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(54) FRAME FIXATION TO A SUITCASE

(57) A frame construction (10) for a piece of luggage comprises a shell (100) with an end portion (101) and a frame (1) with a profile (4) having a profile base (43) and a first profile wall (44) and a second profile wall (45), a seat (41) for receiving the end portion (101) of the shell (100) being delimited by opposing first and second inner surfaces (46; 47) of said first and second profile walls (44; 45). The frame construction (10) further comprises at least one fastening element (42; 62; 106), wherein said fastening element (42; 62; 106) is configured to be removably inserted in the seat (41) of the profile (4) so as to removably fasten the end portion (101) of the shell (100) being received in the seat (41) to the frame (1). A method of fastening a shell to a frame construction of a piece of luggage comprises the steps of providing a piece of luggage with such a frame construction, inserting the end portion (101) of the shell (100) into the seat (41) of the profile (4), and inserting the fastening element (42; 62; 106) in the seat (41) of the profile (4).

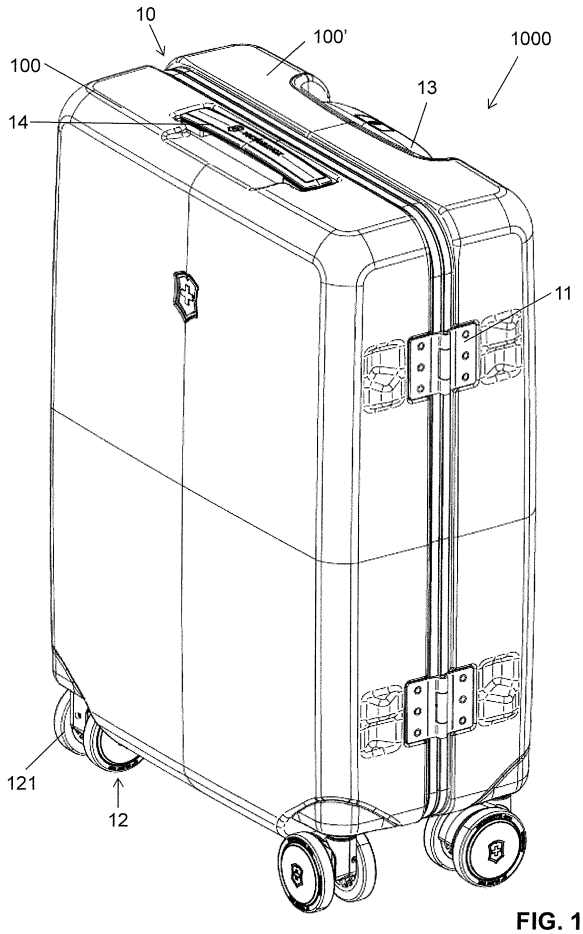

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to a frame construction for a piece of luggage according to the preamble of claim 1 and to a method of fastening a shell to a frame construction of a piece of luggage with such a frame construction according to claim 15.

PRIOR ART

[0002] Suitcases typically comprise a frame construction with shells that are articulately joined to one another by means of hinges provided on the frame construction. From EP 1 867 246 A1 a suitcase is known in which the suitcase shells are connected to the frame construction through adhesive bonding. Other types of connections between the shells and the frame constructions are however possible, too. For example, EP 2 672 857 A1 discloses a suitcase, wherein the shell is connected to the frame constructions by means of stitching.

[0003] Particular drawbacks of such connections are their laborious manufacturing and the fact that the connecting means such as the adhesive or the stitching are visible and seem aesthetically intrusive. Furthermore, although such a permanent fixation can be advantageous due to the durability of fixation, it might nevertheless be desirable to replace broken parts of the suitcase.

SUMMARY OF THE INVENTION

[0004] It is therefore an object of the present invention to provide an improved frame construction for a piece of luggage. In particular, it is an object to provide a frame construction which enables a simple but reliable manufacturing and allows the replacement of damaged parts.

[0005] This object is achieved by means of a frame construction according to claim 1. In particular, a frame construction for a piece of luggage is provided, which comprises a shell with an end portion and a frame. The frame comprises a profile extending in an extension direction and having a profile base and a first profile wall and a second profile wall, a seat for receiving the end portion of the shell being delimited by opposing first and second inner surfaces of said first and second profile walls. The frame construction further comprises at least one fastening element, wherein said fastening element is configured to be removably inserted in the seat of the profile so as to removably fasten the end portion of the shell being received in the seat to the frame.

[0006] In other words, the frame construction comprises a frame with a profile into which an end portion of a shell can be received and fastened by means of a fastening element. A tedious fastening by means of gluing or sewing, for example, is omitted. Moreover, since the fastening element is not permanently fixed to the frame, the end portion of the shell is likewise not permanently fixed to the frame. Instead, the shell can easily be removed in that the fastening element is removed from the frame.

[0007] It is possible to provide one single fastening element which, when inserted in the seat of the profile, extends along said extension direction of the profile around substantially the entire frame. However, it is likewise conceivable to provide a fastening element which, when inserted in the seat of the profile, extends only partially along the extension direction of the profile. In the latter case, it is preferred to provide two or more such fastening elements which are distributed along a circumference of the frame.

[0008] The fastening element can be fastened to the frame by means of a friction fit and/or a positive-locking fit. A friction fit can be caused by a static friction exerted between effective surfaces of the fastening element and the end portion of the shell and of the fastening element and the profile, in particular the inner surface of the profile wall, respectively. Thus, the fastening element can be clamped in the seat, whereby also the end portion of the shell is clamped in the seat. The friction fit has the effect that neither the fastening element nor the end portion of the shell can be removed from the frame without the action of a greater external force. However, since there are no permanent connecting means involved in the fastening of the shell to the frame, the friction fit can be overcome when a certain external force is applied and, as a result, the fastening element and the shell can be removed from the frame. Similarly, a positive-locking fit established between the fastening element and the end portion of the shell within the seat of the frame prevents the removal of these components unless a certain external force is applied. In doing so it is preferred that the distance between the first profile wall and the second profile wall essentially equals the sum of the thickness of the end portion of the shell and the thickness of the fastening element in the region of insertion in the seat of the profile. It is therefore possible to securely fasten the shell to the frame by means of the fastening element only. However, the provision of additional fastening means such as an adhesive is nevertheless possible. For example, it is conceivable to glue the fastening element to the end portion of the shell before they are inserted in the seat of the profile.

[0009] The fastening element can be formed separately from the frame and/or from the shell. Alternatively, it is con-

ceivable to provide the fastening element and the shell as a single component. For example, the fastening element could be integrally formed on the end portion of the shell such that an insertion of the end portion of the shell leads at the same time to a fastening of the end portion of the shell to the frame. In this context, one possibility would be the provision of the fastening element as a protrusion, such as a tab protruding from the end portion of the shell, which tab engages with a corresponding structure such as a groove provided in the profile.

[0010] The fastening element can be configured such, that when the end portion of the shell is received in the seat, the fastening element may be slid into the profile along said extension direction into a space formed between the end portion of the shell and the first profile wall or the second profile wall, respectively, whilst the end portion of the shell is pressed against the second profile wall or against the first profile wall, respectively. In addition or alternatively the fastening element can be configured such, that when the end portion of the shell is received in the seat, the fastening element may be pushed into a space formed between the end portion of the shell and the first profile wall or the second profile wall, respectively, along a direction transverse to said extension direction whilst the end portion of the shell is pressed against the second profile wall or against the first profile wall, respectively.

[0011] It is therefore preferred that the width of the end portion of the shell is smaller than the clear width between the first and second profile walls of the profile. If now the end portion of the shell is in a first step inserted into the seat of the profile, the above-mentioned space is formed between one of the profile walls and one surface of the end portion of the shell. In a second step it is then possible to insert the fastening element into the space formed between the respective other profile wall and the other surface of the end portion of the shell along the extension direction or along a transverse direction extending transverse to said extension direction. If the widths of the fastening element and the end portion of the shell in the region of insertion are essentially equal to or even slightly larger than the clear width between the first and second profile walls of the profile, the fastening element will thereby clamp the end portion of the shell within the seat of the profile.

[0012] At least one of the profile walls and the fastening element in each case can comprise at least one retaining structure, said retaining structures being configured to mutually interact with one another such that an additional mechanical fastening of the fastening element in the frame is effected. The retaining structure on the fastening element is preferably a first protrusion and the retaining structure on the at least one of the profile walls is preferably a toothing provided on the inner surface of said profile wall and/or a lug extending inwards in the direction of the seat, the first protrusion and the toothing being configured to engage one another and the lug providing a stop for the first protrusion. Hence, in addition to a fastening of the fastening element in the seat of the profile by means of a friction fit and/or a positive-locking fit caused by the geometrical dimensions of the fastening element and the end portion of the shell only, it is conceivable to provide additional structures on the profile and the fastening element that can enter into engagement with one another.

[0013] The fastening element can comprise a second retaining structure, preferably in the form of a second protrusion, which, when the end portion of the shell is received in the seat, presses against a first surface of the shell such that an additional fastening of the end portion being received in the seat is effected. That is, it is preferred to design the fastening element in such a way that it effects a clamping force on one of the surfaces of the end portion of the shell.

[0014] To this end it is conveivable to provide the fastening element with an elongate shape being insertable into the seat of the profile, wherein the said first and second retaining structures are arranged on opposite surfaces of the elongate fastening element.

[0015] The free end region of at least one of the profile walls can have a retaining structure, preferably in the form of a lug, extending inwards in the direction of the seat, wherein said retaining structure, when the end portion of the shell is received in the seat, presses against a second surface of the shell such that an additional fastening of the end portion being received in the seat is effected. That is, it is preferred to design at least one of the profile walls in such a way that it effects a clamping force on one of the surfaces of the end portion of the shell. Through the fact that clamping forces can be exerted on both surfaces of the end portion of the shell, once by means of the retaining structure on the fastening element and once by means of the retaining structure on the profile wall, the shell is also secured with respect to a displacement within the frame construction. A dimensionally stable frame construction is thus provided.

[0016] In the region of the seat, the first and second profile walls preferably extend essentially parallel to one another, and/or the second profile wall preferably has a length which is greater than the length of the first profile wall along a direction transverse to said extension direction. Put differently, when seen in the cross-section, the profile preferably has an essentially U-shaped design, wherein the first and second profile walls correspond to the side legs of said "U", respectively, wherein one side leg can be longer than the other side leg.

[0017] The fastening element can be dimensioned such, that a gap is formed between the profile base and a lower side of the fastening element when the fastening element is inserted in the seat of the frame, and/or the fastening element can be dimensioned such, that an upper side of the fastening element is essentially flush with the free end of the second profile wall or that its upper side projects beyond the free end of the second profile wall when the fastening element is inserted in the seat of the frame. The gap serves the purpose of compensating any tolerances between the fastening element and the shell profile. Whereas a fastening element being flush with the profile wall is aesthetically pleasing, a

protruding fastening element brings the advantage that the protruding portion can easily be grasped and can thus be better removed from the frame.

[0018] The shell may have a curvature dividing the shell into the said end portion and a main portion, whereby the main portion is arranged off-set with respect to the end portion, wherein the length of the second profile wall essentially equals the overall length of the end portion and the curvature in a direction transverse to the extension direction, and wherein the second protrusion, when the fastening element is inserted in the seat of the frame, preferably presses against the first surface of the shell in the region of the curvature. The main portion of the wall is preferably essentially flush with the first profile wall of the frame, i.e. the first profile wall and the main portion preferably extend in a common plane.

