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(54) **SLIDER ZIPPER AND CLOTHES**

(57) A slider zipper and clothes. The slider zipper comprises a female-part assembly (100) and a male-part assembly (200). The female-part assembly (100) comprises female-part base tapes (110) and female-part teeth (120) arranged at intervals on the female-part base tapes (110), each female-part tooth (120) being provided with a tooth inner cavity (130) and a main sliding part (140), and the plurality of tooth inner cavities (130) and the main sliding parts (140) forming a slideway. The male-part assembly (200) comprises male-part base tapes (210) and male-part teeth (220) arranged at intervals on the male-part base tapes (210), the male-part teeth (220) comprising tooth parts (223), connecting parts (222) and male-part bases (221); the male-part bases (221) being connected to the male-part base tapes (210),

the tooth parts (223) being matched with the tooth inner cavities (130), and the connecting parts (222) being matched with the main sliding parts (140), so that the tooth parts (223) may slide along the tooth inner cavities (130) arranged in sequence; the male-part bases (221) covering side surfaces of side-arm portions (122b) of the main sliding parts (140); and the left side surfaces of the male-part bases (221) being slidably connected to the right side surfaces of the female-part teeth (120). By means of connecting the male-part bases (221) with the right side surfaces of the female-part teeth (120), the male-part bases (221) replace cloth edges to rub with the female-part teeth (120), thus greatly reducing the total friction, effectively promoting the overall smoothness, and reducing the friction noise.

EP 4 563 035 A1

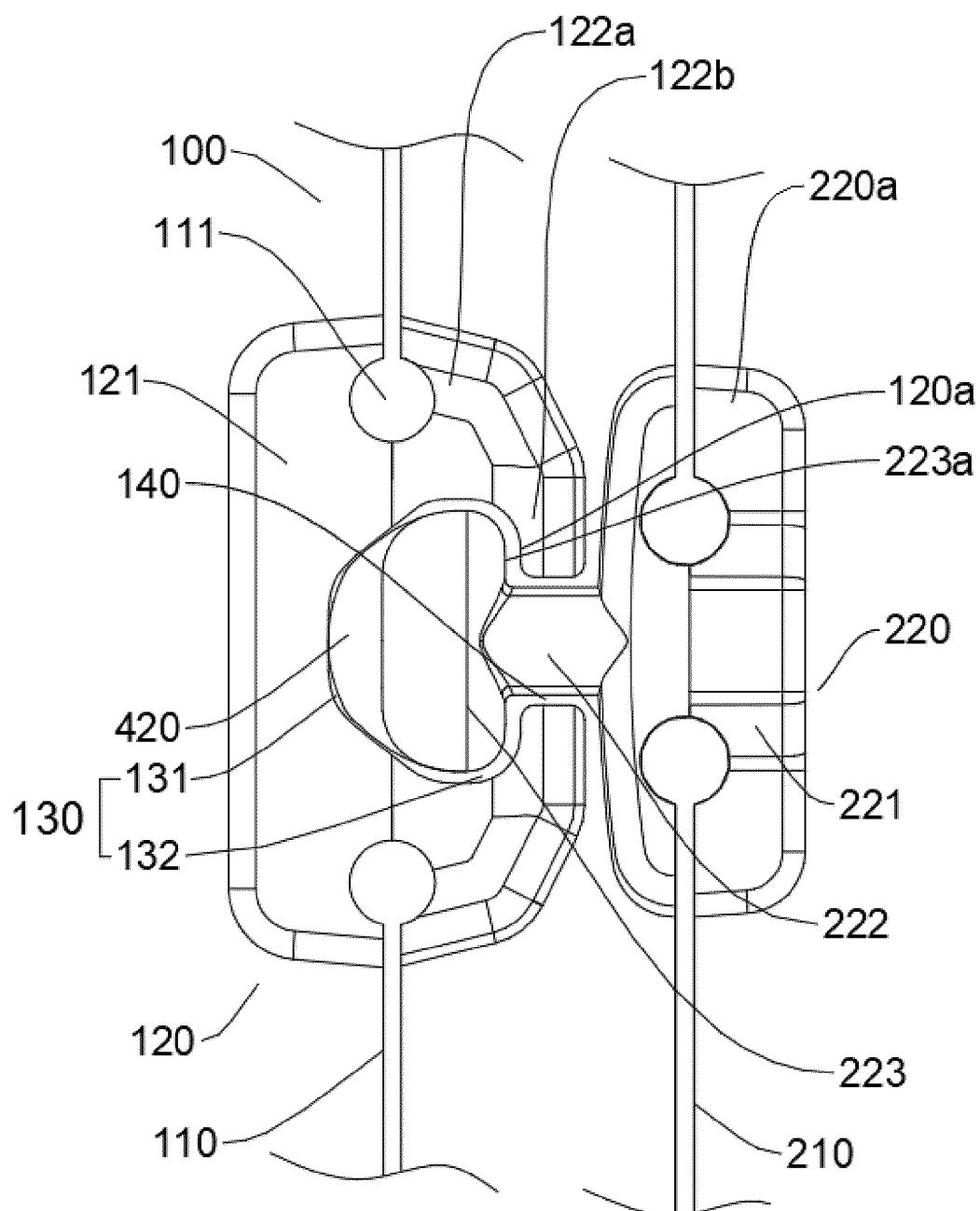


FIG. 10

Description

[0001] The present application claims the priority to Chinese Patent Application No. 202221984342.8, titled "SLIDER ZIPPER AND CLOTHES", filed with the China National Intellectual Property Administration on July 29, 2022, the entire disclosure of which is incorporated herein by reference.

FIELD

[0002] The present application relates to the technical field of clothing and accessories thereof, and in particular to a sliding zipper and a garment.

BACKGROUND

[0003] A sliding zipper generally includes a female assembly and a male assembly. The female part and the male part can slide relative to each other through continuously arranged zipper teeth. At present, sliding zippers are widely used on garments, packages, pockets, tents and the like. Typically, male teeth of the male assembly slide in female teeth of the female assembly. For example, the sliding zipper is used at the connection position between a garment and a hood, and the two assemblies are respectively connected to the garment and the hood, so that the hood can easily rotate along with the head.

[0004] A sliding zipper is disclosed in a Chinese Patent Application publication (No. CN114468483A), which realizes smooth sliding through the matching shapes of a female assembly, a male assembly, female teeth and male teeth. In use of this sliding zipper, the female assembly or the male assembly needs to be exposed to ensure good smoothness. Since the female assembly and the male assembly are assembled together through the teeth that are spaced apart from each other, air and water may easily penetrate the sliding zipper, and the aesthetic appeal of the garment is severely affected.

[0005] For the clothing to be more popular in the market, it is necessary to provide a brim on the hood for shielding. When the hood rotates, the brim rotates along with the hood, and may rub against an outer side surface of the female teeth, adding an external friction to an existing friction between the female teeth and the male teeth. As a result, the smoothness of the sliding zipper is reduced when turning the head, and noise is easily generated. The human ears are very close to the hood and are enclosed by the hood, the garment and the brim, which causes the wearer to feel uncomfortable when turning the head.

[0006] In summary, the existing sliding zipper and garment have the problems of large friction and noise during rotation. In view of this, it is needed to design a sliding zipper and a garment.

SUMMARY

[0007] An object of the present application is to provide a sliding zipper and a garment to reduce the shortcomings of the conventional technology.

[0008] The technical problems are solved through the following technical solutions according to the present application.

[0009] A sliding zipper includes a female assembly and a male assembly. The female assembly includes a female base tape and female teeth that are arranged on the female base tape and spaced apart from each other. A tooth inner cavity and a main sliding part are formed on each of the female teeth, and multiple tooth inner cavities and multiple main sliding parts form a slideway. The male assembly includes a male base tape and male teeth that are arranged on the male base tape and spaced apart from each other.

[0010] The female tooth includes a female base and tooth arm members. The female base is connected to the female base tape, and the tooth arm members are respectively arranged at two ends of the female base. Each of the tooth arm members includes a base part and an arm part that are connected to each other, and the base part is connected to the female base. The arm part of the tooth arm member at one end of the female base extends toward the tooth arm member at the other end of the female base to form the tooth inner cavity and the main sliding part.

[0011] The male tooth includes a tooth part, a connection part and a male base, and the male base is connected to the male base tape. The tooth part matches the tooth inner cavity, and the connection part matches the main sliding part. The tooth part is slidable along the tooth inner cavities arranged in sequence, and the male base covers side surfaces of the arm parts on a side of the main sliding part.

[0012] Preferably, a direction from the main sliding part to the female base is perpendicular to a plane where the female base tape is located, and adjacent surfaces of the male base and the female base are both formed with curved surfaces.

[0013] Preferably, the male base is formed with a fin part that extends in an extension direction of the female tooth.

[0014] Preferably, the tooth arm members at the respective ends of the female base are symmetric to each other.

[0015] Preferably, the sliding zipper further includes limiting teeth that are arranged in an array formed by the male teeth and spaced apart from each other. A protruding part is provided at an end of each limiting tooth to reduce a contact area

between the male tooth adjacent to the limiting tooth and the female tooth.

