



## Description

### Technical field

**[0001]** The present disclosure relates to razor blade carrier assemblies and methods of manufacturing a razor blade carrier assembly, as well as to razor heads, razors and methods of replacing used blades in a razor cartridge.

### Background

**[0002]** Safety razors with shaving consumables have been known for quite some time. Shaving consumables are e.g. blades (e.g. L-type blades, flat blades), and/or lubrication elements (e.g. lubrication strips) arranged in the razor and that are used for shaving. After a certain time of use, the shaving consumables are worn out. This is e.g. the case when the blades get blunt and/or the lubrication elements are used up.

**[0003]** Currently, when the shaving consumables reach their end of life, the user needs to change the whole razor or, when possible, the razor cartridge, whereby disposing the razor or the razor cartridge produces waste and harms the environment. The user then has to buy new razor cartridges or full razors that have an increased cost compared to the cost of blades only and/or other consumables such lubrication elements.

**[0004]** There exist solutions in the market that provide the capability to change only the cutting blade, but this blade is generally a flat-type one, which is fixed in the cartridge and provides low shaving performance benefits to the user, providing less closeness than multi-blade razors, less comfort and less safety (e.g. increased skin irritation and nicks and cuts). There is a lack of razors that provide the ability to the user to replace the blades (e.g. L-type blades), which are usually movably arranged within the multi-blade cartridge, e.g. by sitting on spring fingers.

**[0005]** On one hand, flat blades, usually double edge types, have a body with enlarged width, that makes it easy for the users to manipulate it with their fingers. However, caution should be given not to touch the blade edges which are exposed. Therefore, there is a risk of injuries during manual loading of the blade in a double edge safety razor.

**[0006]** On another hand, handling L-type blades to manually mount them into a suitable razor cartridge is an extremely difficult and tedious task. A manual insertion of L-type blades in a suitable razor cartridge would be very difficult, as: (i) their cross-sectional size is very compact and small compared to a double-edge blade; (ii) no surfaces of enough space exist for a user to safely handle the blade without touching the blade edge; (iii) due to their relatively very small size, the blades can neither be easily nor correctly oriented to be properly mounted into the razor cartridge; (iv) the L-type blades must be inserted in tiny slots within the razor cartridge, usually on top of

respective spring fingers; (v) each single blade has to be inserted individually in the cartridge, usually in the number of 2 to 5 but it can also be 6 or 7 or more; (vi) since the spring fingers should be pre-stressed when the blades are mounted, the blades need to be somehow pressed downwards before being secured by the blade retainers or clips of the razor head, which is an additional parameter that makes the mounting task even more difficult.

**[0007]** In addition, except cutting blades, also lubrication elements get worn during use. There is currently a lack of razors that provide the capability to the user to replace the worn lubrication elements (e.g. lubrication strips of extruded type or co-injected type).

**[0008]** It is the object of the present disclosure to provide a safe, environmental and cost beneficial system that allows the user to dispose the least amount of material (e.g. shaving consumables) that has reached its end of life in a razor.

### Summary

**[0009]** The present disclosure broadly relates to a razor blade carrier assembly to carry shaving consumables such as blades and/or lubrication elements, which enables the user to easily replace only the components that get worn during the shaving action, which usually are the cutting blades and/or the lubrication elements.

**[0010]** According to a first aspect, a razor blade carrier assembly is provided, wherein the razor blade carrier assembly comprises a carrier comprising a carrier base and a carrier cover assembly removably connected to the carrier base, and blades that are removably positioned in the carrier. The razor blade carrier assembly is configured to be inserted into a razor cartridge of a razor to release the blades within the razor cartridge. The razor blade carrier assembly permits to carry the blades without harming the user during handling, and permits to deliver the blades in an easy, safe, and precise manner in the right position into the razor cartridge. The assembly also permits to replace only the blades, and/or other shaving consumables (e.g. lubrication elements), to which is referred further below, without the need to replace other parts or elements of the razor or razor head that are not supposed to wear during shaving action. Further, the assembly permits to release the blades from the carrier in an easy manner. Moreover, the razor blade carrier assembly may not only act as a carrier and holder of the blades during handling, but also as a storage package for the blades (and/or eventually other shaving consumables).

**[0011]** In embodiments, the blades may be removably positioned in the carrier base and may be retained in the razor blade carrier assembly by the carrier cover assembly. This configuration has the advantage that the blades may be positioned and retained between the carrier base and the carrier cover assembly, without the need to fix them to the carrier. In addition, the carrier base and car-

rier cover assembly may on one hand protect the blades from being damaged before delivery to the razor cartridge, and on another hand, protect the user from being harmed by the cutting blades during handling of those.

**[0012]** In embodiments, the carrier base may comprise at least one supporting wall and a disassembling tab.

**[0013]** The disassembling tab may comprise surfaces configured to be grabbed by a user for pulling the carrier base through and out of the razor cartridge. This permits an easy handling of the razor blade carrier assembly and an easy and safe mounting and release of the blades and/or other shaving consumables in the opening of the razor cartridge, in which they are released.

**[0014]** The at least one supporting wall may be configured to removably receive the blades. In embodiments, the supporting wall may comprise slots and/or rips to removably receive the blades. The slots and/or rips may have a linear or non-linear shape. The number of slots and/or rips may be equal to the number of blades of the razor blade carrier assembly. Further, the distance between two adjacent slots and/or rips may equal the distance between two adjacent blades receiving slots of the razor cartridge. The supporting wall may further comprise at least one alignment feature configured to position and guide the razor blade carrier assembly within the razor cartridge. The slots and/or rips, permit to provide suitable locations in which the blades are positioned and hold by the carrier, in particular by the carrier base. The slots and/or rips may be configured in a manner that permits easy mating with the respective blade.

**[0015]** In embodiments, the carrier cover assembly may comprise a carrier cover and at least one blade retaining wall connected to the carrier cover.

**[0016]** In embodiments, the supporting wall may further comprise at least one connection element and the carrier cover may comprise at least one connection element. The connection element of the supporting wall and the connection element of the carrier cover may be configured to connect with each other to removably assemble the carrier cover assembly with the carrier base. With that, the blades are arranged in the carrier, which permits to protect both the blades and the user, as well as to provide a storage and handling device for the blades (and/or other shaving consumables).

**[0017]** In embodiments, each blade may comprise a base portion and an inclined portion, wherein the inclined portion may comprise a cutting edge. Each slot, rib, or tear of the supporting wall of the carrier base may be configured to receive the base portion of the blade. Further, each slot, rib, or tear of the supporting wall of the carrier base may comprise a first portion configured to receive the base portion of the blade. In addition or alternatively, each slot, rib, or tear of the supporting wall of the carrier base may further comprise a second portion configured to receive the inclined portion of the blade.

**[0018]** In embodiments, the blade retaining wall may be configured to retain the blades in the razor blade carrier assembly. Moreover, the blade retaining wall of the

carrier cover assembly may comprise a surface configured to get at least partially in contact with the inclined portion of the blades when the carrier cover assembly is assembled with the carrier base. The surface of the blade retaining wall that is in contact with the cutting edges of the blades may further have a jagged shape, such as to adapt to the shape formed by the inclined portions of the blades it gets in contact with. This has the advantage that, in addition or alternatively to the slots, rib, or tear of the carrier base, the blades and/or other shaving consumables may be hold and positioned in the carrier to reduce or even inhibit the movement of the components (blades) in the carrier.

**[0019]** In embodiments, the inclined portions of the blades may all face in the same direction. In other embodiments, the inclined portions of the blades may face in different directions. Providing the blades that face in different direction, in particular in forward and backward shaving direction may enable shaving in both directions.

**[0020]** In embodiments, the razor blade carrier assembly may further comprise at least one lubrication element. Lubrication elements are shaving consumables (as blades) that need to be replaced when worn out after a certain time in use or after certain conditions of shaving.

One or more lubrication elements may be comprised in the razor blade carrier assembly, depending on the lubrication elements present in the razor head. The features related to the blades may also apply to the lubrication element, i.e. for example storage and/or arrangement in the carrier, loading in the carrier, loading and releasing in the razor cartridge. Other features different from those related to the blades may also apply.

**[0021]** In embodiments, the at least one supporting wall of the carrier base may comprise an additional slot, rib, or tear configured to removably receive the lubrication element, and/or the lubrication element may be retained in the razor blade carrier assembly by the carrier cover assembly. The position of the lubrication element relative to the blades in the razor blade carrier assembly may correspond to the position of the lubrication element relative to the blades once released in the razor cartridge. Further, the lubrication element may comprise active elements. As for the blades, the additional slot, rib, or tear may permit to provide a suitable location in which the lubrication element is positioned and hold by the carrier, in particular by the carrier base and/or by the carrier cover assembly. The additional slot, rib, or tear may be configured in a manner that permits easy mating with the lubrication element. Moreover, the lubrication element may be arranged in the carrier in order to be hold, handled and protect before release within the razor cartridge.

**[0022]** In embodiments, the carrier base and the carrier cover assembly may be assembled to form a rigid structure.

**[0023]** In embodiments, the carrier base and the carrier cover assembly may be made of sustainable material, such as carton or biodegradable polymer, and/or may be made of metals, or ceramics, or composite materials.

**[0024]** In embodiments, any surface of the carrier base and/or of the carrier cover assembly may be printable. Guidelines, logos, esthetics and/or informative graphics may be printed on one or more of the carrier surfaces. This may improve the user experience during manual mounting of the shaving consumables, i.e. e.g. blades and/or lubrication elements, into the razor cartridge. In addition or alternatively, full color coating can be applied on the carrier surfaces.

**[0025]** According to another aspect, a package is provided, wherein the package comprises multiple razor blade carrier assemblies according to any of the previously disclosed embodiments. This may present an additional offer to the user, such that multiple razor blade carrier assemblies may be provided. The package may be made of sustainable material, such as carton or biodegradable polymer, and/or may be made of metals, or ceramics, or composite materials.

**[0026]** According to another aspect, a razor head is provided, wherein the razor head comprises a razor cartridge and a razor blade carrier assembly according to any of the previously disclosed embodiments. The razor head may further comprise spring finger on which the blades may be movably arranged.

**[0027]** According to another aspect, a razor is provided, wherein the razor comprises a razor cartridge, a handle and a razor blade carrier assembly according to any of the previously disclosed embodiments.

**[0028]** According to another aspect, a method of replacing one or more used razor blades of a razor cartridge is provided, wherein one or more replacement razor blades are provided by a razor blade carrier assembly according to any of the previously disclosed embodiments, and wherein the razor cartridge comprises a retaining mechanism configured to retain the one or more replacement razor blades in the razor cartridge. The method comprises: (a) unlocking the retaining mechanism to release the one or more used razor blades; (b) disposing the one or more used razor blades from the razor cartridge; (c) inserting the razor blade carrier assembly comprising the one or more replacement razor blades in the razor cartridge (d) locking the retaining mechanism to secure the one or more replacement razor blades of the razor blade carrier assembly within the razor cartridge; and (e) removing the carrier to release the one or more replacement razor blades in the razor cartridge. Because the one or more razor blades are removably arranged and positioned in the carrier (i.e. with non-permanent connections), an easy release from the carrier components (carrier base and carrier cover assembly) is possible when the one or more blades are mounted and secured by the retaining mechanism of the razor cartridge (or razor head).

**[0029]** In embodiments, the razor cartridge may further comprise at least one alignment feature such that inserting the razor blade carrier assembly in the razor cartridge may comprise: (a) inserting the disassembling tab of the carrier base in the razor cartridge; (b) inserting the at

least one alignment feature of the supporting wall of the carrier base in the at least one alignment feature of the razor cartridge; and (c) guiding the carrier base through the razor cartridge until the razor blade carrier assembly is stopped by contact of the carrier cover with the razor cartridge.

**[0030]** In embodiments, removing the carrier may comprise pulling the disassembly tab to disconnect the carrier base from the carrier cover assembly, while the one or more razor blades are released in the razor cartridge, and removing the disconnected carrier base and carrier cover assembly from either side of the razor cartridge.

**[0031]** In embodiments, the method may further comprise replacing a used lubrication element of the razor cartridge simultaneously to the replacement of used blades, wherein a new lubrication element may be provided with the razor blade carrier assembly according to any of the previously disclosed embodiments, and wherein the new lubrication element may be inserted and locked together with the new blades in the razor cartridge. The replacement and/or insertion of the lubrication element may thus be performed in a similar way than the replacement and/or insertion of the blades in the razor cartridge.

**[0032]** Advantages of the present disclosure are, among others, that practical and safe means, systems and methods of carrying one or more blades, e.g. L-type blades, for easy loading into a suitable cartridge are provided. In fact, the present disclosure enables the user to replace only the cutting blades and/or the lubrication elements (e.g. lubrication strips) of the razor when they are blunt and worn, and when they do not provide the initial comfort and efficiency during shaving any more. Immediate benefits of the present disclosure may be seen from an environmental and cost perspective.

**[0033]** The systems and methods provided herein also enable to replace blades (e.g. high-performance L-type blades) by transferring them together in once while they remain independent from each other within the razor cartridge, usually arranged on movable elements such as spring fingers. In addition, using the carrier components, i.e. the carrier base and/or the carrier cover assembly, the transfer of the blades into the cartridge can be performed safely without the risk of injuring the hands.

