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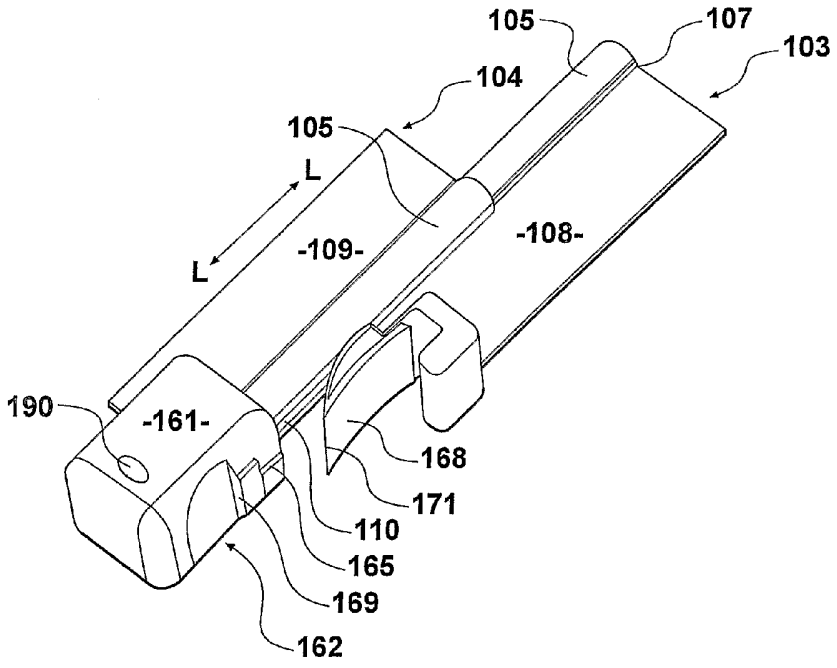
(54) **Title:** ZIP END STOP AND ZIP INCORPORATING SUCH



(57) **Abstract:** A zip end stop for a jacket type zip has a pin box 161 attached to the bottom end of a female zip track 104 and has a rebate 165 or recess for the purposes of receiving a resilient latch attached to the bottom end of a tape or flange attached to the male zip track 103. When engaged the latch will be securely held in the rebate and resists longitudinal movement of the male profile relative to the female profile.

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ZIP END STOP AND ZIP INCORPORATING SUCH

TECHNICAL FIELD OF THE INVENTION

The present invention relates to a zip end stop and zip incorporating such and in particular though not solely to an end stop which can be affixed to or is incorporated at an end of a substantially constant cross section profile zip to prevent movement of one half of the zipper along the other half.

BACKGROUND OF THE INVENTION

Today, zips come in all shapes, sizes and materials for the numerous applications such as for example, different types of garments, bags, luggage and footwear.

The most common form of zip that is used in the garment industry utilises two zipper tracks presenting a series of tooth like elements which are able to move in and out of engagement with each other by the use of a slider. A common zip stop used with this kind of zip is one having a pin box located at one end of a zip track and which also retains a slider and a pin on the other track for engaging and joining of two zipper halves so as to prevent lateral movement of the zipper halves at the end of the zip.

Other zips such as the extruded kind most commonly known in the packaging industry comprise generally of mutually cooperative male and female extruded closure tracks. However whilst such zips have been in use for many years in the packaging industry it would appear that it is only since recent times that such zips have been designed for the use with garments.

DEFINITIONS

The following definitions relate to conventional toothed (chain) type zip fasteners but assist in explaining the component parts many of which have counterparts in the fastener of this invention.

CHAIN

The continuous piece that is formed when both halves of a zipper are meshed together.

CHAIN SIZE

Refers to the specific gauge of the chain, i.e., size of the teeth.

TEETH

The individual elements that make up the chain.

SLIDER

The device that moves up and down the chain to open or close the zipper.

PULL TAB

The part of the slider that you hold to move the slider up or down.

MATERIAL

Refers to the type of chain that is used in the construction of the zipper, such as, metal chain, moulded plastic chain or coil (nylon) chain.

TAPE

The fabric part of the zipper.

TAPE WIDTH

Refers to the width of the fabric on one side only, of the zipper chain.

TAPE ENDS

The fabric part of the zipper that extends beyond the teeth, at the top and / or bottom of the chain.

STYLE

Refers to the manner in which the zipper is assembled for a particular application.

TOP STOP

Two devices affixed to the top of a zipper, to prevent the slider from coming off the chain.

BOTTOM STOP

A device affixed to the bottom of a zipper, to prevent further movement of the half of the zipper from separating.

BRIDGE STOP

A device similar to a bottom stop, used at the top of a zipper to prevent each half of the zipper from separating.

PIN

A device used on a separating (jacket type) zipper whose function is to allow the joining of the two zipper halves.

PIN BOX

A device used on a separating (jacket type) zipper whose function is to correctly align the pin, to begin the joining of the zipper halves.

HEAT SEAL PATCH

The cotton and nylon laminated material fused to the bottom end of a separating zipper, used to reinforce the type.

HEAT-SEALABLE ZIPPERS (WELDABLE LAMINATED ZIPPERS)

Any zipper that has a strip of plastic fused to each half of the zipper tape to allow a manufacturer to electronically "weld" the zipper onto the garment or item that is being manufactured, without the need of sewing or stitching.

CONTINUOUS CHAIN

Any material or size of zipper chain that is continuously spooled without sliders or any other components. Typically used by fabricators on a cut-as-need basis.

CUT-TO-LENGTH ZIPPERS

(Finished Zippers.) Any zipper that is finished to a specific length, with all necessary components attached.

TYPES OF ZIPS

Zip fasteners come in a variety of styles with one end closed, both ends closed, and both ends open. For example a trouser type zip has one end closed, and the slider retained on the zip by end stops. A bag type zip will typically have both ends of the zip closed and will typically have two sliders retained between the closed ends, so that as the sliders move towards the respective closed ends, the central portion of the zip fastener will open.

Jacket type zips on the other hand have both ends of the zip fastener open so that the slider will be retained on one side of the zip fastener when the jacket is open. Such an open ended zip fastener typically has a pin at the end of one side and a pin box on the other side of the zip fastener enabling the two sides to be connected together so that the slider can be used to merge the two sides of the zip fastener.

A number of other configurations have been used with conventional zip fasteners, and the zip fastener of this invention can be configured in all these different ways, whether or not they have all been illustrated in the attached drawings.

REFERENCES

All references, including any patents or patent applications cited in this specification are hereby incorporated by reference. No admission is made that any reference constitutes prior art. The discussion of the references states what their authors assert, and the applicants reserve the right to challenge the accuracy and pertinency of the cited documents. It will be clearly understood that, although a number of prior art publications are referred to herein; this reference does not constitute an admission that any of these documents form part of the common general knowledge in the art, in New Zealand or in any other country.

It is acknowledged that the term 'comprise' may, under varying jurisdictions, be attributed with either an exclusive or an inclusive meaning. For the purpose of this specification, and unless otherwise noted, the term 'comprise' shall have an inclusive meaning - i.e. that it will be taken to mean an inclusion of not only the listed components it directly references, but also other non-specified components or elements. This rationale will also be used when the term 'comprised' or 'comprising' is used in relation to one or more steps in a method or process.

PRIOR ART

WO97/07702 illustrates an extruded zip consisting of a male zip track and a female zip track which are able to be merged and emerged by the use of a slider. However it would appear that the additional and contemporaneously mergable and de-mergable tooth like zip provided adjacent the extruded profile male/female zip is provided not only for the purposes of enhancing the lateral holding strength of the overall zip assembly to prevent the lateral separation of the closure provided by the assembly but also to prevent longitudinal movement. Therefore no zip stop locking mechanism for its extruded zip is necessary. It is important to prevent the male and female sides from sliding up and down relative to each other as such sliding movement is not desired.

US6510595 describes extruded profile zipper tracks. As seen from the drawings of US Patent 6510595, an engaging device presenting a fastening means is provided at one end of a male track and another engaging device presenting a complementary fastening means is

provided at one end of a female track for locking the ends of the male and female tracks together. It enhances resistance to longitudinal movement of the zipper tracks. However such fastening means are bulky and less convenient to operate than the pin box like means of traditional tooth like zips. A conscious alignment of the two elements defining the end stop is necessary. This can be difficult to achieve especially if the zip is provided on a jacket and the user is for example wearing gloves.

OBJECT

Accordingly the present invention is directed towards and aims to provide a zip and end stop therefore which addresses the abovementioned disadvantages or to at least provide the public with a useful choice.

STATEMENT OF INVENTION

In one aspect the invention provides an end stop for a zip having (a) a pin box disposed at the first to be engaged end of one of said male or female profile zip tracks, and (b) a latch disposed at the first to be engaged end of the other of said male or female profile zip tracks, wherein said latch has a latching pawl which is glidingly engagable in a longitudinal direction parallel to the elongate direction of the tracks, said pin box including a catch region with which said latching pawl is able to be pushed in alignment with and become operatively engaged to prevent a retraction of the latching pawl and hence its associated track in a direction opposite to the engagement direction, said latching pawl being of a sufficiently resilient material to allow it to flex from an operatively engagement tending condition to a condition retracted from said catch, to allow the selective disassociation of said latch with said pin box.

This end stop can be used with conventional toothed zips or with the novel zip described below where the male profile fits within and is retained by the female profile along the length of the zip when the zip is closed.

In a second aspect the invention provides a zip having two mutually engagable zip tracks, a slider capable of moving along the zip tracks to merge or demerge the tracks, each end of the zip having end stops to prevent the slider from escaping from the zip, at least one of the end stops being as described above.

Although the zip can have interengaging teeth as used in conventional toothed zips, it is preferred that the male and female tracks have male and female profiles of substantially constant cross section along the length of the zip. In such a case the male profile fits within and is retained by the female profile along the length of the zip when the zip is closed. To prevent sliding of the male profile relative to the female profile the end stop of this invention can be used to anchor the base of the zip (i.e. that end where the zip tracks are first joined).

Accordingly in a further aspect the present invention consists in an end stop for a zip having:

a pin box disposed at the first to be engaged distal end of one of said male or female profile zip tracks,

a latch disposed at the first to be engaged distal end of the other of said male or female profile zip tracks,

said latch including a latching pawl which is slidingly engagable in a longitudinal direction parallel to the elongate direction of the tracks, said pin box including a catch region with which said latching pawl is able to be pushed in alignment with and become operatively engaged to prevent a retraction of the latching pawl and hence its associated track in a direction opposite to the engagement direction, said latching pawl being of a resiliency flexible material to allow its flexing from an operatively engagement tending condition to a condition retracted from said catch, to allow the selective disassociation of said latch with said pin box.

In a second aspect the present invention consists in a zip of a kind which includes mutually engagable male and female profile zip tracks of an elongate nature each having a first to be engaged distal end and an end distal therefrom, said zip including an end stop comprising:

a pin box disposed at the first to be engaged distal end of one of said male or female profile zip tracks,

a latch disposed at the first to be engaged distal end of the other of said male or female profile zip tracks,

said latch including a latching pawl which is slidingly engagable in a longitudinal direction parallel to the elongate direction of the tracks, said pin box including a catch region with which said latching pawl is able to be pushed in alignment with and become operatively engaged to prevent a retraction of the latching pawl and hence its associated track in a direction opposite to the engagement direction, said latching pawl being of a resiliently flexible material to allow its flexing from an operatively engagement tending condition to a condition retracted from said catch, to allow the selective disassociation of said latch with said pin box.

In a further aspect the present invention consists in an end stop for a zip of a kind which includes mutually engagable male and female profile zip tracks of an elongate nature each having a first to be engaged distal end and an end distal therefrom, said end stop comprising:

a pin box disposed at the first to be engaged distal end of one of said male or female profile zip tracks,

a latch disposed at the first to be engaged distal end of the other of said male or female profile zip tracks,

said latch including a latching pawl which, in a longitudinal direction of its movement parallel to the elongate direction of the tracks and relative to said pin box, is able to snap lock with said pin box to prevent a retraction of the latching pawl and hence its associated track in a direction opposite to the engagement direction.

Preferably said latching pawl being of a resiliently flexible material to allow its flexing from an operatively engagement tending condition to a condition retracted from said catch, to allow the selective disassociation of said latch with said pin box.

In a further aspect the present invention consists in a garment incorporating a zip as herein before described.

Preferably said pin box includes a slot with an opening presented to the longitudinal direction toward the associated zip track and the zip track associated with said latch includes a pin extending in the longitudinal direction to penetrate said slot when said latch is moved for latching engagement with said pin box said pin to be captured in said slot to prevent the separation of the male and female profiles of said zip tracks.

Preferably said pin is provided at the first to be engaged distal ends of one of said zip tracks corresponding to that with which said latch is associated.

Preferably said pin and latch are provided at the first to be engaged distal ends of said male track, said pin being the male profile, said slot of said pin box being of a size to accommodate the male profile.

Preferably said pin box includes a stop which interferes with the continued movement of said latch in the elongate direction in which the latch becomes engaged with said pin box, to prevent any significant movement of said latch in this direction, once it is in the latched condition.

Preferably said female profile is a channel profile.

Preferably said channel profile is continuous along the entire length of said female zip track.

Preferably said profiles of said male and female zip tracks are provided at the longitudinal edges of a fastening flange, said fastening flange provided for fastening to elements with which said zip is to be incorporated.

Preferably said female zip track is made from an elastically deformable material.

Preferably said male zip track is made from an elastically deformable material.

Preferably said female zip track is made from an elastically deformable material and which has a high memory coefficient.

Preferably said material is a thermoplastic material.

Preferably said latch includes a hook-shaped region which is directed outwardly from longitudinal direction of said zip track with which it is associated and presented for engagement with the pin box.

Preferably said latch includes a finger engagable region presented to allow a finger of a user to move said latch to an unlatched condition for the purposes of allowing the removal for said latch with said pin box.

Preferably said zip includes a slider as herein described for the purposes of merging and demerging the male and female profiles with each other.

In a further aspect the present invention consist in a zip as herein described with reference to the accompanying drawings.

In a further aspect the present invention consists in an end stop as herein described with reference to the accompanying drawings.

In a further aspect the present invention consists in a garment including a zip with an end stop as herein described with reference to the accompanying drawings.

In a further aspect the present invention consists in a garment as herein described with reference to the accompanying drawings.

This invention may also be said broadly to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more of said parts, elements or features, and where specific integers are mentioned herein which have known equivalents in the art to which this invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

DRAWINGS:

A preferred form of the present invention will now be described with reference to the accompanying drawings in which some of the drawings illustrate features of a novel zip to which the end stop can be applied.

