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(54) COUPLING ELEMENT, SLIDE FASTENER STRINGER AND SLIDE FASTENER

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Description

Technical Field

[0001] The present invention relates in general to slide fasteners, and in particular to a slide fastener with a connection mechanism whereby on the front face of the slide fastener the coupling elements do not appear to engage with each other and form a closely-packed arrangement, with an attractive aesthetic appearance and an improved operation.

[0002] In the present description and the annexed claims, reference is made to "front portions" and "rear portions" of the coupling elements, to indicate the portions of such elements, which in use, for instance in a garment, are visible from the outside and the inside thereof, respectively.

Related Art

[0003] International patent application publication WO2011/023956 A2 discloses coupling elements and a slide fastener.

[0004] Figures 3 and 4 of the annexed drawings show a coupling element 1 for use in a slide fastener according to WO2011/023956 A2, in side view and cross-sectional view, respectively.

[0005] In the present description and throughout the annexed drawings a coupling element is indicated by 1 in its open state, i.e. before it is attached to a fastener tape, and by 1' (with apostrophe) in its closed state, i.e. after it has been attached to a tape. The same convention also applies to each part of the coupling element(s).

[0006] With reference to Figure 3, the related art coupling element 1, shown therein in its open condition, comprises a connecting end portion 2, an anchoring end portion 3 and an intermediate portion 4, which are arranged adjacent each to the next one along a longitudinal axis L-L of the coupling element and ideally join at vertical planes indicated A-A and B-B, respectively.

[0007] The connecting end portion 2 includes a front portion 2f and a rear portion 2r. The anchoring end portion 3 includes a front portion 3f and a rear portion 3r. The intermediate portion 4 includes a front portion 4f and a rear portion 4r. The front portions 2f, 3f, 4f of the connecting end portion 2, the anchoring end portion 3 and the intermediate portion 4 extend above the longitudinal axis L-L. The rear portions 2r, 3r, 4r of the connecting end portion 2, the anchoring end portion 3 and the intermediate portion 4 extend below the longitudinal axis L-L.

[0008] As shown in Figure 4, when such a coupling element 1' is attached to a slide fastener tape T, the connecting end portion 2' faces away from the tape T, the anchoring end portion 3' faces toward the tape T, the front portions 2'f, 3'f, 4'f of the coupling element 1' extend on one side of the tape T and the rear portions 2'r, 3'r, 4'r of the coupling element 1' extend on another side of the tape T, which is opposite to the one side.

[0009] Still with reference to Figure 3, in the connecting end portion 2 the front portion 2f has a smooth front surface 2g, adapted to be juxtaposed to that of opposing coupling elements of a confronting fastener stringer, when the slide fastener SF is closed, to form therewith an essentially coplanar, closely-packed arrangement.

[0010] The smooth front surfaces 2g of the coupling elements 1 is rectangular in shape as shown in the drawings.

[0011] In the anchoring end portion 3 the front and rear portions 3f, 3r form respective leg members 3g, which extend away from the intermediate portion 4, and define a groove 5 therebetween. The leg members 3g are adapted to be clamped onto the edge of the tape T positioned in the groove, as shown in Figure 4.

[0012] The leg members 3g have respective distal, transverse projections 3h pointing to one another, which define an entrance passage 5a with a reduced transverse height to the groove 5.

[0013] In the connecting end portion 2' the rear portion 2'r comprises a coupling formation 2'h, which is for instance mushroom-shaped or essentially arrow-shaped, to be releasably engageable with that of opposing coupling elements 1'.

[0014] Before the coupling element 1 is attached to the tape T, the groove 5 of its anchoring end portion 3 has an essentially uniformly concave profile, as visible in Figure 3. Furthermore, the outer surfaces of the front and rear portions 3f, 3r of the leg members 3g diverge with respect to one another, away from the intermediate portion 4, and form an obtuse angle α with respect to the outer surfaces of the front and rear portions 2f, 2r of the connecting end portion 2 (see Figure 3).

[0015] The coupling element 1 can be made of a plastically deformable material, in particular a metal material, such that the leg members 3g of the anchoring end portion 3 thereof can be clamped, by means of appropriate, per se known, tools, onto the edge of the tape T positioned in the groove 5.

[0016] After being clamped onto the corresponding tape T, the coupling element 1' of the related art assumes the shape and appearance shown in Figure 4: the groove 5' still exhibits a concave transverse profile, but the entrance 5'a thereto has a remarkably smaller transverse height.

[0017] A coupling element according to the preamble of claim 1 is known from US2012/0036685A.

Summary of Invention

Problems to Be Solved by Invention

[0018] Once attached to the tape T, the coupling element 1' manufactured in accordance with the related art tends to form a hollow, indicated by 10 in Figure 4, rather than a flat surface. This is believed to be caused by the working of the forces applied to the leg members of the anchoring end portion of the coupling element in order

to clamp them onto the tape T. The forces may also effect on the other regions of the coupling element, thereby causing unintended deformation at the periphery of the coupling formation 2'h, and thus engagement between the coupling elements may be deteriorated.

[0019] In addition, the hollows 10, which are visible on the front side of the slide fastener SF, are not aesthetically pleasing and furthermore may hinder the application of ornaments, logos, etc. thereto.

[0020] An object of the present invention is to provide an improved coupling element for a slide fastener which, when attached to a slide fastener tape, allows the above inconvenience of the related art coupling elements to be overcome.

[0021] Another object of the present invention is to provide an improved slide fastener stringer with coupling elements which in the closed condition of the fastener, a "block-paving" type appearance, which is both aesthetically pleasing to the eye and to the touch.

Means for Solving Problems

[0022] In order to achieve at least one of the above-described objects, according to a first aspect of the embodiments of the present invention, there is provided a coupling element for use in a slide fastener, comprising: a connecting end portion including a front portion and a rear portion; an anchoring end portion including a front portion and a rear portion; and an intermediate portion disposed between the connecting end portion and the anchoring end portion, the intermediate portion including a front portion and a rear portion, wherein the connecting end portion, the anchoring end portion and the intermediate portion are arranged adjacent each to the next one along a longitudinal axis of the coupling element, such that when the coupling element is attached to a slide fastener tape, the connecting end portion faces away from the slide fastener tape, the anchoring end portion grasps the slide fastener tape, and the front portions of the connecting end portion, the anchoring end portion and the intermediate portion extend on one main surface of the slide fastener tape, and the rear portions of the connecting end portion, the anchoring end portion and the intermediate portion extend on another main surface of the slide fastener tape, which is opposite to the one main surface, wherein in the connecting end portion, the front portion is adapted to be juxtaposed to that of opposing coupling elements of a confronting slide fastener tape, so as to form therewith a closely packed arrangement, and the rear portion is releasably engageable with that of the opposing coupling elements, wherein in the anchoring end portion, the front and rear portions form respective leg members which extend away from the intermediate portion while defining a groove therebetween, and which are adapted to be clamped onto an edge of the slide fastener tape positioned in the groove, and wherein in the groove, a pair of recesses opposing in a direction transverse to the longitudinal axis are provided at inner proximal portions of the leg members, adjacent the intermediate portion.

[0023] Such a coupling element can be easily manufactured and the provision of the transversely opposing recesses allows, upon clamping the leg members onto a fastener tape, an improved distribution of forces on the other regions of the coupling element, whereby the formation of a hollow, rather than a flat surface, in the front portion thereof, is substantially eliminated.

[0024] According to a second aspect of the embodiments of the present invention, there is provided a slide fastener stringer provided with a row of coupling elements attached to a longitudinal edge of a tape, wherein each of the coupling elements comprises: a connecting end portion including a front portion and a rear portion; an anchoring end portion including a front portion and a rear portion; and an intermediate portion disposed between the connecting end portion and the anchoring end portion, the intermediate portion including a front portion and a rear portion, wherein the connecting end portion, the anchoring end portion and the intermediate portion are arranged adjacent each to the next one along a longitudinal axis of each of the coupling elements, such that the connecting end portion faces away from the tape and the anchoring end portion grasps the tape, and the front portions of the connecting end portion, the anchoring end portion and the intermediate portion extend on one side of the tape and the rear portions of the connecting end portion, the anchoring end portion and the intermediate portion extend on another side of the tape, which is opposite to the one side, wherein in the connecting end portion, the front portion is adapted to be juxtaposed to that of opposing coupling elements of a confronting slide fastener stringer, in a closed condition of a slide fastener, so as to form therewith a closely-packed arrangement, and the rear portion is releasably engageable with that of the opposing coupling elements, wherein in the anchoring end portion, the front and rear portions form respective leg members which extend away from the intermediate portion while defining a groove therebetween, and are clamped onto an edge of the tape positioned in the groove, and wherein in the groove, a pair of recesses opposing in a direction transverse to the longitudinal axis are provided at inner proximal portions of the leg members, adjacent the intermediate portion.

[0025] According to a third aspect of the embodiments of the present invention, there is provided a slide fastener comprising the above-described coupling elements or the above-described slide fastener stringers.

