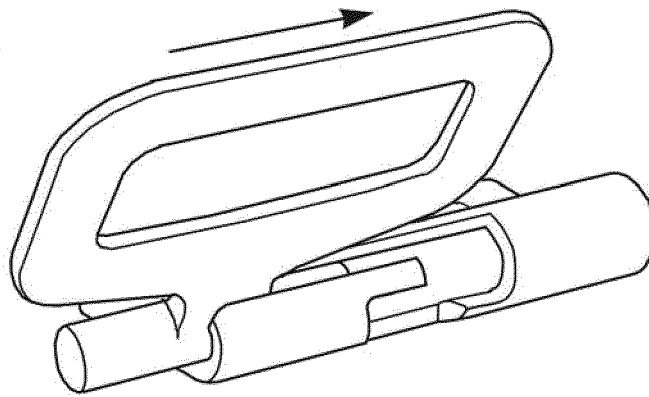
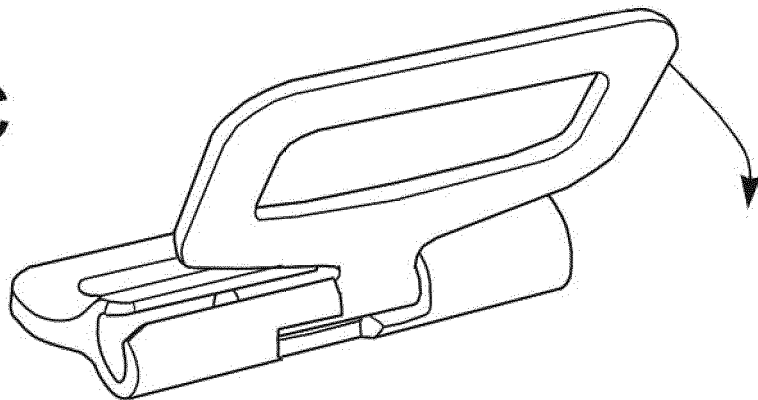


