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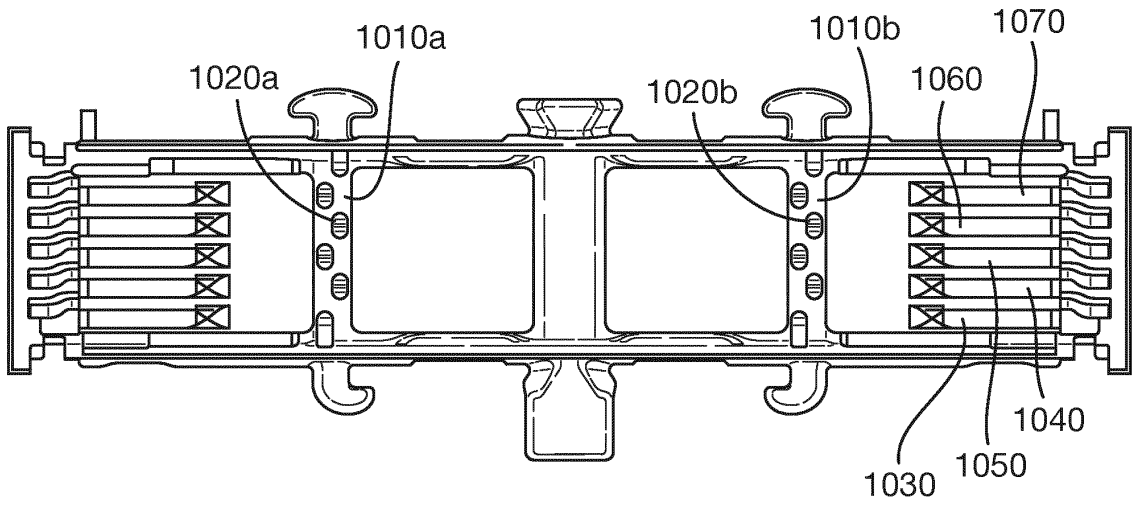
(54) **Razor cartridges**

(57) A razor cartridge having a housing comprising a front and a rear. At least one blade is disposed within the housing the blade having a cutting portion with a cutting edge directed towards the front of the housing and a supporting portion positioned at an angle relative to the cutting portion. The supporting portion and cutting portion are formed out of a single sheet of material. At least two supports spaced apart from one another are provided in the housing, each support extending from one of the front or rear of the housing in a direction towards the other of the front or rear of the housing. The supports each comprise a base and at least one protrusion extending from the base. At least one protrusion of each support is configured to contact the supporting portion of the at least one blade.

Fig. 10



EP 2 823 941 A1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to razor cartridges.

BACKGROUND OF THE INVENTION

[0002] There are a multitude of razors and razor cartridges currently on the market that have been fine tuned over the years to ensure they provide a close and comfortable shave. More recent razor cartridges onto the market tend to have multiple blades (for example, 3, 4, 5 or 6). Increasing the number of blades tends to improve the closeness and comfort of a shave, but leads to other problems, for example, the size of a cartridge or the rinsability of shaving debris etc from blades. Razor cartridges found on the market predominantly fall within two general categories: i) multi-blade cartridges where the blade is welded to an angled blade support, and the blade support is supported within the housing of the razor cartridge; ii) stacked blades, where blades are either welded to each other (with a spacer located between to provide a gap) or blades are adhered directly to a plastic frame. Both of these categories involve complex and precise manufacturing processes, as a number of steps are required to position the blades accurately within a cartridge.

[0003] Recently, razors have been introduced on the market where instead of welding blades to a blade support, the blade and blade support are formed of a single piece of material. Without the requirement of welding the blade to a blade support, the manufacturing process is made much simpler. However, such single-piece blades are typically thinner than conventional blade assemblies where the blade is welded to a blade support, leading to other problems with stability of the blades. Specifically, thinner blades are more prone to flexing during use, which can lead to an increased risk of skin irritation caused by nicks and cuts during shaving.

[0004] There remains a need, therefore, to develop a razor cartridge that provides for an easier manufacturing process without compromising on the more fundamental aspects of a razor cartridge that affect a consumer's experience - such as closeness and comfort of a shave.

SUMMARY OF THE INVENTION

[0005] According to a first aspect, there is provided a razor cartridge comprising a housing comprising a front and a rear, at least one blade disposed within the housing, the blade comprising a cutting portion having a cutting edge directed towards the front of the housing; and a supporting portion positioned at an angle α relative to the cutting portion, wherein the supporting portion and cutting portion are formed out of a single sheet of material; and at least two supports spaced apart from one another, each support extending from one of the front or rear of the housing in a direction towards the other of the front or rear of the housing, the supports each comprising a base, and at least one protrusion extending from the base, wherein said at least one protrusion of each support is configured to contact the supporting portion of said at least one blade.

[0006] By using a blade having a cutting portion and supporting portion formed integrally of the same material, the effort required to manufacture a razor cartridge is reduced, and the amount of material used to manufacture the cartridge is also reduced - thereby resulting in a much cheaper manufacturing process overall. However, by using a single sheet of material, the blades are more prone to flexing when under force (i.e. during shaving) resulting in "chatter" (front-to-back movement of the blade when in use). To compensate for this, at least two contact points are provided between the supporting portion of the blade and the supports across the length of each blade.

[0007] In a preferred embodiment, the razor cartridge comprises at least two blades, each having a cutting edge directed towards a front of the razor cartridge, wherein there is a blade span of less than 1.0 mm between at least two adjacent cutting edges.

[0008] Having a relatively narrow span between adjacent blade edges reduces the bulge of skin between adjacent blades, thereby reducing the likelihood of skin irritation caused by nicks and cuts. Historically, the increased comfort resulting from such a narrow span would have been countered by the reduction in space between blade assemblies and supports which would negatively affect wash-through. The problems associated with wash-through would likely be amplified by the chatter of adjacent blades as shaving debris and hair is more likely to become trapped between blades if they are constantly moving relative to one another. By contrast, blades of the present invention are better supported by having multiple contact points with a support extending from the housing and by using blades formed of a single piece of material (i.e. not having a separate blade and blade support), the amount of material between adjacent blades is reduced allowing for better wash-through when the razor cartridge is in use.

[0009] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. Although methods and materials similar or equivalent to those described herein can be used in the practice or testing of the present invention, suitable methods and materials are described below.

[0010] Other features and advantages of the invention will be apparent from the following detailed description, and from the claims.

BRIEF DESCRIPTION OF DRAWINGS

[0011] While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as forming the present inven-

tion, it is believed that the invention will be better understood from the following description which is taken in conjunction with the accompanying drawings in which like designations are used to designate similar or substantially identical elements, and in which:

FIG. 1A is a perspective view of a razor blade assembly having five blades.

FIG. 1B is a side view of a blade of the present invention.

FIG. 2 is a top view of the internal housing of a razor cartridge of the present invention, incorporating three supports.

FIG. 2A is a top view of a support showing protrusions in accordance with the present invention.