[0016] Preferably, the limiting teeth are the male teeth. The protruding parts are arranged in the array formed by the male teeth and spaced apart from each other to form second limiters that are spaced apart from each other. A total length of the protruding part, the tooth part and the connection part of each limiting tooth is greater than a length from an opening of the main sliding part to an inner side wall of the tooth inner cavity.

[0017] Preferably, the tooth inner cavity includes a first cavity and a second cavity that are communicated with each other. The first cavity matches the limiting tooth and the male tooth, and the second cavity matches the protruding part. The limiting tooth and the male tooth are slidable in the first cavities arranged in sequence, and the protruding part is slidable in the second cavities arranged in sequence.

[0018] Preferably, an edge of the protruding part is of an arc shape.

[0019] Preferably, an edge of the tooth part is of an arc shape. A first plane is formed on a side of the tooth part facing the main sliding part, and a second plane matching the first plane is formed at a joint of the tooth inner cavity and the main sliding part.

[0020] A garment includes a sliding zipper, a first garment part and a second garment part. The first garment part is connected to the female base tape, and the second garment part is connected to the male base tape, so that the first garment part and the second garment part are slidable relative to each other.

[0021] The advantages and positive effects of the present application are as follows.

1. According to the present application, a left side surface of the male base is slidably connected to a right side surface of the female tooth. Since the right side surface of the female tooth is connected to the male base, the male base replaces a brim of a cloth to rub against the female tooth, so that the total friction is greatly reduced, thereby effectively improving the overall smoothness and reducing the friction noise.

2. According to the present application, the male base tape is directly connected to the hood, and a lower edge of the hood forms the brim in the conventional technology, so that no additional brim is needed to cover the female teeth, leading to a good visual effect. Air and water are prevented from passing through, resulting in better sealing performance.

3. According to the present application, through the design of the dimensions of the male teeth, the sliding part and the tooth cavities, and in cooperation with the curved surface of the male teeth in the slideway, a range of motion of the male teeth is limited to prevent the protruding part from entering the first cavity and prevent the range of motion of the male teeth from being excessively large, thus ensuring good smoothness.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022]

FIG. 1 is a front view of a female assembly according to the present application;

FIG. 2 is an isometric view of a female tooth according to the present application;

FIG. 3 is a front view of a male assembly according to the present application;

FIG. 4 is a side view of the male assembly according to the present application;

FIG. 5 is an isometric view of a portion of male teeth according to the present application;

FIG. 6 is an isometric view of a second limiter according to the present application;

FIG. 7 is a front view of the second limiter according to the present application;

FIG. 8 is an isometric view of the second limiter and the female tooth according to the present application;

FIG. 9 is a sectional view showing the assembly of a sliding zipper at a first position according to the present application; and

FIG. 10 is a side view showing the assembly according to the present application.

[0023] Reference numerals:

5	100.	female assembly;	110.	female base tape;
	111.	rib;	120.	female tooth;
	120a.	second plane;	121.	female base;
10	122.	tooth arm member;	122a.	base part;
	122b.	arm part;	130.	tooth inner cavity;
	131.	first cavity;	132.	second cavity;
15	140.	main sliding part;	200.	male assembly;
	210.	male base tape;	220.	male tooth;
	220a.	fin part;	221.	male base;
20	222.	connection part;	223.	tooth part;
	223a.	first plane;	230.	first section;
	240.	second section;	300.	first limiter;
25	310.	limiting seat body;	311.	limiting wall;
	320.	elastic member;	321.	elastic sheet;
	322.	first inclined surface;	330.	limiting inner cavity;
30	331.	upper cavity;	332.	lower cavity;
	340.	secondary sliding part;	350.	receiving part;
	400.	second limiter;	410.	limiting tooth;
35	420.	protruding part;	421.	second inclined surface.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0024] The technical solutions in the embodiments of the present application will be described clearly and completely hereinafter in conjunction with the accompanying drawings in the embodiments of the present application. It is apparent that the described embodiments are only some of the embodiments of the present application rather than all of the embodiments. Based on the embodiments of the present application, all other embodiments obtained by those skilled in the art without any creative effort shall fall within the protection scope of the present application.

[0025] It should be noted that when an assembly is described as being "fixed to" another assembly, it may be directly fixed on another assembly or there may be an intermediate assembly therebetween. When an assembly is described as being "connected to" another assembly, it may be directly connected to another assembly or there may be an intermediate assembly therebetween. When an assembly is described as being "arranged on" another assembly, it may be directly arranged on another assembly or there may be an intermediate assembly therebetween. The terms "perpendicular", "horizontal", "left", "right" and similar expressions used herein are for illustrative purposes only.

[0026] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by those skilled in the art to which the present application belongs. The terms used in the specification of the present application are merely intended for describing specific embodiments, and are not intended to limit the present application. The term "and/or" used herein refers to any or all combinations including one or more correlated items that are listed.

[0027] The embodiments of the present application are further described in detail hereinafter with reference to the accompanying drawings.

[0028] A sliding zipper includes a female assembly 100 and a male assembly 200. The female assembly 100 includes female base tapes 110 and female teeth 120 that are arranged on the female base tapes 110 and spaced apart from each other. Each of the female teeth 120 is formed with a tooth inner cavity 130 and a main sliding part 140. Multiple tooth inner cavities 130 and multiple main sliding parts 140 form a slideway. The male assembly 200 includes male base tapes 210 and male teeth 220 that are arranged on the male base tapes 210 and spaced apart from each other. That is to say, the female assembly 100 and the male assembly 200 are slidably connected to each other, and the multiple female teeth 120 are sequentially arranged on the female base tapes 110 in an array to form a sliding rail. The female assembly 100 further includes the tooth inner cavities 130 and the main sliding parts 140 of the female teeth 120, and the multiple tooth inner cavities 130 and the multiple main sliding parts 140 sequentially match each other to form a slideway. The male teeth 220 are sequentially arranged on the male base tapes 210 in an array. One end of each male tooth 220 slides in the slideway, and the other end of the male tooth 220 is connected to the male base tapes 210 to be sewn on the garment.

[0029] Each of the female teeth 120 includes a female base 121 and tooth arm members 122. The female base 121 is connected to the female base tape 110, and the tooth arm members 122 are respectively arranged at two ends of the

female base 121. The tooth arm member 122 includes a base part 122a and an arm part 122b that are connected to each other. The base part 122a is connected to the female base 121, and the arm part 122b of the tooth arm member 122 at one end of the female base 121 extends toward the tooth arm member 122 on the other end of the female base 121 to form the tooth inner cavity 130 and the main sliding part 140. Specifically, as shown in FIG. 2, a tooth arm member 122 is provided on an upper side of the female base 121, and is integrally formed on the female base 121. A front side and a rear side of the female base 121 are connected to the female base tapes 110 respectively. The tooth arm member 122 includes a base part 122a connected to the female base 121 and an arm part 122b on an upper side of the base part 122a. The base part 122a is connected to the front end of the female base 121, and the arm part 122b is connected to the base part 122a and extends toward the rear end of the female base 121, so that the tooth inner cavity 130 and a main sliding part 140 are formed between the arm part 122b and the female base 121.

[0030] As shown in FIG. 2, the arm part 122b at the front end of the upper side of the female base 121 extends toward the rear end, and the arm 122b at the rear end of the upper side of the female base 121 extends toward the front end, so that the tooth arm members 122 at the two ends of the female base 121 form an encircling shape, and the overall female base 121 is symmetrical. A gap formed between the arm parts 122b is the main sliding part 140, and the tooth inner cavity 130 is defined by the tooth arm members 122 and the female base 121. It should be noted that, a direction from the main sliding part 140 to the tooth inner cavity 130 is inclined relative to the female base tape 110, and preferably is perpendicular to the plane where the female base tape 110 is located.

[0031] When the direction from the main sliding part 140 to the tooth inner cavity 130 is perpendicular to the plane where the female base tapes 110 are located, it can be ensured that an opening of the main sliding part 140 is horizontal after the female base tapes 110 are sewn on the garment, that is, a connection part 222 is horizontal at this time. In the conventional technology, for example, a sliding zipper is disclosed in a Chinese Patent Application publication (No. CN114468483A), in which a conventional sliding zipper manner is replaced by a connection part 222 to solve the technical problem of the large friction at the connection position of a conventional main sliding part 140, so that a good sliding effect can be achieved through the matching between the connection part 222 and the main sliding part 140. However, in this implementation, the male assembly 200 is connected to a hood, and when the hood is wore, the male assembly 200 (specifically, a tooth part 223 of the male tooth 220) will exert a force on the female tooth 120 toward the hood (in an upward direction when the hood is put on). As a result, the tooth part 223 will rub against the main sliding part 140 and the sides of the female tooth 120 (including side wall surfaces of the main sliding part 140). In the present technical solution, when the male tooth 220 is subjected to an upward force, the tooth part 223 will not rub against the main sliding part 140, since the connection part 222 and the main sliding part 140 match each other. In this way, it is possible to reduce the friction between the tooth part 223 and the female tooth 120 at the side wall surfaces of the main sliding part 140, so that the tooth part 223 will only rub against the sides of the female tooth 120 (since the female teeth 120 are spaced apart from each other), thereby further improving the smoothness of the zipper.

