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D E C I S I O N
of 16 October 2002

Case Number: T 0305/00 - 3.2.4

Application Number: 90106787.6

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IPC: A44B 19/54

Language of the proceedings: EN

Title of invention:

Method of and apparatus for manufacturing a woven slide
fastener stringer

Patentee:

YKK CORPORATION

Opponent:

Opti Patent-, Forschungs- und Fabrikations- AG

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step - yes"

Decisions cited:

-

Catchword:

-



Case Number: T 0305/00 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 16 October 2002

Appellant: Opti Patent-, Forschungs- und Fabrikations- AG
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Respondent: YKK CORPORATION
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 3 February 2000
rejecting the opposition filed against European
patent No. 0 393 466 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: C. A. J. Andries
Members: M. G. Hatherly
H. Preglau

Summary of Facts and Submissions

- I. The opposition division's decision to reject the opposition against European patent No. 0 393 466 was posted on 3 February 2000.

On 4 March 2000 the appellant (opponent) filed an appeal and simultaneously paid the appeal fee, filing the statement of grounds on 6 June 2000.

- II. The independent claims of the patent as granted read:

"1. A method of manufacturing a woven slide fastener stringer, comprising the steps of:

(a) weaving a stringer tape (11) with a group of foundation warp threads (12, 13), a group of fixing warp threads (14, 15) and a single weft thread (20) progressively at a fell (16), said foundation warp threads (12, 13) and said weft thread (20) jointly constituting a web portion (39) of said tape (11) and said fixing warp threads (14, 15) extending along one longitudinal edge (11a) of said tape;

(b) forming upper and lower sheds (17, 18) between said groups of warp threads;

(c) inserting said weft thread (20) in said upper shed (17) and introducing an element-forming filamentary material (22) in said lower shed (18) along a path extending substantially parallel to said warp threads (12 - 15); and

(d) coiling said element-forming filamentary material (22) into a row of coupling elements (25) each having a

coupling head portion (25a), substantially superimposed upper and lower leg portions (28, 29) and a heel portion (50) as said filamentary material (22) is woven into said stringer tape (11) along said one longitudinal edge (11a) thereof in synchronism with the weaving of said stringer tape (11), whereby said coiling steps includes hooking said element forming filamentary material (22); **characterized in that** said weft thread (20) and said element forming filamentary material (22) are both inserted in said upper and lower shed (17; 18), respectively, from the said one longitudinal edge (11a) of said tape; and that said hooking of said element forming filamentary material (22) is carried out between said foundation warp threads (12, 13) and said fixing warp threads (14, 15), said heel portion (50) being oriented to project transversely beyond said one longitudinal edge (11a) of said stringer tape (11) and said head portion (25a) being directed toward said web portion (39) of said stringer tape (11)."

"2. An apparatus for manufacturing a woven slide fastener stringer, comprising:

(a) a loom (10) for weaving a stringer tape (11) of foundation warp threads (12, 13), fixing warp threads (14, 15) and a single weft thread (20) progressively at a fell (16), said foundation warp threads (12, 13) and said weft thread (20) jointly constituting a web portion (39) of said tape (11), and said fixing warp threads (14, 15) extending along one longitudinal edge (11a) of said tape (11), said loom (10) including

(1) a reed (23) having guide slots (23a) for the passage therethrough of said foundation warp

threads (12, 13) and adapted to beat said foundation weft threads (20) against said fell (16),

(2) an element-shaping plate (31) secured to and movable with said reed (23) toward and away from said fell (16), said element-shaping plate (31) extending in parallel alignment with said guide slots (23_a) and in between said fixing warp threads (14, 15),

(3) means forming upper and lower sheds (17, 18) for selectively moving said warp threads (12 - 15) up and down,

(4) a first filling carrier (19) disposed at said one longitudinal edge (11_a) of said stringer tape (11) and reciprocable for introducing said weft thread (20) in said upper shed (17) into engagement with said warp threads (12 - 15),

(5) a second filling carrier (21) disposed in parallel spaced relation to said first filling carrier (19) and reciprocable for introducing an element-forming filamentary material (22) in said lower shed (18),