FIG. 3 is a schematic side view of a support of the present invention, showing a blade in a rest position during use.

FIG. 3A shows the blade of FIG. 3 when in use and deflected out of its rest position.

FIGs. 4, 5, 6 and 7 show a top view of a support of the present invention showing illustrating different protrusion shapes.

FIG. 8 is a perspective view of a support with two columns of protrusions in a linear arrangement.

FIG. 9 is a perspective view of a support with protrusions in an angled linear arrangement.

FIG. 10 is a top view of the internal housing of a razor cartridge showing an alternative configuration of support compared with that shown in FIG. 2.

FIG. 11 is a cross-sectional side view of a razor cartridge of the present invention showing the relative positioning of the blades and housing.

DETAILED DESCRIPTION OF THE INVENTION

[0012] With reference to the attached drawings, FIG. 1A shows a razor blade cartridge or unit 10 intended for fixing to a razor handle (not shown). In embodiments, the razor blade cartridge 10 is intended to be permanently fixed to the handle, for example, where the razor is a disposable razor. Alternatively, the razor blade cartridge 10 may be removably attached to the handle by a connecting member 35 such that the cartridge alone may be replaced and disposed of when necessary.

[0013] In the embodiment shown in in FIG. 1A, razor cartridge 10 includes housing 12, guard 14 at the front of housing 12, cap 2 at the rear of the housing 12 and five blades 18, 20, 22, 23, and 25 disposed between the guard 14 and the cap 2. Primary blade 18 is nearest the guard, second blade 20 is next nearest the guard, and so on until the fifth blade 25 that is furthest from the guard. As shown in FIG 1B, each blade is formed of a cutting portion 30 having a cutting edge 34 at one end, and a supporting portion 40, extending at an angle α from the other end of the cutting portion 30. The cutting portion 30 and supporting portion 40 are formed of a single piece of material, forming a "bent blade". This is in contrast to razor cartridges currently found on the market, such as the Gillette® Fusion®, where a much smaller flat blade with cutting edge is welded to a bent blade support formed of a separate piece of material.

[0014] The cutting portion 30 of each blade has a cutting edge 34 and a tip 36. Each blade further has a front and back side 31a and 31b respectively. The thickness T of a blade is determined by the distance between the front and back sides of the blade and typically is between 0.07 and 0.12mm. By using a bent blade vs a blade welded to a blade support, less material is required for the blade. This is beneficial from a manufacturing point of view and it improves wash-through conditions in the cartridge by providing a larger gap between the supporting portion of adjacent blades through which shaving preparation, debris and the like can pass through when the cartridge is rinsed. However, the disadvantage of reducing the overall thickness of a blade is the degradation in stability of the blade. In particular, thinner blades are more prone to vibration/movement during use resulting in "chatter" between adjacent blades or between a blade and the guard or cap. This increase in movement and vibration of the blades can lead to discomfort to the user and it can negate the previously mentioned wash-through benefits since, during use, there will be times when the blades are closer together.

[0015] Accordingly, as shown in FIG. 2, at least two supports 72 are provided, extending from either the front or rear of the housing. It will be appreciated that although three supports 72 are shown, there may be two, four or more supports 72 provided in the cartridge. The supports 72 are spaced apart from one another, preferably at regular intervals across the width of the cartridge, to provide even support and regular touch points for the respective blades. By spacing the supports 72 apart from one another, gaps 73 are still provided between them through which water can flow when the cartridge is rinsed. As shown close-up in FIG. 2A, the supports 72 have a base 75 and a plurality of protrusions 74 extending from the base 72. In a preferred embodiment, the number of protrusions corresponds to the number of blades held within the razor cartridge. In an alternative embodiment, there may be more protrusions than blades. In a preferred embodiment, there are two more protrusions than the number of blades being held. In an alternative embodiment, there may be fewer protrusions than blades, in which case not all the blades are supported by the support. For example, in a particular embodiment of a razor cartridge having three blades, protrusions may be provided to support the second and third blade but not the first.

[0016] When the cartridge is assembled, each protrusion will contact the front 31a or back 31b side of the supporting portion 40 of at least one blade. For example, in a cartridge intended to carry five blades (as shown in FIG. 2A), six protrusions 74 are provided. At least four of the protrusions 74 are intended to make contact with the front or back side of the supporting portion of at least

one blade when the blades are in an at rest position. Two additional end protrusions 76c are provided. These end protrusions 76c do not necessarily make contact with the supporting portion of a blade when in a rest position. However, during use for shaving, as the blades are displaced from their original positions, they will rock back into contact with the end protrusions that accordingly serve to prevent excessive motion of these blades adjacent the guard and cap. Likewise one or more of the other protrusions may contact a different blade when in use compared to in a rest position. Additionally and/or alternatively, a single protrusion may contact just one blade when in a rest position and two blades when in use. This is illustrated in FIGS. 3 and 3A. When a user shaves with the razor cartridges, the blades may be deflected from their original rest positions abutting a particular protrusion and may be pushed back within the cartridge until they abut an adjacent protrusion. For example, FIG. 3 shows a blade in a rest position, where a rear side of the supporting portion is in contact with one protrusion. FIG. 3A shows the same blade in a deflected position while in use and it can be seen that if it were deflected further, a front side of the supporting portion would come into contact with an adjacent protrusion, preventing further motion in that direction. In this case, a single protrusion may provide support to two blades when in use.

[0017] Alternatively, the protrusions 74, including the end protrusions 76c, can be positioned such that, in a rest position, one protrusion makes contact with the front side of the supporting portion of a blade and another protrusion makes contact with the back side of the supporting portion of the same blade. In this embodiment, there is little to no room for the blade to move when being used to shave.

[0018] In an embodiment, the protrusions 74 are positioned in a single row along the length of the base of the support. In an alternative embodiment, and as shown in FIG. 2A, two rows 78A and 78B of protrusions are provided that are off-set from one another such that adjacent protrusions in one row contact alternative blades. This embodiment with multiple rows off-set from one another is particularly preferable in the embodiment where two protrusions contact respectively the front and back sides of the supporting portion of a single blade. In this respect, providing contact sides at both the front and back of the supporting portion further reduces chatter of blades in the cartridge. Off-setting adjacent protrusions makes it easier to manufacture, particularly when the support is moulded. In this respect, the distance between adjacent protrusions is significantly greater where the rows of protrusions are off-set from one another, even though the gap within which a blade can sit remains the same.

[0019] The distance between adjacent protrusions 74 compared to the thickness T of the supporting portion (i.e. the distance from the front side 31a to the back side 31b of the blade) of respective blades determines the amount of flex and freedom to move a blade has when in use. In embodiments, the distance 76 between adjacent protrusions may be between 0.08mm to 0.18mm, preferably 0.08mm to 0.11mm. In this context, protrusions that contact adjacent blades are referred to as adjacent protrusions - they need not be in the same row.

