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D E C I S I O N
of 5 December 2001

Case Number: T 0604/99 - 3.2.6

Application Number: 94100098.6

Publication Number: 0607798

IPC: D03D 1/02

Language of the proceedings: EN

Title of invention:
Polyester filament woven fabric for air bags

Patentee:
TEIJIN LIMITED

Opponent:
Hoechst Trevira GmbH & Co. KG

Headword:
-

Relevant legal provisions:
EPC Art. 54(2), 56

Keyword:
"Novelty - yes"
"Inventive step - yes"

Decisions cited:
T 0472/92

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0604/99 - 3.2.6

D E C I S I O N
of the Technical Board of Appeal 3.2.6
of 5 December 2001

Appellant: (Opponent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 30 March 1999 rejecting the opposition filed against European patent No. 0 607 798 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: P. Alting van Geusau
Members: G. Pricolo
M. Tardo-Dino

Summary of Facts and Submissions

I. The appeal is from the decision of the Opposition Division posted on 30 March 1999 to reject the opposition against European patent No. 0 607 798 granted in respect of European patent application No. 94100098.6.

Granted claims 1 and 8 read as follows:

"1. A non-coated and uncalendered polyester filament woven fabric for air bags, comprising a plurality of polyester multifilament warp and weft yarns, characterized in that the warp and weft yarns respectively and independently from each other have (1) a maximum thermal stress of 0.8 g/denier or less determined by heating a specimen yarn fixed to a length of 50 mm from room temperature to a melting temperature of the yarn, under an initial load of 0.08 g/denier at a heating rate of 150 °C/minute, (2) a maximum thermal shrinkage of 25% or less determined by heating a specimen yarn having a length of 50 mm from room temperature to the melting temperature of the yarn under an initial load of 0.08 g/denier at a heating rate of 150 °C/minute without restricting the thermal shrinkage of the specimen yarn, (3) a limiting viscosity number of from 0.80 to 0.95 dl/g determined in a concentration of 1.2 g/100 ml in o-chlorophenol at a temperature of 25 °c and, (4) a content of terminal carboxyl groups of 5 to 35 equivalent per ton."

"8. A non-coated and uncalendered polyester filament woven fabric having been produced by weaving a plurality of polyester multifilament warp and weft yarns to provide a gray woven fabric; and dry

heat-setting the gray woven fabric, characterized in that (1) The warp and weft yarns have, respectively and independently from each other, a thermal shrinkage of 3 to 13% at a temperature of 150 °c, (2) the gray woven fabric has cover factors in the warp and weft directions of from 1,000 to 1,200 and a difference of 200 or less between the cover factor in the warp direction and that in the weft direction, and (3) the dry heat-setting for the gray woven fabric is carried out by bringing it into contact with a heat-setting metal roller surface under tension to such an extent that the resultant heat-set woven fabric exhibits an air permeability of 0.5 ml/cm^2/sec/0.5 inch Aq (=125 Pa) or less."

II. The Opposition Division held that there was no evidence that the yarn referred to in the tests carried out by the appellant and reported in

Annex I;

filed with the notice of opposition,
was the same as the prior art yarn referred to in Example 3 of

D1: EP-A-0 442 373;

and therefore it could not be concluded that the disclosure of document D1 was prejudicial to the novelty of claim 1 of the patent in suit.

The Opposition Division came to the conclusion that the subject-matter of claims 1 and 8 was novel and involved an inventive step also having regard to the disclosure of document

D2: Winnacker, Küchler: "Chemische Technologie", Band 6, Organische Technologie II, 4. Auflage, Carl Hanser Verlag München Wien 1982; pages 680 and 681.

III. The appellant lodged an appeal, received at the EPO on 5 June 1999, against this decision. The appeal fee was paid simultaneously with the filing of the appeal. The statement setting out the grounds of appeal was received at the EPO on 6 August 1999.

IV. In an annex to the summons for oral proceedings pursuant to Article 11(2) Rules of Procedure of the Boards of Appeal the Board expressed its preliminary opinion that there was no evidence on file that the material used for the tests of Annex I exactly corresponded to the material "Trevira Hochfest" used in Example 3 of D1, and that therefore the subject-matter of claim 1 appeared to be novel.

