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**Datasheet for the decision
of 28 March 2017**

Case Number: T 1309/12 - 3.2.03

Application Number: 01918649.3

Publication Number: 1265507

IPC: A44B18/00

Language of the proceedings: EN

Title of invention:

HOOK AND LOOP FASTENING

Patent Proprietor:

VELCRO BVBA

Opponent:

3M Innovative Properties Company

Headword:

Relevant legal provisions:

EPC Art. 100(a), 56, 114(2)

RPBA Art. 12(4), 13(1)

Keyword:

Late-filed request - admitted (yes)
Late-filed evidence - admitted (yes)
Inventive step - (no)

Decisions cited:

Catchword:



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Case Number: T 1309/12 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 28 March 2017

Appellant:
(Patent Proprietor)

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Decision under appeal:

**Decision of the Opposition Division of the
European Patent Office posted on 30 March 2012
revoking European patent No. 1265507 pursuant to
Article 101(3)(b) EPC.**

Composition of the Board:

Chairman

G. Ashley

Members:

V. Bouyssy

M.-B. Tardo-Dino

Summary of Facts and Submissions

- I. European patent No 1 265 507 (in the following: "the patent") concerns hook and loop fasteners.
- II. The patent as a whole was opposed on the ground of Article 100(c) EPC and on two grounds of Article 100(a) EPC (lack of novelty and lack of inventive step).
- III. The opposition division decided to revoke the patent because the subject-matter of claim 1 as amended according to the main request before it lacked inventive step, and because auxiliary requests 1 and 2 before it contravened Article 123(2) EPC.
- IV. This decision was appealed by the patent proprietor (in the following, "appellant").
- V. With the summons to oral proceedings, the Board sent a communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal (RPBA) indicating its preliminary opinion of the case.
- VI. Oral proceedings before the Board were held on 28 March 2017.
- VII. Requests

The appellant requested that the decision under appeal be set aside and the patent be maintained in amended form on the basis of claim 1 filed as main request with the letter of 28 February 2017.

The opponent (in the following, "respondent") requested that the appeal be dismissed.

VIII. Claim 1 of the appellant's request

The sole claim reads as follows (compared with claim 1 as granted, added features are indicated in bold, deleted features in strike-through):

"1. A **an elongated and elastically stretchable** fastening article (100), which comprises:

an array of loop-engageable hooks (124) having stems molded of thermoplastic resin, the hooks (124) each ~~having a base (122) or~~ extending from a common base layer made of thermoplastic resin which is integrally formed with stems of the hooks (124), the thermoplastic ~~bases~~ **base layer** (122) of the molded stems being in situ laminated to the upper portion of a preformed carrier (110) that comprises one or more elastically stretchy layers, the hooks (124) comprising loop-engageable heads, ~~characterized in that~~

wherein the ~~bases or~~ base layer (122) of the hooks (124) **is** commingled with top fibers ~~or other structure~~ that define the surface structure of the carrier (110) **without penetrating the full depth of the carrier, so that the opposite side of the carrier remains free of resin,** ~~and in that~~

wherein the base layer (122) has resin-free bands ~~or regions~~ (126) at spacings to define bands (125) of hooks (124) ~~or islands of hooks~~ (124) of the array of hooks,

wherein the bands (125) of hooks (124) extend in a machine direction, said direction corresponding to the lengthwise direction of the article in which the article (100) moves during its manufacture, and

wherein the preformed carrier (110) is a loop material web which is elastically stretchable only in the widthwise direction perpendicular to the machine direction of the bands (125) of hooks (124),

the resin-free bands ~~or regions~~ (126) enabling tension applied during use to cause the bands (125) of hooks (124) ~~or islands of hooks (124)~~ to separate further from each other, ~~or to flex freely relative to one another.~~"

IX. Cited evidence

In the statement setting out the grounds of appeal, and in the reply to it, the parties relied among others on the following documents which were filed in the opposition proceedings and are cited in the decision under appeal:

D1: WO 00/50229 A1

D2: US 5,518,795

D5: US 60/189,125 (first priority document of the patent)

