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(54) RAZOR CONNECTOR

(57) In a first aspect the present disclosure relates to a razor connector 10 configured to connect a razor cartridge 100 to a razor handle 12. The razor connector comprises at least one interlocking feature configured to interlock with at least one interlocking part of the razor cartridge 100, a push-button 16 integrally formed with a push-element 24, wherein the push-button 16 is configured to move the push-element 24 from a first position to a second position upon actuation, and wherein movement of the push-element 24 from the first position to the second position is configured to disconnect the razor cartridge 100 from the razor connector 10.

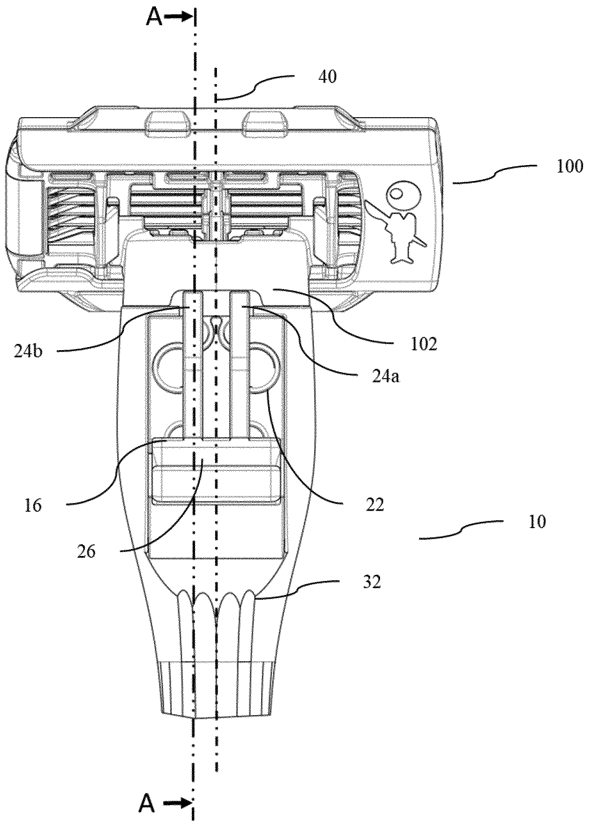

Figure 2

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Description

Technical Field

[0001] The present disclosure relates to the field of razors. More specifically, the present disclosure relates to razor connectors which attach a razor cartridge to a razor handle.

Background

[0002] Razors are well known everyday items to shave of unwanted bodily hair, e.g. beard hairs. The razor may comprise a razor cartridge including blades configured to cut the hair and a razor handle used attached thereto. In use, a user holds the razor handle and brings the razor cartridge into contact with a portion of skin. By movement of the razor handle the razor cartridge moves in a shaving direction and unwanted hair is removed. The razor cartridge may be releasably connected to the razor handle via a razor connector. A releasable attachment of the razor cartridge may allow exchanging the razor cartridge, for example when the blades have become dull, instead of discarding the entire razor. However, razor connectors typically comprise complex mechanisms requiring multiple components, for example springs, pushers, push buttons, releasing mechanisms etc. The complex mechanisms increase the assembly complexity and increase the production time. Further, the multiple components, especially those that are movable, increase the risk of system failure as they are more prone to breaking.

[0003] The present disclosure aims to address the aforementioned issues in optimizing razor connectors.

Summary

[0004] In a first aspect the present disclosure relates to a razor connector configured to connect a razor cartridge to a razor handle. The razor connector comprises at least one interlocking feature configured to interlock with at least one interlocking part of the razor cartridge, a push-button integrally formed with a push-element, wherein the push-button is configured to move the push-element from a first position to a second position upon actuation, and wherein movement of the push-element from the first position to the second position is configured to disconnect the razor cartridge from the razor connector.

[0005] In embodiments, the razor connector may comprise a tongue, configured to allow pivotable movement of the razor cartridge relative to the razor handle.

[0006] In embodiments, the tongue may be a flexible tongue.

[0007] In embodiments, the tongue may extend from a distal end of the razor connector and wherein the razor connector is configured to be connected to the razor handle at a proximal end and wherein the distal end and proximal end of the razor connector define a proximal-distal razor connector axis.

[0008] In embodiments, the push-element may be arranged in distal direction of the push-button.

[0009] In embodiments, the first position may be disposed proximally of the second position.

[0010] In embodiments, the at least one interlocking feature may be a recess, in particular a recess configured to interlock with at least one interlocking protrusion of the razor cartridge.

[0011] In embodiments, the at least one interlocking feature may be an interlocking protrusion, in particular an interlocking protrusion configured to interlock with at least one recess of the razor cartridge

[0012] In embodiments, the protrusion may be configured to disconnect the razor cartridge from the razor connector upon actuation of the push-button by pushing the at least one interlocking part of the razor cartridge out of the at least one interlocking feature.

[0013] In embodiments, the push-element may be configured to disconnect the razor cartridge from the razor connector upon actuation of the push-button by pushing the at least one interlocking part of the razor cartridge out of the at least one interlocking feature by at least a part of the push-element moving in the distal direction upon actuation of the push-button.

[0014] In embodiments, the push-element may be configured to disconnect the razor cartridge from the razor connector upon actuation of the push-button by pushing the at least one interlocking part of the razor cartridge out of the at least one interlocking feature by at least a part of the push-element moving in the distal direction and towards the proximal-distal razor connector axis upon actuation of the push-button.

[0015] In embodiments, the push-element may be configured to push the at least one interlocking part out of the at least one interlocking feature by moving the at least one interlocking part of the razor cartridge in distal direction relative to the at least one interlocking feature.

[0016] In embodiments, the push-element may be configured to push the at least one interlocking part out of the at least one interlocking feature by moving the at least one interlocking part of the razor cartridge in the distal direction and away from the proximal-distal razor connector axis relative to the at least one interlocking feature.

[0017] In embodiments, the push-button moves from a proximal position to a distal position upon actuation.

[0018] In embodiments, the push-button may be connected to an elastic structure configured to exert a biasing force on the push-button to return the push-button from the distal position to the proximal position, in particular wherein the push-button and the elastic structure may be integrally formed.

[0019] In embodiments, a cross-section of the elastic structure, in particular along the proximal-distal razor connector axis, may be V-shaped, or curved, in particular at least partially a semi-circle.

[0020] In embodiments, the elastic structure may comprise one or more circular arcs, in particular wherein a

top-view of the elastic structure may be shaped as one or more circular arcs.

[0021] In embodiments, the push-element may be configured to be in contact with the razor cartridge, when the razor cartridge is connected to the razor connector.

[0022] In embodiments, the push-button may be preloaded when the razor cartridge is connected to the razor cartridge.

[0023] In embodiments, the push-element may be configured to preload the razor cartridge when the razor cartridge is connected to the razor connector.

[0024] In embodiments, the push-button may be moved towards the proximal direction of the proximal-distal razor connector axis when preloaded.

[0025] In embodiments, the razor connector may comprise a receiving head configured to receive a connector sleeve of the razor cartridge.

[0026] In embodiments, the push-button may be arranged in proximal direction of the receiving head's distal end.

[0027] In embodiments, the push-button may comprise at least one actuation surface configured to be actuated by a user to release the razor cartridge, in particular by moving the actuation surface in distal direction of the proximal-distal razor connector axis.

[0028] In embodiments, the at least one actuation surface may be disposed substantially perpendicular to the proximal-distal razor connector axis.

[0029] In embodiments, the elastic structure may be arranged between the actuation surface and the push-element's distal end.

[0030] In embodiments, the at least one actuation surface may comprise an indicator, more specifically a haptic indicator and in particular a protrusion, a dot, a cavity, a groove and/or a rubber element.

[0031] In embodiments, the razor connector may have a top side and a bottom side.

[0032] In embodiments, the tongue may comprise a first section extending parallel to the proximal-distal razor connector axis along the bottom side of the razor connector and a second section diverging towards the top side of the razor connector.

[0033] In embodiments, the push-button may be arranged on the top side or bottom side of the razor connector, in particular on the top side of the razor connector.

[0034] In embodiments, the tongue may have a polygonal cross-section, more specifically a square, rectangular or octagonal shape and in particular a rectangular shape.

[0035] In embodiments, a corner of the polygonal cross-section may be round.

[0036] In embodiments, the push-element may comprise a first push-element and a second push-element, wherein the first push-element and the second push-element may be disposed parallel to one another, in particular wherein the proximal-distal razor connector axis may be disposed between the first push-element and the second push-element.

[0037] In embodiments, the at least one interlocking feature may be positioned proximally of the receiving head's distal end, more specifically on the bottom side of the razor connector on the receiving head proximally of the receiving head's distal end and in particular on the bottom side of the razor connector on the receiving head proximally of the receiving head's distal end adjacent to the tongue.

[0038] In embodiments, the push-button may be integrally formed with the at least one interlocking feature.

[0039] In embodiments, the push-button may be integrally formed with the tongue.

[0040] In embodiments, the push-button, the at least one interlocking feature and the tongue may be integrally formed.

[0041] In embodiments, the razor connector may be a one-piece part.

[0042] In embodiments, the razor connector may comprise a plurality of layers, in particular a plurality of layers substantially parallel to each other.

[0043] In embodiments, the razor connector may be integrally formed with a razor handle.

[0044] In embodiments, a layer of the plurality of layers may have a thickness between about 5 μm to about 100 μm, more specifically between about 10 μm to about 50 μm and in particular between about 15 μm to about 30 μm.

[0045] In embodiments, a layer of the plurality of layers may have a thickness between about 0.05 mm to about 0.6 mm, more specifically between about 0.1 μm to about 0.4 mm and in particular between about 0.15 mm to about 0.3 mm.

[0046] In embodiments, the razor connector may comprise a first polymer, more specifically a photopolymer and in particular an ABS-like polymer and/or polypropylene-like polymer.

