Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [ ] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 3 December 2007

Case Number: T 0143/05 - 3.3.03

Application Number: 99941997.1

Publication Number: 1123350

IPC: C08L 69/00

Language of the proceedings: EN

Title of invention:
Polycarbonate resin blends containing titanium dioxide

Applicant:
GENERAL ELECTRICAL COMPANY

Opponent:
-

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 54, 56, 84, 123(2)

Keyword:
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0143/05 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 3 December 2007

Appellant: GENERAL ELECTRIC COMPANY
1 River Road
Schenectady, NY 12345 (US)

Representative: Modiano, Micaela Nadia
Modiano Josif Pisanty & Staub Ltd
Thierschstraße 11
D-80538 München (DE)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 24 August 2004 refusing European application No. 99941997.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: R. Young
Members: C. Idez
H. Preglau

Summary of Facts and Submissions

I. European patent application No. 99 941 997.1, filed as PCT/US99/17567 on 3 August 1999 in the name of General Electric Company, published under No. WO-A-00/24828 (EP publication No. 1 123 350) on 4 May 2000 and claiming the priority of the US patent application No. 09/177946 filed on 23 October 1998 was refused by a decision of the Examining Division dated 24 August 2004.

II. The decision of the Examining Division was based on a set of Claims 1 to 11 submitted with letter dated 10 April 2001. Independent Claims 1 and 11 read as follows:

"1. A streak resistant, injection moldable thermoplastic resin composition comprising:
(a) an aromatic polycarbonate resin,
(b) a rubber modified graft copolymer comprising a discontinuous rubber phase dispersed in a continuous rigid thermoplastic phase, wherein at least a portion of the rigid thermoplastic phase is chemically grafted to the rubber phase,
(c) a rigid copolymer, and
(d) a surface modified raw or treated titanium dioxide having a first organic surface coating and being free from additional coatings.

11. A method of injection molding the composition of claim 1, said method resulting in molded articles having essentially no streaking."

Claims 2 to 10 were dependent claims.

III. The Examining Division rejected the application on the grounds that it did not meet the requirements of Article 56 EPC in view of the combination of document D4 (EP-A-0 771 852) taken as the closest state of the art with one of the documents D2 (JP-A-09 316 315 in form of an English language abstract), D3 (JP-A-09 048 911 in form of an English language abstract), D5 (R. Butler, "Limiting TiO_2-related degradation in engineering thermoplastics", Plastics Compounding, Nov/Dec. 1993, pages 44 and 46), or D6 (WO-A-80/00708).

IV. Notice of Appeal was filed on 28 October 2004 by the Appellant (Applicant) with simultaneous payment of the prescribed fee.
In the Statement of Grounds of Appeal filed on 13 December 2004, the Appellant essentially submitted that none of the documents D2, D3 or D5 disclosed titanium dioxide having a single coating. Furthermore none of the documents D2, D3, D5, or D6 were concerned with the problem of streaking. Thus, the skilled person would not start from D4 and use one the titanium dioxide disclosed in D2, D3, D5 or D6 for reducing streaking.

V. A communication was issued on 19 March 2007 by the Board, in which the Board gave its preliminary view concerning issues under Articles 84, 54 and 56 EPC. In this communication the Board referred *inter alia* to the further documents:
D7: WO-A-99/51671;

D9: EP-A-0 924 248; and

D12: DE-A-195 30 200.

VI. With its letter dated 27 July 2007, the Appellant submitted a new set of Claims 1 to 10.

VII. In a communication issued on 5 September 2007, the salient issues to be discussed at the oral proceedings scheduled to take place on 3 December 2007 were identified by the Board as being the allowability under Article 123(2) EPC of Claim 1 of the set of Claims filed with letter dated 27 July 2007, the question as whether Claims 1, 6 and 9 of that set of claims met the requirements of Article 84 EPC, the question of novelty in view of documents D7 and D9, and the question of inventive step taking D6 as the closest state of the art.

VIII. With its letter dated 2 November 2007, the Appellant submitted a new main request, and two auxiliary requests. Claim 1 of the main request read as follows:

"A streak resistant, injection moldable thermoplastic resin composition comprising a blend of:
(a) from 50 to 81 parts by weight of an aromatic polycarbonate resin,
(b) from 4 to 30 parts by weight of a rubber modified graft copolymer comprising a discontinuous rubber phase dispersed in a continuous rigid thermoplastic phase, wherein at least a portion of the rigid thermoplastic phase is chemically grafted to the rubber phase, wherein said rubber phase comprises a polybutadiene polymer or a poly(styrene-butadiene) copolymer and the rigid thermoplastic phase comprises structural units derived from one or more monomers selected from vinyl

aromatic monomers and monoethylenically unsaturated nitrile monomers,
(c) from 2 to 15 parts by weight of a rigid copolymer formed from at least two ethylenically unsaturated monomers selected from the group consisting of styrene, alpha-methylstyrene, dibromostyrene, methylmethacrylate, acrylonitrile, maleic anhydride, maleimide, N-phenylmaleimide and acrylamide,
(d) from 0.3 to 10 parts by weight of a surface modified titanium dioxide having a first organic coating and being free from additional coatings, said first coating comprising a coating selected from the group consisting of polyol and polysiloxane, (e) from 0.2 to 1 parts by weight of a fluoropolymer, and
(f) from 5 to 15 parts by weight of an organophosphate flame retardant, where the above ranges are based on 100 parts by weight of the thermoplastic resin composition."