In addition, the respondent relied on the following prior art documents filed with the reply to the grounds of appeal:

D7: US 5,773,374

D8: WO 95/03171 A1

X. The arguments of the parties, insofar as relevant for the present decision, can be summarised as follows:

(a) Admission of the appellant's request

Appellant's case:

Although filed shortly before the oral proceedings, the new request represents a serious and honest attempt to overcome all objections raised in the Board's communication accompanying the summons to oral proceedings. Claim 1 as amended differs from claim 1 of the main request filed with the statement of appeal grounds only in that further limiting features have been introduced, with the aim of overcoming the opposition division's decision in connection with inventive step, and of addressing all of the respondent's objections. These amendments do not give rise to any new or complex issues.

Respondent's case:

The new request has not been filed in due time. It could and should have been filed earlier in the proceedings. At first glance, it cannot overcome all of the respondent's objections under Articles 123(2) and 84 EPC and it gives rise to new objections. It is thus submitted that it is inadmissible.

(b) Inventive step

Appellant's case:

The elastically stretchable fastening article defined in claim 1 differs from the specific disclosure in example 3 of D1 in that the base layer of the hooks is commingled with top fibers of the carrier "without penetrating the full depth of the carrier, so that the opposite side of the carrier remains free of resin",

that the bands of hooks "extend in a machine direction" (the MD direction) and that the carrier web "is elastically stretchable only in the direction perpendicular to the machine direction of the bands of hooks" (the CD direction). The substrate in example 3 of D1 is elastic and breathable, and hence incapable of preventing the resin from penetrating its full depth and reaching the opposite side. The substrate is a multi-layer web comprising two outer layers of nonwoven material and a core of elastic filaments. As stated on page 12, lines 14 to 16, fibrous adhesive penetrates through the elastic filaments to bond the entire composite together. There is no reason to believe that the substrate is permeable to fibrous adhesive, but prevents the resin from penetrating the full depth of the substrate so that the opposite side remains free of resin. Finally, in example 3 of D1, the hook bands are CD-oriented (page 13, lines 30 and 31 and page 14, line 6) and the substrate is elastically stretchable in either direction (page 13, lines 17 to 19).

The three features distinguishing claim 1 from D1 interact to provide an inexpensive fastening article that can be reproducibly and reliably manufactured at high speed. Firstly, thanks to the partial penetration of the base layer in the carrier web, a relatively smaller volume of thermoplastic resin is used and the cost of the fastening article is reduced. Secondly, the bands of hooks extend in the MD direction instead of the CD direction, so that the forces between the rolls and the fastening article remain relatively constant throughout the manufacturing process, which makes process control easier, especially at high speed. Thirdly, because the substrate is elastically stretchable only in the CD direction, suitable machine

direction tension can be maintained on the substrate to ensure that it tracks well through the machine.

Starting from example 3 of D1, the skilled person would not arrive at the claimed fastening article, for the following reasons.

D1 teaches that, when the elastic substrate is allowed to relax after removal of a longitudinal tension force, it becomes shirred, i.e. buckled into soft pleats (page 12, lines 21 to 23). This improves the feel and softness of the substrate, simulating bulk. D1 relies upon the substrate being MD-elastic and the hook bands being CD-oriented to obtain soft shirr pleats in the final product and, at the same time, to promote the adhesion of the hook bands to the substrate. The substrate is tensioned to ensure that its surface is thin, uniform and non-pleated when the resin is applied and the hook bands are formed under nip pressure. The orientation of the hook bands in the CD direction allows the shirr pleats to return after the bands have been formed and the substrate relaxes.

The substrates disclosed in D7 and D8 lack elastic stretchability in the MD direction, and thus would prevent the formation of soft shirr pleats as required in D1, complicate the lamination of the hook bands and result in a product without longitudinal elastic stretchability. The skilled person would recognise that there is no point in replacing the substrate of D1 by that disclosed in either D7 or D8 because the hook bands are themselves inextensible in the CD direction, and thus they would restrict the elastic properties of the finished product. Thus, the skilled person would not make this substitution.