[0019] The frame construction preferably comprises a further frame, wherein the frame comprises a connection profile and the further frame comprises a further connection profile being designed complementary to the connection profile of the frame, the connection profile and the further connection profile being configured to enter into a preferably positive connection with one another. That is, the frame construction can comprise two frames which preferably in each case comprise a profile as described above. It is also preferred that the frames are connectable to one another by means of their complementary connection profiles. In the event that the frame construction is provided on a suitcase, the suitcase shells are preferably connected with each other by one or more articulated joints such as hinges. By pivoting the suitcase shells about the pivot axis provided by the articulated joints it is possible to open and close the suitcase shells of the suitcase. In the closed position, the complementary designed connection profiles of the frames come into engagement with each other.

[0020] In a further aspect a piece of luggage, preferably a suitcase, with a frame construction as described above is provided, wherein the end portion of the shell is received in the seat of the frame and removably fastened by means of the fastening element being removably inserted in the seat of the frame. Said piece of luggage preferably comprises a frame construction having two frames as described above, wherein each frame comprises a suitcase shell removably fastened by means of a fastening element.

[0021] In a further aspect a method of fastening a shell to a frame construction of a piece of luggage is provided, the method comprises the steps of:

- Providing a piece of luggage with a frame construction as described above;
- Inserting the end portion of the shell into the seat of the profile; and
- Inserting the fastening element in the seat of the profile.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022]

Fig. 1 shows a perspective view of a suitcase comprising a frame construction with an upper and lower frame;
Fig. 2 shows a perspective view of the upper and lower frame of the frame construction according to figure 1, the frames comprising in each case a U-profile, a connection profile and a shell profile ;
Fig. 3 shows a cross-section of the upper frame according to figure 2;
Fig. 4 shows a cross-section of the lower frame according to figure 2;
Fig. 5 shows a sectional view of the frame construction according to figure 1, wherein the U-profiles are omitted;
Fig. 6 shows a sectional view of the frame construction according to figure 1, wherein the shell profiles are omitted;
Fig. 7 shows a perspective view of a strip of the frame construction according to figure 1;
Fig. 8 shows a perspective view of the upper frame of the frame construction according to figure 1, wherein a liner is connected to the upper frame by the strip according to figure 7;
Fig. 9 shows a perspective view of the upper frame comprising the liner according to figure 8, wherein the strip is removed;
Fig. 10 shows a perspective view of the liner according to figures 8 and 9;
Fig. 11 shows a perspective view of a fastening element insertable in the shell profile of the frame construction according to figure 1;
Fig. 12 shows a further perspective view of the fastening element according to figure 11;
Fig. 13 shows a perspective view of a shell and a frame of a frame construction according to another embodiment, wherein the shell and the frame are in an unconnected state;
Fig. 14 shows a perspective view of the frame construction according to figure 13, wherein the shell and the frame are in a semi-connected state;
Fig. 15 shows a sectional view of the frame construction according to figure 13, wherein the shell and the frame are in a connected state;
Fig. 16 shows a perspective view of a shell of a frame construction according to another embodiment;
Fig. 17a shows a sectional view of the shell according to figure 16 and a frame according to said other embodiment

in the unconnected state;

Fig. 17b shows a sectional view of the frame and the shell according to figure 17a in the semi-connected state;

Fig. 17c shows a sectional view of the frame and the shell according to figure 17a in the connected state.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0023] A suitcase 1000 comprising two suitcase shells 100, 100' and a frame construction 10 is shown in Figure 1. As will be explained in greater detail with reference to figures 2 to 5, the frame construction 10 comprises two frames 1,1' which in each case are connectable to one of the suitcase shells 100, 100'. The suitcase shells 100, 100' can be made of a metal such as aluminium or of a polymeric material, for example polyethylene, polypropylene, acrylonitrile butadiene styrene, polycarbonate or the like. The frames 1,1' are advantageously made of the same material as the suitcase shells 100, 100', i.e. they are preferably made from aluminium or plastics.

[0024] The frames 1, 1' are articulately jointed by means of hinges 11 fixed either to the frame or to the suitcase shells so as to allow the opening and closing of the suitcase. In the present example, two hinges 11 are provided on one of the longitudinal sides of the suitcase. The suitcase is further equipped with closure means (not shown) such as snap fasteners or a zip closure. On the lower transverse side the suitcase has a wheel assembly 12, which in the present case consist of four wheels 121 that are arranged opposite each other in corner areas of the suitcase. On the upper transverse side of the suitcase a pull-out handle 13 is arranged on one of the suitcase shells 100' and a handgrip 14 is provided on the other suitcase shell 100. For a better understanding the suitcase shell 100 comprising the handgrip 14 is called in the following the upper suitcase shell 100 and the suitcase shell 100' comprising the pull-out handle 13 is called the lower suitcase shell, respectively.

[0025] Figures 2 to 4 depict the frames 1, 1' of the upper and lower suitcase shells 100, 100' individually. As becomes evident from these figures, the frames 1, 1' are provided as single piece elements of an essentially rectangular shape and with a profiled structure. That is, the frames 1, 1' in each case comprise a connection profile 3, 3' serving the purpose of connecting the frames 1,1' with each other, a U-shaped profile 2, 2' serving the purpose of connecting a liner 6 to the frames 1, 1', and a shell profile 4, 4' serving the purpose of connecting the suitcase shells 100, 100' to the frames 1, 1', respectively. In the connected state, i.e. when the two connection profiles 3, 3' are connected with each other and the suitcase shells 100, 100' are received within the shell profiles 4, 4', the shell profiles 4, 4' and the suitcase shells 100, 100' face towards an outside of the suitcase. The connection profiles 3, 3' and the U-shaped profiles 2, 2' are facing towards the interior of the suitcase and are offset inwardly with respect to the suitcase shells 100, 100' and the shell profiles 4, 4'. The U-shaped profiles 2, 2' and the connection profiles 3, 3' are thereby arranged within a common plane that extends parallel to a plane of the suitcase shells 100, 100'.

[0026] However, it needs to be taken into consideration that the frames 1, 1' can be provided without such shell profiles 4, 4' or connection profiles 3, 3' or U-shaped profiles 2, 2', respectively. For example, the frames 1, 1' could be secured to one another by means of external closure means only such as zip closures or snap fasteners. Likewise, especially if no liner is desired in the suitcase, it is possible to omit the U-shaped profiles 2, 2' from the frames 1, 1'. For the reason of simplicity, figure 5 shows frames 1, 1' in which the U-shaped profiles for connecting a liner are omitted. Similarly, the frames 1, 1' according to figure 6 are depicted without the shell profiles. Nevertheless it should be noted that any aspects discussed with respect to one of these frames 1, 1' can be present on the other frames 1, 1'.

[0027] As follows from figures 3 to 6, the connection profiles 3, 3' are arranged such on the frames 1, 1' that they can be brought into engagement with each other when the suitcase 1000 is closed. To this end, the lower frame 1' comprises a connection profile 3' which comprises inner and outer surfaces 31', 32' that run towards each other. The inner surface 31' refers to that surface of the connection profile 3' that faces towards an interior space 15' of the frame 1' and the outer surface 32' refers to the surface facing towards an outside of the frame 1', respectively. In the cross-section, the connection profile 3' of the lower frame 1' is essentially in the shape of a "V", wherein the length of the inner surface 31' is greater than the length of the outer surface 32'. Said V-shaped connection profile 3' on the lower frame 1' forms a receptacle for a correspondingly configured profiled structure 3 on the upper frame 1. That is, the connection structure 3 on the upper frame 1 is designed so as to be insertable into the receptacle formed by the inner and outer surfaces 31', 32' of the connection profile 3' of the lower frame 1' and has an essentially triangular cross-section.

[0028] As best seen in figure 5, the triangularly shaped connection profile 3 on the upper frame 1 has likewise an inner surface 31 facing the interior space 15 of the frame 1 and having a length that is greater than the length of an outer surface 32 facing towards the outside of the frame 1. When the suitcase 1000 is in its closed position, the triangularly shaped connection profile 3 is essentially fully received within the V-shaped connection profile 3' as in the case of a tongue-and-groove connection, wherein the inclination of the respective inner surfaces 31, 31' and outer surfaces 32, 32' and the length of the respective outer surfaces 32, 32' are about the same. As a result, a positive connection between the upper and lower frames 1, 1' is provided which holds the two suitcase shells 100, 100' closed when the suitcase is in the closed position.

[0029] As further follows from figures 3 to 5, the shell profiles 4, 4' on the upper and lower frames 1, 1' are of an

identical design and in each case are substantially U-shaped when viewed in cross-section. An end portion of the suitcase shells 101, 101' can be inserted into the U-shaped seat 41, 41' provided in the shell profiles 4, 4'. Different possibilities to secure the end portions 101, 101' of the suitcase shells 100, 100' into the shell profiles 4, 4' are conceivable. For example, the end portions 101, 101' could be permanently adhered to the shell profiles 4, 4' by e.g. gluing them into the seats 41, 41'. A releasable securing could be achieved by means of a clamping connection, where the end portions 101, 101' have dimensions that approximately correspond to the dimensions of the seats 41, 41'. Or else, the dimensions of the end portions 101, 101' could be smaller than of the clear width the seats 41, 41' and a fastening could be achieved with the aid of an additional fastening element 42 as shown in figures 5 and 11 to 17c.

[0030] The shell profiles 4, 4' are thereby arranged on their respective frame 1, 1' in a mirrored manner with respect to one another. In particular, when the suitcase shells 100, 100' are inserted into the frames 1,1' and the suitcase is in its closed position, the shell profiles 4, 4' are mirrored with respect to a plane extending perpendicularly to a plane spanned by the suitcase shells 100, 100' in the region of the shell profiles 4, 4'. Between the upper and lower suitcase shell 100, 100' a gap 102 is formed which allows the insertion of a zip closure, for example. Though, as has been mentioned earlier, the connection established between the connection profiles 3, 3' of the frames 1, 1' is already sufficient for a tight closing of the suitcase. Said gap 102 is caused by the particular design of the connection profiles 3, 3', in particular by the inner surface 31 of the triangularly shaped connection profile 3 on the upper frame 1 having a length that is greater than the length of the corresponding inner surface 31' of the V-shaped connection profile 3' on the lower frame 1'.

[0031] The U-shaped profiles 2, 2' for connecting a liner 6 to the frames 1, 1' are now discussed in greater detail with respect to figures 3, 4 and 6 to 10. As follows from these figures, the upper and lower frames 1, 1' in each case comprise such a U-shaped profile 2, 2'. For reasons of simplicity reference will be made in the following to only one of the frames and thus to only one of the U-shaped profiles for connecting to a liner. However, it should be noted that the following explanations likewise apply to the other frame and its U-shaped profile.

[0032] The U-shaped profile 2, 2' for connecting to a liner 6 has a profile base 21, 21', a first profile wall 22, 22' and a second profile wall 23, 23'. A seat 28, 28' for a liner 6 is delimited by the opposing first inner surface 24, 24' of the first profile wall 22, 22' and the second inner surface 25, 25' of the second profile wall 23, 23' that face one another. In the embodiment shown, the first and second profile walls 22, 22', 23, 23' extend from the profile base 21, 21' towards their free edge regions 29, 29', 210, 210' in a slightly divergent manner with respect to one another. However, it is likewise conceivable that these profile walls extend parallel to one another. Furthermore, in the cross-sectional view, the first and second profile walls 22, 22', 23, 23' have the same heights. The first inner surface 24, 24' is provided with a first groove 26, 26' and the second inner surface 25, 25' is provided with a second groove 27,27', said grooves 26, 26', 27, 27' facing one another and being arranged on the same height with respect to a depth D of the U-shaped profile 2, 2'. The grooves 26, 26', 27, 27' extend in a longitudinal direction L of said U-shaped profile 2, 2' and along a circumferential direction of the frame 1, 1'. In case that the suitcase shell 100, 100' is in connection with the frame 1, 1', the grooves 26, 26', 27, 27' also extend parallel to a plane spanned through the suitcase shell 100, 100' in the region of the U-shaped profile 2, 2'.