Claim 1 of the first auxiliary request and of the second auxiliary request differed from Claim 1 of the main request in that the coating on the titanium dioxide had been restricted to dimethylpolysiloxane and polyol (first auxiliary request), and to polyol (second auxiliary request).

In its letter the Applicant essentially submitted that neither D7 nor D9 were novelty destroying for the claimed subject-matter and that the claimed subject involved inventive step starting from D6 as closest state of the art.

IX. Oral proceedings were held on 3 December before the Board.

Following considerations from the Board concerning clarity of Claim 1 of the main request submitted with letter dated 2 November 2007 in view of the fact that no distinction could be made in the claimed composition between the rigid phase of component (b), the rigid copolymer (c) and the copolymer present in the fluoropolymer component (f) (cf. page 21, lines 1 to 2 of the application in suit) and the question of inventive step in relation to the use of polysiloxane coated titanium dioxide in view of document D6, the Appellant withdrew the requests submitted with its letter dated 2 November 2007 and submitted a new set Claims 1 to 6 as sole request. Claim 1 thereof reads as follows:

"A method for making a streak resistant, injection moldable thermoplastic resin composition comprising combining:
(a) from 50 to 81 parts by weight of an aromatic polycarbonate resin,
(b) from 4 to 30 parts by weight of a rubber modified graft copolymer comprising a discontinuous rubber phase dispersed in a continuous rigid thermoplastic phase, wherein at least a portion of the rigid thermoplastic phase is chemically grafted to the rubber phase, wherein said rubber phase comprises a polybutadiene polymer or a poly(styrene-butadiene) copolymer and the rigid thermoplastic phase comprises structural units derived from one or more monomers selected from vinyl aromatic monomers and monoethylenically unsaturated nitrile monomers,

(c) from 2 to 15 parts by weight of a rigid copolymer formed from at least two ethylenically unsaturated monomers selected from the group consisting of styrene, alpha-methylstyrene, dibromostyrene, methylmethacrylate, acrylonitrile, maleic anhydride, maleimide,
N-phenylmaleimide and acrylamide,
(d) from 0.3 to 10 parts by weight of a surface modified titanium dioxide having a first organic coating and being free from additional coatings, said first coating comprising a coating of polyol,
(e) from 0.2 to 1 parts by weight of a fluoropolymer masterbatch, and
(f) from 5 to 15 parts by weight of an organophosphate flame retardant, where the above ranges are based on 100 parts by weight of the thermoplastic resin composition;
and mixing the above components (a) to (f) under conditions suitable for the formation of a blend of the components."

Claims 2 to 6 are dependent claims.

In that respect, the Appellant pointed out that document D6 taught only the use of a silicone oil for coating titanium dioxide, and that, the subject-matter of Claims 1 to 6 must, therefore, be considered as inventive.

X. The Appellant requested that the decision be set aside and that a patent be granted in the following version: Claims 1 to 6 of the sole request, filed during the oral proceedings, and remittal of the case to the first instance for adaptation of the description.

Reasons for the Decision

1. The appeal is admissible.

2. *Wording of claims 1 to 6 of the sole request submitted by the Appellant at the oral proceedings before the Board.*

2.1 *Article 123(2) EPC*

2.1.1 Claim 1 finds its support on page 3, lines 10 to 19 read in combination with page 25, lines 18 to 21, with original Claim 14, with page 24, line 3, and with page 17, lines 2 to 6.

2.1.2 Claim 2 is based on original Claim 3, Claims 3 and 4 are supported by page 3, lines 10 to 19, Claim 5 finds its support at page 24, lines 12 to 14 of the application a originally filed, and Claim 6 is based on original Claim 25.

2.1.3 Thus, Claims 1 to 6 meet the requirements of Article 123(2) EPC.

2.2 *Article 84 EPC*

2.2.1 While it was questionable, in the Board's view, how distinction could be made in the polycarbonate composition according to Claim 1 of the main request submitted with letter dated 2 November 2007 between the copolymer of the hard phase of component (b), the rigid copolymer (c), and the copolymer which might be present

in component (f) (cf. Section IX, above), it is however evident that the starting components (a) to (f) to be mixed and blended according to Claim 1 of the sole request submitted at the oral proceedings before the Board can unambiguously be distinguished from each other before combining them so that no unclarity in their respective and relative amounts can arise.