Brief Description of Drawings

[0026] Further objects, features, aspects and advantages of the present invention will become apparent from the following description, provided purely by way of a non-limiting example, with reference to the accompanying drawings, wherein

Figure 1 is a partial front view of a slide fastener according to an embodiment of the present invention;

Figure 2 is a partial, rear perspective view of the slide fastener of Figure 1;

Figure 3, already described, is a side view of a coupling element according to the related art, shown before being clamped or crimped onto the edge of a slide fastener tape;

Figure 4 is a side view of a coupling element for a slide fastener according to the related art, shown after being clamped or crimped onto the edge of a slide fastener tape;

Figure 5 is a side view similar to that of Figure 3 and shows a coupling element according to the embodiment of the present invention before being clamped or crimped onto a slide fastener tape;

Figure 6 is a top plan view of the coupling element of Figure 5;

Figure 7 is a partial sectional view showing a coupling element according to the embodiment of the present invention before and after being clamped or crimped onto a slide fastener tape;

Figure 8 is a transverse sectional view, similar to that of Figure 4, and shows a slide fastener according to the embodiment of the present invention, after the coupling elements have been clamped or crimped onto the fastener tapes;

Figure 9 is a partial sectional view, showing a coupling element according to the embodiment of the present invention after being clamped or crimped onto a slide fastener tape; and

Figure 10 is a partial perspective view, showing a portion of a slide fastener according to the embodiment of the present invention in the closed condition.

Description of Preferred Embodiments

[0027] The embodiment of the present invention will be now described with particular reference to Figures 1, 2 and 5-10.

[0028] Most of the preceding description of the related art is applicable also to the coupling elements and the slide fasteners according to the embodiment of the present invention. Therefore, in the following description, parts and elements which have already been described are attributed again the same previously used, alphanumeric reference signs.

[0029] Also in the following description and throughout the annexed drawings a coupling element is indicated by 1 in its open state, i.e. before it is attached to a fastener tape, and by 1' (with apostrophe) in its closed state, i.e. after it has been attached to a tape. The same convention also applies to each part of the coupling element(s).

[0030] A coupling element 1 according to the embodiment of the present invention has the same general configuration of the related art coupling element 1 disclosed above with reference to Figure 3.

[0031] With reference to Figure 5, a coupling element 1, according to the embodiment of the present invention shown therein in its open condition, comprises a connecting end portion 2, an anchoring end portion 3 and an intermediate portion 4, which are arranged adjacent each to the next one along a longitudinal axis L-L of the coupling element and ideally join at vertical planes indicated A-A and B-B, respectively. In this embodiment, it can be said that the longitudinal axis L-L is a central axis of the coupling element 1' when being attached to a slide fastener tape T, along a width direction of the tape T.

[0032] The connecting end portion 2 includes a front portion 2f and a rear portion 2r with the longitudinal axis L-L as a boundary therebetween. The anchoring end portion 3 includes a front portion 3f and a rear portion 3r with the longitudinal axis L-L as a boundary therebetween. The intermediate portion 4 includes a front portion 4f and a rear portion 4r with the longitudinal axis L-L as a boundary therebetween. In the paper surface of Figure 5, the front portions 2f, 3f, 4f of the connecting end portion 2, the anchoring end portion 3 and the intermediate portion 4 extend above the longitudinal axis L-L. The rear portions 2r, 3r, 4r of the connecting end portion 2, the anchoring end portion 3 and the intermediate portion 4 extend below the longitudinal axis L-L.

[0033] When such a coupling element is attached to the tape T, as shown in Figures 7 and 8, the connecting end portion 2' faces away from the tape T, the anchoring end portion 3' faces toward the tape T, the front portions 2'f, 3'f, 4'f of the coupling element 1' extend on one side of the tape T, i.e. on one main surface thereof and the rear portions 2'r, 3'r, 4'r of the coupling element 1' extend on another side of the tape T, which is opposite to the one side, i.e. on another main surface thereof.

[0034] Still with reference to Figure 5 , in the connecting end portion 2 the front portion 2f has a smooth front surface 2'g, adapted to be juxtaposed to that of opposing coupling elements of a confronting fastener stringer, when the slide fastener SF is closed, to form therewith an essentially coplanar, closely-packed arrangement, as can been seen in particular in Figure 1.

[0035] The smooth front surfaces 2g of the coupling elements 1 can be rectangular in shape as shown in the drawings, but may also have other shapes, provided they are able to closely abut with each other. The 'essentially coplanar, closely-packed arrangement' means that it appears that when engaging the slide fastener, the coupling elements as a whole have a planar shape, as seen from Figure 1 or Figure 10. Preferably, it satisfies at least one of the following conditions.

(1) All of the smooth front surfaces 2'g of the coupling elements 1' has substantially the same shape.

(2) The dimension of the smooth front surface 2'g of each of the coupling elements 1' in the longitudinal direction of the slide fastener tape T is larger than a gap between the adjacent coupling elements 1' attached to the same slide fastener tape T.

(3) A front end of the smooth front surface 2'g of each of the elements attached to the pair of slide fastener tapes T is provided with a flat surface and at least a portion of the flat surface faces the flat surface of the counterpart element in the width direction of the slide fastener tape T.

[0036] In the anchoring end portion 3 the front and rear portions 3f, 3r form respective leg members 3g, which extend away from the intermediate portion 4, and define a groove 5 therebetween. The leg members 3g are adapted to be clamped onto the edge of the tape T positioned in the groove, as shown in Figures 7 and 8.

[0037] The leg members 3g have respective distal, transverse projections 3h pointing to one another, which define an entrance passage 5a with a reduced transverse height (a dimension in an upward and downward direction in the paper surface of Figure 5) to the groove 5. The transverse direction is a direction perpendicular to the longitudinal axis L-L and the longitudinal direction of the tape T when the coupling elements are attached to the tape T. A front and back direction which is described later is the same direction as the longitudinal direction of the tape T.

[0038] In the connecting end portion 2' the rear portion 2'r comprises a coupling formation 2'h, which is for instance mushroom-shaped or essentially arrow-shaped, to be releasably engageable with that of opposing coupling elements 1', as visible in particular in Figure 2. More specifically, the coupling formation 2'h has the same shape as the coupling element 1 before being attached to the tape T. As shown in Figure 6, the coupling formation 2h is formed only in the rear portion 2r of the connecting end portion 2 and projects beyond an end surface of the front portion 2f of the connecting end portion 2, which is located in the foremost side (right side in the paper surface of Figure 6). The coupling formation 2h is provided with a pair of engagement protrusions which project in the front and back direction (the upward and downward direction in the paper surface of Figure 6) of the coupling element 1. In addition, engagement recesses are respectively formed at the rear portion 2r of the connecting end portion 2 between the engagement protrusions and the intermediate portion 4. The bottom surface of the engagement recesses is formed so as to be lower than the front and back surfaces of the front portion 2f of the connecting end portion 2. On the other hand, the top portion of the engagement protrusions is formed so as to be lower than the front and back surfaces of the front portion 2f of the connecting end portion 2, but higher than the bottom surface of the engagement recesses.

[0039] Referring to Figure 1, it is readily apparent that on the front side of each coupling element 1' there is provided an oblong shaped design portion 2'g, suitable for receiving an ornamentation or a design in general and a coupling formation 2'h projects beyond the design portion. The engagement protrusions and the engagement recesses of the coupling formation 2'h are shaped so that it can interdigitate with the coupling portion of a cooperating element 1' on the opposite stringer, in the area at the rear of the design portion 2'g, as shown in Figure 2. The coupling formation 2h (2'h) is disposed at substantially back side (the lower side in the paper surface of Figure 6) of the design portion 2g (2'g), and is substantially invisible from the front side when being engaged, as shown in Figure 1.

[0040] Before the coupling element 1 is attached to the tape T, the groove 5 of its anchoring end portion 3 has the profile visible in Figure 5. Furthermore, the outer surfaces of the front and rear portions 3f, 3r of the leg members 3g diverge with respect to one another, away from the intermediate portion 4.

[0041] The coupling element 1 according to the embodiment of the present invention can be made of a plastically deformable material, in particular a metal material, such that the leg members 3g of the anchoring end portion 3 thereof can be clamped, by means of appropriate, per se known, tools, onto the edge of the tape T positioned in the groove 5.

[0042] After being clamped onto the corresponding tape T, the coupling element 1' assumes the shape and appearance shown with continuous lines in Figure 7: the entrance 5'a to the groove 5 has a remarkably smaller gap.

[0043] As shown in Figure 5, in the groove 5 of the coupling element 1 according to the embodiment of the present invention a pair of transversely opposing recesses 5b are provided at inner proximal portions of the leg members 3g, adjacent the intermediate portion 4 of the coupling element. The opposing recesses are essentially symmetrical with respect to a plane orthogonal to Figure 5, passing through the longitudinal axis L-L.

[0044] In the exemplary embodiment shown in Figure 5, the recesses 5b are joined with one another by an essentially flat surface 5c, which extends close to the plane B-B which delimits the intermediate portion 4 of the coupling element 1 with respect to the anchoring end portion 3 thereof.

[0045] In the exemplary embodiment the recesses 5b and the flat surface 5c considered as a whole form an end indentation or recess provided in the groove 5, at the intermediate portion 4 and between the leg members 3g. The arrangement is such that at the end indentation or recess the leg members 3g form respective essentially cusped profiles 5d, transversely facing each other. The recesses 5c are thus defined between the cusped profiles 5d and the flat surface 5c of the groove 5.

[0046] Still with reference to Figure 5, each leg member 3g has an inner surface which, starting from the flat surface 5c, includes the recess 5b and first and second surface portions 5e, 5f which join each other forming the cusped profile 5d.