[0033] The frame construction 10 further comprises a strip 5 which can be received in the U-shaped profile 2, 2' and which has opposing lateral edge regions 51, 52 that can be inserted in the grooves 26, 26', 27, 27' in order to fasten a liner 6 that is inserted into the seat 28, 28' to the frame 1, 1'. The strip 5 has an elongate rectangular shape as shown in figure 7. In order to securely fix the liner 6 to the frame 1, 1' the strip 5 extends, when inserted into the grooves 26, 26', 27, 27' along the longitudinal direction L of the frame 1, 1' and circumferentially around the entire frame 1, 1'. The grooves 26, 26', 27, 27' and the strip 5 are dimensioned such that, when the strip 5 is inserted into the grooves 26, 26', 27, 27', a small gap 211, 211' is formed between the strip 5 and the first and second inner surfaces 24, 24' 25.25'. The gap 211, 211' allows the liner 6 to extend from within the seat 28, 28' of the U-shaped profile 2, 2' laterally around the lateral edge regions 51, 52 of the strip 5 to the outside of the U-shaped profile 2, 2'.

[0034] The dimensions of the U-shaped profile 2, 2' and the strip 5 are thereby such that, when said liner 6 is inserted into the seat 28, 28', the strip 5 may be clicked or snapped into the U-shaped profile 2, 2' from a transverse direction T running perpendicularly to the longitudinal direction L of the U-shaped profile 2, 2'. In doing so the liner 6 is pressed into the first and second grooves 26, 26', 27, 27' by the strip 5. In addition, the dimensions of the U-shaped profile 2, 2' and the strip 5 are such that, when the liner 6 is inserted into the seat 28, 28', the strip 5 may be slid into the U-shaped profile 2, 2' along the longitudinal direction L of the U-shaped profile 2, 2' whilst said 6 liner is likewise pressed into said first and second grooves 26, 26', 27, 27'. That is to say, when the liner 6 is fastened to the U-shaped profile 2, 2' by means of the strip 5, the lateral edge regions 51, 52 of the strip 5 press part of the liner 6 into the grooves 26, 26', 27, 27'. In the present example, the clear width WU, WU' of the seat 28, 28' is between about 1 to 5 millimetres, the distance DG, DG' between the first groove 26, 26' and the second groove 27, 27' is between about 3 to 6 millimetres, and the cross-section CG of the first and second grooves 26, 26', 27, 27' is between about 0.5 and 1.5 millimetres. The width WS of the strip 5 is between about 2.5 to 5.5 millimetres and the height HS of the strip 5 is between about 0.25 and 1.25 millimetres.

[0035] In the embodiment shown in figures 8 to 10, the liner 6 is a single layer material consisting of a two-piece fabric,

wherein a thick and elastic fabric piece 63 is sewed to a thin and inelastic fabric piece 64. As further follows from these figures, one elongate member 62 in the form of a plastic string is attached to the liner 6, wherein the two pieces of fabric are sewn around the string 62 such that the string 62 is received within the fold 61 of the liner 6. Said fold 61 together with the string 62 is inserted into the seat 28 of the U-shaped profile 2 such, that the thick and elastic fabric piece 63 extends around the first lateral edge region 51 of the strip 5 and the thin and inelastic fabric piece 64 extends around the second lateral edge region 52 of the strip 5 once the strip 5 is inserted into the grooves 26, 27 of the U-shaped profile 2.

[0036] Although not shown in the figures it is also conceivable to provide two or more such U-shaped profiles on the same frame. Said two or more U-shaped profiles could be arranged one above the other with respect to a direction extending perpendicular to the longitudinal direction. In this way, two or more liners could be connected to the frame.

[0037] It should be noted that the frame construction as described above is not restricted to the suitcase shown in the present figures. Instead, it is conceivable to provide such a frame construction to other types of suitcases, e.g. suitcases without wheels, and in particular to any type of luggage comprising two shells to be interconnected.

[0038] The shell profiles 4, 4' for removably fasten the shells 100, 100' to the frames 1, 1' are now discussed in greater detail with respect to figures 3-5 and 11-17c. In figures 1 to 12 the frame construction 10, 10' comprising a shell profile 4, 4' and a fastening element 42, 42' according to a first embodiment is shown, whereas figures 13 to 15 depict a second embodiment and figures 16 to 17c depict a third embodiment of a frame construction, respectively. The main difference between said embodiments is that the shell 100 and the fastening element 42, 62 according to the first and second embodiment are designed as individual parts, whereas in the third embodiment, the fastening element 106 is an integral part of the end portion 101 of the shell 100. Moreover, in the second embodiment the fastening element is provided by means of the elongate member 62 of the liner 6 as described above, whereas the fastening element 42 according to the first embodiment corresponds to an element being designed different from and optionally also provided in addition to the elongate member 62.

[0039] The first embodiment will now be explained with respect to figures 3-5 and 11-12. As best seen in figures 3-5, the fastening element 42 is formed separately from the frame 1 and from the shell 100. The shell profiles 4, 4' in each case comprise a profile base 43, 43' and a first profile wall 44, 44' and a second profile wall 45, 45', wherein a seat 41, 41' for receiving the end portion 101, 101' of the shell 100, 100' is delimited by opposing first and second inner surfaces 46, 46', 47, 47' of said first and second profile walls 44, 44', 45, 45'. Once the shells 100, 100' are inserted in the seats 41, 41' of the respective shell profile 4, 4', said shells 100, 100' are fastened by means of fastening elements 42, 42' which are inserted into the seats 41, 41', namely in each case within a space 412, 412' formed between the end portion 101, 101' of the shell 100, 100' and the first or the second profile wall 44, 44', 45, 45' of the shell profile 4, 4'. For reasons of simplicity, reference is made in the following to one of the frames and accordingly to one of the shell profiles and fastening elements only. However, any aspects regarding one of the profile shells and fastening elements are equally present on the other profile shell and fastening element, respectively.

[0040] In the present case, the fastening element 42' can be seen as a clamping element which is clamped within the space 412' formed between the profile wall 44', 45' and the shell 100', wherein the fastening element 42', the seat 41' and the end portion 101' of the shell 100' are dimensioned such, that the distance between the first profile wall 44' and the second profile 45'wall essentially equals the sum of the thickness of the end portion 101' of the shell 100' and the thickness of the fastening element 42' in the region of insertion of the end portion 101' in the seat 41' of the shell profile 4'. Or, in other words, the fastening element 42' is configured such, that when the end portion 101' of the shell 100' is received in the seat 41', the fastening element 42' may be slid into the shell profile 4' along an extension direction E or may be pushed along a direction TE transverse to said extension direction E into the space 412' formed between the end portion 101' of the shell 100' and the first profile wall 44' or the second profile wall 45', respectively, whilst the end portion 101' of the shell 100 is pressed against the second profile wall 45' or against the first profile wall 44', respectively. The fastening element 42', and as a result also the end portion 101' of the shell 100', are thereby fastened by means of a friction fit and a positive-locking fit only, i.e. without the need of any additional fastening means such as an adhesive or by sewing, for example.

[0041] An additional fixation of the fastening element 42' and the end portion 101' of the shell 100' is achieved by means of retaining structures provided on the fastening element and the profile walls. In fact, the second profile wall 45' and the fastening element 42' comprise mutually interacting retaining structures 413', 414'. Here, the retaining structure of the second profile wall 45' is provided as a lug 414' formed on the free end 411' of the second profile wall 45', which lug extends from the second inner surface 47' inwards in the direction of the seat 41'. Said lug 414' provides a stop for the retaining structure in the form of a protrusion 413' formed on the fastening element 42', such that a removal of the fastening element 42' being inserted into the shell profile 4' out of the shell profile 4' is made more difficult, e.g. because a greater amount of force is needed for the removal. The fastening element 42' is thus engaged or snapped in the shell profile 4'. Moreover, the fastening element 42' comprises a further retaining structure 415' in the form of a further protrusion, which, when the end portion 101' of the shell 100' is received in the seat 41', presses against the surface 102' of the shell 100' facing said further retaining structure 415', such that an additional fastening of the end portion 101' being received in the seat 41' is effected. As best seen in figures 11 and 12, the fastening element 42' has an elongate

shape with an upper side 418' and a lower side 419', wherein the retaining structures 413', 415' are arranged opposite one another and in each case extend along an entire width WF of the fastening element 42'. Since the further retaining structure 415' is formed on the upper side 419' of the fastening element 412', the fastening element 412' essentially takes the form of an "L". Furthermore, the fastening element 42' extends, when inserted in the seat 41' of the shell profile 4', partially along the extension direction E of the shell profile. In fact, the fastening element 42' has a width WF that is a small fraction of the extension lengths of the first and second profile walls 44', 45' along the extension direction E. It is therefore conceivable to provide two or more, in particular a plurality of such fastening elements 42' which can be distributed along said extension direction E around substantially the entire frame 1. However, it is also possible to provide one single fastening element only, in which case said single fastening element preferably has a width that essentially corresponds to the extension lengths of the first and second profile walls along the extension direction E, and as a result, the single fastening element extends along said extension direction E around substantially the entire frame. In the present example, the fastening element 42' is dimensioned such, that a gap 417' is formed between the profile base 43' and the lower side 418' of the fastening element 42' and that the upper side 419' of the fastening element 42' is essentially flush with the free end 411' of the second profile wall 45' when the fastening element 42' is inserted in the seat 41' of the frame 1'. However, it is likewise conceivable to dimension the fastening element 42' such, that its upper side 419' projects beyond the free end 411' of the second profile wall 45' when the fastening element 42' is inserted in the seat 41' of the frame 1'. Such a design would facilitate the removal of the fastening element 42' being inserted in the seat 41', since the projecting upper side 419' could be grasped by a tool such as pliers. In addition, the free end region 48' of the first profile wall 44' has a retaining structure 416' in the form of a lug extending inwards in the direction of the seat 41', wherein said retaining structure 416', when the end portion 101' of the shell 100' is received in the seat 41', presses against the surface 103' of the shell 100' facing said retaining structure 416' such that an additional fastening of the end portion 101' being received in the seat 41' is effected.

[0042] In the region of the seat 41', the first and second profile walls 44', 45' extend essentially parallel to one another, wherein the second profile wall 45' has a length LP2 which is greater than the length LP1 of the first profile wall 44' along the transverse direction TE. In other words, the shell profile 4 has essentially the shape of a "U", wherein the first and second profile walls 44', 45' correspond to the side legs of said "U", and wherein the side leg associated with the second profile wall 45' is longer than the side leg associated with the first profile wall 44'. Moreover, the region of the second profile wall 45' that is extended with respect to the first profile wall 44' is arranged offset with respect to the remaining part of said second profile wall 45'. By means of said offset arrangement as well as the retaining structure 414' in the form of the lug provided at the free end 411' of the second profile wall 45' a groove 420' is formed, within which groove 420' the retaining structure 413' of the fastening element 42' can be received. The shell 100' in turn has a curvature 104' dividing the shell 100' into the end portion 101' and a main portion 105', whereby the main portion 105' is arranged offset with respect to the end portion 101', and wherein the length LP2 of the second profile wall 45' essentially equals the overall length of the end portion 101' and the curvature 104' in the transverse direction TE. When the fastening element 42' is inserted in the seat 41' of the frame 1, the second retaining structure 415' of the fastening element 42' presses against the first surface 102' of the shell 100' in the region of the curvature 104'. The curvature 104', in particular its inclination and its longitudinal extension, is selected in this case such, that the main portion 105' is laterally offset with respect to the end portion 101' of the shell 100' and essentially flush with the first profile wall 44'. In other words, the main portion 105' of the shell 100' and the first profile wall 44' essentially extend in a common plane.

