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(54) **BUCKLE WITH A STANDARD CLOSURE AND AN EMERGENCY CLOSURE**

(57) The present disclosure relates to a buckle 10, 10', 10'', 10''' with a standard closure 20 and an emergency closure 30 for providing a regular opening as well as an emergency opening of the buckle 10, 10', 10'', 10'''. The present disclosure further relates to a retrofitted buckle 10a having a retrofit element 60 providing for the

emergency opening of a buckle 10a. The present disclosure moreover relates to a helmet 100, a bag 110 or a badge holder 120a, 120b comprising the buckle 10, 10', 10'', 10''' according to the present disclosure or the retrofitted buckle 10a according to the present disclosure.

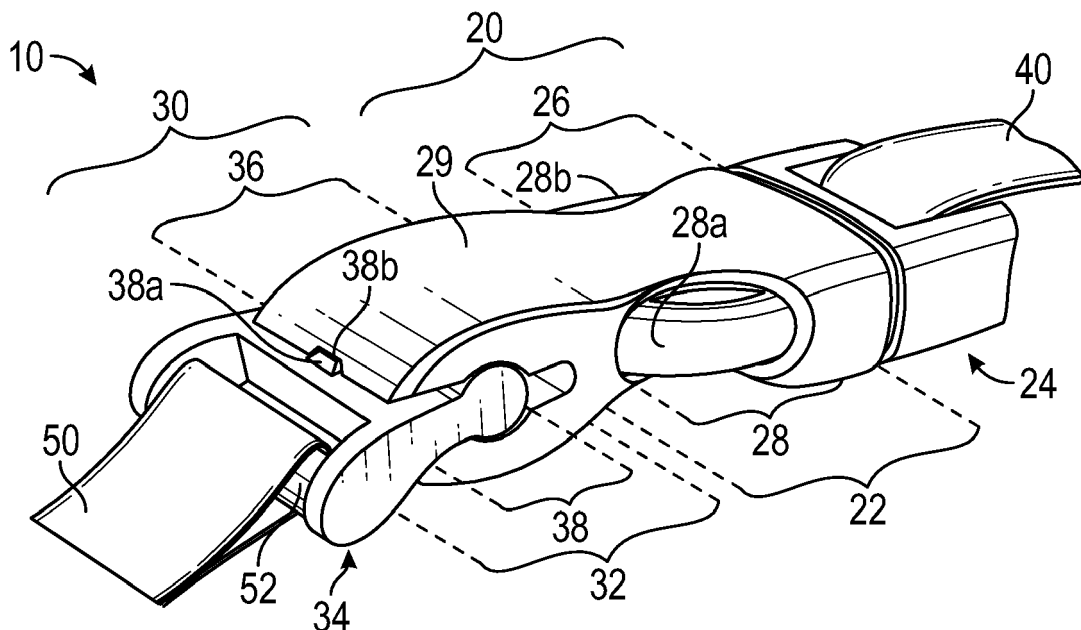


FIG. 2

Description

[0001] The present disclosure relates to a buckle with a standard closure and an emergency closure as well as to a helmet, a bag or a badge holder with such a buckle. The present disclosure further relates to a retrofitted buckle with a standard closure and an emergency closure.

[0002] Buckles are typically used for safety helmets with a chinstrap as head protection, bags or badge holders in different areas, like for example in construction work zones. The chinstrap typically retains the safety helmet more securely on the wearer's head, in particular as the helmet may be exposed to forces in a direction away from the wearer's head occurring, for example, during falling of the wearer or during overhead work. Buckles are typically used to releasably connect two ends of a strap, e. g. a chinstrap of a helmet. Depending on the area or application in which the safety helmet is used, different requirements apply to the chinstrap incl. the buckle.

[0003] For example, while in a work environment the buckle may be required to automatically open and thereby release the chinstrap from the helmet upon exposure to high tensile forces onto the chinstrap and the buckle, respectively. However, this may not be desired or not even be permitted in other areas or applications.

[0004] Safety regulation EN 397 relating to safety helmets requires a buckle of such safety helmets to open upon a force acting on the chinstrap of the helmet being in the range of 150 to 250 N. Safety regulation EN 12492 relating to mountaineer helmets requires a buckle of such a helmet to open upon a force acting on the chinstrap of the helmet being above 500 N.

[0005] An automatically opening (emergency opening) of the buckle may be desired if a wearer entangles the chinstrap of a safety helmet, the belt of a bag or the cord of a badge holder with a fixed element. This may happen, for example, if the wearer sticks with the chinstrap on a fixed element when falling. If the buckle does not open, the wearer may be strangled by the chinstrap. To avoid this risk, it is necessary that the buckle opens early enough.

[0006] There are different types of buckles on the market to avoid this problem, e. g. by providing a buckle with an emergency opening. One type of these buckles may open at defined conditions for emergency opening. Such buckles may have the disadvantage of not being reclosable after this emergency opening. An example of such a buckle is disclosed e. g. in GB2532708 (Edmondson), where a weak line fails in case of emergency opening. Another type of buckle may have combined closures, e. g. integration of the standard opening release function and the emergency opening into one closure. Such a closure with combined opening may have the disadvantage that regularly opening of the buckle may alter the conditions for the emergency opening over lifetime, e. g. due to a wear out of the closure by the frequent opening

(and closing) of the closure when taking the helmet on or off. Such buckles are disclosed, for example, in US 6,360,404 (Mudge et. al.), where the emergency opening happens under tension and the regular opening is achieved by turning one part of the buckle by 90 degrees away from the longitudinal axis. The latter may possibly lead to unwanted high tension in a strap connected to the buckle, e. g. in a helmet. Another example of such a buckle is disclosed in WO 03/031239 (Johansson), where emergency opening also is achieved under tension and where regular opening is achieved by pressing a part of the emergency closure.

[0007] It is therefore an object of the present disclosure to provide an improved buckle with regard to the opening operation. In particular, it is an object of the present disclosure to provide a buckle avoiding the above-mentioned disadvantages, i. e. minimizing or avoiding to use the closure for emergency opening for the regular use or, in other words, minimizing or avoiding the wear out of the closure for emergency opening of the buckle.

[0008] In a first aspect, the present disclosure relates to a buckle with a longitudinal extension. The buckle comprises a standard closure configured and arranged such that it opens upon manually operating a locking mechanism and an emergency closure configured and arranged such that it opens upon application of a tensile force (F_{tensile}) affecting on the buckle exceeding an emergency opening value (F_2). The standard closure is still closed upon application of a tensile force (F_{buckle}) being less than or equal to the emergency opening value (F_2). The standard closure and the emergency closure are reclosable. Exceeding of the emergency opening in this context is understood to be one decimal place higher than the target value, for example if the target value is 150 N, exceeding means a value of 150,1 N or more. The effect of an application of a tensile force (F_{buckle}) being equal to or higher than this emergency opening value (F_2) is that the emergency closure of the buckle opens and the wearer is protected by this opening against injuries, for instance induced by the chinstrap of a helmet. The effect of a standard closure opening upon manual operation (i. e. operating a locking mechanism) is that this standard closure is used for the regular opening and closing of the buckle. A buckle according to the present disclosure is advantageous in that it provides a buckle for a helmet, a bag, a backpack or a badge holder with a combination of closure standard and an emergency closure where wearing out of the safety or emergency closure is avoided or reduced. The standard closure is for the regular opening of the buckle, i. e. to open the chinstrap of a helmet to take off the helmet or to open a strap of a bag to take off the bag after using. The emergency closure opens upon a force affecting on the buckle (F_{Buckle}), i. e. providing for the emergency opening. Such a force (F_{Buckle}) may be affecting on the strap, for instance on a chinstrap of a helmet, if the wearer of such helmet gets stuck somewhere by falling down from a scaffolding. An opening of the chinstrap by the

emergency closure avoids injuries, if the chinstrap opens and the wearer loses the helmet. Otherwise, a severe injury may happen by strangulation of the wearer by the chinstrap.

Definitions

[0009] A buckle within the context of the present disclosure typically comprises a closure and releasably connects two ends of a strap. Such a closure may be releasable or non-releasable, depending on the type and set-up of the closure. A buckle may comprise more than one closure and preferably different types of closures, e. g. a closure for regular opening or release, in the present disclosure called the standard closure, and a closure for safety or emergency opening or release, in the present disclosure called the emergency closure.

[0010] A closure, in particular a standard closure and an emergency closure, in the context of the present disclosure comprises at least two parts which are detachably connected to each other. Typically, these parts either detach or release from each other by a manual operation or upon application of a certain tensile force, e. g. a release force acting on a strap connected to the buckle.

