



Case Number: T 0104/94 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 18 May 1995

Appellant:
(Opponent 02)

HOECHST Aktiengesellschaft
Zentrale Patentabteilung
Postfach 80 03 20
D-65903 Frankfurt (DE)

Respondent:
(Proprietor of the patent)

MITSUBOSHI BELTING LTD.
No. 1-21, 4-Chome, Hamazoe-dori
Nagata-ku
Kobe City
Hyogo, pref. (JP)

Representative:

Bond, Bently George et al
HASELTINE LAKE & CO
Hazlitt House
28 Southampton Buildings
Chancery Lane
London, WC2A 1AT (GB)

Other party:
(Opponent 03)

Mehler GmbH
Edelzeller Str. 44
D-36043 Fulda (DE)

Representative:

Dr. Fuchs, Dr. Luderschmidt
Dr. Mehler, Dipl.-Ing Weiss
Patentanwälte
Abraham-Lincoln-Strasse 7
Postfach 4660
D-65036 Wiesbaden (DE)

Decision under appeal:

Interlocutory decision of the Opposition Division
of the European Patent Office given on 28 October
1993 and issued in writing on 15 December 1993
concerning maintenance of European patent
No. 0 243 152 in amended form.

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane
J.-C. Saisset

Summary of Facts and Submissions

- I. European patent No. 0 243 152 was granted on 26 September 1990 on the basis of European patent application No. 87 303 508.3.
- II. The patent was opposed by the present Appellants and two further Opponents. The ground relied upon in the respective Notices of Opposition was that the subject-matter of the patent did not involve an inventive step (Article 100(a) EPC).

The following prior art documents were cited in support of this ground:

- (D1) Technische Information "Herstellung von Keilriemen aus TREVIRA HOCHFEST", HOECHST AG, Mai 1985
 - (D2) Koppers Resins "Dipping system for polyester tire cord and industrial fabrics", November 1981
 - (D3) US-A-4 522 614
 - (D4) GB-A-924 180
 - (D5) DE-B-1 199 224
 - (D7) DE-A-1 753 659
 - (D8) DE-A-3 431 831
 - (D9) EP-A-0 173 221
- III. After expiry of the opposition period the Appellants submitted that the contested patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC), since the conditions (solvent, temperature) for the determination of the ultimate viscosity of a suitable polyester starting material were not mentioned. In support of this view the following documents were referred to:

- (D10) Römpps Chemie-Lexikon, siebte Auflage (1977), S. 3826-3827
- (D11) Polymer Handbook, 2nd edition (1975), IV-1 to IV-5 and IV-25 to IV-26, John Wiley & Sons London
- (D12) Polymer, Vol. 9, pages 153 to 158, Butterworths London 1968.

The independent product claim (Claim 8 as granted) was also objected to under Article 100(b) EPC as the vulcanisation conditions were not given in the patent specification.

IV. By its decision announced at oral proceedings on 28 October 1993 and issued in writing on 15 December 1993 the Opposition Division held that the patent could be maintained in amended form on the basis of a new set of Claims 1 to 6.

Claim 1 reads as follows:

"A method of forming a tensile cord (10) for use in a power transmission belt (11, 12), comprising the steps of:

providing a cord (13) of twisted polyester multi-filaments having an ultimate viscosity of less than 0.90;

applying adhesive to the cord (13) wherein the application of adhesive to the cord (13) comprises the steps of applying isocyanate or epoxy (14) to the cord (13), drying the cord (13) by heating the cord (13) to a temperature in the range of approximately 60°C to 100°C, and impregnating the isocyanate or epoxy coated and dried cord (13) with resorcinol-formalin-latex solution (17); and

drawing and setting the adhesive-coated cord (13) in two steps at a temperature in the range of approximately 220°C to 240°C with a first draw ratio in the range of 1% to 1.7% and a second draw ratio in the range of 1% to 1.7%."

Claims 2 to 5 relate to preferred embodiments of the method according to Claim 1.

Claim 6 reads as follows:

"A power transmission belt tensile cord (10) formed by a method according to any of Claims 1 to 5, after it has been incorporated into a rubber power transmission belt (11, 12) by vulcanization of the belt material, the cord (10), when removed from the vulcanized belt (11, 12), having a Young's modulus of more than 120 grams/denier, a thermal stress greater than 0.49 grams/denier when heated to 150°C for 8 minutes, a stress ratio of greater than 0.925, and less than 3.5% shrinkage under dry heat when heated to 150°C."