V. With letter dated 20 September 2001, the appellant filed the following documents:

A1: Excerpt from the brochure F00 0/11 published by Hoechst Trevira GmbH in 1973

A2: Brochure "Trevira Hochfest Type 726" published by Hoechst Trevira GmbH in 1995

A3: Brochure "Technische Information. Beständigkeit von Trevira Hochfest", page 34, published by Hoechst Trevira GmbH in 1991

VI. Oral proceedings took place on 5 December 2001.

The appellant requested that the decision under appeal be set aside and that the patent be revoked. It further requested the reimbursement of the appeal fee in view of an alleged substantial procedural violation.

During the oral proceedings, the appellant filed an additional page with Table 17 of document A3.

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

The auxiliary requests for maintenance of the patent in amended form filed before the Opposition Division, and maintained in appeal proceedings as stated in the letter dated 10 May 2000, were not discussed.

VII. In support of its requests the appellant relied essentially on the following submissions:

In Annex I it was stated that a "Trevira Hochfest" yarn with a dtex of 400 in accordance with Example 3 of D1 was tested. This yarn, specifically manufactured by the appellant and easily reproducible by the skilled person, had exactly the same properties given in D1 for the yarn of Example 3. Since these properties unequivocally defined one type of "Trevira Hochfest" yarn, there was no doubt that the yarn used in the tests was identical to that of Example 3 of D1. Annex I showed that the tested yarn, and thus the yarn of Example 3 of D1, met all the requirements referred to in claim 1 and therefore its subject-matter lacked novelty over the disclosure of document D1.

D1 was also prejudicial to the novelty of the subject-matter of claim 8. Although D1 did not explicitly

disclose that the thermal shrinkage of the warp and weft yarn was above 3% at a temperature of 150°C, it was clear from the disclosure of A2, showing the thermal shrinkage as a function of the temperature for a yarn essentially identical to that of D1, that this requirement was also met. Furthermore, the dry-heat setting step referred to in claim 8 had no significant technical effect on the fabric. As a consequence, it did not imply any technical features distinguishing the subject-matter of claim 8 from the woven fabric of D1.

In any case, the subject-matter of claim 8 did not involve an inventive step when starting from document D1, which dealt with the same problem underlying the patent in suit, to improve the durability of the fabric over a long period of time. The solution proposed in claim 8 did not provide any additional effects over the woven fabric of D1. Indeed, as shown in Table 17 of A3, "Trevira Hochfest" yarns maintained their properties also over a long period of time. A dry heat-setting step, which was generally known in the art, was therefore superfluous, and could not support the presence of an inventive step.

In the appealed decision the Opposition Division stated that Example 3 of D1 related to a fabric in which both twisted and untwisted yarns were used, and that, since Annex I did not specify whether the yarn tested was twisted or not, it was not proven that the yarn tested was the same as in Example 3 of D1. Since the appellant was not given any opportunity to present comments on this ground, the decision was issued in violation of Article 113(1) EPC. This constituted a substantial procedural violation justifying the reimbursement of the appeal fee.

VIII. The respondent essentially argued as follows.

The yarn referred to in Annex I was specifically prepared by the appellant for carrying out the tests. However, the appellant did not specify the chemical composition, process of manufacture, and type of "Trevira Hochfest" yarn it used, and therefore it was not possible for the respondent to verify whether the test results given in Annex I were correct. Moreover, the statement that the yarn tested was the same yarn as in Example 3 of D1 was not supported by any evidence and was to be regarded as an unsubstantiated allegation only. Therefore, it was not proven that the yarn of Example 3 of D1 met the requirements of claim 1 of the patent in suit.

Different types of yarns having different properties fell under the denomination "Trevira Hochfest". This was apparent from the disclosure of the late filed documents A1 to A3, including Table 17, which described the properties of specific types of "Trevira Hochfest" yarns only. Since the appellant failed to specify the type of yarn "Trevira Hochfest" used in the tests of Annex I and in Example 3 of D1, no specific information about them could be derived from these documents.

D1 did not address the air permeability of woven fabrics for air bags over an extended period of time and did not comprise any indication that a specific selection of the yarn combined with a post-treating of the gray fabric in a dry heat-setting step would lead to a fabric keeping a low permeability for a long period of time even under severe storage conditions.

Accordingly, the subject-matter of claims 1 and 8 was

novel and involved an inventive step.

Reasons for the Decision

1. The appeal is admissible.

2. *Novelty*

2.1 Document D1 discloses a non-coated and uncalendered polyester filament woven fabric for air bags, comprising a plurality of polyester multifilament warp and weft yarns (see page 4, line 51 to page 5, line 27; see also page 7, lines 27 to 30).

