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Datasheet for the decision of 25 April 2013

Case Number: T 0021/10 - 3.3.03

Application Number: 00959175.1

Publication Number: 1200505

IPC: C08G 63/18, C08G 63/85, D01F 6/84, D01F 6/62, D01F 6/92, D01F 8/14

Language of the proceedings: EN

Title of invention:
Polyesters having a controlled melting point and fibers formed therefrom

Patent Proprietor:
EASTMAN CHEMICAL COMPANY

Opponent:
Evonik Degussa GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty (yes)"
"Inventive step (no) - obvious alternative"

Decisions cited:
-

Catchword:
-

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Case Number: T 0021/10 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 25 April 2013

Appellant: (Opponent)
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Respondent: (Patent Proprietor)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office dated 30 September 2009 and posted on 3 November 2009 rejecting the opposition filed against European patent No. 1200505 pursuant to Article 101(2) EPC.

Composition of the Board:

Chairwoman: B. ter Laan
Members: M. C. Gordon
C.-P. Brandt

Summary of Facts and Submissions

I. The appeal by the opponent lies from the decision of the opposition division announced on 30 September 2009 and posted on 3 November 2009 rejecting the opposition against European patent number EP-B1-1 200 505 (granted on European patent application number 00 959 175.1, derived from international application number PCT/US2000/21190, published under the number WO 2001/10929).

II. The patent was granted with a set of 23 claims, whereby claims 1, 10 and 23 read as follows:

"1. A polyester formed from the reaction product of:

a dicarboxylic acid component and a glycol component;

wherein the dicarboxylic acid component comprises at least one dicarboxylic acid selected from the group consisting of acids, esters, acid chlorides, anhydrides and mixtures thereof, of an aromatic dicarboxylic acid having from 8 to 14 carbon atoms, an aliphatic dicarboxylic acid containing 4 to 12 carbon atoms, a cycloaliphatic dicarboxylic acid having 8 to 12 carbon atoms or mixtures thereof;

wherein the glycol component comprises less than 20 mole % of ethylene glycol or diethylene glycol and more than 50 mole % of a four carbon glycol, a six carbon glycol or mixtures thereof;

wherein the dicarboxylic acid component contains up to 45 mole % of an acid, ester, acid chloride or anhydride of the aliphatic dicarboxylic acid;

wherein the polyester has a melting point in the range of from 140 to 185°C; and

wherein the polyester is formed in the presence of a catalyst system consisting essentially of a titanium catalyst material or a titanium catalyst material and at least one catalyst material selected from the group consisting of manganese, zinc, cobalt, gallium, calcium, silicon and germanium, and wherein the titanium catalyst material is present in an amount ranging from 1 to 35 ppm.

10. A fiber comprising a polyester according to any one of the preceding claims.

23. An automotive article prepared from a fiber blend comprising at least one polyester according to any one of claims 1 to 9."

Claims 2-9 were dependent on claim 1, claims 11-22 were dependent on claim 10.

III. A notice of opposition against the patent was filed on 6 April 2005 in which revocation of the patent on the grounds of Art. 100(a) EPC (lack of novelty, lack of inventive step) was requested.

The following documents *inter alia* were cited in support of the opposition:

D1: DE-B 23 36 026
D2: EP-A-0 699 700.

IV. The decision of the opposition division was based on the claims of the patent as granted.

According to the decision:

Art. 54 EPC

Example 2 of D1 disclosed a polyester having a Ti content of 73 ppm, which was above the maximum permitted by operative claim 1. The general teaching of D1 (pages 6 and 7 being referred to) disclosed transesterification catalysts based on either zinc, manganese or titanium compounds and polycondensation catalysts based on either antimony, germanium or titanium compounds, in each case in an amount of 0.01-0.2 wt.-%. A total of four selections would be required in order to arrive at the subject-matter of present claim 1.

With respect to D2, the argument that the melting point of 140-185°C was an inherent property of the polymers of D2 was dismissed since the opponent had not discharged the burden of proving this.

Hence the subject-matter claimed was novel.

Art. 56 EPC

The closest prior art was D2. The subject-matter of claim 1 was distinguished from the teaching thereof by the specified melting point range which was neither described nor suggested in D2. No technical effect relating to this feature was however identifiable. Thus

the technical problem to be solved was to provide an alternative polymer suitable for fibre production.

The technical problem was solved by the subject-matter of the patent in suit as defined according to the combination of features of granted claim 1.