Furthermore, D7 and D8 do not disclose that band of hooks are commingled with top fibers of the loop material web, "without penetrating the full depth of the carrier, so that the opposite side of the carrier remains free of resin", as required in claim 1. Thus, they cannot lead to the claimed article.

D2 does disclose that the resin forming the base layer of loop-engageable hooks partially penetrates a carrier of loop material web. However, the base layer described in D2 is a large continuous layer, but not a discontinuous layer consisting of discretely separate bands or islands of hooks as disclosed in D1. In addition, it is stated in D2 (column 5, lines 1 to 4) that the loop material web must be smooth, wrinkle free and properly tensioned when the resin is applied to form the hooks. For these reasons, the skilled person would not consider combining these teachings.

Respondent's case:

Since the fastening article according to example 3 of D1 can be fastened to itself when wrapped in either direction around an object (page 14, lines 9 and 10), it is implicitly disclosed that all hook bands are commingled with top fibers of the carrier "without penetrating the full depth of the carrier, so that the opposite side of the carrier remains free of resin", as required by claim 1. This is confirmed by the explicit teachings in D1 that, when the hooks are formed on a loop material web, they are configured to lock with the opposite side of the web (page 5, lines 20 to 25), and that each side of the web has its own functionality (page 10, lines 7 and 8).

Claim 1 requires that the hook bands extend in the MD direction, rather than the CD direction as described in example 3 of D1. However, it is not credible that this feature leads to a discernible difference in the manufactured article and thus it cannot distinguish the claimed article from that disclosed in example 3 of D1. In any event, it is stated in D1 that the hook bands can advantageously extend in the MD direction, instead of the CD direction (page 3, line 9, page 5, line 18 and page 8, line 25).

In conclusion, the subject-matter of claim 1 differs from example 3 of D1 only in that the carrier web "is elastically stretchable only in the direction perpendicular to the machine direction of the bands of hooks".

Thanks to this distinguishing feature, any negative impact on the continuous lamination process caused by longitudinal elasticity of the carrier web is avoided (see paragraph 65 of the patent specification). Thus, the objective technical problem solved by this feature can be formulated as to how to improve the continuous lamination process described in D1.

It is well-known in the relevant field of hook and loop fasteners that such a continuous production process, which typically take place at high speed, has a much better performance if the web is stretchable only in the CD direction, in particular because it overcomes the problem of tension control and poor tracking during lamination. This is common general knowledge, as documented by D7 (column 4, lines 34 to 46 and hooks 8 in figure 5) and D8 (abstract, page 2, lines 4 to 28, page 3, line 34 through page 4, line 18, page 5, lines 2 to 9, page 6, lines 3 to 16).

Using common general knowledge as documented in D7 and D8, the skilled person would realise – without applying any inventive skill – that the production process of D1 could be improved if the loop material web is elastically stretchable only in the CD direction. Therefore, the subject-matter of claim 1 does not involve an inventive step when starting from D1.

Even though it is stated in D1 that it is advantageous if the loop material web is provided with soft shirr pleats, this would not hinder the skilled person from using a loop material web which is elastically stretchable only in the CD direction. D7 discloses how shirr pleats can be created with such a loop material web (see figure 4) and the skilled person would have no practical difficulty in tensioning the web so that its surface is thin, uniform and non-pleated when the resin is applied and the hook bands are formed under nip pressure, as required in D1.

Should the Board decide that it cannot be derived from D1 that the bands of hooks "extend in a machine direction" and that the base layer of the hooks is commingled with top fibers of the carrier "without penetrating the full depth of the carrier, so that the opposite side of the carrier remains free of resin", the claimed subject-matter would still lack inventive step, for the following reasons.

The feature of the partial penetration of the base layer in the web does not interact with the features of the MD orientation of the hook bands and the CD elastic stretchability of the web to achieve a synergistic effect, thus they can be treated independently when assessing inventive step.