2.2 The appellant filed Annex I to show that the yarn according to Example 3 of D1 meets the requirements for maximum thermal stress, maximum thermal shrinkage, limiting viscosity number and an appropriate carboxyl groups content as defined in claim 1 of the patent in suit.

Since the tests have been carried out on a yarn specifically manufactured by the appellant, and the "Trevira Hochfest" yarns of D1 were also manufactured by the appellant, all the evidence in support of the allegation that the yarn tested is identical to that referred to in Example 3 of D1 lies within the power and knowledge of the appellant. For this reason, the present situation is analogous to cases of public prior use where practically all the evidence in support of an alleged prior use lies within the power and knowledge of the opponent (see eg T 472/92, OJ 1998, 161). Accordingly the Board takes the view that it is justified to require a high standard of proof, i.e. the

appellant must prove its allegation "up to the hilt", for little if any evidence is available to the patentee to establish the contradictory proposition that the yarn tested is not identical to that of Example 3 of D1.

In the present case, the appellant failed to file any evidence in support of the allegation that the yarn tested was identical to that referred to in Example 3 of D1, even after having been informed of this deficiency on several occasions during the opposition proceedings (point 1 of the respondent's letter dated 16 July 1998; point 2 of the Opposition Division's decision, in particular the first paragraph of page 3) and appeal proceedings (point 2.3 of the communication pursuant to Article 11(2) of the Rules of Procedure of the Boards of Appeal annexed to the summons to attend oral proceedings).

The mere statement of the appellant that the yarn tested had exactly the same properties given in D1 for the yarn of Example 3, and that these properties unequivocally defined one type of "Trevira Hochfest" yarn, cannot be considered as unequivocal evidence for proving the alleged facts. In this respect it must be noted that the term "Trevira Hochfest" is not necessarily limited to a material with the properties of the yarn used in the tests of Annex I but rather includes yarns with different properties also.

Therefore, the Board comes to the conclusion that it is not proven that the yarn used in the tests of Annex I corresponds to the yarn referred to in Example 3 of D1. It follows that the test results of Annex I cannot be used for assessing the disclosure of document D1.

2.3 Since document D1 is silent about the maximum thermal stress and maximum thermal shrinkage of the yarns determined as specified in claim 1 of the patent in suit, and about the limiting viscosity number and carboxyl groups content thereof, the subject-matter of claim 1 is novel over the disclosure of document D1.

2.4 D1 discloses a non-coated and uncalendered polyester filament woven fabric produced by weaving a plurality of polyester multifilament warp and weft yarns to provide a gray woven fabric. D1 further discloses that the thermal shrinkage of the yarns is less than 9% at 200°C (see page 3, lines 48, 49). It follows that thermal shrinkage at 150°C is certainly less than the value of 13% defined in claim 8 of the patent in suit. With a denier of 360 (400 dtex) and 24 fibers/cm as in Example 3 of D1, the cover factor (calculated according to the formulae on page 7 of the published patent) is about 1156 in both the warp and weft directions. Moreover, the air permeability of the fabric used in Example 3 of D1 is less than 0.5 $ml/cm^2/sec/0.5$ inch Aq, as acknowledged in D1, page 2, lines 50 to 53. The fabric of Example 3 of D1, and of Examples 1 and 2 as well, does not undergo a dry heat-setting step.

Therefore, the following features of claim 8 are not disclosed by document D1: the thermal shrinkage at 150°C is within the range of 3 to 13%, and the fabric is obtained by dry heat-setting the gray woven fabric by bringing it into contact with a heat-setting metal roller surface under tension to such an extent that the resultant heat-set woven fabric exhibits an air permeability of 0.5 $ml/cm^2/sec/0.5$ inch Aq (=125 Pa) or less. The latter feature referring to the manufacturing step of dry heat-setting directly implies that the

fabric of claim 1 has a shrinkage (see page 8, lines 22 to 24, of the patent in suit) which is not present in a fabric that has not undergone a dry heat-setting step.

It follows that the subject-matter of claim 8 is novel over the disclosure of document D1.

2.5 The appellant argued that the dry heat-setting step referred to in claim 8 had no significant technical effect on the fabric and, as a consequence, it did not imply any technical features distinguishing the subject-matter of claim 8 from the woven fabric of D1.

