

(19)



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(11)

EP 0 928 572 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.07.1999 Bulletin 1999/28

(51) Int Cl.⁶: **A44B 18/00**

(21) Application number: **99400025.5**

(22) Date of filing: **07.01.1999**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **09.01.1998 US 5333**

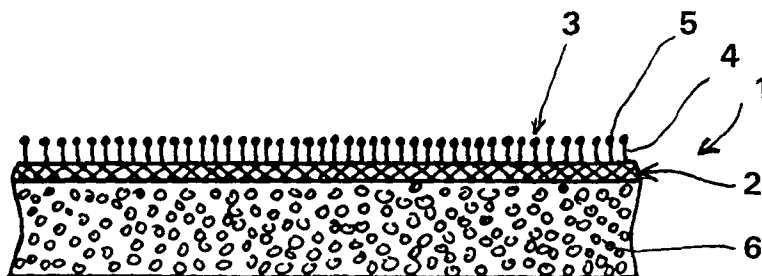
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(54) Self-gripping tape and method of manufacture

(57) A self-gripping tape (1) which, from an initial rectilinear shape, may be formed into any desired shape while remaining in its initial plane. The self-gripping tape

(1) includes a base (2) and fastening elements (3) carried by the base (2). The base is characterized by being a flat-knitted fabric which is flexible and deformable in its own plane.

FIG. 1



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Description

Technical Field and Background of the Invention

[0001] This invention relates to self-gripping fasteners, i.e., to articles which have two separate parts, each of which is provided on one face with fastening elements which are complementary to fastening elements carried by one face of the other part.

[0002] This invention relates self-gripping fasteners of the type wherein one part is formed by a tape or a band intended to cooperate by its fastening elements with the fastening elements carried by the complementary part of the fastener. The complementary part of the fastener is preferably formed of the same type of material, or may be in the form of a web, for example, a covering.

[0003] Tapes of type general type to which the invention relates usually have a rectilinear shape since, in most cases, a rectilinear shape for the fastening or gripping zone is sufficient. In addition, such tapes are usually woven on narrow fabric looms, so that the resulting product is inherently linear, with parallel longitudinal sides. Such woven tapes do not have sufficient deformability to function in the manner of the invention disclosed in this application.

[0004] In some applications the tape, when in its use position, should preferably have a non-rectilinear shape, for example, curved or sinuous, while remaining in a single plane. There are four prior art solutions to this problem.

[0005] First, an attempt may be made to deform the rectilinear tape in its plane. This usually results in the formation of transverse folds, wrinkles or puckers particularly in those compressed zones having a great curvature.

[0006] Second, in order to avoid folds such as described above, the self-gripping tape is cut according to the desired shape from a self-gripping web or sheet. This is costly in terms of labor and requires many precise cuts in order to create an appropriately-shaped product. In addition, tapes which are cut according to one given shape cannot be used for another shape. Finally, cutting shapes in this manner results in substantial waste.

[0007] Third, patches of a self-gripping tape can be cut and then attached to a support which can be deformed in its plane or is both rigid and previously shaped. This solution is also costly.

[0008] Fourth, the fastener can be made of a tape, the base of which carrying the fastening elements is constructed of longitudinal elastic yarns. This solution is extremely costly due to the price of these elastic yarns.

Summary of the Invention

[0009] Therefore, it is an object of the invention to overcome these problems by providing a self-gripping tape which, from an initial rectilinear shape, may be

formed into any desired shape while remaining in its initial plane.

[0010] According to one preferred embodiment of the invention, the invention includes a self-gripping tape which comprises a base and fastening elements carried by the base and which is characterized in that the base is a knitted fabric which is flexible and deformable in its own plane.

[0011] According to another preferred embodiment of the invention, a self-gripping tape is provided wherein the tape may be deformed while the tape is in its own plane to give it any desired shape without generating undesirable folds, without requiring costly labor and without cutting the tape into the desired shape. The tape can be shaped from a rectilinear length of tape. This tape is inexpensive since it is knitted with an ordinary, inelastic yarn.

[0012] Preferably, the fastening elements are integral with the knitting structure itself and they are filamentary.

[0013] According to yet another preferred embodiment of the invention, the fastening elements can be either male or female fastening elements, such as loops, hooks or filamentary elements with enlarged heads.

[0014] According to a preferred embodiment of the invention, the base is adhered by the side opposite the fastening elements to a supplementary layer. This layer is also deformable in its own plane and may be, for instance, a foam layer.

[0015] According to yet another preferred embodiment of the invention, the self-gripping fastener is made according to a method characterized in including the step of flat-knitting a web fabric and then in cutting this web into a plurality of rectilinear tapes, preferably in a continuous manner in the longitudinal direction of the web.