There was no suggestion in D2 to combine its teaching with any of the other cited documents. Consequently the subject-matter of the patent was founded on an inventive step.

The opposition was therefore rejected.

V. On 21 December 2009 the opponent lodged an appeal against the decision, the prescribed fee being paid on the same date. The statement of grounds of appeal was received on 25 February 2010.

VI. The patent proprietor - now the respondent - replied with a letter dated 5 July 2010.

VII. On 21 November 2012 the Board issued a summons to attend oral proceedings. In a communication dated 18 February 2013 the Board set out its preliminary assessment of the case.

VIII. Oral proceedings were held before the Board on 25 April 2013 in the presence of all parties.

IX. The arguments of the appellant can be summarised as follows:

Art. 54 EPC

D1 disclosed in example 2 a polyester meeting all the requirements of operative claim 1 with the exception of the Ti content (73 ppm according to D1). However D1 taught that an amount of 0.01 wt.-% Ti was also permissible, which if applied to example 2 of D1 would result in a Ti content of 7.3 ppm.

Since example 2 of D1 had to be seen as representative of the teaching of D1, it was permissible to combine the teaching of the example with the information contained in the description. Such a combination did not amount to multiple selections.

D2 disclosed explicitly a polyester with all features of the operative claim with the exception of the melting point. The melting point was however an inherent feature of the polyester, resulting directly from the constitution thereof, as was acknowledged in the patent in suit.

Consequently the subject-matter claimed was not novel.

Art. 56 EPC

D2 related to the preparation of polyesters for the production of fibres, and disclosed that stable and colour neutral fibres were obtained when the polyesters contained low levels of Ti (1-10 ppm).

Since none of the examples had been shown to correspond to the claimed subject-matter, the patent in suit contained no evidence of any technical effect related to the melting point, which feature was not disclosed in D2. Accordingly the objective technical problem to be solved had to be formulated as to provide alternative polymers.

This problem was solved by specifying the melting range. As the melting range of the polymer of D2 was simply an inherent feature, no technical effect was, or indeed could be associated therewith. The subject-matter claimed was therefore obvious when starting from D2.

Alternatively, starting from D1 as the closest prior art, which document *inter alia* referred to the use of polyesters in binding fibres (page 9), example 2 disclosed suitable fibres with an indication that the Ti content was too high. The subject-matter claimed differed from the disclosure of D1 by the Ti content. D1 itself provided an incentive to reduce the Ti content in order to improve the colour. D2 also taught that a reduced Ti content lowered the thermal decomposition, so reducing yellowing and hence resulted in better colour properties.

Therefore the claimed subject-matter was obvious in the light of D1 alone or on the basis of the combination of D1 and D2.

X. The arguments of the respondent can be summarised as follows:

Art. 54 EPC

A disclosure of a catalyst system containing Ti in an amount of 1-35 ppm based on the final product could not be unambiguously and directly derived from D1. The skilled person would not simply apply the amount of less than 0.5 wt.-% of Ti catalyst to example 2 of D1 because example 1 of D1 showed that using a different catalyst in a lower amount provided a polymer having completely different properties of viscosity and melting point.

D2 also did not anticipate the claimed subject-matter. All the examples of D2 employed ethylene glycol as the diol and were hence outside the scope of the claims. The general teaching also could not provide the necessary disclosure as it was extremely broad in terms of the amounts and nature of the components and extended to monomers that were not in the scope of operative claim 1. D2 also did not disclose the required melting point. No experimental evidence had been submitted in this respect.

Art. 56 EPC

Starting from D2 the problem to be solved was to provide an alternative polyester suitable for fibre production. D2 did not disclose the required melting point or suggest the glycol component as claimed. The specified melting point range according to the patent in suit was central to the solution of the technical

problem. Hence one aspect of the problem of the patent was to provide polymers with thermal stability which were nevertheless processable.

On the basis that the problem to be solved was to provide alternative polyesters to those of D2, the examples as well as the experimental report of 18 November 2003 showed that the claimed materials had the required properties and that the problem as set out in the patent in suit had been solved by the claimed subject-matter.

There was no teaching in D2 how to modify the examples to obtain polyesters with the claimed melting properties whilst maintaining the colour properties. D2 did not suggest or disclose in particular reducing the Ti concentration in order to obtain improved colour while also obtaining higher melt stability.

Starting from D2, the skilled person would not have considered the teaching of D1 since D1 related to the use of Ti catalyst in a much higher amount - outside the claimed range. There was no teaching in D1 to use a particular Ti catalyst and to reduce the Ti content to obtain improved colour whilst simultaneously obtaining higher melt stability.