[0047] In embodiments, the first polymer may have a Shore D hardness between about 50 to about 120, more specifically between about 55 to about 100 and in particular between about 60 to about 90, measured according to ISO 868:2003.

[0048] In embodiments, the razor connector may comprise a second polymer.

[0049] In embodiments, the second polymer may have a shore A hardness between about 10 to about 95, more specifically between about 25 to about 80 and in particular between about 35 to about 60, measured according to ASTM D2400 - 15.

[0050] In embodiments, the razor connector may comprise a third polymer, more specifically a thermoplastic polymer and in particular ABS and/or polypropylene.

[0051] In embodiments, the razor connector may comprise a fourth polymer, more specifically a thermoplastic elastomer and in particular a TPA, a TPC, a TPO, a TPS, a TPV, a TPZ and/or a TPU.

[0052] In embodiments, the flexible tongue may comprise the second and/or fourth polymer.

[0053] In embodiments, the elastic structure may com-

prise the second and/or fourth polymer.

[0054] In embodiments, the push-button may comprise the first and/or third polymer.

[0055] In embodiments, the push-element may comprise the first and/or third polymer.

[0056] In embodiments, wherein the tongue may be connected to a spring, more specifically a spring configured to allow the tongue to move along the proximal-distal razor connector axis and in particular a spring that compresses and stretches along the proximal-distal razor connector axis.

[0057] In a second aspect the present disclosure relates to a razor system comprising a razor connector according to the second aspect and a razor cartridge, wherein the razor cartridge is releasably attached to the razor connector.

[0058] In embodiments according to the second aspect the razor system may further comprise a razor handle connected to the razor connector.

[0059] In a third aspect the present disclosure relates to a method for manufacturing a razor connector according to any preceding embodiment according to the first aspect. The method may comprise manufacturing the razor connector using a computer-controlled manufacturing system, in particular additive manufacturing, material jetting, fused filament fabrication, stereolithography and/or selective laser sintering.

[0060] In a fourth aspect the present disclosure relates to a computer-based manufacturing system for manufacturing a razor connector, comprising a control unit adapted to execute the method according to the third aspect.

[0061] In a fifth aspect the present disclosure relates to a computer program comprising computer readable code which cause a computer-based manufacturing system to carry out the method according to the third aspect.

[0062] In a sixth aspect the present disclosure relates to a computer readable medium comprising the computer readable code according to the fifth aspect.

[0063] In an eighth aspect the present disclosure relates to a model of the razor connector according to any embodiment according to the first aspect for a computer-controlled manufacturing system, wherein the model is configured to be processed by the computer-controlled manufacturing system to manufacture the razor connector according to the first aspect.

[0064] In an eighth aspect the present disclosure relates to a computer-readable medium, wherein the computer-readable medium comprises instructions configured to be processed by a computer-controlled manufacturing system to manufacture the razor connector according to any embodiment according to the first aspect.

Description of the Drawings

[0065]

Fig. 1 shows a top view of a razor handle 12 with a razor connector 10 according to the present disclosure.

Fig. 2 shows a razor connector 10 connected to a razor cartridge 102.

Fig. 3 shows a cross-section of a razor connector 10 along the proximal-distal razor connector axis 40 according to the present disclosure.

Fig. 4 shows a cross-section of an alternative embodiment of a razor connector 10 along the cutting plane line A-A according to the present disclosure.

Fig. 5 shows a breakout view of a razor connector according to the present disclosure depicted an elastic structure 22.

Fig. 6 shows an isometric bottom view of a razor connector according to the present disclosure.

Detailed Description

[0066] Hereinafter, a detailed description will be given of the present disclosure. The terms or words used in the description and the aspects of the present disclosure are not to be construed limitedly as only having common-language or dictionary meanings and should, unless specifically defined otherwise in the following description, be interpreted as having their ordinary technical meaning as established in the relevant technical field. The detailed description will refer to specific embodiments to better illustrate the present disclosure, however, it should be understood that the presented disclosure is not limited to these specific embodiments.

[0067] Razor connectors typically comprise multiple components, in particular multiple movable components. The number of components increases the required assembly time during production, as well as the risk of breaking of the razor connector.

[0068] In a first aspect the present disclosure relates to a razor connector 10 configured to connect a razor cartridge 100 to a razor handle 12. The razor connector comprises at least one interlocking feature configured to interlock with at least one interlocking part of the razor cartridge 100, a push-button 16 integrally formed with a push-element 24, wherein the push-button 16 is configured to move the push-element 24 from a first position to a second position upon actuation, and wherein movement of the push-element 24 from the first position to the second position is configured to disconnect the razor cartridge 100 from the razor connector 10.

[0069] The razor connector 10 according to the first aspect may significantly reduce the required assembly time compared to other types of razor connectors.

[0070] Figure 1 illustrates a top view of an exemplary razor connector 10 according to the present disclosure with a razor handle 12. The razor connector 10 may be

connected to the razor handle 12 at a proximal end and a razor cartridge 100 at the distal end, as shown in Figure 2. In embodiments, the razor connector 10 may comprise a tongue, configured to allow pivotable movement of the razor cartridge 100 relative to the razor handle 12. The tongue 14 may extend from a distal end of the razor connector 10. The distal end and proximal end may define the proximal-distal razor connector axis 40. Figure 1 shows the proximal-distal razor connector axis 40 running centrically through the razor connector 10.

[0071] Figure 2 is a more detailed top view of the exemplary razor connector 10 connected to a razor cartridge 100. Figure 2 shows two push-elements 24a, 24b. In embodiments, the razor connector may comprise only one push-element. The push-element 24 may extend along the proximal-distal razor connector axis 40, in particular the push-element 24 may exhibit a greater extension along the proximal-distal razor connector axis 40 compared to the two directions perpendicular thereto. Additionally, the push-element 24 may be for example rod-shaped. Further, the push-element 24 may comprise one or more kinks or bends.

[0072] As shown in Figure 2 and Figure 3 the push-elements 24a, 24b are integrally formed with the push-button 16. The hinge 24 may be arranged towards the razor connector's 10 distal end. The push-element 24 may be arranged in distal direction of the push-button 16 and/or may be attached to the push-button 16 at the push-element's 24 proximal end. As depicted in Figure 3, the push-element 24 may comprise a first section diverging towards the proximal-distal razor connector axis 40 and a second section extending parallel to the proximal-distal razor connector axis 40, in particular wherein the second section is disposed in distal direction of the first section. The combination of the first section and second section may allow positioning push-button and actuation surface 26 further away from the proximal-distal razor connector axis 40 and/or other components of the razor connector 10, which may allow easier access to the actuation surface 26 and push-button 16 by the user.

[0073] In embodiments, the push-element may comprise a first 24a and a second push-element 24b, wherein the first 24a and the second push-element 24b may be disposed opposing one another, in particular wherein the proximal-distal razor connector axis 40 is disposed between the first 24a and the second push-element 24b.

[0074] In embodiments, the push-button 16 may move from a proximal position to a distal position upon actuation. As the push-button 16 is integrally formed with the push-element 24, the push-button 16 may transfer forces to the push-element 24. Hence, when the push-button 16 is moved from a proximal position to distal position, the push-button 16 may also move the push-element 24 in distal direction. Therefore, the push-element's first position may be disposed proximally of the second position.

[0075] As mentioned above, the razor connector 10 according to the first aspect comprises at least one interlocking feature. As depicted in Figure 6, the at least one interlocking feature may be a recess 18, in particular a recess 18 configured to interlock with at least one interlocking protrusion of the razor cartridge 100. Alternatively or additionally, the at least one interlocking feature may be an interlocking protrusion, in particular an interlocking protrusion configured to interlock with at least one recess of the razor cartridge 100.

[0076] The interlocking protrusion and the recess may interlock through a snap-fit when the razor connector 10 is connected to a razor cartridge 100 on its distal end. The razor connector 10 or parts thereof and/or the razor connector or parts thereof may be flexible, improving the snap fit and allowing release of the snap-fit.

[0077] The push-element 24 may be configured to disconnect the razor cartridge 100 from the razor connector 10 upon actuation of the push-button 16 by pushing the at least one interlocking part of the razor cartridge 100 out of the at least one interlocking feature. More specifically, the push-element 24 may be configured to disconnect the razor cartridge 100 from the razor connector 10 upon actuation of the push-button 16 by pushing the at least one interlocking part of the razor cartridge 100 out of the at least one interlocking feature by at least a part of the push-element 24 moving in the distal direction upon actuation of the push-button 16.

[0078] As depicted in Figure 2, the push-element 24 may be configured to be in contact with the razor cartridge 100, when the razor cartridge 100 may be connected to the razor connector 10. The push-element 24 may be configured to push the at least one interlocking part out of the at least one interlocking feature by moving the at least one interlocking part of the razor cartridge 100 in distal direction relative to the at least one interlocking feature.

[0079] Movement of the at least one interlocking part of the razor cartridge 100 in distal direction may release the snap fit. More specifically, as the push-element 24 may be in contact with the razor cartridge 100, movement of the push-element 24 in distal direction may also move an adjacent part of the razor cartridge 100, e.g. a part of the razor cartridge comprising the at least one interlocking part, in distal direction leading to release of the snap fit.

[0080] Alternatively, in embodiments, the push-element 24 may be configured to push the at least one interlocking part out of the at least one interlocking feature by moving the at least one interlocking part of the razor cartridge 100 in the distal direction and away from the proximal-distal razor connector axis 40 relative to the at least one interlocking feature. Movement of the at least one interlocking part of the razor cartridge 100 away from the proximal-distal razor connector axis 40 may undo the snap-fit and the movement into the distal direction may prevent reengagement as the at least one interlocking feature and at least one interlocking parts may not be aligned anymore. Movement of the at least one interlocking part of the razor cartridge 100 away from the proximal-distal razor connector axis 40 may for example be

achieved by at least part of the push-element 24 being configured to move between part of the razor cartridge 100 and the razor connector 10, e.g. parts of the razor cartridge 100 and the razor connector 10 in proximity of the at least one interlocking feature and at least one interlocking part.