Figure 1 is a plan view of a slider for use with the zip of the present invention showing in part in phantom, the guide tracks for the male and female profiles and the expansion element,

Figure 2 is an end view of Figure 1,

Figure 3 is a view from the other (merged) end of Figure 1,

Figure 4 is a perspective view of the segmented profiles of the male and female zip tracks of the zip,

Figure 4A is a front view of a garment incorporating the zip as herein described,

Figure 5 is a plan view of the slider of Figure 1 engaged with the male and female zip tracks of Figure 4 shown at and towards a first distal end of the zip tracks,

Figure 6 is a sectional view through the slider showing the location of the expansion element in the female guide slot,

Figure 7 is a side view of the slider of Figure 1 and showing in part in phantom the guide track for the female profile zip track,

Figure 7A is a sectional view through section AA of Figure 7,

Figure 8 is a side view of the male and female zip tracks at and towards a first distal end thereof,

Figure 8A is a sectional view through section AA of Figure 8,

Figure 9 is a sectional view through section AA of Figure 7,

Figure 9A is a sectional view through section EE of Figure 9,

Figure 10 is a perspective view of the slider of Figure 1,

Figure 11 is a perspective view of the male and female profiles of the zip of Example 2,

Figure 12 is a perspective view of the slider of Example 2,

Figure 13 is a an expanded end elevation of the female profile,

Figure 14 is an expanded end elevation of the male profile,

Figure 15 is an expanded end elevation of the slider,

Figure 16 is an elevation of the demerged end of the slider (reduced scale),

Figure 17 top plan view of the slider of figure 16,

Figure 18 is an end elevation of the merged (narrow) end of the slider of figure 16,

Figure 19 is a cross-sectional view on line A-A showing the location of a "torpedo like" expansion means inside the slider (reduced scale),

Figure 20 is a perspective view of segmented male and female profiles attached to a flexible tape with each profile having an integral flange extending along its length, and the last segment of the female profile cut away to show the location of the male segments,

Figure 21 is a cut-away perspective view of the expansion element of Figure 19,

Figure 21a is a cross sectional view through figure 21 showing male and female guide slots and an expansion member in profile,

Figure 22 is a perspective of the slider and pull tab,

Figure 23 is a perspective of segmented tracks showing their attachment to flexible tapes,

Figure 24 shows partly split tracks,

Figure 25 shows an interior plan view of a slider with an alternative more wedge shaped expansion element,

Figure 26 is a cut-way perspective view of the slider and expansion element of Figure 26,

Figure 27 shows a lower end stop attached to a male track,

Figure 28A shows a latch and panel arrangement to lock the lower ends of the zip together,

Figure 28B shows their location at the bottom of a jacket type zip,

Figure 29 is an expanded front elevation of the latch and pawl locked together,

Figure 30 shows a zip with two sliders, and

Figure 31 shows a modified segmented male track where the male segments are substantially ellipsoidal in shape.

EXAMPLE 1 - END STOPS

This novel end stop is applicable to conventional zips but is particularly suited to novel male and female zip tracks 103, 104 are of a kind which are preferably continuously formed over the entire length of the zip tracks with the male track fitting within the female track when the zip is closed. This type of zip is explained in more detail below. Since the male and female zip tracks 103, 104 are of a kind which are of generally uniform or repeating profiles along their length, the zip tracks provide no resistance beyond that provided as a result of friction, to longitudinal sliding relative to each other in the direction LL.

Where a zip is to be incorporated in for example a jacket, a complete separation of the zip tracks needs to be capable of being provided. As such it is not possible to permanently lock the male and female zip tracks 103, 104 together at for example one of the ends of the tracks (as is the case with closed zips such as trouser zips).

A temporary means of fastening the tracks to prevent their relative movement in the longitudinal direction is however desired so that the garment can remain in alignment.

One way of achieving this is to incorporate at one of the ends of the zip track 102, a zip stop 160 as shown in Figure 29. The zip stop 160 consists of a latch 168, and a pin box 161 which may be of a kind similar to those found on tooth like zip tracks (we have used the term "pin box" to designate this part as it appears in a similar location to the pin box of a conventional toothed zip fastener but our pin box performs a different function and is of a different shape.

The pin box 161 is incorporated at the end of one of the male and female zip tracks 103, 104 (preferably to the female zip track 104 as shown in Figure 28A) and extends in a

manner therefrom to present an interference to the movement of the male zip track 103 in the longitudinal direction advancing it beyond the end 162 of the female zip track 104.

The pin box 161 can also incorporate a slot 165 or rebate or recess for the purposes of receiving the end 166 of the male zip track 103.

The slot 165 is provided in a configuration to discourage or prevent the separation of the male zip track 103 from the female zip track 104 in a direction transverse to the longitudinal direction LL.

The end 166 of the male zip track 103 is hence captured and prevented from movement in a direction transverse to the longitudinal direction LL once received within the slot or recess 165. The slot or recess 165 is of a shape which includes a region commensurate with the male profile 105 of the male track 103 and includes an opening to exterior thereof, through which the flange 108 of the male zip track can pass. With the provision of the pin box 161 to one of the male and female zip tracks 103, 104, movement of the male and female zip tracks in one direction of the longitudinal directions LL is able to be prevented.

However without any further enhancement, it is still possible for relative movement in an opposite direction along the axis LL to occur between the male and female zip tracks 103, 104. This direction would be to separate the engagement of the end 166 of the male zip track 103 from within the slot 165 of the pin box 161.

In order to prevent the movement of the male zip track 103 in that direction, the male zip track 103 is provided with a latch 168 which is capable of being located with a catch 169 of for example the pin box 161. The latch 168 includes a surface for mutual engagement with a surface of the catch 169 when the end 166 of the male zip track 103 is located adequately or to its full extent, within the recess 165 in its longitudinal direction LL.

The catch 169 becomes engaged with the latch 168 in a manner to prevent the retraction of the end 166 from the slot 165 of the pin box 161. The arrangement of the latch 168 and catch 169 is preferably for it to act in a snap fit like manner. As the male zip track 103 is advanced for the engagement of its end 166 within the slot 165 by its movement in the direction LL relative to the female zip track 104, the catch 169 is also advanced in the

direction LL until its alignment with the catch 169 whereupon it will snap into an interference relationship therewith.

The catch 169 includes a profiled surface 170 which is provided for the purposes of allowing for the catch 169 to be displaced in a direction transverse to the longitudinal direction LL as it is progressed for engagement of the end 166 into the slot 165. The profiled surface 170 is for example a tapered or curved surface which presents no significant resistance to its movement and the movement of the male zip track 103 in the longitudinal direction to establish an engagement of the end 166 within the slot 165. The latch 168 is hence made from a resiliently flexible material which is capable of moving in the direction transverse to the direction LL so as to allow for it to be advanced and establish the interference like fit with the catch 169 of the pin box 161.

To allow for the disengagement of the latch 168 with the catch 169, the latch 168 includes a graspable end 171 presented to allow for a finger of a user to manipulate the latch 168 for the purposes of its disengagement with the catch 169. The end 171 is hence presented to allow for the displacement of the latch 168 by a finger of the user in a direction transverse to the longitudinal direction LL to slide the interference surfaces of the catch 169 and latch 168 to thereby allow for the male zip track 103 to remove itself from engagement with the slot 165. The end 171 of the latch 168 protrudes or projects sufficiently for convenient grasping or at least engagement by a finger of a user for the purposes of allowing the disengagement of the latch 168 with the catch 169. Whilst in the most preferred form and as herein shown, the pin box 161 is provided at the end of the female zip track 104, it may alternatively be provided at the end of the male zip track 103 and the latch 168 may be provided to the female zip track.

The size and shape of this end stop 160 allows for the placement of a whole 190 passing through the pin box 161 for attachment of a ski pass or other ticket or identification tag.

In order to enhance the ease with which the merging of the male profile 105 with the female profile 106 can be achieved, the zip used with this end stop may incorporate a slider 115 for the purposes of the merging and demerging of the male zip track 103 and female zip track 104.

The slider 115 is an element which is graspable by the hands or fingers of a user and allows for the user to slide the slider in the longitudinal direction LL along the zip tracks 103, 104. The slider 115 is engaged with both the male zip track 103 and female zip track 104. Such engagement is as a result of the capturing of the profiles 105, 106 within guide slots 116, 117 of the slider 115.

The guide slots are of a cross sectional shape sufficiently large enough to receive the respective profiles of the male zip track 103 and female zip track 104, yet confined enough for the purposes of preventing the profiles so captured within the guide slots 116 and 117 from separating from the slider in the transverse direction TT.

The guide slots 116 and 117 are substantially the same but larger cross section than the profiles which pass through the guide slots, so that they correspond to the shape of the two profiles.

Each guide slot 116 and 117 includes an opening 118, 119 which allows the passing of the flange 108 and 109 respectively therethrough.

The slider moving in the longitudinal direction LL along the zip track 102 manipulates the male zip track 103 and female zip track 104 relative to each other for the purposes of their merging and demerging.

At a first end 120 of the slider 115, the male and female zip tracks 103, 104 extend from the slider 115 in a separated condition. At a second end 121 of the slider 115, the male and female zip tracks 103, 104 extend from the slider 115 in a merged condition as for example shown in Figure 5.

A transition between the first and second ends 120, 121 of the guide slots 116, 117 occurs which results in the bringing together of the profiles 105, 106 as a result of the merging of the guide slots 116, 117. The opening for the tracks at end 121 of the slider is optionally off-set from its centreline to allow the latch 168 to pass external of the slider. To prevent a clashing of the latch 168 with the slider 115, the latch 168 can also be off-set from its male track 105 by a distance X as shown in figure 29. The gap between the end of the male track 105 and the latch 168 is sufficient to allow the slider 115 to pass there through.

Preferably the latch 168 is attached to the tape or flange. Further details of the construction of this type of zip and slider are described in the following examples, each of which can incorporate the end stop of Example 1.

EXAMPLE 2:

This example deals with a zip 101 which is provided as an alternative to a zip of a toothed kind which may be incorporated in garments, articles of clothing, bags, clothing accessories or other.

ZIP TRACKS - The zip 101 consists of longitudinal zip tracks 102. With reference to Figure 4 the zip tracks 102 of the present invention are each substantially of a constant cross section along their entire length save for a series of gaps 180. The zip tracks 102 form part of or are secured to portions of a garment which are to have the ability of being connected and separated by the zip 101 of the present invention.

For example where the zip 101 of the present invention is incorporated in a jacket having an anterior positioned opening, the zip 101 may be incorporated to the two front panels of the anterior portion of the jacket to allow for the jacket to be opened and closed providing an open end (jacket type) zip.

MALE AND FEMALE TRACKS - The zip track 102 consists of a male zip track 103 and a female zip track 104. The male zip track 103 is primarily defined by its functional feature being a male profile 105 which is capable of merging and demerging with the female profile 106 of the female zip track 104 in a slider. At least the female profile 106 of the female zip track 104 is made of a material which is resiliently flexible. A suitable resilient material such as a plastics material is used for the purposes of defining the female profile 106 of the female zip track 104.

Each of the profiles 105, 106 are defined along a longitudinal edge 107 of a flange 108, 109 of the male zip track 103 and female zip track 104 respectively. Each flange 108, 109 is provided for the purposes of allowing the male zip track 103 and the female zip track 104 to be incorporated in a garment. The flanges 108, 109 are provided for the purposes of

securing by stitching, ultrasonic welding, adhesive welding or the like to components of a garment.

The male zip track 103 and the female zip track 104 may be made from two separate items being the profiled features 105, 106 and the flanges 108, 109.

Alternatively the male zip track 103 and the female zip track 104 may each be made as a unitary item. The zip tracks 103, 104 are formed by injection moulding the segments about a tape.

Since the cross section of the male zip track 103 and the female zip track 104 are preferably substantially constant along their entire longitudinal (in direction LL) length, extrusion of the zip tracks 103, 104 is an appropriate manner for their manufacture. The slots or gaps which are described below may be formed in one or both of the male and female zip tracks, after their being extruded.

SHAPE OF PROFILES - In this example the female profile 106 and male profile 105 are of a cup and ball shape. However alternative configurations of such profiles are also envisaged and the best profile that we have tested is that described in Example 2. It is a more oval or elliptical profile.

The female profile 106 includes a slot 110 which extends also in the longitudinal direction LL along the length of the female zip track 104. The slot is provided for the purposes of allowing the passing of the male profile 105 therethrough for the purposes of merging and demerging the male and female profiles 105, 106. The interior of the female profile 106 is preferably of a shape complementary to the shape of the male profile 105 although this need not necessarily be so. Indeed as long as the interior and cross sectional shape of the female profile 106 is of a size larger than the male profile 105, then the male profile 105 can be comfortably received within the interior portion of the female profile 106.

SEGMENTED PROFILES - For the purposes of enhancing the longitudinal flexibility and also enhancing the stretchability in the longitudinal direction LL, at least the female profile 106 is defined by and made of a material which whilst of significantly high rigidity in order to allow for it to securely capture and resist removal of the male profile 105, it has a series of slots or gaps 180 provided spaced along its length.

The gaps extend preferably in a direction lateral to the longitudinal direction LL. Therefore the female profile 106 is not of a continuous and constant cross section (in the direction lateral to the longitudinal direction LL) since it is provided with a plurality of such gaps 180. The gaps 180 are preferably through the entire portion of the element defining the female profile 106 separating each of the profiles to define them as discrete items.

STRETCHABILITY - Where the female profiles 106 are provided as a series and/or an array of discrete items, the longitudinal stretchability of the female track 104 is no longer defined or limited by the nature of the material defining the female profile 106. It is then the nature of the material, and the geometry, of for example the flange 109 or the material to which the flange is affixed, which limits the stretchability of the female track 104 in the direction LL.

Where the discrete female profiles 106 are disposed at an edge of a stretchable tape 109 e.g. made of a bias cut tape, neoprene, lycra, spandex or other resilient material, the longitudinal stretchability of the female track 104 can be significant. The gaps 180 provided between adjacent discrete female profile elements 106 will expand and contract as and when the female track 104 is stretched and relaxed. In addition to enhancing the stretchability by the provision of gaps between the elements defining the female profile 106, the flexibility of the female track 104 will also be enhanced.