[0047] The second surface portion 5f extends transversely outwards, away from the corresponding cusped profile 5d, toward the distal transverse projection 3h of the corresponding leg member 3g.

[0048] The first surface portion 5e is formed close to the intermediate portion 4 relative to the second surface portion 5f and the first surface portion 5e is shorter than the second surface portion 5f in a direction along the longitudinal axis L-L, and in the condition shown in Figure 5 (i.e. in the condition of the coupling element before it is clamped onto a fastener tape) is at least approximately parallel to the longitudinal axis L-L.

[0049] The front and rear portions 3f, 3r of the anchoring end portion 3 have outer longitudinal profiles which extend transversely beyond those of the front and rear portions 2f, 2r and 4f, 4r of the connecting end portion 2 and the intermediate portion 4.

[0050] Preferably, the front and rear portions 2f, 2r of the connecting end portion 2 have outer longitudinal profiles which are essentially in the same straight line with those 4f, 4r of the intermediate portion 4.

[0051] Furthermore, the leg members 3g have outer longitudinal profiles which preferably slope gradually toward those of the intermediate portion 4 and the connecting end portion 2.

[0052] The outer longitudinal profiles of the front portions 4f, 2f of the intermediate portion 4 and the connecting end portion 2 can be slightly inclined with respect to the longitudinal axis L-L of the coupling element 1, by an angle which is anyway smaller than the inclination angle of the outer longitudinal profiles of the leg members 3g.

[0053] On the other hand, the outer longitudinal profiles of the rear portions 4r, 2r of the intermediate portion 4 and the connecting end portion 2 are parallel with the longitudinal axis L-L of the coupling element 1. In other words, the outer longitudinal profiles of the front portions 4f, 2f of the intermediate portion 4 and the connecting end portion 2 are slightly inclined with respect to the outer longitudinal profiles of the rear portions 4r, 2r of the intermediate portion 4 and the connecting end portion 2. In addition, the outer longitudinal profiles of the front portions 4f, 2f of the intermediate portion 4 and the connecting end portion 2 are inclined so that the transverse length (the thickness in the front and back direction) of the front portion 2f, 4f of the connecting end portion 2 and the intermediate portion 4 gradually increases from the connecting end portion 2 to the intermediate portion 4.

[0054] Reverting again to Figure 5, the line B-B which is a boundary between the intermediate portion 4 and the anchoring end portion 3 is drawn through the point at which the surface 5c most closely approaches the front end 2h of the coupling element 1, and in a transverse direction to the longitudinal axis L-L.

[0055] The line A-A which is a boundary between the connecting end portion 2 and the intermediate portion 4 is drawn in a transverse direction to the axis L-L, at the engagement recesses of the coupling formation 2h.

[0056] When a coupling element 1 according to the embodiment of the present invention is clamped onto the edge of fastener tape T, the configuration thereof passes from that shown in broken lines in Figure 7 to the configuration shown therein by a continuous line. In particular the leg portions are brought closer to one another, so that the entrance passage 5'a to the groove 5' is considerably narrowed.

[0057] Due to the plastic deformation of the coupling element, after the clamping operation, the outer profiles of the leg portions 3'g and the outer surfaces of the connecting portion 2' become essentially in the same straight line with each other, and parallel to the plane passing through the longitudinal axis L-L orthogonally to Figure 5. That is, the smooth front surface 2'g become essentially parallel to the plane passing through the longitudinal axis L-L orthogonally to Figure 5.

[0058] The deformation of the coupling element is such that also the above mentioned end indentation 5'b, 5'c of the undeformed coupling element changes configuration, assuming a transverse profile which is essentially dovetail-shaped, as shown in Figure 7.

[0059] With reference to Figure 5, the provision of the recesses 5b allows an increase in the magnitude of the flexing in the region wherein the proximal portion of the leg member 3g joins with the intermediate portion 4 of the coupling member 1. With reference to Figure 7 this allows a by far better alignment such that the outer profile of the leg member 3'g with the adjacent front surface 2'g of the connecting end portion 2' are in the same straight line.

[0060] Thus, as a result, the overall smooth front surface 2'g of the top front surface 3'f, 4'f, 2'f of the coupling element 1' appears to be smooth and flat, and the formation of an undesired hollow is definitely avoided.

[0061] Figure 9 shows a coupling element 1' according to the embodiment of the present invention after being clamped onto a fastener tape T, and Figure 8 is a transverse sectional view of a slide fastener SF provided with coupling elements according to the embodiment of the present invention.

[0062] From Figure 8 the actual flatness and smoothness of the overall smooth front surface 2'g of the closely-packed coupling elements 1' can be readily appreciated.

[0063] Figures 8 and 9 show a preferred final shape assumed by the sectional profile of the groove 5 in the clamped condition of the coupling elements 1', which recalls the profile of a wineglass with a flared mouth.

[0064] As mentioned previously, the present invention allows the manufacture of smooth and attractive slide fasteners, which due to the close-fitting arrangement of the front surface portions of the coupling elements, and the superior flatness thereof, has a very smooth appearance, which is both aesthetically pleasant to the eye and to the touch.

[0065] The closely-packed arrangement of the coupling elements in the closed condition of the fastener and the flattened smooth nature of the coupling elements ensure that the material, to which the slide fastener is secured, is not readily trapped between the coupling elements. In addition, if by chance material is trapped in the slide fastener, the coupling elements thereof will cause less or no damage to the material.

Claims

1. A coupling element (1) for use in a slide fastener (SF), comprising:

a connecting end portion (2) including a front portion (2f) and a rear portion (2r);
an anchoring end portion (3) including a front portion (3f) and a rear portion (3r); and
an intermediate portion (4) disposed between the connecting end portion (2) and
the anchoring end portion (3), the intermediate portion (4) including a front portion (4f) and a rear portion (4r),
wherein the connecting end portion (2), the anchoring end portion (3) and the intermediate portion (4) are arranged adjacent each to the next one along a longitudinal axis (L-L) of the coupling element (1), such that when the coupling element (1) is attached to a slide fastener tape (T), the connecting end portion (2) faces away from the slide fastener tape (T), the anchoring end portion (3) grasps the slide fastener tape (T), and the front portions (2f, 3f, 4f) of the connecting end portion (2), the anchoring end portion (3) and the intermediate portion (4) extend on one main surface of the slide fastener tape (T), and the rear portions (2r, 3r, 4r) of the connecting end portion (2), the anchoring end portion (3) and the intermediate portion (4) extend on another main surface of the slide fastener tape (T), which is opposite to the one main surface,
wherein in the connecting end portion (2), the front portion (2f) is adapted to be juxtaposed to that of opposing coupling elements (1) of a confronting slide fastener tape (T), so as to form therewith a closely packed arrangement, and the rear portion (2r) is releasably engageable with that of the opposing coupling elements (1),
wherein in the anchoring end portion (3), the front and rear portions (3f, 3r) form respective leg members (3g) which extend away from the intermediate portion (4) while defining a groove (5) therebetween, and which are adapted to be clamped onto an edge of the slide fastener tape (T) positioned in the groove (5),
wherein in the groove (5), a pair of recesses (5b) opposing in a direction transverse to the longitudinal axis (L-L) are provided at inner proximal portions of the leg 30 members (3g), adjacent the intermediate portion (4),
wherein the front portion (2f) of the connecting end portion (2) have an outer longitudinal profile which is essentially in the same straight line with an outer longitudinal profile of the front portion (4f) of the intermediate portion (4),
wherein the rear portion (2r) of the connecting end portion (2) have an outer longitudinal profile which is essentially in the same straight line with an outer longitudinal profile of the rear portion (4r) of the intermediate portion (4),
wherein the front and rear portions (3f, 3r) of the anchoring end portion (3) have outer longitudinal profiles which extend transversely beyond those of the front and rear portions (2f, 2r; 4f, 4r) of the connecting end portion (2) and the intermediate portion (4),
wherein the leg members (3g) have outer longitudinal profiles which slope towards those of the intermediate portion (4) and the connecting end portion (2), and
wherein the outer longitudinal profiles of the rear portions (2r, 4r) of the connecting end portion (2) and the intermediate portion (4) are parallel with the longitudinal axis (L-L),
characterized in that the outer longitudinal profiles of the front portions (2f, 4f) of the connecting end portion (2) and the intermediate portion (4) are inclined with respect to the longitudinal axis (L-L) by an angle which is smaller than an inclination angle of the outer longitudinal profiles of the leg members (3g) with respect to the longitudinal axis (L-L) so that a transverse length of the front portions (2f, 4f) of the connecting end portion (2) and the intermediate portion (4) gradually increases from the connecting end portion (2) to the intermediate portion (4).

2. The coupling element according to claim 1, wherein the groove (5) includes the recesses (5b) provided adjacent the intermediate portion (4) at the inner proximal portions of the leg members (3g), whereby at the recesses (5b) the leg members (3g) have respective, essentially cusped profiles (5d) transversely facing each other, the recesses (5b) being defined between the cusped profiles (5d) and the intermediate portion (4).

3. The coupling element according to claim 1 or claim 2, wherein an essentially flat surface (5c) is formed at the intermediate portion (4) between the recesses (5b).

4. The coupling element according to claim 3, wherein each of the leg members (3g) has an internal surface which, starting from the flat surface (5c), includes the recesses (5b) and first and second surface portions (5e, 5f) which join with each other forming the cusped profiles (5d), the second surface portion (5f) extending transversely outwards away from the intermediate portion (4).