[0081] Pushing the at least one interlocking part of the razor cartridge 100 out of the at least one interlocking feature of the razor connector 10 shall not be construed as requiring the push-element 24 to directly contact the at least one interlocking feature or part. The push-element 24 may merely push against another part of the razor cartridge 100, whereby the razor cartridge 100 moves in distal direction, which in turn may lead to the push out.

[0082] In embodiments, the push-button 16 may be connected to an elastic structure 22 configured to exert a biasing force on the push-button 16 to return the push-button from the distal position to the proximal position, in particular wherein the push-button and the elastic structure 22 are integrally formed.

[0083] In embodiments, a cross-section of the elastic structure 22, in particular along the proximal-distal razor connector axis 40, may be V-shaped, or curved, in particular at least partially a semi-circle. Figure 4 shows a curved elastic structure 22. The shape of the elastic structure 22, which is partially defined by its cross-section, may be chosen based on the desired movement of the push-button 16 upon actuation, as well as the desired movement of the push-element 24 upon actuation. For example, if the push-element 24 are configured to push the at least one interlocking part out of the at least one interlocking feature by moving the at least one interlocking part of the razor cartridge 100 in the distal direction and away from the proximal-distal razor connector axis 40 relative to the at least one interlocking feature, the shape of the elastic structure 22 may be chosen such that at least a part of the push-element 24 moves between part of the razor cartridge 100 and the razor connector 10 upon actuation of the push-button 16. For example, a curved elastic structure 22 may allow the push-button 16 to move towards the proximal-distal razor connector axis 40 which may move part of the push-element 24 also towards the proximal-distal razor connector axis 40, such that the part of the push-element 24 moves between part of the razor cartridge 100 and the razor connector 10.

[0084] Figure 5 is a breakout view of the razor connector 10 showing an embodiment of the elastic structure 22 in a top view. A plurality of details, such as the push-element 24, have been omitted in Figure 5. As depicted in Figure 5, the elastic structure 22 may comprise one or more circular arcs, in particular wherein a top-view of the elastic structure 22 is shaped as one or more circular arcs. The circular arcs may provide a high degree of elastic force to the elastic structure 22, even when integrally formed with the push-button 16.

[0085] In embodiments, the push-button 16 may be preloaded when the razor cartridge 100 is connected to the razor connector 10. In embodiments, the push-button 16 may be moved towards the proximal direction of the proximal-distal razor connector axis 40 when preloaded. Preloading the push-button 16 when connecting the razor cartridge 100 may reduce the required force for actuating the push-button to disconnect the razor cartridge, as at least part of the force is already provided due to the preloading.

[0086] In embodiments, the push-element 24 may be configured to preload the razor cartridge 100 when the razor cartridge 100 is connected to the razor connector 10. Preloading the razor cartridge 100 may bias the razor cartridge 100 towards an angle relative to the razor handle 12, which may improve the handling of the razor for the user.

[0087] As mentioned above, the razor connector 10 may comprise a tongue 14, configured to allow pivotable movement of the razor cartridge 100 relative to the razor handle 12. The tongue 14 may connect and/or slide into a corresponding feature of the razor cartridge 100. The tongue 14 may restrict movement of the razor cartridge 100 relative to the razor connector 10 in certain axis. The tongue 14 may restrict movement of the razor cartridge 100 relative to the razor connector 10 orthogonally to the proximal-distal razor connector axis 40 and/or pivotable movement around the proximal-distal razor connector axis 40. This may improve the connection between the razor connector 10 and the razor cartridge 100, in particular it may prevent accidental release of the razor cartridge 100. The tongue 14 may however allow pivotable movement around an axis disposed orthogonally to the proximal-distal razor connector axis 40. This may in use allow the razor cartridge 100 to align to the surface of a user's skin. The tongue 14 may allow the razor cartridge 100 to align to the user's skin by a pivotable movement but may also apply a restoring force on the razor cartridge 100 to return to its original orientation relative to the razor handle.

[0088] In embodiments, the tongue 14 may be a flexible tongue 14. The term "flexible tongue" within this disclosure may refer to an elongated structure, in particular a structure elongated at least partly along the proximal-distal razor connector axis 40, wherein the elongated structure comprises or consists of an elastic material. The term "flexible tongue" may refer to an elongated structure allowing pivotable movement of a connected part, in particular a razor cartridge" due to elastic deformation. Additionally or alternatively, the term "flexible tongue" may refer to a flexible elongated structure not comprising movable parts, such as springs or slidable parts.

[0089] The flexible tongue 14 may further reduce the assembly time of the razor connector 10 compared to other components allowing pivotable movement of the razor cartridge 100. Further, the flexible tongue 14 may be integrally formed with other parts of the razor connector 10. The term "elastic material" within this disclosure may refer to a material which undergoes deformation

when exposed to a force and returns, at least partly, to its original size and shape after the force is removed. Additionally or alternatively, the term "elastic material" within this disclosure may refer to a material which has an elongation at yield of at least 1 %, more specifically at least 1.5 % and in particular at least 2 %, measured according to ISO 527-1:2019.

[0090] In embodiments, the razor connector 10 may comprise a receiving head 28 configured to receive a connector sleeve 102 of the razor cartridge 100. The receiving head 28 may align the tongue during its insertion into the razor cartridge 100. Further, the receiving head 28 may aid in preventing movement of the razor cartridge 100 orthogonally to the proximal-distal axis razor connector proximal-distal razor connector axis 40. The razor connector 10 may also connect to the razor connector 100 in other ways, in particular through other types of plug and socket connection types. Additionally, movement of the at least one interlocking part of the razor cartridge 100 away from the proximal-distal razor connector axis 40 may for example be achieved by at least part of the push-element 24 being configured to move between the receiving head 28 and the connector sleeve 102 upon actuation of the push-button 16. As shown in Figure 3 the connector sleeve 102 may comprise an angular portion, which may facilitate movement by the push-element 24 between the receiving head 28 and the razor connector sleeve 102. Further, in embodiments the push-element 24 may comprise an angular portion at its distal end, which may facilitate movement by the push-element 24 between the receiving head 28 and the razor connector sleeve 102.

[0091] As shown in Figure 4, the push-element 24 may also protrude into the razor connector sleeve 102. In particular the push-element 24 may be in contact with a distal end of the razor connector sleeve 102. When the push-button 16 is actuated the push-element 24 may move towards the distal direction, while the receiving head 28 comprising the at least one interlocking feature, in particular the recess 18, stays in place. The push-element 24 may then push against the distal end of the razor connector sleeve 102 moving it in the distal direction, which may lead to the at least one interlocking part being moved out of the at least one interlocking feature, leading to the disconnection of the razor cartridge 100.

[0092] In embodiments, the push-button 16 may be arranged in proximal direction of the receiving head's 28 distal end. Arranging the push-button 16 proximally of the receiving head's 28 distal end may prevent unintentional interaction of the push-button 16 with the razor cartridge 100 and provide improved handling for the user.

[0093] In embodiments, the push-button 16 may comprise at least one actuation surface 26 configured to be actuated by a user to release the razor cartridge 100, in particular by moving the actuation surface 26 in distal direction of the proximal-distal razor connector axis 40.

[0094] In embodiments, the at least one actuation surface 26 may be disposed substantially perpendicular or perpendicular to the proximal-distal razor connector axis 40. Arranging the at least one actuation surface 26 substantially perpendicular or perpendicular to the proximal-distal razor connector axis 40 may allow ergonomic actuation by the user, in particular with his thumb.

[0095] In embodiments, the elastic structure 22 may be arranged between the actuation surface 26 and the push-element's 24 distal end.

[0096] In embodiments, the at least one actuation surface 26 may comprise an indicator, more specifically a haptic indicator and in particular a protrusion, a dot, a cavity, a groove and/or a rubber element. The haptic indicator may facilitate the identification of the actuation surface 26 by the user, in particular without looking at the razor connector 10 and only through haptic perception.

[0097] In embodiments, the razor connector 10 may have a top side 32 and bottom side 36 (shown for example in Figure 2 and Figure 6). The top side 32 may be the side facing against a shaving direction and the bottom side 36 the side facing towards the shaving direction. Alternatively or additionally, the top 32 and bottom 36 side may be defined relative to other components. Alternatively or additionally, the bottom side may be the razor connector's 10 side comprising the tongue, in particular the flexible tongue 14. Alternatively or additionally, the bottom side may be the razor connector's 10 side comprising the at least one interlocking feature. Additionally, the top side 32 may be the side opposite of the bottom side 36.

[0098] As depicted in Figures 3, in embodiments, the tongue 14 may comprise a first section extending parallel to the proximal-distal razor connector axis 40 along the bottom side 36 of the razor connector 10 and a second section diverging towards the top side 32 of the razor connector 10. This configuration may, in instances, be selected to allow the razor cartridge 100 to pivot relative to an axis disposed orthogonally to the proximal-distal razor connector axis 40, while preventing movement orthogonally to the proximal-distal razor connector axis 40.

[0099] In embodiments, the receiving head 28 may comprise a top side 34 (shown for example in Figure 2) and a bottom side 38 (shown in Figure 6). The top 34 and bottom side 38 of the receiving head 28 may be defined accordingly to the top 32 and bottom side 36 of the razor connector 10. As shown in Figure 6 the flexible tongue 14 may be connected to the receiving head 28, more specifically to the receiving head's 28 proximal end and in particular the receiving head's 28 bottom side's 38 proximal end. This configuration may increase the length of the tongue, which may allow for a greater deflection at the same force compared to a shorter tongue, which may improve the alignment of the razor cartridge 100 to the user's skin during the shaving action.

[0100] In embodiments, the push-button 16 may be arranged on the top side 32 or bottom side 36 of the razor connector 10, in particular on the top side 32 of the razor connector 10.