Starting, in the alternative, from D1, example 2 as the closest prior art, the data submitted in November 2003 showed that employing the catalyst quantity specified in the operative claims resulted in better colour. Hence the technical problem starting from D1 was to obtain an improvement in the colour properties of the polyesters. There was no incentive in the prior art to

modify the catalyst content in order to solve the problem of improving the colour properties. The claimed subject-matter was not obvious in the light of D1 either.

XI. The appellant (opponent) requested that the decision under appeal be set aside and that the European patent No. 1 200 505 be revoked.

XII. The respondent (patent proprietor) requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Article 54 EPC*

2.1 D1 discloses a process for the production of a modified polyalkylene terephthalate from terephthalic acid and a glycol in which up to 50 mole % of the terephthalic acid residue has been replaced by an aliphatic dicarboxylic acid residue of four to twelve carbon atoms, the aliphatic dicarboxylic acid being esterified with the glycol in a molar ratio of from 1:1.2 to 1:1.8 up to a degree of esterification of 90 to 95 mole % based on the aliphatic dicarboxylic acid; the mixture so obtained is mixed with a transesterification mixture obtained in a usual way, and polycondensation is carried out in a known way (claim 1). According to the description of D1, page 7, third paragraph, the polycondensation is usually carried out in the presence of suitable polycondensation catalysts such as

compounds of antimony, germanium or titanium, in an amount of 0,01 to 0,2 wt.% based on the polyester.

In example 2 of D1 the preparation of a polyester composition in two stages is described. The polyester is based on butanediol and terephthalic acid and has a melting point of 160°C. According to the - undisputed - submission of the patent proprietor (letter of 2 November 2005, page 3) the resulting polymer has a titanium content of 73 ppm which is above the maximum permitted according to operative claim 1 (1 to 35 ppm).

2.2 The appellant argued that it was permissible to combine the disclosure of example 2 with the amount of Ti disclosed in the description of D1 in particular with the lowest limit of 0.01 wt.% of the indicated range, in order to arrive at subject-matter falling within the scope of the claims. This argument fails for two reasons.

2.2.1 First, the combination of one particular example with one particular value of a range amounts to a multiple selection of features, which is not a clear and unambiguous disclosure and therefore does not lead to a lack of novelty (See "Case Law", Sixth Edition (2010) section I.C.4.2.3). Example 2 discloses a specific embodiment and the description is not a repository from which elements can be exchanged freely in order to generate a disclosure of subject-matter which, whilst within the general scope of the document, is not *per se* disclosed.

2.2.2 Secondly, in making this argument the appellant is in effect arguing that when employing different quantities of catalyst the properties of the polyester, in particular the melting point, would nevertheless remain unchanged. No evidence has been advanced to support this position which is contrary to common chemical knowledge.

Consequently it is concluded that D1 does not disclose the subject-matter of claim 1.

As claims 10 and 23 depend on the subject-matter of claim 1 this conclusion applies to those claims as well.

2.3 D2 discloses according to claim 1 a process for preparing thermostable, colour neutral, antimony free polyesters by esterification of aromatic dicarboxylic acids or transesterification of lower aliphatic esters of aromatic dicarboxylic acids with aliphatic diols followed by polycondensation, which transesterification is carried out in the presence of 20 to 120 ppm, based on the metal, of a catalyst compound and the polycondensation is carried out without the addition of antimony, in the presence of 1 to 10 ppm of titanium, which is added in the form of a titanium compound.

Although according to claim 8 the diol can consist of a mixture of different (cyclo)aliphatic diols of different carbon chain lengths, there are no examples of such embodiments. On the contrary, the examples disclose exclusively polyesters wherein the diol component is ethylene glycol, i.e. 100 mole % ethylene glycol.

Accordingly neither the description nor the examples of D2 disclose a polyester according to the operative claims.

2.4 In view of the above, the subject-matter of the present independent claims is not anticipated by the cited prior art. The requirements of Art. 54 EPC are therefore satisfied.

3. *Article 56 EPC*

3.1 The parties as well as the opposition division agreed that D2 was the closest prior art document. D2 discloses that the polyesters can be employed in the production of, *inter alia*, fibres (page 2 line 19). D2 aims at a process for the preparation of polyesters while avoiding the use of antimony (D2 page 2 lines 35-39), which, according to D2, is expensive and can lead to discoloration in further processing and exerts an influence on the spinning properties.

