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(54) **Fastener capable of resisting tear propagation**

(57) A fastener capable of resisting tear propagation is disclosed. The fastener includes a plastic belt body (31) and a textile belt body (32). The plastic belt body has a first surface (311) and a second surface (312) facing away from the first surface. The textile belt body has a third surface (321) and a fourth surface (322) facing away from the third surface. The first surface is disposed of a plurality of fastening components (3111). The second surface is discontinuously adhered to the third surface to form a plurality of discontinuous adhesion portions (3112, 3221).

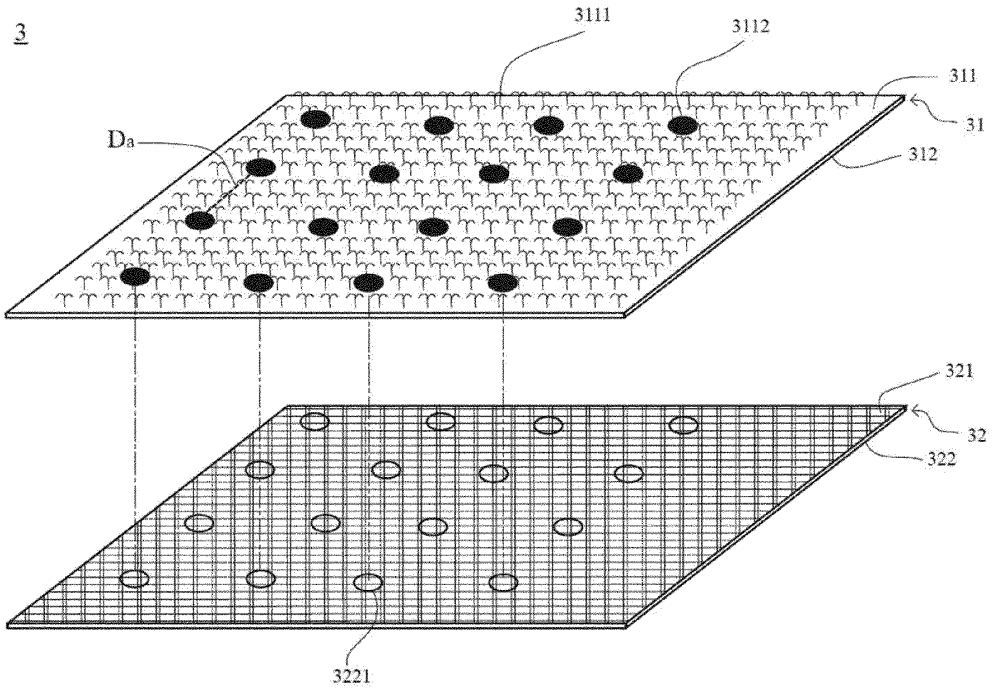

FIG. 2A

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention is related to a fastener to be used repeatedly for fastening, and more particularly related to a fastener capable of resisting tearing.

2. Description of the Prior Art

[0002] A well-known fastener called Velcro can be wisely used in several products, such as clothes, shoes, blood pressure monitors, bags, chair cushions and so on.

[0003] Please refer to FIG. 1A, a well-known fastener 10 includes a hook surface 11 with a plurality of hooks 111 and a textured surface 12 with a plurality of loops 121. When the hook surface 11 and the textured surface 12 are coupled together, the hooks 111 will hook the loops 121 to connect together. When the hooks 111 would like to separate from the loops 121, a force is applied to separate the hooks 111 and the loops 121 and the fastener 10 can be used repeatedly.

[0004] The hook surface 11 and the textured surface 12 of the fastener 10 shown in FIG. 1A are disposed on a belt body fixed in a specific object, such as a cushion 14 or a leather surface 13 to be correspondingly applied on the cushion 14, by a sewing method to form an object 1. However, the fastener 10 assembled by the sewing method will form a gap adjacent to sewing positions 112 and 122. After using a period of time to tear and adhere repeatedly, the gap neighboring the sewing positions 112 and 122 will become larger and the belt body with the hook surface 11 or the textured surface 12 will be loosed from the object. Therefore, the structure of the fastener 10 will be damaged and the lifetime of the product with the fastener 10 will be shortened.

[0005] Therefore, please refer to FIG. 1B, an another fastener 2 is disclosed and in which a plastic thin film 22 is served as a base to support the hook surface or the textured surface of the fastening components 221. In other words, the hook surface or the textured surface is adhered to the plastic thin film 22 with a textile material 21 being adhered to the other surface of the plastic thin film 22 without the fastening components 221. By the tenacity of the interlocking fibers on the textile material 21, the fastener 2 made by this method is not easy to form a breach and the applying tearing forces Pb and Pc are not easy to expand a potentially formed breach after the fastener 2 being repeatedly used. However, once an edge of the plastic thin film 22 forms a breach 23, because the molecules of the plastic thin film 22 are arranged in the same direction, the crack of the breach 23 will propagates along the arrange direction of the molecules of the plastic thin film 22 as the fastener 2 is seriously torn apart. Therefore, the plastic thin film 22 and the fiber 211 of the textile material are also easy to be torn to damage the structure of the fastener 2. Moreover, large usage of adhesive agents will cause a cost problem.