(b) a coiling means operable in synchronism with said loom (10) for coiling said element-forming filamentary material (22) into a row of coupling elements (25) each having a coupling head portion (25_a), upper and lower leg portions (28, 29) and a heel portion (50), whereby the row of coupling elements (25) are woven into said stringer tape (11) as the latter is woven, said coiling means including a hook (27) disposed at said one

longitudinal edge (11a) of said stringer tape (11) and movable in a plane perpendicular to the general plane of said stringer tape (11) between a first position located in alignment with said fell (16) and a second position remote from said fell (16), **characterized in that** said second filling carrier (21) is also disposed at the said one longitudinal edge (11a) of said stringer tape (11), and that said hook (27) is disposed between said foundation warp threads (12, 13) and said fixing warp threads (14, 15), said hook (27) during movement between said first and second positions causing each of said coupling elements to lie with said heel portion (50) oriented to project transversely beyond said one longitudinal edge (11a) of said stringer tape (11) and with said coupling head portion (25a) directed toward said web portion (39) of said stringer tape (11)."

III. The following prior art documents played a role in the appeal proceedings:

D1: EP-A-0 124 129

D2: US-A-3 961 652

D4: DE-A-2 221 855

D4(F): FR-A-2 137 979

IV. The appellant and the respondent (proprietor) attended oral proceedings on 16 October 2002.

In the appeal proceedings the appellant argued that the claimed method and apparatus were not inventive in view of the above-cited prior art documents. The respondent

countered the appellant's arguments.

- V. The appellant requested that the decision under appeal be set aside and the patent revoked.

The respondent requested that the appeal be dismissed (i.e. that the patent be maintained as granted).

Reasons for the decision

1. The appeal is admissible.

2. *Novelty - claims 1 and 2*

The board agrees with the parties that no prior art document on file discloses a method with all the steps of claim 1 or an apparatus with all the features of claim 2.

The subject-matter of each of these claims is thus novel within the meaning of Article 54 EPC.

3. *Comparison of the methods of D1 and the present claim 1*

- 3.1 It is not disputed that the method disclosed in D1 has all the steps in the pre-characterising portion of claim 1.

- 3.2 Figures 3 and 8 of D1 show the coupling heads of the synthetic resin monofilament 7 (i.e. element-forming filamentary material) lying outside the longitudinal edge of the stringer tape with the heels directed toward the web portion of the stringer tape. Therefore it is clear that the method of D1 produces a woven slide fastener stringer of the open (i.e. non-concealed

or non-masked) type.

The method of claim 1 of the present patent, on the other hand, produces a woven slide fastener stringer of the concealed or masked type because lines 26 to 28 of column 8 of the granted patent refer to "said head portion (25a) being directed toward said web portion (39) of said stringer tape (11)" and the drawings of the granted patent show the coupling heads (25a on Figure 3 and 47 on Figure 4) located within the area of the stringer tape 11.

- 3.3 Figure 1 of D1 shows a first carrier 5 introducing a weft thread 4 from one longitudinal edge of the tape and a second carrier 8 introducing the synthetic resin monofilament 7 from the other longitudinal edge of the tape.

The method of claim 1 of the present patent, on the other hand, specifies in column 8, lines 14 to 18 that the weft thread 20 and the element-forming filamentary material 22 are both inserted from the same longitudinal edge of the tape (see the first filling carrier 19 and the second filling carrier 21 on Figures 1 and 2 of the patent).

- 3.4 Figures 1 and 3 of D1 show a hook 12 hooking the synthetic resin monofilament 7 outside one longitudinal edge of the tape (i.e. outside the warp threads 1, 2 and 13), see also "a hook on one side of the warp bunches" in claim 1 of D1 (line 11 on page 11).

The method of claim 1 of the present patent, on the other hand, specifies in column 8, lines 19 to 22 that "said hooking of said element forming filamentary

material (22) is carried out between said foundation warp threads (12, 13) and said fixing warp threads (14, 15)" which is indeed what Figures 1 to 3 of the patent show, the hook being numbered 27.

3.5 In contrast to the disclosure of D1, the last 6 lines of the present claim 1 refer to "said heel portion (50) being oriented to project transversely beyond said one longitudinal edge (11a) of said stringer tape (11) and said head portion (25a) being directed toward said web portion (39) of said stringer tape (11)."

4. *Claim 1 - inventive step*

4.1 D1 is concerned with one of the common types of slide fastener stringer, namely the open type. By contrast, that produced by the method of the present patent is a second common type of slide fastener stringer, namely the concealed type, as known e.g. from D2 (see coupling heads 100 on Figure 8).

4.2 The appellant maintains

- that the method disclosed in D1 is the closest prior art or starting point for the assessment of inventive step for the present invention,
- that the problem starting from the method of D1 is how to find a suitable method to produce a concealed fastener stringer, i.e. the method of D1 is to be adapted so as to produce a concealed fastener stringer, and
- that the skilled person would start from the method of D1 and proceed in an obvious manner to

the method set out in claim 1 of the present patent.