[0020] Where the distance between adjacent protrusions is the same as the thickness T of the supporting portion of a blade, there will be little to no room for movement of the blade in the direction of travel of the cartridge when in use. By contrast, increasing the distance 76 compared to the thickness T of the blade support provides more room for the blades to flex when in use. In some cases, as shown in FIG. 2A, it may be desirable to vary the gaps between adjacent protrustions throughout the cartridge. For example, the distance 76b between the first two protrusions is less than the distance 76a between the subsequent two protrusions. In this respect, it may be desirable, for example, to allow blades towards the rear of the cartridge to move more than those towards the front of the cartridge or vice versa.

[0021] The protrusions 74 can be any shape size sufficient to provide support to the blades. In embodiments, respective protrusions may have widths w_p of, for example, between 0.1, 0.5, 1, 1.5, 2 to 2.5, 3, 3.5 to 5mm. Similarly, the protrusions may have depths d_p of between 1, 1.5, 2 to 2.5, 3, 3.5 to 4mm. In embodiments, the protrusions may have straight and parallel sides. However it will be appreciated that many forms of protrusion may be used, for example, the protrusions may be conical or formed in the shape of a pyramid where they are wider at the point of contact with the base than at the top of the protrusion. Where a pyramid or conical shape is provided, the gap between adjacent protrusions may be equivalent to the thickness of the supporting portion of a blade being held at the point of contact with the base, ensuring that the blade remains firmly in place, while the angular slope of the protrusion as it extends away from the base can be optimsed to allow a certain degree of movement of the blade during use. In a further alternative embodiment, the protrusions may be narrower at the base than at the point furthest from the base.

[0022] In some embodiments, each protrusion 74 is cylindrical or oblong, as shown in FIG. 4 such that the supporting portion of a blade extends along a tangent 39 of the tip 37 of the protrusion 74. As a result, there is a single line of contact between a blade and each protrusion within which it is in contact. Furthermore, rounded protrusions are generally less complicated to mold, manufacture and assemble than other shapes.

[0023] Other shapes/forms for the protrusions are illustrated in FIG. 5. In some embodiments, each protrusion has the same profile. Alternatively, as shown in FIGS. 6 and 7, different protrusions within the razor cartridge have different shapes and profiles depending on the particular control required from that protrusion. It will be appreciated that any other shape of protrusion or combination of shapes could be used to obtain the desired contact at the intersection of the protrusion and blade.

[0024] Though the slalom-like arrangement of protru-

sions (e.g. as shown in FIGs. 2 to 4) provides a stable, easy-to-manufacture design, referring now to Figs. 8 and 9, protrusions 74 in base member 72 may be laid out in several different ways as described below.

[0025] In FIG. 8, rather than a slalom-like arrangement, a linear column of protrusions 74 is shown. In FIG. 9, a layout of two linear columns of protrusions 74 are shown in accordance the present invention.

[0026] FIG. 2 illustrates an embodiment of the support that extends from the front of the cartridge housing to the rear of the cartridge housing. In an alternative embodiment, the support may extend only part-way across the housing, provided it still has sufficient protrusions extending therefrom that are configured to contact the supporting portion of blades disposed within the cartridge.

[0027] Three supports are shown in FIG. 2. However, it will be appreciated that the number of supports may be varied depending on the width of the cartridge. For example, in a smaller cartridge, fewer supports may be required and conversely, in a wider cartridge, more supports may be required. In an embodiment, adjacent supports are spaced apart by between 0.4mm, 1.0mm or 2.0mm to 2.5mm, 3.5mm or 5.0mem.

[0028] As shown in FIG. 2, the cartridge housing has side walls 80, 82 disposed at either end of the cartridge extending between the front and rear of the housing. Slots 84 are provided within these side walls within which the blades may be disposed. In some embodiments, for example, that shown in FIG. 2, spring fingers 86 extend from the side walls 80, 82 upon which the blades may rest. In use, as the blades are deflected, the spring fingers 86 serve to bias the blades back into their original positions.

[0029] As the blades can, in part, be supported by the slots provided in the side walls, in a preferred embodiment, the supports are positioned away from the spring fingers and the side walls of the housing. Preferably, each support is positioned a distance of at least 3mm, 3.5mm or 4mm to a third of a length of the blade away from the side walls. Accordingly, in embodiments where there are two supports as shown in FIG. 10, the supports may be positioned such that each blade has a contact point at either end of the blade (by the slots) and at regular intervals along the length of the blade (by the support).

[0030] As shown in FIGS. 2 and 10, there may be more than one (e.g., two, three, or more) base members 72 per cartridge in the present invention, in which case, they can be, but need not be, equally spaced along the width of the razor cartridge (typically corresponding to the length of the blades or blade assemblies).

[0031] In a preferred embodiment, each support has a corresponding number of protrusions and the members are positioned such that the protrusions are aligned. Thus a blade would be contacted and supported by a protrusion on each of the supports.

[0032] One or more supports may be formed of the same material as the housing. In embodiments, the supports and the housing are formed as a single unit, thus adding stability to the housing of the cartridge. Preferably, the housing and supports are formed of plastic, such as polystyrene, ABS, polypropylene, polyamides, polyphenylenes, Noryl® (a polyphenylene oxide-styrene blend), or Noryl GTX® (a blend of polyamids (PA) or polyphenylene ether polymer (PPE)).

[0033] The base members 72 can be either flexible or rigid, and can be fitted as a separate part or integrally molded as part of the cartridge housing 12.

[0034] Much like the base member 72, the protrusions 74 can be configured as flexible or rigid, but may be desirably rigid, and made from any kind of material, such as elastomeric, plastic or metal. If non-rigid protrusions are desired, materials such as polyethylenes, thermoplastics, elastomers, or rubbers may be utilized. With rigid protrusions, plastics such as polystyrene, ABS, rigid polyvinylchloride (PVC), polyamides, polyphenylenes, Noryl® (a polyphenylene oxide-styrene blend), or Noryl GTX® (a blend of polyamide (PA) or polyphenylene ether polymer (PPE))) may be utilized. Either one, or both of the base member and protrusion may be designed to be resilient but flexible in order to absorb forces effectively.

[0035] FIG. 1B shows an exemplary blade, having a cutting portion (30) angled relative to the supporting portion (40). The angle α between the cutting portion (30) and supporting portion (40) may be between 60°, 65° or 70° and 75°, 80° or 88°.

[0036] Within the cartridge, the blades are positioned typically having the blade edge directed towards the front of the cartridge. As mentioned above, in the embodiments shown in the present application, a guard 14 is provided at the front of the cartridge and a cap 2 is provided at the rear of the cartridge. However, it will be understood that in an alternative embodiment, the respective positioning of the guard and cap may be reversed or the guard may be formed separately to the housing and mounted directly to the razor handle.

[0037] The guard and cap respectively provide a first skin contact point at the front of the cartridge and a second skin contact point at a rear of the cartridge. A skin contact plane P_s is defined tangential to the guard and cap. As shown in the drawings of this application, the blades typically lie below the skin contact plane, though in some cases, the tip of the blade may lie in or above the skin contact plane.