[0006] Thus, how to manufacture a fastener having a structure without being easily damaged and being capable of resisting tear propagation and at same time to reduce manufacturing cost for the fastener are problems for those skilled in the art to solve.

SUMMARY OF THE INVENTION

[0007] Therefore, the object of the present invention is to provide a fastener including a plastic material made substrate and a textile material made substrate that are adhered to each other by discontinuous adhesive portions formed there between . Therefore, the fastener with the plastic material substrate and the textile material substrate is able to resist pin punching and sewing and capable of resisting tear propagation.

[0008] Another object of the present invention is to provide a manufacturing method of the fastener capable of resisting tear propagation. A belt body with textile material is adhered with a belt body with plastic material. The fastening components such as hooks or loops are formed on the belt body with plastic material, at the same time the fastener is made of the belt body with textile material and the belt body with plastic material. The discontinuous adhesive portions are formed between the belt body with textile material and the belt body with plastic material so as to fix the belt bodies to form a fastener and provide the fastener with capability of resisting tear propagation.

[0009] The other object of the present invention is to provide a fastener capable of resisting tear propagation with the fastener being fixed by a plurality of discontinuous adhesive portions so as to decrease the usage of the adhesive agent and reduce the manufacturing cost and time.

[0010] Accordingly, a fastener capable of resisting tear propagation is provided in the present invention and includes a first belt body including a first surface and a second and a second surface being opposite to the first surface, a plurality of fastening components disposed on the first surface; a second belt body including a third surface and a forth surface being opposite to the third surface, the third surface being adhered to the second surface of the first belt body; wherein a plurality of discontinuous adhesive portions are formed between the third surface of the second belt body and the second surface of the first belt body.

[0011] According to one embodiment of the present invention, the distance between two adjacent adhesive portions is 0.4-0.6cm and the crack of the breach of the fastener is prevented from propagating by the interlocking fibers of the second belt body with textile material. Therefore, the first belt body with plastic material and the second belt body with textile material can be prevented from being torn.

[0012] The advantages of the fastener capable of resisting tear propagation in the present invention are:

1. The first belt body and the second belt body of the fastener are adhered to each other by discontinuous adhesive portions between the belt bodies so as to resist the propagation of the crack by the interlocking fibers of the second belt body with textile material.
2. The adhesive portions between the first belt body and the second belt body of the fastener are discontinuous and adhered in the specific positions to reduce the usage of the adhesive agent and the time for waiting drying of the adhesive agent and the manufacture cost can be reduced.
3. The fastener made of the first belt body and the second belt body is capable of resisting tear propagation while being used and resist pin punching and sewing while being manufactured.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same becomes better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIG. 1A is a structural view schematically illustrating a separating status of the hook surface and the textured surface of a well-known fastener fixed on an object by a sewing method. ;
FIG. 1B is a structural view schematically illustrating another well-known fastener being torn to damage status;
FIG. 2A is a structural view schematically illustrating a fastener capable of resisting tear propagation in one embodiment of the present invention;
FIG. 2B is a sectional view schematically illustrating cross-section of a fastener capable of resisting tear propagation in one embodiment of the present invention;
FIG. 3 is a structural view schematically illustrating a fractured surface of the fastener capable of resisting tear propagation in one embodiment of the present invention;
FIG. 4 is a lateral view schematically illustrating a fractured surface of the fastener capable of resisting tear propagation in one embodiment of the present invention; and
FIG. 5 is a flow chart illustrating a manufacturing method of a fastener capable of resisting tear propagation.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] The detailed description of the present invention will be discussed in the following embodiments, which are not intended to limit the scope of the present invention, but can be adapted for other applications. While drawings are illustrated in details, it is appreciated that the quantity of the disclosed components may be greater or less than that disclosed, except expressly restricting the amount of the components.

[0015] A fastener capable of resisting tear propagation is provided in the present invention and the advantage thereof is to enhance the capability to resist sewing and needle punching so as to increase the lifetime of the product. The manufacture cost and time of the fastener capable of resisting tear propagation can be reduced. The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same becomes better understood by reference to the following detailed description.

[0016] The following definition is to specify the meaning of the noun used in the detail description.

[0017] The term "first belt body" or a similar term is to a material for the fastening belt and the fastener or any other adhesive material for the fastening belt in prior art.

[0018] The term "second belt body" or a similar term is to cite a component with two surfaces and the two surfaces are opposite to each other. One of the surfaces of the second belt body is adhered together to one surface of the first belt body for strength the fastener capable of resisting tear propagation.