The amount of stretch along the length of the zip will be dependent upon the choice of the tape material and its stretchiness. We prefer to limit the stretchability of the zip (and hence the tape) to no more than 25% for most applications. For neoprene wetsuits a stretch factor of the zip of 15% to 20% is generally sufficient.

The gaps 180 may preferably completely separate those elements defining the female profile 106 but may in the alternative, only separate part of each of the elements defining the female profile 106. Where longitudinal stretchability is perhaps not an essential or desired feature, the elements defining the female profile 106 may still be attached at for example the base at where they are disposed along the edge of the flange 109. Bending out of the plane of the flange 109 is still able to be achieved where gaps are provided between those regions of the female profile 106 along the ridge 181. However for both flexibility and stretchability the elements defining the female profile 106 are discrete from each other. The gap 180 may be provided at regular intervals along the female track 104 or may be provided only at locations where the desired flexibility and/or stretchability are required.

Depending upon the application, we prefer that at least the female profile is made up of such discrete elements (since it needs to be of a material which has a high resistance to flexing for the purposes of ensuring that it can retain to a suitable amount, the engagement of the male profile 105). However the male profile 105 may likewise be provided as discrete segments as shown for example in Figure 4. Whilst the male profile 105 need not be of a material of the same rigidity as that of the female profile 106 for the purposes of establishing a strong connection between the male and female profiles to resist its separation in a direction transverse to the direction LL, the gaps 180 provided along the male profile 5 will further enhance both the stretchability and flexibility of the zip tracks 102. The male profile 105 may likewise be attached to and be disposed at an edge of a flange or tape 108 of a material which will then define the deciding characteristics of the nature of the stretchability and flexibility of the male track 103. The flexibility of the tracks will be influenced by the size of the gap 180 hence the larger the gap the tighter the radius in which the male and female tracks can be bent.

The gaps 180 may be provided as a result of the female and/or male tracks 104, 103 being injection moulded. Alternatively where the female and/or male tracks 104, 103 or the profiles 105, 106 are extruded, the gaps 180 may be defined after extrusion. Laser cutting or machine cutting may be the most appropriate manner in which to define these gaps 180. Whilst as a result of the provision of the slots in both the female and male profile 106, 105, water tightness of the zip 1 may not be achievable; improvements in water tightness can be created by providing the slots 180 of the male track 105 at different intervals than the gaps 180 of the female profile 106. Having the gaps 180 at different intervals will ensure that only a few gaps of each of the male and female profiles are at any one time, in register with each other. When they are in register with each other clearly no water-resistant seal can be established between the male and female tracks 103, 104 at such a location.

Where the male profile 105 is of a continuous and constant cross section along its entire length, then a water-resistant seal can be established between the male and female tracks 103, 104. Alternatively where the longitudinal relative positioning between the male and female tracks 103 and 104 is constantly repeatable such as for example where (a) the zip is closed end (trouser type) zip, or (b) the zip includes an end stop 184 as for example shown in Figure 4, 5 and 8, the gaps 180 of each of the male and female profiles 105, 106 can be provided so as to remain out of register. This end stop 184 can be a stopper or bung attached to the last female segment 181 to prevent the slider leaving that "upper" end of the female track.

SLIDER - In order to enhance the ease with which the merging of the male profile 105 with the female profile 106 can be achieved, a slider 115 is provided for the purposes of the merging and demerging of the male zip track 103 and female zip track 104. The slider 115 is an element which is graspable by the hands or fingers of a user and allows for the user to slide the slider in the longitudinal direction LL along the zip tracks 103, 104. It may have a pull tab attached thereto for ease of use.

The slider 115 is engaged with both the male zip track 103 and female zip track 104. Such engagement is as a result of the capturing of the profiles 105, 106 within guide slots 116, 117 of the slider 115. The guide slots are of a cross sectional shape (in a direction lateral to the longitudinal direction LL) sufficiently large enough to receive the respective profiles of the male zip track 103 and female zip track 104, yet confined enough for the purposes of preventing the profiles so captured within the guide slots 116 and 117 from separating form the slider in the transverse direction TT. The guide slot 116 for the female profile is in this example substantially of a circular (or one corresponding to the shape of the zip track profiles) cross section and likewise the guide slot 117 for the male profile is also of a substantially circular cross section along its length. Each slot includes an opening 118, 119 which allows the passing of the flange 108 and 109 respectively therethrough. The slider moving in the longitudinal direction LL along the zip track 102 manipulates the male zip track 103 and female zip track 104 relative to each other for the purposes of their merging and demerging.

At a first end 120 of the slider 115, the male and female zip tracks 103, 104 extend from the slider 115 in a separated condition. At a second end 121 of the slider 115, the male and female zip tracks 103, 104 extend from the slider 115 in a merged condition as for example shown in Figure 5 transition between the first and second ends 120, 121 of the guide slots 116, 117 occurs which results in the bringing together of the profiles 105, 106 as a result of the merging of the guide slots 116, 117.

Preferably the slider 115 is provided with a spreader element, which is described in further detail with reference to Example 3 below. Preferably also, the cross sectional area of the female guide slot 116 expands as the slot extends in from each end of the slider 115, refer to the curves 270 detailed in figure 4 which show this increase in cross sectional area of the female guide slot 116. This expansion, and subsequent reduction, in cross sectional area of the female guide slot 116, when traveling from one end of the slot to the other, corresponds

to some extent to the location and geometry of the spreader element which is located within the same slot. The change in cross sectional area is designed to accommodate expansion of the female profile 106 as it passes through the female guide slot 116 and is expanded by the expansion element.

EXAMPLE 3:

This example is similar to example 2; save that the male member is shaped more like an arrow head, and the female member is more triangular in shape. The zip 201 consists of longitudinal zip tracks 202 and a slider 215. With reference to Figure 11 the zip tracks 202 of the present invention are each substantially of a constant cross section along their entire length save for a series of gaps 280A. The zip tracks 202 form part of or are secured to portions of a garment which are to have the ability of being connected and separated by the zip 201 of the present invention. For example where the zip 201 of the present invention is incorporated in a jacket having an anterior positioned opening, the zip 201 may be incorporated to the two front panels of the anterior portion of the jacket to allow for the jacket to be opened and closed.

MALE AND FEMALE ZIP TRACKS - The zip track 202 consists of a male zip track 203 and a female zip track 204.

The male zip track 203 is primarily defined by its functional feature being a male profile 205 which is capable of merging and demerging with the female profile 206 of the female zip track 204.

At least the female profile 206 of the female zip track 204 is made of a material which is resiliently flexible. Depending upon the application a suitable plastics material or rubber material (or a composite of the two) may be used for the purposes of defining the female profile 206 of the female zip track 204. Suitable plastics materials include polyethylene and polyvinylchloride. Other plastics can be used. Choice of plastic will depend on its properties and suitability for the end use, ease of moulding about a flexible tape, flexibility and stretchability as well as the desired tensile strength.

Each of the profiles 205, 206 are preferably defined along a longitudinal edge 207 of a flange 208, 209 of the male zip track 203 and female zip track 204 respectively. Each flange 208, 209 is provided for the purposes of allowing the male zip track 203 and the female zip track 204 to be incorporated in a garment. The flanges 208, 209 are provided for the purposes of securing by stitching, ultrasonic welding, adhesive welding or the like to components of a garment. The male zip track 203 and the female zip track 204 may be made from two separate items being the profiled features 205, 206 and the flanges 208, 209. Alternatively the male zip track 203 and the female zip track 204 may each be made as a unitary item. The zip tracks 203, 204 may be formed by extrusion. It could also be made by injection moulding. Since the cross section of the male zip track 203 and the female zip track 204 are preferably substantially constant along their entire longitudinal (in direction LL) length, extrusion of the zip tracks 203, 204 is an appropriate manner for their manufacture. The slots or gaps which are herein after described may be formed in one or both of the male and female zip track, after their being extruded.

SHAPE OF PROFILES – A profile we have tested is shown in Figures 13 and 14. The male profile 205 looks a little like an arrowhead but it has a rounded nose. It leading edge is part of an ellipse. It has a pair of re-entrant flanges at rear. The female profile 206 includes a slot 210 which extends also in the longitudinal direction LL along the length of the female zip track 204. The slot is provided for the purposes of allowing the passing of the male profile 205 there through for the purposes of merging and demerging the male and female profiles 205, 206. The interior of the female profile 206 is complementary in shape to the shape of the male profile 205. The female profile provides a continuous (or semi-continuous) cavity of a cross-sectional shape corresponding to but slightly larger than the dimensions of the male profile.

The re-entrant nature of the jaws 211 of the female profile 206 co-acting with the flanges 212 of the male profile 205 in a 50mm length of a first prototype had a tensile strength (resistance to being pulled apart at right angles to the length of the zip) of over 15kgs. This tensile strength can be varied by suitable design of the profile shapes and choice and flexibility of materials used in the manufacture of the zip. In some cases a low tensile strength may be an advantage (for safety) in other cases a high tensile strength may be desirable.

SEGMENTED PROFILES - For the purposes of enhancing the longitudinal flexibility and preferably also enhancing the stretchability in the longitudinal direction LL at least the female

profile 206 is defined by and made of a material, which has sufficient rigidity to allow it to securely capture and resist removal of the male profile 205, and which has a series of slots or gaps 280A provided spaced along its length.

The gaps 280A extend preferably in a direction lateral to the longitudinal direction LL. Therefore the female profile 206 is not of a continuous and constant cross section (in the direction lateral to the longitudinal direction LL) since it is provided with a plurality of such gaps 280A but it is repetitive. The gaps 280A are preferably through the entire portion of the element defining the female profile 206 separating each of the profiles to define them as discrete items. Where the female profiles 206 are provided as a series and/or an array of discrete items, the longitudinal stretchability of the female track 204 is no longer defined or limited by the nature of the material defining the female profile 206. It is then the nature of the material of for example the flange 209 or the material to which the flange is affixed, which limits the stretchability of the female track 204 in the direction LL.

Where the discrete female profiles 206 are disposed at an edge of for example a neoprene or Lycra material flange 209, the longitudinal stretchability of the female track 204 will be significant. The gaps 280A provided between adjacent discrete female profile elements 206 will expand and contract as and when the female track 204 is stretched and relaxed. In addition to enhancing the stretchability by the provision of gaps between the elements defining the female profile 206, the flexibility of the female track 204 will also be enhanced. The gaps 280A may preferably completely separate those elements defining the female profile 206 but may in the alternative, only separate part of each of the elements defining the female profile 206. Where longitudinal stretchability is perhaps not an essential or desired feature, the elements defining the female profile 206 may still be attached at for example the base at where they are disposed along the edge of the flange 209. Bending out of the plane of the flange 209 is still able to be achieved where gaps are provided between those regions of the female profile 206 along the ridge 281. However for both flexibility and stretchability the elements defining the female profile 206 are discrete from each other.

The gap 280 may be provided at regular intervals along the female track 204 or may be provided only at locations where the desired flexibility and/or stretchability are required.

Whilst most importantly it is the female profile which is preferably of such discrete elements (since it needs to be of a material which has a high resistance to flexing for the purposes of

ensuring that it can retain to a suitable amount, the engagement of the male profile 205) therewith the male profile 205 may likewise be provided as discrete segments as shown for example in Figures 20 and 21. Whilst the male profile 5 need not be of a material of the same rigidity as that of the female profile 206 for the purposes of establishing a strong connection between the male and female profiles to resist its separation in a direction transverse to the direction LL, the gaps 280A provided along the male profile 205 will further enhance both the stretchability and flexibility of the zip tracks 202. The male profiles 205 may likewise be attached to and be disposed at an edge of a flange 208 of a material which will then define the deciding characteristics of the nature of the stretchability and flexibility of the male track 203. Clearly the flexibility of the tracks will be limited by the size of the gap 280 hence the larger the gap the tighter the radius in which the male and female tracks can be bent.

The gaps 280A may be provided as a result of the female and/or male tracks 204, 203 being injection moulded. Alternatively where the female and/or male tracks 204, 203 or the profiles 205, 206 are extruded, the gaps 280A may be defined after extrusion. Laser cutting or machine cutting may be the most appropriate manner in which to define these gaps 280A. Whilst as a result of the provision of the slots in both the female and male profile 206, 205, water tightness of the zip 201 may not be achievable; improvements in water tightness can be created by providing the slots 280 of the male track 205 at different intervals than the gaps 280A of the female profile 206. Having the gaps 280A at different intervals will ensure that only a few gaps of each of the male and female profiles are at any one time, in register with each other. When they are in register with each other clearly no water-resistant seal can be established between the male and female tracks 203, 204 at such a location.

Where the male profile 205 is of a continuous and constant cross section along its entire length, then a water-resistant seal can be established between the male and female tracks 203, 204. Alternatively where the longitudinal relative positioning between the male and female tracks 203 and 204 is constantly repeatable such as for example where the zip includes an upper end stop, the gaps 280A of each of the male and female profiles 205, 206 can be provided so as to remain out of register.

SLIDER - In order to enhance the ease with which the merging of the male profile 205 with the female profile 206 can be achieved, the present invention incorporates a slider 215

for the purposes of the merging and demerging of the male zip track 203 and female zip track 204.

The slider 215 (refer to Figure 22) has a pull tab 231 hingedly connected to an external boss 230 and is designed to be graspable by the hands or fingers of a user and allows for the user to slide the slider in the longitudinal direction LL along the zip tracks 203, 204. The slider 215 is engaged with both the male zip track 203 and female zip track 204. Such engagement is as a result of the capturing of the profiles 205, 206 within guide slots 216, 217 of the slider 215.

The guide slots are of a cross sectional shape (in a direction lateral to the longitudinal direction LL) sufficiently large enough to receive the respective profiles of the male zip track 203 and female zip track 204, yet confined enough for the purposes of preventing the profiles so captured within the guide slots 216 and 217 from separating form the slider in the transverse direction TT. The guide slot 216 for the female profile as shown figure 15 is of a shape corresponding to the shape of the female profile 206 shown in figure 13. Similarly the guide slot 217 for the male profile is of a shape corresponding to the shape of the male profile 205 shown in figure 14.

It will be noted that the cross sectional area of the female guide slot is larger about the torpedo shaped expansion element 226 to allow for expansion of the female profile as described below. This is also evident in the modified slider 226Ashown in Figure 25.

Figure 21a shows the male and female guide slots 216 and 217 and the expansion member 226 in profile, in a cross sectional view. It can be seen in this drawing that the bridge 228 attaches the expansion member 226 to the central island portion 227. The central island portion 227 is essentially the material of the slider 215 which is between the male and female guide slots 216 and 217. In this view the male and female guide slots 216 and 217 can be seen diverging as they extend away from the bifurcation area (not shown) towards the first end 220 of the slider 215.

