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D E C I S I O N
of 25 November 2004

Case Number: T 1039/02 - 3.2.6

Application Number: 96939044.2

Publication Number: 0862667

IPC: D04H 13/00

Language of the proceedings: EN

Title of invention:
A synthetic textile support for bituminous sheaths, particularly for coating roofs

Patentee:
FREUDENBERG POLITEX S.R.L.

Opponent:
John Manville Europe GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1039/02 - 3.2.6

D E C I S I O N
of the Technical Board of Appeal 3.2.6
of 25 November 2004

Appellant: (Proprietor of the patent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 2 August 2002 revoking European patent No. 0862667 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: H. Meinders
Members: G. L. De Crignis
J. H. Van Moer

Summary of Facts and Submissions

I. European Patent Nr. 0 862 667, granted on application No. 96939044.2, was revoked by the opposition division by decision posted on 1 August 2002. It based the revocation on the finding that the subject-matter of claim 1 as amended in the opposition proceedings lacked inventive step, considering:

D1: EP-A- 0 506 051 and

D2: Synthesefasern, edited by Béla von Falkai; Verlag Chemie; Weinheim; Deerfield Beach, Florida; Basel; 1981; page 449

Of the other documents filed in the opposition proceedings the following is of relevance for the present decision:

D3: Chemiefasern/Textilindustrie, 37./89. Jg., September 1987; pages 794 to 805

II. The appellant (patentee) filed a notice of appeal against this decision and paid the appeal fee, both on 27 September 2002. On 29 November 2002 the statement of grounds of appeal was filed in facsimile, accompanied by a set of amended claims, an amended page 2 of the description as well as document:

D7: "Chemie Faser Lexikon", edited by Hans J. Koslowski, 11th edition, Deutscher Fachverlag 1997, pages 124 to 129 and table 2 (pages 190, 191).

With letter of 22 April 2003 the appellant filed:

D8: Declaration of Franco Francalanci in Italian, with translation into English.

III. With a communication dated 12 March 2004 accompanying the summons to oral proceedings, the Board set out its preliminary opinion. In reply to this summons the appellant filed an amended claim 1, with letter of 25 October 2004.

IV. Oral proceedings were held on 25 November 2004, which the respondent (opponent) did not attend. In the oral proceedings reference was also made to
D9: DE-A-3941189, the family member of US-A-5 118550, mentioned as closest prior art in the patent in suit.
The appellant requested to set aside the decision under appeal and to maintain the patent on the basis of claim 1 filed with letter of 25 October 2004.
With letter of 13 November 2002 the respondent withdrew its request to dismiss the appeal (filed with letter of 21 October 2002) as well as its auxiliary request for oral proceedings. With letter of 26 October 2004 it informed the Board that it would not attend the oral proceedings.

V. Claim 1 according to the request of the appellant reads as follows:

"A synthetic textile support for bituminous sheaths, particularly for coating roofs, consisting of two layers (1, 2) of non-woven lap of polyester fibres, between which there is interposed a plurality of continuous reinforcing filaments (3) arranged parallel

to one another in the longitudinal direction of the textile support, said continuous reinforcing filaments (3) consisting of polyester threads, characterized in that said polyester threads (3) have a Young's modulus ranging from 10 GPa to 14 GPa."

VI. In support of its request the appellant argued essentially as follows:

D1 disclosed all features of the preamble of claim 1. Furthermore, D1 disclosed that the polyester reinforcement filaments should have a breaking extension similar to the polyester fibres in the non-woven layers. This implied a Young's modulus for these filaments which was considerably lower than the Young's modulus of the polyester reinforcing filaments presently claimed in claim 1.

The known textile supports had the drawback that they showed transversal shrinkage during impregnation because of the high elongation in the longitudinal direction resulting from the high production speeds presently used.

The solution was found in the use of polyester reinforcing filaments with a higher Young's modulus, i.e. filaments which did not follow the suggestion in D1 to use polyester filaments exhibiting the same stress-strain relationship as the polyester fibres in the non-woven laps. This was a clear indication of inventive step even though polyester filaments with this Youngs' modulus were known at the time, see e.g. D2 or D7. However, from the declaration D8 it was clear that in 1995 such filament yarns would not have been

contemplated for use in textile supports for bituminous sheaths. D9 was not relevant as it preferred glass reinforcement threads which had the clear disadvantages mentioned in the patent in suit.

