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Datasheet for the decision of 24 April 2018

Case Number: T 0137/15 - 3.3.03

Application Number: 05741587.9

Publication Number: 1757634

IPC: C08G64/18, G03G5/05

Language of the proceedings: EN

Title of invention:
POLYCARBONATE RESIN AND ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER USING SAME

Patent Proprietor:
IDEMITSU KOSAN CO., LTD.

Opponent:
SABIC Global Technologies B.V.

Relevant legal provisions:
EPC Art. 123(2), 54, 56, 111(1), 112(1)(a)

Keyword:
Amendments - allowable (yes)
Novelty - (yes)
Inventive step - unexpected improvement shown
Referral to the Enlarged Board of Appeal - (no)

Decisions cited:
G 0002/10, G 0003/98, T 0615/95, T 0181/82

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Case Number: T 0137/15 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 24 April 2018

Appellant I: (Patent Proprietor)	IDEMITSU KOSAN CO., LTD. 1-1, Marunouchi 3-chome, Chiyoda-ku Tokyo 100-8321 (JP)
Representative:	Gille Hrabal Brucknerstrasse 20 40593 Düsseldorf (DE)
Appellant II: (Opponent)	SABIC Global Technologies B.V. Plasticslaan 1 4612 PX Bergen op Zoom (NL)
Representative:	Modiano, Micaela Nadia Modiano Josif Pisanty & Staub Ltd Thierschstrasse 11 80538 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 24 November 2014 concerning maintenance of the European Patent No. 1757634 in amended form.**

Composition of the Board:

Chairman	D. Semino
Members:	F. Rousseau
	C. Brandt

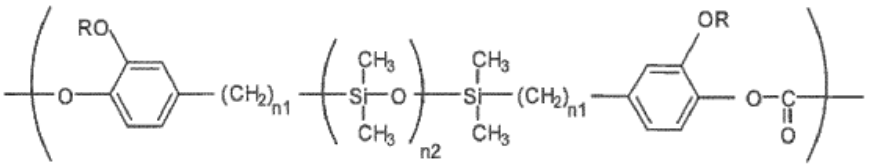
Summary of Facts and Submissions

I. The appeals of the patent proprietor and the opponent are against the interlocutory decision of the opposition division according to which European patent No. 1 757 634 as amended according to the documents of the first auxiliary request and a description adapted thereto, both submitted on 28 October 2014 during the oral proceedings, met the requirements of the EPC. The decision was also based on a main set of claims submitted with letter of 28 August 2014.

II. Claims 1 and 2 of the main request read as follows:

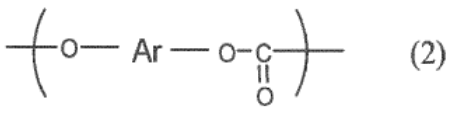
"1. A polycarbonate resin comprising

(i) a repetitive unit represented by the following Formula (1)



(1)

wherein R represents an alkyl group having 1 to 3 carbon atoms; n1 is an integer of 2 to 4; and n2 is an integer of 1 to 200; and
(ii) a repetitive unit represented by the following Formula (2):



(2)

wherein

a) Ar represents a divalent aromatic group obtained from a mixture of two or more kinds of bisphenol compounds, selected from

bis(4-hydroxyphenyl)methane, 1,1-bis(4-hydroxyphenyl)ethane, 1,2-bis(4-hydroxyphenyl)ethane, 2,2-bis(4-hydroxyphenyl)propane, 2,2-bis(3-methyl-4-hydroxyphenyl)butane, 2,2-bis(4-hydroxyphenyl)butane, 2,2-bis(4-hydroxyphenyl)octane, 4,4-bis(4-hydroxyphenyl)heptane, 1,1-bis(4-hydroxyphenyl)-1,1-diphenylmethane, 1,1-bis(4-hydroxyphenyl)-1-phenylethane, 1,1-bis(4-hydroxyphenyl)-1-phenylmethane, bis(4-hydroxyphenyl) ether, bis(4-hydroxyphenyl) sulfide, bis(4-hydroxyphenyl) sulfone, 1,1-bis(4-hydroxyphenyl)cyclopentane, 1,1-bis(3-methyl-4-hydroxyphenyl)cyclopentane, 1,1-bis(4-hydroxyphenyl)cyclohexane, 2,2-bis(3-methyl-4-hydroxyphenyl)propane, 2,2-bis(3-phenyl-4-hydroxyphenyl)propane, 2-(3-methyl-4-hydroxyphenyl)-2-(4-hydroxyphenyl)-1-phenylethane, bis(3-methyl-4-hydroxyphenyl) sulfide, bis(3-methyl-4-hydroxyphenyl) sulfone, bis(3-methyl-4-hydroxyphenyl)methane, 1,1-bis(3-methyl-4-hydroxyphenyl)cyclohexane, 4,4'-biphenol, 3,3'-dimethyl-4,4'-biphenol, 3,3'-diphenyl-4,4'-biphenol, 3,3'-dichloro-4-4'-biphenol, 3,3'-difluoro-4,4'-biphenol, 3,3',5,5'-tetramethyl-4-4'-biphenol, 2,7-naphthalenediol, 2,6-naphthalenediol, 1,4-naphthalenediol, 1,5-naphthalenediol, 2,2-bis(2-methyl-4-hydroxyphenyl)propane, 1,1-bis(2-butyl-4-hydroxy-5-methylphenyl)butane, 1,1-bis(2-tert-butyl-4-hydroxy-3-methylphenyl)ethane, 1,1-bis(2-tert-butyl-4-hydroxy-5-methylphenyl)propane, 1,1-bis(2-tert-butyl-4-hydroxy-5-methylphenyl)butane, 1,1-bis(2-tert-butyl-4-hydroxy-5-methylphenyl)isobutene, 1,1-bis(2-tert-butyl-4-hydroxy-5-methylphenyl)heptane, 1,1-bis(2-tert-butyl-4-hydroxy-5-methylphenyl)-1-phenylmethane, 1,1-bis(2-tert-amyl-4-hydroxy-5-methylphenyl)butane, bis(3-chloro-4-hydroxyphenyl)methane, bis(3,5-dibromo-4-hydroxyphenyl)methane, 2,2-bis(3-chloro-4-hydroxyphenyl)propane, 2,2-bis(3-fluoro-4-hydroxyphenyl)propane, 2,2-bis(3-bromo-4-hydroxyphenyl)propane, 2,2-bis(3,5-difluoro-4-hydroxyphenyl)propane, 2,2-bis(3,5-dichloro-4-hydroxyphenyl)propane, 2,2-bis(3,5-dibromo-4-