FIG. 4C



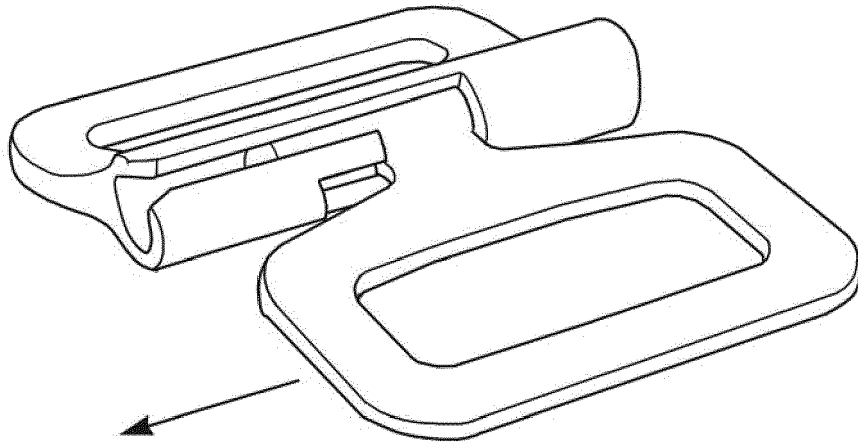


FIG. 4D

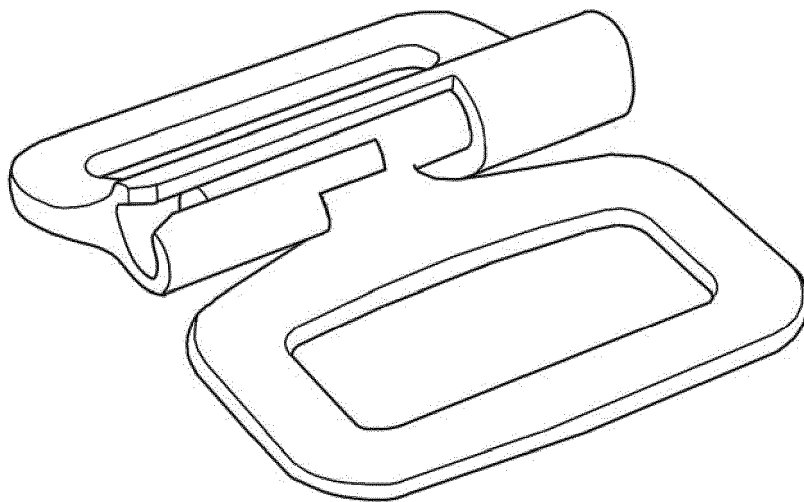
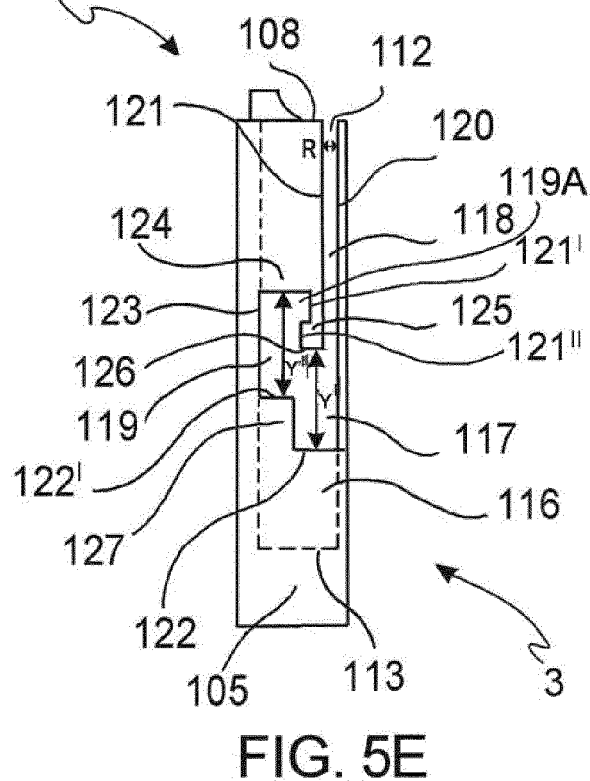