When replacing the loop material web described in example 3 of D1 by a loop material web which is elastically stretchable only in the CD direction, as disclosed by D7 or D8, the skilled person would inevitably adjust the orientation of the inextensible hook bands so that they extend in the MD direction, otherwise they would impair the elastic stretchability of the finished article. In addition, the skilled person would recognise that the lamination process can be further improved if the hook bands extend are MD-oriented, because they then stabilise the process.

As ruled by the opposition division, the feature of the partial penetration of the base layer in the web is an obvious modification in light of D2 to obtain a uniform opposite surface with hook engageability. The mere fact that the base layer of the hooks disclosed in D2 is continuous while that of D1 is discontinuous would not hinder the skilled person from combining the teachings of D1 and D2.

Reasons for the Decision

1. Admission of the appellant's request
 - 1.1 The appellant's current request was filed one month before the oral proceedings before the Board. The sole claim differs from claim 1 of the main request filed with the statement of grounds of appeal essentially by the further limitations that the claimed article is elastically stretchable, that the loop-engageable hooks extend from a discontinuous common base layer consisting of separate bands, and that the thermoplastic resin from which the base layer is formed does not penetrate the full depth of the carrier of

loop material web, so that the opposite side remains free of resin.

- 1.2 The Board does not share the appellant's view that the filing of this request was justified by developments in the appeal proceedings, in particular by the Board's communication under Article 15(1) RPBA. There had been no change in the subject of the proceedings after the filing of the statements of grounds of appeal and the reply thereto. The Board's communication did not raise any new issues; it merely established the factual and legal situation of the case and indicated the preliminary and non-binding opinion of the Board that the appellant's main request and first auxiliary request contravened Article 123(2) EPC and that the second auxiliary request lacked inventive step, for the reasons given by the respondent in its reply to the statement of grounds of appeal. Thus, the filing of the appellant's current request was belated.
- 1.3 However, the amendments prima facie overcame all respondent's objections raised under Articles 123(2) EPC and did not give rise to any new or complex issues that could not be dealt with without adjournment of the oral proceedings. Thus, the amendments did not compromise the procedural economy.
- 1.4 For these reasons the Board, exercising its discretion under Article 114(2) EPC and Article 13 RPBA, decided to admit the appellant's request into the proceedings and to consider it.

2. Consideration of D7 and D8 in the proceedings

2.1 D7 and D8 were submitted for the first time with the reply to the grounds of appeal. The respondent relied on them essentially to document that the feature of claim 1 that the carrier web "is elastically stretchable only in the widthwise direction perpendicular to the machine direction" was an obvious design option to facilitate tension control and tracking when manufacturing or downstream processing webs for diaper fasteners.

2.2 This feature was already present in claim 1 of auxiliary request 1 filed in the opposition proceedings with letter dated 7 February 2012 and maintained as auxiliary request 2 in the oral proceedings on 7 March 2012. Thus, D7 to D13 could arguably have been filed in the opposition proceedings.

2.3 Nevertheless, D7 and D8 were prima facie extremely relevant for the evaluation of inventive step of claim 1, for the reason given by the respondent and the appellant had the opportunity to comment upon them. For these reasons, the Board decided not to disregard these two documents (Article 114(2) EPC and Article 12(4) RPBA).

2.4 In the oral proceedings, the appellant no longer disputed the admissibility in the proceedings of documents D7 and D8.

3. Priority and relevance of D1

3.1 As ruled by the opposition division, the subject-matter of claim 1 goes beyond the content of D5, the first priority document of the patent, so that its priority

cannot be validly claimed and that D1, which was published on 31 August 2000, is prior art under Article 54(2) EPC.

3.2 The appellant has not challenged this decision and the Board cannot find any reason to overturn it.

4. Inventive step

4.1 The parties agree that the fastening article as disclosed in example 3 of D1 forms a relevant starting point for the assessment of inventive step. The Board shares this view.