5. The coupling element according to claim 4, wherein the leg members (3g) have distal transverse projections (3h) pointing to one another, reducing a trans-

verse width of the groove (5) and defining an entrance passage (5a) to the groove (5), the second surface portions (5f) of the leg members (3g) diverging from one another towards the distal transverse projections (3h).

6. The coupling element according to claim 4 or 5, wherein when the coupling element (1) is not attached to the slide fastener tape (T), the first surface portions (5e) are at least approximately parallel with the longitudinal axis (L-L) of the coupling element (1).

7. A slide fastener stringer provided with a row of coupling elements (1') attached to a longitudinal edge of a tape (T),
wherein each of the coupling elements (1') is the coupling element according to any of claims 1 to 6

8. A slide fastener (SF) comprising coupling elements (1') each of which is the coupling elements (1') according to any of claims 1 to 6 crimped onto a pair of confronting tapes (T), wherein when the coupling elements (1') are crimped onto the pair of confronting tapes (T), the groove (5') of each of the coupling elements (1') has a sectional profile essentially like that of a wineglass with a flared mouth.

Patentansprüche

1. Kuppelglied (1) zur Verwendung in einem Reißverschluss (SF), aufweisend:

einen Verbindungsendabschnitt (2) mit einem vorderseitigen Abschnitt (2f) und einem rückseitigen Abschnitt (2r);
einen Verankerungsendabschnitt (3) mit einem vorderseitigen Abschnitt (3f) und einem rückseitigen Abschnitt (3r); und
einen zwischen dem Verbindungsendabschnitt (2) und dem Verankerungsendabschnitt (3) angeordneten Zwischenabschnitt (4),
wobei der Zwischenabschnitt (4) einen vorderseitigen Abschnitt (4f) und einen rückseitigen Abschnitt (4r) aufweist,
wobei der Verbindungsendabschnitt (2), der Verankerungsendabschnitt (3) und der Zwischenabschnitt (4) einer neben dem anderen entlang einer Längsachse (L-L) des Kuppelglieds (1) angeordnet sind, so dass, wenn das Kuppelglied (1) an dem Reißverschlussstragband (T) befestigt ist, der Verbindungsendabschnitt (2) dem Reißverschlussstragband (T) abgewandt ist, der Verankerungsendabschnitt (3) das Reißverschlussstragband (T) greift und die vorderseitigen Abschnitte (2f, 3f, 4f) des Verbindungsendabschnitts (2), des Verankerungsendabschnitts (3) und des Zwischenabschnitts (4) sich auf einer Hauptoberfläche des Reißverschlusstragbands (T) erstrecken und die rückseitigen Abschnitte (2r, 3r, 4r) des Verbindungsendabschnitts (2), des Verankerungsendabschnitts (3) und des Zwischenabschnitts (4) sich auf der anderen Hauptoberfläche des Reißverschlusstragbands (T) erstrecken, die der einen Hauptoberfläche entgegengesetzt ist,
wobei der vorderseitige Abschnitt (2f) des Verbindungsendabschnitts (2) dazu ausgestaltet ist, neben dem eines gegenüberliegenden Kuppelglieds (1) eines gegenüberstehenden Reißverschlusstragbands (T) angeordnet zu sein, um mit diesem eine dichtgepackte Anordnung zu bilden, und der rückseitige Abschnitt (2r) lösbar mit den gegenüberliegenden Kuppelgliedern (1) in Eingriff bringbar ist,
wobei der vorderseitige und der rückseitige Abschnitt (3f, 3r) des Verankerungsendabschnitts (3) jeweils sich von dem Zwischenabschnitt (4) weg erstreckende und dabei zwischen sich eine Rinne (5) definierende Beinelemente (3g) bilden, und die dazu ausgestaltet sind, an einem Rand des in der Rinne (5) angeordneten Reißverschlusstragbands (T) festgeklemmt zu werden,
wobei in der Rinne (5) ein Paar von sich in einer Richtung quer zur Längsachse (L-L) gegenüberliegende Aussparungen (5b) an inneren proximalen Abschnitten der Beinelemente (3g) neben dem Zwischenabschnitt (4) angeordnet sind,
wobei der vorderseitige Abschnitt (2f) des Verbindungsendabschnitts (2) ein äußeres Längsprofil aufweist, das mit einem äußeren Längsprofil des vorderseitigen Abschnitts (4f) des Zwischenabschnitts (4) im Wesentlichen auf der gleichen geraden Linie liegt,
wobei der rückseitige Abschnitt (2r) des Verbindungsendabschnitts (2) ein äußeres Längsprofil aufweist, das mit einem äußeren Längsprofil des rückseitigen Abschnitts (4r) des Zwischenabschnitts (4) im Wesentlichen auf der gleichen geraden Linie liegt,
wobei der vorderseitige und der rückseitige Abschnitt (3f, 3r) des Verankerungsendabschnitts (3) äußere Längsprofile aufweisen, die sich quer über die der vorderseitigen und der rückseitigen Abschnitte (2f, 2r; 4f, 4r) des Verankerungsendabschnitts (2) und des Zwischenabschnitts (4) hinaus erstrecken,
wobei die Beinelemente (3g) äußere Längsprofile aufweisen, die auf die des Zwischenabschnitts (4) und des Verbindungsendabschnitts (2) schräg zu laufen, und
wobei die äußeren Längsprofile der rückseitigen Abschnitte (2r, 4r) des Verbindungsendabschnitts (2) und des Zwischenabschnitts (4)

parallel zur Längsachse (L-L) sind,
dadurch gekennzeichnet, dass die äußeren Längsprofile der vorderseitigen Abschnitte (2f, 4f) des Verbindungsendabschnitts (2) und des Zwischenabschnitts (4) bezüglich der Längsachse (L-L) in einem Winkel geneigt sind, der kleiner ist als ein Neigungswinkel der äußeren Längsprofile der Beinelemente (3g) bezüglich der Längsachse (L-L), so dass eine Querlänge der vorderseitigen Abschnitte (2f, 4f) des Verbindungsendabschnitts (2) und des Zwischenabschnitts (4) allmählich von dem Verbindungsendabschnitt (2) zu dem Zwischenabschnitt (4) zunimmt.

2. Kuppelglied gemäß Anspruch 1, wobei die Rinne (5) die neben dem Zwischenabschnitt (4) an den inneren proximalen Abschnitten der Beinelemente (3g) angeordneten Aussparungen (5b) aufweist, wobei die Beinelemente (3g) an den Aussparungen (5b) jeweils im Wesentlichen höckerförmige Profile (5d) aufweisen, die einander quer zugewandt sind, wobei die Aussparungen (5b) zwischen den höckerförmigen Profilen (5d) und dem Zwischenabschnitt (4) angeordnet sind.

3. Kuppelglied gemäß Anspruch 1 oder Anspruch 2, wobei eine im Wesentlichen ebene Oberfläche (5c) an dem Zwischenabschnitt (4) zwischen den Aussparungen (5b) gebildet ist.

4. Kuppelglied gemäß Anspruch 3, wobei jedes der Beinelemente (3g) eine innere Oberfläche aufweist, die ausgehend von der ebenen Oberfläche (5c) die Aussparungen (5b) und einen ersten und einen zweiten Oberflächenabschnitt (5e, 5f) aufweist, die sich verbinden und die höckerförmigen Profile (5d) bilden, wobei sich der zweite Oberflächenabschnitt (5f) von dem Zwischenabschnitt (4) aus quer nach außen weg erstreckt.

5. Kuppelglied gemäß Anspruch 4, wobei die Beinelemente (3g) zueinander zeigende distale Quervorsprünge (3h) aufweisen, die eine Querbreite der Rinne (5) verringern und einen Eintrittszugang (5a) zu der Rinne (5) definieren, wobei die zweiten Oberflächenabschnitte (5f) der Beinelemente (3g) zu den distalen Quervorsprüngen (3h) hin auseinandergehen.

6. Kuppelglied gemäß Anspruch 4 oder 5, wobei die ersten Oberflächenabschnitte (5e) zumindest ungefähr parallel zu der Längsachse (L-L) des Kuppelglieds (1) sind, wenn das Kuppelglied (1) nicht an dem Reißverschlusstragband (T) befestigt ist.

7. Reißverschlusskette mit einer an einem longitudinalen Rand eines Bands (T) befestigten Reihe von Kuppelgliedern (1'),
wobei jedes der Kuppelglieder (1') das Kuppelglied gemäß einem der Ansprüche 1 bis 6 ist.

8. Reißverschluss (SF) mit Kuppelgliedern (1'), von denen jedes das Kuppelglied (1') gemäß einem der Ansprüche 1 bis 6 ist, welche an gegenüberstehende Bänder (T) eines Paares gecrimpt sind, wobei die Rinne (5') jedes der Kuppelglieder (1') ein Querschnittsprofil aufweist, das im Wesentlichen das eines Weinglases mit einer ausgestellten Öffnung ist, wenn die Kuppelglieder (1') an das Paar einander gegenüberstehender Bänder (T) gecrimpt sind.