[0032] The male tooth 220 includes a tooth part 223, a connection part 222 and a male base 221, and the male base 221 is connected to the male base tape 210. The tooth part 223 matches the tooth inner cavity 130, and the connection part 222 matches the main sliding part 140. The tooth part 223 slides along the tooth inner cavities 130 arranged in sequence, and the male base 221 covers side surfaces of the arm parts 122b on a side of the main sliding part 140. That is to say, the male tooth 220 includes the male base 221, the connection part 222 and the tooth part 223. The tooth part 223 slides in the tooth inner cavity 130, and the tooth part 223 has a cross-section larger than that of the main sliding part 140 to prevent the male tooth 220 from departing from the female tooth 120. The connection part 222 slides in the main sliding part 140, and the male base 221 is connected to the male base tape 210.

[0033] Specifically, as shown in FIG. 10, the male tooth 220 includes a male base 221, a connection part 222 and a tooth part 223, and upper and lower sides of the male base 221 are connected to the male base tapes 210 respectively. The connection part 222 is perpendicular to the male base 221, and the male base 221, the connection part 222 and the tooth part 223 form an "I" shape. The connection part 222 slides in the main sliding part 140, and matches the main sliding part 140 in size. It should be noted that the male base 221 extends upward and downward to cover a right side surface of the female tooth 120, that is, a left side surface of the male base 221 is slidably connected to the right side surface of the female tooth 120. Since the right side surface of the female tooth 120 is connected to the male base 221, the male base 221 replaces a brim of a cloth to rub against the female tooth 120, so that the total friction is greatly reduced, thereby effectively improving the overall smoothness and reducing the friction noise.

[0034] In another embodiment, a direction from the main sliding part 140 to the female base 121 is perpendicular to a plane where the female base tapes 110 are located, and adjacent surfaces of the male base 221 and the female base 121 are both formed with curved surfaces.

[0035] As shown in FIG. 10, the upper side and the lower side of the female tooth 120 are respectively connected to the female base tapes 110. The main sliding part 140 extends toward the tooth inner cavity 130, and an extension line of the main sliding part 140 is perpendicular to the plane where the female base tapes 110 are located, so that the female tooth 120 can be formed vertically, and the opening of the main sliding part 140 is in a horizontal direction. The upper side and the lower side of the male base 221 are respectively connected to the male base tapes 210, and the female base tapes 110 are

parallel to the male base tapes 210. The right side surface of the female tooth 120 is formed with a gradually changing faceted or curved surface, so that a small contact surface is formed on the rightmost side of the female tooth 120. The left side of the male base 221 is formed with a curved surface, and a middle position of the curved surface protrudes, so that the contact surface between the female tooth 120 and the male base 221 is further reduced.

[0036] According to this connection manner, the male base tapes 210 are directly connected to the hood, and a lower edge of the hood forms the brim in the conventional technology. Therefore, no additional brim is needed to shield the female tooth 120, thereby achieving a good visual effect and preventing air and water from passing through, leading to a good sealing performance.

[0037] In further another embodiment, the male base 221 is formed with a fin part 220a, which extends in the extension direction of the female tooth 120. Specifically, as shown in FIG. 10, the fin part 220a is formed on the male base 221 in a vertical direction, so that a total length of the male base 221 in the vertical direction is basically the same as that of the female base 121. In this way, the male base 221 completely covers the opened end of the main sliding part 140 of the female tooth 120, thus achieving good smoothness.

[0038] In further another embodiment, the tooth arm members 122 at the two ends of the female base 121 are symmetric to each other. Specifically, as shown in FIG. 10, a central axis of the tooth inner cavity 130 and a central axis of the main sliding part 140 coincide with a central axis of the female tooth 120, so that the connection part 222 is always in the horizontal direction, which facilitates the movements of the tooth part 223 and the connection part 222 driven by the moving hood.

[0039] In further another embodiment, the sliding zipper further includes limiting teeth 410, which are arranged in the array of the male teeth 220 and spaced apart from each other. A protruding part 420 is provided at an end of the limiting tooth 410 to reduce the contact area between the male tooth 220 adjacent to the limiting tooth 410 and the female tooth 120.

[0040] The female base tapes 110 are further connected with first limiters 300, which are arranged in the array of the female teeth 120 and spaced apart from each other, so that when the slideway is formed on the female teeth 120, the first limiter 300 at each end of the slideway limits the male teeth 220 to prevent the male assembly 200 from departing from the female assembly 100.

[0041] The sliding zipper includes more than one second limiter 400, which are arranged in the array of the male teeth 220 and spaced apart from each other, that is to say, in a single-row array of the male teeth 220, at least two of the second limiters 400 have male teeth 220 on both left and right sides thereof. The second limiters 400 are connected to the male base tapes 210, and the male base tapes 210 drive the male teeth 220 and the second limiters 400 to move together.

[0042] Under the cooperation of the first limiters 300 and the second limiters 400, the male assembly 200 slides in a slideway formed by the female teeth 120 between the two first limiters 300. When the male assembly 200 slides to a first position, the first limiter 300 abuts against the second limiter 400, so as to limit the sliding of the male assembly 200. When the male assembly 200 is at the first position, the male teeth 220 on one side of one second limiter 400 are located in the slideway, and the male teeth 220 on the other side of the one second limiter 400 are located outside the slideway. When the male assembly 200 is at a second position, the male teeth 220 on one side of the other second limiter 400 are located in the slideway, and the male teeth 220 on the other side of the other second limiter 400 are located outside the slideway.

[0043] As shown in FIG. 1, the female assembly 100 includes female teeth 120 and two female base tapes 110. In the left-right direction, the multiple female teeth 120 are arranged between the two female base tapes 110 in a single-row array, and there is a certain distance between every two female teeth 120. A rib 111 is formed on an edge of each of the female base tapes 110, and the female teeth 120 are provided on the ribs 111. This connection structure has been disclosed in an application publication No. CN215958629U, which will not be described in detail herein. In other embodiments, the sliding zipper includes only one female base tape 110, and the female teeth 120 are connected to the one female base tape 110.

[0044] As shown in FIG. 2, the front side and the rear side of each female tooth 120 are respectively connected to the female base tapes 110, and the tooth inner cavity 130 runs through the female tooth 120 from left to right. The main sliding part 140 extends upward from the tooth inner cavity 130 and extends through the female tooth 120. The main sliding part 140 has a smaller diameter than that of the tooth inner cavity 130, leading to a limiting effect. Referring to FIG. 1, the multiple female teeth 120 arranged in sequence, i.e., the multiple sequentially arranged tooth inner cavities 130 and main sliding parts 140 form a slideway in the left-right direction, so that the male teeth 220 slide in the slideway.

[0045] As shown in FIG. 3, the male assembly 200 includes male teeth 220 and two male base tapes 210. In the left-right direction, the multiple male teeth 220 are arranged between the two male base tapes 210 in a single-row array, and there is a certain distance between every two male teeth 220. A rib 111 is formed on an edge of each of the male base tapes 210, and the male teeth 220 are provided on the ribs 111. As shown in FIG. 4, the male tooth 220 includes the male base 221, the connection part 222, and the tooth part 223. The tooth part 223 slides in the tooth inner cavity 130, and the tooth part 223 has a section larger than that of the main sliding part 140 to prevent the male tooth 220 from departing from the female tooth 120. The connection part 222 slides in the main sliding part 140, and the male base 221 is connected to the male base tapes 210.

[0046] As shown in FIG. 1, the first limiters 300 are provided at a left end and a right end of the array of the female teeth 120 respectively. Referring to FIG. 9, the first limiter 300 includes a limiting seat body 310 and an elastic member 320. The

cooperation of the first limiter 300 and the second limiter 400 on the left side is taken as an example. A vertical surface on a right side of the elastic member 320 is higher than a bottom surface of the slideway formed by the female teeth 120. An upper surface of the elastic member 320 is at most as high as a lower surface of the male tooth 220, so that the male tooth 220 directly slides out of the first limiter 300a on the left side of the slideway. A lower surface of the second limiter 400a is lower than an upper surface on the right side of the elastic member 320.

[0047] When the male assembly 200 is at the first position, a left side surface of the second limiter 400a abuts against a right side surface of the first limiter 300a, so that the first limiter 300a prevents the male assembly 200 from moving further to the left. At this time, the male teeth 220 on a left side of the second limiter 400a are located outside the slideway, and the male teeth 220 on a right side of the second limiter 400a are located in the slideway.

[0048] When the male assembly 200 is at the second position, a right side surface of the second limiter 400b abuts against a left side surface of the first limiter 300b, so that the first limiter 300b prevents the male assembly 200 from moving further to the right. At this time, the male teeth 220 on a right side of the second limiter 400b are located outside the slideway, and the male teeth 220 on a left side of the second limiter 400b are located in the slideway.