[0019] Please refer to FIG. 2A, a fastener 3 capable of resisting tear propagation in one embodiment of the present invention includes a first belt body 31 and a second belt body 32. The first belt body 31 includes a first surface 311 and a second surface 312 and the second surface 312 being opposite to the first surface 311, a plurality of fastening components 3111 disposed on the first surface 311.The second belt body 32 includes a third surface 321 and a fourth surface 322 and the forth surface 322 being opposite to the third surface 321, and the third surface 321 being adhered to the second surface 312 of the first belt body 31. There are a plurality of discontinuous adhesive portions 3112 between the third surface 321 of the second belt body 32 and the second surface 312 of the first belt body 31. The adhesive portions 3112 are in form of a plurality of recesses on the first surface 311 of the first belt body 31 or in form of protrusions (not shown) on the second surface 312. The adhesive portions 3221 on the third surface 321 are corresponding to the adhesive portions 3112 and are in form of a plurality of recesses on the third surface 321 or in form of protrusions (not shown) on the fourth surface 322. In other words, the second surface 312 and the third surface 321 are adhered to each other in the locations of the adhesive portions 3112 and the second surface 312 and the third surface 321 are not adhered to each other in the locations without the adhesive portions 3112.

[0020] In the present embodiment, the material of the first belt body 31 is plastics and the fastening component 3111 can be a hook with single hook shape, a dual hook shape, or a mushroom shape hook, or a cotton loop with spherical bubble shape, or circle shape. In addition, the geometric shape of the discontinuous adhesive portions 3112 is circle shape. The distance Da between two ad-

jacent adhesive portions is between 0.4cm and 0.6cm, and prefers to be 0.5cm. In a different embodiment, the shape of the adhesive portion 3112 can be circle shape or polygon shape, such as square shape, rectangular shape or triangle shape. Moreover, the second belt body 32 is a textile material and includes the third surface 321 and the fourth surface 322. The adhesive portions 3112 on the third surface 321 and the fourth surface 322 are adhered by punctate adhesive method. The adhesive portions 3221 corresponding to the adhesive portions 3112 can be clearly seen on the third surface 321. The distribution location and the geometric shape of the adhesive portion 3221 are the same as the adhesive portion 3112. The adhesive method of the adhesive portions 3112 between the third surface 312 and the third surface 322 is supersonic welded, adhered by thermal plastic rubber or adhered by a glue tape. On the locations without adhesive portions, the second surface 312 and the third surface 322 cannot be adhered to each other, such as a space 412 shown in FIG. 2B.

[0021] The supersonic welding theory is a processing method to convert voice is heat. The voice generator will generate a high frequency with 20 KHz or 15 KHz and the signal is transmitted to the energy converter horn on the supersonic machine to contact with the plastic product. The molecules within the plastic product are severely rubbing each other to generate high temperature. When the temperature is higher than the melting point of the plastics, the plastics is melting. When the melting plastics are cooling down to adhere again to achieve a welding result. The thermal melting adhering method is to implement the operation of the thermal plastic rubber machine to melt the thermal plastic rubber to be a liquid and the liquid is transferred to the surface of the adhesive object by the thermal plastic pipe and the thermal plastic rubber gun of the thermal plastic rubber machine. After the liquid is cooling down, the adhesive operation is done. The glue sticking method in the embodiment of FIG. 2A includes steps of: 1. providing a bidder on the adhesive portions 3112 of the second surface 312 and 2.waiting for the adhesive time of the bidder to stick the second surface 312 and the third surface 321 together. The other way of the glue sticking method includes steps of: 1. providing a release agent on the non-adhesive portions; 2.providing a bidder on the adhesive portions 3112 of the second surface 312 and 3. waiting for the adhesive time of the bidder to stick the second surface 312 and the third surface 321 together.

[0022] FIG. 2B is a sectional view illustrating the fastener 4 capable of resisting tear propagation in one embodiment of the present invention. As shown in FIG. 2B, a plurality of hooks 414 are formed on the first belt body 41 of the fastener 4 capable of resisting tear propagation and a plurality of adhesive portions are formed as a plurality of recesses between the first belt body 41 and the second belt body 42 that are adhered to each other. The spaces 412 with no adhesive portions are not adhered to each other. The sectional surface 413 on the first belt body 41 with plastic material is a smooth and continuous line and the sectional face 422 on the second belt body 42 of the textile material is a discontinuous textile cross line 421. The different sectional surfaces described above can be used to resist tear force. The molecules of the plastic thin film of the first belt body 41 are arranged tightly and it is easy to extend the crack from the breach and the sectional surface with smooth continuous line of the second belt body 42 can resist the tear force because of the textile cross line 421.

[0023] Please further refer to FIG. 3; the force is applied on the crack on the fastener capable of resisting tear propagation in the present invention, such as the reverse horizontal forces Fa and Fb. Because of the recesses for the adhesive portions between the first belt body 51 with plastic thin film material and the second belt body 52 with textile material are discontinuous, the propagation speed of the crack in the first belt body 51 with plastic thin film material is faster than the propagation speed of the crack in the second belt body 52 with textile material. Therefore, the propagation speed of the crack in the first belt body 51 with plastic thin film material is affected by the second belt body 52 with textile material, the crack cannot be extended from the arrange direction of the molecules of the first belt body 51 with plastic thin film material.