**[0034]** Overall, with the present systems and methods, a safe and easy handling of the components and shaving consumables is assured. In particular, a set of blades (e.g. L-type blades) can be easily loaded in a multi-blade cartridge.

**[0035]** Further, the present disclosure provides a low-cost carrier (respectively carrier assemblies) of one or more razor blades. In addition, the razor blade carrier (respectively razor blade carrier assemblies) may be made of sustainable materials, thus may be safely disposed without harming the environment.

## Description of the drawings

**[0036]** Other characteristics will be apparent from the accompanying drawings, which form a part of this disclosure. The drawings are intended to further explain the present disclosure and to enable a person skilled in the art to practice it. However, the drawings are intended as nonlimiting examples. Common reference numerals on different figures indicate like or similar features.

**Fig. 1** is a perspective view of a razor blade carrier assembly according to a first embodiment.

**Fig. 2a** is a cross-sectional side view of the carrier of **Fig. 1**.

**Figs. 2b and 2c** show exemplary designs of the support wall of the carrier of **Figs. 1 and 2**.

**Fig. 3a** is a side view of the razor blade carrier assembly of **Fig. 1**.

**Fig. 3b** is a partial cross-sectional side view along the axis A-A according to **Fig. 3a** of the razor blade carrier assembly.

**Fig. 4a** is a side view of the razor blade carrier assembly of **Fig. 1** fully inserted into a razor cartridge.

**Fig. 4b** is a cross-sectional view along the axis B-B according to **Fig. 4a** of the razor blade carrier assembly and the razor cartridge.

**Figs. 5a, 5b, 5c** are top views of a razor head in three stages: empty (**Fig. 5a**), razor blade carrier assembly of **Fig. 1** inserted in the razor cartridge (**Fig. 5b**), and loaded with blades (**Fig. 5c**).

**Figs. 6a, 6b, 6c** are perspective views of three different steps of blades loading with the razor blade carrier assembly of **Fig. 1** into a razor cartridge.

**Figs. 7a, 7b** are two perspective views of a razor blade carrier assembly according to a second embodiment.

**Fig. 8** is a cross-sectional side view of the carrier of **Figs. 7a and 7b**.

**Fig. 9a** is a cross-sectional side view of the razor blade carrier assembly of **Figs. 7a and 7b** fully inserted into a razor cartridge.

**Fig. 9b** shows an modified carrier cover.

**Figs. 10a, 10b, 10c** are top views of a razor head in three stages: empty (**Fig. 10a**), razor blade carrier assembly of **Figs. 7a and 7b** inserted in the razor cartridge (**Fig. 10b**), and loaded with blades (**Fig. 10c**).

**Figs. 11a, 11b, 11c** are perspective views of three different steps of blades loading with the razor blade carrier assembly of **Figs. 7a and 7b** into a razor cartridge.

**Fig. 12** is another perspective view for **Fig. 11a** of the insertion of the razor blade carrier assembly of **Figs. 7a and 7b** into the razor cartridge.

## Detailed description

**[0037]** The present disclosure broadly relates to razor

blade carrier assemblies comprising carrier components and shaving consumables such as e.g. L-type blades and/or lubrication elements. The razor blade carrier assemblies may securely carry and protect the shaving consumables during storing and user handling. Further, the user may handle the razor blade carrier assembly with his/her fingers and place it safely in a suitable razor cartridge, where the shaving consumables may then be released. The present disclosure further refers to razor cartridges, razor heads and razor in and with which the razor blade carrier assemblies may be used. Further, methods of handling such razor blade carrier assemblies are also disclosed.

**[0038]** The detailed description as follows presents examples of embodiments of the systems and methods according to the present disclosure and shall not be limiting. The present Figures disclose the usage of L-type cutting blades, but it shall be understood that any other type of cutting blades may also be used. As an example, the blades may be mounted on an outer surface or on an inner surface of a blade support. The blades or the blade supports may comprise a bent portion.

**[0039]** **Figs. 1 to 6** disclose a first embodiment of a razor blade carrier assembly according to the present disclosure and **Figs. 7 to 12** disclose a second embodiment of a razor blade carrier assembly according to the present disclosure.

**[0040]** The razor blade carrier assemblies according to the present disclosure may comprise one or more shaving consumables. In particular, any razor blade carrier assembly according to the present disclosure comprises one or more blades (e.g. L-type blades) and in examples one or more lubrication elements. Usually, the blades will be of the number of 2 to 5, but it can also be 6, 7, 8 or more, or even only one blade. As exemplary matter, the razor blade carrier assemblies disclosed herein comprise five L-type blades.

**[0041]** The razor blade carrier assemblies may be capable of carrying blades, in particular L-type blades, and/or lubrication elements for an easy and safe mounting into the razor cartridge (respectively razor head). The blades and/or lubrication elements may be retained in the carrier at suitable locations that permit easy mating with the respective blade and/or lubrication slots and/or ribs within the razor cartridge. All components of the carrier may be made of sustainable type of materials such as any type of carton, biodegradable polymers, or metals, or ceramics, or composite materials.

**[0042]** Where suitable, the features that will be described for the first embodiment of the razor blade carrier assembly (**Figs. 1 to 6**) may also apply for the second embodiment of the razor blade carrier assembly (**Figs. 7 to 12**), and vice versa.

**[0043]** **Fig. 1** is a perspective view of a razor blade carrier assembly 10 according to a first embodiment. The razor blade carrier assembly 10 comprises a carrier 100 comprising a carrier base 30 and a carrier cover assembly 20 removably connected to the carrier base 30, and

razor blades 40 (here e.g. L-type blades) that are removably positioned in the carrier 100. The razor blade carrier assembly 10 is configured to be inserted into a razor cartridge 60 of a razor to release the blades 40 within the razor cartridge 60. The blades 40 are removably positioned in the carrier base 30 and are retained in the razor blade carrier assembly 10 by the carrier cover assembly 20. As depicted in **Fig. 1**, the carrier base 30 is in contact with the carried L-type blades. In embodiments, the carrier cover assembly 20 and the blades may not or only partially be in contact.

**[0044]** The razor blade carrier assembly permits to carry the blades without harming the user during handling, and permits to deliver the blades in an easy, safe and precise manner in the right position into the razor cartridge. The assembly also permits to replace only the blades, and/or other shaving consumables (e.g. lubrication elements), to which is referred further below, without the need to replace other parts or elements of the razor or razor head that are not supposed to wear during shaving action. Further, the assembly permits to release the blades from the carrier in an easy manner. Moreover, the razor blade carrier assembly may not only act as a carrier and holder of the blades during handling, but also as a storage package for the blades (and/or eventually other shaving consumables).

**[0045]** The blades being removably positioned in the carrier base has the advantage that the blades may be positioned and retained between the carrier base and the carrier cover assembly, without necessary the need to fix them to the carrier. In addition, the carrier base and carrier cover assembly may on one hand protect the blades from being damaged before delivery to the razor cartridge, and on another hand, protect the user from being harmed by the cutting blades during handling of those.

**[0046]** The carrier base may comprise at least one supporting wall, that may be configured to removably receive the blades, and a disassembling tab. In the embodiment of **Figs. 1 to 6**, the carrier base 30 comprises two supporting walls 32 and a disassembling tab 31. The disassembling tab 31 comprises surfaces 311 (tab surfaces or pull-out surfaces) configured to be grabbed by a user for pulling the carrier base 30 through and out of the razor cartridge 60 (see e.g. **Figs. 6a to 6c** or **Figs. 11a to 11c**). This may permit an easy handling of the razor blade carrier assembly and an easy and safe mounting and release of the blades and/or other shaving consumables in the opening of the razor cartridge, in which they are released. In the embodiment depicted in **Figs. 1 to 6**, the planes defined by the grabbing surfaces 311 extend mainly parallel to the longitudinal direction of the razor blade carrier assembly 10 and/or of the razor cartridge 60. Further, the planes extend mainly parallel to the longitudinal direction of the blades 40. In embodiments, the grabbing surfaces may be the front and rear surfaces of the disassembling tab. In other embodiments, the grabbing surfaces may be defined as to be other surfaces of the dis-

assembly tab that are suitable to be grabbed.

**[0047]** As further shown in **Fig. 1**, the two supporting walls 32 are configured to removably receive and support the blades 40 in the carrier 100. The two blades supporting walls 32 are mainly planar and vertical compared to a horizontal plane formed by the blades 40 in the razor blade carrier assembly 10.

**[0048]** In embodiments, each supporting wall of the carrier base may further comprise at least one alignment feature configured to position and guide the razor blade carrier assembly within the razor cartridge. As best shown in **Fig. 1**, as well as in **Figs. 4a, 4b** and **Fig. 5b**, each supporting wall 32 comprises two alignment features 34 on a front side FS, and two alignment features 34 on a rear side RS, which in total results in four alignment features 34. Herein, part of the front and/or rear portion of each blade supporting wall 32 may serve as a feature to facilitate the alignment of the razor blade carrier assembly 10 with the razor cartridge 60 (or razor head) during insertion of the razor blade carrier assembly 10 into the razor cartridge 60.

**[0049]** As further depicted in **Figs. 4a to 4b** and **Figs. 5a to 5c**, the razor cartridge 60 includes alignment features 61 (e.g. through slots) in the regions of the guard bar 64 and of the rear wall 65. When the user moves the razor blade carrier assembly towards the open razor cartridge, the portions of the blade supporting walls are inserted into the respective alignment features in the guard bar and into the alignment features in the rear wall region of the razor cartridge, providing guidance to the user for proper alignment of the razor blade carrier assembly with the razor cartridge. In embodiments, each alignment feature (e.g. through slot) may at least correspond in dimensions to the alignment feature of the corresponding side (front or rear), such that the alignment features of the supporting walls (respectively carrier base) can be inserted and guided through the corresponding alignment features of the razor cartridge. However, alignment features in the razor cartridge may only be foreseen where corresponding alignment features are provided on the supporting walls or on the carrier base.

**[0050]** In embodiments, the carrier cover assembly may comprise a carrier cover and at least one blade retaining wall connected to the carrier cover, wherein the at least one blade retaining wall is configured to retain the blades in the razor blade carrier assembly. Referring to **Fig. 1**, the carrier cover assembly 20 comprises a carrier cover 21 and two blade retaining walls 22 connected to the carrier cover 21. The blade retaining walls 22 of this embodiment are respectively arranged on each side end portion (i.e. left and right side end portions) of the carrier cover 21. In other embodiments, the at least one blades retaining wall may be arranged on a portion of the carrier cover that is best adapted to hold and retain the blades within the carrier, i.e. e.g. in end portions of the carrier cover, or in central portions. The number of blade retaining walls may be one or more. Ideally two blade retaining wall may be provided, such that the blades may

be securely retained.

**[0051]** From a general point of view, the carrier cover assembly may be configured to connect with the carrier base and shall provide (i) a protection to the user from any accidental contact with the blades, in particular with the cutting edges of the blades, (ii) an improved holding for the blades in the carrier and (iii) large surfaces for the user to hold and handle the carrier during manual assembling.

**[0052]** In embodiments, each supporting wall further comprises at least one connection element and the carrier cover may also comprise at least one connection element, wherein the connection element of the supporting wall and the connection element of the carrier cover are configured to connect with each other to removably assemble the carrier cover assembly with the carrier base. As best shown in **Fig. 6c**, each supporting wall 32 comprises a connection element 35 on a front portion and on a rear portion, that connects with a respective connection element 25 on the carrier cover 21. In embodiments, the connection elements of the supporting wall (i.e. the carrier base) may be features that enable a non-permanent connection of the carrier base with the carrier cover. These features may be for example rectangular slots on the carrier base, that mate with respective slots on the carrier cover (see for example in **Fig. 6c**). Alternatively, in embodiments, the connection element of the carrier cover may for example be a portion of the front and/or rear wall of the carrier cover itself, that may be inserted in a corresponding opening (e.g. a slot) of the carrier base. In other embodiments, other types of geometries may be used with the same objective. The connection elements may be other specific elements or devices configured to mate with each other in a removable manner such as to enable an easy and reliable assembly and disassembly of the carrier cover assembly with the carrier base. These may be for example perforated areas that will be easily torn by the user during disassembling, or non-permanent or mild adhesives.

**[0053]** **Fig. 2a** is a cross-sectional side view of the carrier of **Fig. 1**. As depicted, each supporting wall 32 comprises one or more slots 33 to removably receive the one or more razor blades 40. Instead of, or in addition to the one or more slots, other structures may be provided for removably receiving the one or more razor blades. For example, as shown in **Fig. 2b**, the support wall 32 of the carrier may comprise one or more rips 33' (i.e. slots with no width) for removably receiving the one or more razor blades 40. Due to the soft nature of the material of the supporting wall 33, the rips can deform during mating with the blades. As shown in **Fig. 2c**, at the end of the rips 33', a relief cut-out 37 may be provided to facilitate deformation. The relief cut-out 37 may have any shape, for example, a circular, a semi-circular, a triangular, a rectangular, an elliptical, a polygonal, or a square shape. The relief cut-out 37 may have a width or diameter between 0.2-0.5 mm or 0.5-0.7 mm or 0.7-1.0 mm or 1-2 mm. The width or diameter may be less than the inter-

blade-span and/or the distance between slots or rips. It is to be understood that one or more slots may be combined with one or more rips for receiving the one or more razor blades as well as for receiving one or more lubrication elements (or any other element). The slots or rips may be provided in a linear or a non-linear shape.