[0038] A span δ_s is defined as the distance between adjacent blade edges, as shown in FIG. 11. Further spans δ are defined between the guard and first blade of the cartridge and the final blade in the cartridge and the cap. The span between adjacent blade edges may be less than 1.0mm. In a preferred embodiment, there is a span of less than 0.9mm, preferably less than 0.7mm between adjacent blade edges. The use of blades of the present invention together with multiple spaced apart supports ensures maximum amount of wash-through between the blades without compromising on the comfort and safety of the shave. In this respect, as the span between adjacent blade edges is reduced, the space between the sup-

porting portion of adjacent blades is likewise reduced. However, the reduction in material of the blades of the present invention vs traditional blade assemblies with blades welded to blade supports allows for better wash-through conditions, even in a cartridge with narrow inter-blade spans. The supports provide sufficient support to the blades to reduce chatter of the blades in a way that further facilitates wash-through and ensures that the narrow and specific geometry between blades is not detrimentally altered while shaving.

[0039] Guard 14 is typically a unitary molded member that can be formed of a rigid plastic at the bottom (14A), and an elastomeric material at the top (14B). The elastomeric material is chosen to provide flexibility for ribs 66, e.g., as is described in detail in U.S. Patent Number 5,249,361. The tips of ribs 66 are typically in a plane that is about half-way between a plane that passes through the cutting edges of the blades 18, 20, 22, 23, and 25, and the top of clips 24, 26. The raised tips (relative to the cutting edges) may provide effective shielding of the blades and may also exert a traction force on the skin to stretch it and raise hairs before the primary blade, thus reducing overall cutting force.

[0040] During shaving, blades 18, 20, 22, 23, and 25 may be independently resiliently movable with respect to housing 12 in directions not towards one another, and housing 12 pivots with respect to the handle with the result that the cutting edges tend to follow the contours of the skin surface. Furthermore, it may be advantageous to set the blades to have different exposures, e.g., increasing exposure progressing from the primary blade to each subsequent blade, e.g., as is described in US Patent 6,212,777. Additionally, different blade spans can be set between groups of two adjacent elements that contact the skin, e.g., as also described in detail in US Patent 6,212,777.

[0041] According to some embodiments of the invention, a razor is provided, which generally comprises a razor cartridge according to the invention as described hereinabove, and a handle (or grip portion) permanently or removably attached to the cartridge. The razor can be manual or power driven and can be used for wet and/or dry application. The razor cartridge may be replaceable and/or pivotally connected to the handle (e.g. via a cartridge connecting structure) and in turn or independently (e.g. permanently fixed) to a handle. In some embodiments, the cartridge connecting structure includes at least one arm to releasably engage the razor cartridge.

[0042] A razor cartridge or razor of the present invention may be used for hair removal (especially shaving), or in a method of hair removal (especially shaving), the method comprising the steps of providing a razor cartridge or razor according to the present invention in any form, and passing the same over a surface of the body. The method may be a method of reducing vibration of one or more blades during hair removal or during shaving. Optional additional steps may include wetting the surface, washing the surface, applying one of various commonly known shaving preparations to the surface, (the preceding options typically occurring before passing the hair removal/razor cartridge or hair removal device/razor over the surface), rinsing the surface (which could occur prior to and/or after passing the hair removal/razor cartridge or hair removal device/razor over the surface), drying the surface and applying one of various commonly known post-shave compositions to the surface (the last two steps typically occurring after passing the hair removal/razor cartridge or hair removal device/razor over the surface)

[0043] The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm".

Claims

1. A razor cartridge (10) comprising:

a. a housing (12) comprising a front (4) and a rear (6);
b. at least one blade (18) disposed within the housing (12), the blade comprising:

i. a cutting portion (30) having a cutting edge (34) directed towards the front (4) of the housing; and
ii. a supporting portion (40) positioned at an angle α relative to the cutting portion (30), wherein the supporting portion (40) and cutting portion (30) are formed out of a single sheet of material; and

c. at least two supports (72) spaced apart from one another, each support extending from one of the front (4) or rear (6) of the housing (12) in a direction towards the other of the front or rear of the housing, the supports each comprising:

i. a base (75), and
ii. at least one protrusion (74) extending from the base,
wherein said at least one protrusion of each support is configured to contact the supporting portion (40) of said at least one blade.

2. A razor cartridge (10) as claimed in claim 1, comprising two or more blades and at least a corresponding number of protrusions (74) extending from each support (72), wherein at least one protrusion from each support is configured to contact the supporting portion of each blade.

3. A razor cartridge as claimed in claim 1, comprising two or more blades and more than a corresponding number of protrusions (74) extending from each support (72), wherein at least two protrusions (74) extending from each support are arranged to contact the supporting portion of each blade when in use for shaving.

4. A razor cartridge as claimed in claim 2 or claim 3, each support having at least two protrusions (74) extending from the base (75) of the support (72), wherein the protrusions are arranged in a row substantially in parallel with a length of the support.

5. A razor cartridge as claimed in claim 4, comprising at least two rows of protrusions (74) extending from the base (75) of the support (72), wherein protrusions in the at least two rows are off-set from one another such that adjacent protrusions in a single row are arranged to contact the supporting portion of alternate blades.

6. A razor cartridge as claimed in any of claims 2 to 5, wherein the gap 76 between adjacent protrusions in which a blade may be received is equal to or greater than the thickness T of the supporting portion of the blade, wherein the thickness is measured from a front side 31a to a rear side 31b of the blade.

7. A razor cartridge as claimed in claim 6, wherein the two or more blades have thickness of between 0.08mm and 0.18mm.

8. A razor cartridge as claimed in any preceding claim, further comprising two side walls (80, 82) disposed at either end of the cartridge extending between the front (4) and rear (6) of the housing, wherein the supports are positioned up to a third of the length of the cartridge away from the side walls.

9. A razor cartridge as claimed in claim 8, wherein the supports are positioned at least 3mm from either side wall.

10. A razor cartridge as claimed in any preceding claim, wherein the supports are positioned at regular intervals along the length of the cartridge.

11. A razor cartridge as claimed in any of claims 2 to 10, each blade having a cutting edge directed towards the front of the housing, wherein the distance between cutting edges of adjacent blades is 1.0mm or less.