[0024] As the description above, please refer to FIG. 4, the different forces Fc and Fd are applied in the cracking position on the fastener capable of resisting tear propagation. Because the adhesive portions 621 between the first belt body 61 and the second belt body 62 are discontinuous and are adhered together discontinuously, the adhesive portions 621 between the first belt body 61 with plastic thin film material and the second belt body 62 with textile material are discontinuous and are adhered together discontinuously. In the non-adhesive portions between the first belt body 61 with plastic thin film material and the second belt body 62 with textile material, the propagation of the crack in the first belt body 61 with plastic thin film is faster than the propagation of the crack in the second belt body 62 with textile material. Therefore, the propagation of the crack in the first belt body 61 with plastic thin film will be affected by the second belt body 62 with textile material and the propagation of the crack cannot be extended along the arrange direction of the molecule of the first belt body.

[0025] The advantages of the fastener capable of resisting tear propagation in the present invention are:

1. The first belt body 31, 41, 51 and 61 and the second belt body 32, 42, 52 and 62 of the fastener 3, 4, 5 and 6 capable of resisting tear propagation are adhered to each other by discontinuous adhesive portions 3112, 411, 512 and 621 between the belt bodies so as to resist the propagation of the crack by the interlocking fibers of the second belt body 31, 41, 51 and 61 with textile material.
2. The adhesive portions 3112, 411, 512 and 621 between the first belt body 31, 41, 51 and 61 and the

second belt body 32, 42, 52 and 62 of the fastener 3, 4, 5 and 6 capable of resisting tear propagation are discontinuous and adhered in the adhesive portions 3112, 411, 512 and 621 to reduce the usage of the adhesive agent and the time for waiting drying of the adhesive agent and the manufacture cost can be reduced.

3. The fastener 3, 4, 5 and 6 capable of resisting tear propagation made of the first belt body and the second belt body is capable of resisting tear propagation while being used and resist pin punching and sewing while being manufactured.

[0026] Please refer to FIG. 2A and FIG. 5 in conjunction, a manufacturing method 7 for the fastener capable of resisting tear propagation is provided in the present invention. The steps thereof include:

In step 71, it is to provide a first belt body 31 with plastic material, and the first belt body 31 includes a first surface 311 and a second surface 321 being opposite to the first surface 311, forming a plurality of fastening components 3111 on the first surface 311 of the first belt body 31;

In step 72, it is to provide a second belt body 32 with textile material, and the second belt body 32 includes a third surface 321 and a forth surface 322 being opposite to the third surface 321;

In step 73, it is to discontinuously adhere the third surface 321 of the second belt body 32 to the second surface 312 of the first belt body 31 by a method selected from the group consisting of supersonic welding, thermal melting and glue sticking. In particular, it is to form a plurality of discontinuous adhesive portions 3112 between the second surface 322 of the first belt body 31 and the third surface 321 of the second belt body 32, and to attach the first belt body 31 and the second belt body to each other, and it is to finish the form of the fastener capable of resisting tear propagation in the present invention.

[0027] Please refer to FIG. 2A, the adhesive components 3111 formed on the first surface in step 71 is to form a plurality of hooks or cotton loops on the first surface 311. In addition, in step 73, the discontinuous adhesive portions 3112 formed between the second surface 322 of the first belt body 31 and the third surface 321 of the second belt body 32 is adhered by supersonic welding, thermal melting or adhered by a glue sticking. The geometric shape of the discontinuous adhesive portions 3112 is circle shown in the first surface 311 and the fourth surface 322 of the fastener 3 capable of resisting tear propagation in the previous embodiment of the present invention.

[0028] Although specific embodiments have been illustrated and described, it will be appreciated by those skilled in the art that various modifications may be made without departing from the scope of the present invention, which is intended to be limited solely by the appended claims.

Claims

1. A fastener capable of resisting tear propagation, comprising:

   a first belt body including a first surface and a second surface, the second surface being opposite to the first surface, a plurality of fastening components disposed on the first surface;

   a second belt body including a third surface and a forth surface, the forth surface being opposite to the third surface, the third surface being adhered to the second surface of the first belt body;

   wherein a plurality of discontinuous adhesive portions are formed between the third surface of the second belt body and the second surface of the first belt body.

2. The fastener capable of resisting tear propagation of claim 1, wherein the adhesive portions are in form of a plurality of recesses on the first surface of the first belt body .

3. The fastener capable of resisting tear propagation of claim 2, wherein each of the recesses on the first surface of the first belt body has a shape selected from the group consisting of circle and polygon.

4. The fastener capable of resisting tear propagation of claim 1, wherein the first belt body is made of plastic.

5. The fastener capable of resisting tear propagation of claim 1, wherein the fastening components are hooks having a shape selected from the group consisting of: single hook shape, dual hook shape and mushroom shape.

6. The fastener capable of resisting tear propagation of claim 1, wherein the fastening components are cotton loops having a shape selected from the group consisting of spherical bubble and circle.

7. The fastener capable of resisting tear propagation of claim 1, wherein an interval between the discontinuous adhesive portions is between 0.4cm and 0.6cm.