[0011] A regular opening or release within the context of the present disclosure is understood such that the parts of the closure disconnect or detach from each other. The regular opening or release is caused by a manual operation, e. g. unlocking a locking mechanism. Such a locking mechanism may comprise e. g. clamps on one part of the closure engaging with a respective structure on the other part of the closure. Typically, opening or release happens during a normal use of the buckle or a device the buckle is connected to. Before such opening or release, the closure is considered to be closed or non-released. The closure for the regular or normal release is considered to be a standard closure.

[0012] An emergency or safety opening or release within the context of the present disclosure is understood such that the parts of the closure disconnect, open or detach from each other upon application of a tensile force acting on a strap connected to the buckle exceeding a certain value, i. e. an opening value. Exceeding of the emergency opening in this context is understood to be one decimal place higher than the target value, for example if the target value is 150 N, exceeding means a value of 150,1 N or more. The opening value in the context of the present disclosure is understood as a value of a tensile force affecting on the buckle at which the emergency closure will open, i. e. a threshold of a force which can be applied to a buckle without opening or release. In other words, the parts of the emergency closure will disengage or disconnect from each other, i. e. the closure will automatically open or release upon application of a force being equal to or higher than the opening value. Such a release is considered to be an emergency or safety release or opening. Before such opening or release, the closure is considered to be closed or non-re-

leased. The closure for the safety or emergency release is considered to be the safety or emergency closure.

[0013] A strap, in particular a chinstrap, within the context of the present application is understood as an elongated, preferably flexible material, wherein two ends of a strap are typically connected by a buckle. The other ends of a strap may be connected to a helmet. The strap is to fix or secure the helmet in a wearing position when worn by a person, i. e. the user or wearer. According to the safety regulation EN 12492 relating to mountaineer helmets, a chinstrap should be capable to withstand forces applied thereupon in the range of 500 N or more. A suitable material for a chinstrap may comprise a woven polymeric material.

[0014] In one embodiment, the emergency opening value (F_2) of the emergency closure is in the range of 50 to 300 N, preferably 150 to 250 N. As an effect of that, the buckle is still closed and locked tight enough to fix the device as required upon application of a tensile force (F_{buckle}) below this emergency opening value (F_2). As mentioned above, upon application of a tensile force (F_{buckle}) being equal to or higher than this emergency opening value (F_2), the emergency closure of the buckle opens and the wearer is protected by this opening against injuries, for instance by the chinstrap of a helmet. In other words, if the tensile force is applied in the range of or higher than 50 to 300 N, preferably 150 to 250 N, the emergency closure opens.

[0015] In one embodiment, the standard closure is further configured and arranged such that it opens upon an application of a tensile force (F_{tensile}) affecting on the buckle exceeding a standard opening value (F_1), wherein the standard opening value (F_1) is preferably in the range of 500 N or higher. Exceeding of the emergency opening in this context is understood to be one decimal place higher than the target value, for example if the target value is 500 N, exceeding means a value of 500,1 N or more. By that, it is ensured that the emergency closure opens before the standard closure opens because the opening value for the emergency closure is lower than the opening value at which the standard closure opens. This warrants the emergency opening of the buckle and protects the user or the wearer of a helmet or any other device with such a buckle. This is beneficial as the standard closure only opens upon manual operation, whereas the emergency closure is responsible for the emergency opening.

[0016] In one embodiment, closing of the emergency closure of the buckle requires a closure tool or device. In other words, it is not reclosable by the wearer without such a tool or device. Such reclosing of the emergency closure may be required from a security perspective, for example, to control the helmet, the chinstrap and/or the buckle for damages. After such a check of the components and a positive assessment of the components it is possible to reclose the emergency closure by the tool or device. This embodiment has the advantage that an additional control step can be implemented, if the buckle is

used in an application with such special security requirements. This may be done by another person to achieve a so-called four-eyes principle.

[0017] In one embodiment, parts of the standard closure and of the emergency closure of the buckle are integrally formed with the buckle. For example, the first part of the standard closure (engageable with the second part connected to a strap) and the first part of the emergency closure (engageable with the second part connected to a strap on the other side) may be integrally formed with the buckle. Integrally forming in this context is to be understood that some parts may be combined to form a single piece of the buckle. This design with integrally formed closure parts has the advantage that the buckle is small, light and pleasant to wear, for example on a safety helmet in combination with a chinstrap.

[0018] In one embodiment, the standard closure and the emergency closure of the buckle are spaced apart and longitudinally offset relative to each other. The advantage of such an arrangement is that the buckle exhibits a compact design in the longitudinal extension which may increase the wearing comfort to a user.

[0019] In a certain embodiment, the standard closure and the emergency closure of the buckle are connected by a connection element, preferably a strap, chain, belt or hinge. Such a connection between the standard closure and the emergency closure may be made by a flexible connection element, for instance a strap. The advantage of this embodiment is, that the buckle is more flexible, and this may allow for usage in applications where an inflexible buckle is not suitable.

[0020] In one embodiment, the standard closure and the emergency closure of the buckle each comprise a first and a second releasably engageable part. A suitable design of the first and the second releasably engageable parts may comprise a male and a female part. The advantage of such an arrangement is, that opening and closing of the buckle is easy, simple and intuitive, in particular with male and female parts. This may be especially important for the standard opening of the buckle.

[0021] In one embodiment, the standard closure and the emergency closure of the buckle comprises a receiving portion and an anchoring portion. The anchoring portion optionally comprises clamps. The anchoring portion may engage with the receiving portion, e. g. by inserting the anchoring portion into the receiving portion. Preferably, the material of such a receiving portion exhibits a certain resiliency in order to provide a form-fit for receiving the receiving portion. This may be such that the entrance of the receiving portion is smaller in cross-section than the cross-section of the anchoring portion received by the receiving portion. For example, upon opening of the emergency closure, the receiving portion may be deformed such that the entrance of the receiving portion widens and allows the anchoring portion to move out. In a preferred embodiment, the receiving portion may have a c-shaped cross-section seen from an angle 90 degree to the longitudinal extension of the buckle. The ends of

the c-shape may provide for clamps or jaws engaging with the anchoring portion. In case of an opening or closure, e. g. upon application of a tensile force F_{buckle} being equal to or higher than the emergency opening value (F_2) being in the range of 50 to 300 N, preferably in the range of 150 to 250 N, the anchoring portion disconnects or disengages from the receiving portion and the buckle opens. Such a design provides for an easy and reliable engagement of the parts of the emergency closure. For example, the standard closure may comprise clamps in the anchoring portion forming the locking mechanism. Typically, the clamps are configured and arranged to be resilient, i. e. made of a resilient material or rendered resilient by their design, e. g. spring-loaded or the like. In this case, upon opening of the standard closure and the manual operation, the clamps deviate from their initial position in the receiving portion thereby releasing the anchoring portion from the receiving portion.

[0022] In one embodiment, the anchoring portion of the emergency closure of the buckle is form-fit connected with the receiving portion. The advantage of a form-fit connection is, that the receiving portion will open upon application of a tensile force being at or higher than the emergency opening value (F_2) and that the closing of the emergency closure is realizable by a closing operating by lateral movement of the anchoring portion into the receiving portion. To avoid a higher tension in the strap connected to the buckle, such closing may be done before closing the standard closure. The anchoring portion and the receiving portion may comprise elements to generate a form-fit connection to avoid an uncontrolled opening of the emergency closure by a lateral movement of the anchoring portion out of the receiving portion. The anchoring portion and the receiving portion may have elements to generate a form-fit connection to avoid an uncontrolled opening. In certain embodiments, the emergency closure of the buckle comprises an anchoring portion with a least one bulge and a receptacle in its receiving portion. The bulge slips into at least one receptacle in the receiving portion or vice versa thereby providing a form-fit between them. This form-fit between the bulge and the receptacle avoids an uncontrolled opening of the emergency closure by lateral movement. The advantage is that the closing operating of the emergency closure is a simple and easy-to-handle operation.

[0023] In one embodiment, the standard closure and the emergency closure of the buckle open in the same direction. This direction may preferably be the longitudinal direction. Both, opening and closing of the standard closure and the emergency closure, may work in the same direction. The advantage is that tension of strap, connected with the buckle, may not change after the closing operation. Otherwise, i. e. closing or opening of the buckle in a non-longitudinal direction, e. g. lateral, may lead to an intermediate higher tension of the chinstrap during the closing operation. This, in turn, may require a retension of the strap to ensure correct fit as well as a safe and reliable function of the chinstrap.