Revendications

1. Élément de couplage (1) à utiliser dans une fermeture à glissière (SF), comprenant :

une partie d'extrémité de raccordement (2) incluant une partie avant (2f) et une partie arrière (2r) ;
une partie d'extrémité d'ancrage (3) incluant une partie avant (3f) et une partie arrière (3r) ; et
une partie intermédiaire (4) disposée entre la partie d'extrémité de raccordement (2) et la partie d'extrémité d'ancrage (3), la partie intermédiaire (4) incluant une partie avant (4f) et une partie arrière (4r),
dans lequel la partie d'extrémité de raccordement (2), la partie d'extrémité d'ancrage (3) et la partie intermédiaire (4) sont agencées de manière adjacente les unes à côté des autres le long d'un axe longitudinal (L-L) de l'élément de couplage (1), de telle sorte que, lorsque l'élément de couplage (1) est attaché à une bande de fermeture à glissière (T), la partie d'extrémité de raccordement (2) est orientée à l'opposé de la bande de fermeture à glissière (T), la partie d'extrémité d'ancrage (3) saisit la bande de fermeture à glissière (T), et les parties avant (2f, 3f, 4f) de la partie d'extrémité de raccordement (2), de la partie d'extrémité d'ancrage (3) et de la partie intermédiaire (4) s'étendent sur une surface principale de la bande de fermeture à glissière (T), et les parties arrière (2r, 3r, 4r) de la partie d'extrémité de raccordement (2), de la partie d'extrémité d'ancrage (3) et de la partie intermédiaire (4) s'étendent sur une autre surface principale de la bande de fermeture à glissière (T), qui est opposée à la une première surface principale,
dans lequel, dans la partie d'extrémité de raccordement (2), la partie avant (2f) est adaptée pour être juxtaposée à celle d'éléments de couplage opposés (1) d'une bande de fermeture à glissière (T) opposée, de manière à former avec

ceux-ci un agencement étroitement groupé, et la partie arrière (2r) peut être mise en prise amovible avec celle des éléments de couplage opposés (1),
dans lequel, dans la partie d'extrémité d'ancrage (3), les parties avant et arrière (3f, 3r) forment des éléments pattes respectifs (3g) qui s'étendent à l'opposé de la partie intermédiaire (4) tout en définissant une rainure (5) entre eux, et qui sont adaptés pour être bloqués sur un bord de la bande de fermeture à glissière (T) positionné dans la rainure (5),
dans lequel, dans la rainure (5), une paire de renfoncements (5b) s'opposant dans une direction transversale à l'axe longitudinal (L-L) sont disposés au niveau de parties proximales intérieures des éléments pattes (3g), adjacentes à la partie intermédiaire (4),
dans lequel la partie avant (2f) de la partie d'extrémité de raccordement (2) présente un profil longitudinal extérieur qui est essentiellement dans la même ligne droite avec un profil longitudinal extérieur de la partie avant (4f) de la partie intermédiaire (4),
dans lequel la partie arrière (2r) de la partie d'extrémité de raccordement (2) présente un profil longitudinal extérieur qui est essentiellement dans la même ligne droite avec un profil longitudinal extérieur de la partie arrière (4r) de la partie intermédiaire (4),
dans lequel les parties avant et arrière (3f, 3r) de la partie d'extrémité d'ancrage (3) présentent des profils longitudinaux extérieurs qui s'étendent transversalement au-delà de ceux des parties avant et arrière (2f, 2r ; 4f, 4r) de la partie d'extrémité de raccordement (2) et de la partie intermédiaire (4),
dans lequel les éléments pattes (3g) présentent des profils longitudinaux extérieurs qui s'inclinent vers ceux de la partie intermédiaire (4) et de la partie d'extrémité de raccordement (2), et dans lequel les profils longitudinaux extérieurs des parties arrière (2r, 4r) de la partie d'extrémité de raccordement (2) et de la partie intermédiaire (4) sont parallèles à l'axe longitudinal (L-L),
caractérisé en ce que les profils longitudinaux extérieurs des parties avant (2f, 4f) de la partie d'extrémité de raccordement (2) et de la partie intermédiaire (4) sont inclinés par rapport à l'axe longitudinal (L-L) d'un angle qui est plus petit qu'un angle d'inclinaison des profils longitudinaux extérieurs des éléments pattes (3g) par rapport à l'axe longitudinal (L-L) de telle sorte qu'une longueur transversale des parties avant (2f, 4f) de la partie d'extrémité de raccordement (2) et de la partie intermédiaire (4) augmente progressivement depuis la partie d'extrémité de raccordement (2) vers la partie intermédiaire (4).

2. Élément de couplage selon la revendication 1, dans lequel la rainure (5) inclut les renfoncements (5b) disposés entre la partie intermédiaire (4) au niveau des parties proximales intérieures des éléments pattes (3g), moyennant quoi au niveau des renfoncements (5b) les éléments pattes (3g) présentent des profils essentiellement en pointe respectifs (5d) se faisant transversalement mutuellement face, les renfoncements (5b) étant définis entre les profils en pointe (5d) et la partie intermédiaire (4).

3. Élément de couplage selon la revendication 1 ou la revendication 2, dans lequel une surface essentiellement plate (5c) est formée au niveau de la partie intermédiaire (4) entre les renfoncements (5b).

4. Élément de couplage selon la revendication 3, dans lequel chacun des éléments pattes (3g) comporte une surface interne qui, en partant de la surface plate (5c), inclut les renfoncements (5b) et des première et seconde parties de surface (5e, 5f) qui se rejoignent formant les profils en pointe (5d), la seconde partie de surface (5f) s'étendant transversalement vers l'extérieur à l'opposé de la partie intermédiaire (4).

5. Élément de couplage selon la revendication 4, dans lequel les éléments pattes (3g) comportent des saillies transversales distales (3h) pointant les unes vers les autres, réduisant une largeur transversale de la rainure (5) et définissant un passage d'entrée (5a) vers la rainure (5), les secondes parties de surface (5f) des éléments pattes (3g) divergeant les unes des autres vers les saillies transversales distales (3h).

6. Élément de couplage selon la revendication 4 ou 5, dans lequel, quand l'élément de couplage (1) n'est pas attaché à la bande de fermeture à glissière (T), les premières parties de surface (5e) sont au moins approximativement parallèles à l'axe longitudinal (L-L) de l'élément de couplage (1).

7. Demi-chaîne de fermeture à glissière pourvue d'une rangée d'éléments de couplage (1') attachés à un bord longitudinal d'une bande (T),
dans laquelle chacun des éléments de couplage (1') est l'élément de couplage selon l'une quelconque des revendications 1 à 6.

8. Fermeture à glissière (SF) comprenant des éléments de couplage (1') dont chacun est les éléments de couplage (1') selon l'une quelconque des revendications 1 à 6 sertis sur une paire de bandes (T) opposées, dans laquelle, quand les éléments de couplage (1') sont sertis sur la paire de bandes (T) opposées, la rainure (5') de chacun des éléments de couplage (1') présente un profil en coupe essen-

tiellement comme celui d'un verre à vin ayant une ouverture évasée.