[0049] As shown in FIG. 4, the array of the male teeth 220 is arranged in the left-right direction, and the second limiters 400a, 400b are symmetrically arranged in the array of the male teeth 220. In this embodiment, the array of the female teeth 120 has a total length of 52 cm, and the array of the male teeth 220 has a total length of 52 cm. The array of the male teeth 220 on the left side of the second limiter 400a has a total length of 7 cm, and the array of the male teeth 220 on the right side of the second limiter 400b has a total length of 7 cm.

[0050] The limiting seat body 310 is connected with the elastic member 320, and the elastic member 320 is located at each of the two ends of the slideway formed by the female teeth 120. The elastic member 320 abuts against the second limiter 400 to limit the male assembly 200.

[0051] The limiting teeth 410 of the second limiters 400 and the male teeth 220 are connected to the male base tapes 210 in an array. A protruding part 420 is formed at an end of the limiting tooth 410, so that the end of the limiting tooth 410 protrudes from the male teeth 220. The protruding part 420 abuts against the elastic member 320, thereby limiting the male assembly 200.

[0052] As shown in FIG. 10, the protruding part 420 of the limiting tooth 410 extends toward a left side surface of the tooth inner cavity 130. It can be understood that the protruding part 420 of the limiting tooth 410 helps to reduce the contact surface between the male teeth 220 adjacent to the limiting tooth 410 and the female teeth 120, so as to reduce the total contact area of the array of the male teeth 220, thereby reducing the total probability of friction.

[0053] As shown in FIG. 4, the array of the limiting teeth 410 is formed in the array of the male teeth 220, and the limiting teeth 410 may be provided at the left end and the right end of the array of the male teeth 220.

[0054] The contact surface between the protruding part 420 and the tooth inner cavity 130 is an arc surface, so as to reduce the friction. Specifically, as shown in FIG. 3, the four edges of the protruding part 420 have rounded chamfers. Similarly, the four edges of the tooth part 223 of the male tooth 220 have rounded chamfers. As shown in FIG. 4, the front and rear edges of the protruding part 420 are rounded at the corners, and the front and rear edges of the tooth part 223 of the male tooth 220 are rounded at the corners.

[0055] The elastic members 320 respectively block the two ends of the slideway. When the male assembly 200 is at the first position or the second position, the protruding part 420 of the second limiter 400 abuts against the elastic member 320 to prevent the male assembly 200 from being separated from the female assembly 100. However, the elastic member 320 is deformable and will deform when it is subjected to a certain stress. That is to say, when the second limiter 400 exerts a force on the elastic member 320 that exceeds the deformation capacity of the elastic member 320, the limiting tooth 410 can depart from the slideway and the limiting seat.

[0056] The elastic member 320 is provided in the first limiter 300, so that the second elastic member 320 can depart from the slideway and the limiting seat. That is, the male assembly 200 can depart from the female assembly 100, and the assembling and disassembling are simple and effective, which is beneficial to improving the production efficiency and manual operation.

[0057] As shown in FIG. 1, the upper end and the lower end of the limiting seat body 310 are respectively connected to the female base tapes 110, and the limiting seat body 310 and the female teeth 120 are arranged in an array. There is a certain distance between the limiting seat body 310 and the adjacent female tooth 120. As shown in FIG. 6, a limiting inner cavity 330 is formed in the limiting seat body 310 in the left-right direction. The limiting inner cavity 330 runs through the limiting seat body 310 from left to right, and the limiting inner cavity 330 runs through the limiting seat body 310 upward to form a secondary sliding part 340 extending in the left-right direction. The limiting inner cavity 330 has a diameter larger than that of the secondary sliding part 340 to prevent the tooth part 223 from being detached from the secondary sliding part 340. The elastic member 320 is provided in the limiting seat body 310 and is connected to the limiting seat body 310, and the elastic member 320 divides the limiting inner cavity 330 into an upper cavity 331 and a lower cavity 332. The upper cavity 331 is in communication with the secondary sliding part 340. The two sides of the male base 221 are respectively connected to the male base tapes 210, so that the overall structure of the sliding zipper is more stable. The connection part 222 slides out of the main sliding part 140 and then enters the secondary sliding part 340. The tooth part 223 of the male

tooth 220 slides out of the slideway into the limiting inner cavity 330, and then departs from the limiting seat through the limiting inner cavity 330.

[0058] As shown in FIG. 6, the elastic member 320 includes an elastic sheet 321, which is provided in the limiting inner cavity 330. The elastic sheet 321 is integrally formed on the limiting seat body 310, and divides the limiting inner cavity 330 into an upper cavity 331 and a lower cavity 332. As shown in FIG. 7, the limiting seat body 310 extends in the left-right direction, and the elastic sheet 321 extends in the left-right direction. A right end of the elastic sheet 321 extends to a right end of the limiting seat body 310. The right end of the limiting seat body 310 protrudes to the right to form a receiving part 350, so as to reduce the distance between the elastic sheet 321 and the female tooth 120 on the right side thereof. As shown in FIG. 8, an upper surface of the elastic sheet 321 forms a first inclined surface 322 that gradually rises from left to right, which facilitates the limiting tooth 410 to enter the slideway, and also facilitates the limiting tooth 410 to quickly slide out of the limiting inner cavity 330 when the elastic sheet 320 is deformed. As shown in FIG. 8, the elastic sheet 321 extends in the left-right direction, and a distance between a left end of the elastic sheet 321 and the left side of the limiting seat body 310 is 1/4 to 1/3 of the length of the limiting seat body 310. The vertical surface on the right side of the elastic sheet 321 is thicker. An upper side surface at the right end of the elastic sheet 321 is higher than a bottom surface of the tooth inner cavity 130, and a lower side surface at the right end of the elastic sheet 321 is lower than the bottom surface of the tooth inner cavity 130.

[0059] The limiting tooth 410 is the male tooth 220, and the protruding part 420 is formed on a second inclined surface 421 in an extension direction of the male base tape 210. Specifically, as shown in FIG. 4, the limiting teeth 410 are arranged in the array of the male teeth 220, and an upper side surface of the limiting tooth 410 forms the second inclined surface 421, which is gradually lowered from an end of the male base tape 210 to the middle of the male base tape 210. The first inclined surface 322 matches the second inclined surface 421, so that the male base tape 210 may be conveniently mounted to the female base tape 110, and the stress required for the detachment of the male base tape 210 and the female base tape 110 remains the same as that without the inclined surface, thereby improving the operation experience.

[0060] As shown in FIG. 4, the array of the male teeth 220 on the left side of the second limiter 400a is referred to as a first section 230a, the array of the male teeth 220 on the right side of the second limiter 400b is referred to as another first section 230b, and the array of the male teeth 220 between the two second limiters 400 is referred to as a second section 240.

[0061] As shown in FIG. 8, a limiting wall 311 of the limiting tooth 410 extending in the left-right direction has a length the same as that of the limiting seat body 310 extending in the left-right direction. As shown in FIG. 4, the tooth part 223 extends in the left-right direction. A ratio of the length of the limiting wall 311 of the limiting seat body 310 to the length of the tooth part 223 extending in the left-right direction is 1.2, and the spacing between the tooth parts 223 of every two adjacent male teeth 220 is 0.5 mm, so that the limiting seat body 310 will not enter the gap between the adjacent male teeth 220 when the male teeth 220 in the first section 230 slides into the slideway, thereby ensuring the smoothness.

[0062] In other embodiments, the ratio of the length of the limiting wall 311 of the limiting seat body 310 to the length of the tooth part 223 extending in the left-right direction is 1.3, 1.4, 1.5 or 1.6, and the spacing between the tooth parts 223 of every two adjacent male teeth 220 is 0.5 mm, 0.45 mm, 0.4 mm, 0.35 mm, 0.3 mm, 0.25 mm or 0.2 mm. The above two sets of values may be arbitrarily combined in various embodiments.

[0063] In other embodiments, the ratio of the length of the limiting wall 311 of the limiting seat body 310 to the length of the tooth part 223 extending in the left-right direction is 1.5, and the spacing between the tooth parts 223 of every two adjacent male teeth 220 is 0.3 mm.

[0064] The male teeth 220 in the first section 230 are mounted on the male base tape 210 at equal intervals, and the male teeth 220 in the second section 240 are mounted on the male base tape 210 at equal intervals. The distance between the adjacent male teeth 220 in the first section 230 is smaller than the distance between the adjacent male teeth 220 in the second section 240. The distance between the adjacent male teeth 220 in the second section 240 is 0.6 mm, 0.7 mm, 0.8 mm, 0.9 mm, 1.0 mm, 1.1 mm, 1.2 mm, 1.3 mm, or 1.4 mm. The male teeth 220 in the second section 240 have a larger spacing, so that the male assembly 200 can be bent to a greater extent at the second section 240, which facilitates the folding and storage of the male assembly 200.

[0065] In further another embodiment, the limiting teeth 410 are the male teeth 220, and the protruding parts 420 are arranged in the array of the male teeth 220 and spaced apart from each other to form the second limiters 400 which are spaced apart from each other. The total length of the protruding part 420, the tooth part 223 and the connection part 222 of each limiting tooth 410 is greater than the length from the opening of the main sliding part 140 to the inner side wall of the tooth inner cavity 130.