4.3 Concerning the difference set out in the above section 3.3, the appellant points out that in the method of D1

- the element-forming filamentary material is brought in from one longitudinal edge of the stringer tape which is opposite to the other longitudinal edge on which the coupling elements are to be formed, and
- the coupling heads which are hooked with the hook extend from said other longitudinal edge of the tape.

The appellant argues that, if the second type of fastener stringer is to be produced, in which the coupling heads are directed towards the web portion of the stringer tape, then it is obvious that the filament material is to be introduced from the other longitudinal edge of the tape, so that the hooking can take place.

Thus the appellant is of the opinion that the difference discussed in the above section 3.3 is obvious for the skilled person.

4.4 Concerning the difference set out in the above section 3.4, the appellant argues that if, to produce a concealed fastener stringer, the coupling heads are to be directed towards the tape and moreover the legs of the coupling elements are to be fastened with fixing threads then necessarily the hooking of the element-

forming filamentary material (to form the coupling element heads) must take place between the foundation warp threads and the fixing warp threads.

- 4.5 Concerning the difference set out in the above section 3.5, the appellant argues that it is normal in a concealed type of fastener that the coupling head portions are directed towards the stringer tape and that the heel portions of the coupling elements are so oriented that they project transversely beyond the longitudinal edge of the stringer tape, as is shown in e.g. Figure 8 of D2.
- 4.6 Therefore, according to the appellant, all the features of the characterising portion of claim 1 of the present patent are obvious for the skilled person in the light of the disclosure of D1 and so the subject-matter of this claim lacks inventive step.
- 4.7 However, the board does not agree that the closest prior art or starting point for the assessment of inventive step for the method of the present invention (producing the concealed type of fastener stringer) is the method of D1 (producing the open type of fastener stringer).

The board considers that, although the person skilled in the art is free to choose a starting point, his future actions are restricted by his initial choice. If he decided to start from a method to produce the open type of fastener stringer, he would of course develop the known method but the normal result of his development would still be a method to produce the open type of fastener stringer, not a method to produce the concealed type which he deliberately chose not to

choose at the beginning of his considerations. His initial choice of method, based on the respective properties of the open and concealed types, defines the framework for his development i.e. a development of a method producing the open type. If he wanted to produce a fastener stringer of the concealed type then he would start from a method that produces this concealed type.

The board does not deny that the skilled person would know of methods for producing the open type (such as the method of D1), however the board finds that the skilled person's initial choice would not be from such methods.

- 4.8 It follows that the board does not consider that it would be obvious for the skilled person starting from D1 to decide to modify its method to make it produce the concealed type of fastener stringer.

Therefore

- the appellant's argument that it is obvious to introduce the filament material from the other longitudinal edge of the tape (see section 4.3 above),
- and his argument concerning the obviousness of the location of the hooking (see section 4.4. above),

which are both based on the false premise that it is obvious to modify the D1 method to make the concealed fastener stringer, cannot be accepted by the board.

- 4.9 Moreover concerning the location of the hooking (see section 4.4 above), D1 states in the paragraph bridging

pages 1 and 2 discussing the disadvantages of the prior art that due to the position of the hooked end portion "there is the danger that the hooked end portion thereof will snag a warp bunch other than monofilament undergoing shedding motion." The object of the invention of D1 is therefore explained in lines 11 to 17 of page 2 to be to enable "positive seizing of a monofilament ... without giving rise to any interference with a warp bunch undergoing shedding motion."

This object is achieved by the steps set out in lines 26 to 32 of page 2 (i.e. the characterising portion of claim 1 of D1), namely that there is "a hook on one side of the warp bunches".

Indeed, page 5, line 22 to page 6, line 4 of D1 explains that there is "a swinging arm 13 having a hook 12 on its upper end for hooking and holding the monofilament 7." Further, the swinging arm 13 swings in a range "defined by a **region outside the warp rows**, which region lies between a first position A, at which the hook 12 is situated at one side of the fell 11, as shown in Figures 2 and 3, and a second position B, at which the hook is situated **outside the warp bunches 1, 2, 3** and remote from the fell 11, as shown in Figure 1." Indeed all of Figures 1 to 3 show the swinging arm 13 and hook 12 outside the warp rows 1 to 3.

Moreover "the swinging range of said swinging arm being a region which is at a side of the warp bunches" is also laid down by the independent apparatus claim 7 of D1 (see lines 5 to 8 of page 12).

Thus it is central to the teaching of D1 that the hooking takes place outside the warp bunches. Accordingly the board cannot accept that it would be obvious to modify that teaching in a modified method of D1 and to arrange for the hooking to take place between the foundation warp threads and the fixing warp threads which is what is specified in claim 1 of the present patent but which is taught against by D1.

4.10 Regarding the above section 4.5, as the board does not consider that it would be obvious to adapt the method of D1 to produce a concealed type of fastener, then it would not be obvious to arrange for the coupling head portions to be directed towards the stringer tape, even though this is of course *per se* a feature of a concealed type of fastener.

4.11 Therefore the board does not agree with the appellant that it would be obvious for the skilled person to proceed from the method of D1 to the method of the present claim 1.

4.12 According to the appellant, the claimed method is also obvious when D1 is looked at with D4 or its equivalent D4(F). The appellant maintains that at least the majority of the features of the pre-characterising portion of claim 1 and all the features of the characterising portion are disclosed by D4.

4.13 Figures 1 to 3, 6 and 7 of D4 only concern the open type of woven slide fastener stringer and so are no more relevant than D1.

Figures 4, 8 and 9 and the second paragraph on page 6, on the other hand, are relevant because they concern

the concealed type of woven slide fastener stringer.

However, while the present claim 1 (column 8, lines 19 to 22 specifies that "said hooking of said element forming filamentary material (22) is carried out between said foundation warp threads (12, 13) and said fixing warp threads (14, 15)", Figure 4 of D4 shows the hooking by hook 18 taking place at the left hand edge of the assembly. The hooking of the element-forming filamentary material 9 can only of course take place where this material is located and, according to Figure 4 and the second paragraph of page 6 of D4, this material 9 is "not between the warp threads 3, but to their outside left." Therefore the hooking in D4 is not as specified in the present claim 1 (and the board can see no reason why it would be obvious to modify the teaching of the concealed type method of D4 in this respect).

4.14 Moreover the method of D1 also does not disclose hooking at this position and indeed teaches against it, see section 4.9 above. Therefore, even if it were obvious for the skilled person to combine the concealed type method of D4 with the open type method of D1, the result could not be a method as set out in the present claim 1.

4.15 It may also be mentioned that, while Figure 4 of D4 shows that the weft thread 5 and the element-forming filamentary material 9 are both inserted from the same longitudinal edge of the tape, D4 does not disclose their insertion into respective upper and lower sheds (compare the present claim 1, lines 54 to 57 of column 7 and lines 14 to 17 of column 8).

- 4.16 Thus the board finds that the method of the present claim 1 is not obvious even when D1 is looked at with D4.
- 4.17 While D2 concerns the open type of slide fastener stringer (see Figures 8 to 10 and column 4, lines 17 to 35), it does not disclose in any detail how this is made, let alone a method coming anywhere near to the method of the present claim 1.
- 4.18 The board thus cannot see that any of the prior art documents relied upon in the appeal proceedings (taken singly or in combination) would lead the skilled person in an obvious manner to the method set out in the present claim 1.

5. *Claim 2 - inventive step*

- 5.1 The present claim 2 is an independent apparatus claim corresponding closely to the independent method claim 1 discussed above. The appellant's arguments alleging lack of inventive step of the subject-matter of this claim 2 and the board's comments thereon are therefore essentially the same as those concerning claim 1.

In particular it would not be obvious, in the board's view, for the skilled person to start from the apparatus disclosed in D1 for making the open type of woven slide fastener stringer and to modify this apparatus using the teaching of D4 to arrive at an apparatus which makes the concealed type of stringer. Neither would it be obvious to modify the apparatus of D1, even with knowledge of D4, to arrange for the hooking to take place between the foundation warp threads and the fixing warp threads which is what is

specified in claim 2, column 9, lines 29 to 33.

5.2 Very little can be inferred from D2 as to the apparatus on which the slide fastener stringer is made and what can be inferred does not come anywhere near the presently claimed apparatus.

5.3 Thus the board finds that the apparatus defined by the present claim 2 is inventive over the prior art documents relied upon in the appeal proceedings (taken singly or in combination).

6. Thus the present claims 1 and 2 are patentable as are the present claims 3 to 6 which are dependent on claim 2. Accordingly the patent can be maintained unamended i.e. as granted.

Order

For these reasons it is decided:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Magouliotis

C. Andries