In the decision the Opposition Division stated its reasons for disregarding under Article 114(2) EPC the belated submission with respect to the ground of opposition under Article 100(b) EPC.

VI. The present appeal was filed on 8 February 1994 and the appeal fee paid at the same time. The Statement of Grounds of Appeal was filed on 25 April 1994.

An appeal was also filed by Opponents 01. With letter dated 27 October 1994 these Opponents withdrew their opposition. They are therefore no longer party to the proceedings, see T 789/89 (OJ EPO 94,482).

VII. Oral proceedings before the Board were held on 18 May 1995. Opponents 03, who had been duly summoned, did not appear. According to Rule 71(2) EPC the oral proceedings were continued without them.

The Appellants requested that the contested decision be set aside and the patent revoked in its entirety .

The Respondents requested that the appeal be dismissed and the patent maintained in the form approved by the Opposition Division.

VIII. The arguments brought forward by the Appellants can be summarised as follows:

- (i) The person skilled in the art could only perform the invention defined in Claim 1 if he knew which starting material to take. According to the claim the required polyester had an "ultimate" (i.e. intrinsic) viscosity of less than 0.90. The patent specification contained however no indication of the conditions, in particular solvent and temperature, under which this viscosity was measured. It was well known that these conditions had a significant effect on the value measured so that a material might have an intrinsic viscosity of less than 0.90 when measured in one solvent and more than 0.90 when measured in another. In deciding to disregard the objection under Article 100(b) the Opposition Division had relied on what was said in a document referred to as state of the art in the patent specification. That was inappropriate since there was no clear connection between that

reference to the state of the art and the description of the claimed invention. In this connection the Appellant therefore requested that the following questions be referred to the Enlarged Board of Appeal:

- 1) Darf eine bestimmte Meßvorschrift, die in einem Dokument beschrieben worden ist, das in einem dem Stand der Technik gewidmeten Absatz einer Patentanmeldung zitiert wurde, in den davon streng getrennten, der Erfindung gewidmeten Beschreibungsteil "hineingelesen" werden?
- 2) Ist dies auch zulässig, wenn in der Erfindungsbeschreibung selbst kein Bezug mehr auf diesen Stand der Technik genommen wird?
- 3) Ist dies auch zulässig, wenn zum Anmeldezeitpunkt dem Fachmann noch mehrere alternative Meßmethoden bekannt waren?

- (ii) Claim 6 was directed to a polyester cord which was supposed to have certain properties after it had been incorporated in a transmission belt by vulcanisation of the belt material. The conditions of the vulcanisation treatment were however nowhere mentioned in the patent specification and were in now way standard with a large number of variables such as temperature, duration and chemical additives all of which would affect the properties of the polyester cord. It was therefore purely a matter of chance whether the skilled person starting with a cord

formed by the method according to Claim 1 would arrive at a cord having the properties stated in Claim 6 after this had been vulcanised into a belt.

- (iii) In its decision the Opposition Division had correctly established the features, identified as (a) to (c), which distinguished the subject-matter of Claim 1 from the state of the art according to document (D3). Each of those features was however known from or obvious with respect to the state of the art and taken together they had no combinative effect. The subject-matter of the claim therefore lacked inventive step.

IX. In reply the Respondents (Proprietors of the patent) argued substantially as follows:

At the time of filing the Opposition the Appellants had stated that both Fortel III, a polyester mentioned in the introductory description of the patent specification, and the polyester described in document D8 had an intrinsic viscosity of 0.85 and 0.87 respectively. The Appellants also provided similar information concerning three of their Trevira polyester grades in an infotec-fax to Opponents 01. Clearly therefore the absence of a specific indication of the conditions of measurement of the intrinsic viscosity had not been seen as a difficulty then. In fact, intrinsic viscosity, as its name implied, was a measure of the size of the polymer molecules and largely independent of the solvent in which it was measured, or the temperature at which the measurement took place.

Claim 6 was necessary to give the Respondents adequate protection for their invention since the polyester cord in question would generally first be brought into trade after it had been incorporated into a transmission belt. As could be seen from the patent specification the effects of vulcanisation on the properties of the cord were not large so that changes in the vulcanisation conditions would have little effect on them. As long as the skilled person chose sensible conditions he could arrive without difficulty at the results specified in the claim.