Guide slot 216 may be straighter than guide slot 217, as the female profile because of its size and shape may be less flexible than the male profile and may depending upon design parameters be less able to accommodate as much of a bend within the slider guide tack as would the male member. However in some cases it will be desirable to

make the guide slots of the same length to minimize differential drag between the profiles and the slider which may result in twisting of the slider.

Each slot includes an opening 218, 219 which allows the passing of the flange 208 and 209 respectively there through.

The slider moving in the longitudinal direction LL along the zip track 202 manipulates the male zip track 203 and female zip track 204 relative to each other for the purposes of their merging and demerging. At a first end 220 of the slider 215, the male and female zip tracks 203, 204 extend from the slider 215 in a separated condition as shown in figures 20 and 30.

At a second end 221 of the slider 215, the male and female zip tracks 203, 204 extend from the slider 215 in a merged condition as for example is shown in Figure 20. A transition between the first and second ends 220, 221 of the guide slots 216, 217 occurs which results in the bringing together of the profiles 205, 206 as a result of the merging of the guide slots 216, 217. Hence extending from the second distal end 221 where the guide slots 216 and 217 are merged, towards the first distal end 220, the guide slots 216 and 217 bifurcate.

Extending immediately along the guide slot 216 for the female profile beyond the region 225 thereof where bifurcation is initiated the guide slot 216 for the female profile incorporates a torpedo like expansion element 226.

The expansion element 226 is disposed within the guide slot 216 in a region thereof immediately adjacent to the bifurcation initiation zone 225. The expansion element 226 is an elongate element extending in the direction of the guide slot 216. The expansion element 226 is of a profile which at least immediately adjacent the bifurcation zone 225 results in the expansion of the slot 210 to the extent that it opens sufficiently to receive and allow the passing there through of the male profile 205 of the male zip track 203. The cross section of the expansion element 226 corresponds to the cross section of the female profile. The shape of the expansion element is shown in more detail in figure 21.

This expansion initiated by the sliding of the slider 215 in a direction advancing the first distal end 220 as the leading edge of the slider 215, will result in the progressive traveling of the expansion element 226 along and within the female profile 206 and as the female profile 206 passes over the expansion element 226 the female profile 206 is opened to expand the slot 210 sufficiently to allow the male profile 205 to pass there through with a reduced requirement for the pressing of the male profile 205 into the slot 210. In the most preferred form the slot 210 is opened to a size slightly larger than the thickness of the male profile 205 so that no pressing of the male and female profiles 205, 206 together is necessary to establish a merged condition therebetween.

The expansion element 226 is of a tapered nature extending from its widest point at or near the bifurcation zone 225, to a bullet shaped end 229 towards the first distal end 220 of the slider 215. Such a tapered profile will allow for the gradual expansion of the female profile 206 as the slider is advanced in the direction to merge the male and female profiles 205, 206.

The expansion element 226 is attached to a central island 227 of the slider by a bridge member 228. The bridge member 228 is of a size which allows it to pass through the slot 210 of the female profile 206.

In the most preferred form of the present invention the guide slot 216 for the female profile 206 is not of a constant cross section along its length between the first distal end 220 and at least the bifurcation zone 225. Most preferably the guide slot 216 expands from a smaller cross section at the first distal end 220 to a slightly larger cross section at where the expansion element 226 is provided.

Such expansion can be seen for example with reference to Figure 9A. The expansion of the guide slot 216 is commensurate with the expansion in the shape of the female profile 206 as it progresses along the guide slot 216. Whilst a constant cross section of a shape commensurate with the female profile when in a fully expanded condition may be appropriate along the entire length of the guide slot 216, it is preferred, and in order to ensure that the female profile remains well captured within the guide slot 216, that the cross section does vary over the length of the guide slot 216.

In order for contact to be maintained by the expansion element 226 with the female profile 206 over a distance for as long as practically possible prior to the merging of

the female profile with the male profile, it can be seen that the expansion element 226 extends at least in part into the path of the male profile defined by the guide slot 217.

The end of the expansion element 226 nearest the second end 221 preferably includes a cut out 238 which is of a shape to allow the passing there adjacent of, of the male profile 205. However once the male and female profiles are merged substantially in the merged zone 239 of the then non-bifurcated guide tracks 216, 217, no influence of the expansion element 226 is necessary for the female profile 206. It will be appreciated that whilst in a majority there has been reference made herein to the merging of the male and female profiles, a demerging of the male and female profiles operates in substantially the reverse manner to that which has herein been described, that is, the spreader expands the female profile 206 away from the male profile in the area where the guide slots 216 and 217 bifurcate.

DEMERGING

When the zip is closed the top of the male and female profiles will extend from the first end 220 of the slider (in that sense a jacket zip is never fully closed as a small portion of the male and female profiles will always be unmerged – unlike the face to face seals inside zip lock plastic bags. Consequently downward movement of the slider along the zip will cause the male and female profiles to pass through the guide slots and demerge whether or not there is an expansion element in the female guide slot. Nevertheless by suitable shaping of the end of the expansion element facing end 221 it is possible to assist the demerging operation and help the female profile to open up as it moves away from the male member where the guide slots separate. By suitably spacing the shaped expansion element away from the side of the guide track by a thin bridge it is possible for the jaws of the female profile to fit around the bridge portion as it relaxes into the demerged state, so that the bridge portion is thin enough to pass through slot 210 of the female profile.

In the demerging of the male and female profiles, the advanced most edge of the slider is the second end 221. The slider 215 will always remain in contact with the male and female guide tracks 203 and 204 and when the zip tracks 202 are in a fully merged condition along substantially their entire length, the slider will be provided at the upper end of the zip tracks 202.

The slider is preferably injection moulded from a low friction plastics material, such as PTFE (polytetrafluoroethylene), to allow ease of movement of the slider and the insertion of the expansion element into the female profile.

Another form of expansion element is shown in Figures 25 and 26. It is a sharper wedge shape designed to penetrate the slot and interior of the female profile and allow it to expand sufficiently to snap over the male profile.

End stops are provided on the zip tracks to prevent the slider 215 from sliding beyond and off the zip tracks 202. Progression of the slider 215 towards the other end of the zip tracks 202 will result in the male and female profiles 205, 206 demerging.

CLOSED END ZIPS - If the zip fastener is intended as a closed end zip such as a trouser zip (or a bag zip), one end of the two profiles can be joined together in a suitable fashion typically by sewing in a similar fashion to prior art zippers. End stops may be provided at the other end (top) of the profiles to trap the slider on at least one of the profiles. In most cases this will be the female profile.

OPEN END ZIPS (Jacket type zips) - Where the two profiles are not joined together to allow full separation as is the case with a jacket type zip then end stops can be provided at each end of the zip profiles. Preferably at least one end of the profiles has mean for locking the zip tracks together to prevent longitudinal movement of the male track sliding within and then out of the female track when the zip is closed as described above.

PARTIAL SLITS – With reference to Figure 24 there is shown a modification to the otherwise constant cross section female profile 206A. In this instance there are slots 280A formed not entirely through the female profile. The slots 280A are provided through the female profile with a view to weakening its bending moment strength in the direction LL, for the enhancement of the flexibility of the female profile. In this way the female profile need no longer consist of discrete elements as shown in Figure 23 as the female profile is weakened to allow for easier bending in a plane extending longitudinally and perpendicular to the plane of the flange 209. It will be appreciated that in this configuration, the material of the female profile will be influential in the nature of the stretchability of the female zip track since the female profiles are not separated elements.

ELLIPSOIDAL MALE SEGMENTS – With reference to Figure 31 there is shown a modification to the shape of the male segments 305. In this version the segments are generally ellipsoidal in nature. By rounding the ends of the male segments 205 it is possible to allow for larger gaps between both the male and female segments to enhance stretchability and flexibility whilst minimizing the risk of the leading edge of the male segments 305 from catching in the gap 380 between the female segments 306.

Although we prefer to manufacture the male and female segments from a plastics material it is possible (though unlikely) that the male segments (especially these ellipsoidal segments 305) could be made of metal and crimped onto the tape.

EXAMPLES OF DIMENSIONS

It will be appreciated that the drawings are mostly on an enlarged scale, in order to illustrate the shapes, and functioning of the various components making up the zip fastener of this example. The zip fastener of this example can be made in various shapes, sizes and lengths to suit the end use of the product. However to appreciate the relative size of the components, we have given the following dimensions based on a prototype zip fastener designed for clothing for a typical zip length from 100mm to 500mm. These dimensions are given purely by way of example only, and are not intended to be in any way limiting on the scope of the invention.

Slider

Length 15mm	internal male track in slider = 2.5mm
Widest end 11.5mm	internal female track in slider = 4mm
Narrowest end 8mm	internal merged track in slider = 4mm

Pull tab: 20mm long by 5mm wide

Profiles:

Male profile height: 2.5mm	Width at widest: 2.0mm
Female profile height: 3.0mm	Width at widest: 3.0mm

End stop: 4mm x 3mm x 3mm long

INDUSTRIAL APPLICATION

The invention relates to a novel end stop for a zip fastener particularly suited for use in the manufacture of clothing, as well as for bags and footwear.

ADVANTAGES

The novel end stop for a zip fastener as described in example 1 allows at least one end of the fastener to be anchored to prevent relative movement of the male and female profiles along the length of the zip.

VARIATIONS

Whilst we have illustrated one configuration of the end stop it will be appreciated that a number of different and complementary shapes could be used for the pin block and the pawl.

Although in most cases the pin block and pawl as well as the slider will be made from a hard plastics material, it is also possible to make all or part of theses components from other materials, and in particular from metal.

The slider of this invention typically has a shallower entrance angle than conventional sliders used with toothed zips where the teeth have to be meshed together.

Finally, it will be appreciated that various other alterations or modifications may be made to the foregoing without departing from the scope of this invention.

CLAIMS

1. An end stop for a zip having (a) a pin box disposed at the first to be engaged end of one of said male or female profile zip tracks, and (b) a latch disposed at the first to be engaged end of the other of said male or female profile zip tracks, wherein said latch has a latching pawl which is glidingly engagable in a longitudinal direction parallel to the elongate direction of the tracks, said pin box including a catch region with which said latching pawl is able to be pushed in alignment with and become operatively engaged to prevent a retraction of the latching pawl and hence its associated track in a direction opposite to the engagement direction, said latching pawl being of a sufficiently resilient material to allow it to flex from an operatively engagement tending condition to a condition retracted from said catch, to allow the selective disassociation of said latch with said pin box.

2. A zip having two mutually engagable zip tracks, a slider capable of moving along the zip tracks to merge or demerge the tracks, each end of the zip having end stops to prevent the slider from escaping from the zip, at least one of the end stops being as claimed in claim 1.

3. A zip as claimed in claim 2 wherein a first of said zip tracks has a female profile defining a slotted cavity with the slot extending along the length of the zip; and a second of said zip tracks has a male profile capable of fitting within and being closely held by the female profile; the wherein the slider has guide means within the slider adapted to guide the male and female profiles towards one another for merging, and an expansion element within said slider adapted to open the slot of the female profile sufficiently to allow the female profile to fit over and capture the male profile so that the two tracks are merged together into a closed state.

4. A zip as claimed in claim 3 wherein the pin box is attached to or integral with one end of the female zip track, and the latch is attached to or is integral with one end of the male track.

5. A zip as claimed in claim 4 wherein the latch is attached to or is integral with a flange or tape extending form the lower end of the male track so that the latch can bypass the slider when the male profile is inserted into the slider.

6. A zip as claimed in claim 5, wherein said pin box includes a stop which interferes with the continued movement of said latch in the elongate direction in which the latch becomes engaged with said pin box, to prevent any significant movement of said latch in this direction, once it is in the latched condition.

5

7. A zip as claimed in claim 6, wherein said latch includes a hook-shaped region which is directed outwardly from longitudinal direction of said zip track with which it is associated and presented for engagement with the pin box.

10 8. A zip as claimed in claim 7, wherein said latch includes a finger engagable region presented to allow a finger of a user to move said latch to an unlatched condition for the purposes of allowing the removal for said latch with said in box.