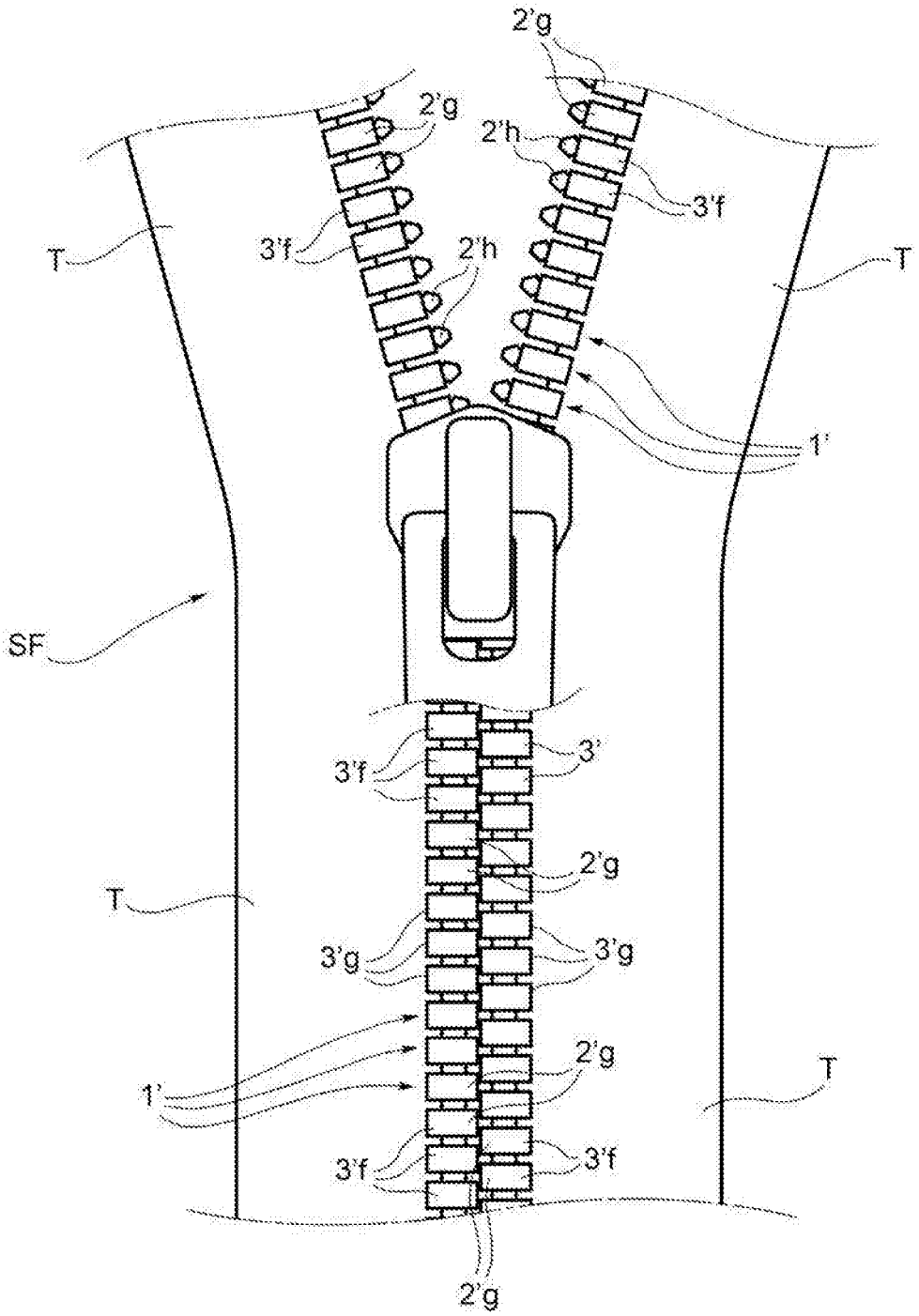

FIG. 1

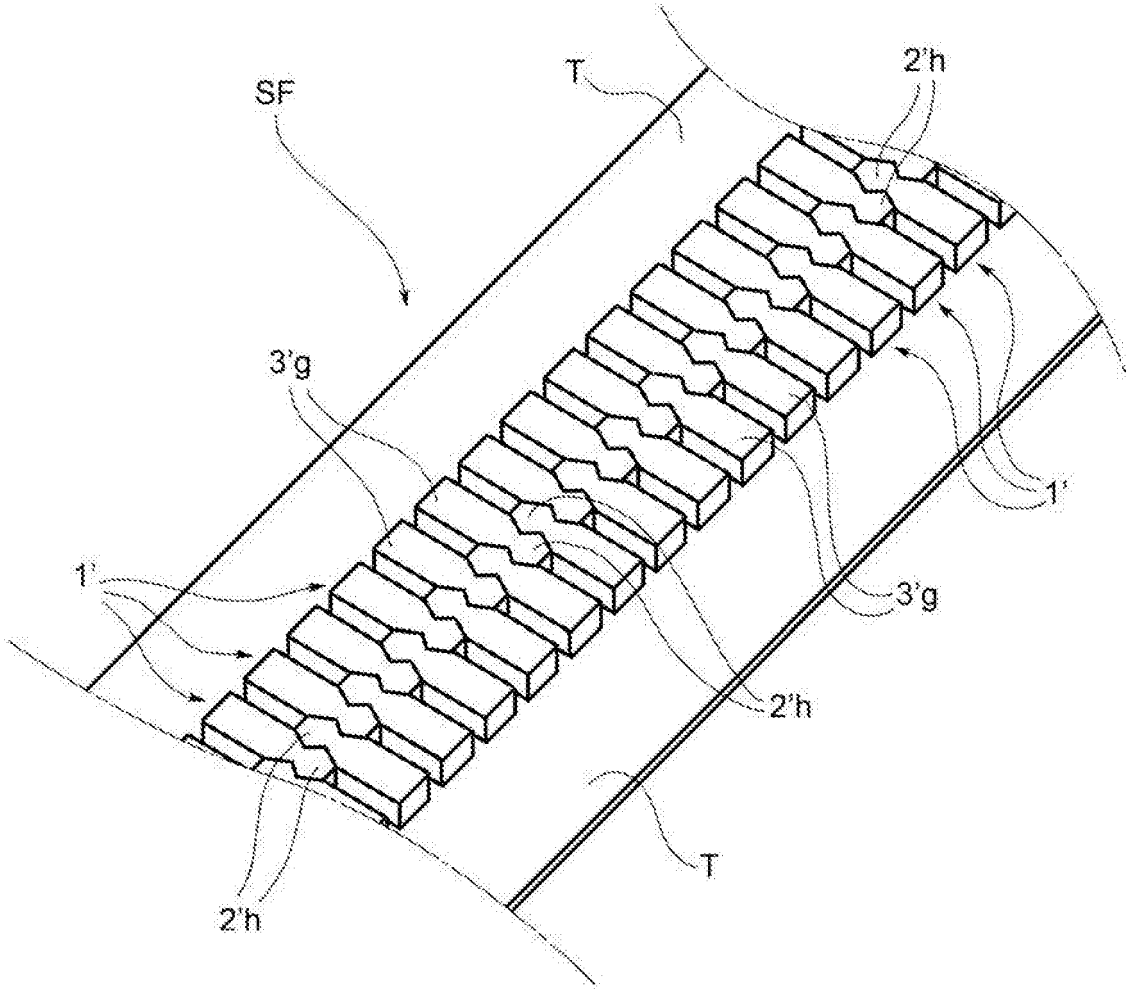

FIG. 2

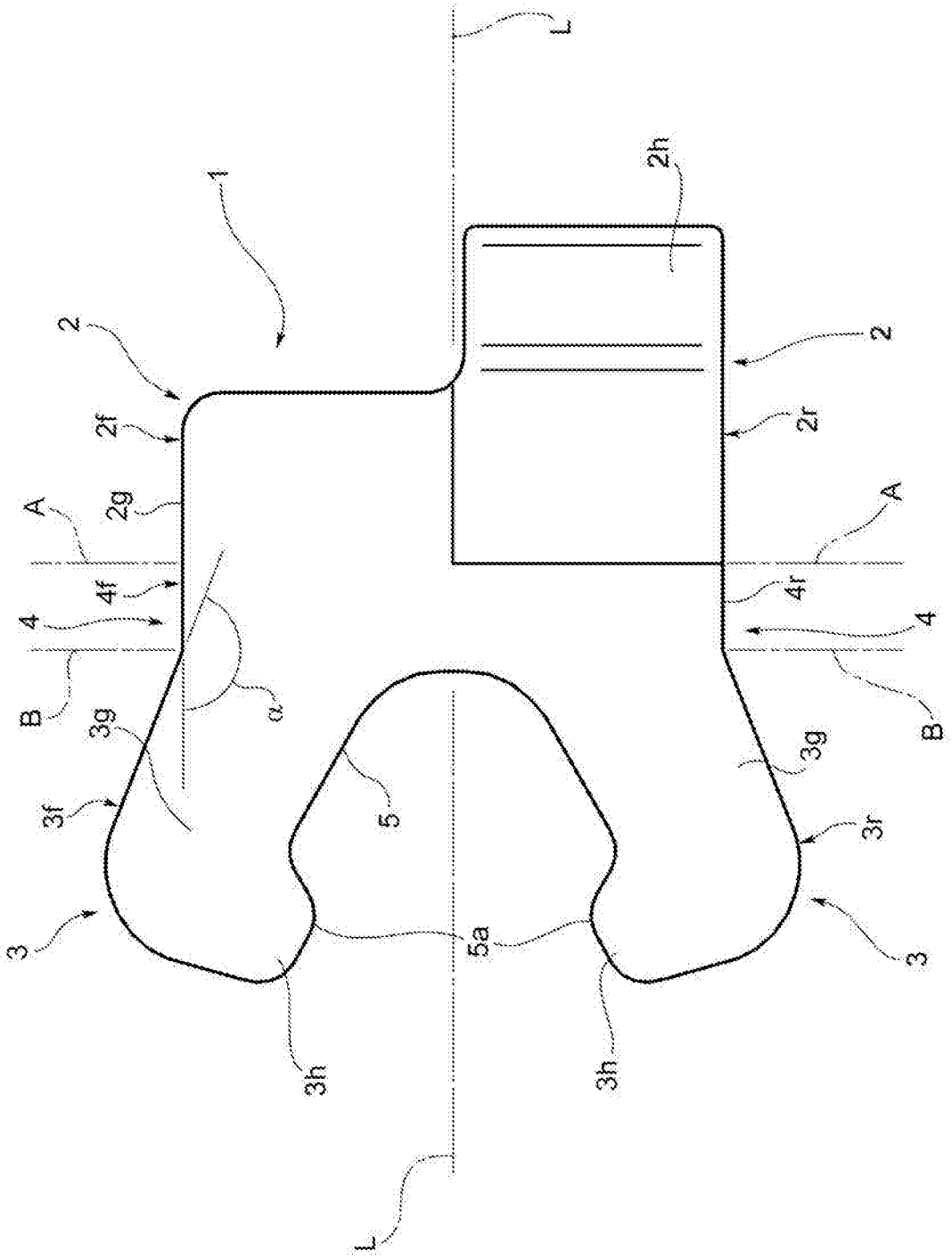

FIG. 3
(PRIOR ART)