[0101] In embodiments, the tongue 14 may have a polygonal cross-section, more specifically a square, rectangular or octagonal shape and in particular a rectangular shape. In embodiments, a corner of the polygonal cross-section may be round. The rounded edges may facilitate sliding the tongue into the razor cartridge's 100 corresponding feature.

[0102] In embodiments, the push-element 24 may be positioned at the top side 32 of the razor connector 10. In embodiments, the push-element 24 may be positioned at the bottom side 36 of the razor connector 10.

[0103] In embodiments, the at least one interlocking feature may be positioned proximally of the receiving head's 28 distal end, more specifically on the bottom side 36 of the razor connector 10 on the receiving head 28 proximally of the receiving head's 28 distal end and in particular on the bottom side 36 of the razor connector 10 on the receiving head 28 proximally of the receiving head's 28 distal end adjacent to the tongue 14. Placing the at least one interlocking feature, in particular a recess 18 on the bottom side 38 of the razor connector 10 may be used e.g. if the bottom side 38 of the razor connector 10 is facing against the shaving direction, in some instances, as during the shaving action the at least one interlocking feature may be pressed together, due to the forces transferred to the razor cartridge 100 during the shaving action.

[0104] In embodiments, different parts of the razor connector 10 may be integrally formed with other parts of the razor connector 10. This may decrease the assembly time of the razor connector 10.

[0105] In embodiments, the push-button 16 may be integrally formed with the at least one interlocking feature. Additionally or alternatively, the push-button 16 may be integrally formed with the tongue. In embodiments, the push-button 16, the at least one interlocking feature and the tongue 14 may be integrally formed.

[0106] In embodiments, the razor connector 10 may be a one-piece part. Integrally forming parts of the razor connector 10 may decrease the assembly time of the razor connector 10 drastically. In particular, manufacturing the razor connector 10 as a one-piece part may lead to no assembly time for the razor connector 10 at all. Figures 1 to 8 show the razor connector 10 as a one-piece part.

[0107] To manufacture the razor connector 10 as a one-piece part different manufacturing technologies may be used. The razor connector 10 may be, in some instances, manufacturable by additive manufacturing technologies. The razor connector 10 may have a complex geometry, which may be efficiently manufacturable by additive manufacturing. In particular, the razor connector 10 may comprise multiple undercuts, which may make for example injection molding inefficient, especially if the razor connector 10 is intended to be manufactured as a one-piece part.

[0108] The razor connector 10 may be an individual part and connected to the razor handle 12 by a detachable or non-detachable connection, for example a push-in connection. Manufacturing the razor connector 10 as an individual part may be advantageous if the razor handle 12 can be rapidly and efficiently manufactured, e.g. by injection molding, whereas the razor connector 10 can only be manufactured with more cost and time intensive processes, e.g. additive manufacturing. In that case, an individually manufactured razor handle 12 and razor connector 10 may reduce the manufacturing time and cost of the complete razor. Further, a releasably attached individually formed razor connector 10 could be exchanged if it is worn out, while retaining the razor handle 12.

[0109] Alternatively or additionally, the razor connector 10 may be integrally formed with a razor handle 12. Integrally forming the razor connector 10 with razor handle 12 reduces the assembly time further.

[0110] In embodiments, the razor connector 10 may comprise a plurality of layers, in particular a plurality of layers substantially parallel to each other. The layered structure may comprise a plurality of layers, in particular a plurality of layers substantially parallel to each other. Additive manufacturing technologies, such as fused filament fabrication or material jetting may lead to a plurality of layers, in particular a plurality of layers substantially parallel to each other.

[0111] In embodiments, a layer of the plurality of layers may have a thickness between about 5 μm to about 100 μm, more specifically between about 10 μm to about 50 μm and in particular between about 15 μm to about 30 μm.

[0112] In embodiments, a layer of the plurality of layers may have a thickness between about 0.05 mm to about 0.6 mm, more specifically between about 0.1 μm to about 0.4 mm and in particular between about 0.15 mm to about 0.3 mm.

[0113] The thickness of the plurality of layers may depend upon the process used for manufacturing. Further, a smaller layer thickness may lead to an increased manufacturing time of the razor connector 10, but may also increase the mechanical stability and dimensional accuracy of the razor connector 10.

[0114] In embodiments, the razor connector 10 may comprise a first polymer, more specifically a photopolymer and in particular an ABS-like polymer and/or polypropylene-like polymer. A photopolymer and in particular an ABS-like polymer and/or polypropylene-like polymer may be processable by an additive manufacturing process such as stereolithography. The first polymer may have a Shore D hardness between about 50 to about 120, more specifically between about 55 to about 100 and in particular between about 60 to about 90, measured according to ISO 868:2003. The first polymer may be for example Durus or Rigur, by the company Stratasys, Ltd.

[0115] In embodiments, the razor connector 10 may comprise a second polymer. The second polymer may have a shore A hardness between about 10 to about 95, more specifically between about 25 to about 80 and in particular between about 35 to about 60, measured ac-

cording to ASTM D2400 - 15. The second polymer may be for example Tango or Agilus 30, by the company Stratasys, Ltd.

[0116] In embodiments, the razor connector 10 may comprise a third polymer, more specifically a thermoplastic polymer and in particular ABS and/or polypropylene.

[0117] In embodiments, the razor connector 10 may comprise a fourth polymer, more specifically a thermoplastic elastomer and in particular a TPA, a TPC, a TPO, a TPS, a TPV, a TPZ and/or a TPU.

[0118] Thermoplastic elastomers, as well as ABS and/or polypropylene may be processable by technologies wherein a solid material is liquified and subsequently resolidified for manufacturing, for example extrusion. Thermoplastic elastomers, as well as ABS and/or polypropylene may in particular be processable by additive manufacturing technologies such as fused filament fabrication and/or selective laser melting.

[0119] Additive manufacturing technologies may also be employed as multi-material processes, wherein a one-piece part comprising at least two different materials can be manufactured. For example, stereolithography and fused filament fabrication may be used to create multi-material parts. In fused filament fabrication the manufacturing device, e.g. the 3D-printer, may comprise multiple nozzles, wherein each nozzle is configured to extrude a different polymer. In stereolithography the part to be produced may change between vats comprising different precursors. Hence, additive manufacturing may be employed to optimize properties of certain parts and/or regions of the razor connector 10 by varying the choice of material locally.

[0120] The second and/or fourth polymer may have a lower modulus of elasticity compared to the first and/or third polymer. A material with a lower modulus of elasticity exhibits a higher degree of deformation when exposed to the same force compared to a material with a higher modulus of elasticity. The second and/or fourth polymer may have a lower hardness, in particular shore A and/or shore D hardness, compared to the first and/or third polymer, which may allow for a higher degree of deformation of the second and/or fourth compared to the first and/or third polymer when exposed to the same force.

[0121] In embodiments, the flexible tongue 14 may comprise the second and/or fourth polymer. The flexible tongue 14 comprising the second and/or fourth polymer, more specifically a second and/or fourth polymer exhibiting a lower modulus of elasticity compared to the first and/or third, may in use allow the razor cartridge 100 to align to the skin of the user under less force. However, a flexible tongue 14 comprising the first and/or third polymer with a higher modulus of elasticity may provide a higher stability to the razor cartridge 100. In embodiments, the flexible tongue 14 may comprise the first and/or third polymer and the second and/or fourth polymer. This may allow adjusting the flexible tongue's 14 modulus of elasticity to an optimized value. In embodiments, the elastic structure 22 may comprise the second and/or fourth polymer. The elastic structure 22 comprising the second and/or fourth polymer may reduce the force required to actuate the push-button 16 and/or may allow the push-button 16 to move to a greater extent, before the elastic structure 22 breaks.

[0122] In embodiments, the push-element 24 may comprise the first and/or third polymer. The push-element 24 comprising the first and/or third polymer, more specifically a first and/or third polymer exhibiting a higher modulus of elasticity may lead to a higher rigidity of the push-element 24 which may improve the actuation mechanism, in particular the release of the razor cartridge 100 upon actuation. A higher rigidity of the push-element 24 may lead to a higher proportion of the force applied to the razor cartridge 100 during actuation, in particular as less force is absorbed by elastic deformation of the push-element 24.

[0123] In embodiments, the push-button 16 may comprise the first and/or third polymer.

[0124] In embodiments, the actuation surface may comprise the second and/or fourth polymer. The second and/or fourth polymer may have a higher tack and/or coefficient of friction compared to the second and/or fourth polymer and may therefore provide better grip to the user.

[0125] In embodiments, the tongue 14 may be connected to a spring, more specifically a spring configured to allow the tongue to move along the proximal-distal razor connector axis 40 and in particular a spring that compresses and stretches along the proximal-distal razor connector axis 40.

[0126] In a second aspect the present disclosure relates to a razor system comprising a razor connector 10 according to any preceding embodiment according to the first aspect and a razor cartridge 100, wherein the razor cartridge 100 is releasably attached to the razor connector 10.

[0127] In embodiments according to the second aspect the razor system may further comprise a razor handle 12 connected to the razor connector 10.

[0128] In a third aspect the present disclosure relates to a method for manufacturing a razor connector 10 any preceding embodiment according to the first aspect according to the first aspect. The method may comprise manufacturing the razor connector 10 using a computer-controlled manufacturing system, in particular additive manufacturing, material jetting, fused filament fabrication, stereolithography and/or selective laser sintering.

[0129] In a fourth aspect the present disclosure relates to a computer-based manufacturing system for manufacturing a razor connector 10, comprising a control unit adapted to execute the method according to the third aspect.

[0130] In a fifth aspect the present disclosure relates to a computer program comprising computer readable code which cause a computer-based manufacturing system to carry out the method according to the third aspect.

[0131] In a sixth aspect the present disclosure relates to a computer readable medium comprising the computer

readable code according to the fifth aspect.