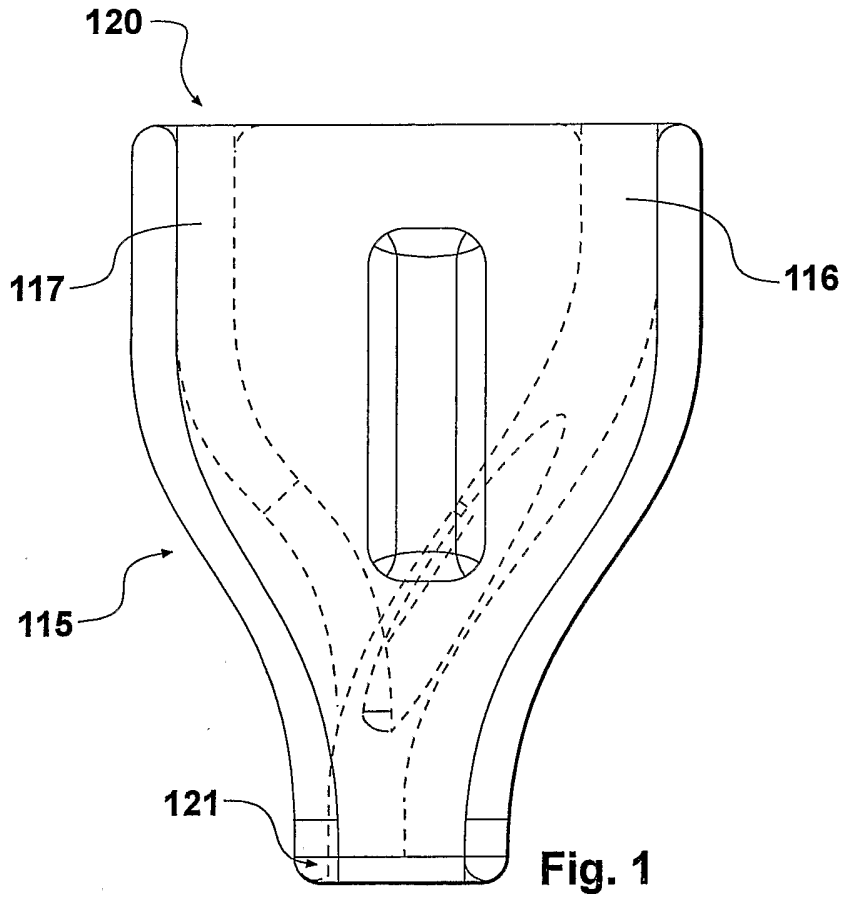


Fig. 1

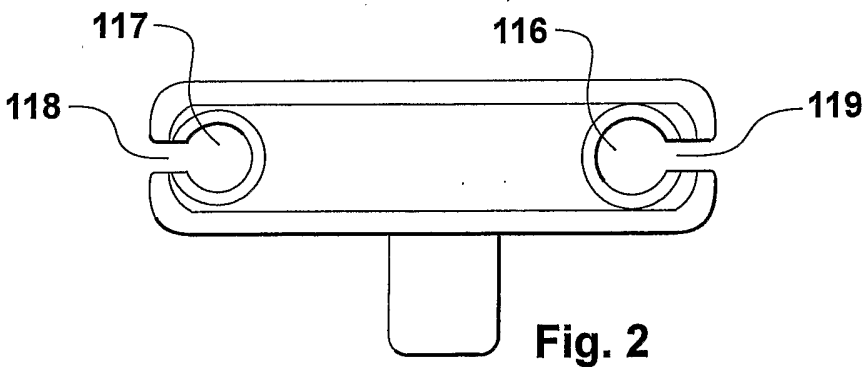


Fig. 2

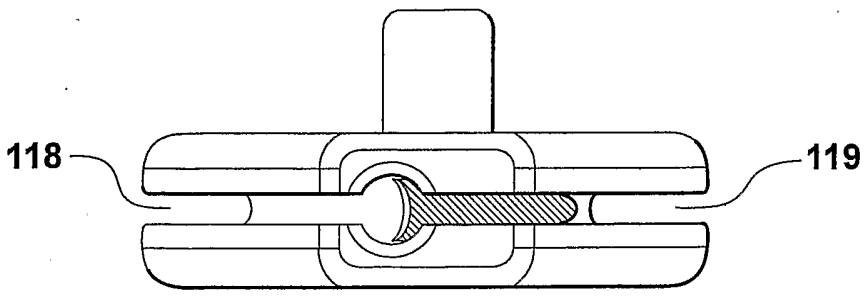
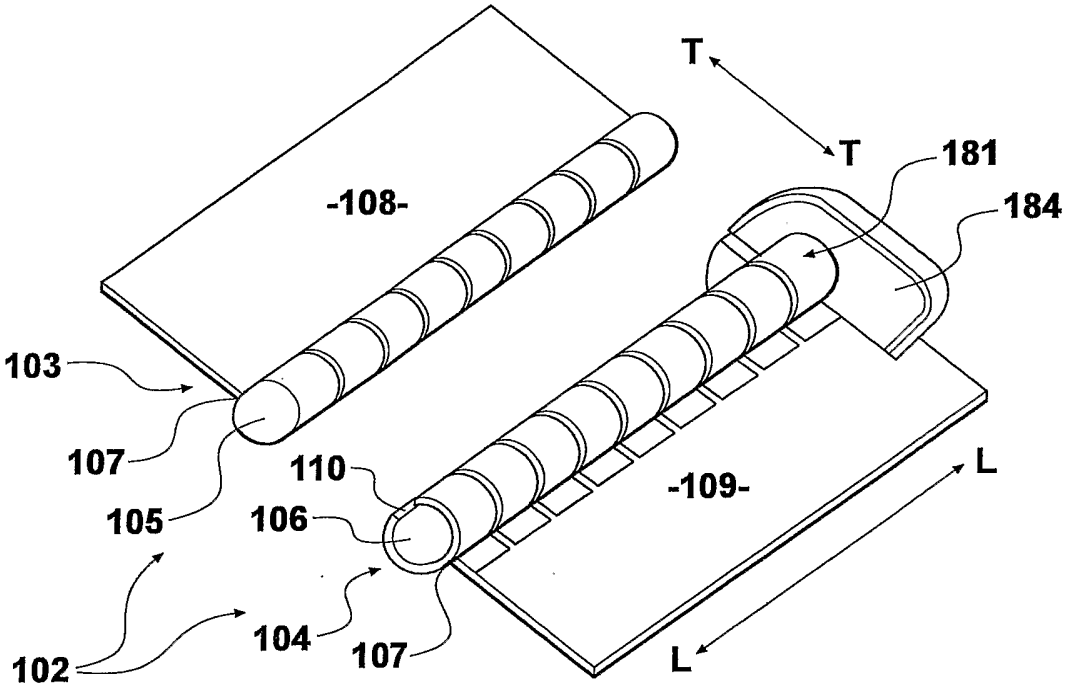


Fig. 3



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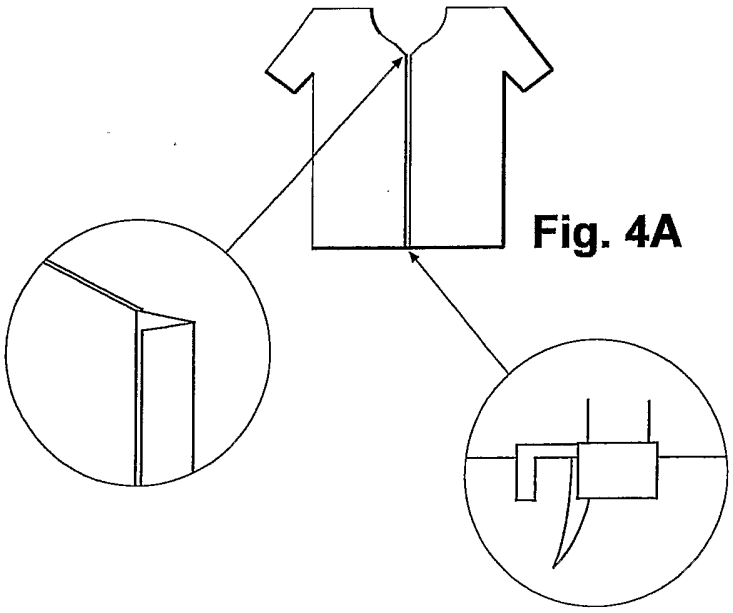