The Appellants were adopting the wrong approach to inventive step by considering the distinguishing features (a) to (c) individually. In fact, the Respondents had developed a method in which the choice of the starting material, the low temperature of the adhesive dipping treatment, and the low two step draw ratio of 1% to 1.7% in each step specified in Claim 1 all played a role in achieving a desirable end product. There was nothing in the state of the art which could suggest this combination to the skilled person.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC. It is therefore admissible.
2. *Articles 123(2) and (3) EPC*

Present Claim 1 has been derived from granted Claim 1 by the introduction of features specifying the way adhesive is applied to the cord, taken from page 3, lines 32 to 46, of the patent specification and of a restriction of

the drawing step to two step drawing with a draw ratio of 1% to 1.7% in each step, taken from page 3, line 50 of the patent specification.

Claim 6 corresponds essentially to granted Claim 8 with the introduction into the claim of the statement that the cord has been formed by a method according to any of Claims 1 to 5.

The amendments of the claims dependent on Claim 1 and of the description do not go beyond those necessary to make these consistent with the terms of the independent claims.

Since the granted patent specification corresponds to the application documents as originally filed it is evident that the amendments made meet the requirements of both Articles 123(2) and (3) EPC.

3. *Article 100(b) EPC*

According to Opinion G 10/91 of the Enlarged Board of Appeal an Opposition Division should only consider belatedly submitted grounds for opposition which, **prima facie**, in whole or in part would seem to prejudice the maintenance of the patent. Acting on this principle the Opposition Division in the present case decided to use its discretion under Article 114(2) EPC to disregard the belated submissions made with respect to the ground of insufficiency of disclosure (Article 100(b) EPC) and gave its reasons for doing so.

In principle, a Board of Appeal is not barred from considering a belatedly submitted ground of opposition which had been disregarded by the Opposition Division pursuant to Article 114(2) EPC if the Board is of the opinion that the Opposition Division exercised its

discretion in this respect wrongly, see decision T 986/93 of 25 April 1995 (not published in OJ EPO), points 2.1 to 2.5 of the reasons. However, in the present case the Board, having heard the parties, can see nothing which points towards a misuse of the discretion of the Opposition Division in this respect and concurs in essence with what is said in the contested decision by way of explanation of the reasons for disregarding the ground of opposition under Article 100(b) EPC. It therefore intends to follow the same path.

Since the present decision as a consequence does not turn on detailed consideration of the arguments brought forward by the Appellants with respect to the ground of insufficiency of disclosure it would clearly be inappropriate to refer the related questions formulated by them, see point VIII above, to the Enlarged Board of Appeal. This request, therefore, must be rejected and there was no need for a translation of this question into the language of the proceedings.

4. *Novelty and inventive step*

Both Appellants and Respondents agree that the analysis performed in the contested decision of the teachings of the prior art documents D1 to D9 is of exemplary character. The Board concurs with that view and therefore does not intend to repeat the analysis here. The Board and the parties also agree with the finding of the Opposition Division that document D3 represents the closest state of the art. This document is directed, as is the present patent, to the manufacture of a polyester tensile cord for use in a power transmission belt. The basic idea involved is to treat the cord such that it will generate thermal contractive forces on generation of heat caused by slipping of the belt during running.

To achieve this end the cord is hot stretched by at least 5% at a temperature of 220°C to 240°C. Preferably two stage stretching is used, with 2% stretching in the first stage and 4% on the second. The cord produced in this way does not shrink appreciably during vulcanisation.

The subject-matter of Claim 1 is distinguished from this state of the art by the following features:

- (a) The "ultimate" (i.e. inherent) viscosity of the polyester multifilaments is less than 0.90;
- (b) the application of adhesive to the cord comprises two dips, i.e. applying the isocyanate or epoxy as a first dip of adhesive, drying the isocyanate or epoxy coated cord by heating it to a temperature in the range of approximately 60°C to 100°C, and impregnating the isocyanate or epoxy coated and dried cord with the RFL-solution as a second dip of adhesive; and
- (c) the first and the second draw ratio is in a range of 1% to 1.7%.