**[0054]** In embodiments, the number of slots may be equal to the number of blades in the razor blade carrier assembly. In the embodiment of **Fig. 2**, the slots 33, rips 33' are in the number of five, and are arranged parallel to each other. In other embodiments, the slots or rips may not be arranged parallel to each other. However, as the blades are usually arranged parallel to each other once positioned in the razor cartridge, the slots or rips in the supporting walls of the carrier base shall be arranged and configured such that a direct release of the blades into the razor cartridge in their final position is enabled. Other embodiments in which the blades are arranged differently in the razor cartridge may also be thinkable of; in this case, the receiving slots or rips of the supporting walls of the carrier base shall be arranged accordingly.

**[0055]** **Fig. 3b** depicts a partial cross-sectional side view along the axis A-A according to **Fig. 3a** of the razor blade carrier assembly 10. **Fig. 3b** presents a detailed view of the slots 33 of one of the supporting walls 32 of the carrier base 30, that are configured to receive the blades 40 of the razor blade carrier assembly 10, as well as the area of the carrier cover 21 that is facing the blades 40 in the razor blade carrier assembly 10. **Figs. 3a and 3b** depict the area of the carrier 100 in which the blades 40 are positioned and retained, according to the first embodiment of this disclosure. However, the disclosed area may be present in any embodiment of a razor blade carrier assembly according to the present disclosure. Any feature disclosed with reference to the embodiment of **Figs. 3a and 3b** shall not be limiting to this particular embodiment and may also apply to any other embodiment and combination of embodiments covered by the present disclosure, in particular to the embodiment according to **Figs. 7 to 12**.

**[0056]** In embodiments, each blade(s) supporting wall may include slots or rips in the number equal to the number of blades in the razor blade carrier assembly e.g. for a full loading. Each slot, rip or tear may be configured to mate with each blade at a position that correspond to the relevant position of the blades within the razor cartridge. Usually, the supporting wall(s) will comprise more than one blade receiving slot, rip or tear, as usually, more than one blade will be loaded within the razor cartridge. Each blade receiving slot, rip or tear may be adjacent to the next blade receiving slot, rip or tear. In the example of **Fig. 3b**, the supporting wall 32 comprises five slots 33, each receiving one blade 40 (here L-type blades). In other embodiments, the number of slots or rips may be one or more. The slots or rips permit to provide suitable locations in which the blades are positioned and hold by the carrier, in particular by the carrier base. The slots or rips may be configured in a manner that permits easy

mating with the respective blade.

**[0057]** The blades may be of any type, and in particular of L-type (see e.g. **Figs. 3b, 9**). L-type blades may e.g. be monolithic bent blades, or 2-part blades with bent support and welded blades on top or below the upper part of the support. Each blade may comprise a base portion 41 and an inclined portion 42, wherein the inclined portion 42 may comprise a cutting edge 43 (see e.g. **Fig. 3b**). The base portion, or lower portion, may be part of the blade support and may represent a free length of the blade that is generally provided to hold the blade in a counter part e.g. in the razor cartridge. The inclined portion of the blade may be an upper portion of the blade, which may comprise the cutting edge.

**[0058]** In embodiments, each slot, rip or tear of the supporting wall of the carrier base may be configured to receive at least the base portion of the blade. Moreover, each slot, rip or tear of the supporting wall of the carrier base may comprise a first portion configured to receive the base portion of the blade. In embodiments, each slot, rip or tear of the supporting wall of the carrier base may further comprise a second portion configured to receive the inclined portion of the blade. In the example depicted in **Fig. 3b**, each blade receiving slot 33 of the supporting wall 32 comprises a first portion 331 configured to receive the base portion 41 of the blade 40 and a second portion 332 configured to receive the inclined portion 42 of the blade 40. In other embodiments, the blade receiving slot, rip or tear may only comprise one portion, in particular the first portion.

**[0059]** In embodiments, the distance  $p$  (see **Fig. 3b**) between two adjacent slots in the supporting wall may equal the distance between two adjacent blades receiving slots in the razor cartridge. The distance  $p$  between two adjacent slots in the supporting wall further may equal the distance between two adjacent blades of the razor cartridge. When the blades are carried within the razor cartridge, the free lengths of the blades or blade supports will mate with the corresponding slots within the razor cartridge. The value of the distance  $p$  can be 0,5 to 1 mm, or 0,8 to 1,1 mm, or 1 to 1,3 mm, or 1,2 to 1,5 mm, or 1,4 to 1,8 mm, or 2 to 3 mm, or 3 to 5 mm, or 4 to 8 mm.

**[0060]** In embodiments, the blade receiving slots or rips of the supporting wall may have a suitable shape to fit the blades during mating, in particular the base portion of the blades. In embodiments, the slots or rips may have a suitable shape to fit the base portion of the L-type blades during mating. A portion of the slot, rip or tear may be configured to receive the base portion of the blade, and another portion of the slot, rip or tear may have an inclined or drafted shape to fit the upper portion (inclined portion) of the blade. The upper portion of the blade may be inclined to an angle from 90 to 45 degrees, usually and more specifically 65 to 70 degrees. The cut portion for the upper part of the blade can be optional, and only the cut portion for the lower part of the blade may exist, but generally an upper drafted cut also facilitates the assembly of the blades on the carrier base.

**[0061]** In embodiments, the slot configured to the receive the base portion of the blade may have a rectangular shape. This is for example depicted in **Fig. 3b**. In embodiments, the width  $t$  of one slot may be approximately equal to the thickness of the blade's support (or base portion), in case of a welded type, or equal to the thickness of the blade's thickness in the case of a monolithic bent blade. The value of the width  $t$  may be 0,05 to 0,10 mm, or 0,10 to 0,15 mm, or 0,15 to 0,25 mm, or 0,25 to 0,35 mm, or 0,35 to 0,5 mm, or 0,5 to 1,0 mm. In embodiments, the height  $h$  of the slot may be equal to the height of the base portion (lower portion) of the blade or less to a fraction of it, e.g., 80-90% or 60-80% or 30-60%, or greater. The value of the height  $h$  may be from 0,1 to 0,3 mm, or 0,3 to 0,6 mm, or 0,6 to 1 mm, or 1 to 1,4 mm, or 1,4 to 2 mm, or 2 to 3 mm, or 3 to 5 mm. If the height of the slot is equal or smaller than the height of the base portion of the blade, then the blade's base portion may contact the bottom surface of the slot during mating. If the height of the slot is greater, the blade's base portion may not contact the bottom surface of the blade receiving slot. In this case the upper portion of the blade may mainly contact the second portion of the slot of the supporting wall of the carrier base. In other embodiments, the blade receiving slot may be of any other shape suitable to receive the blade.

**[0062]** The mating between the blade retaining slot, rip or tear and the blade may be of any type (e.g. fitting type), such as clearance mating, transition mating or interference mating. In a clearance mating, the width of the slot may be larger than the thickness of the blade, thus enabling the two parts to freely slide when assembled with each other. In a transition mating, the width of the slot may be fractionally smaller than the thickness of the blade, and a mild force is required to assemble and/or disassemble the blade and the slot (i.e. the supporting wall or the carrier base). Finally, in an interference mating, the width of the slot may be smaller than the thickness of the blade, and a high force and/or heat may be required to assemble and/or disassemble the blade and the slot (i.e. the supporting wall or the carrier base).

**[0063]** Referring now to the carrier cover assembly of any embodiment according to the present disclosure, the blade retaining walls of the carrier cover may be configured to retain the blades in the razor blade carrier assembly. This is best shown in the example of **Fig. 3b**, in which is depicted that the blade retaining walls 22 of the carrier cover assembly 20 are positioned above the blades 40 such as to contact the inclined portion 42 of the blades 40. The contact between the blades and the blade retaining wall is not a mandatory feature. In embodiments, the blade retaining walls may not be in contact with the blades, but only be positioned above the blades such as to limit any potential movement of the blades in the razor blade carrier assembly during transport, handling, or other actions. In still other embodiments, the blade retaining wall may be partially in contact with a portion of the blade, in particular of the inclined portion of the blade, and/or



be in at least partial contact only with some blades comprised in the razor blade carrier assembly. In still other embodiments, the blade retaining wall may be in contact with part or all blades at a certain point of time, for example when the razor blade carrier assembly is moved and the blades move within the razor blade carrier assembly.

**[0064]** In embodiments, the at least one blade retaining wall may be connected to the carrier cover. The blade retaining wall(s) may be connected to the cover via connecting features, such as slots that inter-connect with corresponding slots of the carrier cover. Other connecting features can also be used, or e.g. adhesive surfaces can be used instead. Further, the blade retaining wall may provide rigidity to the carrier cover and/or may provide features that may come in contact with the top of the blades, thus improving the securing of the blades within the carrier. In embodiments, the at least one blade retaining wall of the carrier cover assembly may comprise a surface configured to get at least partially in contact with the inclined portion of the blade(s) when the carrier cover assembly is assembled with the carrier base. Further, the surface of the blade retaining wall that is in contact with the cutting edges of the blades may have a corrugated or jagged shape, such as to adapt to the shape formed by the inclined portions of the blades it gets in contact with. The surface of the blade retaining wall that at least faces the blades when assembled in the razor blade carrier assembly may also have such kind of shape if it does not get in contact with the blades. However, the eventuality that a contact between the surface and the blade occurs shall be taken into consideration. In embodiments, the contact surface may be of another shape, such as planar, wavy, inclined, and any other, independently if a contact between the blades and the surface is created at a certain point of time during e.g. storage, transport, handling, and others, or not. In the embodiment disclosed in **Fig. 3b**, the surface 221 of the razor blade retaining wall 22 that faces the blades 40 when assembled in the carrier 100 has a zig-zag shape (or corrugated, or jagged shape) that corresponds to the shape of the surface formed by the inclined portions 42 of the blades 40 when assembled in the carrier 100. This has the advantage that, in addition or alternatively to the slots of the carrier base, the blades and/or other shaving consumables may be held and positioned in the carrier to reduce or even inhibit the movement of the components (blades) in the carrier.

**[0065]** In embodiments, the cutting edges of the blades that are assembled in the carrier may contact the blade retaining wall(s) of the carrier cover assembly. Overall, the carrier cover assembly also fulfills the function to protect the blades, in particular the cutting edges of the blades during transport and storage, until insertion and release of the blades in the razor cartridge. In other embodiments, the cutting edges may not contact the surface.

**[0066]** In embodiments, the razor blade carrier assembly

may further comprise at least one lubrication element.

**Figs. 7a and 7b** are two perspective views of a same razor blade carrier assembly 10' according to a second embodiment. The razor blade carrier assembly 10' comprises a carrier 100' comprising a carrier base 30' and a carrier cover assembly 20' removably connected to the carrier base 30', and blades 40 (here e.g. L-type blades) that are removably positioned in the carrier 100', and at least one lubrication element 50, which is also removably positioned in the carrier 100'. The razor blade carrier assembly 10' is configured to be inserted into a razor cartridge 60' of a razor to release the blades 40 and the lubrication element 50 within the razor cartridge 60'. The blades 40 and the lubrication element 50 are removably positioned in the carrier base 30' and are retained in the razor blade carrier assembly 10' by the carrier cover assembly 20'. The position of the lubrication element relative to the blades in the razor blade carrier assembly may correspond to the position of the lubrication element relative to the blades once released in the razor cartridge. In embodiments, as shown in **Figs. 9 and 12**, the lubrication element 50 of the razor blade carrier assembly 10' according to the second embodiment is situated behind the blades area in a shaving direction S. In other embodiments, the lubrication may alternatively be positioned before the blades area or between the blades in the blades area. In still other embodiments, the razor blade carrier assembly may comprise more than one lubrication element, wherein the multiple lubrication elements may all be placed before (generally at the guard bar side), behind (i.e. generally at the razor cartridge rear wall side) or in between the blades area or spread throughout the blades area. In embodiments, as depicted in **Figs. 7a and 7b**, the carrier base 30' is in contact with the carried L-type blades 40 and/or with the lubrication element 50. In embodiments, the carrier base may not or only partially be in contact with the carried blades and/or with the lubrication element(s).

**[0067]** The carrier base may comprise at least one supporting wall, that may be configured to removably receive the blades and the lubrication element, and a disassembling tab. In the embodiment of **Figs. 7 to 12**, the carrier base 30' comprises two supporting walls 32' and a disassembling tab 31'.