2.3 Thus, the Board is satisfied that the requirements of Article 84 EPC are met by all the claims.

3. *Novelty*

3.1 No objection of lack of novelty has been raised by the Examining Division against Claim 1 of the set of claims submitted with the letter dated 10 April 2001 in view of the prior art relied on by the Examining Division in the course of the examining procedure i.e. documents D1 (JP-A-08 012 869 in form of an English language abstract) to D6. The Board sees no reason to depart from that view.

3.2 Since the subject-matter of Claim 1 has been restricted in comparison to the subject-matter of Claim 1 of the set of claims submitted with letter dated 10 April 2001, the Board comes to the conclusion that the subject-matter of Claim 1 must be considered as novel over D1 to D6.

3.3 While in the written phase of the appeal proceedings, objections of lack of novelty have been raised by the Board against the subject-matter of the claims then on file in view of documents D7 and D9 (both belonging to the state of the art according to Article 54(3)(4) EPC),

introduced by the Board, the Board however notes that none of these documents discloses either the preparation of a composition by mixing and blending the components (a) to (f) in the respective amounts defined in present Claim 1 or the use of titanium dioxide coated with a first coating of polyol as required by Claim 1.

3.4 Consequently, the Board comes to the conclusion that the subject-matter of Claim 1 must be considered as novel. The same conclusion applies evidently to the subject-matter of Claims 2 to 6.

4. *Closest state of the art, the technical problem*

4.1 The application in suit relates to polycarbonate resin blends containing titanium dioxide and their use in injection molding.

4.2 Such compositions are known from document D6. D6 refers to polycarbonate compositions comprising up to 5% based on the polycarbonate resin of a pigment such as titanium dioxide coated with a methyl hydrogen silicone fluid (Claims 4 and 5).

4.3 The injection molded articles obtained from these compositions are submitted to Streak Test which includes a visual examination for surface degradation such as streaking (page 6, lines 1 to 4). According to Table VI on page 14 of D6, the compositions comprising such a coated titanium dioxide exhibit good values in the Steak test (cf. Samples W', X', Y' and Z').

4.4 Although D6 does not expressly mention the use of components (b), (c), (e) and (f) according to present Claim 1, it nevertheless indicates that other materials can also be employed with the aromatic polycarbonate (page 5, lines 18 to 19).

4.5 As can be deduced from the application in suit, its aim is to provide polycarbonate compositions containing titanium dioxide which could be injection molded into articles with low streaking.

4.6 Thus, starting from D6 the technical problem might be seen in the provision of further polycarbonate compositions comprising coated titanium dioxide and enabling the production of injection molded articles exhibiting low streaking.

4.7 According to the patent in suit, this technical problem is solved by preparing polycarbonate blends as defined in Claim 1 using a titanium dioxide having a first coating of polyol.

4.8 In view of Examples 1 to 5 of the application in suit which show that injection molded articles obtained from the blends prepared according to Claim 1 exhibit a low streaking, it is credible to the Board that the claimed measures provide an effective solution to the technical problem.

5. *Inventive step*

5.1 It remains to be decided whether the proposed solution was obvious in view of the relevant prior art, i.e. D1, D2, D3, D4, D5, D6, and D12.

5.2 In that respect, the Board observes that only document D3 discloses a polycarbonate composition comprising a titanium dioxide which has been contacted with a polyol. The Board, however, notes that D3 is totally silent on the problem of streaking, so that it cannot give any hint to the solution of the technical problem.

5.3 Nor could documents D1, D2, D5, and D6 lead to the solution proposed by the application in suit, since they only relate to polycarbonate compositions comprising a titanium dioxide the surface of which has been treated either with an inorganic compound (D1) or by a silicon resin (D2, D5, D6).

5.4 The same conclusion applies to document D4 which is totally silent on the use of a titanium dioxide in the polycarbonate compositions disclosed therein, and to document D12, which, although relating to polycarbonate compositions comprising titanium dioxide (cf. Claim 11, page 7, lines 37 to 38; page 9, lines 29 to 32; Examples 4, 5, 8 and 9) does not even mention the presence of a coating on the titanium dioxide.

5.5 Consequently, the subject-matter of Claim 1, and by the same token that of Claims 2 to 6 involves an inventive step (Article 56 EPC).

6. It thus follows from the above, that the request of the Appellant is allowable, and that the decision under appeal must be set aside.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to grant a patent on the basis of Claims 1 to 6 of the sole request filed during the oral proceedings and after any necessary consequential amendment of the description.

The Registrar: The Chairman:

E. Görgmaier R. Young