[0132] In an eighth aspect the present disclosure relates to a model of the razor connector 10 according to any embodiment according to the first aspect for a computer-controlled manufacturing system, wherein the model is configured to be processed by the computer-controlled manufacturing system to manufacture the razor connector.

[0133] In a ninth aspect, the present disclosure relates to a computer-readable medium, wherein the computer-readable medium comprises instructions configured to be processed by a computer-controlled manufacturing system to manufacture the razor connector according to any embodiment according to the first aspect.

Aspects

[0134]

1. A razor connector (10) configured to connect a razor cartridge (100) to a razor handle (12) comprising:

    at least one interlocking feature configured to interlock with at least one interlocking part of the razor cartridge (100),
    a push-button (16) integrally formed with a push-element (24), wherein the push-button (16) is configured to move the push-element (24) from a first position to a second position upon actuation, and
    wherein movement of the push-element (24) from the first position to the second position is configured to disconnect the razor cartridge (100) from the razor connector (10).

2. The razor connector (10) according to aspect 1, wherein the razor connector (10) comprises a tongue, configured to allow pivotable movement of the razor cartridge (100) relative to the razor handle (12).

3. The razor connector (10) according to aspect 2, wherein the tongue is a flexible tongue (14).

4. The razor connector (10) according to any one of aspect 2 or 3, wherein the tongue extends from a distal end of the razor connector (10) and wherein the razor connector (10) is configured to be connected to the razor handle (12) at a proximal end and wherein the distal end and proximal end of the razor connector define a proximal-distal razor connector axis (40).

5. The razor connector (10) according to any preceding aspect, wherein the push-element (24) is arranged in distal direction of the push-button (16).

6. The razor connector (10) according to any preceding aspect, wherein the first position is disposed proximally of the second position.

7. The razor connector (10) according to any preceding aspect, wherein the at least one interlocking feature is a recess (18), in particular a recess (18) configured to interlock with at least one interlocking protrusion of the razor cartridge (100).

8. The razor connector (10) according to any one of aspects 1 to 7, wherein the at least one interlocking feature is an interlocking protrusion, in particular an interlocking protrusion configured to interlock with at least one recess of the razor cartridge (100)

9. The razor connector (10) according to any preceding aspect, wherein the push-element (24) is configured to disconnect the razor cartridge (100) from the razor connector (10) upon actuation of the push-button (16) by pushing the at least one interlocking part of the razor cartridge (100) out of the at least one interlocking feature.

10. The razor connector (10) according to any preceding aspect, wherein the push-element (24) is configured to disconnect the razor cartridge (100) from the razor connector (10) upon actuation of the push-button (16) by pushing the at least one interlocking part of the razor cartridge (100) out of the at least one interlocking feature by at least a part of the push-element (24) moving in the distal direction upon actuation of the push-button (16), or wherein the push-element (24) is configured to disconnect the razor cartridge (100) from the razor connector (10) upon actuation of the push-button (16) by pushing the at least one interlocking part of the razor cartridge (100) out of the at least one interlocking feature by at least a part of the push-element (24) moving in the distal direction and towards the proximal-distal razor connector axis (40) upon actuation of the push-button (16).

11. The razor connector (10) according to any preceding aspect, wherein the push-element (24) is configured to push the at least one interlocking part out of the at least one interlocking feature by moving the at least one interlocking part of the razor cartridge (100) in distal direction relative to the at least one interlocking feature; or,
wherein the push-element (24) is configured to push the at least one interlocking part out of the at least one interlocking feature by moving the at least one interlocking part of the razor cartridge (100) in the distal direction and away from the proximal-distal razor connector axis (40) relative to the at least one interlocking feature.

12. The razor connector (10) according to any preceding aspect, wherein the push-button (16) moves from a proximal position to a distal position upon actuation.

13. The razor connector (10) according to any preceding aspect, wherein the push-button (16) is connected to an elastic structure (22) configured to exert a biasing force on the push-button (16) to return the push-button from the distal position to the proximal position, in particular wherein the push-button (16) and the elastic structure (22) are integrally formed.

14. The razor connector (10) according to aspect 13, wherein a cross-section of the elastic structure (22), in particular along the proximal-distal razor connector axis (40), is V-shaped, or curved, in particular at least partially a semi-circle.

15. The razor connector (10) according to aspect 12 or 13, wherein the elastic structure (22) comprises one or more circular arcs, in particular wherein a top-view of the elastic structure (22) is shaped as one or more circular arcs.

16. The razor connector (10) according to any preceding aspect, wherein the push-element (24) is configured to be in contact with the razor cartridge (100), when the razor cartridge (100) is connected to the razor connector (10).

17. The razor connector (10) according to any preceding aspect, wherein the push-button (16) is preloaded when the razor cartridge (100) is connected to the razor cartridge (100).

18. The razor connector (10) according to any preceding aspect, wherein the push-element (24) is configured to preload the razor cartridge (100) when the razor cartridge (100) is connected to the razor connector (10).

19. The razor connector (10) according to any preceding aspect, wherein the push-button (16) is moved towards the proximal direction of the proximal-distal razor connector axis (40) when preloaded.

20. The razor connector (10) according to any preceding aspect, wherein the razor connector (10) comprises a receiving head (38) configured to receive a connector sleeve (102) of the razor cartridge (100).

21. The razor connector (10) according to aspect 20, wherein the push-button (16) is arranged in proximal direction of the receiving head's (38) distal end.

22. The razor connector (10) according to any preceding aspect, wherein the push-button (16) comprises at least one actuation surface (26) configured to be actuated by a user to release the razor cartridge (100), in particular by moving the actuation surface (26) in distal direction of the proximal-distal razor connector axis (40).

23. The razor connector (10) according to any one of aspects 4 to 22, wherein the at least one actuation surface (26) is disposed substantially perpendicular to the proximal-distal razor connector axis (40).

24. The razor connector (10) according to any one of aspects 22 or 23, wherein the elastic structure (22) is arranged between the actuation surface (26) and the push-element's (24) distal end.

25. The razor connector (10) according to any one of aspects 22 to 24, wherein the at least one actuation surface (26) comprises an indicator, more specifically a haptic indicator and in particular a protrusion, a dot, a cavity, a groove and/or a rubber element.

26. The razor connector (10) according to any preceding aspect, wherein the razor connector (10) has a top side (32) and bottom side (36).

27. The razor connector (10) according to aspect 26, wherein the tongue comprises a first section extending parallel to the proximal-distal razor connector axis (40) along the bottom side (36) of the razor connector (10) and a second section diverging towards the top side (32) of the razor connector (10).

28. The razor connector (10) according to aspect 26 or 27, wherein the push-button (16) is arranged on the top side (32) or bottom side (36) of the razor connector (10), in particular on the top side (32) of the razor connector (10).

29. The razor connector (10) according to any one of aspects 2 to 28, wherein the tongue has a polygonal cross-section, more specifically a square, rectangular or octagonal shape and in particular a rectangular shape.

30. The razor connector (10) according to aspect 29, wherein a corner of the polygonal cross-section is round.

31. The razor connector (10) according to any preceding aspect, wherein the push-element comprises a first push element (24a) and a second push-element (24b), wherein the first push element (24a) and the second push-element (24b) are disposed parallel to one another, in particular wherein the proximal-distal razor connector axis (40) is disposed between

the first push (24a) and the second push-element (24b).

32. The razor connector (10) according to any one of aspects 20 to 31, wherein the at least one interlocking feature is positioned proximally of the receiving head's (38) distal end, more specifically on the bottom side (36) of the razor connector (10) on the receiving head (38) proximally of the receiving head's (38) distal end and in particular on the bottom side (36) of the razor connector (10) on the receiving head (38) proximally of the receiving head's (38) distal end adjacent to the tongue.

33. The razor connector (10) according to any preceding aspect, wherein the push-button (16) is integrally formed with the at least one interlocking feature.

34. The razor connector (10) according to any one of aspects 2 to 33, wherein the push-button (16) is integrally formed with the tongue.

35. The razor connector (10) according to any one of aspect 2 to 34, wherein the push-button (16), the at least one interlocking feature and the tongue are integrally formed.

36. The razor connector (10) according to any preceding aspect, wherein the razor connector (10) is a one-piece part.

37. The razor connector (10) according to any preceding aspect, wherein the razor connector (10) comprises a plurality of layers, in particular a plurality of layers substantially parallel to each other.

38. The razor connector (10) according to any preceding aspect, wherein the razor connector (10) is integrally formed with a razor handle (12).

39. The razor connector (10) according to aspect 37 or 38, wherein a layer of the plurality of layers has a thickness between about 5 μm to about 100 μm, more specifically between about 10 μm to about 50 μm and in particular between about 15 μm to about 30 μm.

40. The razor connector (10) according to aspect 37 or 38, wherein a layer of the plurality of layers has a thickness between about 0.05 mm to about 0.6 mm, more specifically between about 0.1 μm to about 0.4 mm and in particular between about 0.15 mm to about 0.3 mm.

41. The razor connector (10) according to any preceding aspect, wherein the razor connector (10) comprises a first polymer, more specifically a photopolymer and in particular an ABS-like polymer and/or polypropylene-like polymer.

42. The razor connector (10) according to aspect 41, wherein the first polymer has a Shore D hardness between about 50 to about 120, more specifically between about 55 to about 100 and in particular between about 60 to about 90, measured according to ISO 868:2003.

43. The razor connector (10) according to any preceding aspect, wherein the razor connector (10) comprises a second polymer.

44. The razor connector (10) according to aspect 43, wherein the second polymer has a shore A hardness between about 10 to about 95, more specifically between about 25 to about 80 and in particular between about 35 to about 60, measured according to ASTM D2400 - 15.

45. The razor connector (10) according to any preceding aspect, wherein the razor connector (10) comprises a third polymer, more specifically a thermoplastic polymer and in particular ABS and/or polypropylene.

46. The razor connector (10) according to any preceding aspect, wherein the razor connector (10) comprises a fourth polymer, more specifically a thermoplastic elastomer and in particular a TPA, a TPC, a TPO, a TPS, a TPV, a TPZ and/or a TPU.

47. The razor connector (10) according to any one of aspects 43 to 46, wherein the flexible tongue (14) comprises the second and/or fourth polymer.

48. The razor connector (10) according to any one of aspects 43 to 47, wherein the elastic structure (22) comprises the second and/or fourth polymer.

49. The razor connector (10) according to any one of aspects 41 to 48, wherein the push-button (16) comprises the first and/or third polymer.

50. The razor connector (10) according to any one of aspects 41 to 49, wherein the push-element (24) comprises the first and/or third polymer.

51. The razor connector (10) according to any one of aspects 2 to 50, wherein the tongue is connected to a spring, more specifically a spring configured to allow the tongue to move along the proximal-distal razor connector axis (40) and in particular a spring that compresses and stretches along the proximal-distal razor connector axis (40).

52. A razor system comprising a razor connector (10)

according to any preceding aspect and a razor cartridge (100), wherein the razor cartridge (100) is releasably attached to the razor connector (10).

53. The razor system according to aspect 52, wherein the razor system further comprises a razor handle (12) connected to the razor connector (10).

54. A method for manufacturing a razor connector (10) according to any one of aspects 1 to 51 comprising:
manufacturing the razor connector (10) using a computer-controlled manufacturing system, in particular additive manufacturing, material jetting, fused filament fabrication, stereolithography and/or selective laser sintering.

55. A computer-based manufacturing system for manufacturing a razor connector (10), comprising a control unit adapted to execute the method according to aspect 54.

56. A computer program comprising computer readable code which cause a computer-based manufacturing system to carry out the steps according to aspect 54 or 55.

57. A computer readable medium comprising the computer readable code according to aspect 56.

58. A model of the razor connector (10) according to any one of aspects 1 to 51 for a computer-controlled manufacturing system, wherein the model is configured to be processed by the computer-controlled manufacturing system to manufacture the razor connector.

59. A computer-readable medium, wherein the computer-readable medium comprises instructions configured to be processed by a computer-controlled manufacturing system to manufacture the razor connector according to any one of aspect 1 to 15.

Claims

1. A razor connector (10) configured to connect a razor cartridge (100) to a razor handle (12) comprising:

at least one interlocking feature configured to interlock with at least one interlocking part of the razor cartridge (100),
a push-button (16) integrally formed with a push-element (24), wherein the push-button (16) is configured to move the push-element (24) from a first position to a second position upon actuation, and
wherein movement of the push-element (24) from the first position to the second position is configured to disconnect the razor cartridge (100) from the razor connector (10).

2. The razor connector (10) according to claim 1, wherein the razor connector (10) comprises a tongue (14), configured to allow pivotable movement of the razor cartridge (100) relative to the razor handle (12).

3. The razor connector (10) according to any preceding claim, wherein the first position is disposed proximally of the second position.

4. The razor connector (10) according to any preceding claim, wherein the push-element (24a) is configured to disconnect the razor cartridge (100) from the razor connector (10) upon actuation of the push-button (16) by pushing the at least one interlocking part of the razor cartridge (100) out of the at least one interlocking feature.

5. The razor connector (10) according to any preceding claim, wherein the push-element (24a) is configured to disconnect the razor cartridge (100) from the razor connector (10) upon actuation of the push-button (16) by pushing the at least one interlocking part of the razor cartridge (100) out of the at least one interlocking feature by at least a part of the push-element (24) moving in the distal direction upon actuation of the push-button (16), or wherein the push-element (24) is configured to disconnect the razor cartridge (100) from the razor connector (10) upon actuation of the push-button (16) by pushing the at least one interlocking part of the razor cartridge (100) out of the at least one interlocking feature by at least a part of the push-element (24) moving in the distal direction and towards the proximal-distal razor connector axis (40) upon actuation of the push-button (16).

6. The razor connector (10) according to any preceding claim, wherein the push-button (16) moves from a proximal position to a distal position upon actuation.

7. The razor connector (10) according to any preceding claim, wherein the push-button (16) is connected to an elastic structure (22) configured to exert a biasing force on the push-button (16) to return the push-button from the distal position to the proximal position, in particular wherein the push-button (16) and the elastic structure (22) are integrally formed.

8. The razor connector (10) according to claim 7, wherein the elastic structure (22) comprises one or more circular arcs.

9. The razor connector (10) according to any preceding claim, wherein the push-element (24a) is configured

to preload the razor cartridge (100) when the razor cartridge (100) is connected to the razor connector (10).

10. The razor connector (10) according to any preceding claim, wherein the push element (24) comprises a first push element (24a) and a second push-element (24b), wherein the first push element (24a) and the second push-element (24b) are disposed parallel to one another, in particular wherein the proximal-distal razor connector axis (40) is disposed between the first push (24a) and the second push-element (24b).

11. The razor connector (10) according to any preceding claim, wherein the at least one interlocking feature is positioned proximally of a receiving head's (38) distal end, more specifically on a bottom side (36) of the razor connector (10) on the receiving head (38) proximally of the receiving head's (38) distal end and in particular on the bottom side (36) of the razor connector (10) on the receiving head (38) proximally of the receiving head's (38) distal end adjacent to the tongue (14).

12. A razor system comprising a razor connector (10) according to any preceding claim and a razor cartridge (100), wherein the razor cartridge (100) is releasably attached to the razor connector (10).

13. The razor system according to claim 12, wherein the razor system further comprises a razor handle (12) connected to the razor connector (10).

14. A method for manufacturing a razor connector (10) according to any one of claims 1 to 11 comprising: manufacturing the razor connector (10) using a computer-controlled manufacturing system, in particular additive manufacturing, material jetting, fused filament fabrication, stereolithography and/or selective laser sintering.

15. A model of the razor connector (10) according to any one of claims 1 to 11 for a computer-controlled manufacturing system, wherein the model is configured to be processed by the computer-controlled manufacturing system to manufacture the razor connector.

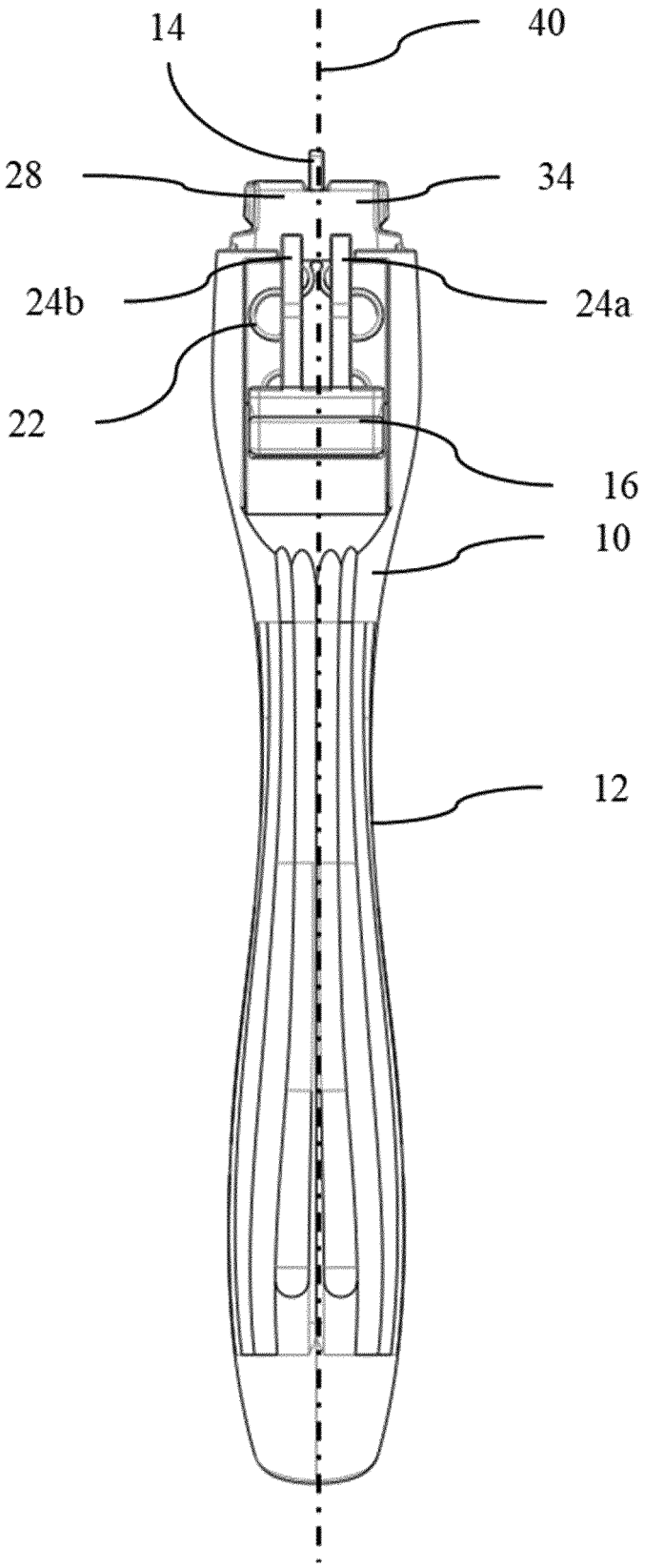


Figure 1

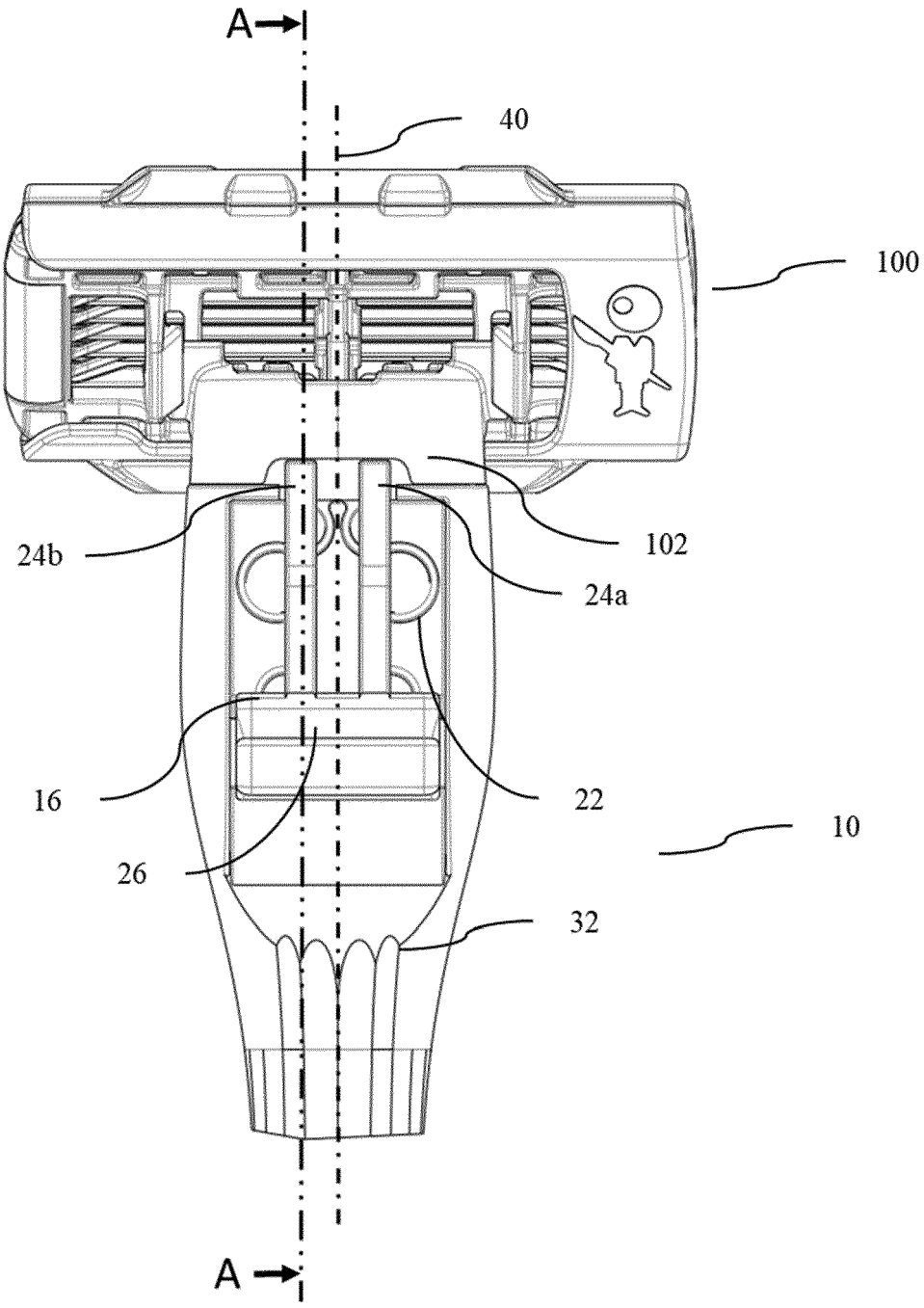


Figure 2

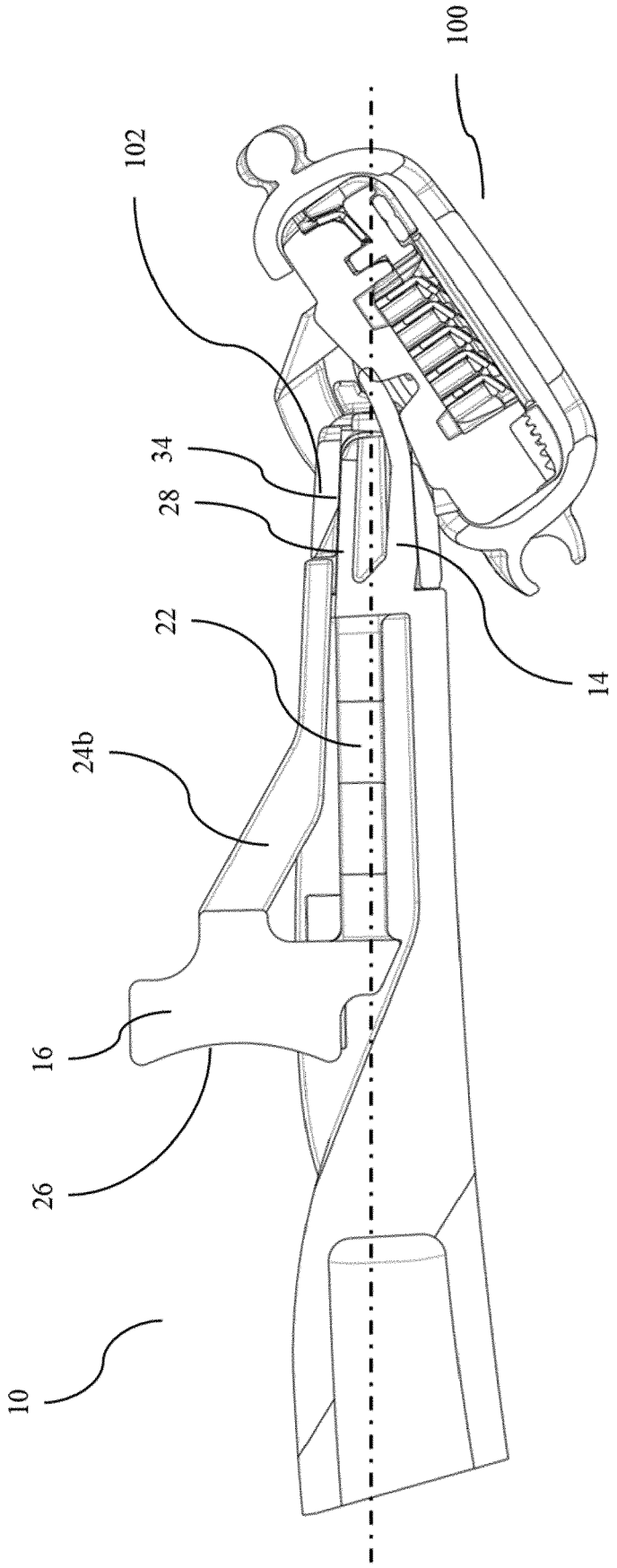
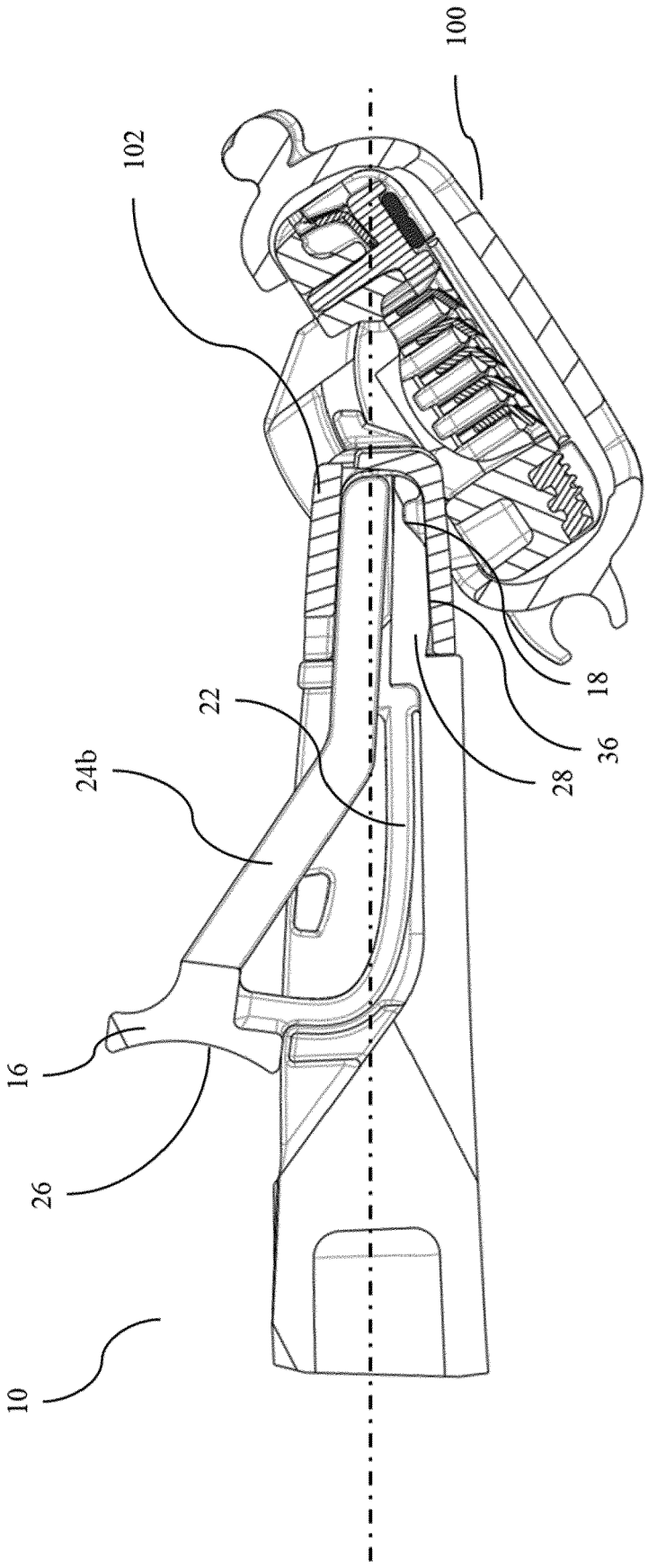