[0043] In the following, the second and third embodiment of the frame construction will be described with reference to figures 13 to 15 and figures 16 to 17c, respectively. It should be noted that the frame construction in these figures is shown rather schematically. For example, the connection profile 3, 3' is merely outlined as a recess and the profile 2, 2' serving the purpose of connecting the liner 6 to the frame 1, 1' is completely omitted. It should be understood that one or both of these profiles 2, 2', 3, 3' as well as any other aspect of the above-described frame construction according to the first embodiment can equally be present on the frame construction according to the second and the third embodiment, respectively.

As has been mentioned previously, the frame construction according to the second embodiment differs from the frame construction according the first embodiment manly in that the fastening element is provided by means of the elongate member 62 being attached to the liner 6. To this end, the second profile wall 45 of the shell profile 4 has a recess 421, into which the elongate member 62 can be received. The recess 421 is formed in the second profile wall 45 such, that the elongate member 62 presses against the shell 100, in particular against the curvature 104 of the shell 100, and thereby clamps the shell 100 within the shell profile 4. In this case, the elongate member 62 acts as a clamping element which fastens the shell 100 to the frame 1 by means of a friction fit and a positive-locking fit only, i.e. without the need of any additional fastening means such as an adhesive or by sewing. Thus, also the frame construction according to the second embodiment allows a removable fixation of the elongate member 62, and as a consequence of the shell 100, to the frame 1.

[0044] The same holds for the frame construction according to the third embodiment. Namely, said frame construction is characterized by a fastening element 106 being formed integrally on the end portion 101 of the shell 100, wherein the

fastening element 106 has the form of a locking tab protruding from the end portion 101 of the shell 100 and being configured to snap into a correspondingly shaped groove 422 provided within the shell profile 4 of the frame 1. As best seen in figures 17a to 17c, the first and second profile walls 44, 45 of the shell profile 4 delimit a narrow insertion opening and seat, the clear width of which essentially corresponds to the thickness of the shell 100. In order to make it possible to insert the end portion 101 of the shell 100 with its protruding locking tab 106 into the seat of the shell profile 4, the locking tab 106 is configured compressible, preferably spring-elastically. Once the end portion 101 with its locking tab 106 is inserted in the seat of the shell profile 4, the locking tab 106 is pushed away from the end portion 101 of the shell 100 and latches in the groove 422 formed in the second profile wall 45 of the shell profile 4. In this manner the shell 100 is removably clamped within the shell profile 4. As can be seen in figure 16, it is thereby conceivable to provide a plurality of such locking tabs 106 on the shell 100. Hence, the frame construction according to the third embodiment allows a removable fastening of the shell to the frame construction, too.

LIST OF REFERENCE SIGNS

1000	suitcase	31, 31’	inner surface
100, 100’	suitcase shell	32, 32’	outer surface
101, 101’	end portion		
102, 102’	first surface	4, 4’	shell profile
103, 103’	second surface	41, 41’	seat
104, 104’	curvature	42	fastening element
105, 105’	main portion	43, 43’	profile base
106, 106’	locking tab	44, 44’	first profile wall
		45, 45’	second profile wall
10	frame construction	46, 46’	first inner surface
11	hinge	47, 47’	second inner surface
12	wheel assembly	48, 48’	free end region of first profile wall
121	wheel		
13	pull-out handle	49, 49’	free end region of second profile wall
14	handgrip	410, 410’	free end of first profile wall
1, 1’	frame	411, 411’	free end of second profile wall
2, 2’	U-shaped profile		
21, 21’	profile base	412, 412’	space
22, 22’	first profile wall	413, 413’	retaining structure of fastening element
23, 23’	second profile wall		
24, 24’	first inner surface	414, 414’	retaining structure of second profile wall
25, 25’	second inner surface		
26, 26’	first groove	415, 415’	retaining structure of fastening element
27, 27’	second groove		
28, 28’	seat	416, 416’	retaining structure of first profile wall
29, 29’	free edge region		
210, 210’	free edge region	417, 417’	gap
211, 211’	gap	418, 418’	lower side of fastening element
3, 3’	connection profile element	419, 419’	upper side of fastening
		64	second liner piece
420, 420’	groove		
421, 421’	recess	L	longitudinal direction
422, 422’	groove	T	transverse direction
		D	depth
5	strip	HS	height of strip
51	lateral edge region	WS	width of strip
52	lateral edge region	WU, WU’	clear width of seat
		DG, DG’	distance between grooves
6	liner	E	extension direction
61	fold	TE	transverse direction

(continued)

62	elongate member	LP1	length of first profile wall
63	first liner piece	LP2	length of second profile wall

Claims

1. A frame construction (10) for a piece of luggage comprising:

   - a shell (100) with an end portion (101); and
   - a frame (1), wherein the frame (1) comprises a profile (4) extending in an extension direction (E) and having a profile base (43) and a first profile wall (44) and a second profile wall (45), a seat (41) for receiving the end portion (101) of the shell (100) being delimited by opposing first and second inner surfaces (46; 47) of said first and second profile walls (44; 45);

   characterized in
   that the frame construction (10) further comprises at least one fastening element (42; 62; 106), wherein said fastening element (42; 62; 106) is configured to be removably inserted in the seat (41) of the profile (4) so as to removably fasten the end portion (101) of the shell (100) being received in the seat (41) to the frame (1).

2. The frame construction (10) according to claim 1, wherein the fastening element (42; 62; 106) is fastened to the frame (1) by means of a friction fit and/or a positive-locking fit.

3. The frame construction (10) according to claim 1 or 2, wherein the fastening element (42) is formed separately from the frame (1) and/or from the shell (100).

4. The frame construction (10) according to any one of the preceding claims, wherein the fastening element (42) is configured such, that when the end portion (101) of the shell (100) is received in the seat (41), the fastening element (42) may be slid into the profile (4) along said extension direction (E) into a space (412) formed between the end portion (101) of the shell (100) and the first profile wall (44) or the second profile wall (45), respectively, whilst the end portion (101) of the shell (100) is pressed against the second profile wall (45) or against the first profile wall (44), respectively.

5. The frame construction (10) according to any one of the preceding claims, wherein the fastening element (42) is configured such, that when the end portion (101) of the shell (100) is received in the seat (41), the fastening element (42) may be pushed into a space (412) formed between the end portion (101) of the shell (100) and the first profile wall (44) or the second profile wall (45), respectively, along a direction (TE) transverse to said extension direction (E) whilst the end portion (101) of the shell (100) is pressed against the second profile wall (45) or against the first profile wall (44), respectively.

6. The frame construction (10) according to any one of the preceding claims, wherein at least one of the profile walls (45) and the fastening element (42) in each case comprises at least one retaining structure (413; 414), said retaining structures (413; 414) being configured to mutually interact with one another such that an additional mechanical fastening of the fastening element (42) in the frame (1) is effected.

7. The frame construction (10) according to claim 6, wherein the retaining structure (413) on the fastening element (42) is a first protrusion and the retaining structure (414) on the at least one of the profile walls (45) is a toothing provided on the inner surface (47) of the said profile wall (45) and/or a lug extending inwards in the direction of the seat, the first protrusion (413) and the toothing being configured to engage one another and the lug (414) providing a stop for the first protrusion (413).

8. The frame construction (10) according to any one of the preceding claims, wherein the fastening element (42) comprises a second retaining structure (415), preferably in the form of a second protrusion, which, when the end portion (101) of the shell (100) is received in the seat (41), presses against a first surface (102) of the shell (100) such that an additional fastening of the end portion (101) being received in the seat (41) is effected.

9. The frame construction (10) according to any one of the preceding claims, wherein the free end region (48) of at

least one of the profile walls (44) has a retaining structure (416), preferably in the form of a lug, extending inwards in the direction of the seat (41), wherein said retaining structure (416), when the end portion (101) of the shell (100) is received in the seat (41), presses against a second surface (103) of the shell (100) such that an additional fastening of the end portion (101) being received in the seat (41) is effected.

10. The frame construction (10) according to any one of the preceding claims, wherein, in the region of the seat (41), the first and second profile walls (44; 45) extend essentially parallel to one another, and/or

wherein the second profile wall (45) has a length (LP2) which is greater than the length (LP1) of the first profile wall (44) along a direction (TE) transverse to said extension direction (E).

11. The frame construction (10) according to any one of the preceding claims, wherein the fastening element (42) is dimensioned such, that a gap (417) is formed between the profile base (43) and a lower side (418) of the fastening element (42) when the fastening element (42) is inserted in the seat of the frame (1), and/or

wherein the fastening element (42) is dimensioned such, that an upper side (419) of the fastening element (42) is essentially flush with the free end (411) of the second profile wall (45) or that its upper side (419) projects beyond the free end (411) of the second profile wall (45) when the fastening element (42) is inserted in the seat of the frame (1).

12. The frame construction (10) according to any one of the preceding claims, wherein the shell (100) has a curvature (104) dividing the shell (100) into the said end portion (101) and a main portion (105), whereby the main portion (105) is arranged off-set with respect to the end portion (101), wherein the length (LP2) of the second profile wall (45) essentially equals the overall length of the end portion (101) and the curvature (104) in a direction (TE) transverse to the extension direction (E), and wherein the second retaining structure (415) of the fastening element (42), when the fastening element (42) is inserted in the seat (41) of the frame (1), preferably presses against the first surface (102) of the shell (100) in the region of the curvature (104).

13. The frame construction (10) according to any one of the preceding claims, comprising a further frame (1), wherein the frame (1) comprises a connection profile (3) and the further frame (1') comprises a further connection profile (3') being designed complementary to the connection profile (3) of the frame (1), the connection profile (3) and the further connection profile (3') being configured to enter into a preferably positive connection with one another.

14. A piece of luggage (1000), preferably a suitcase, with a frame construction (10) according to any one of the preceding claims, wherein the end portion (101) of the shell (100) is received in the seat (41) of the frame (1) and removably fastened by means of the fastening element (42) being removably inserted in the seat (41) of the frame (1).

15. Method of fastening a shell to a frame construction of a piece of luggage comprising the steps of:

- Providing a piece of luggage with a frame construction (10) according to any one of the preceding claims 1 to 13;
- Inserting the end portion (101) of the shell (100) into the seat (41) of the profile (4); and
- Inserting the fastening element (42; 62; 106) in the seat (41) of the profile (4).