According to the present patent specification the aim of the invention is to produce a tensile cord exhibiting an optimum combination of high Young's modulus, high stress ratio, high thermal stress and low thermal shrinkage under dry heat at 150°C. This is achieved through the claimed heat setting/drawing method performed on a polyester cord having a preselected intrinsic viscosity.

With regard to distinguishing feature (c) identified above there is nothing in document D3 which could lead the skilled person to depart from the more than 5% total stretching taught there, since this value is given as an

essential requirement. In this context the Appellants have referred to document D2 as showing that two stage drawing with draw ratios in the range specified in Claim 1 was known *per se*. That document relates to a dipping system for polyester cord in which in a first stage the isocyanate and epoxy coated cord is heated to 220°C to unblock the isocyanate, the cord being stretched by 0-0.5%. In a second stage resorcinol-formalin-latex (RFL) is applied to the cord and dried at 110°C while the cord is stretched by 1%. The cord is then heat treated at 225°C without stretching. There is therefore no teaching in document D2 of a two stage drawing of the cord at 220°C to 240°C subsequent to application of the RFL and nothing in this document which could encourage the skilled person to reduce the draw ratios of 2% and 4% specifically proposed in document D3 to the values envisaged by present Claim 1. The only other cited document which proposes two stage drawing of a polyester cord is document D5. Here a minimum total stretching of 8% is required followed by relaxation of the cord to substantially the same initial length ($\pm 1\%$) at a lower temperature. It is evident that a method involving stretching at a fairly high draw ratio, followed by relaxation, cannot be compared with the method claimed which uses low draw ratios from the outset.

As for feature (b) it is not in dispute that two stage dipping systems of the general type specified in Claim 1 are well known in the art, see for example document D2 referred to above, and documents D1 and D6. However the temperature range of 60°C to 100°C stated in Claim 1 for drying the isocyanate or epoxy applied to the cord in the first stage is significantly lower than the equivalent temperatures proposed in the state of the art (220°C in document D2 and 160°C in document D6). In this context the Appellants argued that such high

temperatures were only required to unblock the blocked isocyanates used and that if instead unblocked isocyanates were being used then a drying temperature of less than 100°C would be necessary to preserve their reactivity. Although for practical reasons blocked isocyanates were now preferred since their solutions were easier to prepare and handle there was nothing to stop the skilled person using unblocked isocyanates if he so desired. The Respondents on the other hand stated that in their method the low drying temperature was used to ensure that unblocking first occurred during hot stretching and not prior thereto as in the state of the art. It is to be noted however that the patent specification does not make it clear whether blocked or unblocked materials are involved in the first coating stage. In this respect the Board does not find it necessary to come to a definite conclusion as to whether the temperature range specified in feature (b) represents a significant departure from the state of the art since in any event the cited documents do not lead the skilled person to combine features (b) and (c) in a method for treating polyester cord with an inherent viscosity of less than 0.90, such material being known per se, with the aim of producing a tensile cord having optimum properties for use in a power transmission belt.

The Board therefore comes to the conclusion that the subject-matter of Claim 1 is new and involves an inventive step (Articles 52(1), 54 and 56 EPC).

The Appellants did not argue separately with regard to the novelty and inventive step of the subject-matter of Claim 6, relying instead on the objection under Article 100(b) EPC. The Board is satisfied that a cord having the combination of characteristics specified in the claim is not disclosed in, or derivable in an obvious manner from, any of the cited documents.

Order

For these reasons it is decided that:

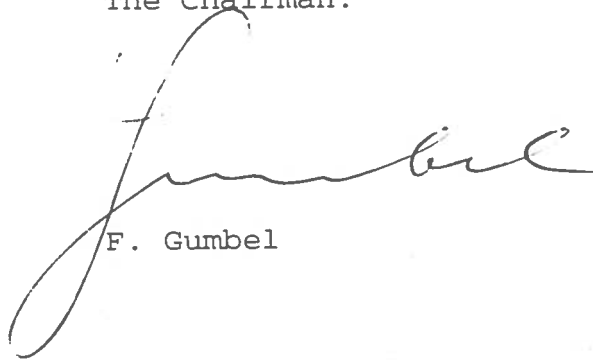
The appeal is dismissed.

The Registrar:

The Chairman:



S. Fabiani



F. Gumbel