Brief Description of the Drawings

[0016] Some of the objects of the invention have been set forth above. Other objects and advantages of the invention will appear as the invention proceeds when taken in conjunction with the following drawings, in which:

Fig. 1 is a longitudinal cross-section view showing a part of a self-gripping tape according to a preferred embodiment of the invention;

Fig. 2 is a broken-away plan view of the tape of Fig. 1 which has been deformed in its own plane to adopt a desired shape;

Figs. 3 and 4 are views similar to Fig. 1, showing two alternatives of the fastening elements carried by the base; and

Fig. 5 is a broken-away plan view illustrating the method according to the invention.

Description of the Preferred Embodiment and Best Mode

[0017] Referring now specifically to the drawings, a part of a self-gripping tape 1 according to a preferred embodiment of the invention is shown in longitudinal cross-section.

[0018] This tape 1 is generally classified as a self-gripping fastener, the tape being intended to cooperate in a separable fastening relationship with a complementary part. For instance, the tape may be attached to a cover of, for example, an automobile seat assembly, and used to retain the seat dress cover on the foam cushion portion of the seat assembly. See, for example, applicant's prior patent No. 4,693,921.

[0019] The tape 1 includes a base 2 and fastening elements 3 which are carried by the base 2. In the illustrated example in Fig. 1 the fastening elements 3 are each made of a stem 4 projecting from a face of the base 2. Each of the stems 3 has an enlarged head 5. These enlarged heads 5 may be formed in any one of several ways, such as by thermal fusion of the free ends of the stems 4.

[0020] The tape 1 is intended to be attached flat to a support, directly or indirectly. In order that the tape 1 may be given any non-rectilinear desired shape in its own plane, and therefore also out of this plane, the tape 1 is arranged, according to the invention, so that its base 2 is made of a knitted fabric which is flexible and deformable in its own plane. This fabric is knitted with a non-elastic yarn, the deformability being the result of the flat knit structure.

[0021] From an initial rectilinear shape of the tape 1, which is the most economical shape for the tape 1, it is possible to give to the tape any non-rectilinear shape in its use position, this shape being, for instance, curved or undulated as shown in Fig. 2. This ability of the tape to be deformed in its own plane results from the knitted structure itself of the tape and not from the proprieties of its components, as is the case for an elastic base.

[0022] The tape 1 is attached to its support in a deformed state by any appropriate means, for instance, by adhering, sewing or joining with a foam article, e.g. an automobile seat-rest or back-rest.

[0023] In the example shown in Figs. 1 and 2, the tape base 2, by its face opposite to that which carries the fastening elements 3, is adhered to a supplementary flexible layer 6, also deformable in its own plane and made, for instance, of foam.

[0024] According to a preferred embodiment, the fastening elements 3 belong to the knitting structure itself, i.e., they are obtained in their final shape or in an intermediary shape during the knitting step itself of the base 2.

[0025] Also preferably, the tape 1 is obtained from a flat-knitted rectilinear part which is then cut into a plurality of rectilinear tapes. A plurality of tapes is thus obtained in an economical manner from a single knitted

web.

[0026] The fastening elements of the tape according to the invention, among others the fastening elements 3 of Figs. 1 and 2, are filamentary. These fastening elements, depending on the uses of the tape, can be male or female elements, or with enlarged heads, as described above.

[0027] In the example shown in Figs. 1 and 2, the fastening elements are male elements. In the alternative or Fig. 3, which differs from the embodiment of Figs. 1 and 2 only by the shape of the fastening elements 3', the latter are also of male type, and they are constituted by hooks while, in the alternative of Fig. 4, the elements 3" are of the female type, for example, loops.

[0028] The fastening elements 3' and 3" of Figs. 3 and 4, respectively, are preferably part of the knitting structure of the fabric base 2. The fastening elements 3" are obtained directly in their final shape by knitting, while the fastening elements 3' are each obtained by an additional step of cutting a loop.

[0029] Fig. 5 illustrates a method according to the invention for manufacturing the above tape 1. According to this method, a relatively wide web 7 is first knitted in a flat-knitting machine (not shown), the web 7 being up to several meters in width. The knitting direction is shown by arrow A and the web 7 is shown broken-away or interrupted both in the longitudinal direction A and in the width direction. The web 7 is then cut along parallel rectilinear cutting lines 8 to give rectilinear tapes which form the tapes 1 in the manner described above.

[0030] Preferably, the cuts are made in a continuous manner in the longitudinal direction A, so that all of the cut tapes 1 have the same width.