Fig. 1A

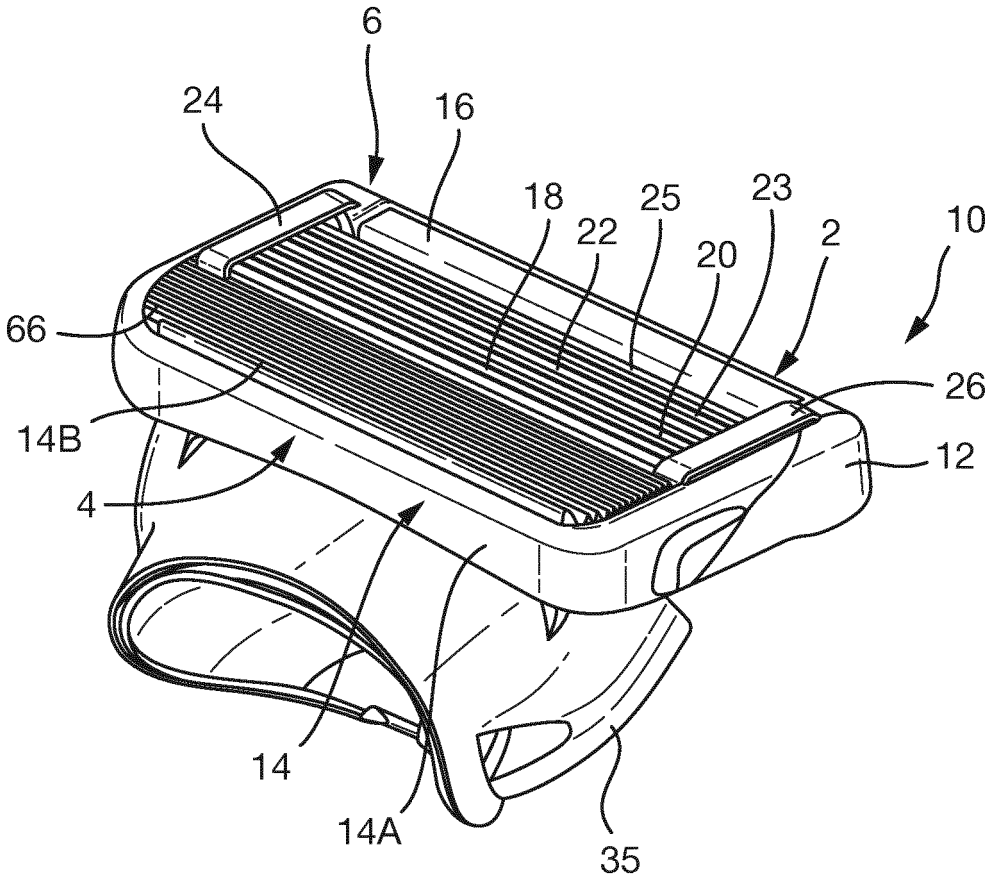


Fig. 1B

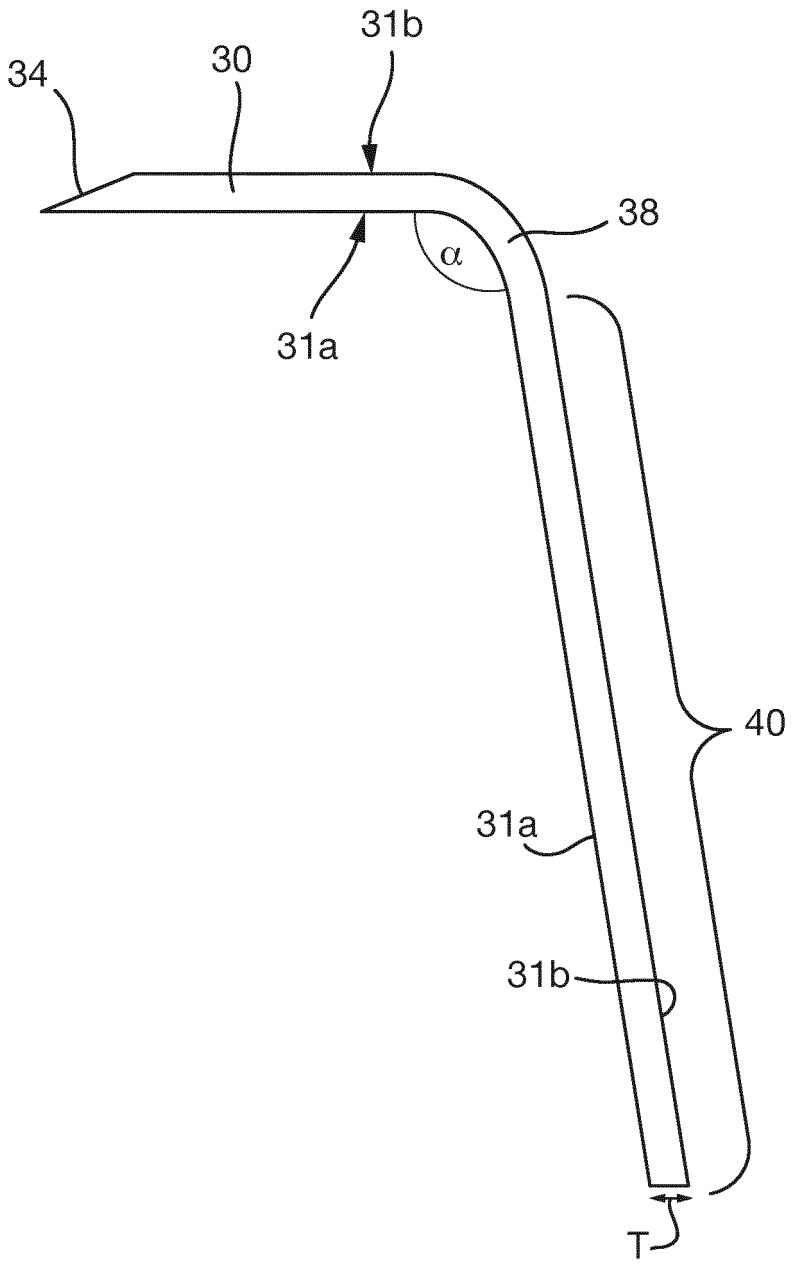


Fig. 2

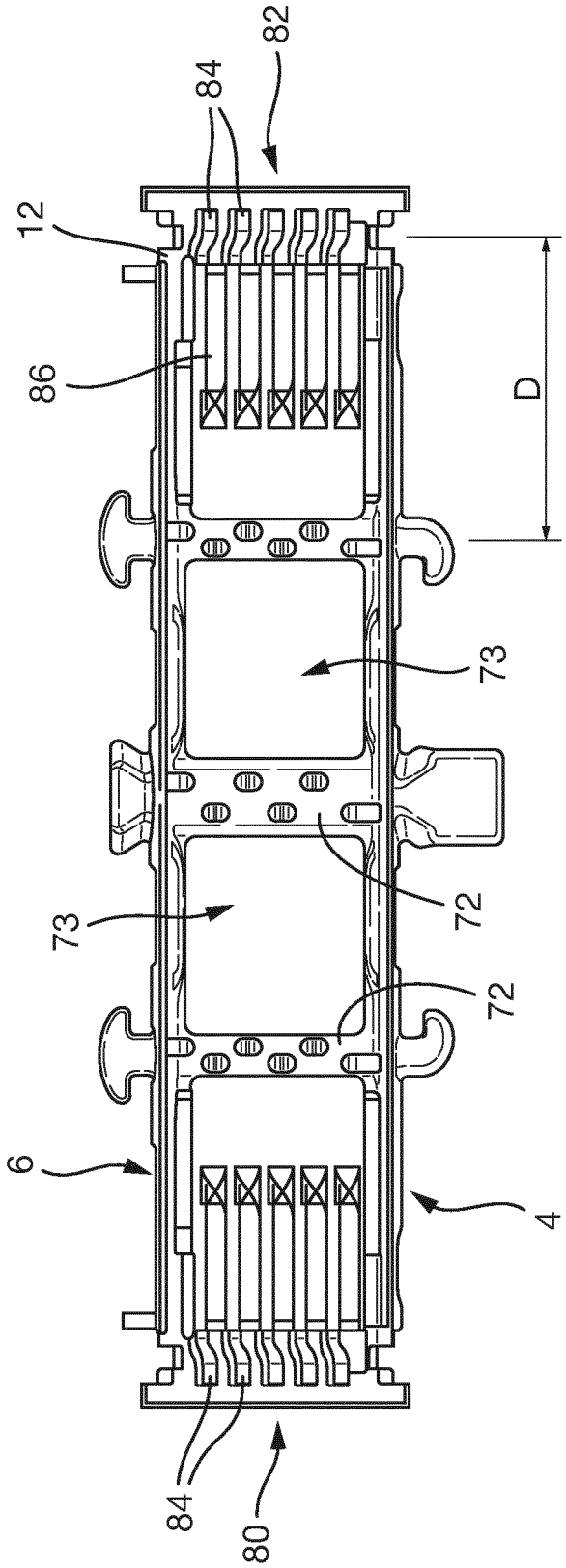


Fig. 2A

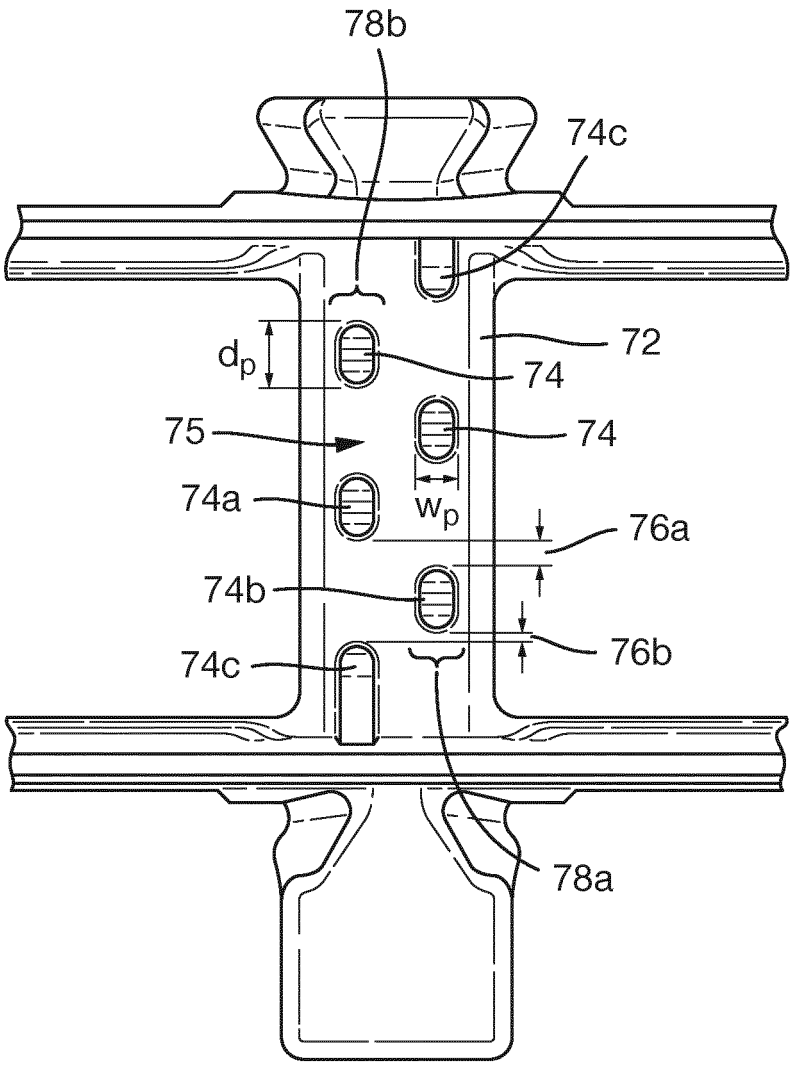


Fig. 3

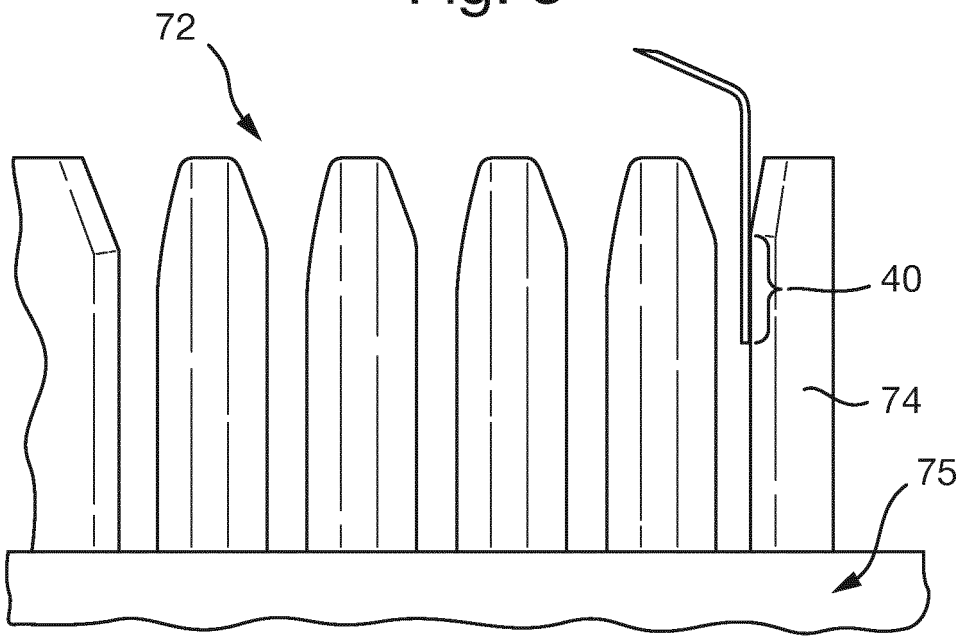