**[0068]** In embodiments, the disassembling tab (31') may comprise surfaces (311') (tab surfaces or pull-out surfaces) configured to be grabbed by a user for pulling the carrier base (30') through and out of the razor cartridge (60') (see **Figs. 11a to 11c**). In the embodiment of **Figs. 11a to 11c**, the planes defined by the grabbing surfaces extend mainly perpendicular to the longitudinal direction of the razor blade carrier assembly. Further, the planes may extend mainly perpendicular to the longitudinal direction of the blades. In embodiments, the grabbing surfaces may be the front and rear surfaces of the disassembling tab. In other embodiments, the grabbing surfaces may be defined as to be other surfaces of the disassembly tab that are suitable to be grabbed.

**[0069]** As further shown in **Figs. 7a and 7b**, the two supporting walls 32' are configured to removably receive and support the blades 40 in the carrier 100'. In embodiments, the two blades supporting walls may be mainly planar and vertical compared to a horizontal plane formed by the blades in the razor blade carrier assembly.

**[0070]** In embodiments, each supporting wall of the carrier base may further comprise at least one alignment feature configured to position and guide the razor blade carrier assembly within the razor cartridge. As best shown in **Fig. 7a**, as well as in **Figs. 10a to 10c** and **Fig. 12**, each supporting wall 32' comprises an alignment feature 34' on a front side FS. On a rear side RS, the supporting walls 32' are linked by an alignment wall 322', which extends between the two supporting walls 32', vertically, and mainly perpendicular to the supporting walls 32', i.e. parallel to the blades 40. Any other arrangement of the walls of the carrier base resulting in a relation other than parallel and/or perpendicular may be foreseen. In embodiments, the alignment wall may be integrally formed with the carrier base (e.g. by bending, sheet metal forming, heat pressed, or others) or be a separate element assembled to the supporting walls, e.g. by welding, gluing or others. In embodiments, the alignment wall may be connected to another portion of the carrier base. The alignment wall may be configured to guide the back region of the carrier through the razor cartridge during assembling. In embodiments, the one or more alignment features, which may be part of the front and/or rear portion of each blade supporting wall, may serve as a feature to facilitate the alignment of the razor blade carrier assembly with the razor cartridge (or razor head) during insertion of the razor blade carrier assembly into the razor cartridge. In general, the alignment features and the alignment wall have the same function, i.e. to position and guide the razor blade carrier assembly in and through the razor cartridge.

**[0071]** As further depicted in **Figs. 10a to 10c**, **Fig. 11a** and **Fig. 12**, the razor cartridge 60' comprises alignment features 61' and 62' such as through slots (or alignment slot) in form of small slots or bigger recesses in the regions of the guard bar and of the rear wall. When the user moves the razor blade carrier assembly towards the open razor cartridge, the alignment features of the blade supporting walls are inserted into the respective alignment features (through slots) of the guard bar and the alignment wall is simultaneously inserted into the corresponding alignment feature (wider through slot, or recess) at the rear wall region of the razor cartridge, providing guidance for the proper alignment of the razor blade carrier assembly within the razor cartridge. In embodiments, each alignment feature of the razor cartridge may at least correspond in dimensions to the respective the alignment features of the razor blade carrier assembly (carrier base), such that the alignment features of the supporting walls (respectively carrier base) may be inserted and guided through the corresponding alignment features (through slots, recess) of the razor cartridge.

However, alignment features in the razor cartridge may only be foreseen where corresponding alignment features are provided on the carrier base.

**[0072]** In embodiment, the carrier cover assembly may comprise a carrier cover and at least one blade retaining wall connected to the carrier cover. Referring to **Figs. 7a and 7b**, the carrier cover assembly 20' comprises a carrier cover 21' and two blade retaining walls 22' connected to the carrier cover 21'. The blade retaining walls 22' are respectively arranged on each side end portion (i.e. left side and right side end portions) of the carrier cover 21'.

**[0073]** In embodiments, each supporting wall may further comprise at least one connection element and the carrier cover may also comprise at least one connection element, wherein the connection element of the supporting wall and the connection element of the carrier cover may be configured to connect with each other to removably assemble the carrier cover assembly with the carrier base. In the embodiment of **Figs. 7a, 7b, Fig. 11c and Fig. 12**, each supporting wall 32' comprises a connection element 35' on a front portion, that connects with a respective connection element 25' on the carrier cover 21'. In embodiments, the alignment wall may also comprise connection elements (here in the number of two) which are configured to connect with connection elements provided on tabs that extend outwardly from a central rear portion of the carrier cover. The connection elements of the supporting wall (i.e. the carrier base) may be features that enable a non-permanent connection of the carrier base with the carrier cover. These features may be for example rectangular slots on the carrier base, that mate with respective slots on the carrier cover (see for example in **Fig. 6c**). Alternatively, the connection element of the carrier cover may for example be a portion of the front and/or rear wall of the carrier cover itself, that may be inserted in a corresponding opening (e.g. a slot) of the carrier base. The connection elements may be other specific elements or devices configured to mate with each other in a removable manner such as to enable an easy and reliable assembly and disassembly of the carrier cover assembly with the carrier base.

**[0074]** As for the first embodiment, the supporting walls of the carrier base may comprise slots to removably receive the blades. Any disclosure relative to the blades supporting slots made with regard to the first embodiment may also apply to the second embodiment (and generally to any embodiment) and will not be repeated here.

**[0075]** In embodiments, as e.g. in the embodiment of **Fig. 9**, the supporting wall(s) 32' of the carrier base 30' further comprises an additional slot 36 configured to removably receive the lubrication element 50. Further, the lubrication element may be retained in the razor blade carrier assembly by the carrier cover assembly. In other embodiments, more than one lubrication element may be provided. In these cases, the number of slots in the supporting wall(s) configured to receive the lubrication elements need to be aligned with the number of lubrication elements. In examples, the position of the slot for

the lubrication element on the supporting wall may correspond to the position of the lubrication element relative to the blades area. The additional slot in the supporting wall shall be configured such that the lubrication element may be inserted into it to be retained. In embodiments, the shape of the additional slot may be rectangular with a flat and rectangular end, or a rounded end, or a tapered end, or any form that permits to insert and mate with the shape of the lubrication element that is inserted. The additional slot may also be an additional rip or tear, similar to slots or ribs described above for retaining the blades. In embodiments, the lubrication element may comprise a base that extends vertically and that is configured to be inserted in the razor cartridge. The additional slot in the supporting wall shall also mate with this exemplary tab.

**[0076]** According to further aspects of the present disclosure, in embodiments, the blade supporting wall(s) of the carrier base may be mainly planar. The thickness of each supporting wall may be 0,1 to 0,3 mm, or 0,3 to 0,4 mm, or 0,4 to 0,6 mm, or 0,6 to 0,8 mm, or 0,8 to 1 mm, or 1 to 1,25 mm, or 1,25 to 1,5 mm, or 1,5 to 2 mm, or 2 to 3 mm, or 3 to 10 mm. Each blade supporting wall may have a different thickness compared to the other supporting wall(s) or have the same thickness. In the same manner, the overall dimensions of the supporting walls may be different from one to the other or be the same.

**[0077]** In embodiments, all blades of the razor blade carrier assembly may face in the same direction. In other embodiments, the blades of the razor blade carrier assembly may face in different direction. In particular, in embodiments, the inclined portions of the blades may all face in the same direction. In other embodiments, the inclined portions of the blades may face in different directions. Providing the blades that face in different direction, in particular in forward and backward shaving direction may enable shaving in both directions. The orientation of the single blades in the razor blade carrier assembly directly depends on and is aligned with the orientation of the blades when assembled in the razor cartridge. Providing the blades that face in different direction, in particular in forward and backward shaving direction may enable shaving in both directions.

**[0078]** In embodiments, the razor blade carrier assembly may comprise one or more lubrication element. As described previously with respect to the second embodiment of a razor blade carrier assembly according to the present disclosure, the lubrication element may be positioned in any area (before, behind, in between) of the group of blades (or before or behind a single blade). In embodiments, the lubrication element(s) may comprise active elements. In embodiments where more than one lubrication element is provided, the lubrication elements may all comprise the same active element or may comprise different active elements. The active elements may be made of materials or mixtures of materials that reduce friction and/or provide lubrication. In embodiments, the lubricating element may comprise water-soluble and/or

water-insoluble components, and/or a combination thereof. In addition or alternatively, it may also comprise soap and/or soap-based mixtures, or pure-polymers able to reduce friction forces. Examples of rigid water insoluble components are polystyrene, styrene copolymers, polyethylene, polypropylene, polyacetal, acrylonitrile-butadiene-styrene copolymer, ethylene vinyl acetal copolymer, polylactic acid, polycarbonate, maleic anhydride ethylene co-polymer blends, polyether-containing block copolymers (e.g. with polyamide), blends and copolymers of the above with or without other additives. Examples of elastic water insoluble components are thermoplastic elastomer compounds (TPEs), more specifically thermoplastic polyurethanes, and/or silicone polymers. Typical examples of water-soluble lubricating components are polyethylene oxide and/or polyethylene glycol, polyvinyl pyrrolidone, polyacrylamide, polyhydromethacrylate, polyvinyl imidazoline, polyvinyl alcohol, polyhydromethymethacrylate, silicone polymers, blends and copolymers of the above.

**[0079]** In embodiments, the shape of the lubrication element may be an extruded strip and its cross-sectional shape may facilitate the semi-permanent assembly on the carrier base. Such a shape may be a T-shape, such as e.g. depicted in **Fig. 9**, where the lower vertical part is inserted into the carrier base, in particular in a respective slot in the supporting wall of the carrier base, and later in the respective slots of the razor cartridge. The strip may be secured into place within the razor cartridge by the movable blade retainers that also secure the blades. The T-shape may provide an improved rigidity to the lubrication element, compared to a simple rectangular strip. However, in embodiments, many alternative cross-sectional shapes may be applicable, such as rectangular, circular, elliptical, with curved outline, e.g. wavy.

**[0080]** In embodiments, the lubrication element can may be placed on a base, either through e.g. adhesion or through co-molding (e.g. co-injected, over-molding). The base may be made of a harder material than that of the lubrication material, either being a polymer or a metallic or composite, or ceramic. In this case the base of the lubrication element may be the one that is connected to the carrier and later is inserted into the respective slot of the razor cartridge.

**[0081]** In embodiments, the carrier base and the carrier cover assembly may be removably assembled (connected; joint) to form a rigid structure. The structure may enable to protect the shaving consumables, i.e. the blades and/or the lubrication elements, comprised in the razor blade carrier assembly against damage, environmental aspects, loss, and others, as well as to protect the user from any accidental contact with the shaving consumables, in particular the blades (cutting edges), which could be harmful, during handling. In fact, a rigid structure may enable to securely carry and protect the blades (e.g. L-type blades) during storing and user handling. The user may handle the razor blade carrier assembly with his/her fingers and place it safely in a suitable razor cartridge.

**[0082]** In embodiments, the carrier base and the carrier cover assembly may be made of sustainable material, such as carton or biodegradable polymer, and/or made of metals, or ceramics, or composite materials. In examples, all components of the carrier may be made of sustainable type of materials such as any type of carton, biodegradable polymers, or metals, or ceramics, or composite materials.

**[0083]** In embodiments, the carrier base and/or the carrier cover assembly, or part of it (e.g. carrier cover, blade retaining wall), may be of a bent sheet type (like e.g. origami), and/or it may include assembly features such as e.g. interconnecting slots, and/or it may include surfaces for permitting any type of suitable chemical adhesion. It may also have no bends, and be an assembly of simple parts, e.g., simple sheets. However, in embodiments, bends may provide an easy way to increase the rigidity of the whole structure.

**[0084]** Fig. 9b shows a modified cover 21, 21' including a groove 212, which extends along the bending line and facilitates bending of the material. The groove may be formed for example with a laser or with die-cut tools. The groove may also be created by compressing the material with a pressing tool along the bending line. This process does not contain cutting or removing material steps. The grooves' depth can reach to a percentage of the carton thickness, e.g. approximately 20 to 90%. The grooves may improve the precision and easiness of the bending process. The grooves can be placed either outside or inside or both inside and outside of the bend. Other ways can also be applicable for facilitating and improving the precision of the bending process such as locally deforming the bending region by pressing tools. The bends preparation processes usually occur when the parts are still flat (blanks).

**[0085]** In embodiments, a shape of the carrier cover may be a bent sheet with 3 planar surfaces and 2 bends, and extending parallel to the blade edges. In alternative embodiments, other shapes may also be applicable, e.g. wherein the top surface of the carrier cover may be curved or wavy, with continuous material or with apertures. In embodiment, the length of the elongated side of the carrier cover may be close to the length of the blades and/or lubrication element(s), thus providing their full coverage. This length may e.g. be from 30 to 35 mm, or 35 to 40 mm, or 40 to 50 mm, which may be close to the length of conventional L-type blades available in current razor products. Usually, the length of the lubrication element is adapted and related to the length of the blades. The width of the carrier cover may (and even should) be suitable to cover all the carried blades and/or lubrication element(s), thus its dimension depends on the number of blades and/or lubrication element(s) and the distances between them. Typical sizes for 5 blades could be 4 to 10 mm, for 3 blades 3 to 8 mm, for 1 or 2 blades 2 to 5 mm. An additional length (and/or width, and/or height) may be given to the width of the cover for incorporating the necessary connecting features with the carrier base

component. The height of the cover may be adequate for facilitating the manual handling from the user. It can be 5 to 10 mm, or 10 to 20 mm, or 20 to 50 mm. Any other suitable dimension of length, width and height of the carrier cover may be possible. However, it shall still be suitable with the carrier base and the shaving components comprised in the razor blade carrier assembly.