Reasons for the Decision

1. The appeal is admissible.

2. *Novelty (Article 54 EPC)*

D1 discloses a synthetic textile support for bituminous sheaths, particularly for coating roofs, consisting of two layers of non-woven lap of polyester fibres, between which there is interposed a plurality of continuous reinforcing filaments arranged parallel to one another in the longitudinal direction of the textile support, said continuous reinforcing filaments consisting of polyester threads.
D1 does not mention the Young's modulus of the polyester filament yarns used as reinforcement, therefore the subject-matter of claim 1 is distinguished from that known textile support by the Young's modulus for the polyester reinforcing filament threads ranging specifically from 10 GPa to 14 GPa.
Therefore the subject-matter of claim 1 is novel.

3. *Inventive step*

3.1 For the discussion of inventive step the Board considers with the appellant that D1 constitutes the closest prior art. Where the appellant mentions the "breaking extension" for these polyester filaments as

disclosed in D1 it refers to the "Höchstzugkraftdehnung", which is, in actual fact, the "elongation at break".

3.2 According to D1 (column 2, lines 12 to 16) the reinforcing yarns should be made of fully oriented polyester filaments ("FOY"-yarns) as known from D3. D1 states for these reinforcing yarns that they possess an elongation at break (Höchstzugkraftdehnung) similar to that of the polyester fibers of the non-woven layers, which should lie between 20 and 60 % (column 1, lines 54 to 57, column 2, lines 21 to 23 and claim 3). The tenacity ("feinheitsbezogene Festigkeit") of the reinforcing yarns is indicated in D1 to be between 20 and 40 cN/tex (column 2, lines 23 to 24). No reference to the Young's modulus of the polyester filament reinforcement yarns is made.

3.3 The appellant argued that reinforcing yarns exhibiting such a behaviour had a Young's modulus in the range of 20 - 40 cN/dtex (3.32 - 5.33 GPa), i.e. much lower than the presently claimed range of 10 to 14 GPa.

However, no evidence to support this allegation was filed by the appellant.

The FOY-yarns suggested for the support forming the subject of D1 and as disclosed - according to D1 - in D3 (see figure 8 and page 802), have an elongation at break of 20 to 40% and a tenacity between 20 and 40 cN/tex. These values correspond to the values mentioned in D1. However, in contrast to what the appellant alleges, the stress-strain curves for these yarns as discussed in D3 show a steep initial rise,

which is indicative of a **high Young's modulus**, the latter being the slope of the initial straight segment of (or of the initial tangent on) the stress-strain curve.

3.4 The appellant further argued that as the non-woven laps in the textile support known from D1 were made up of polyester staple fibers or endless fibers (column 3, line 44), it must be assumed that the polyester filament reinforcing yarns had the same Young's modulus as these polyester fibers, as they **should exhibit the same stress-strain behaviour** (emphasis is added by the Board). According to D2 (table 2, pages 190,191) such fibres would have a Young's modulus between 3.32 and 5.33 GPa.

The Board, however, notes that for the polyester filament yarns it is **only** mentioned in D1 that the elongation at break ("Höchstzugkraftdehnung") and the tenacity ("Höchstzugkraft") should be **similar** to that of the non-woven web filaments. The stress-strain behaviour of the reinforcement filaments in comparison with the non-woven web filaments is only mentioned in D1 **where the prior art is discussed**. There it is said to be "very different" from the stress-strain behaviour of the non-woven web filaments.

The latter statement, however, cannot be interpreted in such a way that the invention as disclosed in D1 is characterized as being the **opposite** of the prior art mentioned therein, namely that the stress-strain behaviour of the polyester filament reinforcement yarns is the **same in all its aspects** as the stress-strain behaviour of the polyester staple fibers or endless

fibers in the non-woven laps, in particular that the Young's modulus would be identical to that modulus for these fibers, i.e. between 3.32 and 5.33 GPa.

The appellant's assumptions are therefore not considered convincing.

3.5 In respect of the disclosure of D1 the question therefore remains what would be the Young's modulus of the FOY-polyester filament yarns proposed by D1 or chosen by the skilled person when executing the teaching of D1.

The standard reference at the time, D2 as filed by the appellant, mentions for polyester filament yarns and high tenacity polyester filament yarns one single range for the Young's modulus ("Elastizitätsmodul (Dehnung → 0)") of 10 to 15 GPa (see table 1b, page 449). D7 mentions in this respect 10 to 21 GPa (see table 2, page 190).