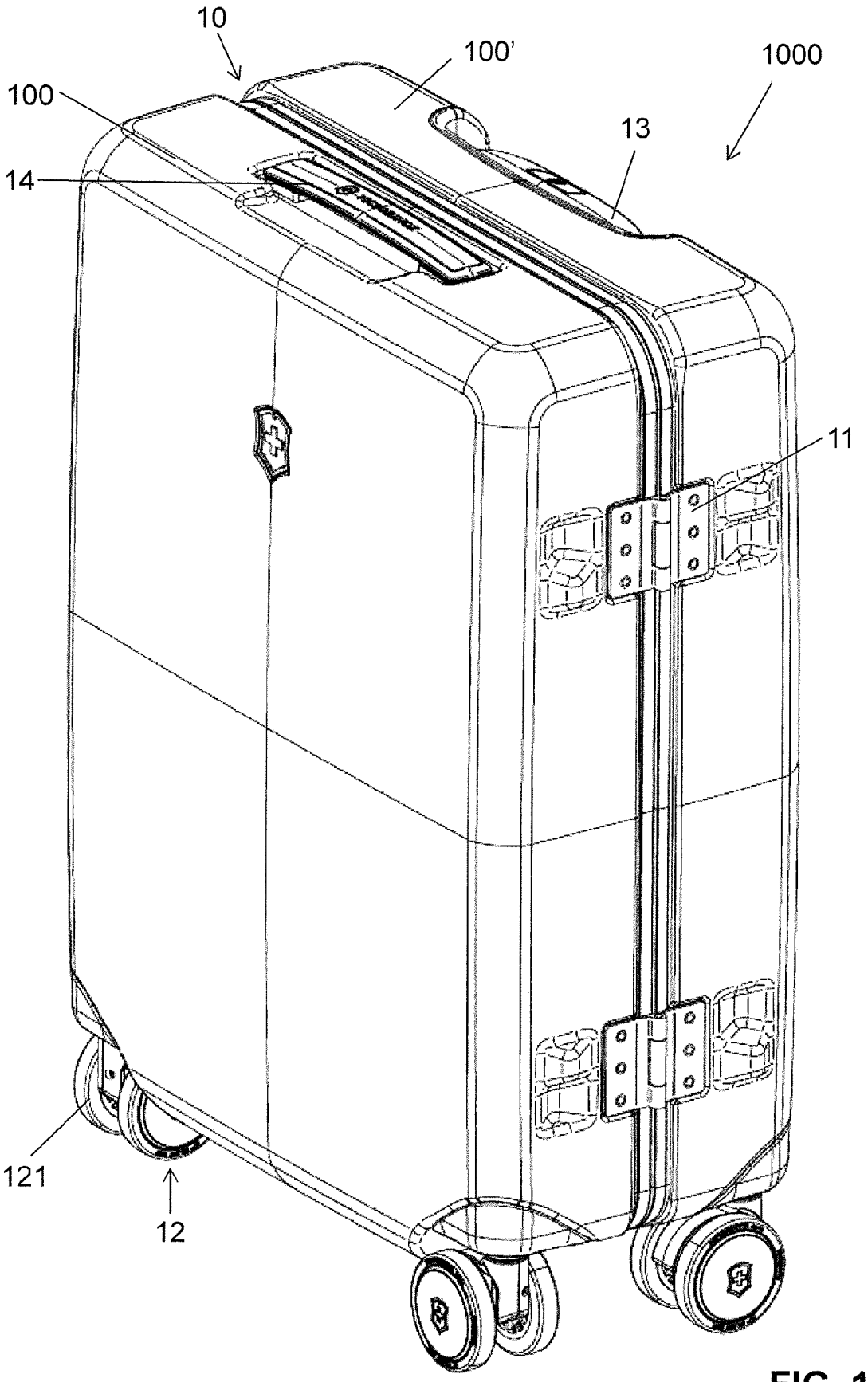


FIG. 1

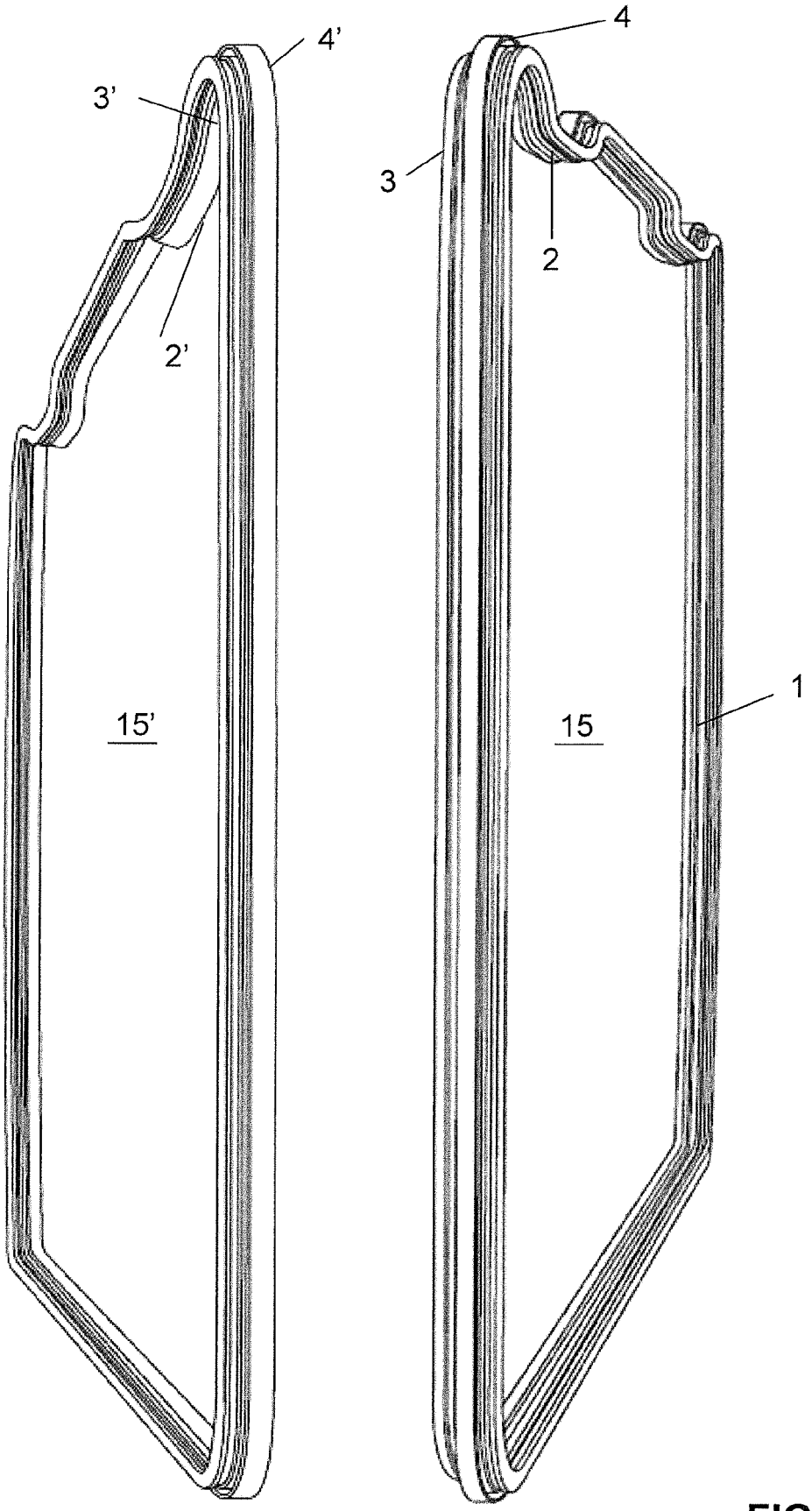


FIG. 2

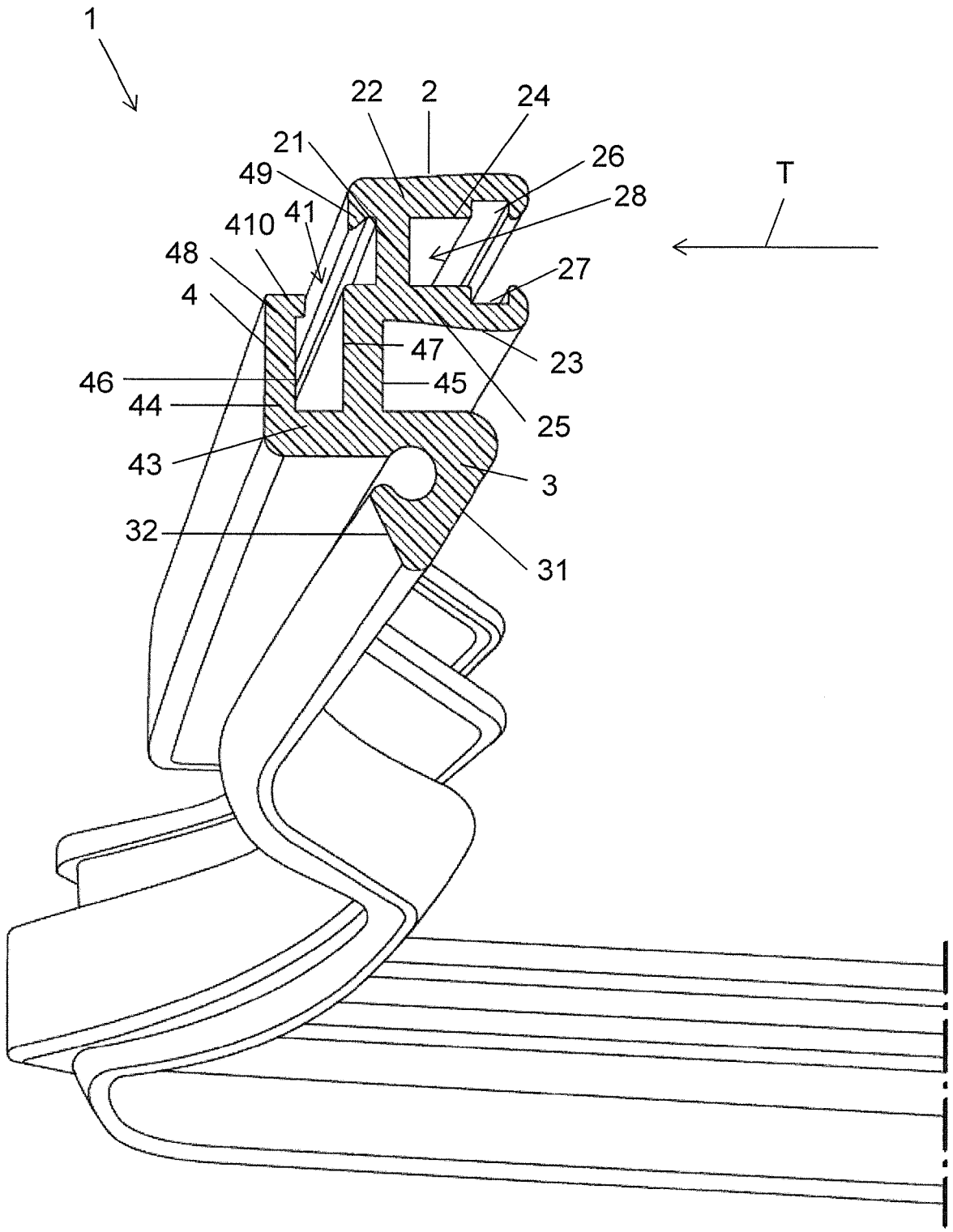


FIG. 3

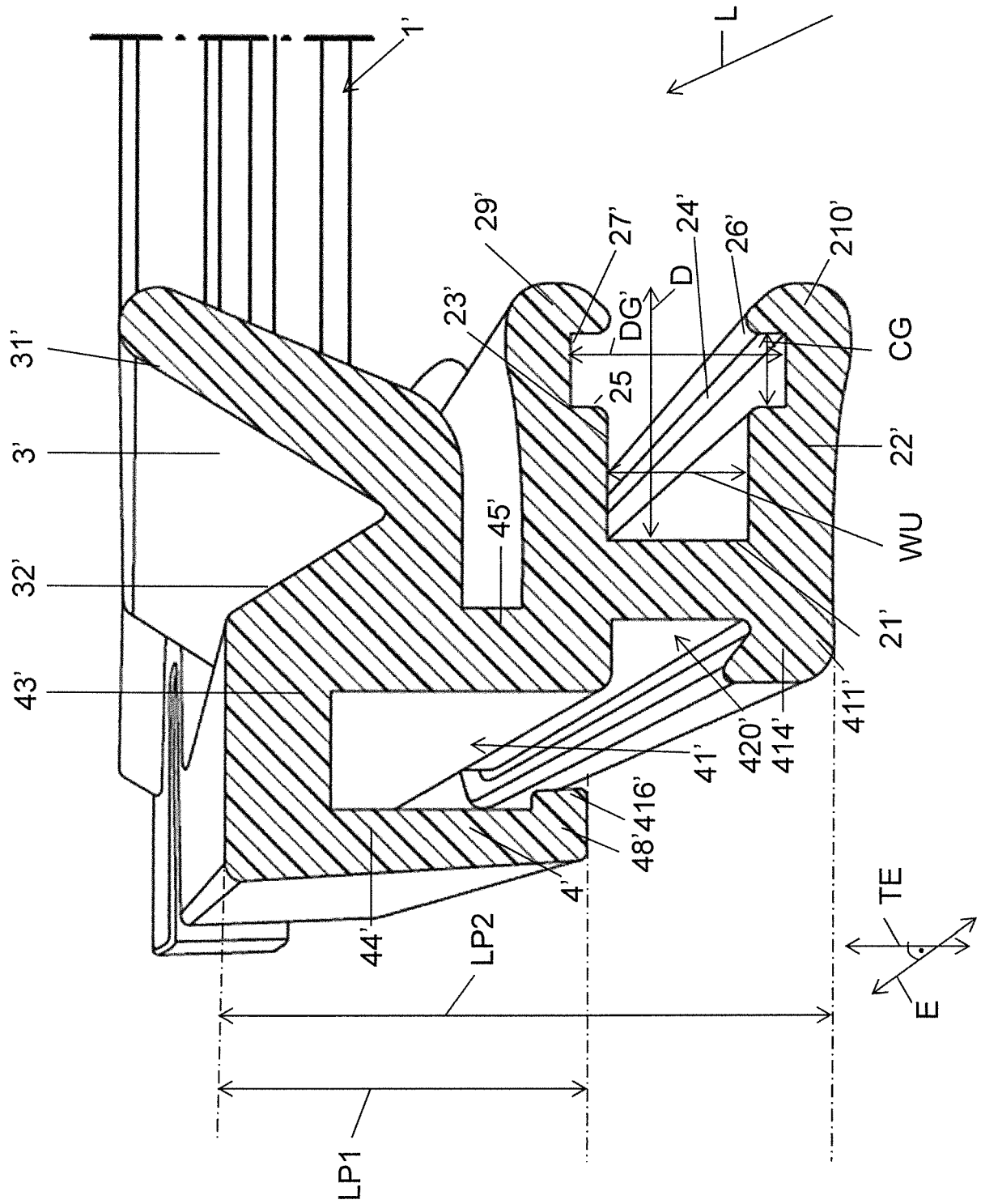
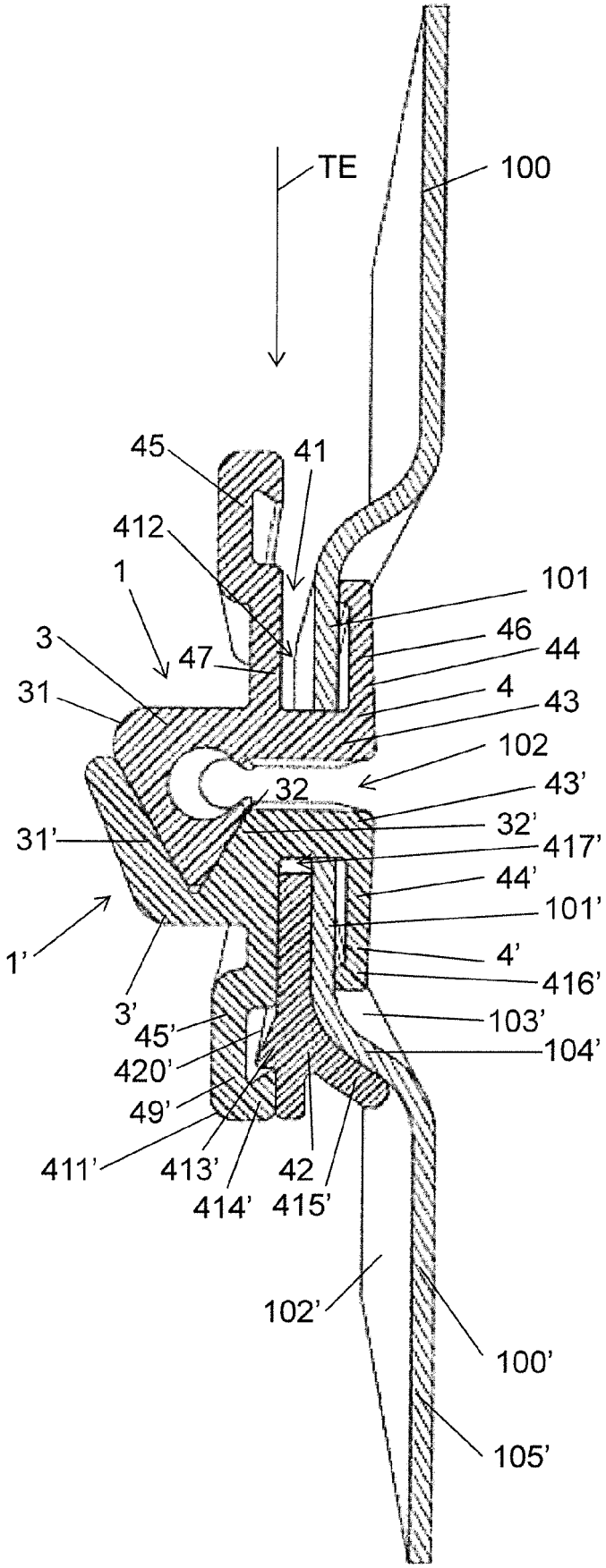

1'
L
29'
27'
24'
26'
210'
23'
DG'
D
CG
31'
25
3'
22'
45'
WU
32'
21'
43'
411'
41'
420'
414'
48'
416'
4'
44'
LP2
TE
E
LP1

FIG. 4