[0066] The limiting tooth 410 is the male tooth 220, and a protruding part 420 is formed on a side of the male tooth 220 to form the second limiter 400. In other words, in the array of male teeth 220, the protruding parts 420 are formed on the male teeth 220 spaced apart from each other. Specifically, as shown in FIG. 4, the limiting tooth 410 includes a male base 221, a connection part 222 and a tooth part 223, and has a shape and a position corresponding to the array of the male teeth 220. A protruding part 420 is formed on an upper side of the tooth part 223 of the limiting tooth 410. Referring to FIG. 5, the tooth part 223 of the male tooth 220 has a cross-sectional area gradually shrinking from bottom to top, and the peripheral surfaces have rounded chamfers. The upper side of the tooth part 223 of the limiting tooth 410 protrudes upward to form the

protruding part 420, and any surface of the protruding part 420 is a curved surface.

[0067] It should be noted that, as shown in FIG. 10, the total length of the protruding part 420, the tooth part 223 and the connection part 222 is greater than the length from the opening of the main sliding part 140 to the inner side wall of the tooth inner cavity 130. That is to say, the distance from a contact point between the protruding part 420 and the female tooth 120 on a leftmost side of the protruding part 420 to the male base 221 is greater than the distance from a contact point of the tooth inner cavity 130 and the protruding part 420 to the main sliding part 140 on the right side of the female tooth 120. That is to say, when the female tooth 120 and the male tooth 220 slide relative to each other, the left side surface of the male base 221 does not contact the right side surface of the female tooth 120, so that the friction is further reduced, and the connection part 222 matches the main sliding part 140 to achieve a stable connection.

[0068] In further another embodiment, the tooth inner cavity 130 includes a first cavity 131 and a second cavity 132 that are communicated with each other. The first cavity 131 matches the limiting tooth 410 and the male tooth 220, and the second cavity 132 matches the protruding part 420. The limiting tooth 410 and the male tooth 220 slide in the first cavities 131 arranged in sequence, and the protruding part 420 slides in the second cavities 132 arranged in sequence. As shown in FIG. 10, the female tooth 120 forms two horizontal wall surfaces at the sliding part, and the upper and lower wall surfaces of the first cavity 131 are both curved. When the male tooth 220 is located in the female tooth 120, there is a difference between the vertical thickness of the connection part 222 and the vertical size of the sliding part of the female tooth 120, and the difference is between 0.2 mm and 0.5 mm. In this embodiment, the difference is 0.3 mm; and in other embodiments, the difference may be 0.25 mm, 2.35 mm, 0.4 mm or 0.45 mm. Similarly, in the same vertical plane, there is a difference between the thickness of the tooth part 223 in the left-right direction and the distance between the upper and lower wall surfaces of the first cavity 131, and the difference is between 0.2 mm and 0.8 mm. In this embodiment, the difference is 0.4 mm; and in other embodiments, the difference is 0.3 mm, 0.5 mm, 0.6 mm or 0.7 mm. Through the design of the dimensions of the male tooth 220, the sliding part and the tooth inner cavity, and in combination with the curved surface of the male tooth 220 in the slideway, the range of motion of the male tooth 220 is limited to prevent the protruding part 420 from entering the first cavity 131 and prevent the range of motion of the male tooth 220 from being too large, thus ensuring good smoothness.

[0069] In further another embodiment, an edge of the tooth part 223 is of an arc shape. A first plane 223a is formed on a side of the tooth part 223 facing the main sliding part 140, and a second plane 120a matching the first plane 223a is formed at the joint of the tooth inner cavity 130 and the main sliding part 140. Specifically, as shown in FIG. 10, the protruding part 420 is formed on a side of the tooth part 223 away from the main sliding part 140. Referring to FIG. 10, the main sliding part 140 of the female tooth 120 faces to the right, and the protruding part 420 is formed on the left side of the tooth part 223. The cross-section of the protruding part 420 gradually shrinks from the tooth part 223 to the left side, forming an arc shape, so that the left side of the protruding part 420 is in line contact with the left side surface of the tooth inner cavity 130. The left side surface of the tooth inner cavity 130 is a flat surface, and is connected to a flat surface of the elastic member 321 with a gap therebetween. As shown in FIG. 10, the tooth inner cavity 130 includes the first cavity 131 and the second cavity 132. The first cavity 131 is in communication with the main sliding part 140, and the upper and lower side wall surfaces of the first cavity 131 gradually vary to form an arc shape. The second cavity 132 gradually expands from left to right and is connected to the first cavity 131, so that the sides of the male tooth 220 are in line contact with the wall surfaces of the first cavity 131, and the side of the protruding part 420 is in line contact with the wall surface of the second cavity 132.

[0070] The upper and lower side surfaces of the tooth part 223 are both curved surfaces, which match the curved surfaces of the first cavity 131. The first plane 223a is formed on the right side of the tooth part 223, and the second plane 120a is formed at a position where the tooth inner cavity 130 matches the first plane 223a. The first plane 223a matches the second plane 120a, and the tooth part 223 matches the curved surfaces of the first cavity 131, so as to achieve good connections between the planes and between the curved surfaces when the male tooth 220 is under forces, thereby ensuring the smoothness of the sliding zipper.

[0071] A garment includes a sliding zipper, a first garment part and a second garment part. The first garment part is connected to the female base tape 110, and the second garment part is connected to the male base tape 210, so that the first garment part and the second garment part can slide relative to each other. Specifically, a garment is connected to the female base tape 110, and a hood is connected to the male base tape 210. As shown in FIG. 10, the female assembly 100 and the male assembly 200 are in the same plane, so that the garment and the hood can slide relative to each other.

[0072] It should be noted that the embodiments described in the present application are illustrative rather than limitative. Therefore, the present application is not limited to the embodiments described in the specific implementations, and any other implementations obtained by those skilled in the art based on the technical solutions in the present application also fall within the protection scope of the present application.

Claims

1. A sliding zipper, comprising:

a female assembly (100); and
 a male assembly (200), wherein
 the female assembly (100) comprises a female base tape (110) and female teeth (120) that are arranged on the
 female base tape (110) and spaced apart from each other, a tooth inner cavity (130) and a main sliding part (140)
 are formed on each of the female teeth (120), and a plurality of the tooth inner cavities (130) and a plurality of the
 main sliding parts (140) form a slideway;
 the male assembly (200) comprises a male base tape (210) and male teeth (220) that are arranged on the male
 base tape (210) and spaced apart from each other;
 each of the female teeth (120) comprises a female base (121) and tooth arm members (122), the female base
 (121) is connected to the female base tape (110), and the tooth arm members (122) are respectively arranged at
 two ends of the female base (121);
 each of the tooth arm members (122) comprises a base part (122a) and an arm part (122b) that are connected to
 each other, the base part (122a) is connected to the female base (121), and the arm part (122b) of the tooth arm
 member (122) at one end of the female base (121) extends toward the tooth arm member (122) at the other end of
 the female base (121) to form the tooth inner cavity (130) and the main sliding part (140);
 each of the male teeth (220) comprises a tooth part (223), a connection part (222) and a male base (221), and the
 male base (221) is connected to the male base tape (210); and
 the tooth part (223) matches the tooth inner cavity (130), the connection part (222) matches the main sliding part
 (140), the tooth part (223) is slidable along the tooth inner cavities (130) arranged in sequence, and the male base
 (221) covers side surfaces of the arm parts (122b) on a side of the main sliding part (140).

2. The sliding zipper according to claim 1, wherein a direction from the main sliding part (140) to the female base (121) is perpendicular to a plane where the female base tape (110) is located, and adjacent surfaces of the male base (221) and the female base (121) are both formed with curved surfaces.
3. The sliding zipper according to claim 2, wherein the male base (221) is formed with a fin part (220a) that extends in an extension direction of the female tooth (120).
4. The sliding zipper according to claim 3, wherein the tooth arm members (122) at the respective ends of the female base (121) are symmetric to each other.
5. The sliding zipper according to claim 1 or 4, further comprising limiting teeth (410) that are arranged in an array formed by the male teeth (220) and spaced apart from each other, wherein a protruding part is provided at an end of each of the limiting teeth (410) to reduce a contact area between the male tooth (220) adjacent to the limiting tooth (410) and the female tooth (120).
6. The sliding zipper according to claim 5, wherein the limiting teeth (410) are the male teeth (220), the protruding parts (420) are arranged in the array formed by the male teeth (220) and spaced apart from each other to form second limiters (400) that are spaced apart from each other, and a total length of the protruding part (420), the tooth part (223) and the connection part (222) of each of the limiting teeth (410) is greater than a length from an opening of the main sliding part (140) to an inner side wall of the tooth inner cavity (130).
7. The sliding zipper according to claim 5, wherein the tooth inner cavity (130) comprises a first cavity (131) and a second cavity (132) that are communicated with each other, the first cavity (131) matches the limiting tooth (410) and the male tooth (220), the second cavity (132) matches the protruding part (420), the limiting tooth (410) and the male tooth (220) are slidable in the first cavities (131) arranged in sequence, and the protruding part (420) is slidable in the second cavities (132) arranged in sequence.
8. The sliding zipper according to claim 7, wherein an edge of the protruding part (420) is of an arc shape.
9. The sliding zipper according to claim 8, wherein an edge of the tooth part (223) is of an arc shape, a first plane (223a) is formed on a side of the tooth part (223) facing the main sliding part (140), and a second plane (120a) matching the first plane (223a) is formed at a joint of the tooth inner cavity (130) and the main sliding part (140).