Fig. 4A

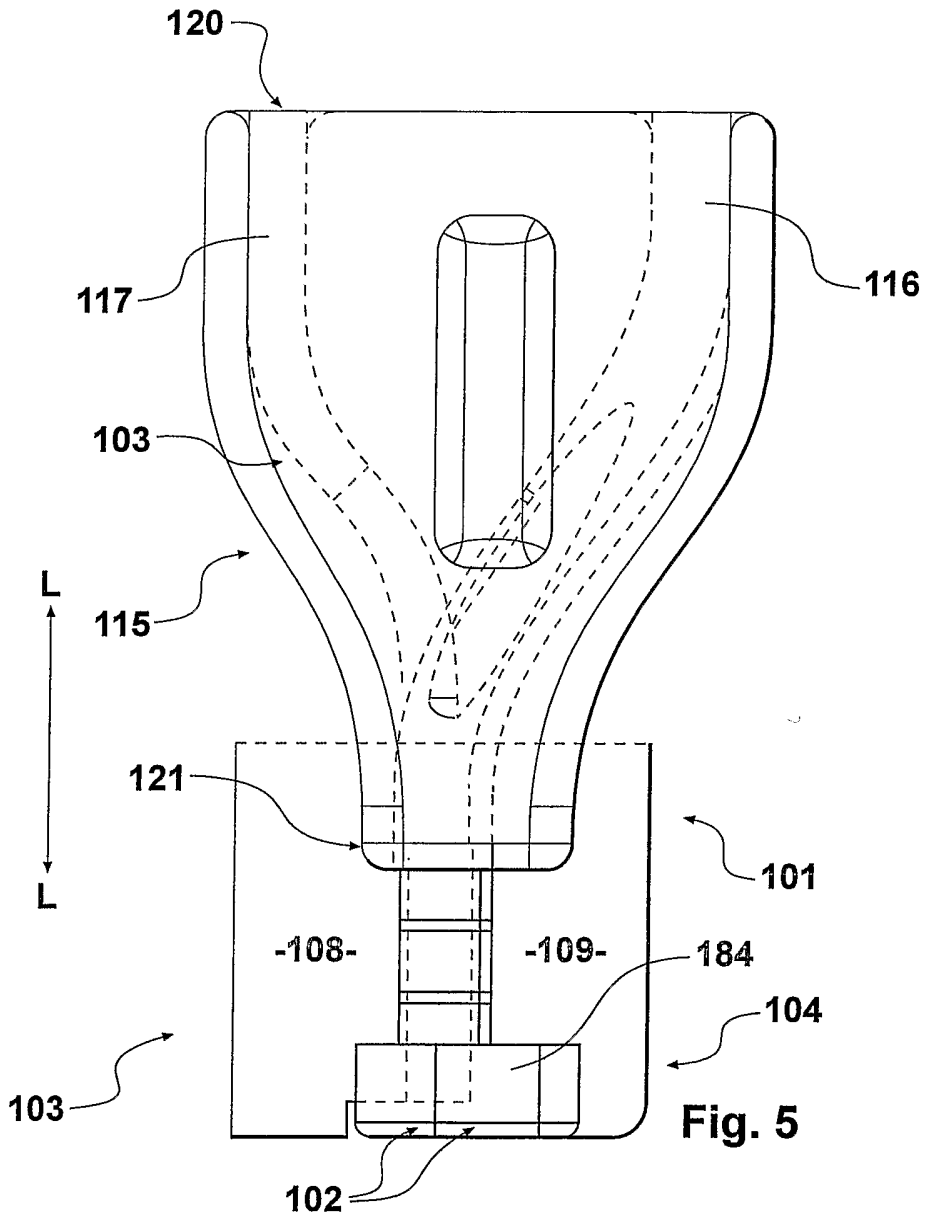


Fig. 5

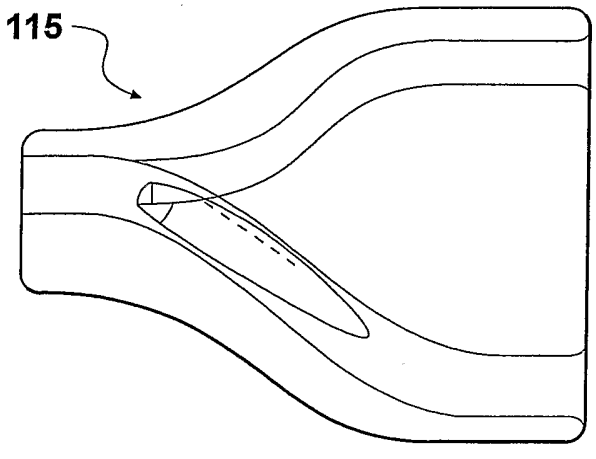


Fig. 6

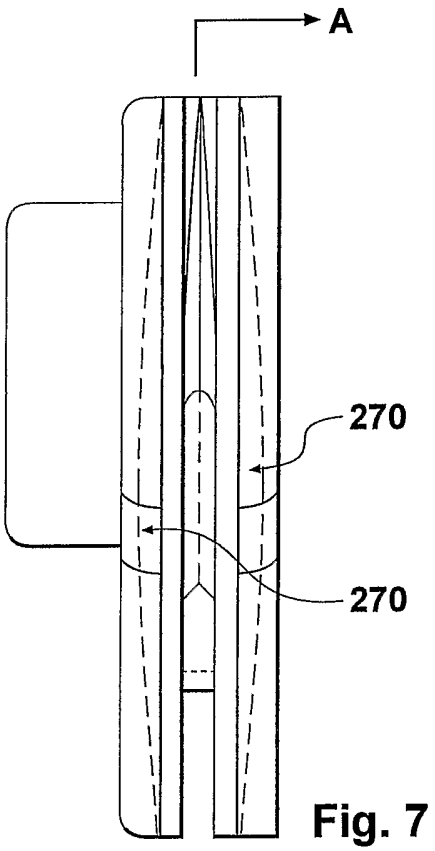


Fig. 7

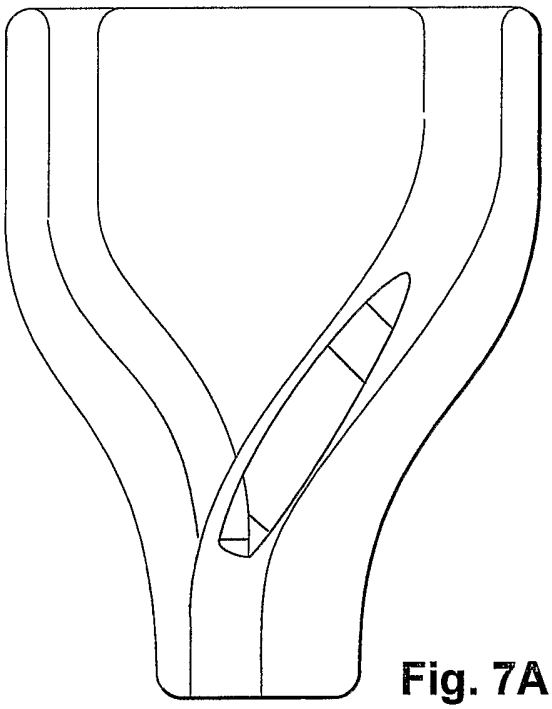


Fig. 7A

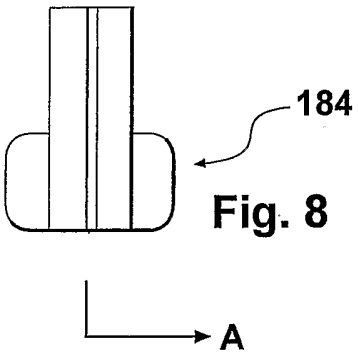


Fig. 8

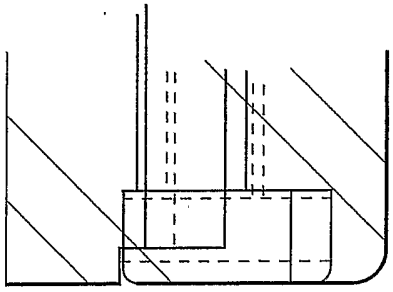


Fig. 8A

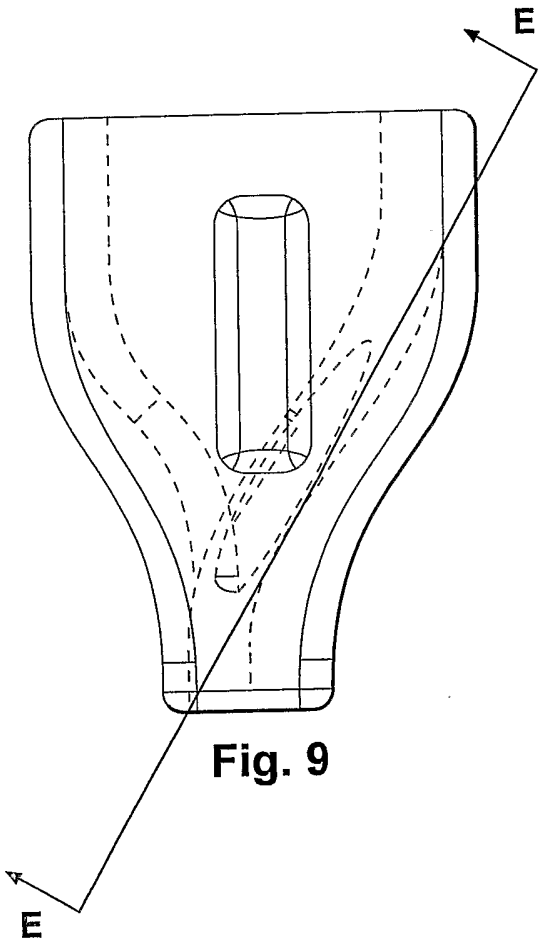


Fig. 9

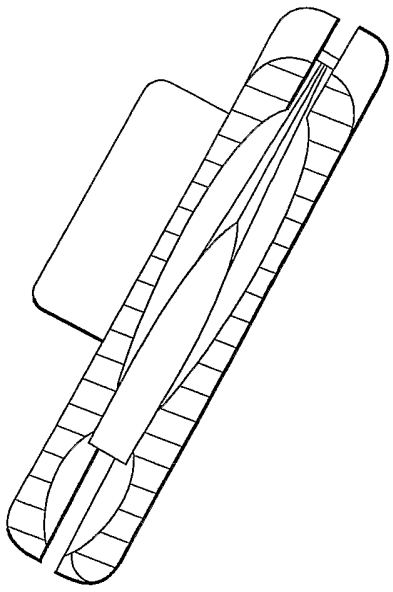


Fig. 9A

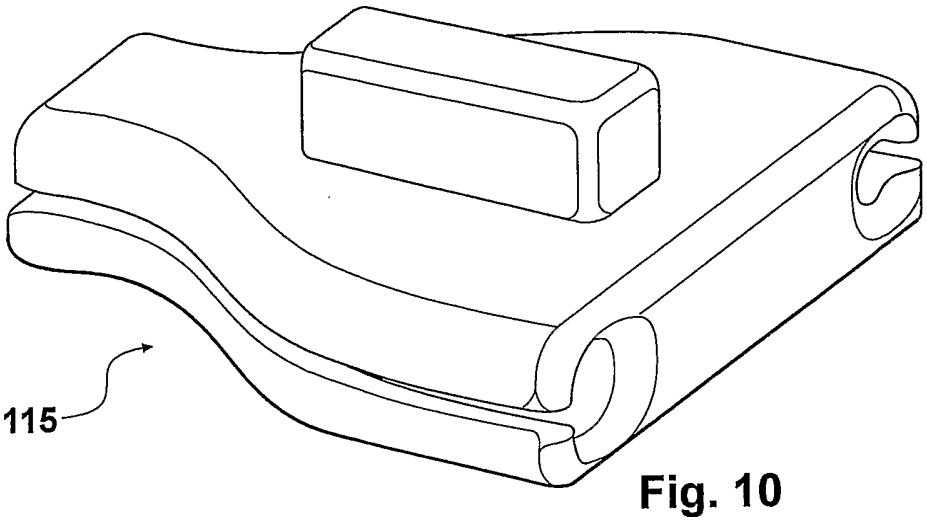


Fig. 10

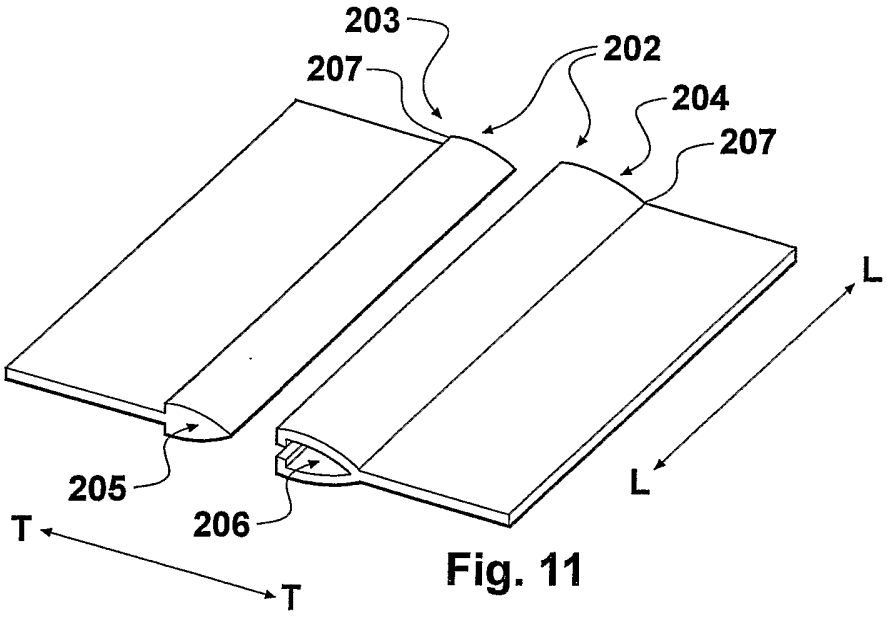
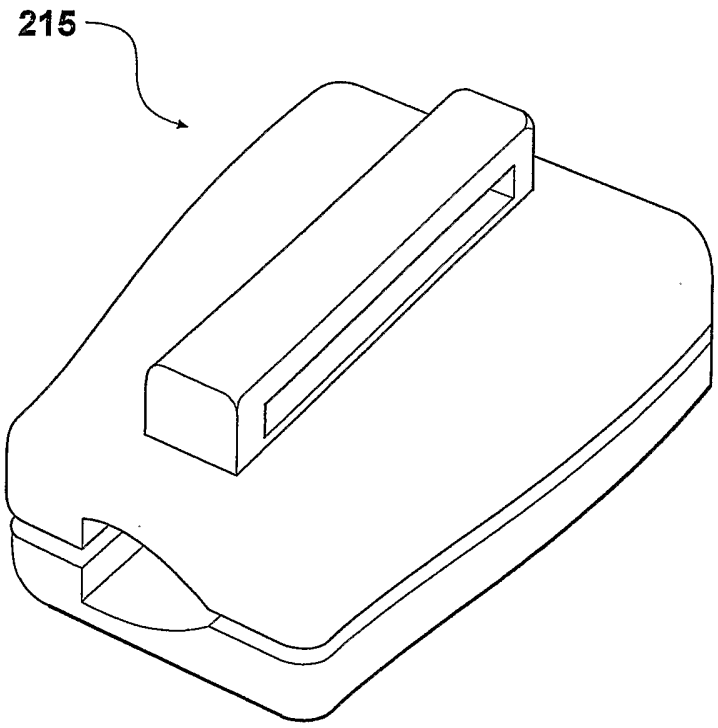


Fig. 11



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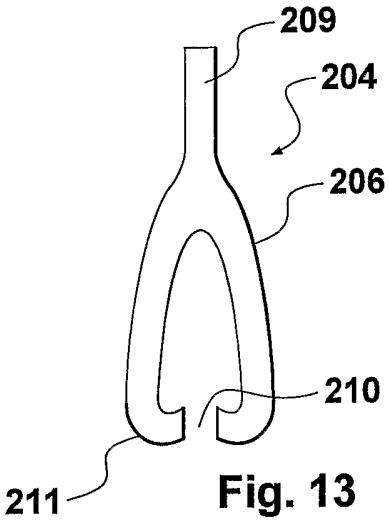


Fig. 13

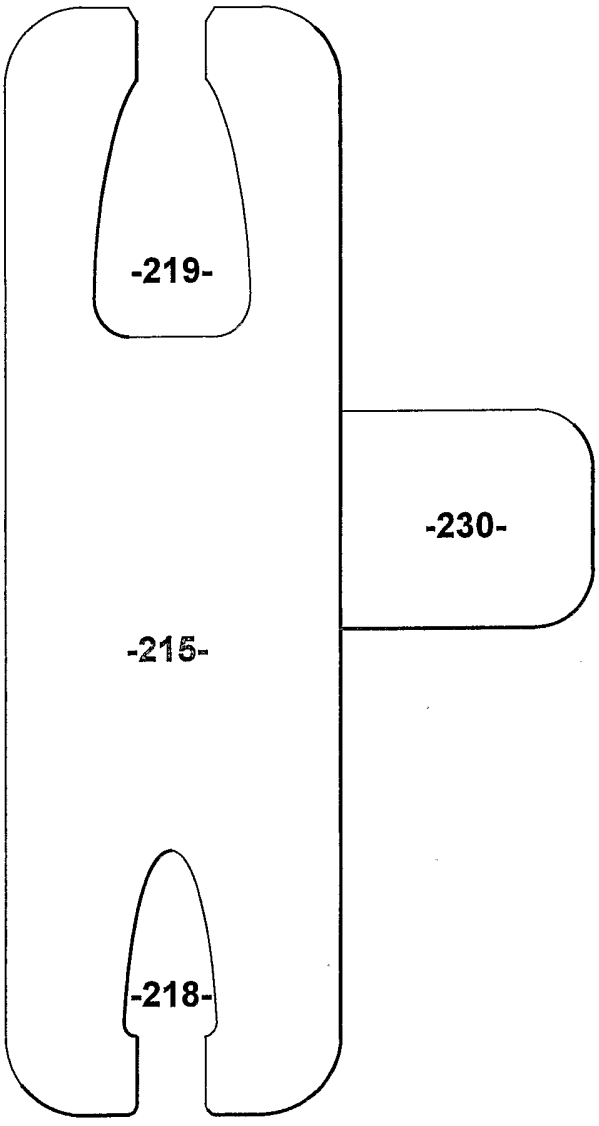


Fig. 15

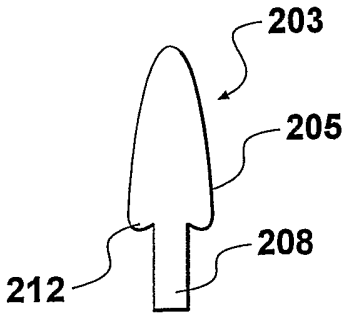
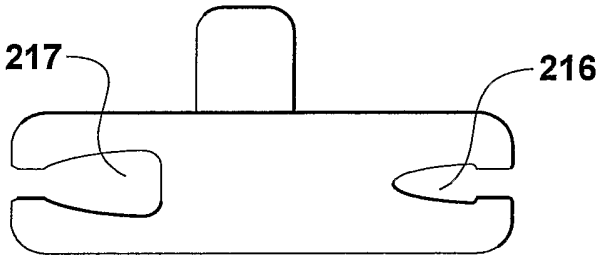


Fig. 14



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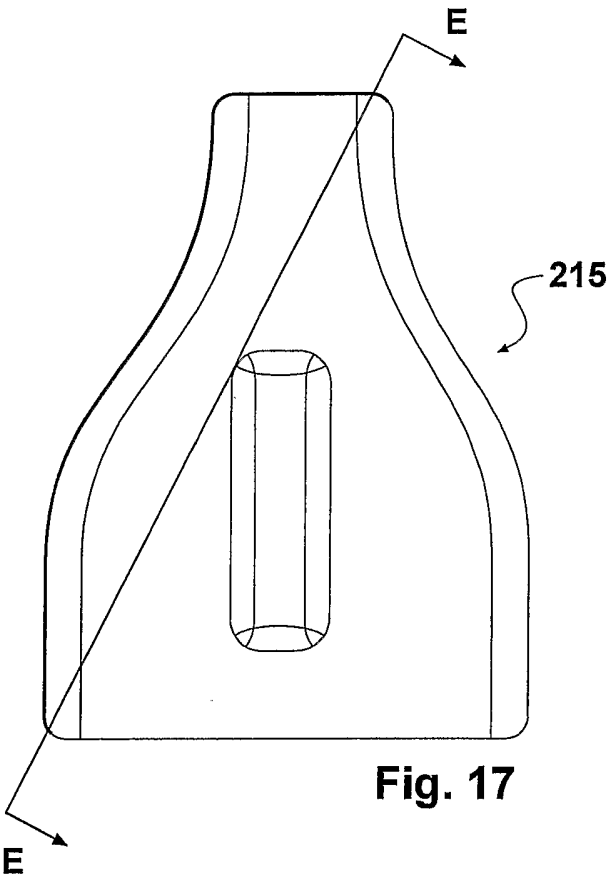

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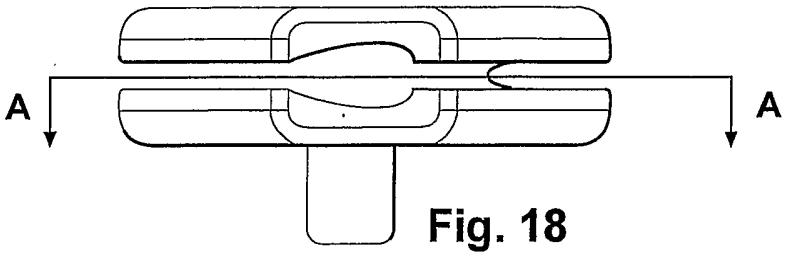