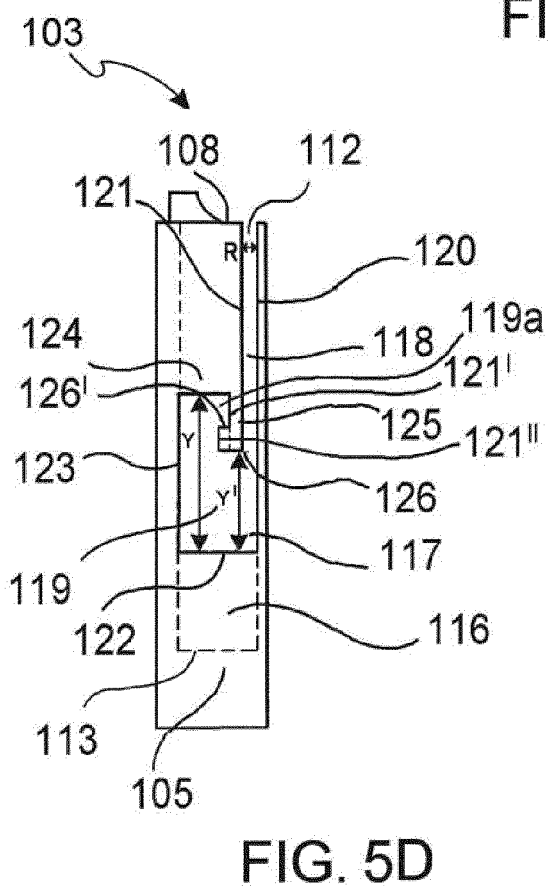
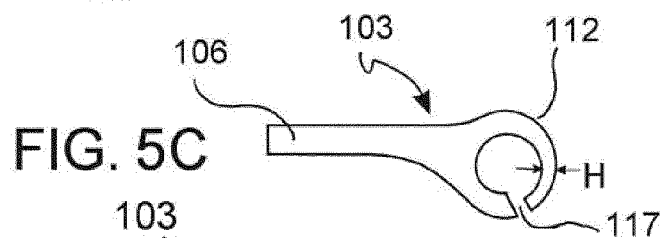
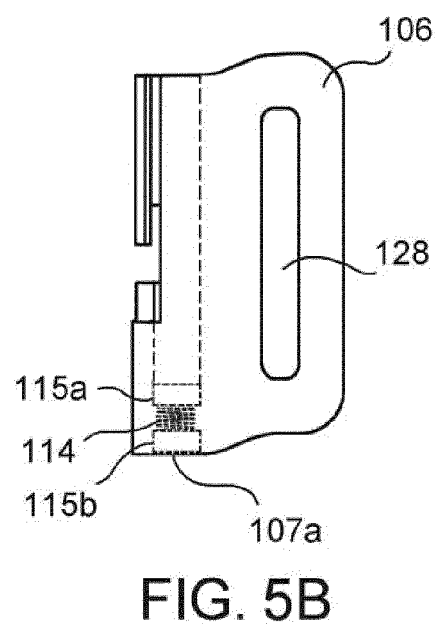
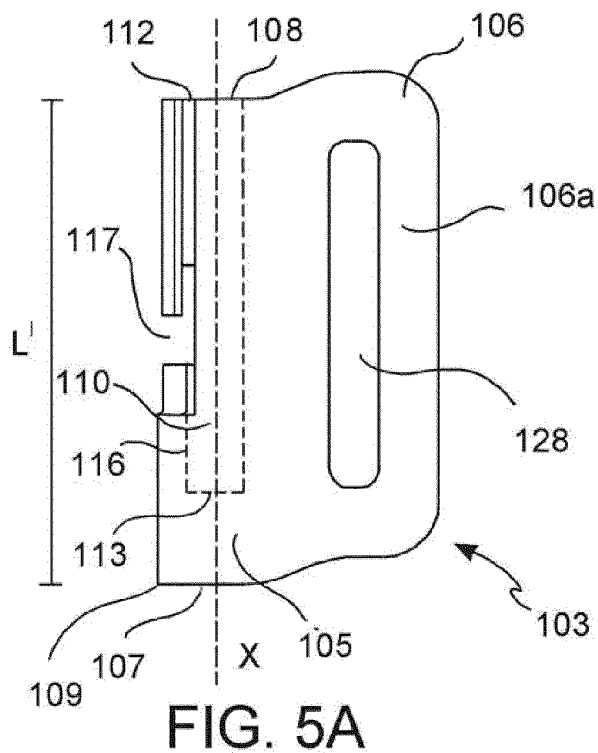