3.6 In any case, the patent in suit neither mentions special advantages nor specific technical effects resulting from the choice of the claimed sub-range of 10 to 14 GPa that could substantiate an inventive selection from a broader range. In fact, the description mentions a "Young's modulus less than 20 GPa, preferably ranging from 10 GPa to 14 GPa" (column 2, lines 49 and 50), without indicating for what reason this range is preferred. The claimed range therefore does not appear to differ essentially from what is known from D2.

Also considering the choice of the range of 10 to 14 GPa out of the known range of 10 to 15 GPa as disclosed in D2, the appellant did not submit any evidence whatsoever in support of such a small difference (between 14 and 15 GPa) providing an unexpected behaviour of the textile support or a discontinuity in its technical properties.

Therefore, in the absence of any teaching to the contrary when applying knowledge based on the relevant prior art, the skilled person would, when executing the teaching of D1 and employing the polyester filament yarns commercially available at the time, directly arrive at the subject-matter of claim 1, which therefore lacks an inventive step.

3.7 For the sake of argument the Board will, in the following, discuss the general argument of the appellant that the polyester filament reinforcement yarns in the textile support known from the closest prior art D1 **had a low Young's modulus** and that the skilled person would not contemplate replacing these low Young's modulus polyester filament yarns with polyester filament yarns having a Young's modulus as high as 10 to 14 GPa to solve the problem of transversal shrinkage and elongation in length during production. According to the appellant the strong encouragement in D1 to approximate the stress-strain behaviour of the polyester fibres in the non-woven laps would keep him from doing this.

As already stated in point 3.4 above, the Board fails to find support for the appellant's opinion that D1 contains a strong encouragement to use polyester

reinforcement filament threads with a low Young's modulus.

3.8 The Board notes also that in D1 the invention is presented as a response to the observation that previous textile supports with high-modulus reinforcement yarns between non-woven laps as suggested by the closest prior art D9 showed delamination under thermal and mechanical stress.

In fact, that same prior art D9 (in the form of its family member US-A-5 118 550) is mentioned as closest prior art in the patent in suit (paragraphs 0005 and 0006) as providing glass reinforcement filaments between two layers of polyester fibre non-woven laps. The patent in suit mentions as a disadvantage of these filaments that they provide a very good resistance to traction up to a certain limit, but then break suddenly leaving the textile support without any longitudinal reinforcement. A further disadvantage of these glass reinforcement filaments is their reaction to thermal expansion of the roof, resulting in the creation of ripples between one filament and the next.

If, as argued by the appellant, the textile support known from D1 suffers from transversal shrinkage and displays insufficient elastic behaviour in use, it can be expected of the skilled person charged with solving this problem to return to the state of the art D9 (which also relates to solving the problem of transversal shrinkage due to elongation in length during production of the support, see page 2, lines 31 to 37) - being the state of the art he started from to develop the invention of D1 - so as to examine whether

this state of the art provided him with further teachings which did not lead to these disadvantages.

3.9 D9 mentions (page 4, lines 13 to 19) as an alternative to the glass threads the **use of high-tenacity polyester threads** ("Polyester-Fäden mit hoher Festigkeit"). Thus, recognising in the support of D1 that the polyester reinforcement filament threads do not solve the problem of transversal shrinkage due to elongation during production **and** knowing that glass reinforcement filaments provide a good resistance to tractions up to a certain limit, but then break suddenly, he logically would try out the other solutions as presented by D9, such as the above mentioned use of high tenacity polyester threads. The latter have the additional advantage of being of a product (polyester) similar to the filaments he is already using.

Such threads ("hochfeste Polyester Filamente" according to D9, page 4, line 17), as available at the priority date of the patent in suit according to D2, had a Young's modulus of 10 to 15 GPa (see Table 1b, page 449).

In applying this alternative solution suggested by D9 the skilled person would arrive at the subject-matter of claim 1, the claimed slightly smaller range of 10 to 14 GPa not providing any special technical effect or special advantages in respect of the known range of 10 to 15 GPa as discussed above under point 3.6.

3.10 The declaration D8 stating that the firm Montefibre was not aware at the priority date (1995) of the fact that a polyester thread with a modulus less than 20 GPa

could be used as a reinforcement thread for supports for bituminous sheaths is considered by the Board as being in contradiction to the publicly available suggestion in D9 (which dates from 1990) to use such threads as an alternative to the glass threads in supports for bituminous sheaths (page 2, lines 17 to 26 and 31 to 36; page 4, lines 16 to 19). These threads had, according to D2, a Young's modulus less than 20 GPa.

3.11 Thus, for these reasons also the subject-matter of claim 1 lacks inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Patin H. Meinders