[0024] In one embodiment, the buckle comprises a polymeric material. A polymeric material may allow for an easy manufacturing, e. g. by injection molding. The polymeric material may be a blend of different kinds of polymeric materials. The advantage of a polymeric material is, that the buckle can be produced in high quantities with a cost-efficient manufacturing process.

[0025] In one embodiment, the buckle comprises an elastomeric material such as, e. g. rubber, silicone rubber, ethylene-propylene-diene-monomer rubber or combinations thereof. Such an elastomeric material may be advantageous to use in the standard and/or emergency closure according to the present disclosure, e. g. to provide a resilient form-fit element in an easy and reliable way. It may also be conceivable to combine the elastomeric materials with other materials, e. g. non-elastomeric materials, thermoplastic materials or thermoset materials.

[0026] In one embodiment, the buckle comprises metal, preferably aluminum and/or stainless steel. Some parts may partially or entirely be made of metal. The advantage is that metal may provide for parts having a higher tensile strength e-modulus in comparison to polymeric materials. Also, good processability for instance by die-casting, pressing or forming is achieved by using metal. It may also be conceivable to combine different metal materials as well as to combine metal with other materials, e. g. polymeric materials, thermoplastic materials, thermoset or elastomeric or non-elastomeric materials.

[0027] In one embodiment, the buckle comprises a thermoplastic material. Several thermoplastic materials are suitable for the buckle, preferably materials are polyamide, polypropylene, polyethylene, polycarbonate, polyoxymethylene or a mixture of these materials alone or with other polymeric materials or other filler. The fillers may comprise organic or inorganic materials. The filler may be a reinforcing material to increase the tensile strength or the resiliency of the material to a desired level. Examples for these fillers are glass fibers or carbon fibers, talcum or glass bubbles, wood powder, cellulose, metal threads, polymeric threads and/or combinations. The advantage of the thermoplastic materials is a good processability. Adding of the fillers may influence the material properties, for example an increase of the e-modulus resulting in a better stiffness of the buckle. It may also be conceivable to combine the thermoplastic materials with other materials, e. g. thermoset materials or elastomeric materials.

[0028] In one embodiment, the buckle comprises a thermoset material. Suitable thermoset materials may include phenolic resin, melamine resin or combinations thereof. It may also be conceivable to combine the thermoset materials with other materials, e. g. thermoplastic materials or elastomeric materials. The advantage of using a thermoset material is that these materials may exhibit a higher thermal stability and may be easy to handle during manufacture. In particular, some materials may strengthen when heated up. This may help with main-

taining the function of components of the buckle as thermoset materials may withstand higher temperatures without losing their structural integrity. The use of thermoset materials for the buckle may thus be advantageous in an environment of elevated temperatures.

[0029] In a second aspect, the present disclosure relates to a retrofitted buckle comprising a first standard closure comprising a first set of a first and a second part engageable with each other. The first and second parts are spaced apart longitudinally by a retrofit element inserted between the first and second parts of the first standard closure thereby releasing the first standard closure. The retrofit element comprises an emergency closure having a first and second part engaged with each other. The emergency closure is configured and arranged such that it opens upon application of a tensile force (F_{buckle}) exceeding an emergency opening value (F_2). Exceeding of the emergency opening in this context is understood to be one decimal place higher than the target value, for example if the target value is 150 N, exceeding means a value of 150,1 N or more. The buckle further comprises a second set of a first and a second part and a third set of a first and a second part. The second set of a first and a second part are engaged with each other thereby forming a second standard closure and the third set of a first and second parts are engaged with each other thereby forming a third standard closure. The first, the second and the third standard closures are configured and arranged such that these open upon manually operating a locking mechanism. Preferably the first, the second and the third standard closure and the emergency closure are reclosable. The advantage of such a retrofitted buckle is, that standard buckles (initially not having an emergency opening) can be upgraded with the insertion of such a retrofit element to a buckle with a standard closure for the standard opening operations and an emergency closure for safety opening operations. Similar advantages apply to the retrofitted buckle as these apply to the buckle according to the first aspect of the present disclosure as explained above.

[0030] In a certain embodiment, the emergency opening value (F_2) of the emergency closure of the retrofitted buckle is in the range of 50 to 300 N, preferably 150 to 250 N. As an effect of that, the retrofitted buckle is still closed and locked tight enough to fix the device as required upon application of a tensile force (F_{buckle}) below this emergency opening value (F_2). As mentioned above, upon application of a tensile force (F_{buckle}) being equal to or higher than this emergency opening value (F_2), the emergency closure of the buckle opens and the wearer is protected by this opening against injuries, for instance by the chinstrap of a helmet. In other words, if the tensile force is applied in the range of or higher than 50 to 300 N, preferably 150 to 250 N, the emergency closure opens.

[0031] In a certain embodiment, the first and second parts of the standard closure and the retrofit element, respectively, are formed as male and female parts engaging with each other. The female part may be a receiv-

ing portion and the male part may be an anchoring portion. The advantage of such a design with a female part and a male part is, that the operation of the standard closure works very easy and reliable.

[0032] In one embodiment, the first, second and third standard closures of the retrofitted buckle are further configured and arranged such that these open upon an application of a tensile force (F_{tensile}) affecting on the retrofitted buckle exceeding a standard opening value (F_1), wherein the standard opening value (F_1) is preferably in the range of 500 N or higher. Exceeding of the emergency opening in this context is understood to be one decimal place higher than the target value, for example if the target value is 500 N, exceeding means a value of 500,1 N or more. By that, it is ensured that the emergency closure opens before the standard closure opens because the opening value for the emergency closure is lower than the opening value at which the standard closure opens. This warrants the emergency opening of the retrofitted buckle and protects the user or the wearer of a helmet or any other device with such a buckle. This is beneficial as the standard closure only opens upon manual operation, whereas the emergency closure is responsible for the emergency opening.

[0033] In a third aspect, the present disclosure relates to a helmet, a bag or a badge holder comprising the buckle according to the present disclosure or a retrofitted buckle according to the present disclosure. In several environments it is not enough to have a buckle for a standard opening operation, for example to take off the helmet, the bag or the badge holder. For security reasons it may be necessary or required to have a safety/emergency opening of the buckle. The advantage of helmets, bags or badge holders having such a buckle is that they have two reclosable closures, one for the standard opening and one for the safety opening. Effects and advantages of such a buckle have been explained above in detail.

[0034] A suitable method for making a buckle according to the present disclosure may include injection molding including multi-component injection molding, pressing, deep drawing, forming, die casting, additive manufacturing like e. g. 3D-printing and/or extrusion. One or more of these methods may be used in combination, e. g. to make one or more parts by one method and one or more parts by another method for one buckle.

[0035] The invention was described in various embodiments above. It is understood by a person skilled in the art, that one, several or all of the above-mentioned embodiments can be combined with each other.

Brief Description of the Figures

[0036]

Fig. 1 is a perspective view of a buckle according to an embodiment of the invention;

Fig. 2 is a perspective view of a buckle according to an embodiment of the invention;

Fig. 3 is a perspective view of parts of a buckle according to an embodiment of the invention;

Fig. 4 is a view of a buckle according to an embodiment of the invention;

Fig. 5 is a view of a buckle according to an embodiment of the invention;

Fig. 6 is a view of a retrofitted buckle according to an embodiment of the invention;

Fig. 7 is a view of a retrofitted buckle according to an embodiment of the invention;

Fig. 8 is a view of a retrofitted buckle according to an embodiment of the invention;

Fig. 9 is a perspective view of a helmet with a buckle according to an embodiment of the invention;

Fig. 10 is a perspective view of a bag with a buckle according to an embodiment of the invention;

Fig. 11 a is a view of a badge holder with a buckle according to an embodiment of the invention;

Fig. 11b is a view of another badge holder with a buckle according to an embodiment of the invention.

Detailed Description of the Figures

[0037] Fig. 1 shows in a perspective view the buckle 10 according to an embodiment of the present disclosure. The buckle 10 comprises a standard closure and an emergency closure 20, 30. The standard closure 20 comprises a first part 22 having a receiving portion 26 for receiving a second part 24 (not shown here, see Fig. 2) being a complementary element and being engageable with the receiving portion 26. The buckle 10 further comprises a first part 32 of the emergency closure 30 being engageable with a second part 34 of the emergency closure 30. The second part 34 is shown in Fig. 1 in a non-engaged manner, i. e. positioned aside of the buckle 10. The first part 32 has a receiving portion 36 for receiving a complementary anchoring portion 38 of the second part 34. For engaging the first and second parts 32, 34, the anchoring portion 38 will be moved laterally into the receiving portion 36 of the first part 32. A bulge 38a is arranged to engage with a corresponding receptacle 38b in the receiving portion 36 of the first part 32 to avoid a lateral movement out of the receiving portion 36 on the opposite side. In other words, a dead stop is provided by the interaction of the bulge 38a and the receptacle 38b to achieve correct positioning of the second part when engaging with the first part 32. The second part 34 further has a strap holder 52 for fixing a strap 50 (not shown here, see Fig. 2) being connected e. g. to a helmet or the like (not shown here) to the second part 34. The strap holder 52 is a pin-like element with an opening aside of the strap holder 52 towards the second part 34 such that a strap 50 can move into the second part 34 and thereby be fixed thereto, i. e. the strap 50 is wound around the strap holder 52 and the superimposed parts of the strap 50 are fixed together for instance by sewing.