The Board cannot follow this view, since the dry heat-setting step results in a shrinkage of the woven fabric, as explained above, which is a technical feature.

2.6 Document D2 generally refers to properties of polyester fibers, and has been cited to show that PET has a crystallinity of less than 50%. It does not give any specific information about woven fabric properties.

2.7 Documents A1 to A3 were filed in appeal proceedings. Table 17 of A3 in particular was filed during oral proceedings. The respondent stated that the information given in these documents was not contested.

The Board follows the view of the respondent that documents A1 to A3 cannot be used to supplement the disclosure of D1. These documents specify the properties of certain types of "Trevira Hochfest" yarns only, namely Type 715 (A1), Type 726 (A2), Type 710 (A3). Since there is no evidence that any of the yarns cited in D1 corresponds to one of these types, these

documents cannot be used to derive any precise value about the thermal stress and thermal shrinkage of the yarns of D1.

Thus, the appellant's argument that it was clear from the disclosure of A2 that the thermal shrinkage of the yarns of D1 was above 3% at a temperature of 150°C cannot be followed.

Furthermore, novelty of the subject-matter of claims 1 and 8 over the disclosure of documents A1 and A3, including Table 17, follows from the fact that none of them discloses either a woven fabric for air bags or a woven fabric having an air permeability of 0.5 $ml/cm^2/sec/0.5$ inch Aq (=125 Pa). With respect to the disclosure of A2, it does not form part of the state of the art according to Article 54(2) EPC since it was published in 1995.

2.8 Therefore, the subject-matter of claims 1 and 8 is deemed to be novel.

3. *Inventive step*

3.1 Starting from the closest prior art D1, the object underlying the patent in suit is to provide a non-coated and uncalendered polyester filament woven fabric for air bags having an excellent durability in air permeability and burst strength over a long period of time even after aging at a high temperature in a dry or wet condition (page 3, lines 21 to 23).

3.2 This problem is effectively solved by the fabric of claims 1 and 8. In particular, by selecting the maximum thermal stress and the maximum thermal shrinkage to be

within the ranges defined in claim 1 and by providing a fabric on which a dry heat-setting has been carried out as defined in claim 8, the air permeability after dry heat aging does not increase undesirably (see page 4, lines 14 to 16 and 27 to 31 and page 8, lines 12 to 24).

3.3 It is to be noted that neither D1, nor the other cited prior art, suggests that either the selection of maximum thermal stress and maximum thermal shrinkage defined in claim 1 for the warp and weft yarns, or the heat-setting step under tension defined in claim 8 with respect to the fabric, have any effects on the durability of the air permeability in time.

3.4 Furthermore, the Board cannot follow the argument of the appellant that, since the woven fabric of D1 was already satisfactory in respect of the durability over a long period of time, the dry heat-setting was a superfluous step.

The patent in suit describes (page 8, lines 5 to 24) that by dry heat-setting the fabric under tension an appropriate shrinkage is obtained which "can prevent a generation of an undesirable excessive and uneven crimp structure and thus the resultant woven fabric can obtain a stable air permeability, and a high burst strength retention after dry or wet aging".

The appellant has not submitted any arguments contesting this statement, but merely referred to Table 17 of document A3 to show that "Trevira Hochfest" yarns maintained their properties also over a long period of time.

However, as explained above (point 2.7), the yarns of A3 are not those referred to in D1. Moreover, the fact that a certain type of "Trevira Hochfest" **yarn** (Type 710 according to A3) maintains its properties also over a long period of time does not imply that a dry heat-setting step under tension of the **woven fabric** is superfluous for the **woven fabric** itself.

3.5 It therefore follows that the cited prior art does not lead the skilled person in an obvious manner to the specific combination of features of claims 1 and 8. Consequently the subject-matter of these claims involves an inventive step (Article 56 EPC).

4. *Request for reimbursement of the appeal fee*

According to Rule 67 EPC, the prerequisite for the reimbursement of the appeal fee in the event of an alleged substantial procedural violation is that the appeal is found allowable. Since in the present case the Board comes to the conclusion that the appeal is not allowable, there is no need to examine the question of whether or not a substantial procedural violation was committed by the Opposition Division and reimbursement cannot be ordered.

Order

For these reasons it is decided that:

1. The appeal is dismissed.

2. The request for reimbursement of the appeal fee is

rejected.

The Registrar: The Chairman:

M. Patin P. Alting van Geusau