TE
100
45
41
412
1
101
3
47
46
44
31
4
43
102
32
43'
31'
32'
417'
44'
101'
1'
4'
416'
3'
45'
103'
104'
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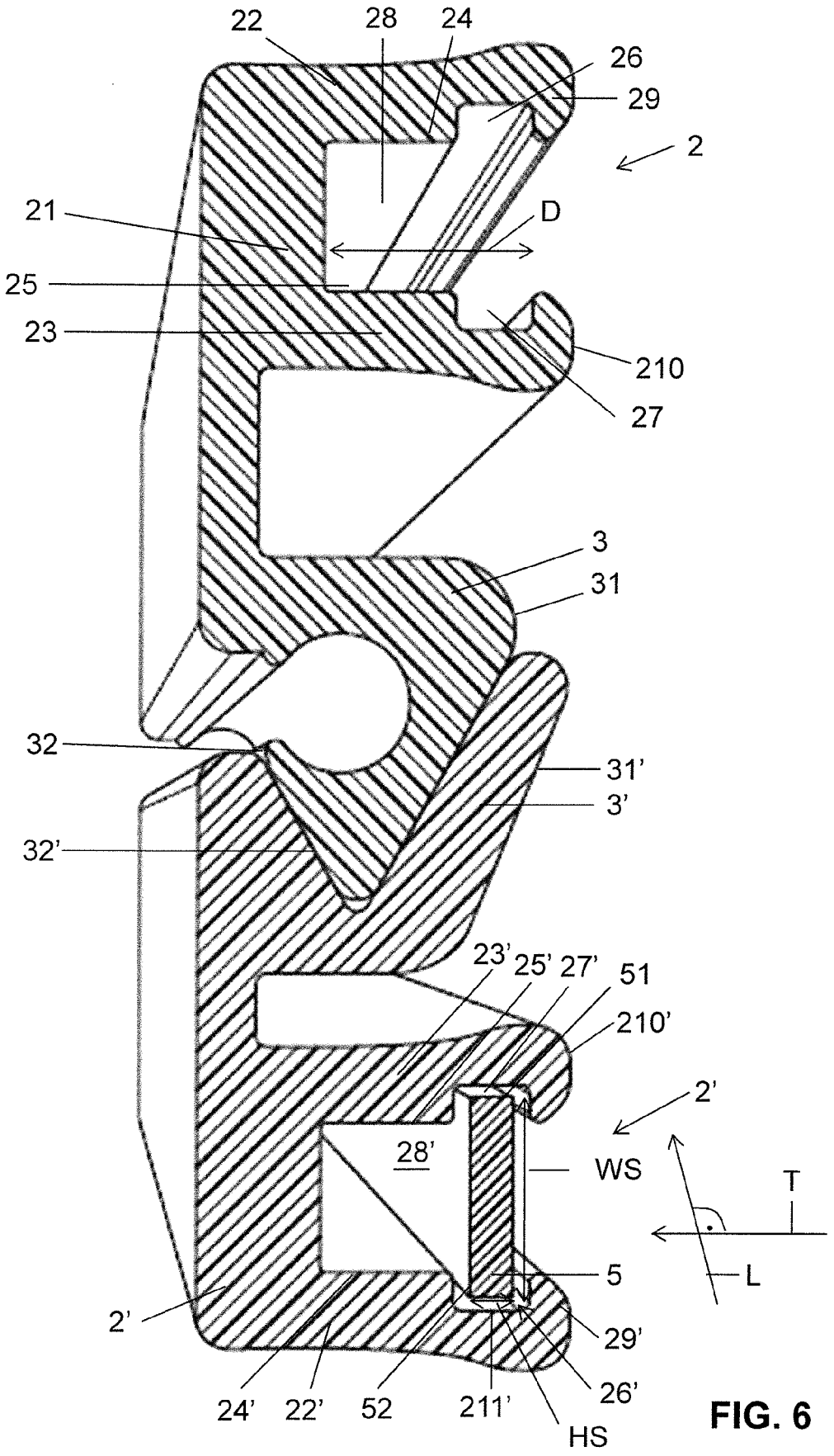
49'
411'
413'
42
414'
415'
102'
100'
105'

FIG. 5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27'
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52
211'
HS

FIG. 6

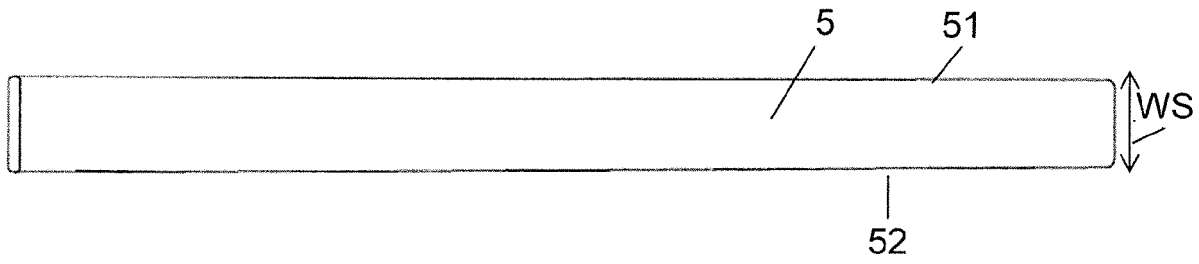

FIG. 7

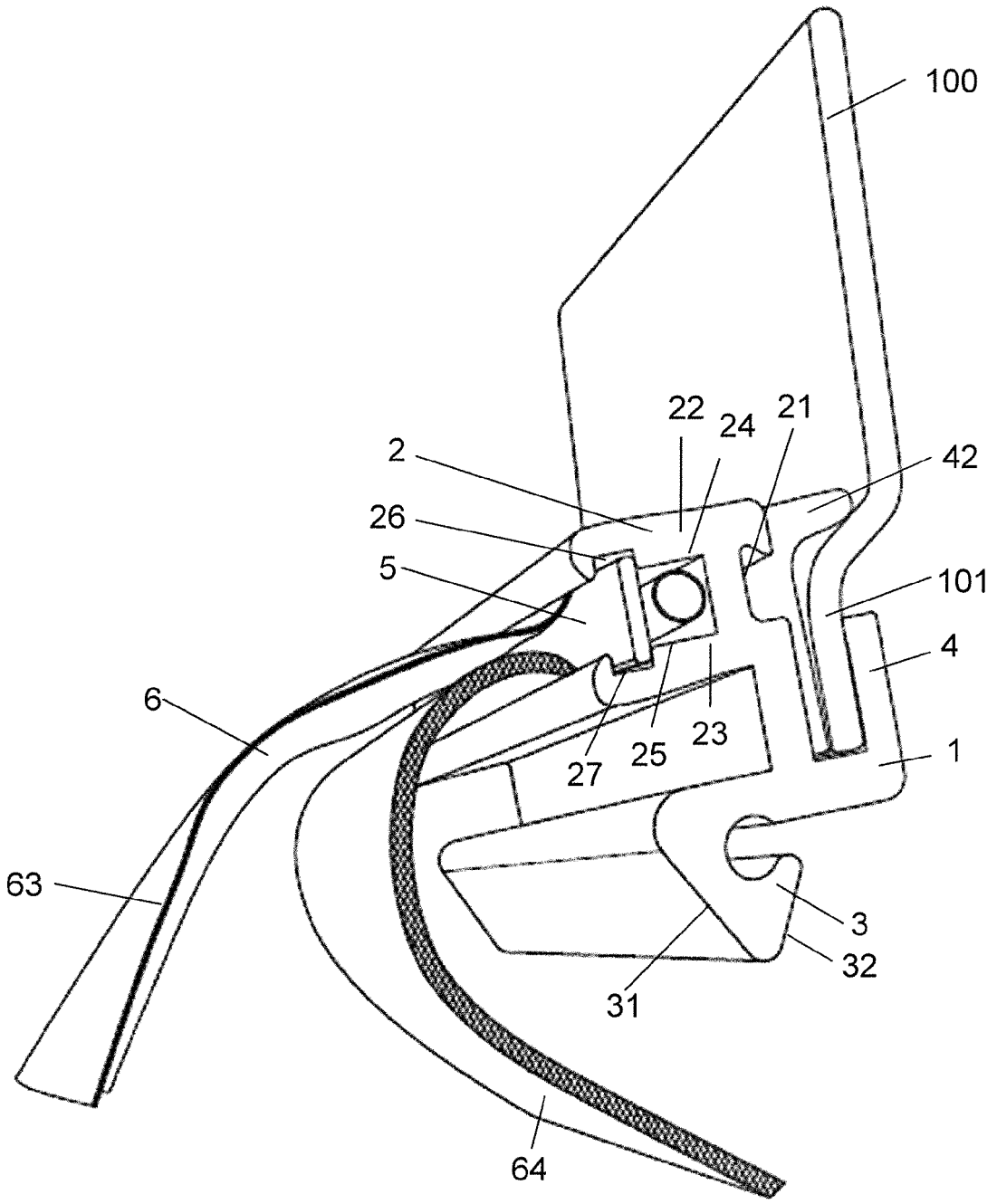

FIG. 8

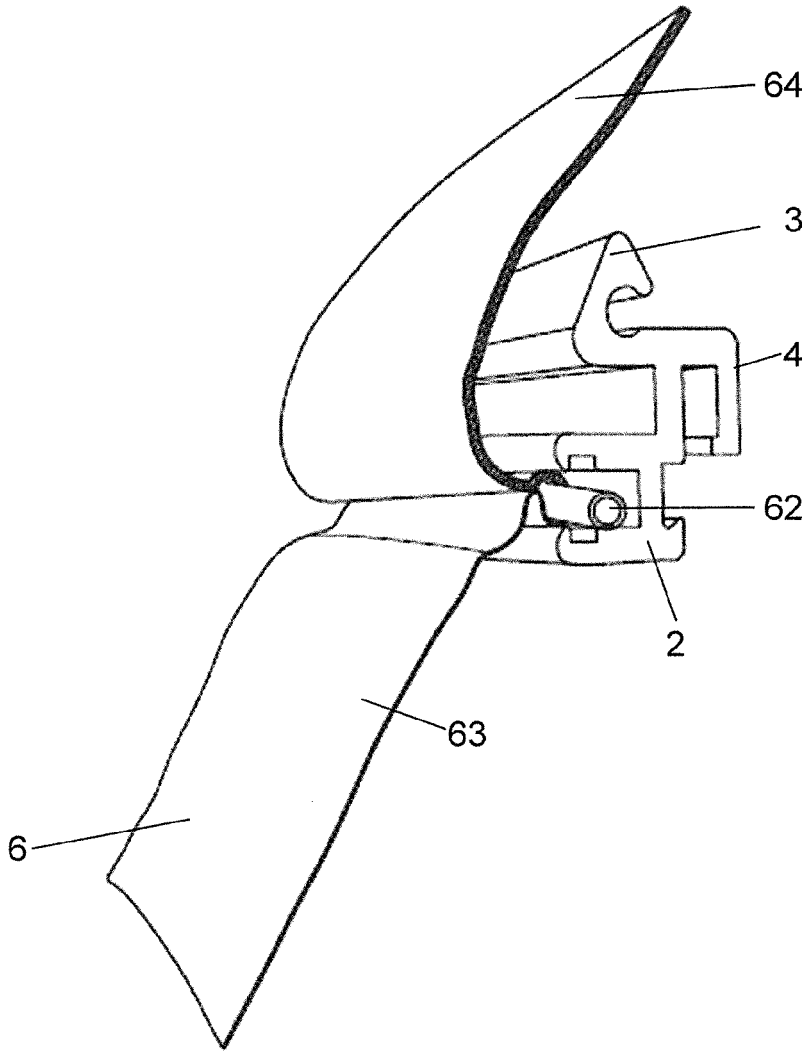

FIG. 9

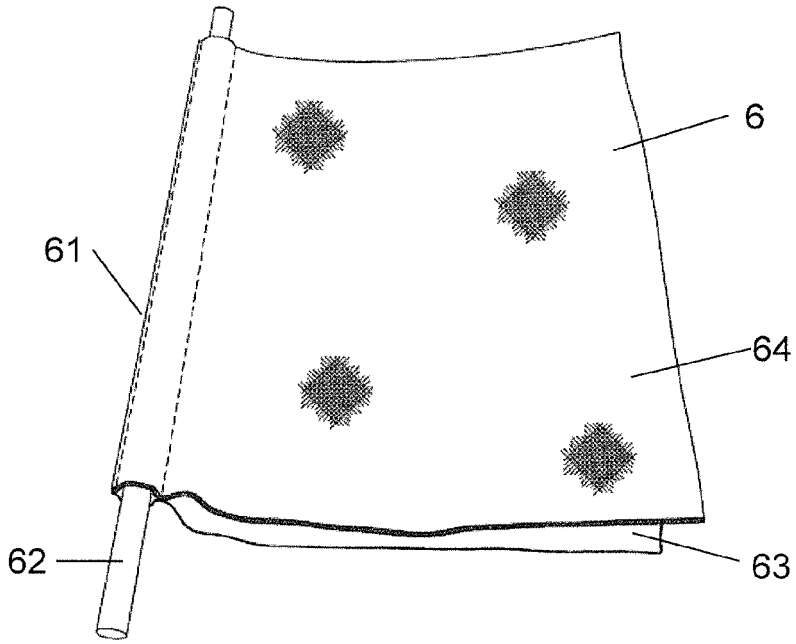

FIG. 10

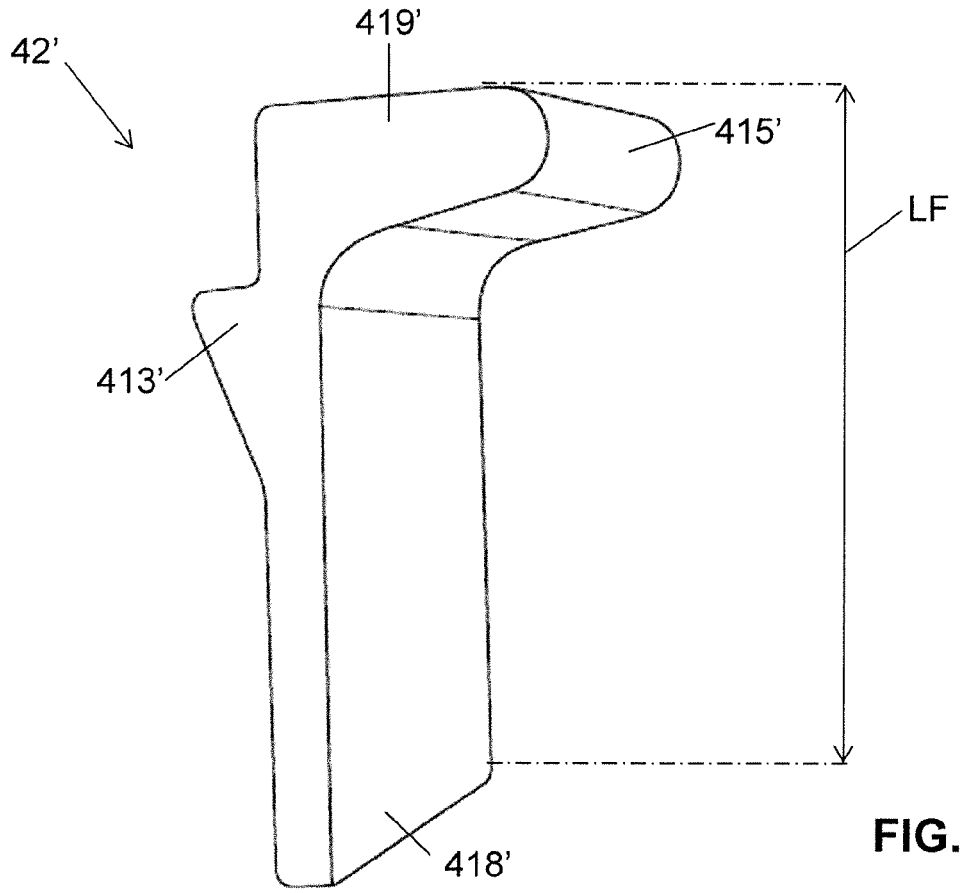

FIG. 11

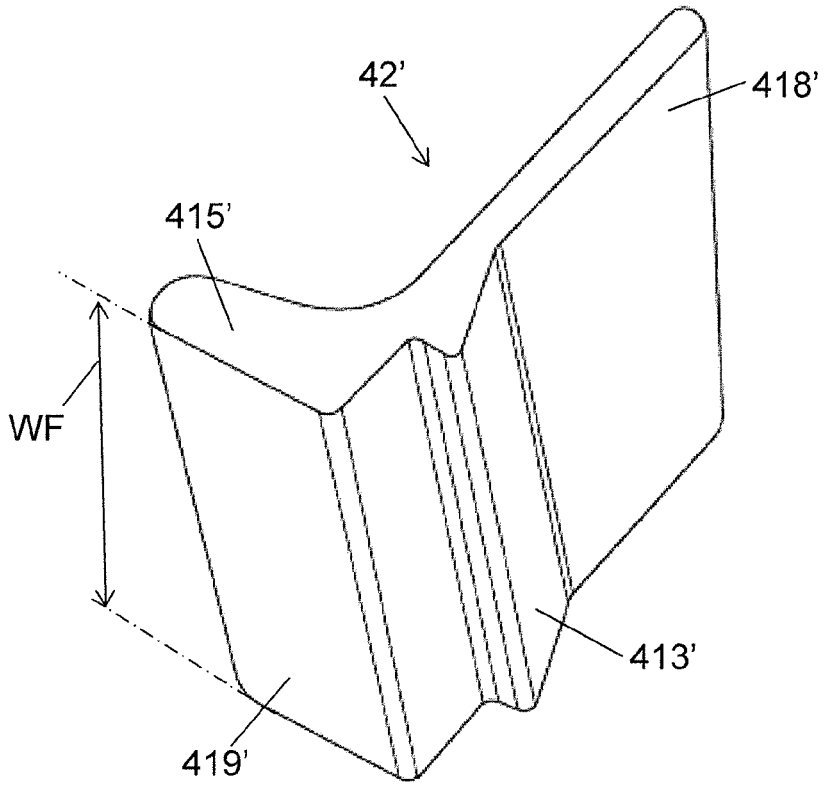

FIG. 12

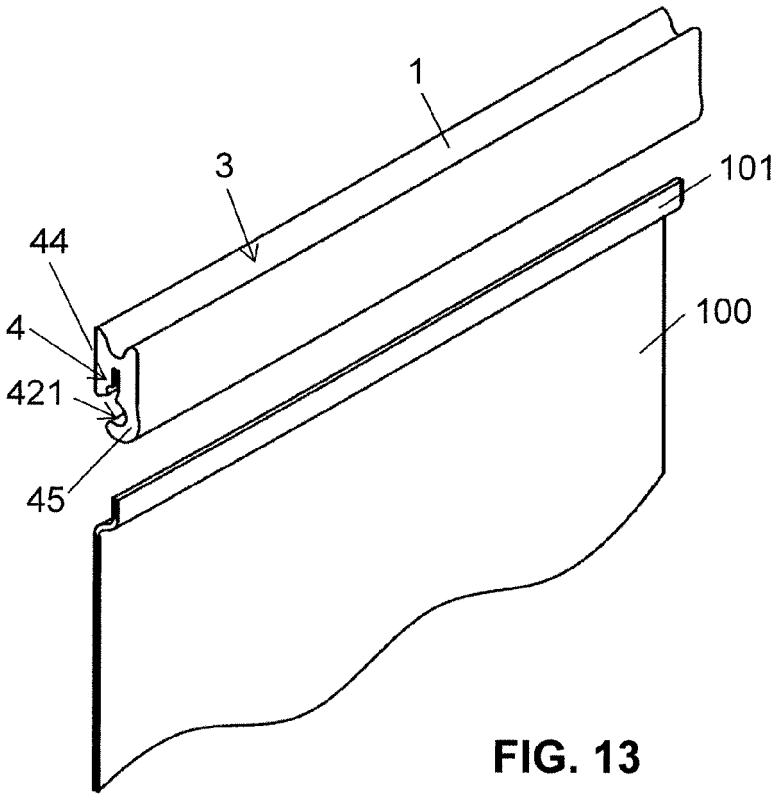

FIG. 13

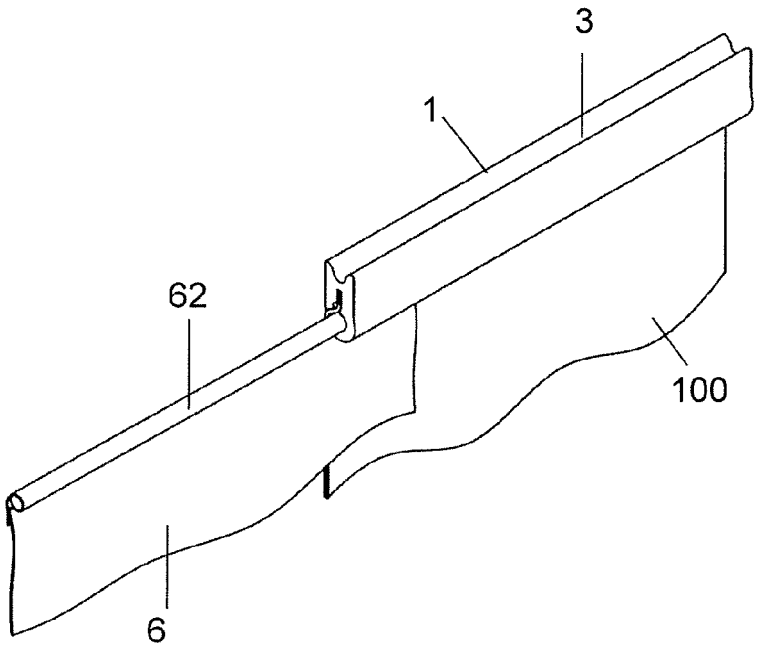

FIG. 14

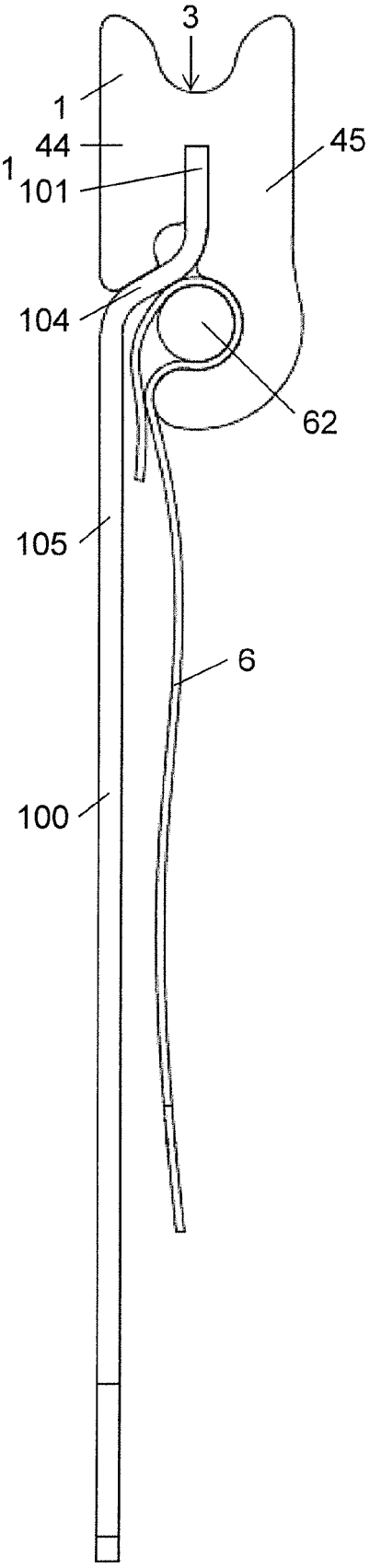