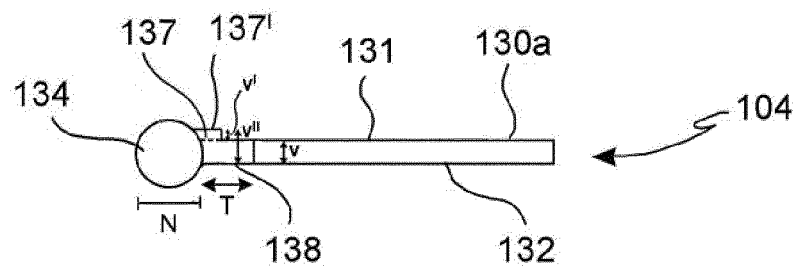
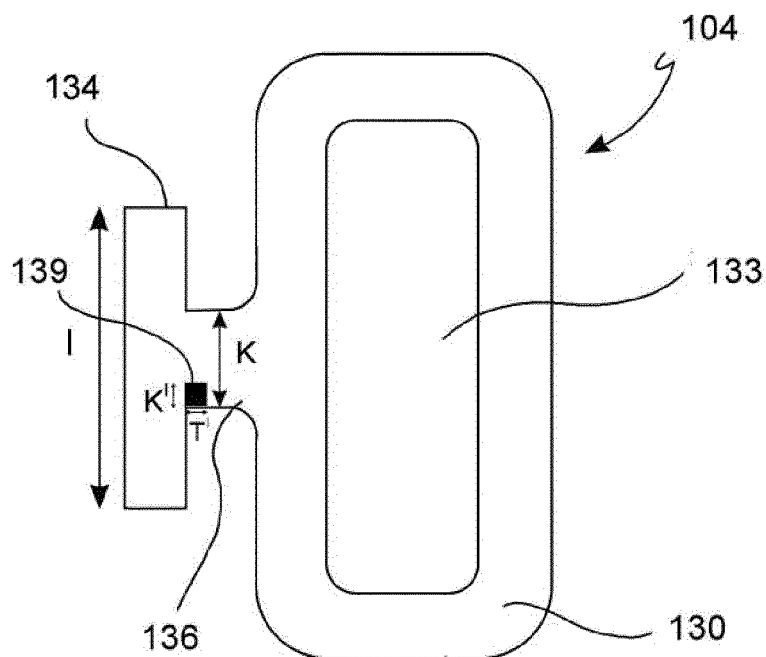
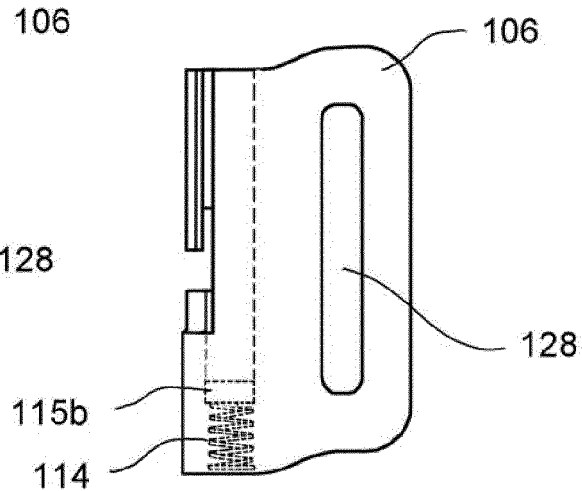
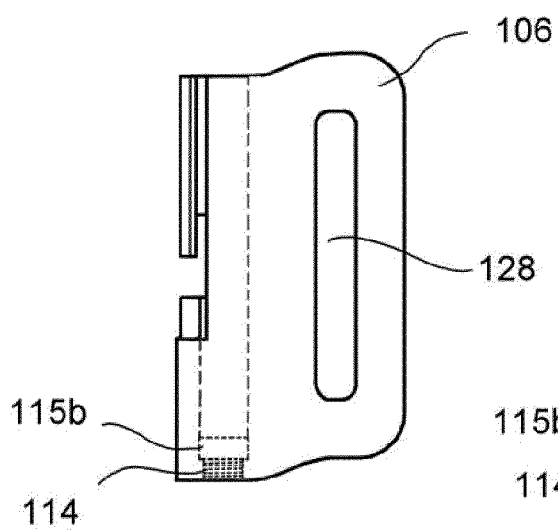