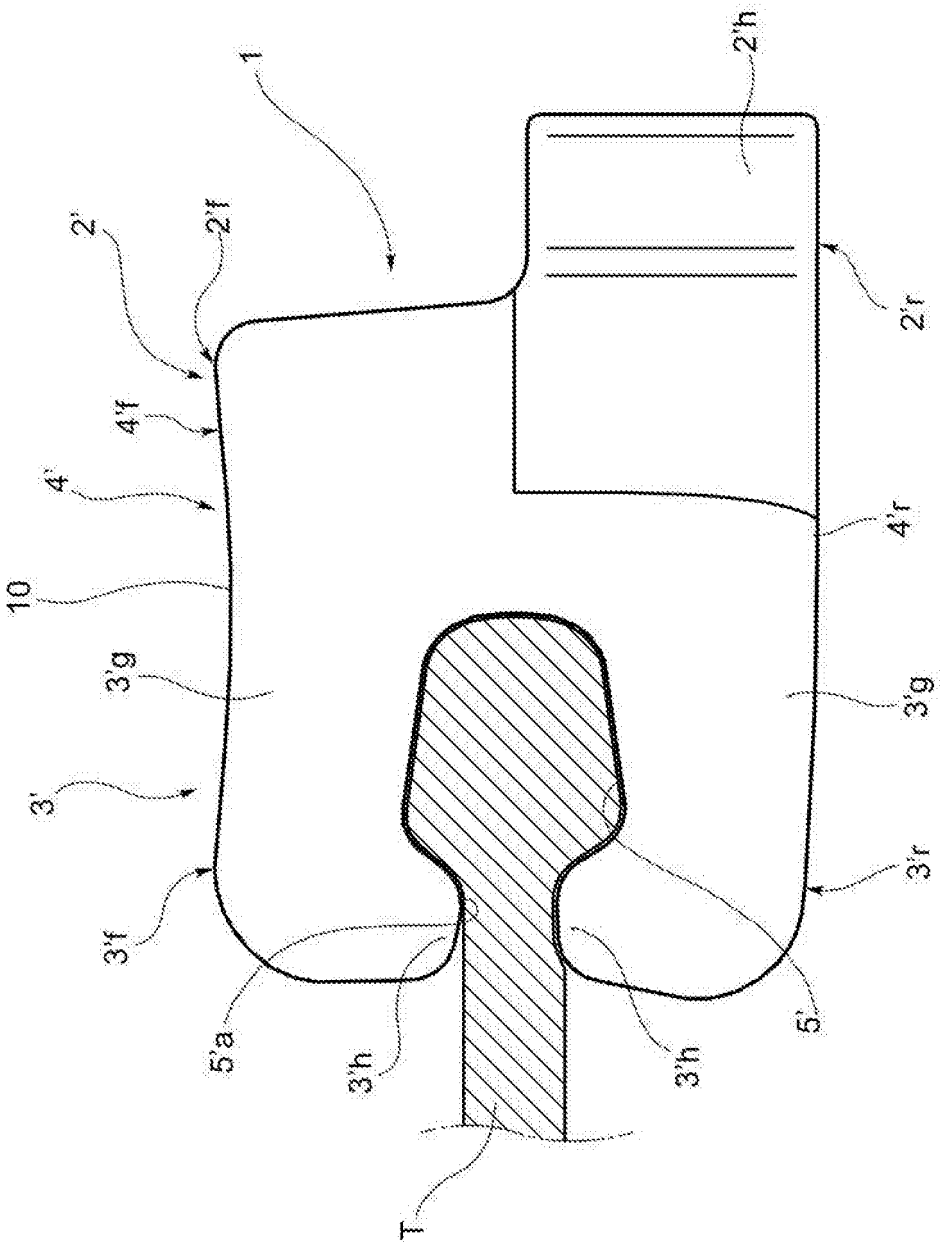

FIG. 4
(PRIOR ART)

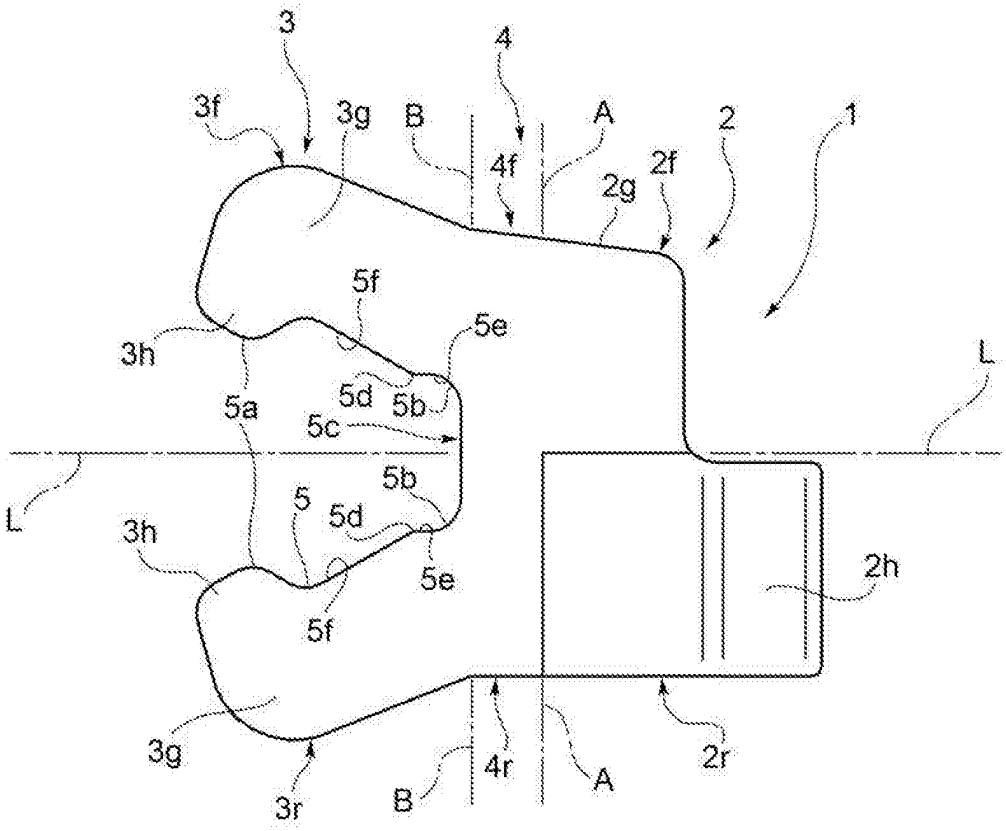
3
4
3f
3g
B
A
2
1
4f
2g
2f
5f
5e
3h
L
5a
5d
5b
5c
5b
L
5
5d
3h
2h
5e
5f
3g
2r
4r
A
3r
B