3.2 The patent in suit relates to polyesters having a controlled melting point and fibres, in particular binder fibres, formed therefrom. Binder fibres can be employed for the production of articles from nonwoven fabrics without the need for water based adhesives (col. 1 lines 50-53).

According to paragraph [0007] of the patent in suit, the problem addressed was to provide polyesters which could be formed into products that could repeatedly withstand temperatures of up to 110°C without losing bond integrity. Paragraph [0007] further states that by

controlling the nature of the catalyst system copolyesters having improved colour were obtained.

3.3 There is no evidence that the problems as set out in the patent in suit are solved by the claimed subject-matter, since none of the examples of the patent in suit, or those submitted during the examination procedure (letter of 18 November 2003) fall within the scope of claim 1, let alone provide a comparison with the closest prior art D2.

3.3.1 Thus in example 1 of the patent in suit a number of embodiments are described:
That reported at col. 19 lines 5-26 has a content of Ti (83 ppm) which is outside the scope of the claims.

- For the polyesters referred to at col. 19 lines 26-30, the melting points are not disclosed.
- For the polybutylene terephthalate (PBT) copolyester reported at paragraph [0070] there is no indication of the Ti content.

Therefore, of the embodiments of example 1, one clearly falls outside the scope of claim 1, and the others do not fall clearly within the claimed scope.

3.3.2 In the case of example 2, the only information given about the PBT material is that this was "similar to that described in example 1". As noted above, example 1 discloses a plurality of polyesters. Example 2 neither specifies to which polyester of example 1 the PBT was "similar", nor is the nature or extent of the "similarity" elucidated.

3.3.3 In Example 3 in the first part a binder fibre from example 1 is employed, without identifying the polyester used. In the second part a binder fibre "similar" to that of example 2 is employed, again with no information about the nature of the "similarity".

3.3.4 In Example 4 reference is made to a fibre made from a melt containing 90 wt.% PET copolyester modified with 3.5 mole % cyclohexanedimethanol and 10 wt.% PBT copolyester modified with 42 mole % adipic acid. There is no indication of the Ti content or melting point of said fibre.

3.3.5 Example 5 reports the preparation of a polyester "using the general procedure of example 1". In addition to the vagueness concerning the preparation of the polyester, there is no indication of the Ti content of the polyester.

3.3.6 Similarly in example 6 there is no indication of which "unicomponent binder fibre from example 1" is employed. Example 6 refers in the final sentence to test samples produced with a poly(ethylene naphthalene dicarboxylic acid) (PEN) fibre, however neither the Ti content nor melting point of said PEN fibre is reported.

3.3.7 The examples submitted with the letter of 18 November 2003 do not specify the melting point of the polyesters there described.

3.3.8 The argument of the respondent that, despite the lack of explicit data, it had to be assumed that the various polyesters met the requirements of operative claim 1 is supported by no evidence, nor has the respondent

demonstrated that there is any other information in the available data which would necessarily lead to such a conclusion.

3.4 As it has not been shown that any of the materials of the examples meet the requirements of the claims there is no evidence for any technical effect associated with the claimed subject-matter. Accordingly the only technical problem that can be formulated with respect to D2 is to provide further polyesters.

3.5 The technical problem was solved with respect to the teaching of D2 by specifying a range for the melting point and by restricting the content of ethylene glycol in the glycol component compared to the teaching of D2.

Both these features are however conventional in the polyester art as demonstrated by D1 which discloses in example 2 a polyester with a melting point of 160°C, and in which polyester the diol is exclusively 1,4-butanediol, so that both the melting point and the glycol content fall within the claimed range.

Accordingly the subject-matter claimed represents an obvious solution to the problem of providing a further polyester based on the disclosure of D2 and no inventive step can be recognised with respect to the teaching of D2.

3.6 Starting in the alternative from D1 as the closest prior art, the modification, i.e. the specified Ti content compared to D1 has not been shown to give rise to any technical effect. Consequently the technical problem to be solved with respect to D1 can also be

formulated only as the provision of a further polyester. The modification compared to the examples of D1, i.e. reducing the amount of Ti is however within the framework of the teaching of D1 as disclosed at page 6, line 25 with respect to the transesterification reaction.

Consequently even if, in the alternative D1 were to be considered as the closest prior art no different conclusion regarding obviousness would be reached compared to starting from D2.

3.7 The subject-matter of claim 1 therefore does not meet the requirements of Art. 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar The Chairwoman

E. Goergmaier B. ter Laan