Fig. 3A

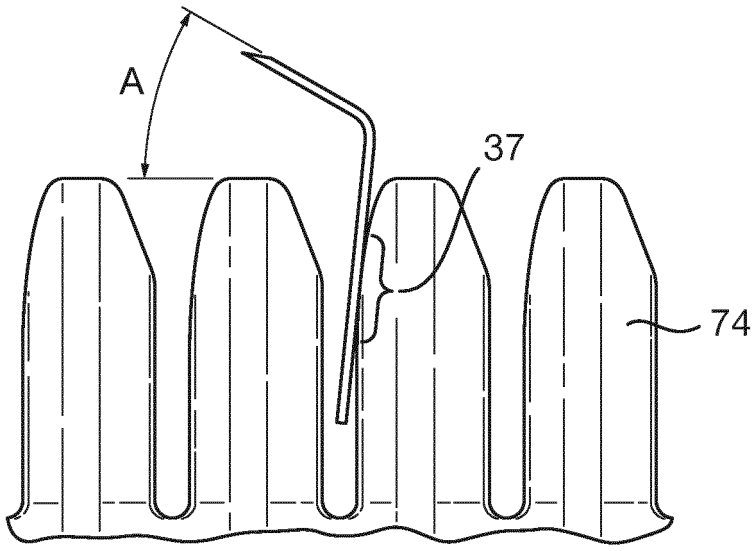


Fig. 4

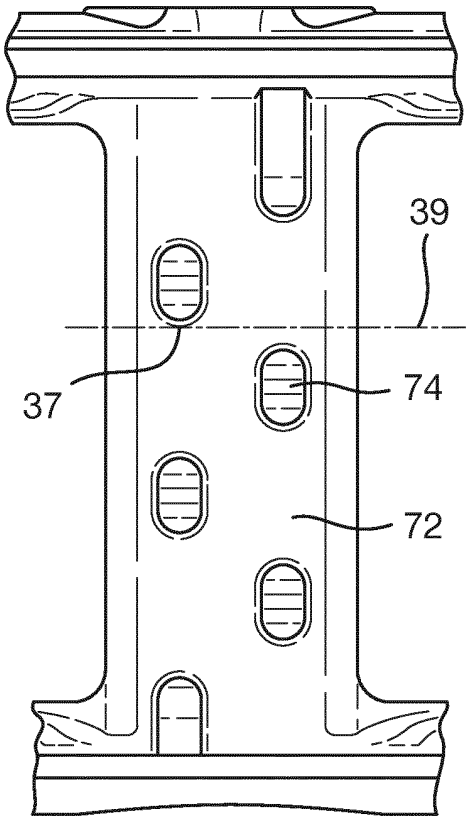


Fig. 5

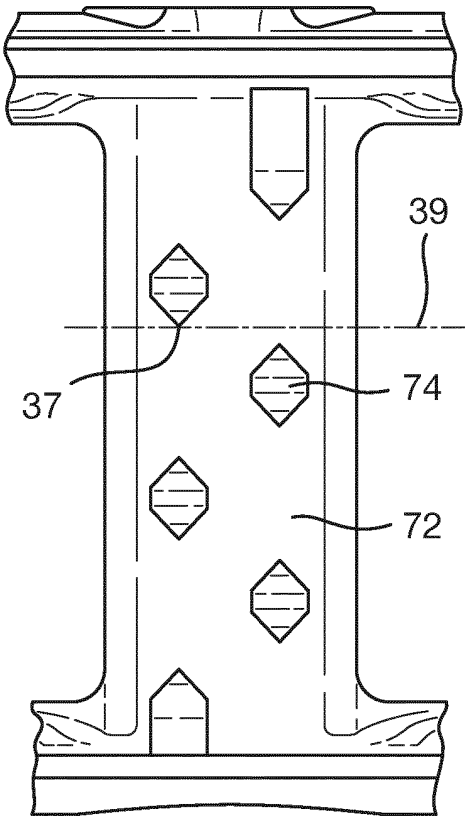


Fig. 6

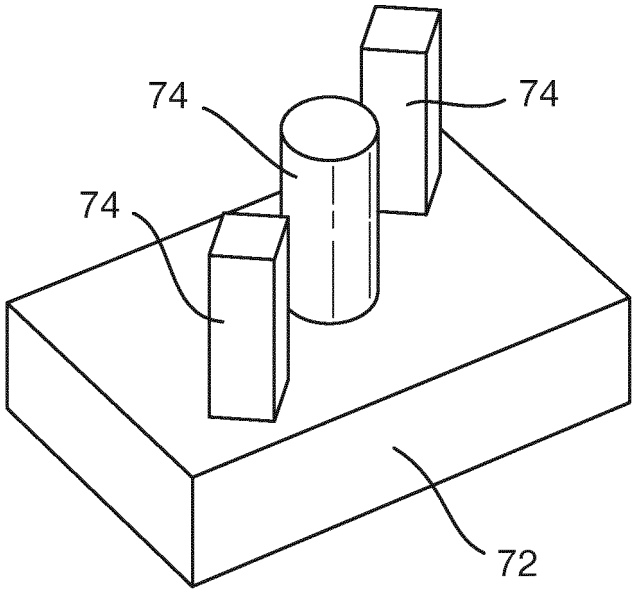


Fig. 7