[0031] The following examples illustrate production on two different types of machines:

EXAMPLE 1

[0032] Type of process--pile warp knitting machine; one needle bar, plain weave, polyester fiber, 167 decitex, 1 or 2 ends; one hair loop needle bar:

WEAVE B1 Plain weave 10 or 12
B2 Loop 10 01
Needle bar Pile 00 11

[0033] The loops are sheared to produce stems.

EXAMPLE 2

[0034] Type of process--raschel loom with two needle bars, producing either a plain weave, single knit, on each plain weave needle bar and one hair bar connecting the two needle bars, A and B.

	A	B	A	B
Needle bar 1	10	11	12	11

(continued)

	A	B	A	B
Needle bar 2	10	10	01	01
Needle bar 3	11	10	11	12

[0035] The fabric can also be knitted on a circular knitting machine, but the loop would be oriented as on the pile warp knitting machine (Example 1).

[0036] A self-gripping fastener capable of being used in non-rectilinear configurations while remaining an initial single plane is described above. Various details of the invention may be changed without departing from its scope. Furthermore, the foregoing description of the preferred embodiment of the invention and the best mode for practicing the invention are provided for the purpose of illustration only and not for the purpose of limitation--the invention being defined by the claims.

Claims

1. A self-gripping tape, comprising a base (2) and fastening elements (3, 3', 3'') carried by said base, characterized in that the base is constituted by a fabric knitted of non-elastic yarns and which is flexible and deformable in its own plane.

2. The self-gripping tape of claim 1, wherein the fastening elements are filamentary and are integral with the fabric knitting structure.

3. The self-gripping tape of claim 1, wherein the fastening elements are selected from the group consisting of male fastening elements and female fastening elements.

4. The self-gripping tape of claim 3, wherein the fastening elements are selected from the group consisting of loops, hooks and filamentary elements with enlarged heads.

5. The self-gripping tape of claim 1, wherein the base is adhered, on the side opposite to the fastening elements, to a supplementary layer, which is deformable in its own plane.

6. The self-gripping tape of claim 5, wherein the supplementary layer comprises foam.

7. A method for manufacturing the self-gripping tape of claim 1, comprising the step of flat-knitting a web fabric and the step of cutting this web into a plurality of rectilinear tapes.

8. The method of claim 7, and including the step of

cutting the web in a continuous manner along rectilinear cutting lines which are parallel to the longitudinal knitting direction.

9. The method of claim 7, and including the step of cutting all of the tapes to the same width.

FIG. 1

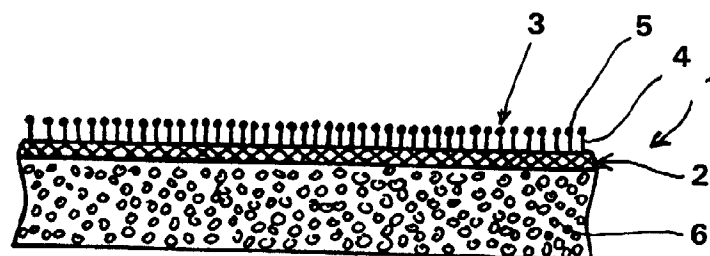


FIG. 2

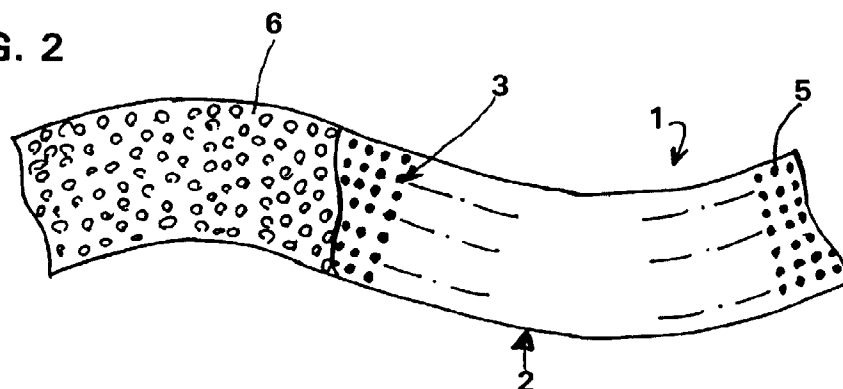


FIG. 3

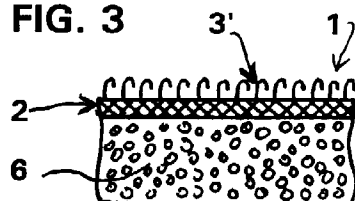


FIG. 4

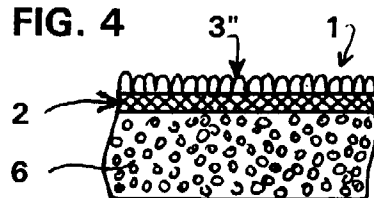


FIG. 5