8. The fastener capable of resisting tear propagation of claim 1, wherein the second belt body is made of a textile material.

9. A manufacturing method of a fastener capable of resisting tear propagation, comprising steps of:

providing a first belt body including a first surface and a second surface with the second surface being opposite to the first surface, forming a plurality of fastening components on the first surface of the first belt body ;

providing a second belt body including a third surface and a forth surface with the forth surface being opposite to the third surface;

forming a plurality of discontinuous adhesive portions between the third surface of the second belt body and the second surface of the first belt body; and

discontinuously adhering the third surface of the second belt body to the second surface of the first belt body.

10. The manufacturing method of claim 9, wherein the step of discontinuously adhering the third surface of the second belt body to the second surface of the first belt body is performed by a method selected from the group consisting of supersonic welding, thermal melting and glue sticking.

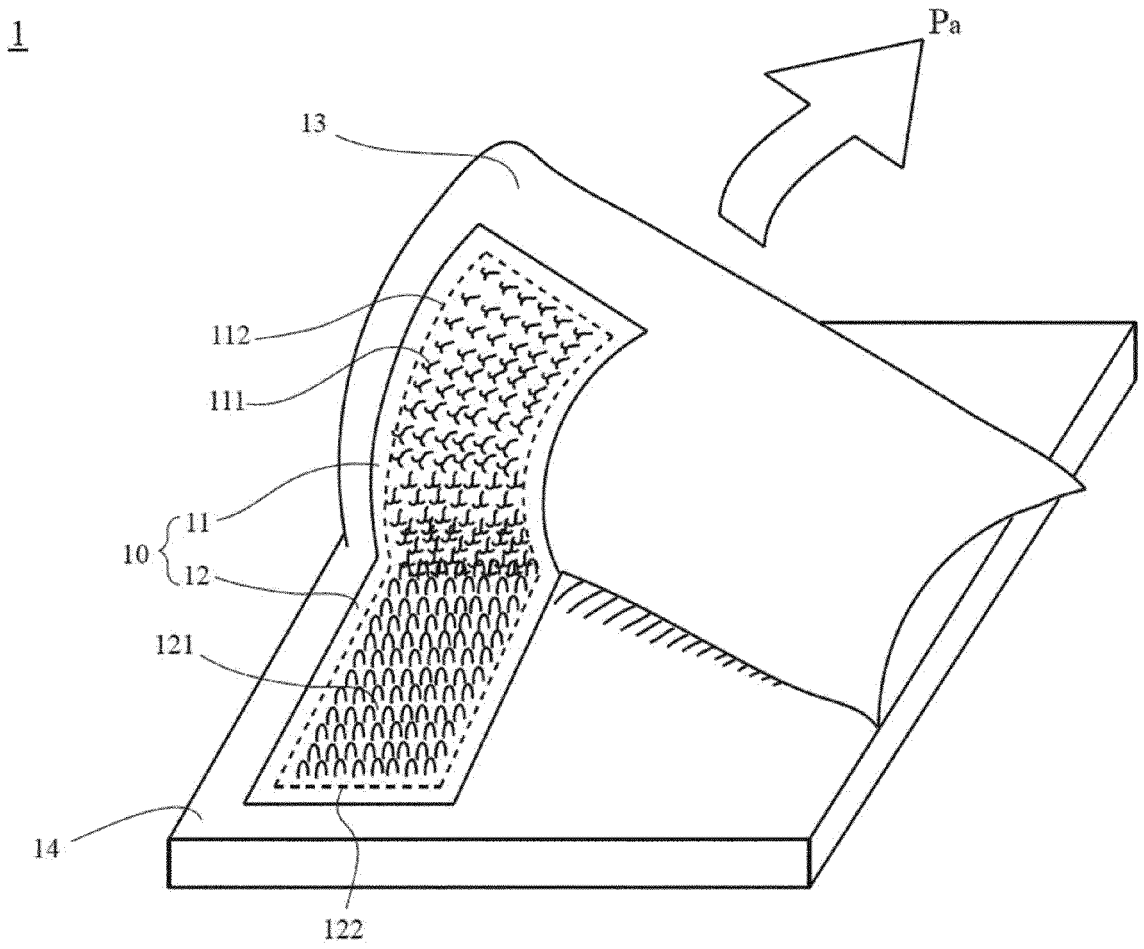

FIG. 1A

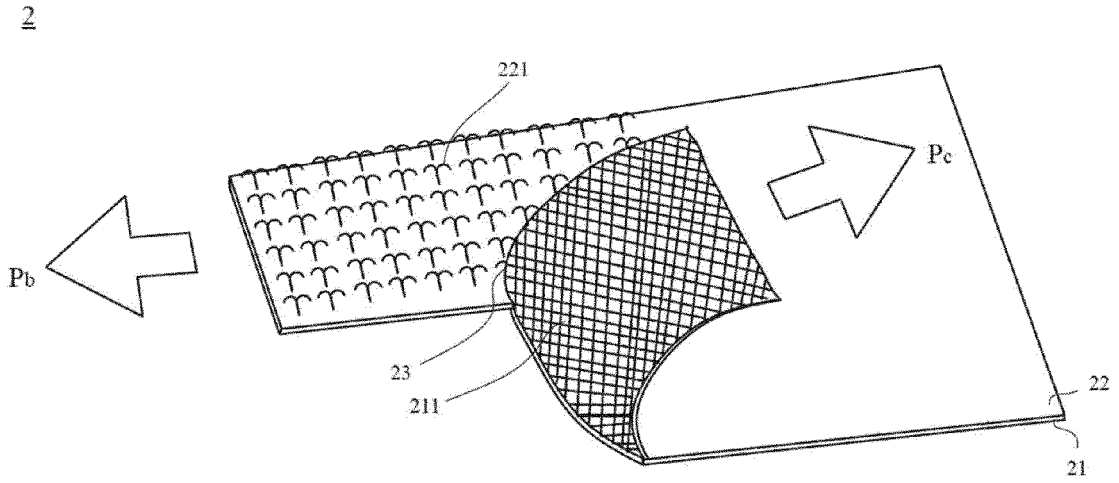

FIG. 1B

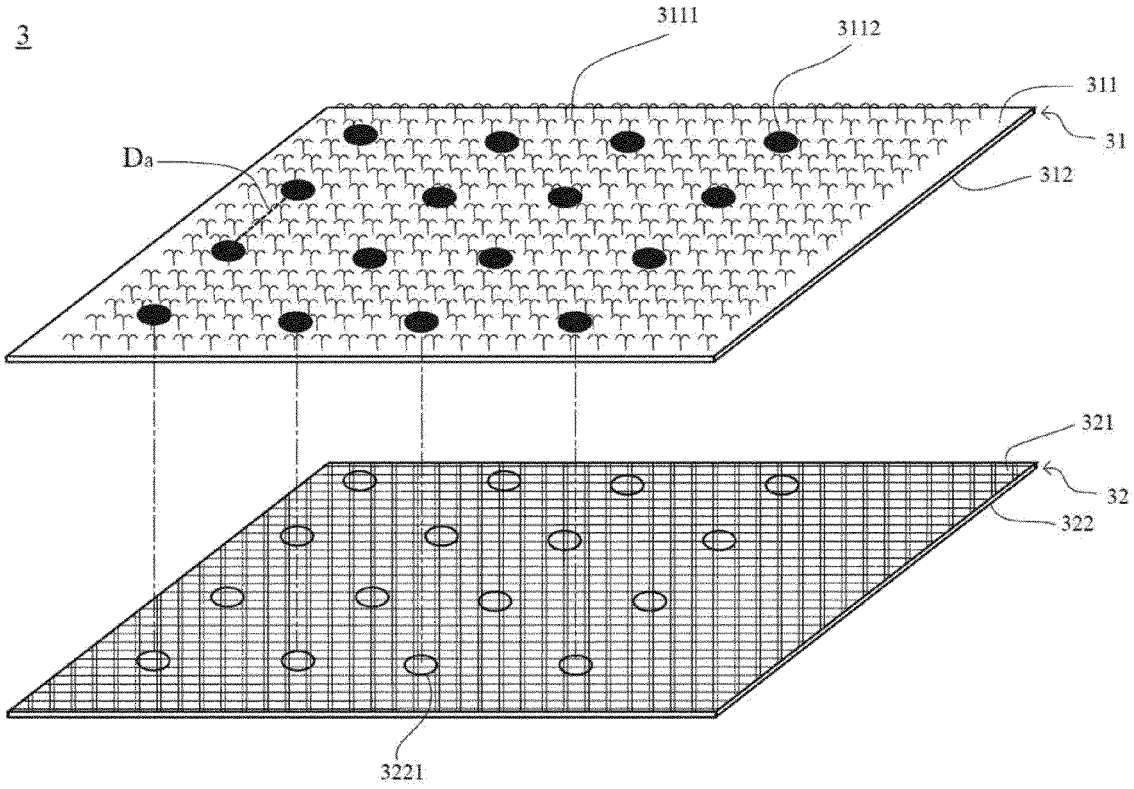