FIG. 4E





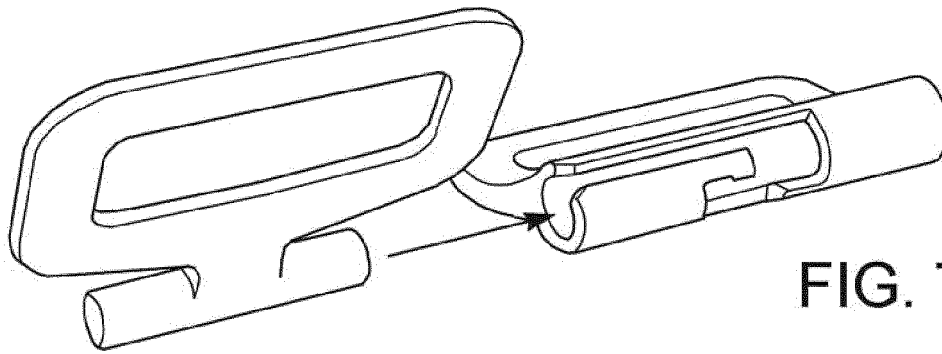


FIG. 7A

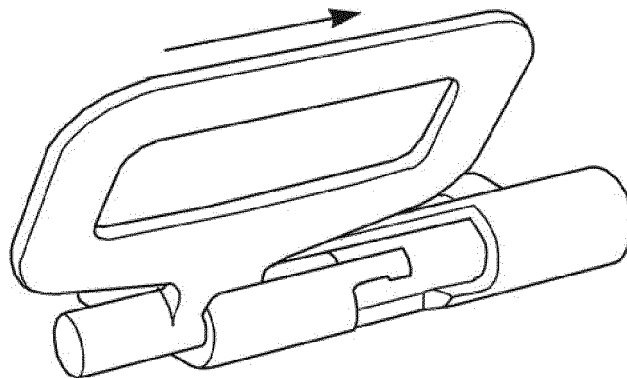


FIG. 7B

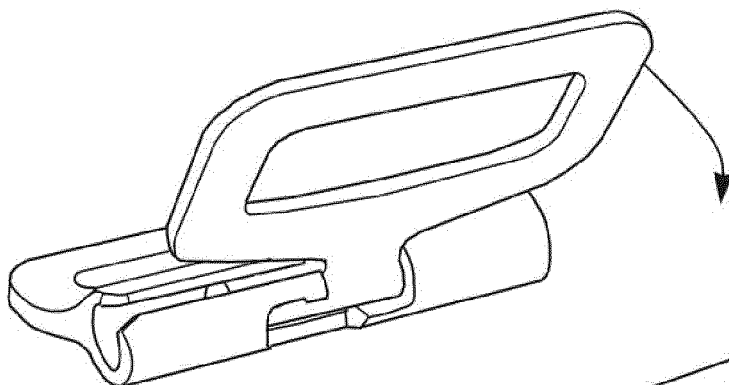


FIG. 7C

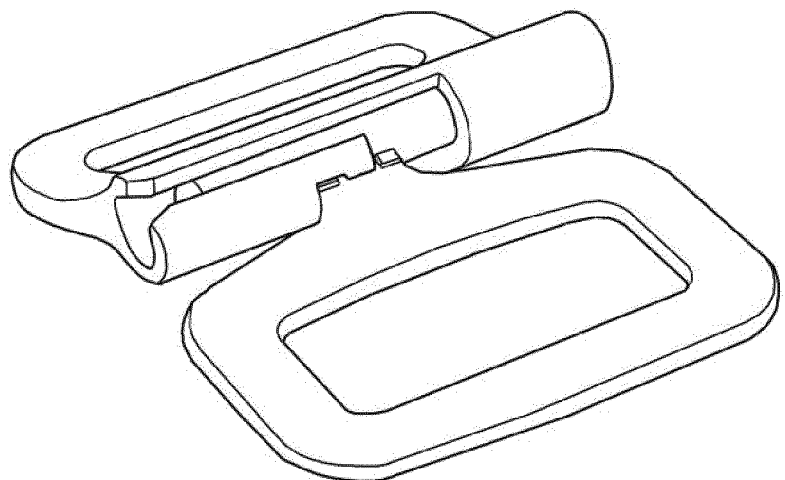


FIG. 7D

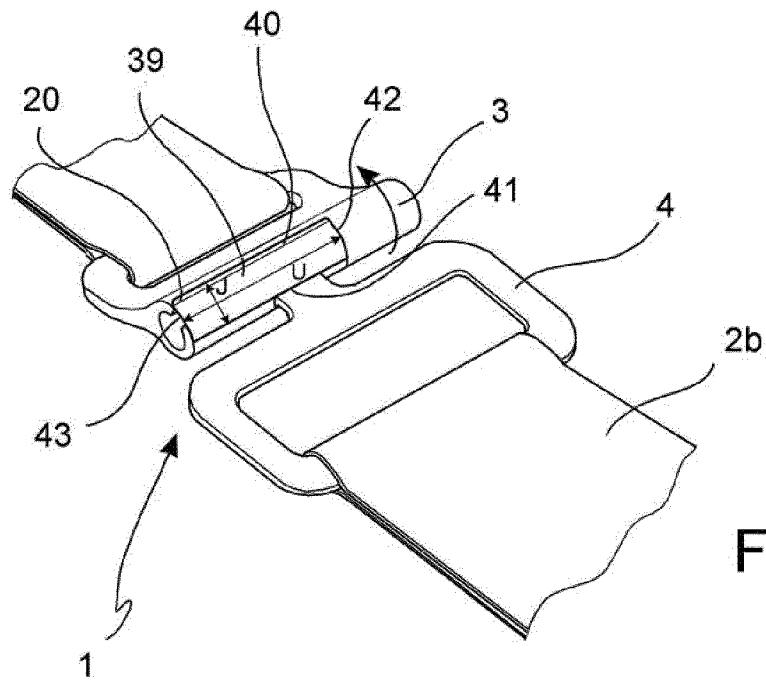


FIG. 8A

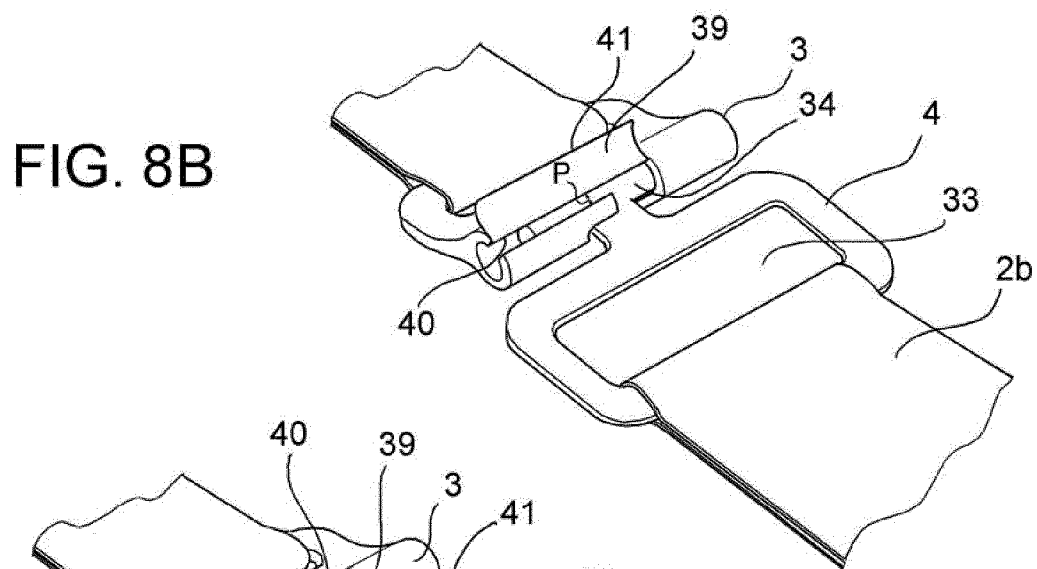


FIG. 8B

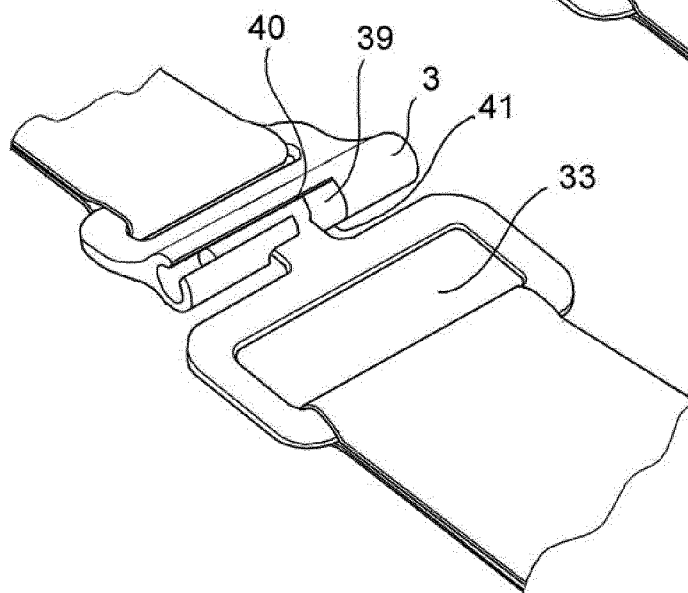


FIG. 8C

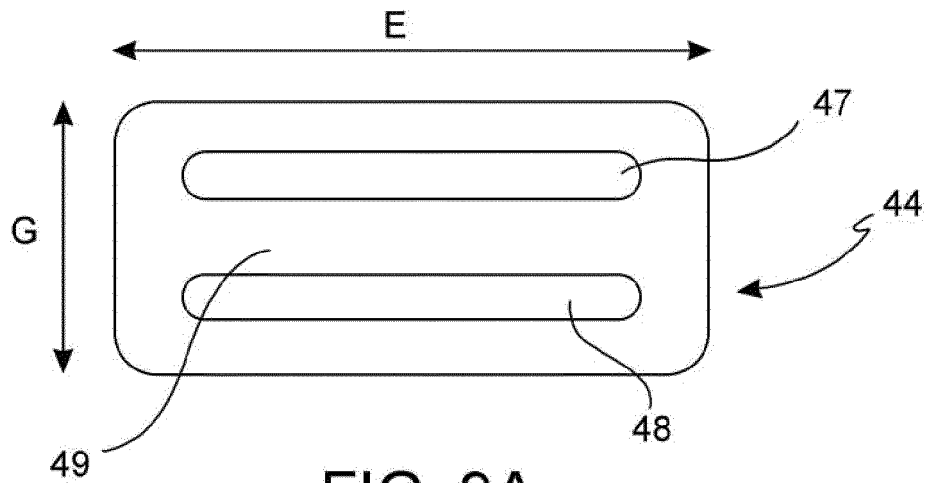