[0038] Fig. 2 shows in a perspective view the embodiment of the buckle 10 as shown in Fig. 1. In addition to

what is shown in and described for Fig. 1, the second part 24 of the standard closure 20 is shown here. The second part 24 comprises an anchoring portion 28 having two clamps 28a, 28b and a centering means 28c (not visible here, see Figs. 3 to 5). The anchoring portion 28 with its clamps 28a, 28b and the centering means 28c are engaged with the receiving portion 26 of the first part 22 of the standard closure 20. A strap 40 is connected to the second part 24 on a side opposite to the side having the anchoring portion 28 as can be seen here. The strap 40 is connected to the second part 24 by a strap holder 42 (not visible here). Fig. 2 further shows the second part 34 of the emergency closure 30 in a configuration engaged with the first part 32 of the emergency closure 30. Different to the configuration as shown in Fig. 1, the second part 34 is engaged with the first part 32, e. g. by sliding the anchoring portion 38 into the receiving portion 36. In this configuration, it is apparent that the bulge 38a of the second part 34 engages with the receptacle 38b of the first part 32 such that an easy removal or falling laterally out of the second part 34 is prevented or minimized. Fig. 2 further shows a strap 50 connected to the second part 34 at a side opposite to the side having the anchoring portion 38. The strap 50 is connected at one of its ends to the second part by a strap holder 52. Strap 50 may, be connected to a helmet (not shown here) on its other end.

[0039] Fig. 3 shows in a perspective view the buckle 10 with its standard closure 20 in more detail. As can be seen, the second part 24 of the standard closure 20 comprises an anchoring portion 28 having two clamps 28a, 28b and a centering means 28c. The clamps 28a, 28b may be made of a resilient material such that these can slightly deviate from their position when moving the second part 24 into or out of the receiving portion 26 of the first part 22. The clamps 28a, 28b interact and engage with respective parts of the receiving portion 26 (not shown here) such that these arrest with these respective parts and thereby secure the second part 24 to the first part 22. Centering means 28c helps to move the second part 24 into the first part 22 in the correct way and to the correct position. The second part 24 further comprises a pin-like strap holder 42 for fixing a strap 40 (not shown here, see Fig. 2) being connected e. g. to a helmet or the like (not shown here) to the second part 24. The pin-like strap holder 42 has a square-shape, but other shapes are also conceivable, e. g. round or oval. It may also be conceivable, that more than one pin is present to increase fixing of the strap to the strap. Fig. 3 further shows the first part of the emergency closure 30 being connected with the connection element 29. In the embodiment shown, the first part 22 of the standard closure 20 and the first part 32 of the emergency closure 30 are integrally formed with each other and with the connection element 29. It is also conceivable to form these parts in a different way, e. g. non-integral, but connected with a connection element 29 being a strap or the like (not shown here). Fig. 2 also shows the receiving portion 36 of the first part

32 of the emergency closure 30. As can be seen, the receiving portion 36 comprises a receptacle 38b configured and arranged to engage with an element, e. g. a bulge 38a, of the anchoring portion 38 of the second part 34 of the emergency closure 30 (not shown in Fig. 3). The second part 34 has been omitted here.

[0040] Fig. 4 shows in a top view the embodiment of the buckle 10 as shown in Figs. 1 to 3. In the configuration shown here, the second part 24 of the standard closure 20 with the anchoring portion 28, the clamps 28a, 28b and the centering portion 28c are not (yet) engaged with the receiving portion 26 of the first part 22 of the standard closure 20. The second part 24 further has the strap holder 42, to which a strap 40, e. g. from a helmet, may be connected (both not shown here). Fig. 4 further shows the first part 32 of the emergency closure 30 connected to the first part 22 of the standard closure 20 by the connection element 29. The first part 32 of the emergency closure 30 further comprises a receiving portion 36 for receiving an anchoring portion 38 (not shown here) of the second part 34 of the emergency closure 30. As explained for Fig. 3, the first part 22 of the standard closure 20 and the first part 32 of the emergency closure 30 are integrally formed with each other as well as with the connection element 29. The second part 34 of the emergency closure 30 was omitted in Fig. 4.

[0041] Fig. 5 shows in a top view the buckle 10 as shown in Fig. 4 with the first and emergency closure 20, 30 connected by and integrally formed with each other and with the connection element 29. Fig. 5 shows - in addition to Fig. 4 - the second part 34 of the emergency closure 30 being engaged with its anchoring portion 38 to the receiving portion 36 of the first part 32 of the emergency closure 30. Similar to Fig. 4, the second part 24 of the standard closure 20 is not engaged with the first part 22.

[0042] Fig. 6 illustrates the retrofitted buckle 10a according to the present disclosure. The standard buckle comprises a first standard closure formed by the first set of the first part 22" and the second part 24', which are engageable with each other. In Fig. 6, the first and second parts 22", 24' have been disengaged and moved away from each other thereby releasing the first standard closure. Fig. 6 shows the retrofitted buckle 10a with a retrofit element 60 and two standard closures 20', 20" and one emergency closure 30'. The retrofit element 60 is inserted between the standard buckle, i. e. between the spaced apart first and second parts 22", 24'. The standard buckle comprises a first part 22" with a receiving portion 26", a second part 24' with anchoring portion 28' and the strap holder 42'. The anchoring portion 28' comprises the clamps 28a', 28b' and the centering means 28c'. The straps 40', 50' are connected to the first part 22" and to the second part 24' as described in Fig. 2 before. The strap holders 42, 52" fix the strap 40', 50' to the strap holder 42', 52', wherein the straps 40', 50' are looped around the strap holders 42', 52'. The retrofit element 60 provides for retrofitting of a standard buckle having no

safety opening function to a buckle 10a according to the present disclosure. The retrofit element 60 is mounted between the first part 22" and the second part 24'. The retrofit element 60 comprises two connection elements 29', 39'. The connection element 29' comprises parts of the standard closure 20', the first part 22' and the receiving portion 26', and parts of the emergency closure 30', the first part 32' and the receiving portion 36'. The connection element 39' comprises parts of the standard closure 20", the second part 24" with the anchoring portion 28", the clamps 28a", 28b" and the centering means 28c", and the second part 34' with the anchoring portion 38'. In Fig. 6 the anchoring portions 28', 28", 38' are not engaged with the respective receiving portions 26', 26", 36'. As illustrated in Fig. 6, in the retrofitted configuration of the buckle 10a, the second set of the first and the second part 22', 24' form a second standard closure 20' and the third set of the first and the second part 22", 24" form a third standard closure 20".

[0043] Fig. 7 shows the retrofitted buckle 10a with the retrofit element 60 as illustrated in Fig. 6 in a different configuration. Here, the second part 34' is engaged with its anchoring portion 38' into the respective receiving portion 36' of the first part 32'. It is to be noted, that in Fig. 7, although not shown, the extension of the parts 32' and 34' overlap as these parts 32', 34' engage with each other. The overlap is not shown for reasons of simplification. The second set of the first and the second parts 22', 24' forming the second standard closure 20' are still not engaged with each other in Fig. 7. Similarly, the third set of the first and the second parts 22", 24" forming the third standard closure 20" are still not engaged with each other in Fig. 7.