4.2 D1 concerns hook and loop fasteners, in particular elastic fasteners adapted to be used as elastic wraps to secure cables, orthopedic articles, diapers, athletic protective devices, clothing or packaging materials (page 10, lines 11 to 13). Example 3 of D1 discloses an elongated and elastically stretchable fastening article, which comprises an array of loop-engageable hooks having stems molded of thermoplastic resin and extending from a discontinuous common base layer made of thermoplastic resin which is integrally formed with stems of the hooks (page 14, lines 1 to 10 and "stem formable material, Aspun™ 6806" as defined on page 12, line 24, which is a thermoplastic polyethylene resin). The discontinuous base layer is in situ laminated to the upper portion of a preformed elastically stretchable carrier of porous loop material engageable by the hooks (see substrate A described in example 1). It is commingled with top fibers of the carrier and has resin-free bands at spacings to define bands of hooks of the array of hooks (page 14, lines 6 to 8). The bands of hooks extend in the CD direction ("cross-web direction", page 13, line 30 and page 14,

line 6). The resin-free bands enable tension applied during use to cause the bands of hooks to separate further from each other.

- 4.3 The parties dispute whether or not example 3 of D1 discloses the following features of claim 1:
- (a) that the hook bands do not penetrate the full depth of the carrier, so that the opposite side of the carrier remains free of resin ("the base layer of the hooks is commingled with top fibers that define the surface structure of the carrier without penetrating the full depth of the carrier, so that the opposite side of the carrier remains free of resin"); and
 - (b) that the hook bands extend in the MD direction ("the bands of hooks extend in a machine direction, said direction corresponding to the lengthwise direction of the article in which the article moves during its manufacture").

4.4 Feature (a) is implicitly disclosed in D1 for the following reasons.

4.4.1 Figure 1 of D1 shows a preferred embodiment of the invention of D1, namely a web 10 forming a substrate and having hook-formed stems 12 arranged in numerous discrete patches or regions on the upper surface 18 of the web, but not on its lower surface 19 (page 4, line 22 to page 5, line 5). It is stated on page 5, lines 20 to 25 that, when the web 10 itself contains loop structures, such as nonwoven fibres, the stems 12 can be configured to lock with the opposite side 19 of the web 10 (page 5, lines 20 to 25). The web 10 is preferably made of nonwoven and elastic material (page 5, line 26 to page 6, line 1).

- 4.4.2 Example 3 of D1 clearly relates to this preferred embodiment. It is a stem-surfaced, elastic substrate which is a multi-layer web containing outer layers of nonwoven material and core layers of BMF-PSA fibers and elastic filaments. Hence, the stems formed on the top side of the web are configured to lock with the loops on the bottom side of the web, as taught on page 5, lines 20 to 25 of D1. Further, it is stated on page 14, lines 9 and 10 of D1 that the article of example 3 is configured to fasten onto itself when wrapped in either direction around an object, which object can take various shapes and sizes (page 9, lines 9 to 13 of D1). This implies that the hooks formed on the top side of the web can freely engage the loops on the bottom side of the web, meaning that the bottom side of the web is free of resin, as required in claim 1.
- 4.4.3 Even though it is stated on page 14, line of D1 that the finished product of example 3 is breathable, the Board is not persuaded that the molten resin deposited on the web inevitably penetrates the full depth of the web, as argued by the appellant. In fact, it is apparent that the core layers of the multi-layer web of example 3, which consist of BMF-PSA fibers and elastic filaments, prevent the migration of the resin to the bottom side of the web.
- 4.5 Feature (b) defines the claimed article by referring to the method by which it is manufactured. Nevertheless the in situ lamination of thermoplastic resin to form bands of hooks extending in the MD direction, instead of the CD direction as disclosed in example 3 of D1, would inevitably lead to a discernible difference in the manufactured article, such as the orientation of the polymer chains of the thermoplastic resin in the lengthwise direction of the article. Thus, feature (b)

is indeed a distinguishing feature of the claimed article, as argued by the appellant.