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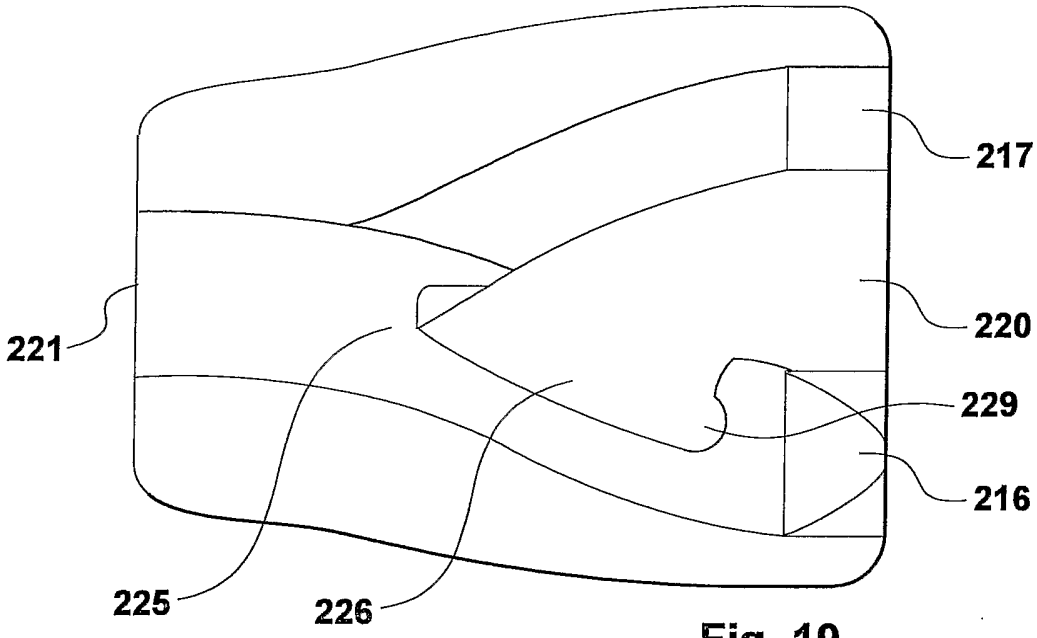

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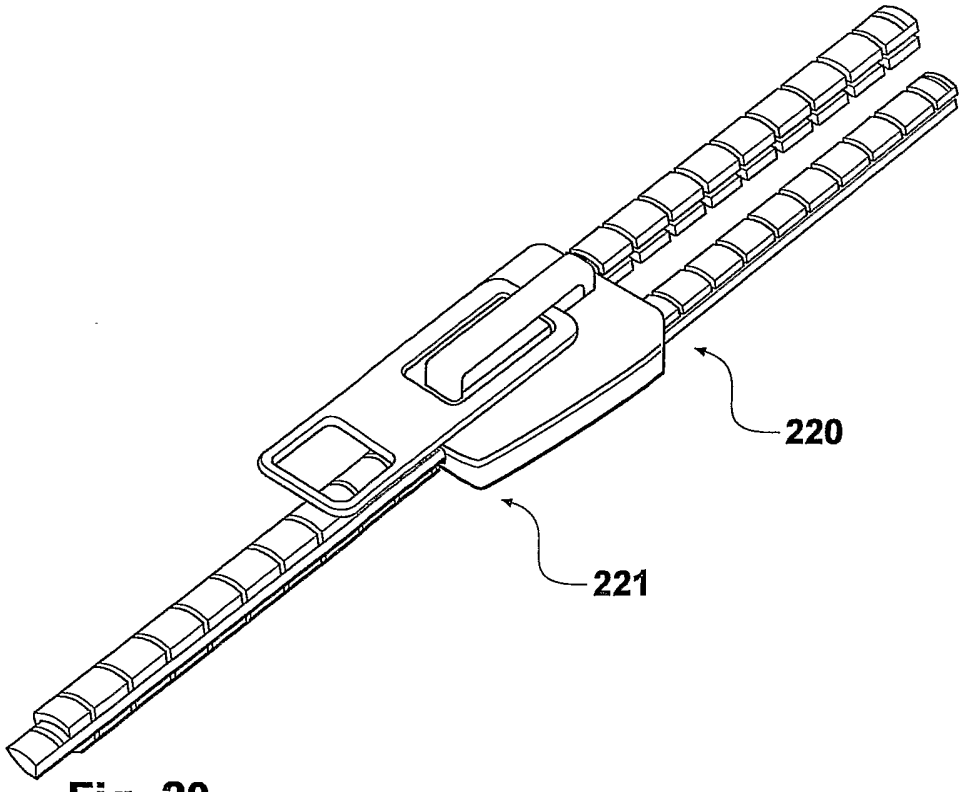