[0044] Fig. 8 shows the retrofitted buckle 10a with the retrofit element 60 as illustrated already above in Figs. 6 and 7 in a further different configuration. Here, not only the second part 34' and the first part 32' are engaged with each other via their respective receiving and anchoring portions 36', 38'. Also, the first and second parts 22', 24' of one of the standard closure 20' are engaged with each other via their respective receiving and anchoring portions 26', 28' (wherein 28' is not visible in this view because of the engagement with the receiving portion 26'). Furthermore, the first and second parts 22", 24" of the other standard closure 20" are engaged with each other via their respective receiving and anchoring portions 26", 28" (wherein 28" is not visible in this view because of the engagement with the receiving portion 26"). Thus, the retrofitted buckle 10a is in a completed closed configuration in this view. Application of a tensile force F_{buckle} affecting on the buckle being at or above the emergency opening value F_2 of the emergency closure 30' will lead to disengagement of the receiving and anchoring portions 36', 38' and consequently to separation of the first and second parts 32', 34' of the retrofit element 60 and one of the emergency closure 30', respectively. However, the application of such a tensile force will not disengage or separate the receiving and anchoring portions

26', 28' and the first and second parts 22', 24' on the one hand. On the other hand, also the receiving and anchoring portions 26", 28" and the first and second parts 22", 24" will not be disengaged or separated by the application of the tensile force in that case. Thereby, a defined emergency opening of the emergency closure 30' is achieved with the first and second parts 32', 34' separating from each other, or, in other words, with the receiving and anchoring portions 36', 38' disengaging from each other. The regular opening or release of the buckle 10a works either by disengaging or separating the first and second parts 22', 24' or by disengaging or separating the first and second parts 22", 24", i. e. without disengaging or separating the receiving and the anchoring portion 36', 38'. As illustrated in Fig. 8, the second set of the first and the second parts 22', 24' forming the second standard closure 20' are now engaged with each other in Fig. 7. Similarly, the third set of the first and the second parts 22", 24" forming the third standard closure 20" are now engaged with each other in Fig. 7.

[0045] Fig. 9 shows in a perspective view a safety helmet 100 comprising a buckle 10 according to the present disclosure. The buckle 10 is connected to the safety helmet 100 by two straps 40, 50 via their strap holders 42 (not shown here), 52. The fixing of the strap 40 to the safety helmet 100 as well as the fixing of the strap 40 to the buckle 10 via strap holder 42 is not shown here. The strap 50 is fixed on the opposite side of the helmet 100 (not shown here). The two straps 40, 50 and the buckle 10 are forming a reclosable chinstrap of the safety helmet 100 with a safety release function as described above. Regular opening or release or emergency or safety opening or release of the buckle works in the same ways as described above leading to a separation of the straps 40, 50 from each other. Also, a buckle 10a as shown in Fig. 6 to 8 is conceivable to be used for the helmet 100 including the retrofit element 60 and all the components as described under Figs. 6 to 8 above.

[0046] Fig. 10 shows in a perspective view a bag 110 comprising a buckle 10' according to the present disclosure. The buckle 10' is connected to the two straps 40', 50', which are in turn fixed by two fixing elements 112, 114 to the bag 110. In Fig. 10, the bag 110 is closed and held in that condition by the closed buckle 10' and the two straps 40', 50'. Each strap 40', 50' are connected to the two fixing elements 112, 114. Details of the buckle 10' are omitted here for simplification. The buckle 10' comprises the same components as described above for the buckle 10 as illustrated in Figs. 1 to 5. Regular opening or release or emergency or safety opening or release of the buckle works in the same ways as described above leading to a separation of the straps 40', 50' from each other. Also, a buckle 10a as shown in Fig. 6 to 8 is conceivable to be used for the bag 110 including the retrofit element 60 and all the components as described under Figs. 6 to 8 above.

[0047] Fig. 11a shows a badge holder 120a of a first embodiment comprising a buckle 10", two straps 40",

50", an ID card or badge 122a and a connection element 124a. The strap 40" forms a loop and both ends of the strap 40" are fixed to the same side of the buckle 10", e. g. by a strap holder (not shown) configured and arranged to fix two ends of the loop formed by the strap 40" to the buckle 10". The first end of the strap 50" is fixed to the buckle 10" by a strap holder (not shown) and the second end of the strap 50" is fixed with the connection element 124a to the ID card or badge 122a. A wearer (not shown in the figure) of the badge holder 120a is wearing the badge holder 120a by pulling the strap 40" over his head and placing it onto his neck. Regular opening or release or emergency or safety opening or release of the buckle works in the same ways as described above leading to a separation of the straps 40", 50" from each other. Also, a buckle 10a as shown in Fig. 6 to 8 is conceivable to be used for the badge holder 120a including the retrofit element 60 and all the components as described under Figs. 6 to 8 above.

[0048] Fig. 11b shows a badge holder 120b of a second embodiment comprising a buckle 10", two straps 40", 50", an ID card or badge 122b and a connection element 124b. Each of one ends of the straps 40", 50" are fixed with the connection element 124b to the ID card or badge 124b. Each of the other ends of the straps 40", 50" are fixed to the buckle 10" by strap holders (not shown). The two straps 40", 50" and the buckle 10" are forming a loop in this embodiment. A wearer (not shown in the figure) of the badge holder 120b is wearing the badge holder 120b by pulling the loop over his head and placing it onto his neck. Regular opening or release or emergency or safety opening or release of the buckle works in the same ways as described above leading to a separation of the straps 40", 50" from each other. Also, a buckle 10a as shown in Fig. 6 to 8 is conceivable to be used for the badge holder 120b including the retrofit element 60 and all the components as described under Figs. 6 to 8 above.

Claims

1. A buckle (10, 10', 10", 10''') with a longitudinal extension comprising a standard closure (20) configured and arranged such that it opens upon manually operating a locking mechanism and an emergency closure (30) configured and arranged such that it opens upon application of a tensile force (F_{buckle}) affecting on the buckle exceeding an emergency opening value (F_2), wherein the standard closure (20) is still closed upon application of a tensile force (F_{buckle}) being less than or equal to the emergency opening value (F_2) and wherein the standard closure and the emergency closure are reclosable.
2. The buckle (10, 10', 10", 10''') according to claim 1, wherein the emergency opening value (F_2) is in the range of 50 to 300 N, preferably 150 to 250 N.
3. The buckle (10, 10', 10", 10''') according to claim 1 or 2, wherein the standard closure (20) is further configured and arranged such that it opens upon an application of a tensile force (F_{buckle}) affecting on the buckle exceeding a standard opening value (F_1), wherein the standard opening value (F_1) is preferably in the range of 500 N or higher.
4. The buckle (10, 10', 10", 10''') according to any of the preceding claims, wherein the standard closure (20) and the emergency closure (30) each comprise a first and a second releasably engageable part (22, 24, 32, 34).
5. The buckle (10, 10', 10", 10''') according to any one of the preceding claims, wherein the standard closure (20, 20') and the emergency closure (30, 30') each comprises a receiving portion (26, 36) and an anchoring portion (28, 38), the anchoring portion (28, 38) optionally comprising clamps (28a, 28b).
6. The buckle (10, 10', 10", 10''') according to anyone of the preceding claims, wherein parts of the standard closure (20) and of the emergency closure (30) are integrally formed with the buckle (10, 10', 10", 10''').
7. The buckle (10, 10', 10", 10''') according to any one of claims 1 to 5, wherein the standard closure (20) and the emergency closure (30) are spaced apart and are longitudinally offset relative to each other.
8. The buckle (10, 10', 10", 10''') according to claim 7, wherein the standard closure (20) and emergency closure (30) are connected by a connection element, preferably a strap, chain, belt or hinge.
9. The buckle (10, 10', 10", 10''') according to any one of the preceding claims, wherein the standard closure (20) and the emergency closure (30) open in the same direction, preferably in the direction of the longitudinal extension of the buckle.
10. The buckle (10, 10', 10", 10''') according to any one of the preceding claims, wherein the buckle (10, 10', 10", 10''', 10a) comprises a polymeric material.
11. The buckle (10, 10', 10", 10''') according to any one of the preceding claims, wherein the buckle (10, 10', 10", 10''') comprises a thermoplastic material.
12. A retrofitted buckle (10a) comprising a first standard closure comprising a first set of a first and a second part (22", 24') engageable with each other, wherein the first and second parts (22", 24') are spaced apart longitudinally by a retrofit element (60) inserted between the first and second parts (22", 24') of the first standard closure thereby releasing the first standard

closure, the retrofit element (60) comprising an emergency closure (30') having a first and second part (32', 34') engaged with each other, wherein the emergency closure (30') is configured and arranged such that it opens upon application of a tensile force (F_{buckle}) exceeding an emergency opening value (F_2), the buckle (10a) further comprises a second set of a first and a second part (22', 24'') and a third set of a first and a second part (22'', 24'), wherein the second set of a first and a second part (22', 24') are engaged with each other thereby forming a second standard closure (20') and wherein the third set of a first and a second part (22'', 24'') are engaged with each other thereby forming a third standard closure (20''), wherein the first, the second and the third standard closures (20', 20'') are configured and arranged such that these open upon manually operating a locking mechanism, preferably the first, the second and the third standard closure (20', 20'') and the emergency closure (30') are reclosable.

13. The retrofitted buckle (10a) according to claim 12, wherein the emergency opening value (F_2) of the emergency closure (30') of the retrofitted buckle (10a) is in the range of 50 to 300 N, preferably 150 to 250 N.
14. The retrofitted buckle (10a) according to claim 12 or 13, wherein the first, second and third standard closures (20', 20'') are further configured and arranged such that these open upon an application of a tensile force (F_{buckle}) affecting on the retrofitted buckle exceeding a standard opening value (F_1), wherein the standard opening value (F_1) is preferably in the range of 500 N or higher.
15. A helmet (100), a bag (110) or a badge holder (120a, 120b) comprising the buckle (10, 10', 10'', 10''') according to any one of claims 1 to 11 or the retrofitted buckle (10a) according to any one of claims 12 to 14.

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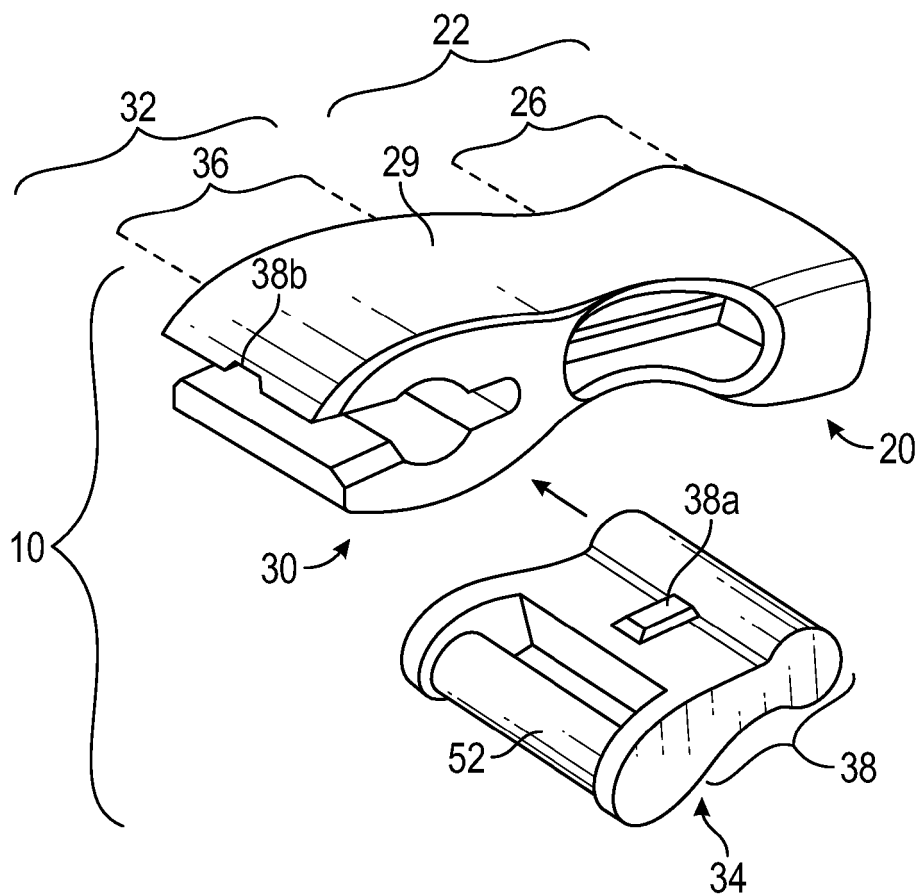


FIG. 1

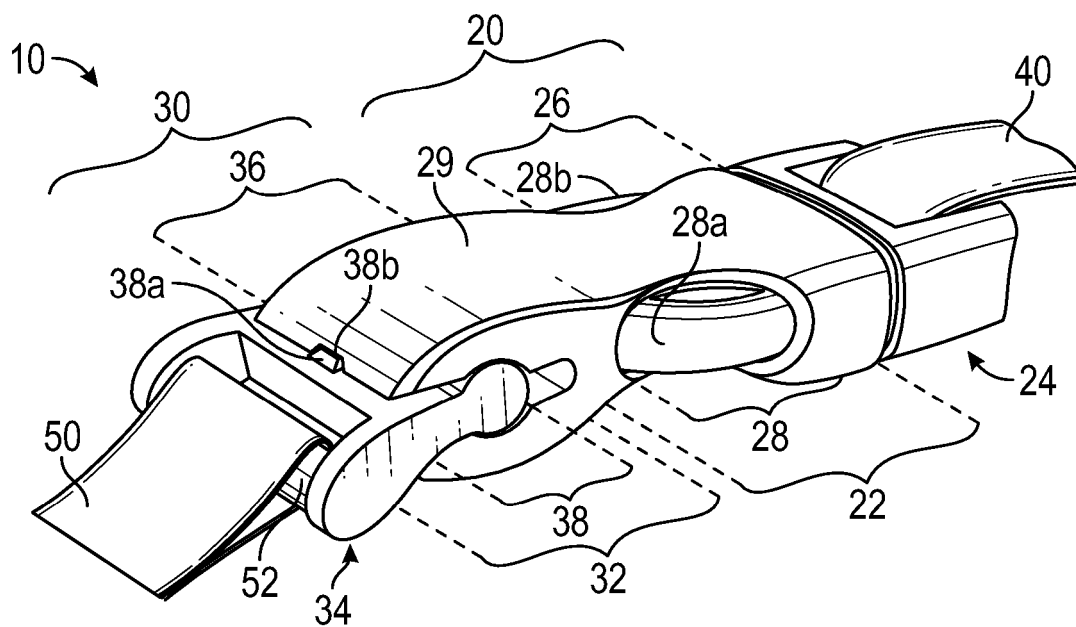


FIG. 2

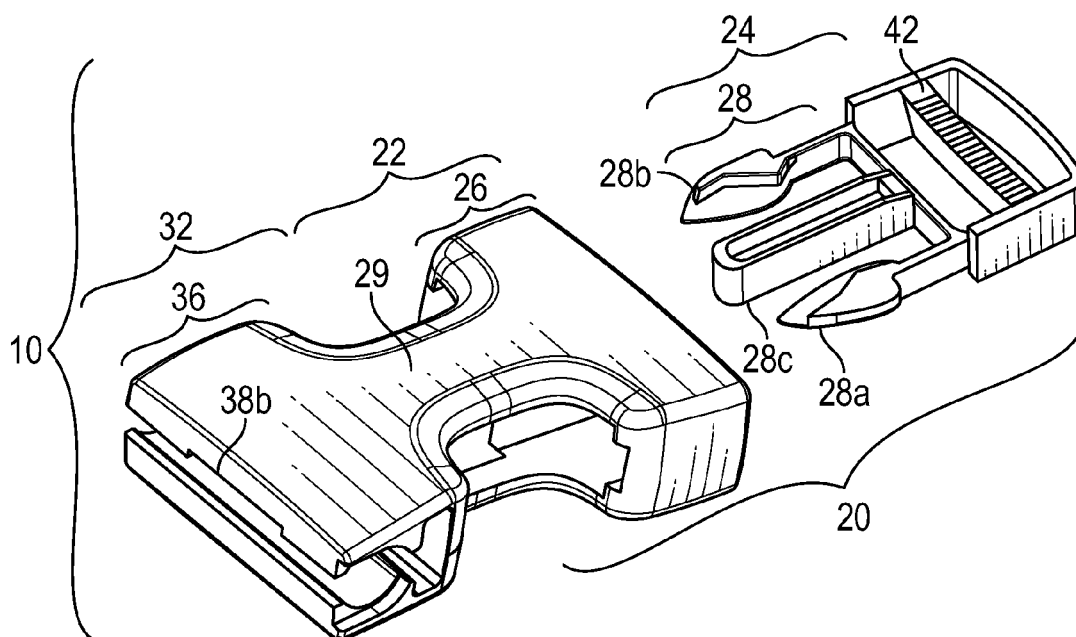


FIG. 3

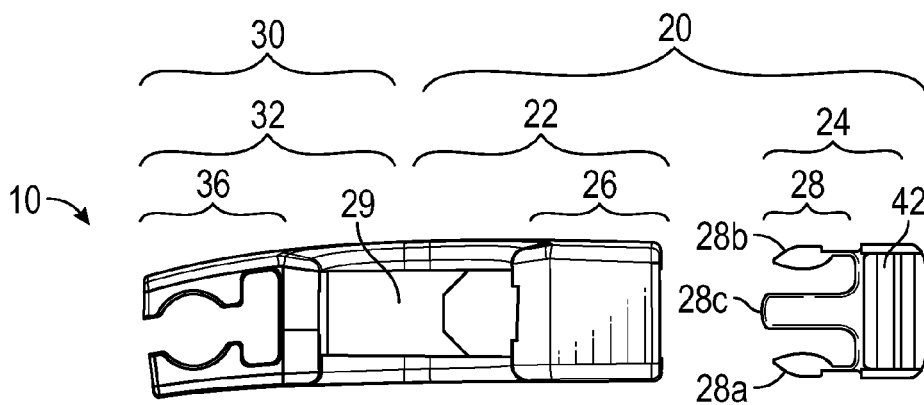


FIG. 4

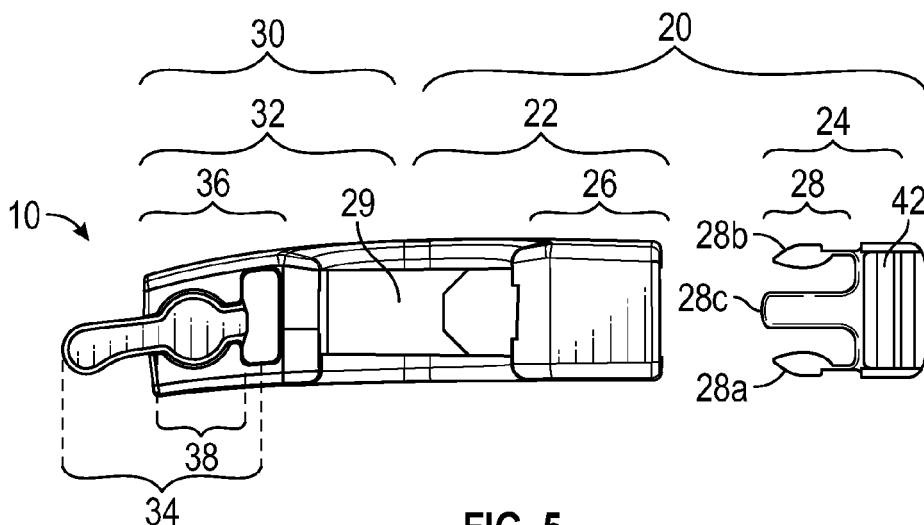
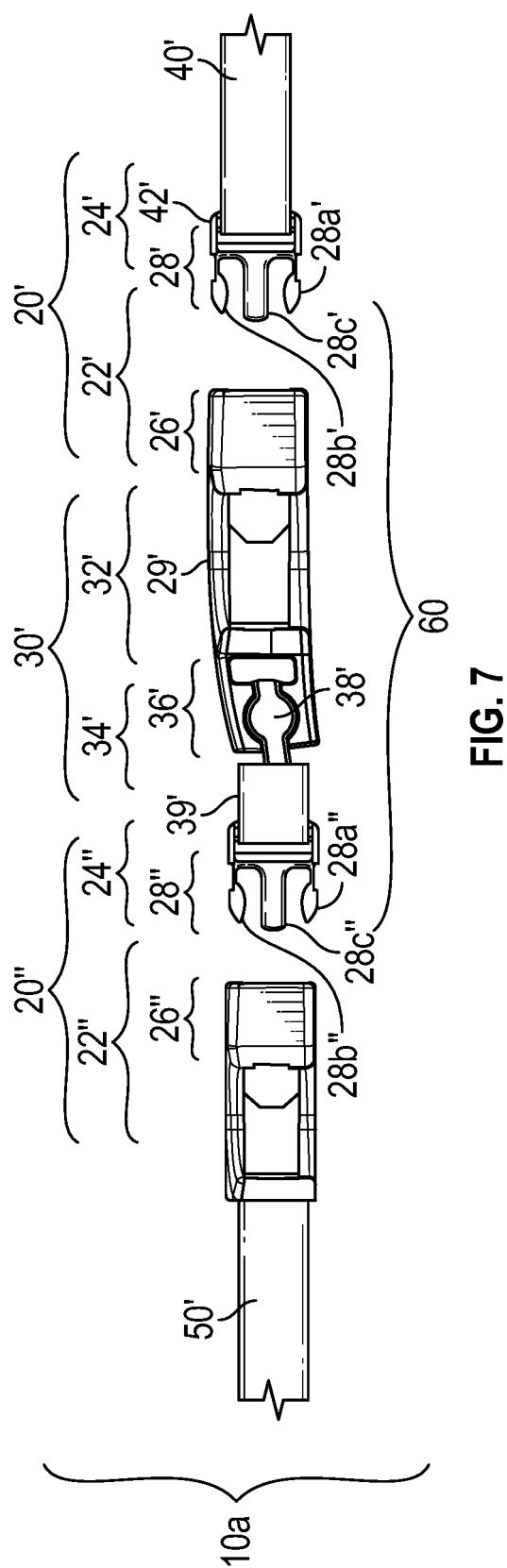
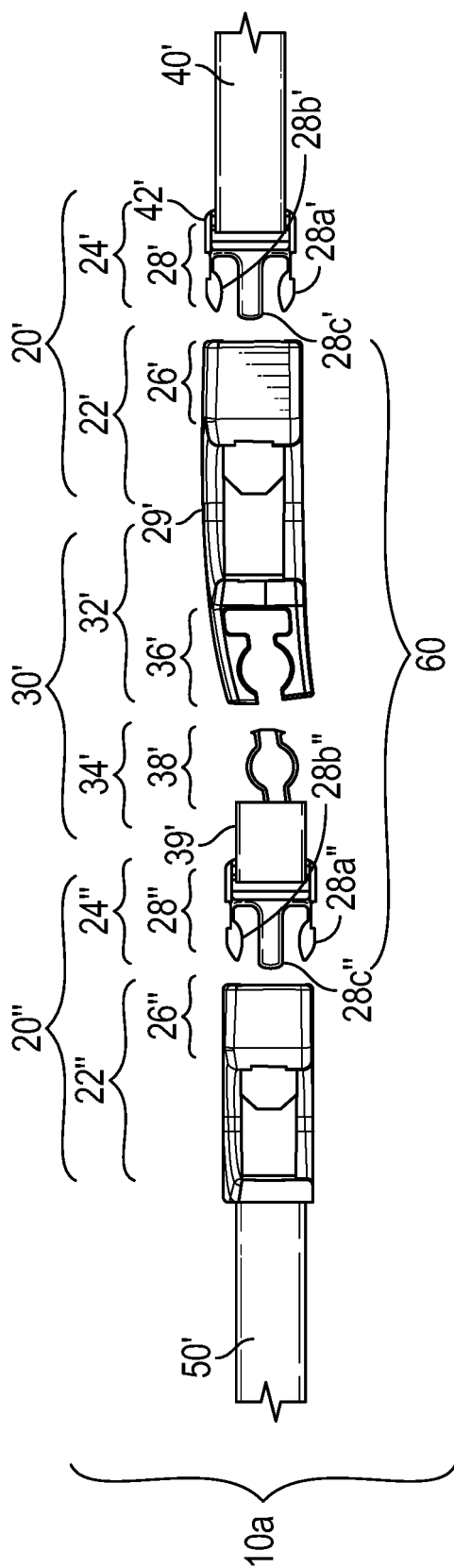