**[0086]** In embodiments, in order to improve corrosion resistance, an anti-corrosion element may be embedded, or adhered or attached on the razor blade carrier assembly, for example on the carrier cover. The anti-corrosion element can have the shape of a rod or follow the contours of the cover or be a foil or be printed on the carrier assembly surfaces. Preferably, the anti-corrosion element comprises a metallic element (for example aluminum) that will come into contact with the blades so as to provide a cathodic protection.

**[0087]** In embodiments, any surface of the carrier base and/or of the carrier cover assembly may be printable. For example guidelines, logos, esthetic or informative graphics may be printed on any surface of the carrier. This may improve the user experience during manual mounting of the blades and/or lubrication elements into the razor cartridge. In embodiments, full color coating may be applied on any carrier surface.

**[0088]** Advantages of the present disclosure are, among others, that practical and safe means, systems and methods of carrying one or more blades, e.g. L-type blades, for easy loading into a suitable cartridge are provided. In fact, the present disclosure enables the user to replace only the cutting blades and/or the lubrication elements (e.g. lubrication strips) of the razor when they are blunt and worn, and when they do not provide the initial comfort and efficiency during shaving any more. Immediate benefits of the present disclosure may be seen from an environmental and cost perspective.

**[0089]** The systems and methods provided herein also enable to replace blades (e.g. high-performance L-type blades) by transferring them together in once while they remain independent from each other within the razor cartridge, usually arranged on movable elements such as spring fingers. In addition, using the carrier components, i.e. the carrier base and/or the carrier cover assembly, the transfer of the blades into the cartridge can be performed safely without the risk of injuring the hands.

**[0090]** Overall, with the present systems and methods, a safe and easy handling of the components and shaving consumables is assured. In particular, a set of blades (e.g. L-type blades) can be easily loaded in a multi-blade cartridge.

**[0091]** Further, the present disclosure provides a low-cost carrier (respectively carrier assemblies) of one or more razor blades. In addition, the razor blade carrier (respectively razor blade carrier assemblies) may be made of sustainable materials, thus may be safely disposed without harming the environment.

**[0092]** Another advantage may be that the cartridge may be easily opened, and the position of the blades

easily changed manually within the cartridge, thus prolonging the use period of the blades. Still another advantage may be that a variety of lubrication strips, and/or even cosmetic strips, that are available to buy in different varieties, can be used and tried.

**[0093]** According to another aspect of the present disclosure, a method of replacing blades, in particular used blades, of a razor cartridge is provided. In embodiments, old used blades may be already positioned in the razor cartridge. New blades may be provided by a razor blade carrier assembly according to the present disclosure. The razor cartridge may comprise at least one retaining mechanism configured to retain the blades in the razor cartridge. The method may comprise the steps of: (a) unlocking the retaining mechanism to release the used blades; (b) disposing the used blades from the razor cartridge; (c) inserting the razor blade carrier assembly comprising the new blades in the razor cartridge (d) locking the retaining mechanism to secure the new blades of the razor blade carrier assembly within the razor cartridge; and (e) removing the carrier to release the new blades in the razor cartridge. The blades being removably, i.e. with non-permanent joints, arranged and positioned in the carrier, an easy release from the carrier components (carrier base and carrier cover assembly) when the blades are mounted and secured by the retaining mechanism of the razor cartridge (or razor head) is permitted.

**[0094]** An exemplary embodiment of the replacement of blades according to the method presently disclosed is shown in **Figs. 6a to 6c**. The Figures depict the different steps of replacing (or inserting) one or more replacement blades 40 in a razor cartridge 60 making use of a razor blade carrier assembly 10 according to a first embodiment (shown e.g. in **Fig. 1**). In **Fig. 6a**, the two elements of the retaining mechanism 63 are opened (unlocked) (depicted with the two arrows pointing in the outwards direction on either side of the length of the razor cartridge). If positioned in the razor cartridge, the old, used blades may be disposed, i.e. removed, from the razor cartridge (not disclosed in **Fig. 6a**). The razor blade carrier assembly 10 comprising the replacement blades 40 may then be inserted top down in the opening of the razor cartridge 60 from top side of the razor cartridge 60. **Fig. 6b** shows the razor blade carrier assembly 10 fully inserted in the razor cartridge 60. As can be seen, the carrier cover 20 of the carrier 100 rests on the top surface of the razor cartridge 60, while the disassembly tab 31 extends downwards from the bottom side of the razor cartridge 60. As shown by the two arrows, the two elements of the retaining mechanism 63 are locked (closed) to secure the replacement blades 40 within the razor cartridge 60. Finally, **Fig. 6c** depicts that the carrier 100 is removed by disconnecting the carrier cover assembly 20 and the carrier base 30 to release the replacement blades 40 within the razor cartridge 60. As shown by the arrows, the carrier cover assembly 20 is removed from the top of the razor cartridge 60 while the carrier base 30 is pulled out and removed from the bottom side of the razor car-

tridge 60.

**[0095]** It has to be emphasized that the sequence of relating the blades as shown in the embodiment of figures 6a to 6c are not intended to be limiting. Whereas for the embodiment of figures 6a to 6c it is shown that the carrier is inserted from the top side of the razor cartridge and pulled out and removed from the bottom side of the razor cartridge, it could also be inserted differently, which mainly depends on the blade type used. For example, L-type blades in cartridges without spring fingers may also allow for an insertion of the carrier from the bottom side of the razor cartridge.

**[0096]** In embodiments, the method may further comprise replacing a used lubrication element of the razor cartridge simultaneously to the replacement of used blades, wherein a new lubrication element is provided with the razor blade carrier assembly according to the present disclosure. Herein, the new lubrication element may be inserted and locked together with the new blades in the razor cartridge.

**[0097]** An exemplary embodiment of the replacement of blades and lubrication element according to the method presently disclosed is shown in **Figs. 11a to 11c**. The Figures depict the different steps of replacing (or inserting) new blades 40 and lubrication element 50 in a razor cartridge 60' making use of a razor blade carrier assembly 10' according to a second embodiment, i.e. comprising a lubrication element 50 (shown e.g. in **Figs. 7a and 7b**). In **Fig. 11a**, the two elements of the retaining mechanism 63' are opened (unlocked) (depicted with the two arrows pointing in the outwards direction on either side of the length of the razor cartridge). If positioned in the razor cartridge, old, used blades may be disposed, i.e. removed, from the razor cartridge (not disclosed in **Fig. 6a**). The razor blade carrier assembly 10' comprising the replacement blades 40 and lubrication element 50 may then be inserted top down in the opening of the razor cartridge 60' from top side of the razor cartridge 60' (see also **Fig. 12**). **Fig. 11b** shows the razor blade carrier assembly 10' fully inserted in the razor cartridge 60'. The carrier cover 21' of the carrier may be configured to rest on the top surface of the razor cartridge 60', e.g. with the blades retaining wall(s) 22', while the disassembly tab 31' may extend downwardly from the bottom side of the razor cartridge 60'. As shown by the two arrows, the two elements of the retaining mechanism 63' are then locked (closed) to secure the replacement blades 40 and lubrication element 50 within the razor cartridge 60'. Finally, **Fig. 11c** depicts that the carrier 100' is removed by disconnecting the carrier cover assembly 20' and the carrier base 30' to release the blades 40 and the lubrication element 50 within the razor cartridge 60'. As shown by the arrows, the carrier cover assembly 20' is removed from the top of the razor cartridge 60' while the carrier base 30' is pulled out and removed from the bottom side of the razor cartridge 60'.

**[0098]** In embodiments, the razor cartridge may further comprise at least one alignment feature such that insert-

ing the razor blade carrier assembly in the razor cartridge comprises: (a) inserting the disassembling tab of the carrier base in the razor cartridge, (b) inserting the at least one alignment feature of the supporting wall of the carrier base in the at least one alignment feature of the razor cartridge, and (c) guiding the carrier base through the razor cartridge until the razor blade carrier assembly is stopped by contact of the carrier cover with the razor cartridge. Some type and arrangements of alignment features have been disclosed further above with reference to the razor blade carrier assemblies. In embodiments, an alignment feature may be e.g. an alignment slot, an alignment wall or a through slot. The alignment feature or through slots (or recess) of the razor cartridge may extend in a top-down direction of the razor cartridge to enable an insertion and guidance in the top-down direction.

**[0099]** Exemplary embodiments of alignment features have been described previously and are best depicted in **Figs. 5a to 5c** and **Figs. 10a to 10c**. **Figs. 5a to 5c** refer to a razor blade carrier assembly 10 according to **Fig. 1**, and **Figs. 10a to 10c** refer to a razor blade carrier assembly 10' according to e.g. **Figs. 7a and 7b** (comprising blades 40 and a lubrication element 50). **Figs. 5a and 10a** each depict a top view of a razor cartridge (60, 60') with opened (unlocked) retaining mechanisms 63 and 63', and without blades or lubrication element. In both Figures, alignment features 61, 61' and 62' of the razor cartridge are clearly visible. **Fig. 5a** depicts two alignment slots 61 through the guard bar 64 and two alignment slots 61 in the rear wall 65 of the razor cartridge 60. **Fig. 10a** depicts two alignment slots 61' through the guard bar 64' (similar to the ones in **Fig. 5a**), and one much wider alignment feature 62' (i.e. through slot, alignment slot or alignment recess) in the rear wall 65' of the razor cartridge 60'. **Figs. 5b and 10b** depict a view of the razor cartridges (60, 60') of respectively **Fig. 5a** and **Fig. 10a** with fully inserted razor blade carrier assembly (10, 10'). As previously described, the alignment features of the razor blade carrier assemblies may vary and be simple alignment features in form of e.g. tabs up to e.g. wider alignment walls. In the Figures, the retaining mechanism are closed (locked). Finally, **Fig. 5c and Fig. 10c** depict the razor cartridges 60 and 60' with inserted and released blades 40 and/or lubrication element 50. Any feature already previously describes with reference to the embodiments of the razor blade carrier assemblies may be applicable here. For the sake of completeness, **Figs. 5a to 5c** presents top views of the razor cartridge 10 of respectively **Figs. 6a to 6c**. Similarly, **Figs. 10a to 10c** presents top views of the razor cartridge 10' of respectively **Figs. 11a to 11c**.

**[0100]** In embodiments, removing the carrier may comprise pulling the disassembly tab to disconnect the carrier base from the carrier cover assembly, while the blades and/or lubrication element are released in the razor cartridge, and removing the disconnected carrier base and carrier cover assembly from either side of the razor car-

tridge. The disassembling tab (or pull-out surfaces) may facilitate a manual disassembling of the carrier base from the carrier cover when the new blades and/or new lubrication element have been secured in the razor cartridge by the retaining mechanism. The user may simply pull down the disassembly tab by grabbing the surfaces of the disassembly tab and pulling down the carrier base, which will disconnect from the carrier cover assembly, while the blades and/or the lubrication element stay secured in the cartridge. In embodiments, the grabbing surfaces of the disassembly tab should have enough area to be easily grabbed and handled by the user's fingers. For that, one surface area may be at least 0.5 cm<sup>2</sup>, or 0.5 to 1 cm<sup>2</sup>, or 1 to 3 cm<sup>2</sup>.

**[0101]** In embodiments, the razor cartridge may be empty from old used blades and/or lubrication elements. In that case, the method described may also apply to only inserting replacement blades and/or lubrication elements into a razor cartridge, without having to remove old, used blades and/or lubrication elements from the razor cartridge (i.e. step b of the method).

**[0102]** The Figures of the present disclosure depict one type of blades retaining mechanism, wherein a first retainer is arranged on one side of the razor cartridge in the elongated direction and a similar second retainer is arranged on the other side of the razor cartridge in the elongated direction. This type of retainer is configured to open and close by a rotary movement along one edge of the retainer. However, the retaining mechanism as disclosed herein shall not be limited to the depicted retaining mechanism. Moreover, any other retaining mechanism that is configured to retain the blades and or the lubrication element in the razor cartridge may be suitable.

**[0103]** In embodiments, the blades (e.g. L-type blades) may be placed on top of spring fingers within the razor cartridge, which enable them to be movable during shaving, decreasing the force of the blade cutting edge on the skin, which makes them safer during shaving. During mounting, the carrier may hold the blades into the razor cartridge slots on top of the spring fingers until the retaining mechanism is closed. The carrier may hold the blades at a position within the razor cartridge where the spring fingers are not pressed, or at a lower position within the razor cartridge where the spring fingers are pressed, and the closing of the retaining mechanism may be facilitated. The final removal of the carrier components may enable the blades to take their normal position within the razor cartridge, usually with the spring fingers preserving a pre-stress state that forces the blades to contact the retaining mechanisms' inner surface. Usually, the lubrication element(s) is not placed on spring fingers in the razor cartridge but is inserted in a corresponding slot in the razor cartridge to rest there until they are worn out. However, in case the lubrication element(s) is also provided on spring fingers in the razor cartridge, the previously disclosed features may also apply to the lubrication element(s).

**[0104]** According to another aspect of the present dis-

closure, a package comprising multiple razor blade carrier assemblies according to the present disclosure may be provided. The package may be offered to users and may be made of e.g. sustainable materials, such as carton or biodegradable polymers. Any other suitable material may be possible. This may present an additional offer to the user, such that multiple razor blade carrier assemblies may be provided. The package may be made of sustainable material, such as carton or biodegradable polymer, and/or may be made of metals, or ceramics, or composite materials.

**[0105]** According to another aspect, a razor head comprising a razor cartridge and a razor blade carrier assembly according to the present disclosure may be provided. The razor head may further comprise spring fingers on which the blades and/or the at least one lubrication element are movably arranged.

**[0106]** According to another aspect, a razor comprising a razor cartridge, a handle, and a razor blade carrier assembly according to the present disclosure may be provided. The razor cartridge may be comprised in a razor head. Further, the handle may be detachable from the razor head and/or the razor cartridge.

**[0107]** This disclosure shall not be limiting to any embodiment. Moreover, any combination of the embodiments disclosed herein may be possible. For example, the razor blade carrier assembly according to the first embodiment may be provided with one or more lubrication element, and/or the razor blade carrier assembly according to the second embodiment may be provided without lubrication element.

**[0108]** Although the present disclosure has been described above and is defined in the attached claims, it should be understood that the disclosure may alternatively be defined in accordance with the following embodiments:

1. A razor blade carrier assembly comprising:

a carrier comprising a carrier base and a carrier cover assembly removably connected to the carrier base; and  
blades that are removably positioned in the carrier;  
characterized in that  
the razor blade carrier assembly is configured to be inserted into a razor cartridge of a razor to release the blades within the razor cartridge.

2. The razor blade carrier assembly according to embodiment 1, wherein the blades are removably positioned in the carrier base and retained in the razor blade carrier assembly by the carrier cover assembly.

3. The razor blade carrier assembly according to any of the preceding embodiments, wherein the carrier base comprises:

at least one supporting wall; and  
a disassembling tab.

4. The razor blade carrier assembly according to any of the preceding embodiments, wherein the disassembling tab comprises surfaces configured to be grabbed by a user for pulling the carrier base through and out of the razor cartridge.

5. The razor blade carrier assembly according to any of the preceding embodiments, wherein the at least one supporting wall is configured to removably receive the blades.

6. The razor blade carrier assembly according to any of the preceding embodiments, wherein the supporting wall comprises slots to removably receive the blades.

7. The razor blade carrier assembly according to any of the preceding embodiments, wherein the number of slots is equal to the number of blades of the razor blade carrier assembly.

8. The razor blade carrier assembly according to any of the preceding embodiments, wherein the distance between two adjacent slots equals the distance between two adjacent blades receiving slots of the razor cartridge.

9. The razor blade carrier assembly according to any of the preceding embodiments, wherein the supporting wall further comprises at least one alignment feature configured to position and guide the razor blade carrier assembly within the razor cartridge.

10. The razor blade carrier assembly according to any of the preceding embodiments, wherein the carrier cover assembly comprises:

a carrier cover; and  
at least one blade retaining wall connected to the carrier cover.

11. The razor blade carrier assembly according to any of the preceding embodiments, wherein the supporting wall further comprises at least one connection element and the carrier cover comprises at least one connection element, wherein the connection element of the supporting wall and the connection element of the carrier cover are configured to connect with each other to removably assemble the carrier cover assembly with the carrier base.

12. The razor blade carrier assembly according to any of the preceding embodiments, wherein each blade comprises a base portion and an inclined portion, wherein the inclined portion comprises a cutting

edge.

13. The razor blade carrier assembly according to any of the preceding embodiments, wherein each slot of the supporting wall of the carrier base is configured to receive the base portion of the blade. 5

14. The razor blade carrier assembly according to any of the preceding embodiments, wherein each slot of the supporting wall of the carrier base comprises a first portion configured to receive the base portion of the blade. 10

15. The razor blade carrier assembly according to any of the preceding embodiments, wherein each slot of the supporting wall of the carrier base further comprises a second portion configured to receive the inclined portion of the blade. 15

16. The razor blade carrier assembly according to any of the preceding embodiments, wherein the blade retaining wall is configured to retain the blades in the razor blade carrier assembly. 20

17. The razor blade carrier assembly according to any of the preceding embodiments, wherein the blade retaining wall of the carrier cover assembly comprises a surface configured to get at least partially in contact with the inclined portion of the blades when the carrier cover assembly is assembled with the carrier base. 25 30

18. The razor blade carrier assembly according to any of the preceding embodiments, wherein the surface of the blade retaining wall that is in contact with the cutting edges of the blades has a jagged shape, such as to adapt to the shape formed by the inclined portions of the blades it gets in contact with. 35

19. The razor blade carrier assembly according to any of the preceding embodiments, wherein the inclined portions of the blades all face in the same direction. 40

20. The razor blade carrier assembly according to any of the preceding embodiments, wherein the inclined portions of the blades face in different directions. 45

21. The razor blade carrier assembly according to any of the preceding embodiments further comprising at least one lubrication element. 50

22. The razor blade carrier assembly according to any of the preceding embodiments, wherein the at least one supporting wall of the carrier base comprises an additional slot configured to removably receive the lubrication element, and/or wherein the lu- 55

brication element is retained in the razor blade carrier assembly by the carrier cover assembly.

23. The razor blade carrier assembly according to any of the preceding embodiments, wherein the position of the lubrication element relative to the blades in the razor blade carrier assembly corresponds to the position of the lubrication element relative to the blades once released in the razor cartridge.

24. The razor blade carrier assembly according to any of the preceding embodiments, wherein the lubrication element comprises active elements.

25. The razor blade carrier assembly according to any of the preceding embodiments, wherein the carrier base and the carrier cover assembly are assembled to form a rigid structure

26. The razor blade carrier assembly according to any of the preceding embodiments, wherein the carrier base and the carrier cover assembly are made of sustainable material, such as carton or biodegradable polymer, and/or made of metals, or ceramics, or composite materials.

27. The razor blade carrier assembly according to any of the preceding embodiments, wherein any surface of the carrier base and/or of the carrier cover assembly is printable.

28. A package comprising multiple razor blade carrier assemblies according to any of embodiments 1 to 27.

29. A razor head comprising a razor cartridge and a razor blade carrier assembly according to any of embodiments 1 to 27.

30. Razor head, further comprising spring fingers on which the blades are movably mounted on said spring fingers arranged.

31. A razor comprising a razor cartridge, a handle and a razor blade carrier assembly according to any of embodiments 1 to 27.

32. A method of replacing one or more used blades of a razor cartridge,

providing one or more replacement razor blades in a razor blade carrier assembly according to any of embodiments 1 to 27;  
wherein the razor cartridge comprises a retaining mechanism configured to retain the the one or more blades in the razor cartridge;  
the method comprising:



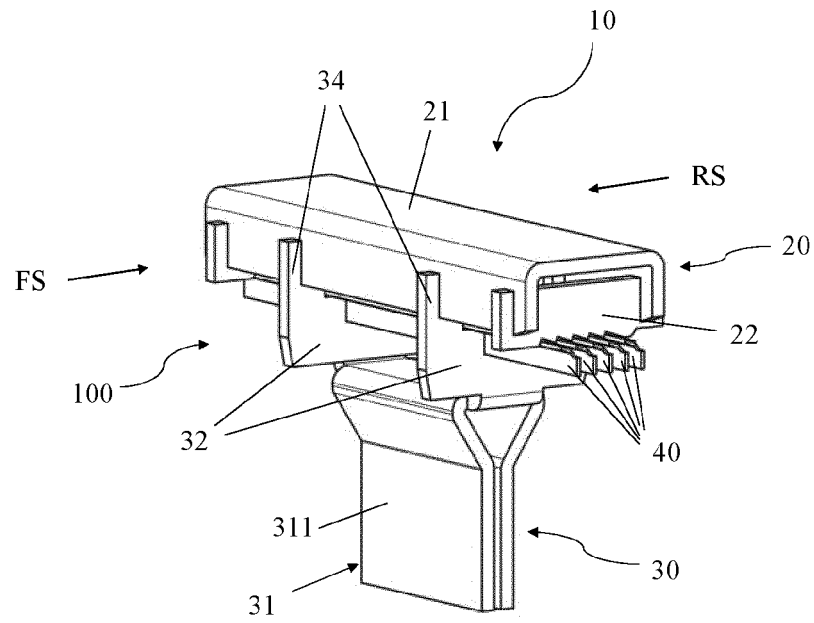
- a. Unlocking the retaining mechanism to release the one or more used razor blades;  
 b. Disposing the one or more used razor blades from the razor cartridge;  
 c. Inserting the razor blade carrier assembly comprising the one or more replacement blades in the razor cartridge;  
 d. Locking the retaining mechanism to secure the new blades of the razor blade carrier assembly within the razor cartridge; and  
 e. Removing the carrier to release the one or more replacement blades in the razor cartridge.
33. The method according to embodiment 32, wherein the razor cartridge further comprises at least one alignment feature such that inserting the razor blade carrier assembly in the razor cartridge comprises:
- a. inserting the disassembling tab of the carrier base in the razor cartridge;  
 b. inserting the at least one alignment feature of the supporting wall of the carrier base in the at least one alignment feature of the razor cartridge; and  
 c. guiding the carrier base through the razor cartridge until the razor blade carrier assembly is stopped by contact of the carrier cover with the razor cartridge.
34. The method according to any of embodiments 32 to 33, wherein removing the carrier comprises pulling the disassembly tab to disconnect the carrier base from the carrier cover assembly, while the one or more razor blades are released in the razor cartridge, and removing the disconnected carrier base and carrier cover assembly from either side of the razor cartridge.
35. The method according to any of embodiments 32 to 34, further comprising replacing a used lubrication element of the razor cartridge simultaneously to the replacement of used blades, wherein a new lubrication element is provided with the razor blade carrier assembly according to any of embodiments 21 to 27, and wherein the new lubrication element is inserted and locked together with the new blades in the razor cartridge.
- one or more razor blades (40) that are removably positioned in the carrier (100, 100'); wherein the razor blade carrier assembly (10, 10') is configured to be inserted into a razor cartridge (60) of a razor to release the one or more blades (40) within the razor cartridge (60).
2. The razor blade carrier assembly according to claim 1, wherein the one or more razor blades (40) are removably positioned in the carrier base (30, 30') and retained in the razor blade carrier assembly (10, 10') by the carrier cover assembly (20, 20').
3. The razor blade carrier assembly (10, 10') according to any of the preceding claims, wherein the carrier base (30, 30') comprises:
- at least one supporting wall (32, 32'); and  
 a disassembling tab (31, 31');  
 wherein the at least one supporting wall (32, 32') is configured to removably receive the one or more razor blades (40).
4. The razor blade carrier assembly (10, 100') according to claim 3, wherein the supporting wall (32, ) comprises slots (33) and/or ribs (33') to removably receive the one or more razor blades (40), in particular wherein the amount of slots (33) and/or ribs (33') is equal to the amount of razor blades (40) of the razor blade carrier assembly (10).
5. The razor blade carrier assembly (10) according to any of claims 3 or 4, wherein the supporting wall (32, 32') further comprises at least one alignment feature (34, 34') configured to position and guide the razor blade carrier assembly (10, 10') within the razor cartridge (60).
6. The razor blade carrier assembly (10, 10') according to any of the preceding claims, wherein the carrier cover assembly (20, 20') comprises:
- a carrier cover (21, 21'); and  
 at least one razor blade retaining wall (22, 22') connected to the carrier cover (21, 21').
7. The razor blade carrier assembly (10, 10') according to any of the preceding claims, wherein the supporting wall (32, 32') further comprises at least one connection element (35) and the carrier cover (21, 21') comprises at least one connection element (25), wherein the connection element (35) of the supporting wall (32, 32') and the connection element (25) of the carrier cover (21, 21') are configured to connect with each other to removably assemble the carrier cover assembly (20, 20') with the carrier base (30).
8. The razor blade carrier assembly (10, 10') according

## Claims

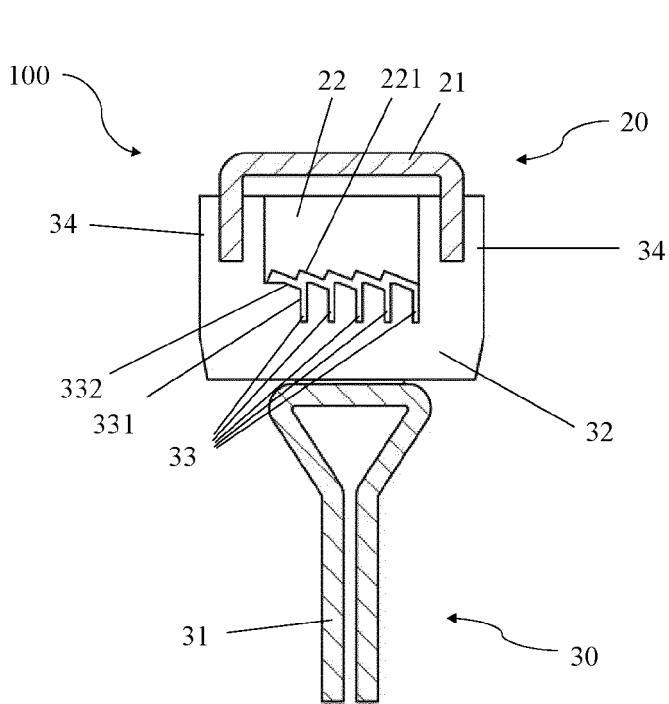
1. A razor blade carrier assembly (10, 10') comprising:

a carrier (100, 100') comprising a carrier base (30, 30') and a carrier cover assembly (20, 20') removably connected to the carrier base (30, 30'); and

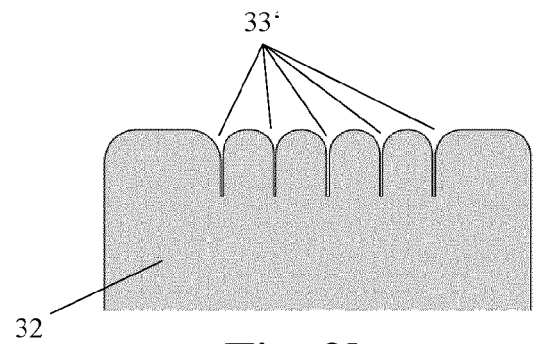
- to any of the preceding claims, wherein each of the one or more razor blades (40) comprises a base portion (41) and an inclined portion (42), wherein the inclined portion (42) comprises a cutting edge (43), wherein each slot (33) and/or rip (33') of the supporting wall (32, 32') of the carrier base (30) is configured to receive the base portion (41) of the one or more razor blades (40), wherein the razor blade retaining wall (22, 22') is configured to retain the one or more razor blades (40) in the razor blade carrier assembly (10, 10'), wherein the razor blade retaining wall (22, 22') of the carrier cover assembly (20, 20') comprises a surface (221, 221') configured to get at least partially in contact with the inclined portion (42) of the one or more razor blades (40) when the carrier cover assembly (20, 20') is assembled with the carrier base (30, 30').
9. The razor blade carrier assembly (10, 10') according to any of claims 4 to 8 further comprising at least one lubrication element (50), wherein the at least one supporting wall (32, 32') of the carrier base (30, 30') comprises an additional slot (36) or rip (33') configured to removably receive the lubrication element (50), wherein the lubrication element (50) is retained in the razor blade carrier assembly (10, 10') by the carrier cover assembly (20, 20').
10. A razor head comprising a razor cartridge (60, 60') and a razor blade carrier assembly (10, 10') according to any of claims 1 to 9.
11. A razor comprising a razor cartridge (60, 60'), a handle and a razor blade carrier assembly (10, 10') according to any of claims 1 to 9.
12. A method of replacing one or more used razor blades (40) of a razor cartridge (60, 60'), providing one or more replacement razor blades (40) in a razor blade carrier assembly (10, 10') according to any of claims 1 to 9; wherein the razor cartridge (60, 60') comprises a retaining mechanism (63, 63') configured to retain the one or more razor blades (40) in the razor cartridge (60, 60'); the method comprising:
- Unlocking the retaining mechanism (63, 63') to release the one or more used razor blades (40);
  - Disposing the one or more used razor blades (40) from the razor cartridge (60, 60');
  - Inserting the razor blade carrier assembly (10, 10') comprising the one or more replacement razor blades (40) in the razor cartridge (60, 60');
  - Locking the retaining mechanism (63, 63') to secure the one or more replacement razor blades (40) of the razor blade carrier assembly (10, 10') within the razor cartridge (60, 60'); and
- Removing the carrier (100, 100') to release the one or more replacement razor blades (10, 10') in the razor cartridge (60, 60').
13. The method according to claim 12, wherein the razor cartridge (60, 60') further comprises at least one alignment feature (61, 61', 62') that facilitates inserting the razor blade carrier assembly (10) in the razor cartridge (60, 60'), the method comprising:
- inserting the disassembling tab (31, 31') of the carrier base (30, 30') in the razor cartridge (60, 60');
  - inserting the at least one alignment feature (34, 34') of the supporting wall (32, 32') of the carrier base (30, 30') in the at least one alignment feature (61, 61') of the razor cartridge (60, 60'); and
  - guiding the carrier base (30, 30') through the razor cartridge (60, 60') until the razor blade carrier assembly (10) is stopped by contact of the carrier cover (21, 21') with the razor cartridge (60, 60').
14. The method according to any of claims 12 to 13, wherein removing the carrier (100, 100') comprises pulling the disassembling tab (31, 31') to disconnect the carrier base (30, 30') from the carrier cover assembly (20, 20'), while the one or more razor blades (40) are released in the razor cartridge (60, 60'), and removing the disconnected carrier base (30, 30') and carrier cover assembly (20, 20') from either side of the razor cartridge (60, 60').
15. The method according to any of claims 12 to 14, further comprising replacing a used lubrication element (50) of the razor cartridge (60, 60') simultaneously to the replacement of the one or more used razor blades (40), wherein a new lubrication element (50) is provided with the razor blade carrier assembly (10, 10') according to claim 9, and wherein the new lubrication element (50) is inserted and locked together with the one or more replacement razor blades (40) in the razor cartridge (60, 60').