- 4.6 It also cannot be derived from D1
(c) that the carrier web is elastically stretchable only in the CD direction, as required by claim 1 ("the preformed carrier is ... elastically stretchable only in the widthwise direction perpendicular to the machine direction of the bands of hooks").
- 4.7 In conclusion, the subject-matter of claim 1 differs from example 3 of D1 only in that the loop material carrier web is elastically stretchable only in the CD direction, while the hook bands extend in the MD direction (see features (b) and (c) above).
- 4.8 Starting from D1, the technical problem objectively solved by these features is how to overcome the problem of tension control and poor tracking during lamination (see paragraph 65 of the patent specification).
- 4.9 D7 and D8 concern loop material webs for use as elastic wraps to secure disposable diapers and they both provide the same solution to this technical problem: they teach that a loop material web having elasticity only in the CD direction solves the problem of tension control and poor tracking when manufacturing or downstream processing the webs (see D7, column 4, lines 34 to 46, hook fastener 8 in figure 5; see D8, page 2, lines 4 to 28, page 3, line 34 to page 4, line 18, page 5, lines 2 to 5, and page 6, lines 3 to 16).
- 4.10 The skilled person would see the advantages of these teachings and recognise that, when carrying out the lamination process described in example 3 of D1, the

above technical problem could be solved by using a loop material carrier web which is elastically stretchable only in the CD direction, not in the MD direction. In doing this, and using common general knowledge, he would immediately recognise that the bands of hooks must then extend in the MD direction, instead of the CD direction, otherwise the relatively inextensible bands would jeopardise the elastic stretchability of the finished product in the CD direction. There is no practical difficulty in modifying the lamination process described in example 3 of D1 accordingly. In fact, it is already stated in D1 that the bands of hooks can extend in the MD direction, instead of the CD direction (page 3, line 9, page 5, line 18 and page 8, line 25). After doing this, the skilled person would inevitably arrive at the subject-matter of claim 1.

- 4.11 D1 teaches that, when making the carrier web of example 3, it was longitudinally stretched and allowed to relax so that its outer layers were buckled into soft pleats and that the shirred elastic web was collected on a cardboard roll (page 12, lines 20 to 23). Contrary to the appellant's view, this teaching would not hinder the skilled person from using a loop material carrier web which is elastically stretchable only in the CD direction, as taught in D7 and D8.

Firstly, it cannot be derived from D1 that shirring is a mandatory feature of the fastening article of example 3. In fact, the above passage is the only passage of D1 referring to shirring.

Secondly, should shirr pleats be desired, D7 discloses how they can be formed in the CD-elastic web. The skilled person, using common general knowledge, would have no practical difficulty in assuring proper

tensioning of such a web in the CD direction so that its surface is thin, uniform and non-pleated when the resin is applied and the hook bands are formed under nip pressure, as required in D1.

- 4.12 For the sake of completeness, even if it were assumed that example 3 of D1 does not comprise feature (a) (see point 4.3 above), as argued by the appellant, this would not render the claimed subject-matter inventive. Indeed, there is no functional reciprocal relationship between features (b) and (c), on the one hand, and feature (a), on the other hand, thus they can be considered independently for the purpose of inventive step analysis. Feature (a) has mainly the technical effect that all loops on the opposite side of the carrier web can be engaged by the hooks (paragraphs 86 and 110 of the patent specification), so that the article can fasten onto itself when wrapped around objects of various size and shape. D2 concerns hook and loop fasteners used as straps or ties (column 2, lines 47 to 59) and teaches that this very effect can be achieved by in situ laminating hooks on one side of a loop backing, while leaving the loops on the opposite side of the backing free of the resin (column 3, lines 55 to 57 and figure 8). In light of this teaching in D2 the skilled person would arrive at feature (a) in an obvious manner. In D2, the hooks extend from a large continuous common base layer, but not from a discontinuous base layer consisting of separate bands as in example 3 of D1. However, this would not hinder the skilled person from combining the teachings of D1 and D2 when seeking to improve the hook engageability of the bottom side of the web in example 3 of D1.

4.13 Hence, the claimed subject-matter lacks an inventive step in the sense of Article 56 EPC when starting from example 3 of D1.

5. In conclusion, the ground for opposition of lack of inventive step prejudices the maintenance of the patent as amended.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



C. Spira

G. Ashley

Decision electronically authenticated