10. A garment, comprising:

the sliding zipper according to any one of claims 1 to 9;
 a first garment part; and

EP 4 563 035 A1

a second garment part, wherein
the first garment part is connected to the female base tape (110), and the second garment part is connected to the
male base tape (210), so that the first garment part and the second garment part are slidable relative to each other.

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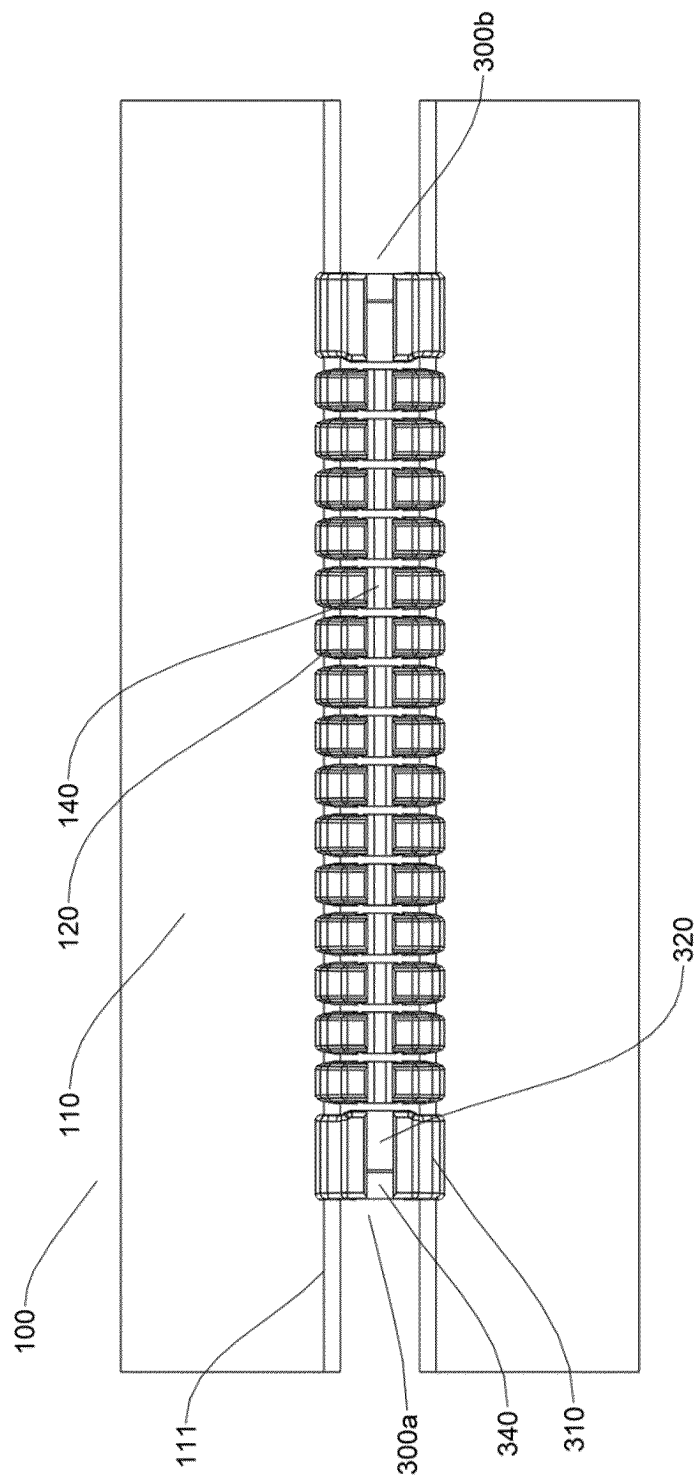