Fig. 20

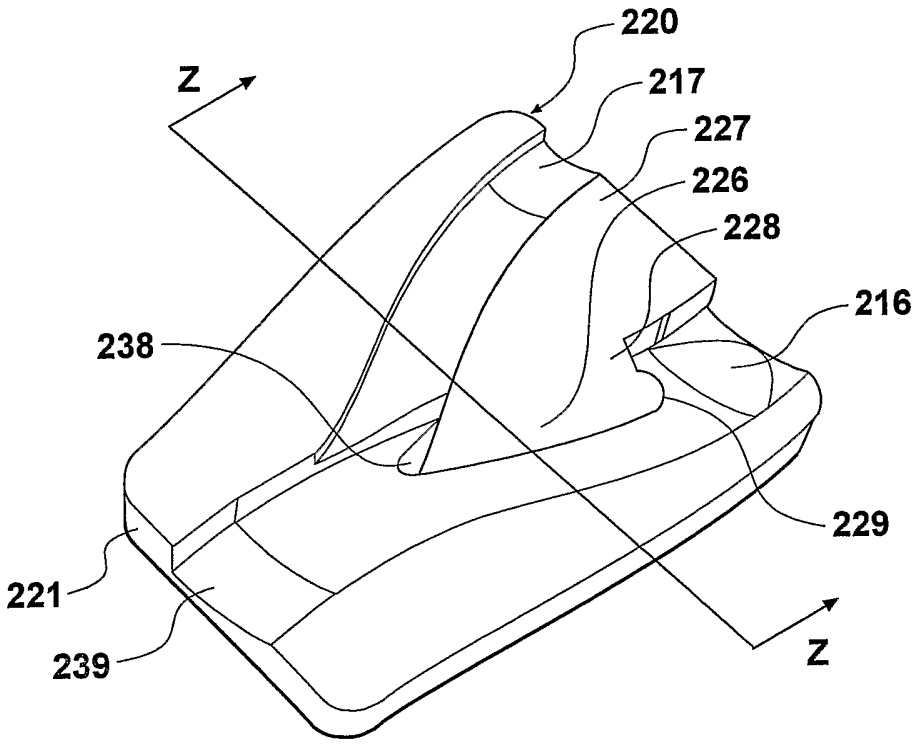


Fig. 21

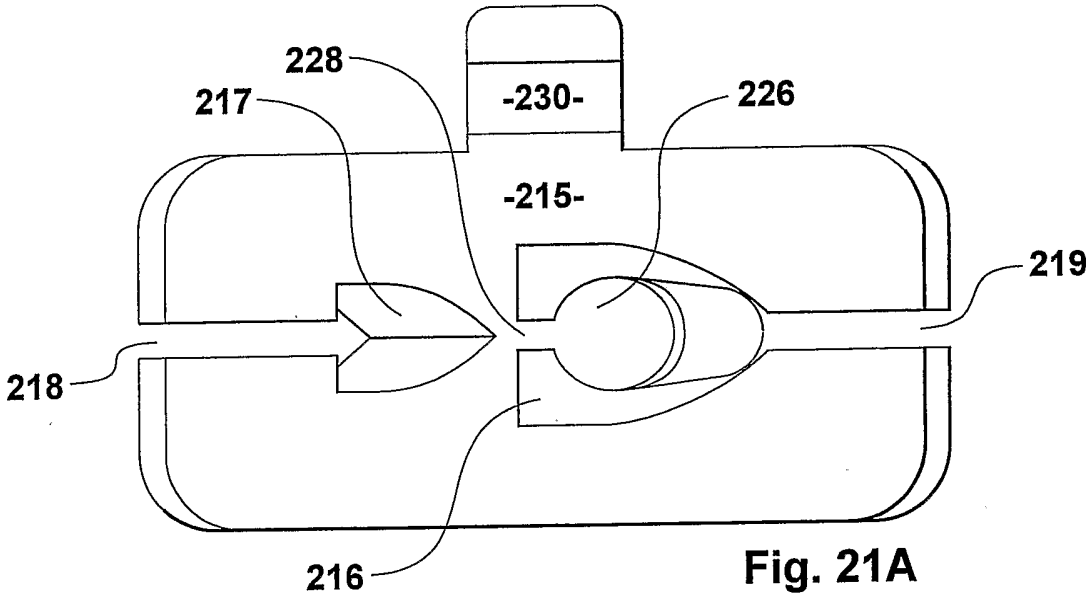


Fig. 21A

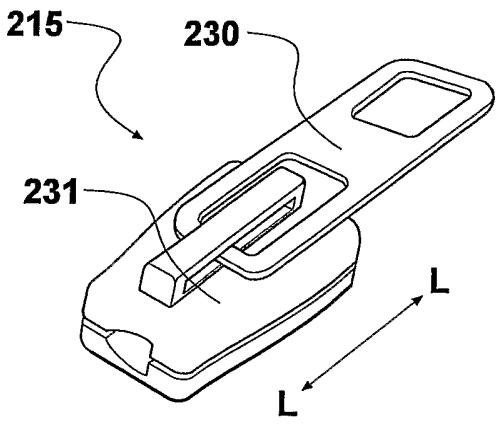


Fig. 22

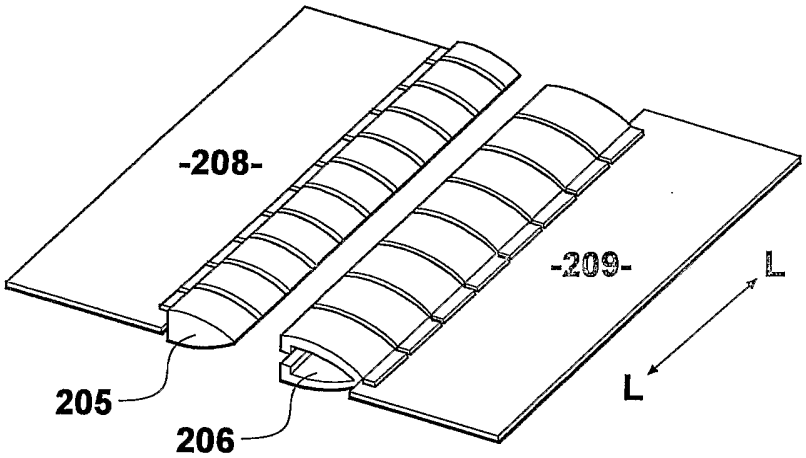


Fig. 23

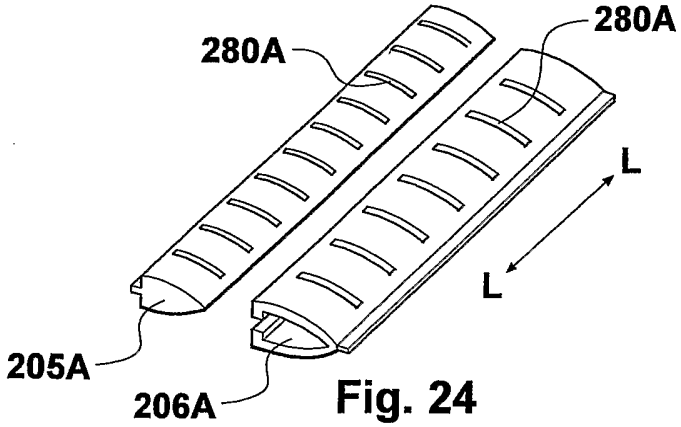


Fig. 24

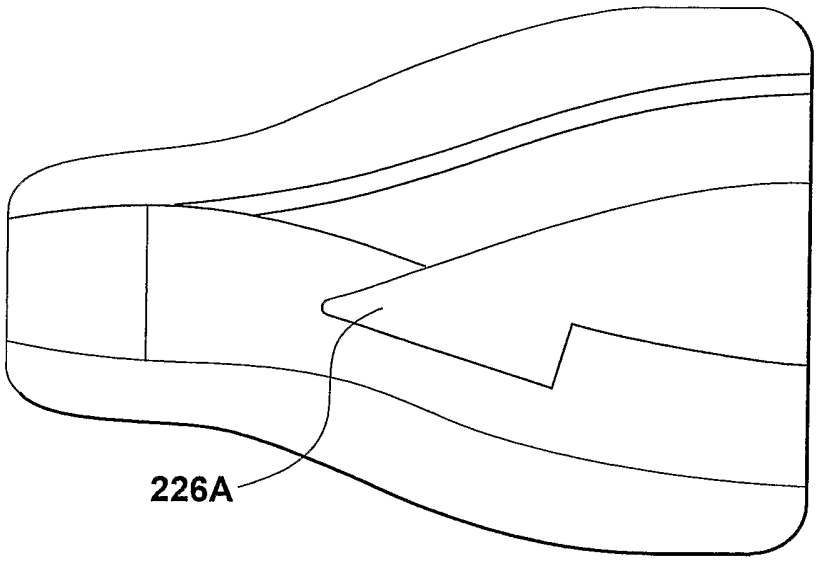


Fig. 25

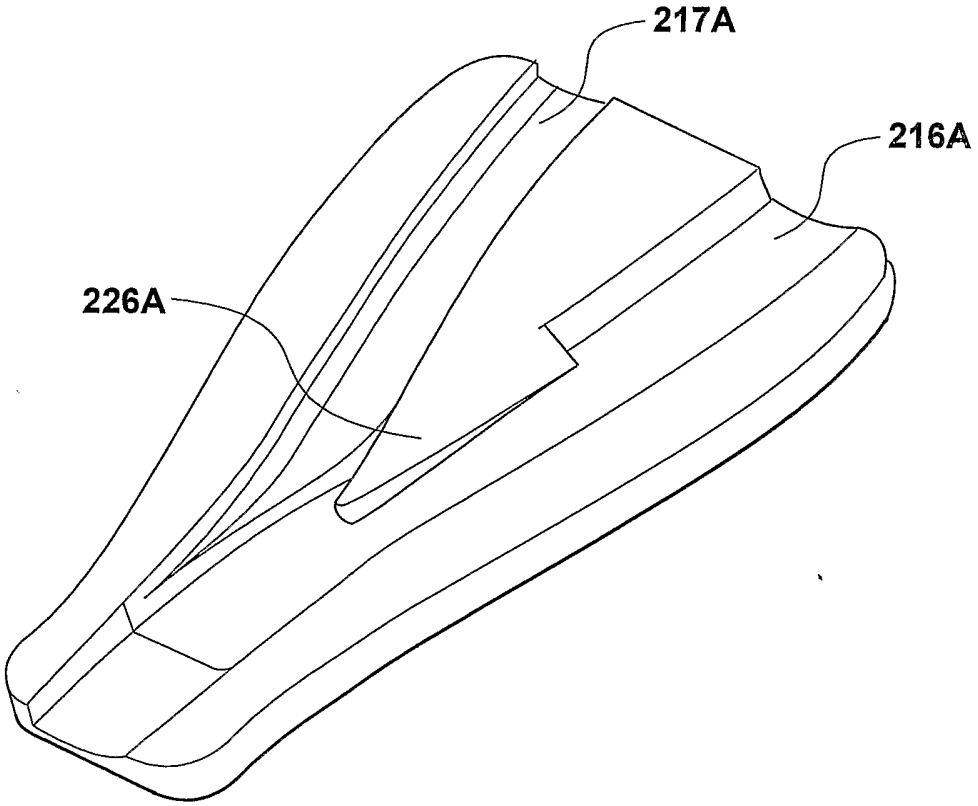


Fig. 26

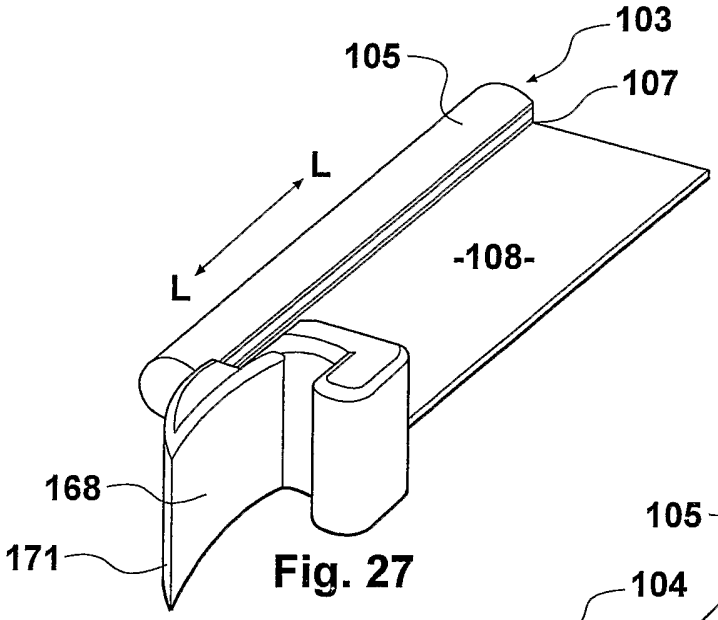


Fig. 27

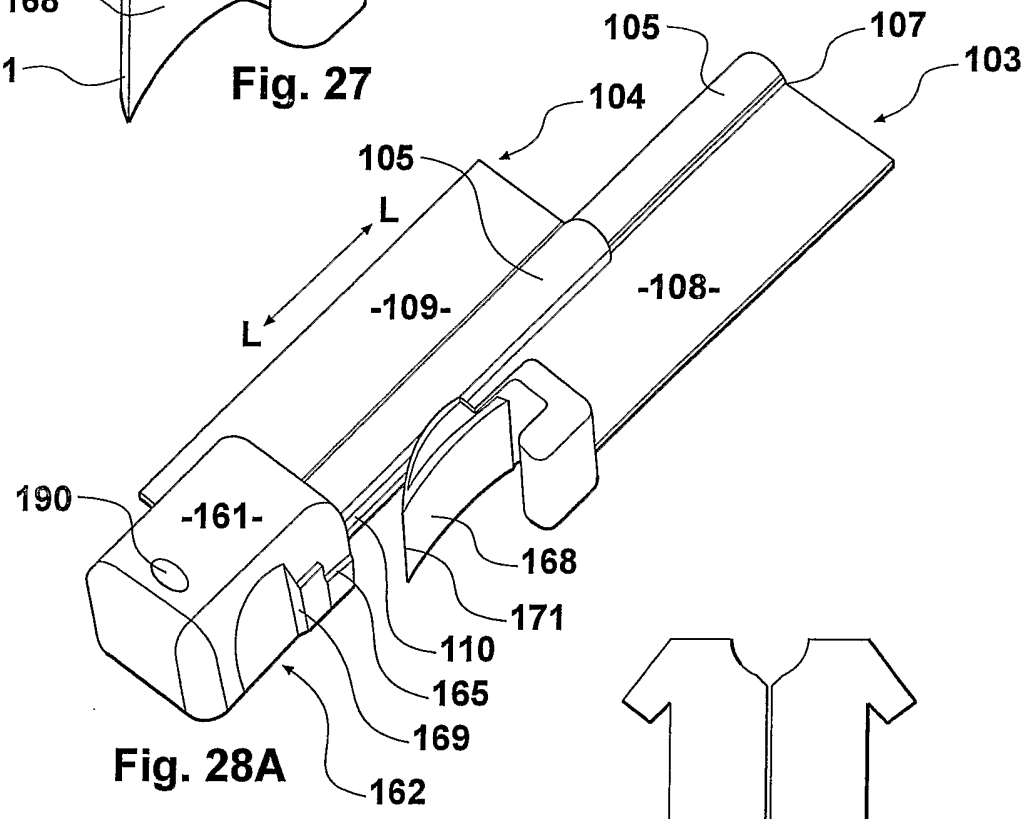


Fig. 28A

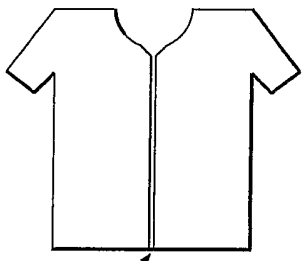
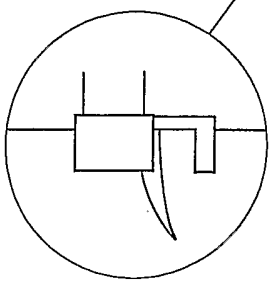


Fig. 28B



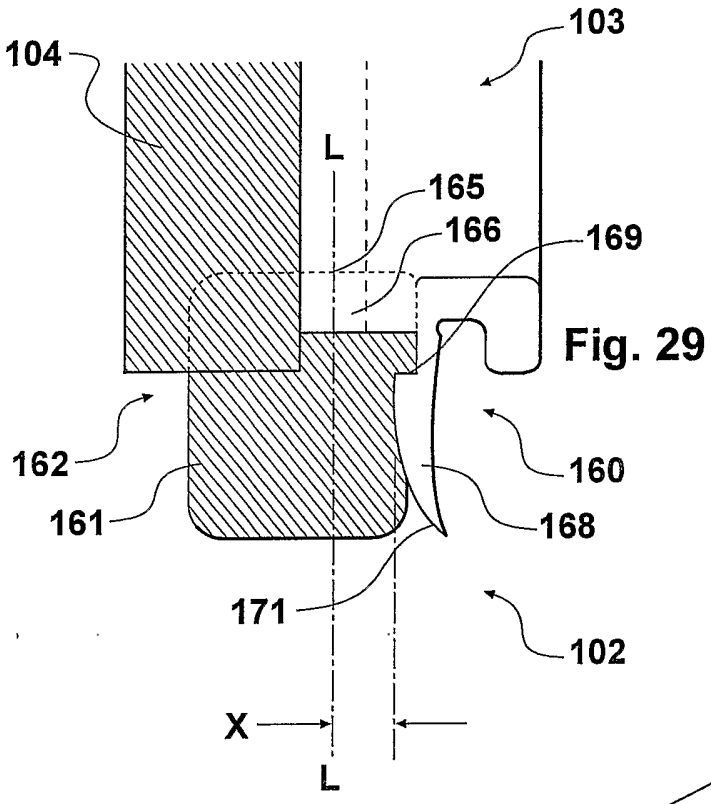


Fig. 29

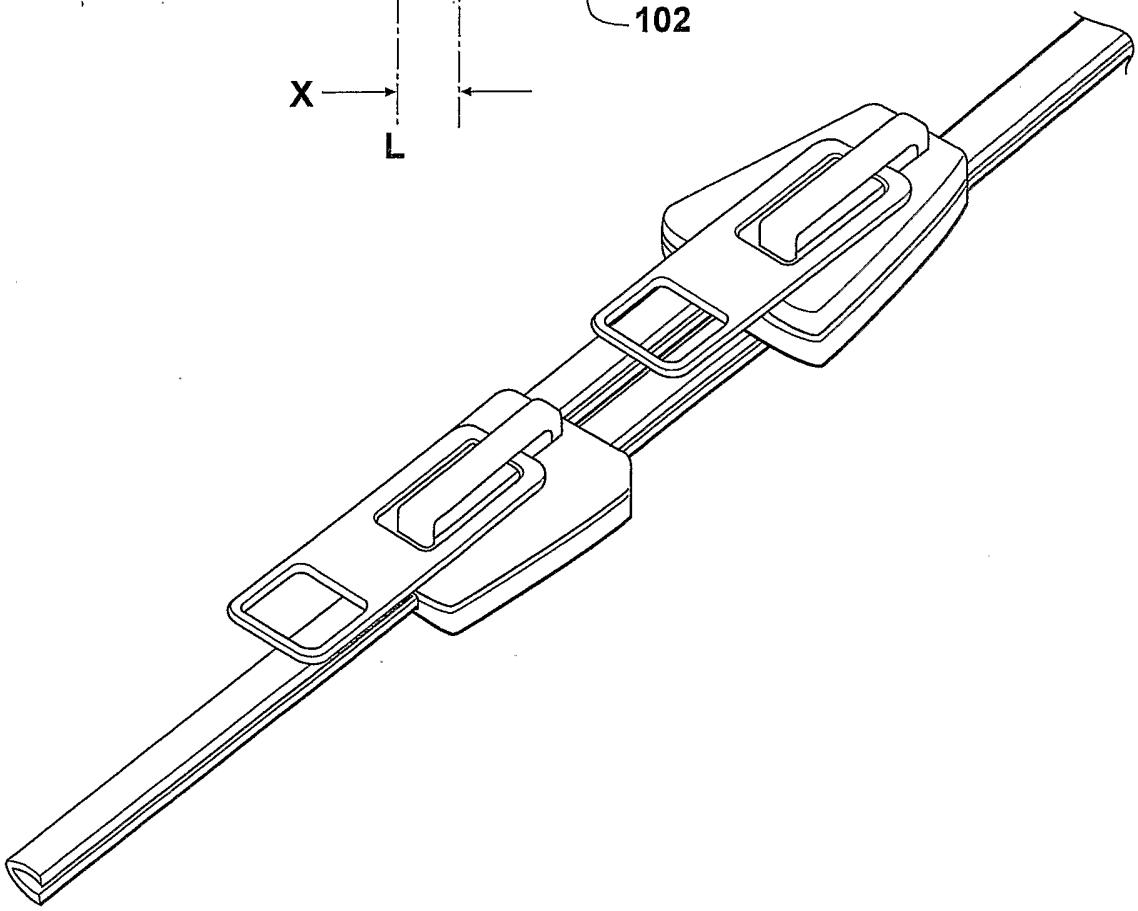


Fig. 30

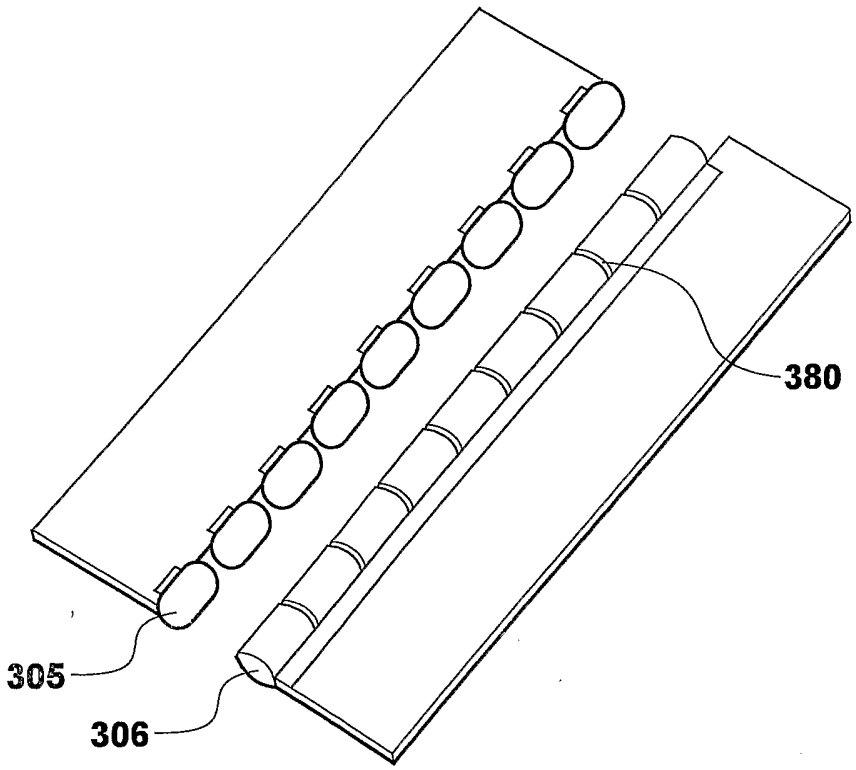


Fig. 31

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NZ2005/000199

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. [7]: A44B 19/38, 19/16, 19/04, 19/26, 19/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI IPC – A44B 19/-, A44B 19/04, 19/10, 19/14, 19/16, 19/26, 19/28, 19/30, 19/32, 19/36, 19/38, 19/60, B65D 33/25, A41F 1/00, A43C 11/12, A45C 13/00, 13/10, B29D 5/08, 5/10, B21D 53/56 & keywords (male, female, slot, tongue, fluid, water, wet, rain, barrier, resist, water proof, stretch, lengthen, elongate, latch, pawl, end, stop, expand, splay, widen) & like terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 3775812 A (CARVER Jr.) 4 December 1973 Especially figures; column 2, line 65 to column 3, line 19	1-2 3-8
Y	GB 731834 A (MASTRACCHI-MANES) 15 June 1955 Whole document. See especially figures 1, 2, 4; page 2, line 77 to page 3 line 6	3-8
Y	DE 3240150 A1 (SCHUMANN) 3 May 1984 Whole document	3-8
A	US 5007145 A (KIM) 16 April 1991 Whole document	1-8

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 November 2005	28 NOV 2005
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer **ALLAN SMAILES** Telephone No : (02) 6283 2154

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NZ2005/000199

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4130917 A (SHOPALOVICH) 26 December 1978 Whole document	1-8
A	US 1830078 A (NORTON) 3 November 1931 Especially figures 4-6	1-8

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/NZ2005/000199

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	3775812	NONE					
GB	731834	NONE					
DE	3240150	NONE					
US	5007145	AU	29428/89	EP	0353276	SU	1793893
		WO	8906504				
US	4130917	NONE					
US	1830078	NONE					

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX