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D E C I S I O N
of 5 December 1996

Case Number: T 0236/93 - 3.2.2

Application Number: 87106948.0

Publication Number: 0245851

IPC: D21F 1/00

Language of the proceedings: EN

Title of invention:
Fourteen harness dual layer weave

Patentee:
Huyck Corporation

Opponent:
Andreas Kufferath GmbH & Co. KG

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-



Case Number: T 0236/93 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 5 December 1996

Appellant:
(Opponent)

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Decision under appeal:

Decision of the Opposition Division of the
European Patent Office posted 18 January 1993
rejecting the opposition filed against European
patent No. 0 245 851 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: H. J. Seidenschwarz
Members: P. Alting van Geusau
J. C. M. De Preter

Summary of Facts and Submissions

- I. The mention of the grant of European patent No. 0 245 851 based on the European patent application No. 87 106 948.0, filed on 13 May 1987 and claiming a priority of 13 May 1986 from the United States application 862 761, was published on 31 October 1990.

The independent Claims 1 and 3 of the patent read as follows:

"1. An improved papermakers' fabric comprising a fourteen harness dual layer endless fabric with at least 80% cover formed of machine direction and cross machine direction yarn system having:
a set of machine direction yarns (11);
a first set of cross machine direction yarns (24) located mainly on a side of the fabric facing the material to be formed and interlaced with said set of machine direction yarns in a pattern;
a second set of cross machine direction yarns (22) located mainly on a side of the fabric facing the machine and interlaced with said set of machine direction yarns in a pattern different than the pattern of the first set of cross machine direction yarns;
a float of the interlacing pattern of the machine side cross machine direction yarn (22) being under eleven machine direction yarns (11); and
each machine direction yarn having the same pattern of interlacing as the adjacent machine direction yarn."

"3. An improved papermakers' fabric comprising a fourteen harness dual layer endless fabric with at least 80% cover formed of machine direction and cross machine direction yarn systems having:
a set of machine direction yarns (11);
a first set of cross machine direction yarns (24)

located mainly on a side of the fabric facing the material to be formed and interlaced with said set of machine direction yarns in a pattern;
a second set of cross machine direction yarns (22) located mainly on a side of the fabric facing the machine and interlaced with said set of machine direction yarns in a pattern different than the pattern of the first set of cross machine direction yarns;
a float of the interlacing pattern of the machine side cross machine direction yarn (22) being under eleven machine direction yarns (11); and
two machine direction yarns, separated by one machine direction yarn, interlacing with the same machine side cross machine direction yarn."

II. Notice of opposition was filed on 3 July 1991 on the grounds of lack of inventive step. The opposition was supported by the documents:

D1: EP-A-0 085 363 (cited in the patent description)
D2: DE-C-3 036 409
D3: FR-A-2 342 368 (cited in the patent description)
D4: US-A-4 470 434

III. By a decision which was given at the end of oral proceedings held on 15 December 1992 and issued in writing on 18 January 1993 the Opposition Division rejected the opposition.

The Opposition Division held that the combination of the teaching of the documents D1 and D2 did not lead in an obvious manner to the subject-matter of the patent. Given the fact that the teachings of the documents D3 and D4 were less relevant than those of the documents D1 and D2 it could be concluded that the subject-matter of Claims 1 and 3 was also not obvious by any combination of the disclosures of the documents D1 to D4.

IV. On 4 March 1993 a notice of appeal was filed against the above decision and the appeal fee was paid on the same day.

The statement of grounds of appeal was filed on 3 May 1993.

V. In a communication issued in preparation of oral proceedings, the Board expressed the provisional opinion that, given the different opinions of the parties in respect of the disclosures of the closest prior art document D1, it should firstly be discussed at the oral proceedings in exactly what manner the skilled person would interpret the disclosure of document D1.

A further issue concerned the question as to why the skilled person was led to adopt features known from document D2 and if he were, whether he would then arrive in an obvious manner at the subject-matter of the independent Claims 1 and 3 of the patent in suit.

VI. Oral proceedings were held on 5 December 1996.

The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patentee) requested that the appeal be dismissed and that the patent be maintained.

VII. In support of his request the appellant essentially relied upon the following submissions:

When considering document D1 in detail the skilled person would arrive at the conclusion that this prior art document disclosed most of the features defined in Claim 1 of the present patent. In fact in document D1

the float of the interlacing pattern of the machine side cross machine direction yarn was under 13 machine direction yarns but this meant that it was also at least under 11 machine direction yarns. Indeed, document D1 did not mention the cover rate of the fabric, however in accordance with the acknowledgment of this document in the description of the patent in suit the machine direction cover was usually more than 80% and such value would appear to apply to the fabric of document D1 too. Therefore, it could be concluded that the fabric in accordance with Claim 1 lacked novelty when compared to the fabric known from document D1.

If the appellant's interpretation of the disclosure of document D1 was not followed, the fabric in accordance with claims 1 and 3 of the patent in suit lacked at least an inventive step having regard to the fabrics known from documents D1 and D2. Starting from document D1 representing the closest prior art relating to dual layer fabrics the object of the present patent was twofold, namely avoidance of marking of the material to be formed by providing a smooth paper making surface and improvement of wear resistance of the machine sided surface. Exactly such object was found in document D2 (column 3, lines 1 to 5) and it would therefore be obvious to the skilled person to apply the teaching of document D2 to the fabric of document D1 in order to obtain the corresponding technical results. Moreover, document D2 related to a dual layer endless fabric and in accordance with the embodiment of Figures 6 to 10 a configuration was disclosed with two machine direction yarns, separated by one machine direction yarn, thus in a manner as claimed in claim 3 of the patent in suit. Adoption of such pattern so as to increase wear

resistance and machine direction yarn protection by sufficient yarn burial of the fabric disclosed in document D1 would immediately lead the skilled person to the papermakers' fabric as claimed in Claims 1 and 3 of the patent in suit.

VIII. The respondent disputed the appellant's view and its arguments are summarised as follows:

Although it was agreed that document D1 disclosed the most relevant prior art, when taking into account the explanations given in the present patent, this document did not disclose a 14 harness dual layer endless fabric but rather a 7 harness dual layer fabric. Furthermore, document D1 did not disclose a cover rate of at least 80% and also not that each machine direction yarn had the same pattern of interlacing as the adjacent machine direction yarn as defined in Claim 1 of the patent in suit. It was also clear to the skilled person that a number of 11 machine direction yarns excluded 13 machine direction yarns so that the fabric claimed in Claim 1 of the patent in suit differed in at least four features from the fabric disclosed in document D1.

When the fabric disclosed in document D1 was compared to the fabric claimed in Claim 3 in which effectively the last feature of Claim 1 was replaced by the feature that two machine direction yarns, separated by one machine direction yarn were interlaced with the same machine side cross machine direction yarn, also four differing features remained.

The principle disclosed in document D2 related mainly to the incorporation of two sets of different machine direction yarns, one set for the transmission of the driving power and one set for constructive purposes. Document D2 did not hint to or suggest the so-called "reinforced interlacing" into a 7 shaft fabric to form

a float over 11 machine direction yarns and turn it into a 14 shaft weave. Therefore even a combination of the teachings derived from the documents D1 and D2 would not lead to the subject-matter of the granted Claims 1 and 3.

Reasons for the Decision

1. The appeal is admissible
2. *Novelty*
 - 2.1 The appellant was the opinion that it was obvious to the skilled person that the known 14 harness fabric shown in document D1 had at least 80% cover and the same pattern of interlacing of adjacent machine direction yarns as well as that the float under 13 machine direction yarns shown in Figure 8B also implied a float of the interlacing pattern of the machine side cross machine direction yarn being under 11 machine direction yarns.

Harness structure

Considering the meaning of a "14 harness dual layer endless fabric" in accordance with Claims 1 and 3, reference is made to the description of the patent, in particular to column 1, lines 27 to 48, from which it is clear that the term "endless" as used in the patent in suit refers to endless belts in which the warp yarns may extend in either the machine direction (the direction of travel of the papermakers' fabric on the papermaking machine) or cross machine direction.

Furthermore, in the explanations given in column 3, line 61 to column 4, line 45, the weave pattern is related to machine direction and cross machine direction yarns only and in view of the conclusions in respect of the meaning of "endless" the machine direction and cross machine direction yarns can thus be either warp or weft yarns.

Considering now the embodiment of the fabric disclosed in Figures 8, 8A and 8B of document D1 and knowing that, a "harness" (or shaft) weave is related to the weave pattern in relation to the warp yarns (see column 4, lines 46 to 50 and Figures 4 to 4B of the description of the patent in suit) the appellant can be followed that Figure 8B rather than Figure 8A is relevant for determining the harness weave.

Indeed, considering Figure 8B only, it appears to disclose a 14 shaft repeat but in view of the fact that two sets of 7 warp yarns are used, namely the set of warp yarns indicated as **a** to **g** and a second set without any indication, this known fabric concerns a usual 7 shaft weave of the prior art fabrics as discussed in the patent in suit in relation to Figures 1 to 3.

Even considering Figure 8A, relied upon by the respondent but which in the Board's opinion is not relevant for the reasons given here above, two sets of weft yarns (1' to 7' and 31 to 37) and one set of floater yarns (1A to 7A) are shown. Therefore when taking into account these three sets of yarns indeed a repeat of 14 is achieved. However, considering the two sets of weft yarns only, the repeat is also 7.

Since Claims 1 and 3 of the patent in suit define only a combination of one set of machine direction yarns and two sets of cross machine direction yarns, in the board's opinion, a comparison between the fabric disclosed in document D1 and the fabric claimed should be based on equal sets of yarns and for that case the fabric disclosed in document D1 comprises thus again a 7 harness structure in the direction parallel to the warp yarns as was submitted by the respondent.

Cover factor

Document D1 does not disclose a cover formed of machine direction and cross direction yarns system which is 80% or more. Indeed, there is stated in the description of the patent in suit that the machine direction cover is usually more than 80% but such cover value is related to the machine direction yarns in relation to the total width of the machine direction yarns (see column 1, lines 13 to 16).

Float of the cross machine direction yarn

The Board cannot follow either the opinion that a float of the cross machine direction yarn under 13 machine direction yarns such as shown in Figure 8B of document D1 anticipates a float under 11 machine direction yarns, as was submitted by the appellant. For the definition of a fabric, parameters such as harness weave, interlacing pattern and floats are well accepted in this technical field and have a clear limiting meaning as can be derived from the cited documents (in respect of "float" see for example document D3, page 8, line 19, a document cited in the description of the patent in suit, column 2, lines 18 to 25).

Interlacing pattern

It cannot be maintained either that, given the structure as shown in Figures 8, 8A and 8B of document D1, the machine direction yarn must have the same pattern of interlacing as the adjacent machine direction yarn. The skilled person is well aware of the fact that a dual layer fabric may have totally different patterns on the machine and paper side surfaces - following already from the fact that the interlacing patterns of the two sets of cross machine direction yarns are different - and without any consequence leading to the necessity of a pattern in which each machine direction yarn should have the same pattern of interlacing as the adjacent machine direction yarn.

- 2.2 Document D2 also concerns a dual layer fabric and it is an object of the invention disclosed in D2 to improve the wear resistance while at the same time marking of the paper sheet by the fabric should be avoided (see column 3, lines 1 to 5).

In accordance with the solution proposed in document D2, the wear resistance is improved essentially by using long weft floats so that a large wear volume is available and by the use of two sets of warp yarns, one set for the force transmission which is interlaced with the upper layer of the dual layer fabric and one set of constructive warp yarns, which is interlaced with the upper and lower layers (machine side of the fabric). Therefore, even when the constructive warp yarns are worn through no direct rupture of the fabric is to be feared (see column 3, lines 19 to 24).

On the paper side of the fabric the number of warp yarns is greater than on the machine side (column 5, lines 5 to 9) and lies mostly within the fabric (see column 5, lines 24 to 27) so as to provide a non-marking sheet side of the fabric.

In an preferred embodiment (see claim 3 of document D2) the constructional warp yarns are further protected from wear by a double interlace so that these machine direction warps yarns are pulled further into the fabric and away from the machine side surface.

In an example, document D2 (column 6, lines 26 to 45) describes a 14 shaft fabric but the disclosure is silent about the float length or machine direction yarn pattern.

When compared to the fabric claimed in claims 1 and 3 of the patent in suit, D2 does not disclose or hint to a cover factor of 80%, the use of one set of machine direction yarns, a float of the interlacing pattern of the machine side cross direction yarn being under eleven machine direction yarns and also not that each machine direction yarn has the same pattern of interlacing as the adjacent machine direction yarn (claim 1) or that two machine direction yarns, separated by one machine direction yarn, interlace with the same machine side cross machine direction yarn (claim 3).

- 2.3 There is no need to consider the documents D3 and D4, not any longer relied upon by the appellant in the present appeal proceedings, since these documents are clearly less relevant than the documents D1 and D2.

2.4 Consequently novelty of the subject-matter of the claims 1 and 3 of the patent in suit follows from the fact that none of the cited documents discloses a papermakers' fabric based on, in combination, a 14 harness dual layer endless fabric with at least 80% cover formed of machine direction and cross machine direction yarn system, a float of the interlacing pattern of the machine side cross machine direction yarn being under eleven machine direction yarns and each machine direction yarn having the same pattern of interlacing as the adjacent machine direction yarn (Claim 1) or in which two machine direction yarns are separated by one machine direction yarn and are interlaced with the same machine side cross machine direction yarn (Claim 3).

3. *Inventive step*

3.1 Starting from the prior art fabric such as disclosed in document D1 the patent in suit seeks to provide a dual layer forming fabric with improved cross machine direction wear resistance with enhanced protection of the machine direction yarns and in which the fibre support on the sheet side of the fabric is suitable for fine paper production, without the need for floater yarns as described in document D1 (see column 2, lines 26 to 35 of the description of the patent in suit).

3.2 These objects are met by the fabric in accordance with the alternatives defined in Claims 1 and 3, in particular by the features that the fabric is a fourteen harness dual layer fabric having weave floats in the cross machine direction yarns on the paper machine side of the fabric that are under eleven machine direction yarns.

The weave floats provide extra wear mass and are formed by a double machine direction knuckle (Claim 3), which gives extra protection to the warp yarns on the machine side of the fabric. The added protection is provided without detriment to the fine paper making surface of the fabric (see also column 2, line 36 to column 3, line 12 of the description of the patent in suit).

3.3 It is to be noted that the object of the papermakers' fabric according to document D1 (see page 3, lines 26 to 36) concerns also the improvement of sheet support surface smoothness and long service life but this is essentially achieved by the incorporation of floater yarns at the sheet support surface and the provision that the fabric is free of any warp interlacing between the floater yarns and adjacent weft yarns. Therefore the teaching of document D1 cannot give the skilled person a lead to the additional features (see point 3.2 above) of the granted Claims 1 and 3 for solving the problem underlying the patent in suit.

3.4 In the fabric according to document D2, two different kinds of machine direction yarns are used, namely a set of constructive warp yarns and a set of force transmission warp yarns which is essential to this known fabric. There is consequently no teaching derivable from document D2 which would lead the skilled person in the art to use two identical machine direction yarns to attain the last feature of Claim 3. Moreover, applying the teaching to the fabric known from document D1 would result in an adaptation of the existing two warp yarn sets to become a constructive and force transmitting set rather than that this would lead in the direction of the fabric configuration of Claims 1 or 3.

- 3.5 It cannot, in the Board's opinion, be said either that the features of Claims 1 and 3, respectively, have no functional relationship with each other.

It follows clearly from the disclosure of the patent in suit (see also column 6, lines 13 to 23) that the parameters of the claimed fabrics are selected with a view to optimise the use of the fabric as a papermakers' fabric which is durable and at the same time sufficiently flat to avoid marking of the paper sheet while maintaining good dewatering abilities.

- 3.6 In conclusion, even when combining the teachings known from the documents D1 and D2, the skilled person would not arrive at a fabric according to the Claims 1 and 3 of the patent in suit without further adaptations to be made and therefore, each of the combinations of features defined in Claims 1 and 3 of the patent in suit involves an inventive step.

4. The subject-matter of the Claims 1 and 3 is patentable having regard to Articles 52 (1), 54 and 56 EPC. Dependent Claims 2 and 4 to 7 define particular embodiments and meet likewise the requirements of the EPC. Hence the patent can be maintained as granted.

Order

for these reasons it is decided that:

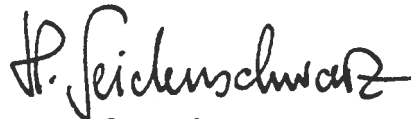
1. The appeal is dismissed.

The Registrar:



S. Fabiani

The Chairman:



H. Seidenschwarz