FIG. 1

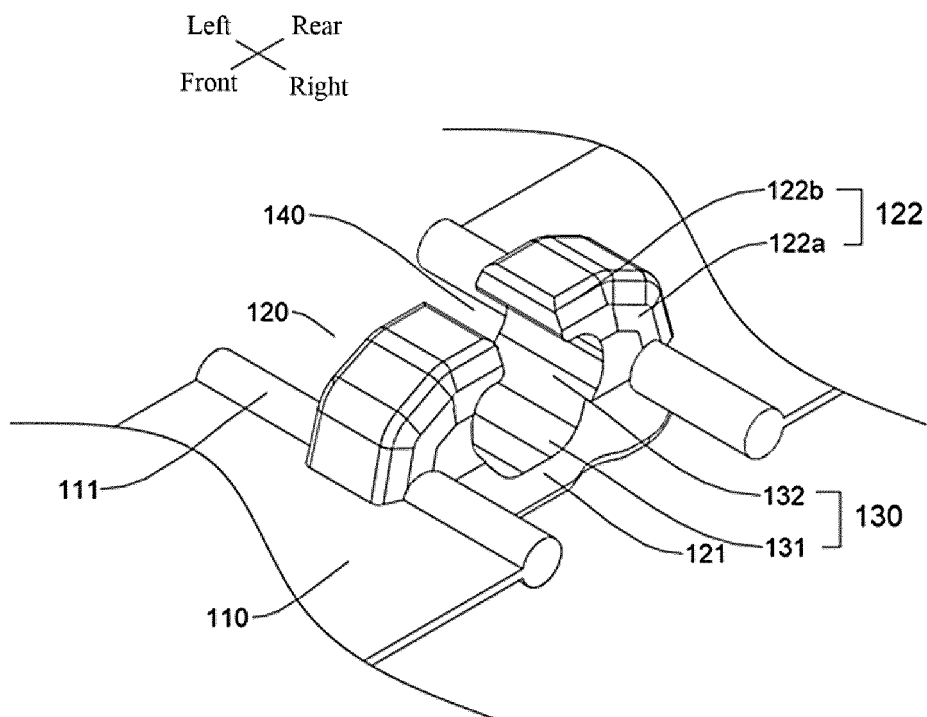


FIG. 2

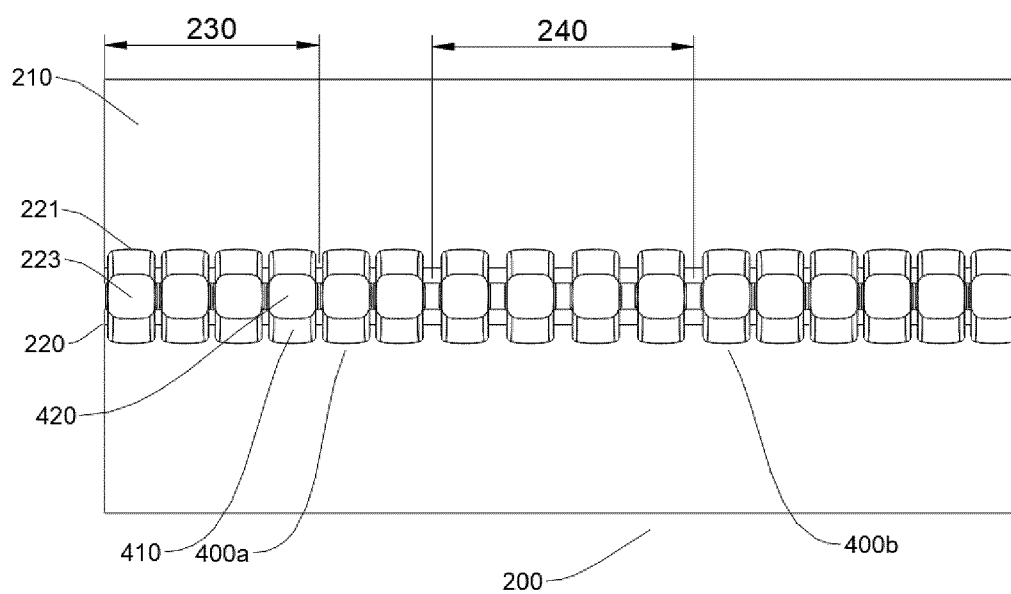


FIG. 3

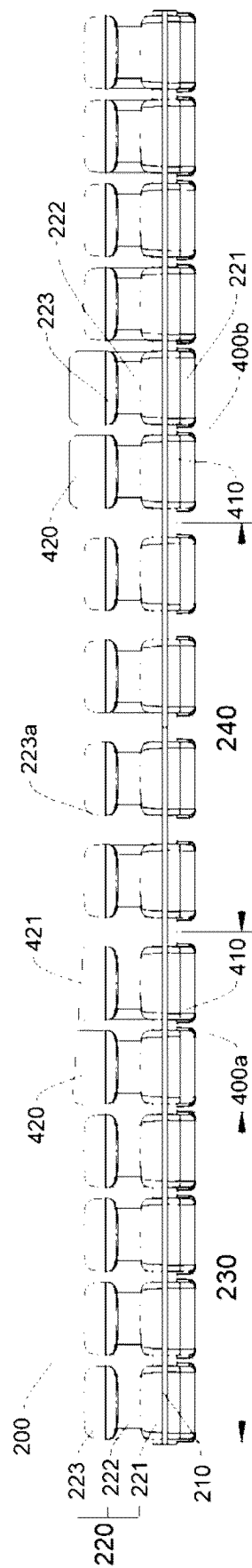


FIG. 4

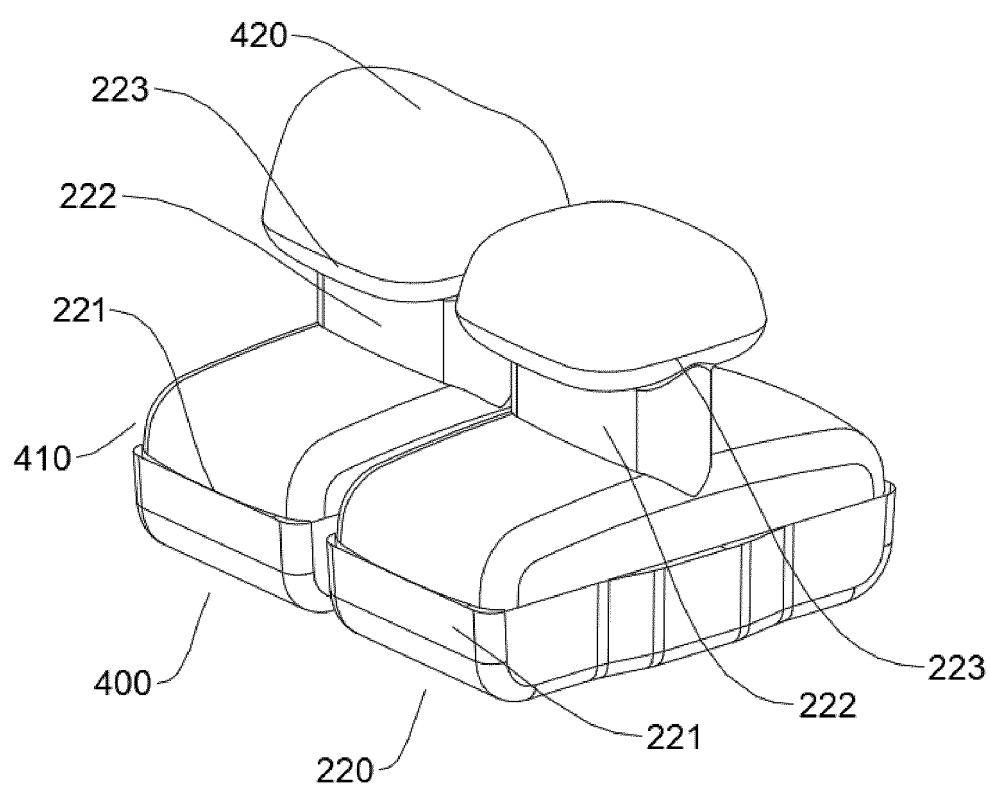


FIG. 5

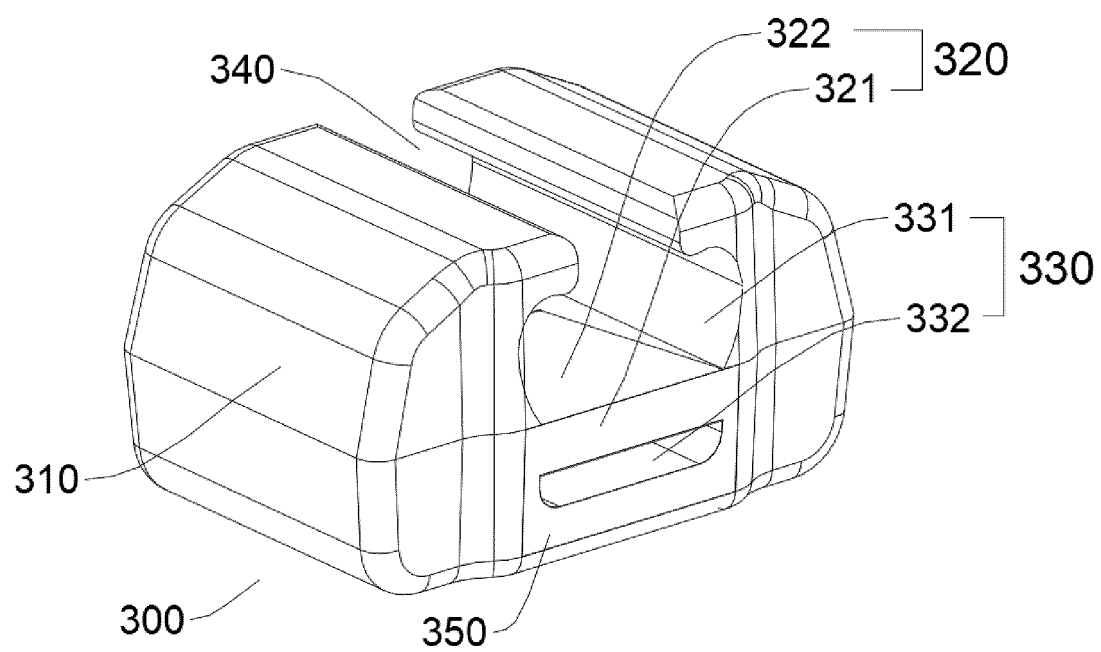


FIG. 6

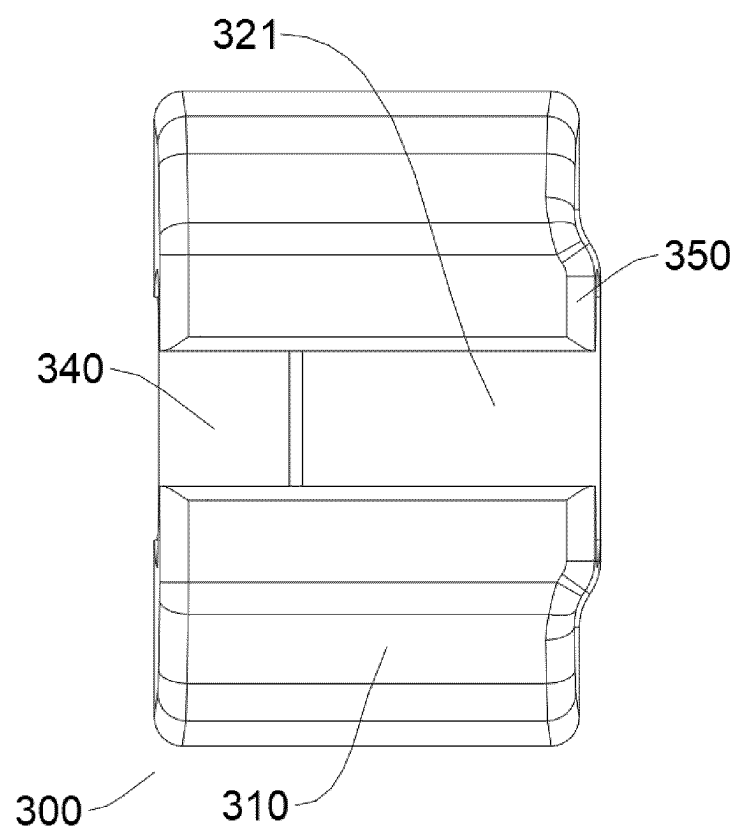


FIG. 7

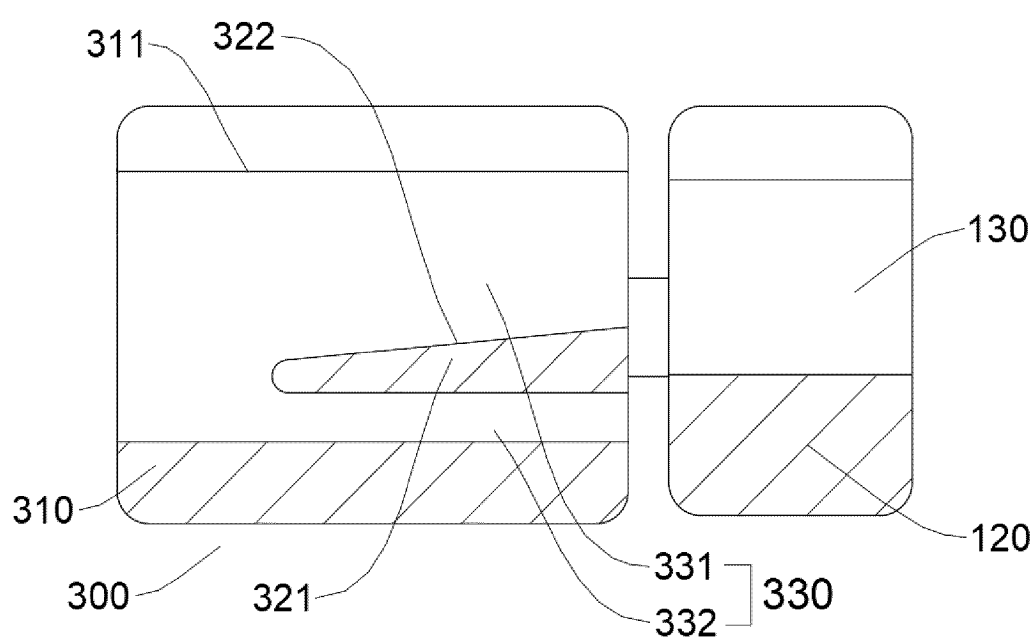


FIG. 8

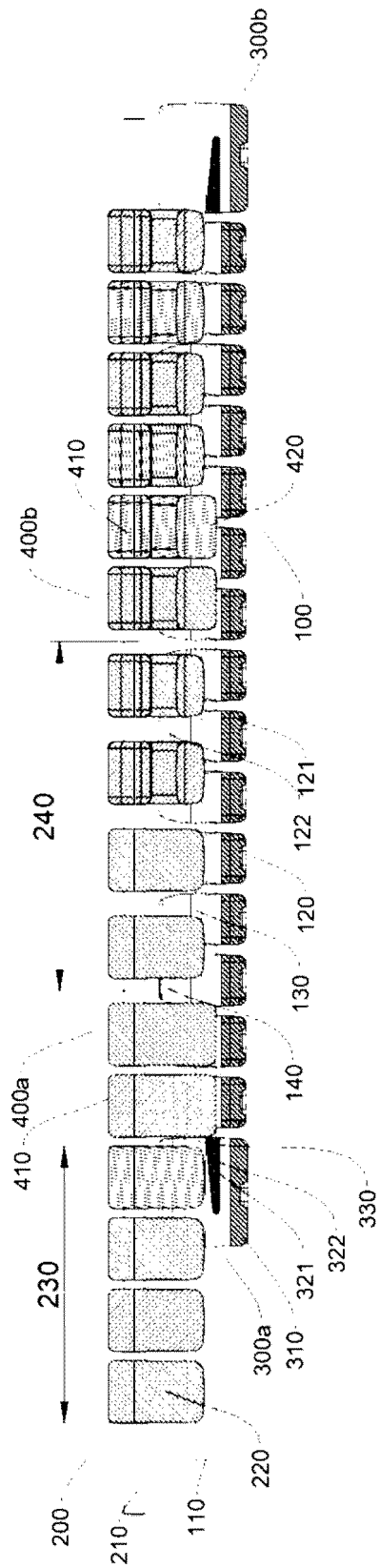


FIG. 9

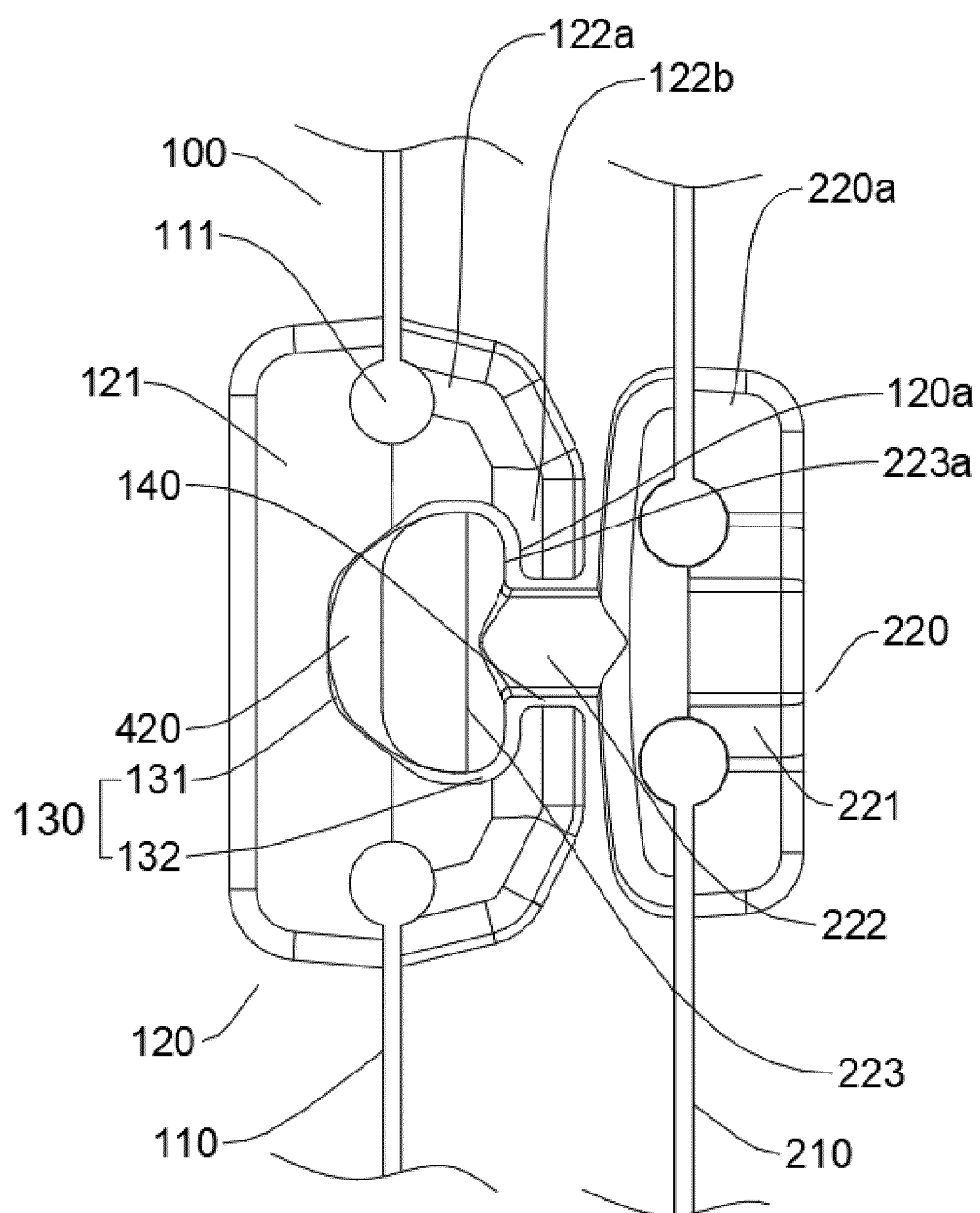


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/108109

A. CLASSIFICATION OF SUBJECT MATTER

A44B 19/02(2006.01)i; A44B 19/24(2006.01)i

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)

IPC: A44B 19/-

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)

CNTXT, ENTXTC, WPABSC: 滑链, 拉链, 母件, 子件, 内腔, 主滑部, 基座, 臂部, 齿部, sliding chain, zipper, parent component, sub-component, cavity, main sliding part, base, arm part, tooth part

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 114468483 A (ZHEJIANG WEIXING INDUSTRIAL DEVELOPMENT CO., LTD. et al.) 13 May 2022 (2022-05-13) description, paragraphs [0040]-[0058], and figures 1-11	1-4, 10
Y	CN 109875188 A (KEE (GUANGDONG) GARMENT ACCESSORIES LTD.) 14 June 2019 (2019-06-14) description, paragraphs [0024]-[0026], and figures 1-3	1-4, 10
PX	CN 217658447 U (SHAOXING KEQIAO MINGTAI TEXTILE CO., LTD.) 28 October 2022 (2022-10-28) description, paragraphs [0039]-[0082], and figures 1-10	1-10
PX	CN 217695462 U (SHAOXING KEQIAO MINGTAI TEXTILE CO., LTD.) 01 November 2022 (2022-11-01) description, paragraphs [0033]-[0053], and figures 1-6	1-9
PX	CN 217695455 U (SHAOXING KEQIAO MINGTAI TEXTILE CO., LTD.) 01 November 2022 (2022-11-01) description, paragraphs [0029]-[0039], and figures 1-5	1-4

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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“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

18 August 2023

Date of mailing of the international search report

24 August 2023

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)
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Beijing 100088

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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E	CN 116584742 A (SHAOXING KEQIAO MINGTAI TEXTILE CO., LTD.) 15 August 2023 (2023-08-15) claims 1-10, and description, paragraphs [0039]-[0082], and figures 1-10	1-10
A	CN 215958629 U (WANG ZHIGANG) 08 March 2022 (2022-03-08) entire document	1-10
A	CN 107865491 A (KEE (GUANGDONG) GARMENT ACCESSORIES LTD.) 03 April 2018 (2018-04-03) entire document	1-10
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/CN2023/108109

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CN	217658447	U	28 October 2022	None	
CN	217695462	U	01 November 2022	None	
CN	217695455	U	01 November 2022	None	
CN	217851646	U	22 November 2022	None	
CN	116584742	A	15 August 2023	None	
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REFERENCES CITED IN THE DESCRIPTION

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