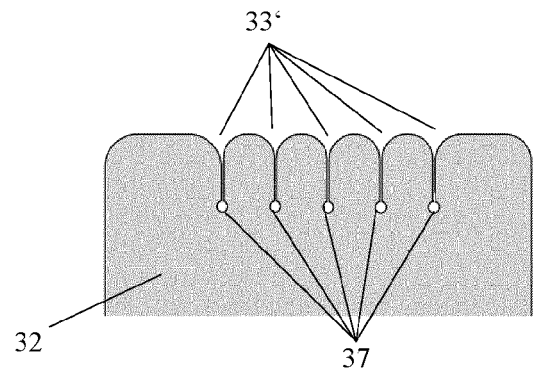
**Fig. 1**



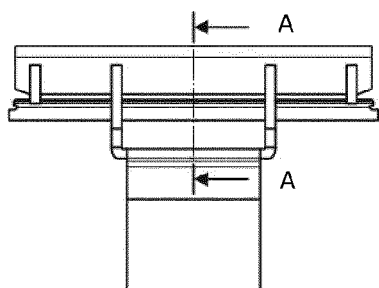
**Fig. 2a**



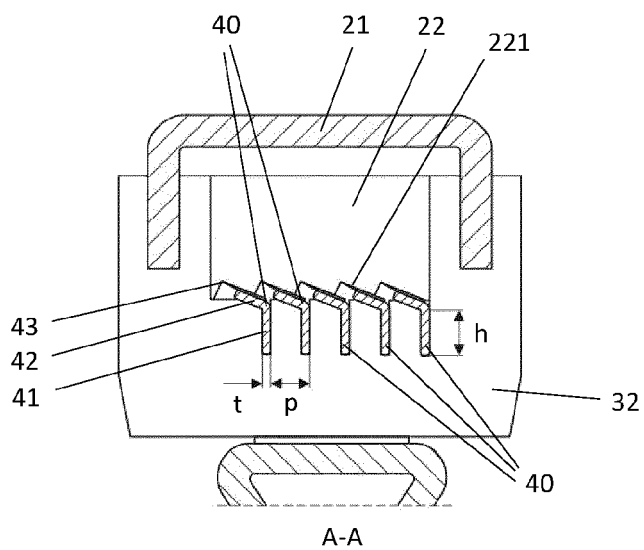
**Fig. 2b**



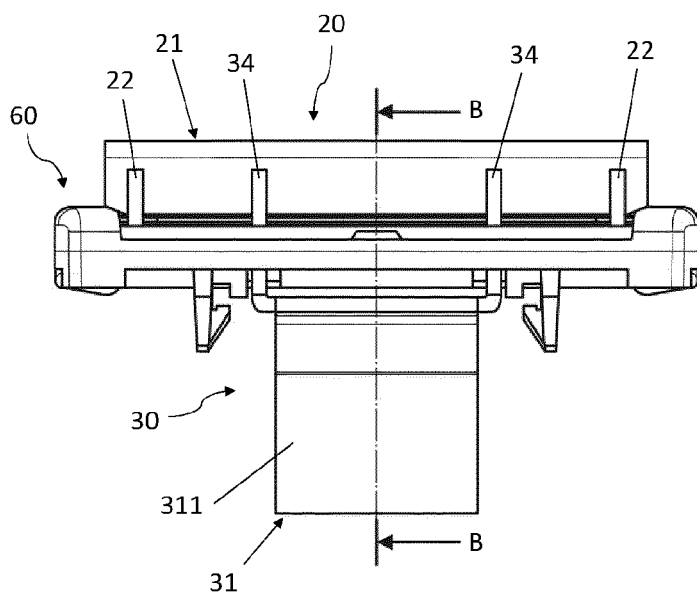
**Fig. 2c**



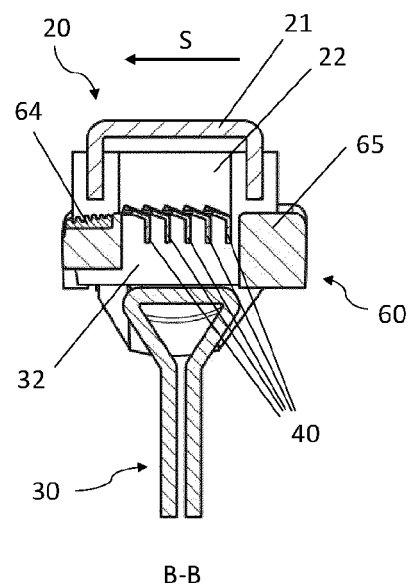
**Fig. 3a**



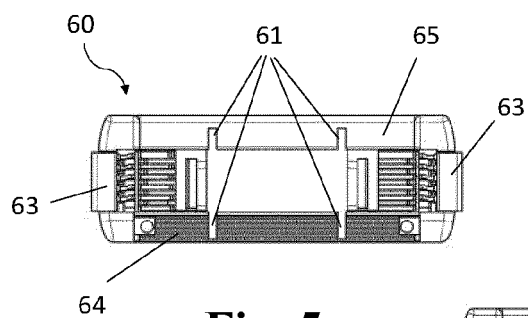
**Fig. 3b**



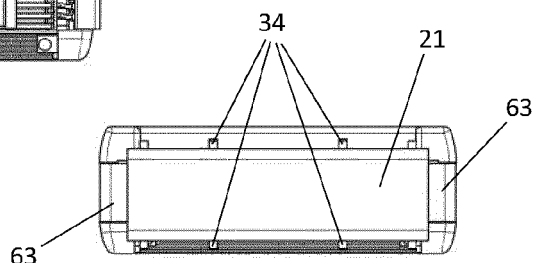
**Fig. 4a**



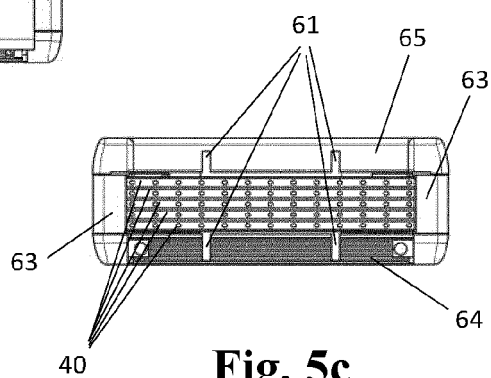
**Fig. 4b**



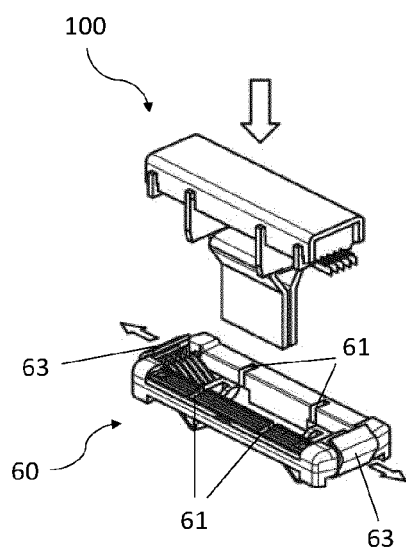
**Fig. 5a**



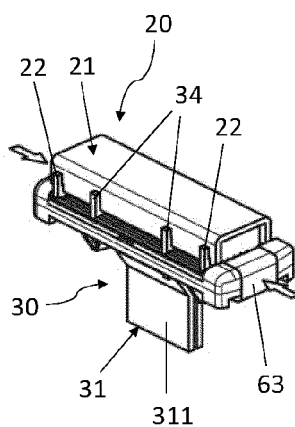
**Fig. 5b**



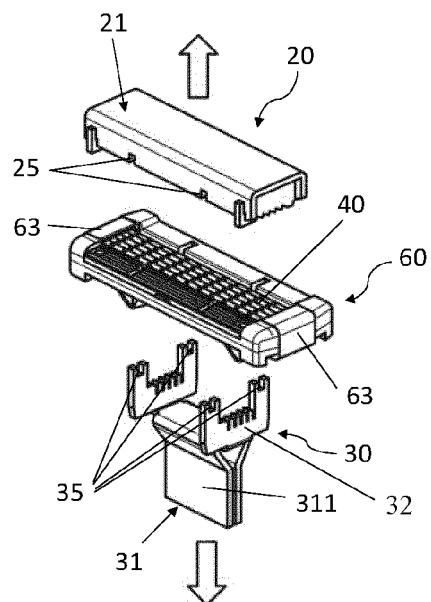
**Fig. 5c**



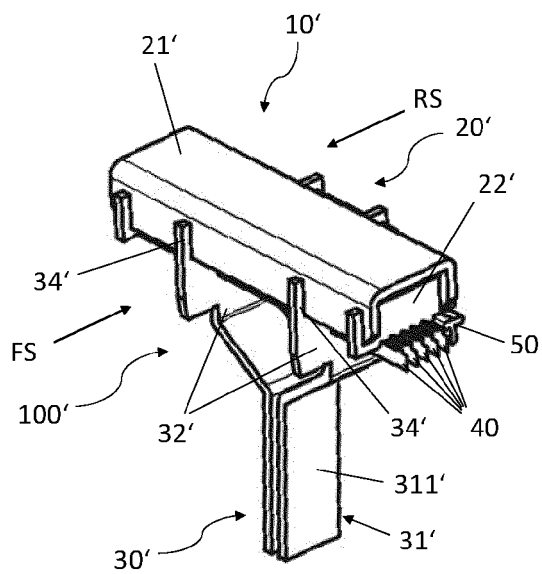
**Fig. 6a**



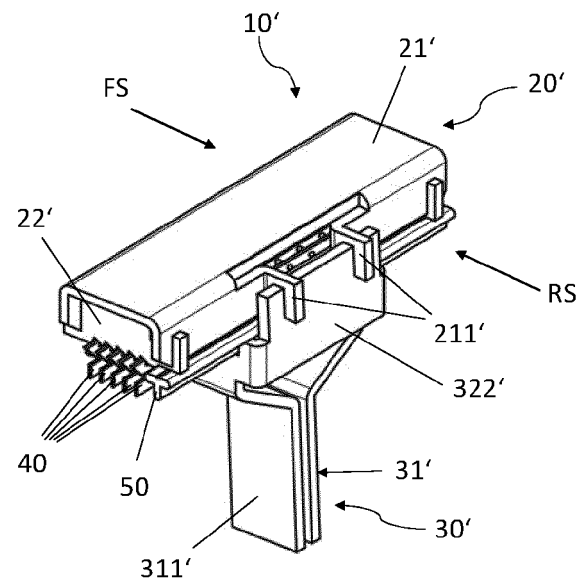
**Fig. 6b**



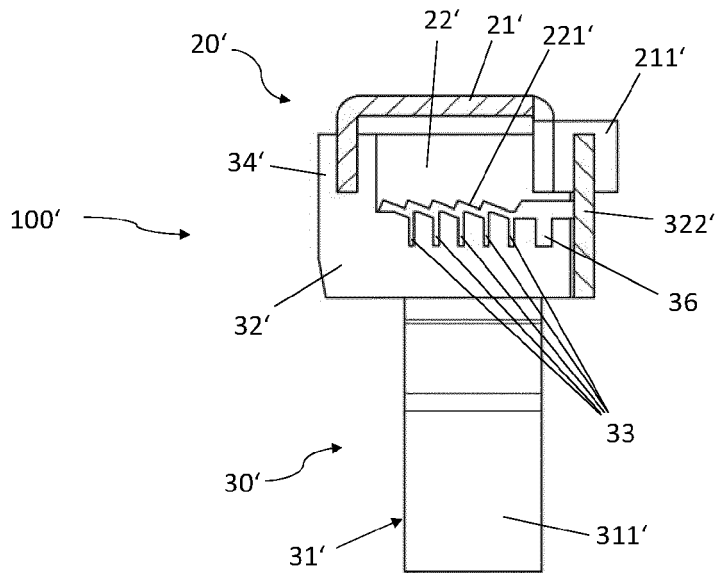
**Fig. 6c**



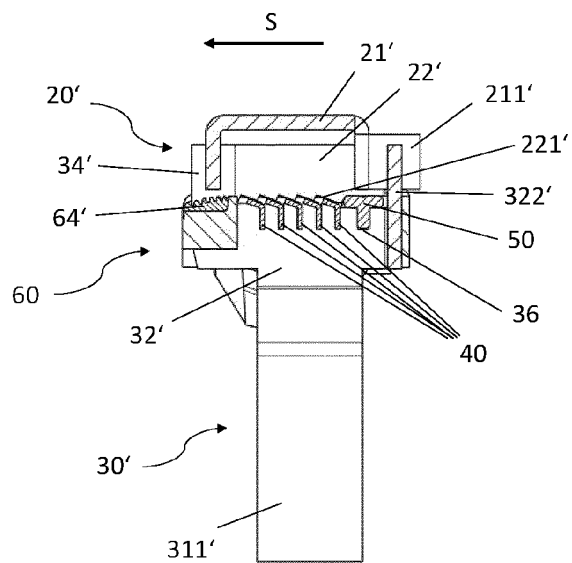
**Fig. 7a**



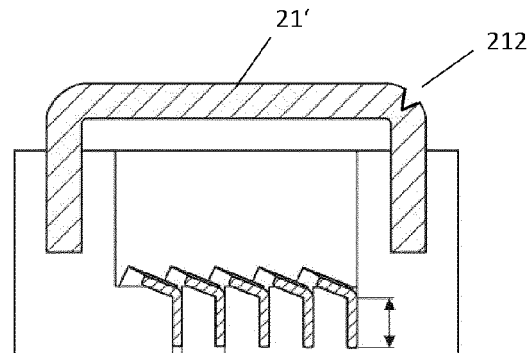
**Fig. 7b**



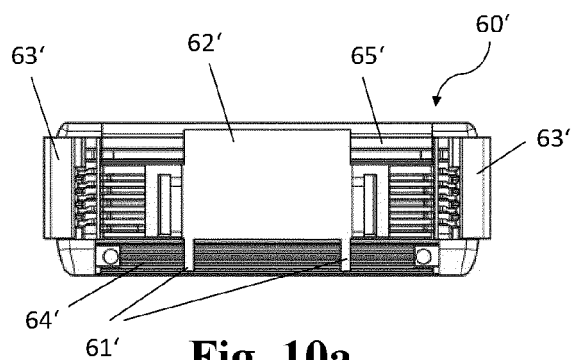
**Fig. 8**



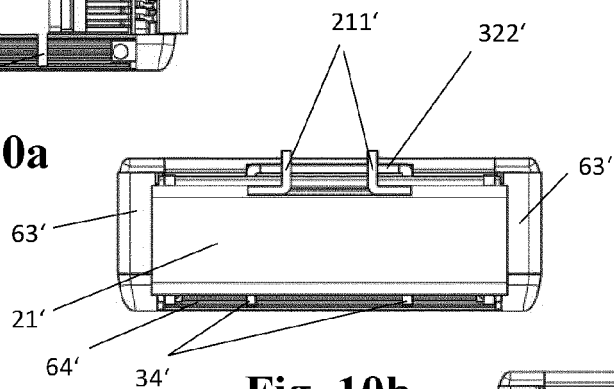
**Fig. 9a**



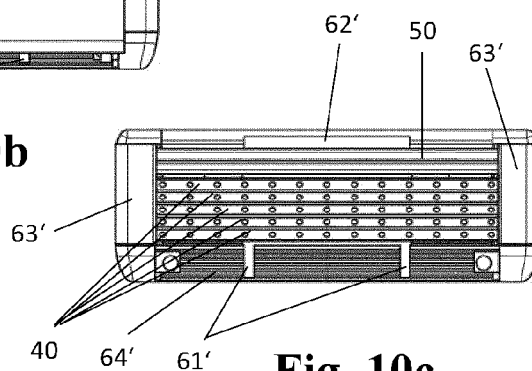
**Fig. 9b**



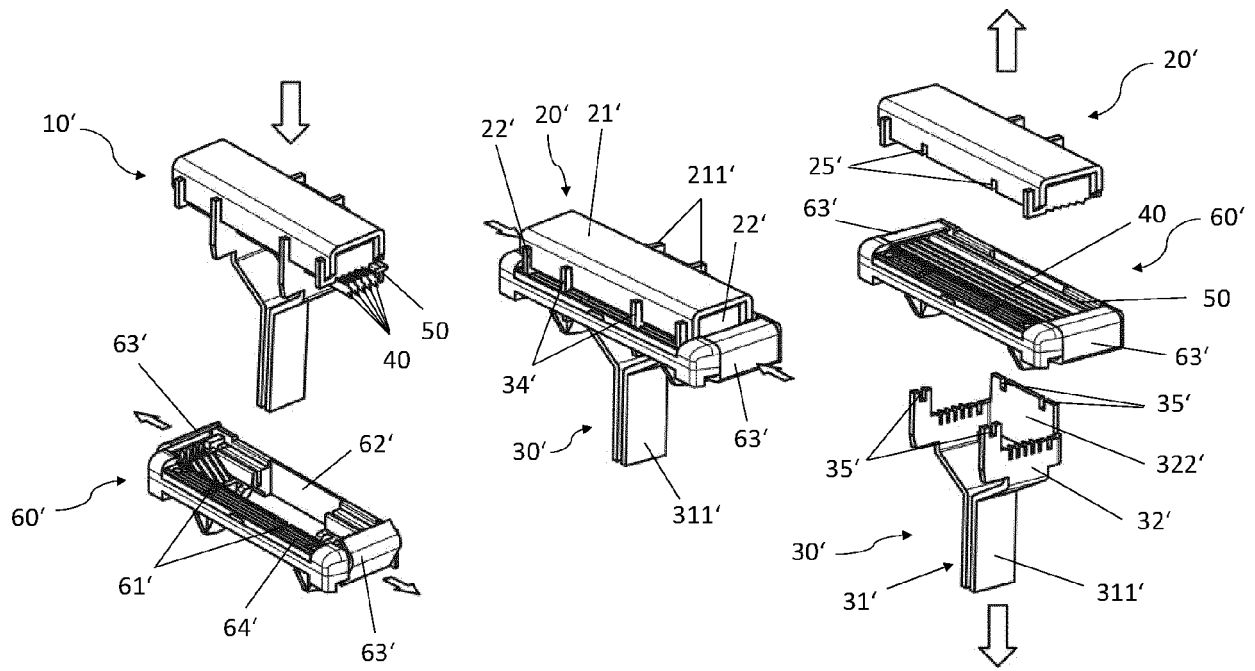
**Fig. 10a**



**Fig. 10b**



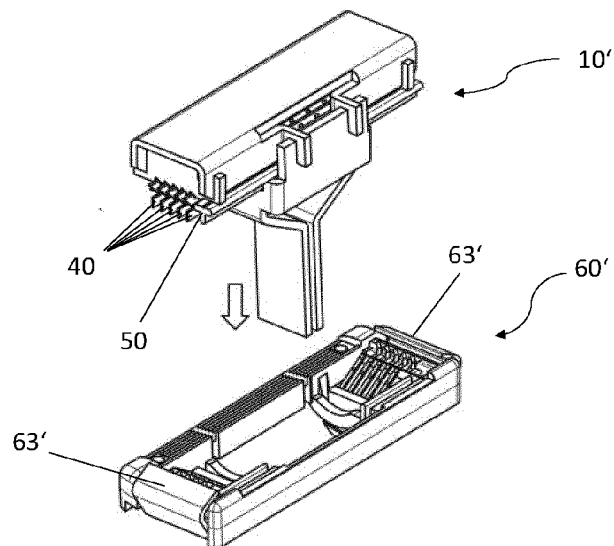
**Fig. 10c**



**Fig. 11a**

**Fig. 11b**

**Fig. 11c**



**Fig. 12**





## EUROPEAN SEARCH REPORT

Application Number

EP 22 21 2747

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category                                                                                                                                                                                                                | Citation of document with indication, where appropriate, of relevant passages                                                | Relevant to claim                                                                                                                                                                                                                                                            | CLASSIFICATION OF THE APPLICATION (IPC) |
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| The present search report has been drawn up for all claims                                                                                                                                                              |                                                                                                                              |                                                                                                                                                                                                                                                                              |                                         |
| Place of search                                                                                                                                                                                                         |                                                                                                                              | Date of completion of the search                                                                                                                                                                                                                                             | Examiner                                |
| Munich                                                                                                                                                                                                                  |                                                                                                                              | 9 May 2023                                                                                                                                                                                                                                                                   | Calabrese, Nunziante                    |
| CATEGORY OF CITED DOCUMENTS                                                                                                                                                                                             |                                                                                                                              | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                         |
| X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                                                                              |                                                                                                                                                                                                                                                                              |                                         |

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 22 21 2747

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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