FIG. 15

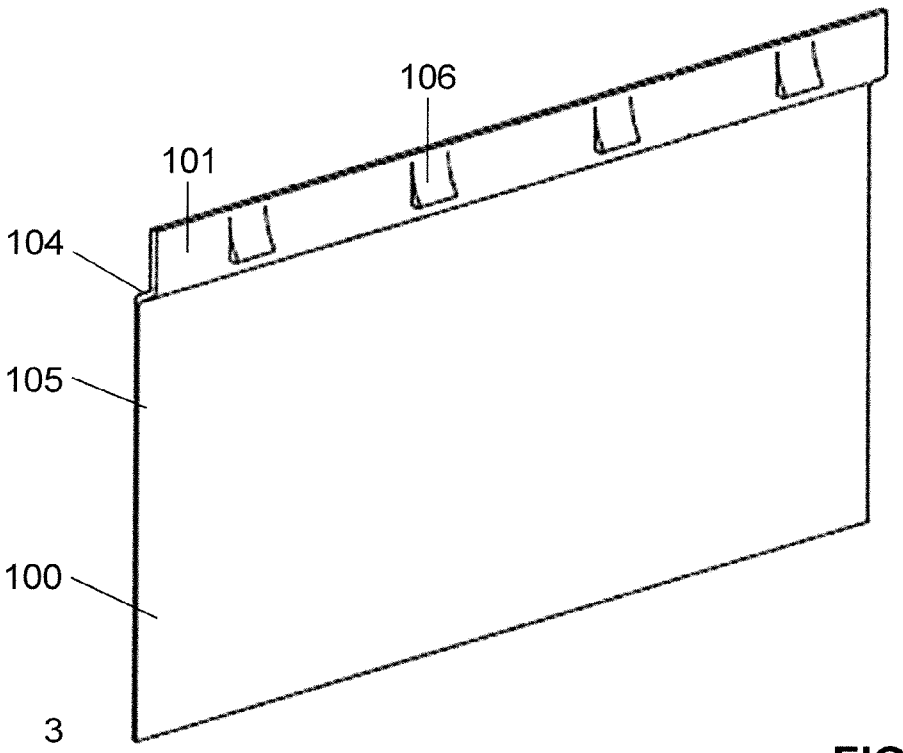

FIG. 16

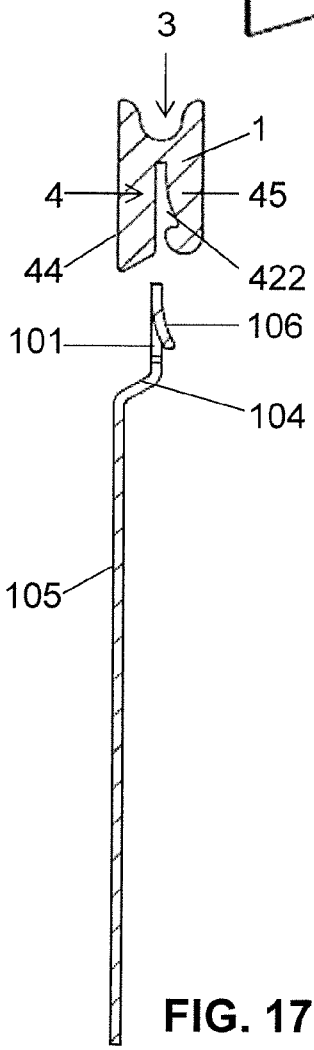

FIG. 17a

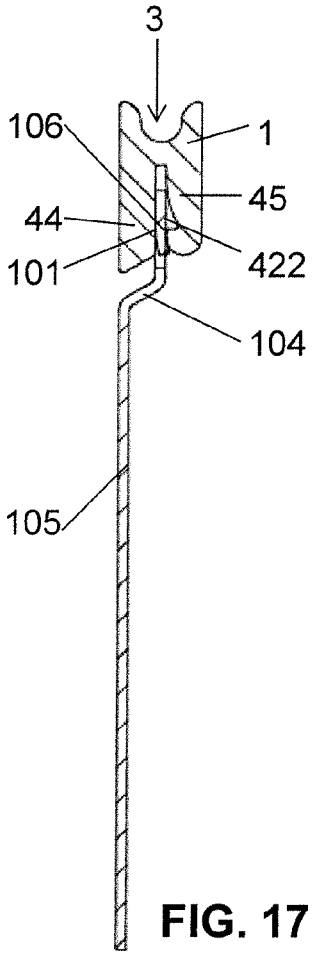

FIG. 17b

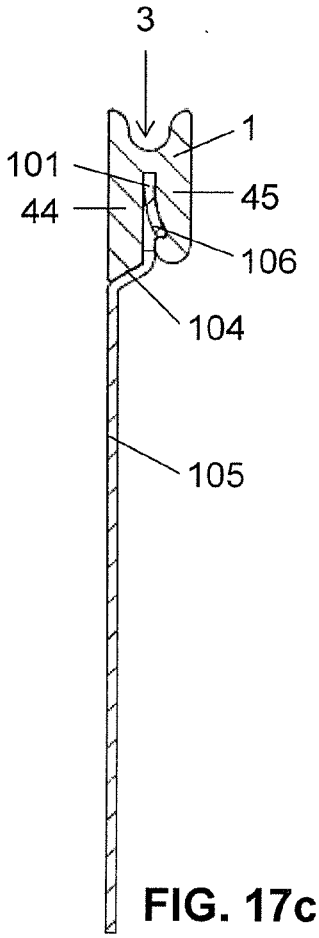

FIG. 17c

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EUROPEAN SEARCH REPORT

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
The Hague	27 September 2018	Nicolás, Carlos

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