FIG. 5



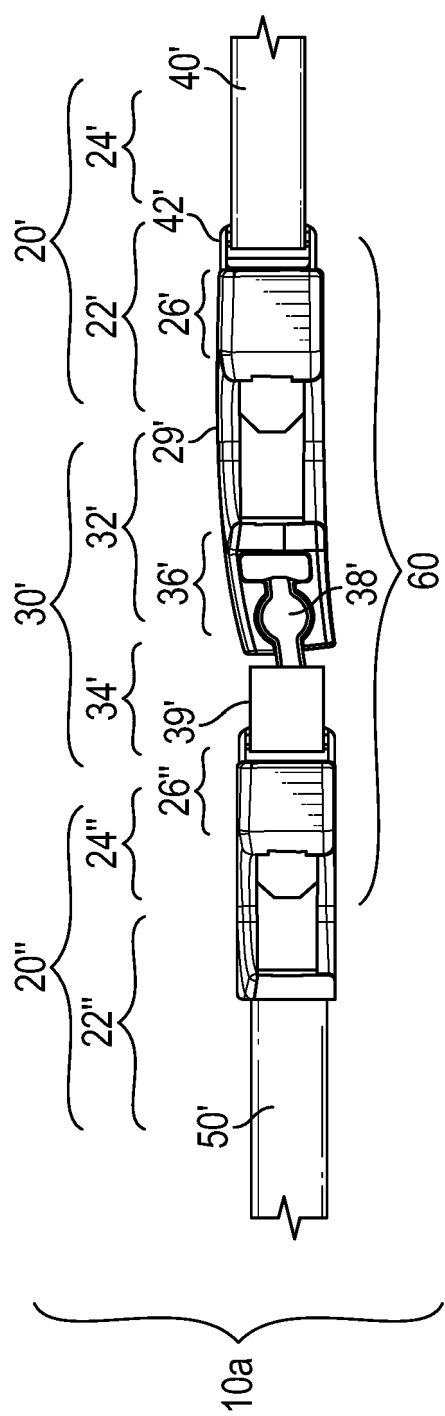


FIG. 8

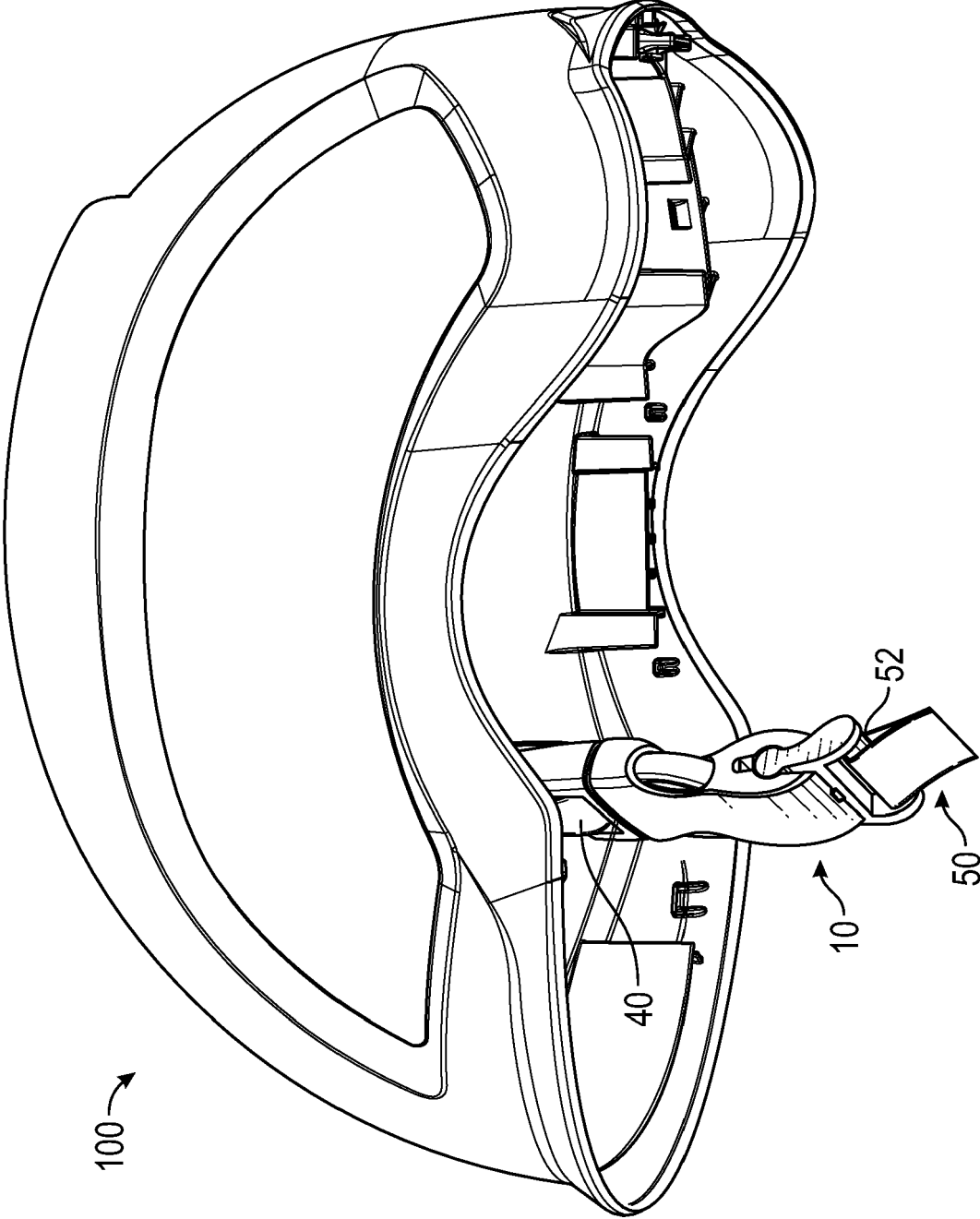


FIG. 9

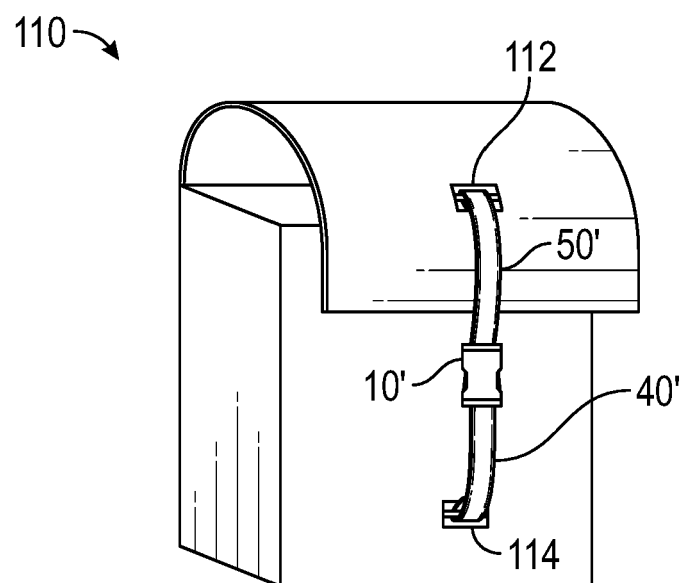


FIG. 10

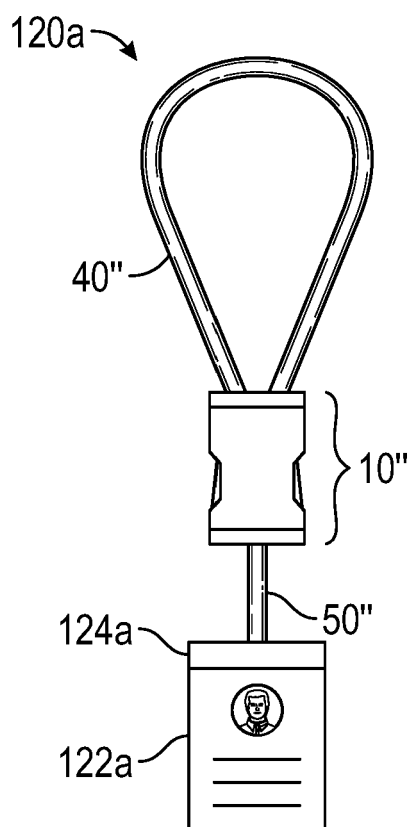


FIG. 11A

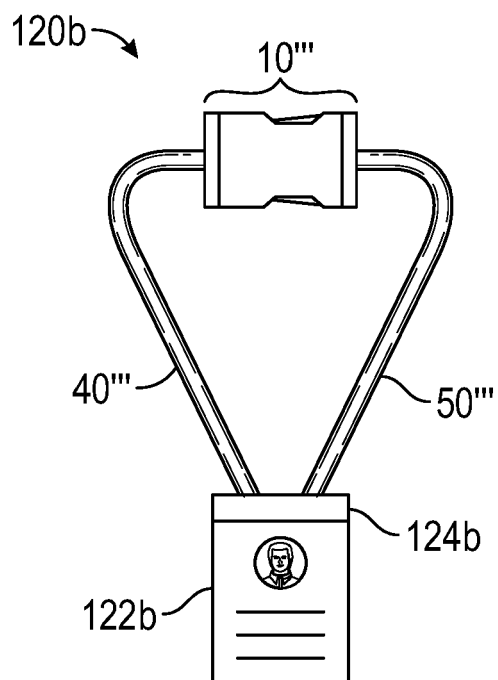


FIG. 11B



EUROPEAN SEARCH REPORT

Application Number
EP 20 17 5015

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X	WO 2018/104701 A1 (JSP LTD [GB]) 14 June 2018 (2018-06-14) * page 1, line 20 - line 26; figures 1-3,4,6,7 * * page 2, line 9 - line 20 *	12-15	
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			A44B A01K B60R A45F A42C A42B A45C B63C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		2 October 2020	da Silva, José
CATEGORY OF CITED DOCUMENTS			
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