FIG. 9A

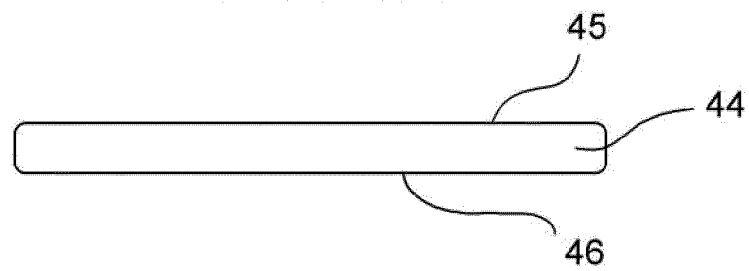


FIG. 9B

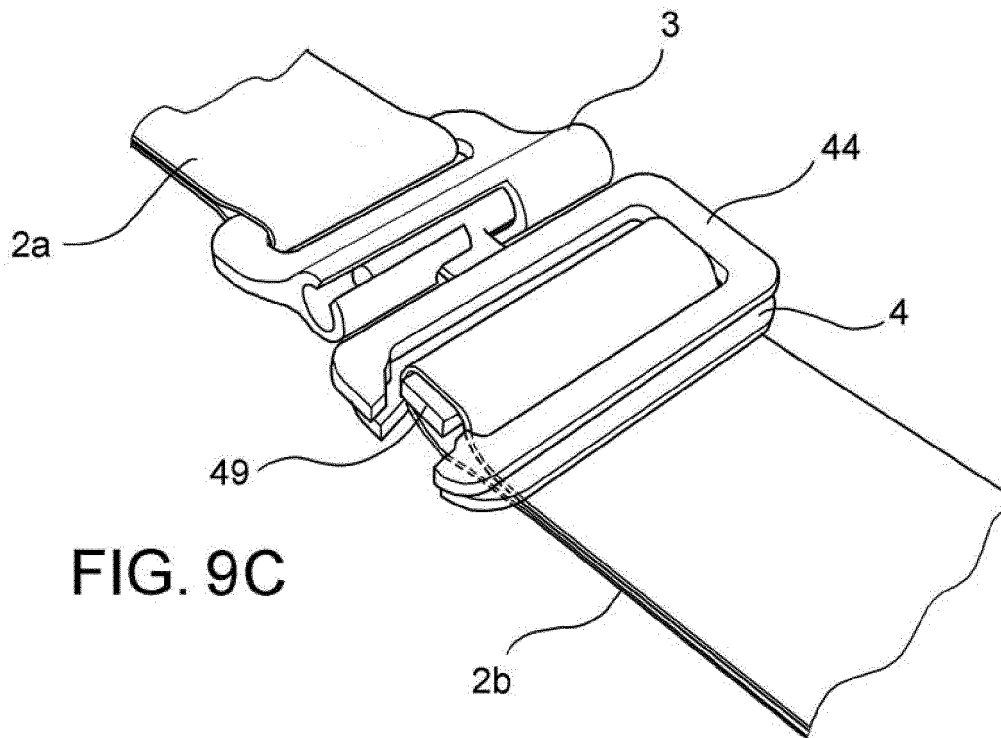


FIG. 9C

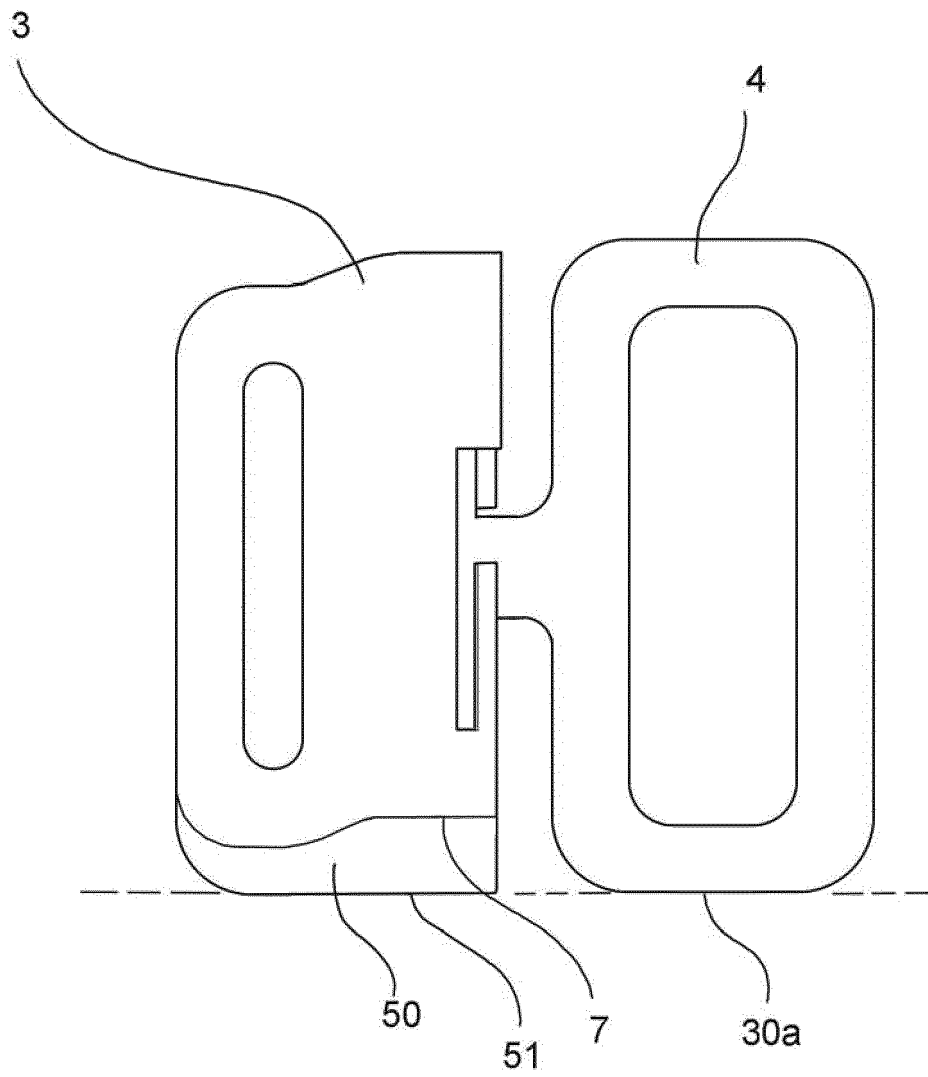


FIG. 10

FIG. 11A

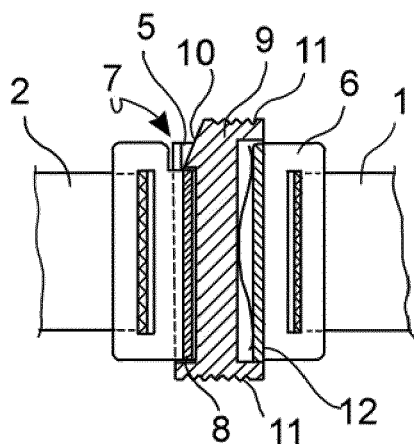


FIG. 11B

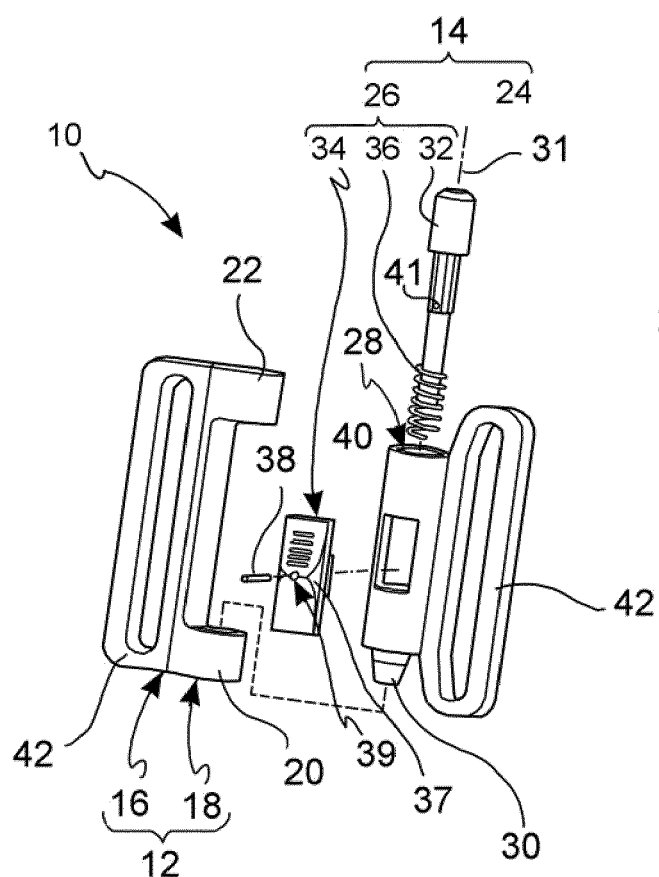
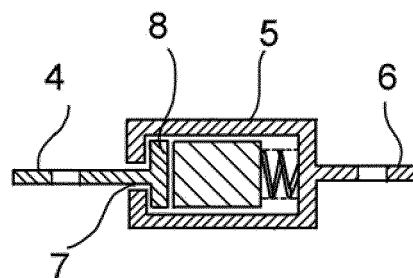


FIG. 11C

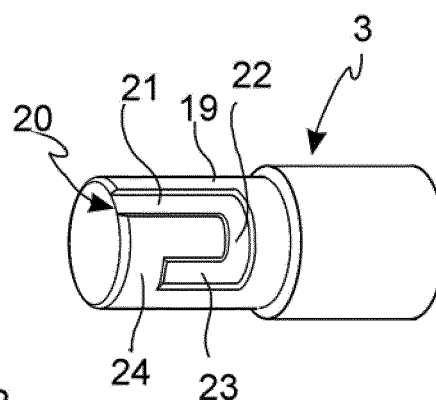


FIG. 11D



EUROPEAN SEARCH REPORT

Application Number
EP 15 16 7473

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A	DE 41 35 458 A1 (KOTHE HELMUT [DE]) 29 April 1993 (1993-04-29) * figures 1, 3, 4, 5, 7, 8 *	1-22	INV. A44B11/25
A	US 2011/113601 A1 (SAINT NATHANAEL [NL] ET AL) 19 May 2011 (2011-05-19) * figure 1 *	1-22	
A	DE 295 10 652 U1 (HANSPETER HOESLI BIJOUTERIE FO [CH]) 21 December 1995 (1995-12-21) * figures 1, 2 *	1-22	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A44B
Place of search		Date of completion of the search	Examiner
The Hague		18 September 2015	Krüger, Sophia
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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18-09-2015

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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