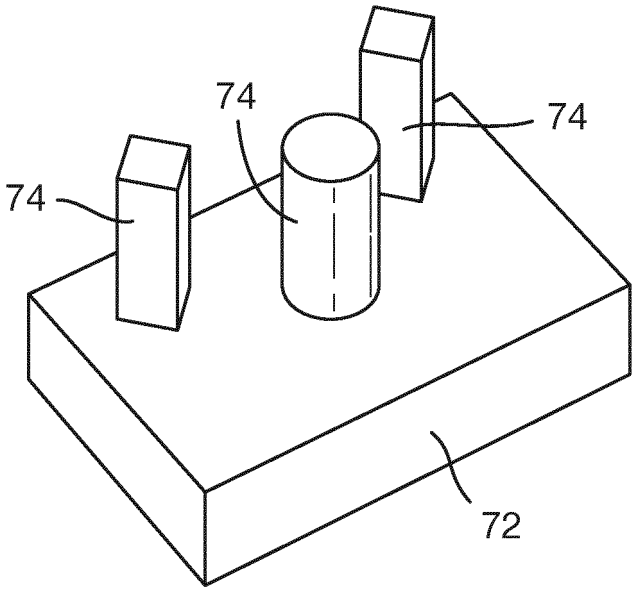


Fig. 8

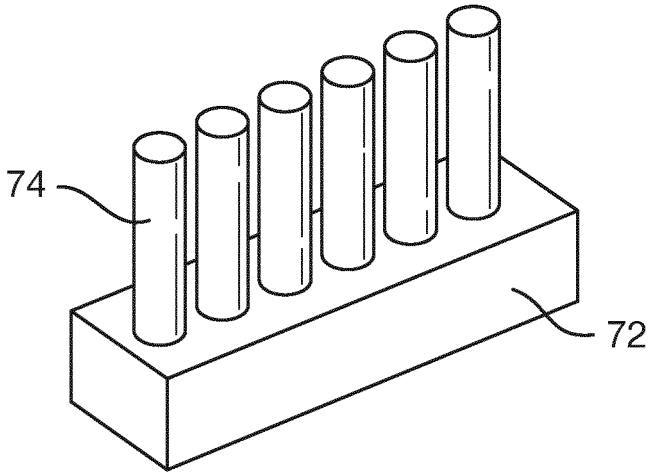


Fig. 9

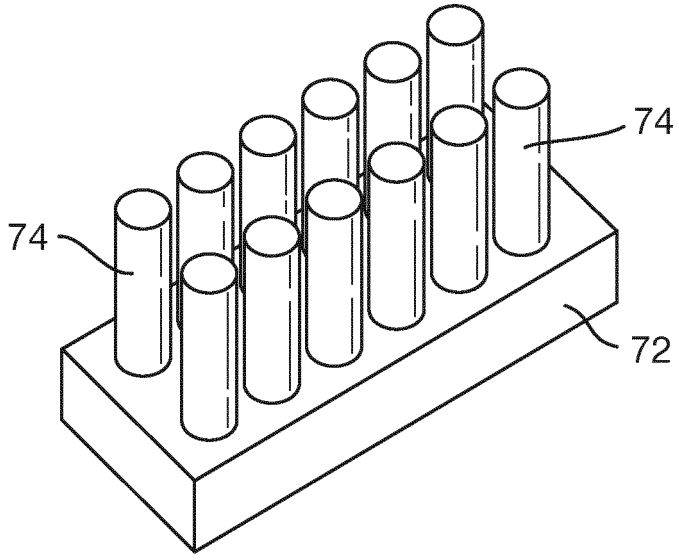


Fig. 10

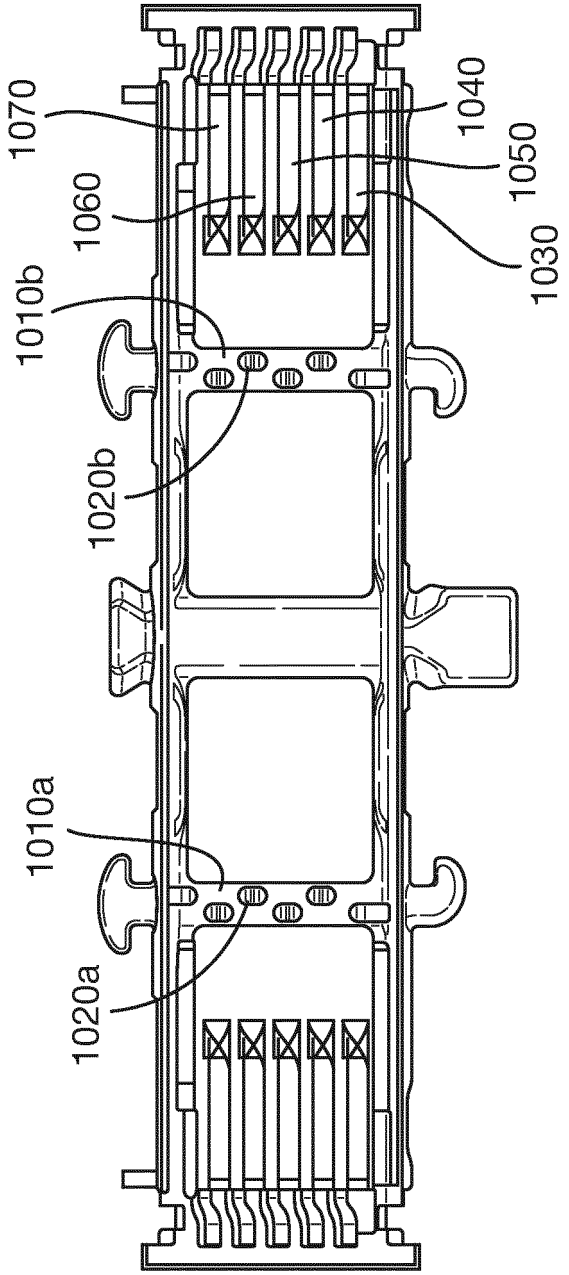
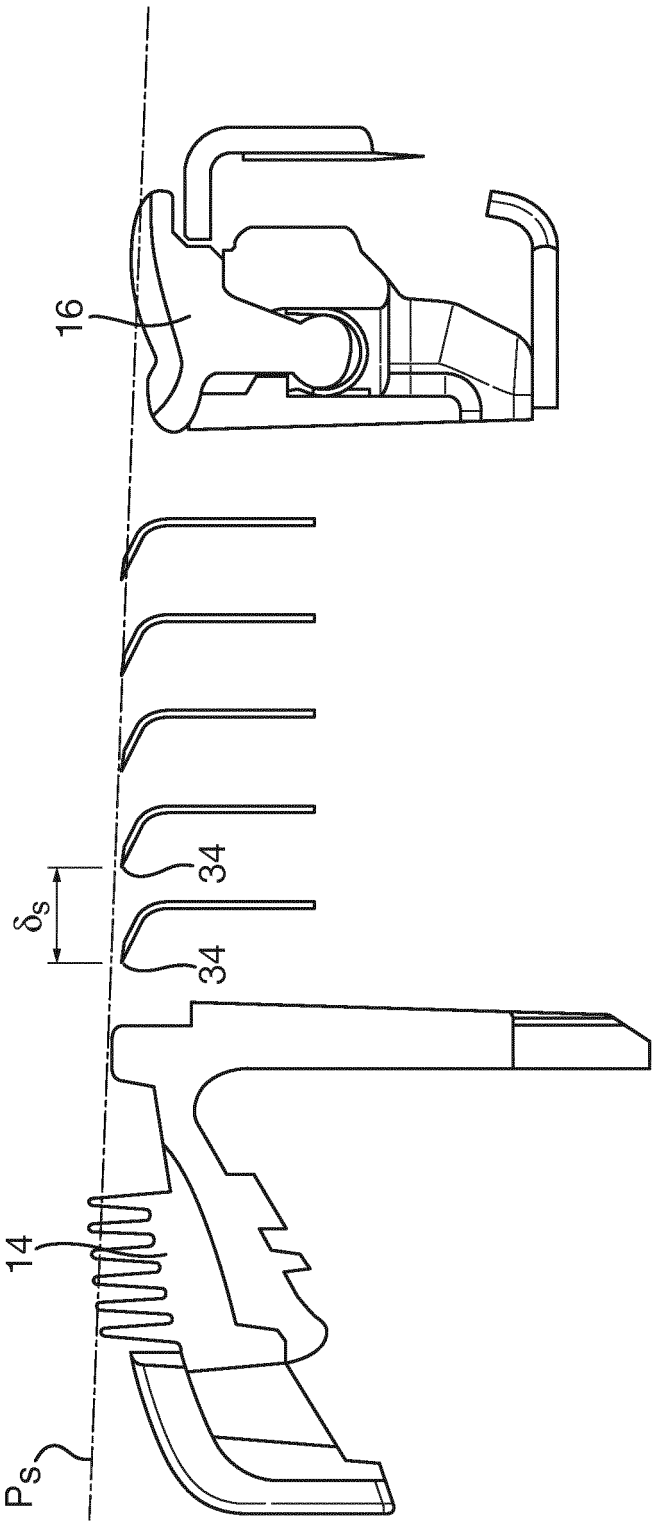


Fig. 11



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Application Number
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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 December 2013	Cardan, Cosmin

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