FIG. 5

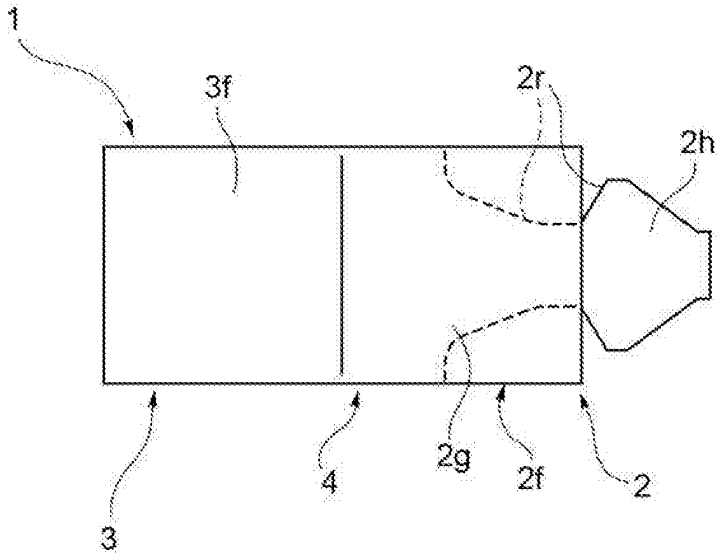
1
3f
2r
2h
3
4
2g
2f
2

FIG. 6

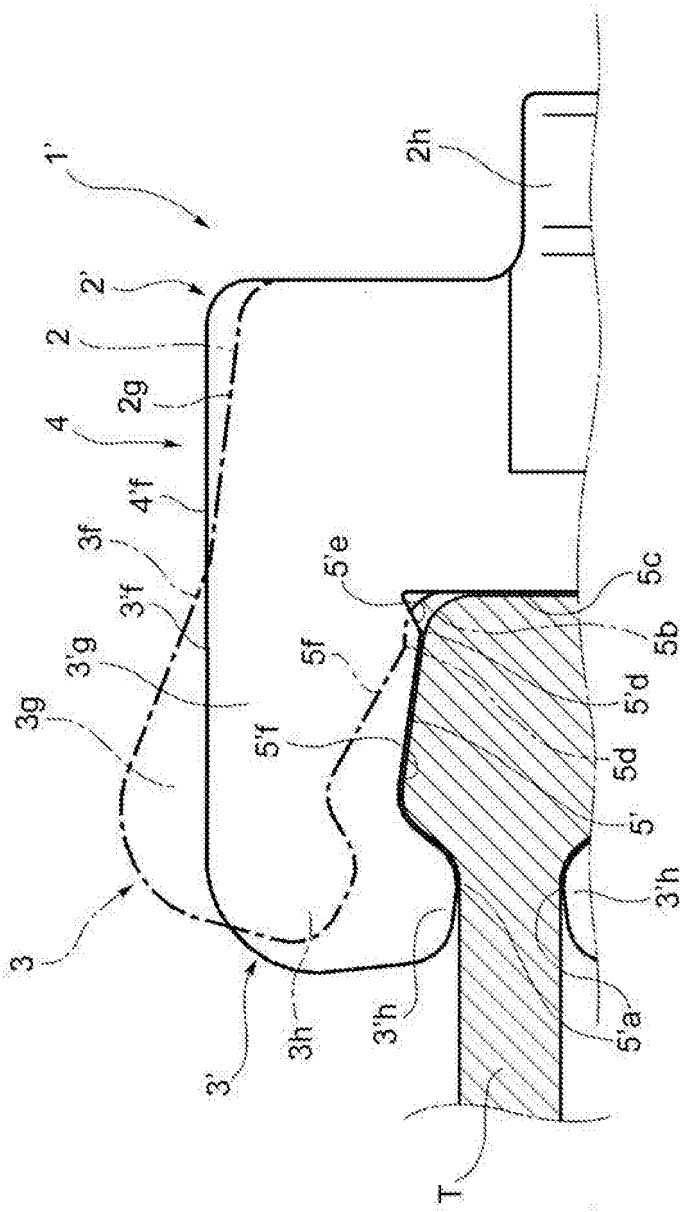

FIG. 7

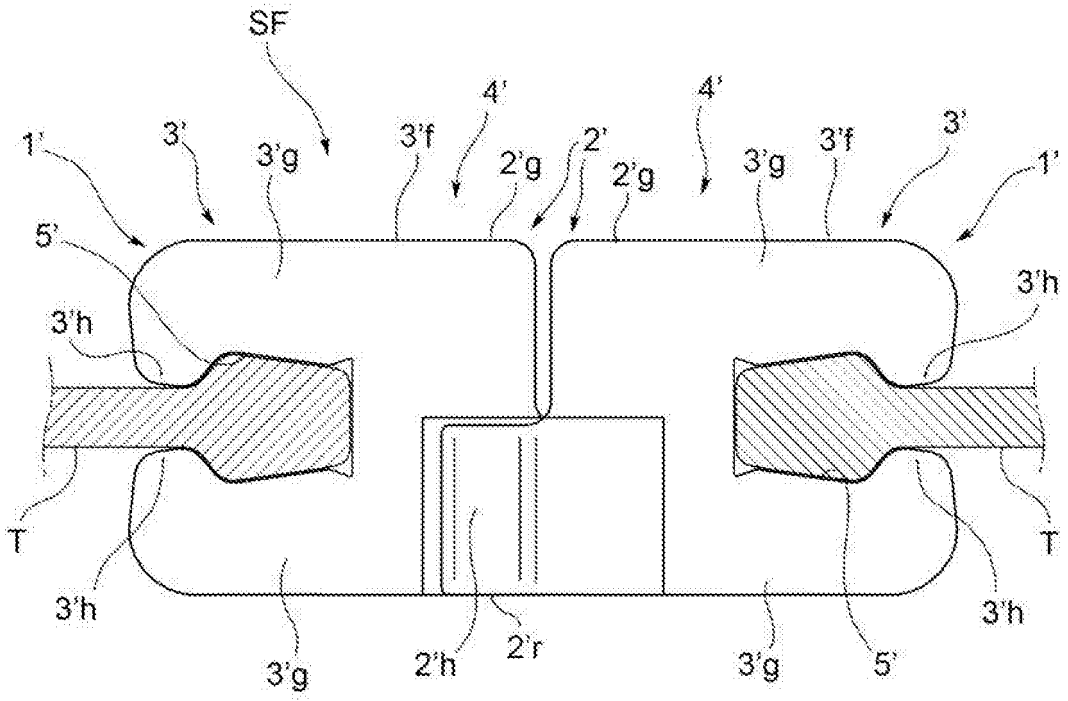
SF
1'
3'
3'g
3'f
4'
2'g
2'
2'g
4'
3'g
3'f
3'
1'
5'
3'h
3'h
T
3'h
3'g
2'h
2'r
3'g
5'
3'h
T

FIG. 8

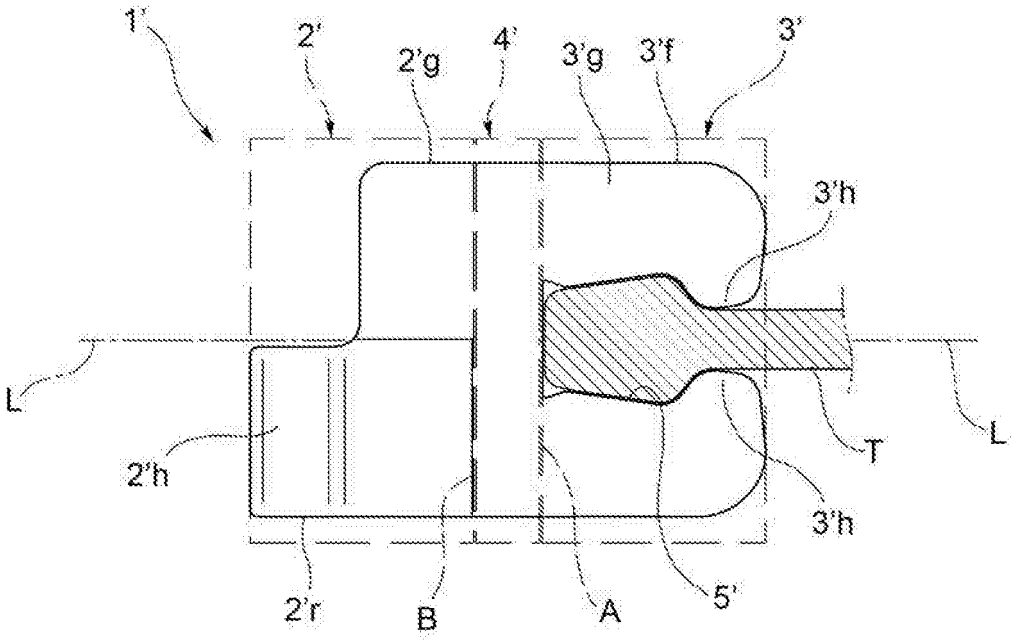
1'
2'
2'g
4'
3'g
3'f
3'
3'h
L
T
L
2'h
3'h
2'r
B
A
5'

FIG. 9

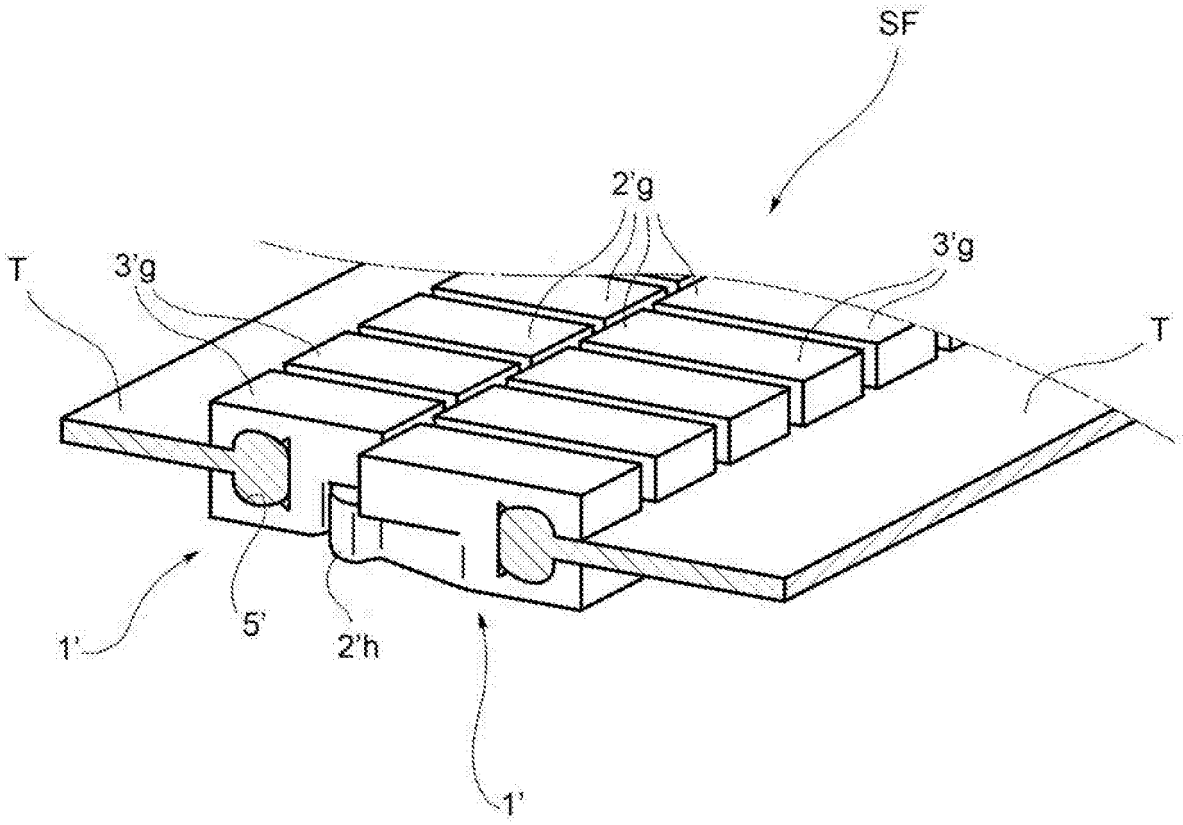

FIG. 10

REFERENCES CITED IN THE DESCRIPTION

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- US 20120036685 A **[0017]**