FIG. 2A

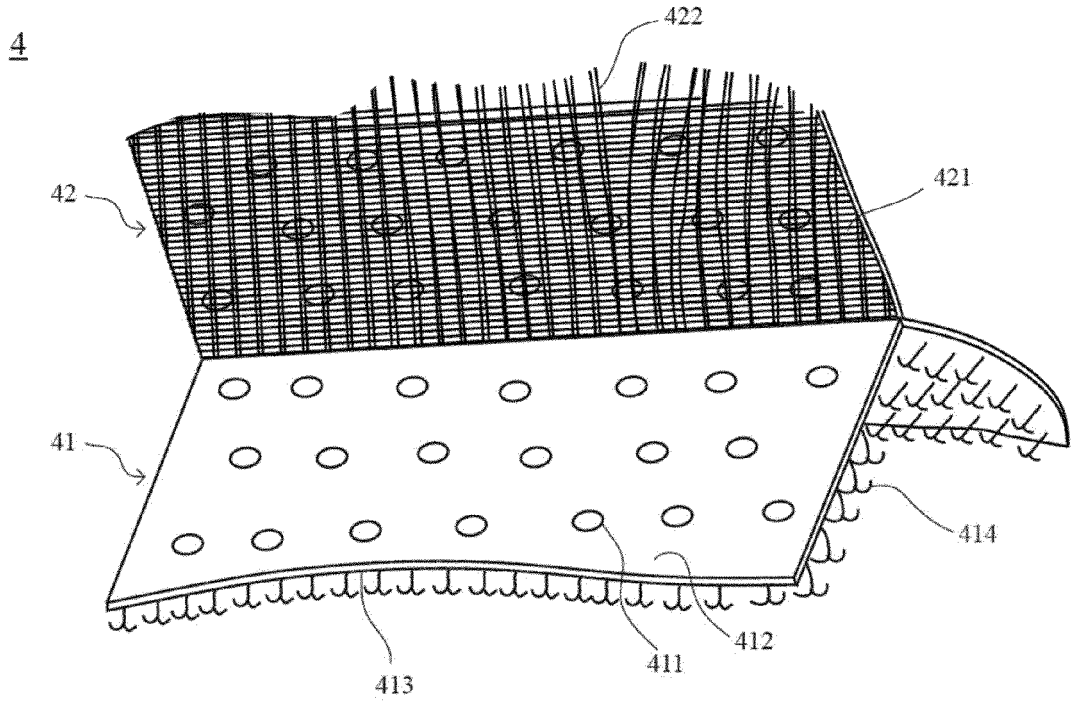

FIG. 2B

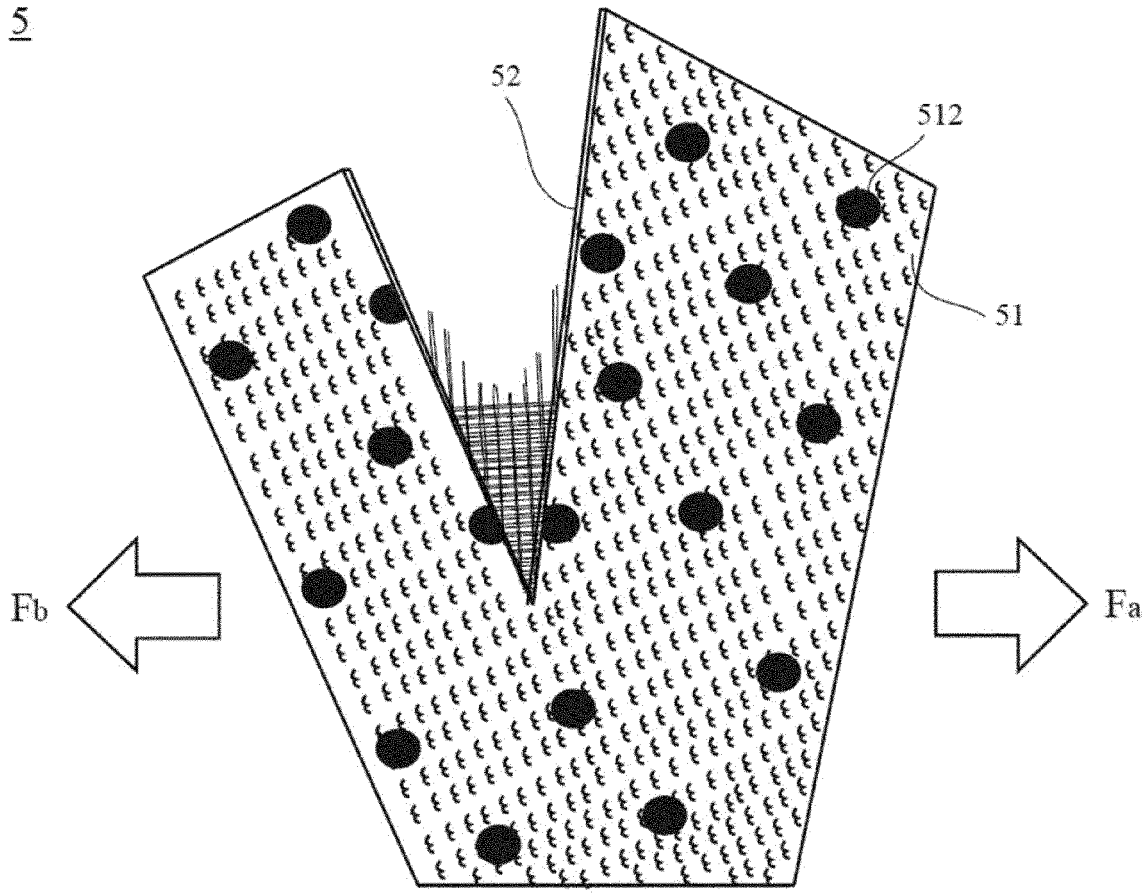

FIG. 3

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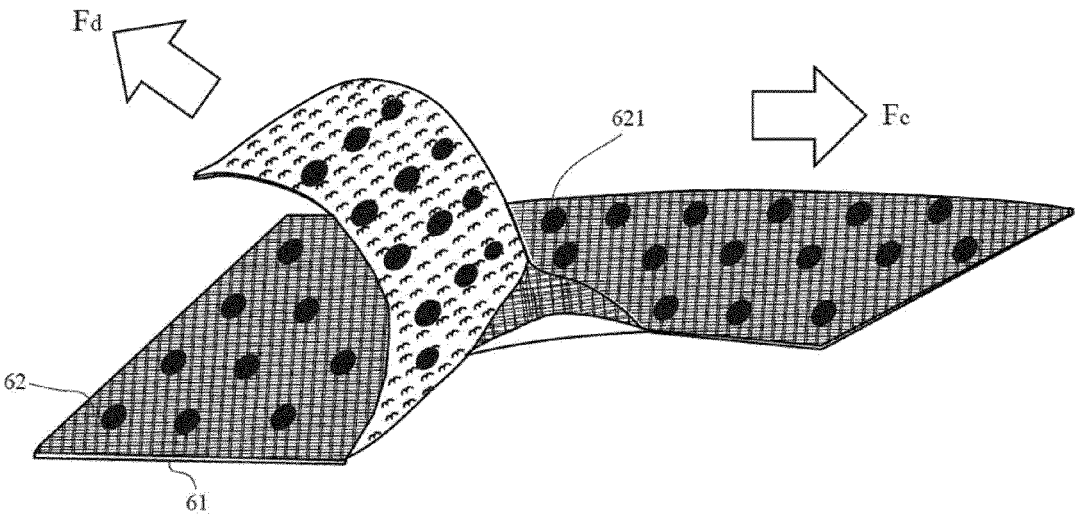

FIG. 4

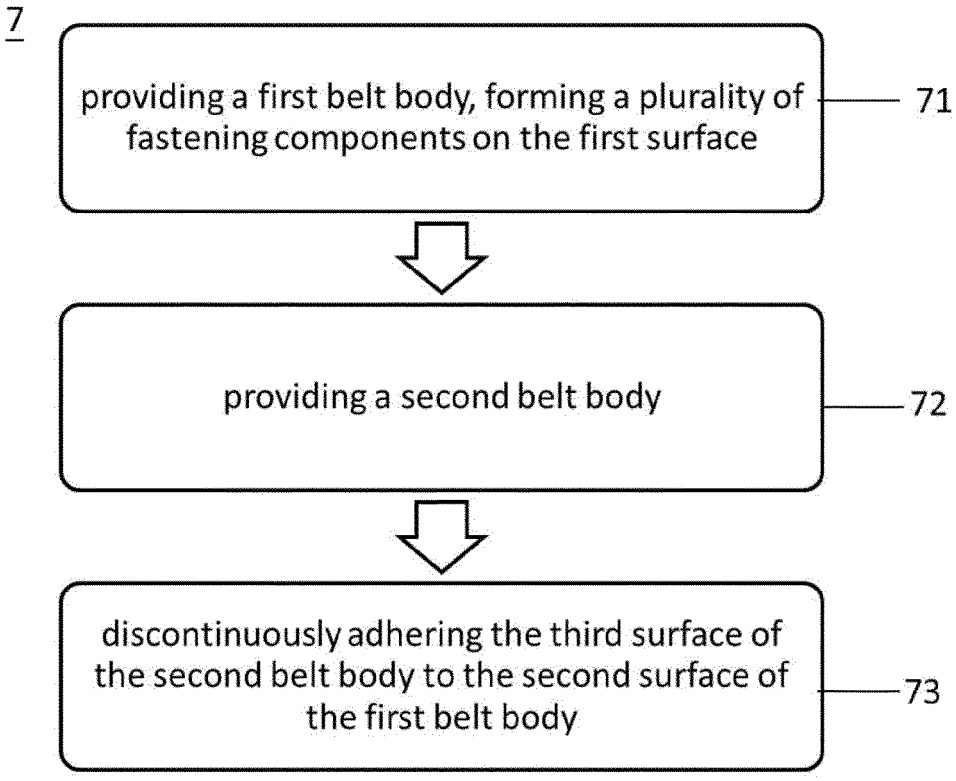
7
providing a first belt body, forming a plurality of fastening components on the first surface
71
providing a second belt body
72
discontinuously adhering the third surface of the second belt body to the second surface of the first belt body
73

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 13 16 3612

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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X	US 2010/015386 A1 (BALDAUF GEORG [DE] ET AL) 21 January 2010 (2010-01-21) * paragraph [0017] - paragraph [0020]; figure 1 *	1,9,10	
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A	US 5 857 245 A (SAKAKIBARA KEISUKE [JP] ET AL) 12 January 1999 (1999-01-12) * column 1, line 5 - column 2, line 9; figures 1-4 *	1-10	TECHNICAL FIELDS SEARCHED (IPC) A44B A61F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	7 March 2014	Simpson, Estelle

CATEGORY OF CITED DOCUMENTS

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07-03-2014

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82