Figure 3



Section A-A

Figure 4

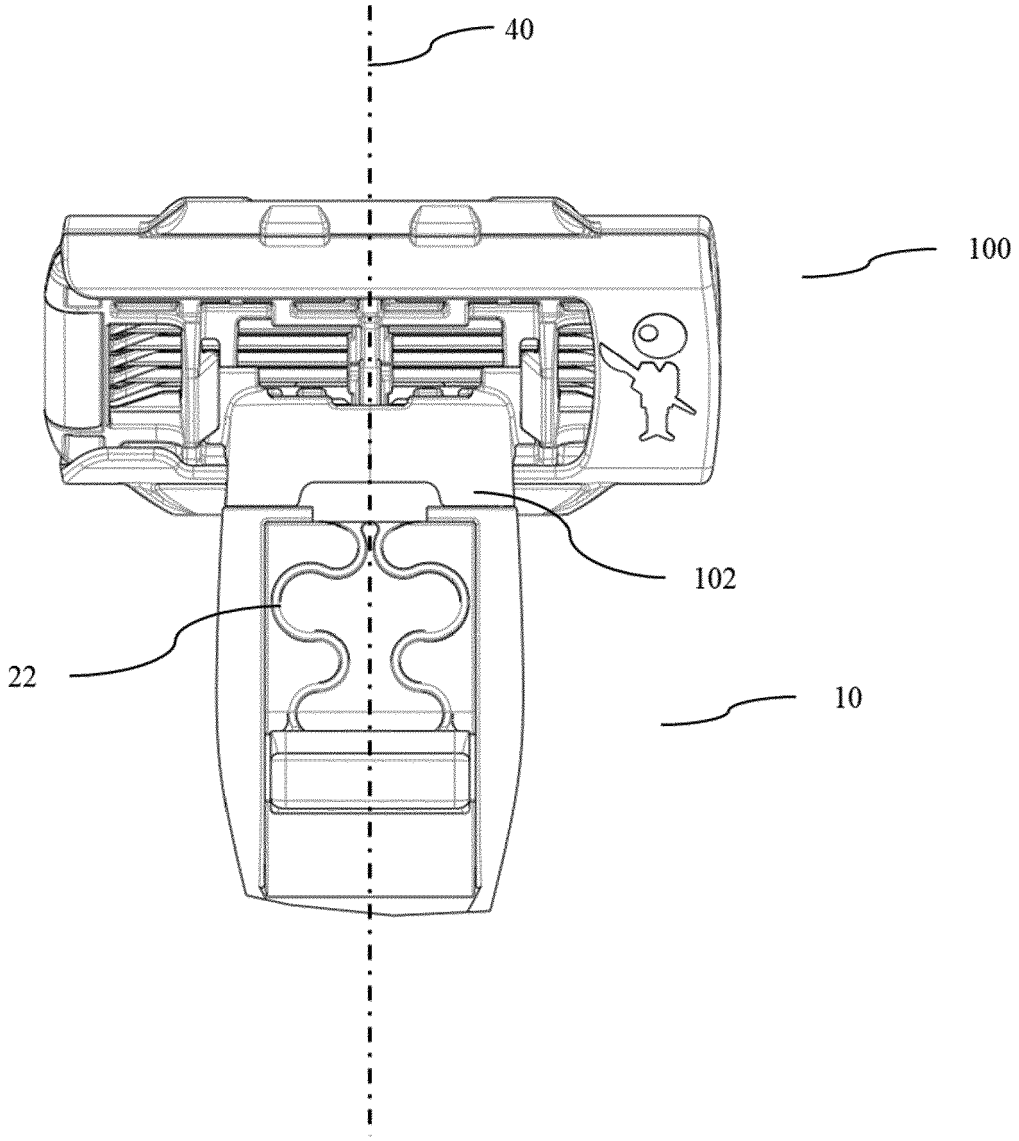


Figure 5

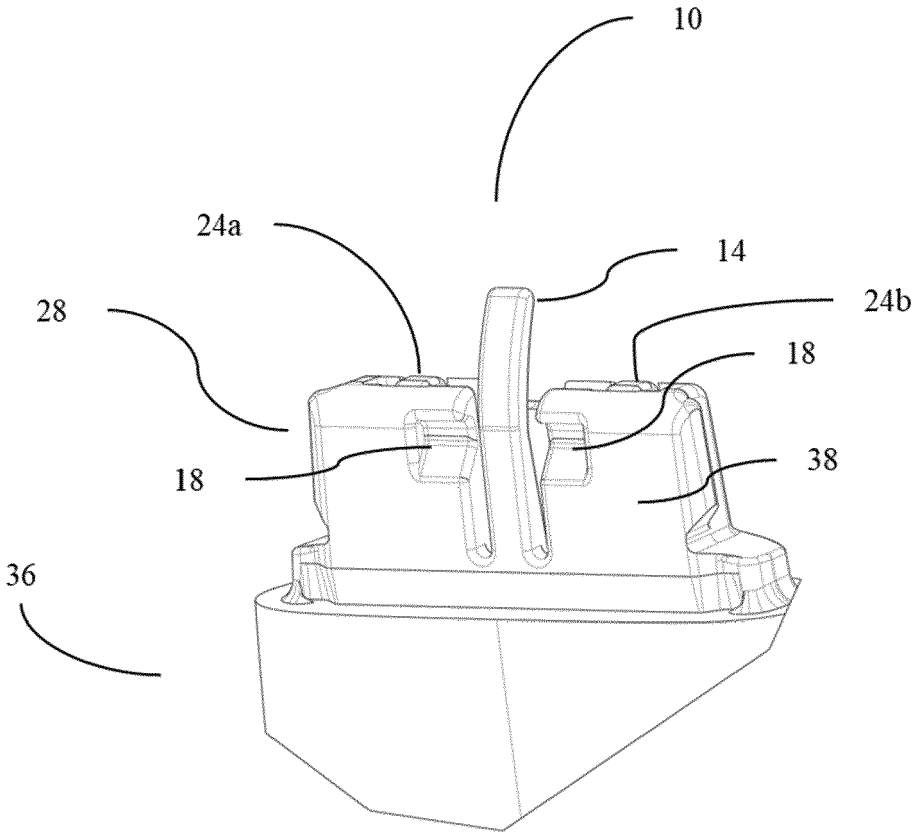


Figure 6

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 22 19 5090

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2010/037418 A1 (BIC VIOLEX SA [GR]; EFTHIMIADIS DIMITRIS [GR] ET AL.) 8 April 2010 (2010-04-08) * page 4, line 17 - page 6, line 29; figures 1-6 *	1-3,6,7, 12-15	INV. B26B21/52
X Y	US 4 446 619 A (JACOBSON CHESTER F [US]) 8 May 1984 (1984-05-08) * column 2, lines 9-68; figures 4, 5 *	1,3-9, 12-15 2,11	
Y	US 2017/087732 A1 (METCALF STEPHEN CABOT [US] ET AL) 30 March 2017 (2017-03-30) * paragraphs [0031], [0032], [0045]; figures 6a, 6b *	2,11	
X	US 2005/198830 A1 (WALKER VINCENT P [US] ET AL) 15 September 2005 (2005-09-15) * paragraphs [0104] - [0106]; figures 39-44 *	1,3-7, 10,12, 13,15	
			TECHNICAL FIELDS SEARCHED (IPC)
X	EP 3 878 614 A1 (WENZHOU MERS R&D LTD [CN]) 15 September 2021 (2021-09-15) * paragraphs [0023], [0026]; figures 1-5 *	1,3-6, 12,13,15	B26B
X	EP 3 372 360 A1 (BIC VIOLEX SA [GR]) 12 September 2018 (2018-09-12) * paragraphs [0005] - [0013]; figure 1 *	14	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	30 January 2023	Rattenberger, B

CATEGORY OF CITED DOCUMENTS

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30-01-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010037418 A1	08-04-2010	BR PI0823103 A2	16-06-2015
		CA 2737995 A1	08-04-2010
		CN 102202840 A	28-09-2011
		EG 26963 A	08-02-2015
		EP 2334475 A1	22-06-2011
		JP 5497046 B2	21-05-2014
		JP 2012504434 A	23-02-2012
		KR 20110093776 A	18-08-2011
		PL 2334475 T3	18-05-2020
		RU 2011115979 A	10-11-2012
		US 2011239475 A1	06-10-2011
		WO 2010037418 A1	08-04-2010
		ZA 201102037 B	30-05-2012
US 4446619 A	08-05-1984	AR 231090 A1	28-09-1984
		CA 1202771 A	08-04-1986
		EP 0110954 A1	20-06-1984
		ES 281982 U	01-04-1985
		GR 78485 B	27-09-1984
		IT 1163466 B	08-04-1987
		US 4446619 A	08-05-1984
		WO 8304386 A1	22-12-1983
US 2017087732 A1	30-03-2017	EP 3356093 A1	08-08-2018
		US 2017087732 A1	30-03-2017
		US 2019047166 A1	14-02-2019
		WO 2017058453 A1	06-04-2017
US 2005198830 A1	15-09-2005	AR 048171 A1	05-04-2006
		AU 2005222587 A1	29-09-2005
		BR PI0508605 A	31-07-2007
		CA 2558882 A1	29-09-2005
		CN 1929966 A	14-03-2007
		CN 102922548 A	13-02-2013
		CN 102962854 A	13-03-2013
		EP 1722941 A1	22-11-2006
		JP 2007528271 A	11-10-2007
		KR 20060126810 A	08-12-2006
		MY 143954 A	29-07-2011
		RU 2358859 C2	20-06-2009
		US 2005198830 A1	15-09-2005
		US 2006179661 A1	17-08-2006
		WO 2005090019 A1	29-09-2005
EP 3878614 A1	15-09-2021	CN 112823087 A	18-05-2021
		EP 3878614 A1	15-09-2021

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 19 5090

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30-01-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		WO 2021026676 A1	18-02-2021
EP 3372360 A1	12-09-2018	NONE	

EPO FORM P0459

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