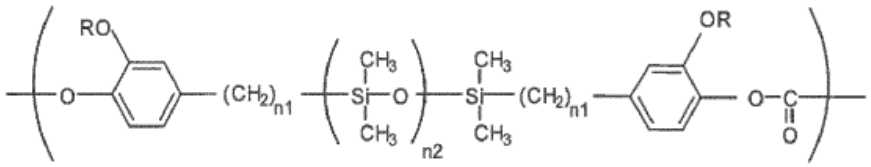
hydroxyphenyl)propane, 2,2-bis(3-bromo-4-hydroxy-5-chlorophenyl)propane, 2,2-bis(3,5-dichloro-4-hydroxyphenyl)butane, 2,2-bis(3,5-dibromo-4-hydroxyphenyl)butane, 1-phenyl-1,1-bis(3-fluoro-4-hydroxyphenyl)ethane, bis(3-fluoro-4-hydroxyphenyl) ether, 3,3'-difluoro-4,4'-dihydroxybiphenyl, 1,1'-bis(3-cyclohexyl-4-hydroxyphenyl)cyclohexane, 2,2-bis(4-hydroxyphenyl)hexafluoropropane, 2,2-bis(3-phenyl-4-hydroxyphenyl)propane, 1,1-bis(3-phenyl-4-hydroxyphenyl)cyclohexane, bis(3-phenyl-4-hydroxyphenyl) sulfone, 4,4'-(3,3,5-trimethylcyclohexylidene)diphenol, 4,4'-[1,4-phenylenebis(1-methylethylidene)]bisphenol, 4,4'-[1,3-phenylenebis(1-methylethylidene)]bisphenol, 9,9-bis(4-hydroxyphenyl)fluorene, 9,9-bis(3-methyl-4-hydroxyphenyl)fluorene, end-phenolpolydimethylsiloxane and α-trimethylsiloxy-ω-bis{3-(2-hydroxyphenyl)propyldimethylsiloxy}-methylsiloxy-2-dimethylsilylethyl-polydimethylsiloxane; or

b) Ar represents a divalent aromatic group obtained from bisphenol compounds, selected from bis(4-hydroxyphenyl)methane, 1,1-bis(4-hydroxyphenyl)ethane, 1,2-bis(4-hydroxyphenyl)ethane, 2,2-bis(3-methyl-4-hydroxyphenyl)butane, 2,2-bis(4-hydroxyphenyl)butane, 2,2-bis(4-hydroxyphenyl)octane, 4,4-bis(4-hydroxyphenyl)heptane, 1,1-bis(4-hydroxyphenyl)-1,1-diphenylmethane, 1,1-bis(4-hydroxyphenyl)-1-phenylethane, 1,1-bis(4-hydroxyphenyl)-1-phenylmethane, bis(4-hydroxyphenyl) ether, bis(4-hydroxyphenyl) sulfide, bis(4-hydroxyphenyl) sulfone, 1,1-bis(4-hydroxyphenyl)cyclopentane, 1,1-bis(3-methyl-4-hydroxyphenyl)cyclopentane, 1,1-bis(4-hydroxyphenyl)cyclohexane, 2,2-bis(3-methyl-4-hydroxyphenyl)propane, 2,2-bis(3-phenyl-4-hydroxyphenyl)propane, 2-(3-methyl-4-hydroxyphenyl)-2-(4-hydroxyphenyl)-1-phenylethane, bis(3-methyl-4-hydroxyphenyl) sulfide, bis(3-methyl-4-hydroxyphenyl) sulfone, bis(3-methyl-4-hydroxyphenyl)methane, 1,1-bis(3-methyl-4-hydroxyphenyl)cyclohexane, 4,4'-biphenol, 3,3'-dimethyl-4,4'-biphenol, 3,3'-diphenyl-4,4'-biphenol, 3,3'-dichloro-4-4'-biphenol,

3,3'-difluoro-4,4'-biphenol, 3,3',5,5'-tetramethyl-4-4'-biphenol, 2,7-naphthalenediol, 2,6-naphthalenediol, 1,4-naphthalenediol, 1,5-naphthalenediol, 2,2-bis(2-methyl-4-hydroxyphenyl)propane, 1,1-bis(2-butyl-4-hydroxy-5-methylphenyl)butane, 1,1-bis(2-tert-butyl-4-hydroxy-3-methylphenyl)ethane, 1,1-bis(2-tert-butyl-4-hydroxy-5-methylphenyl)propane, 1,1-bis(2-tert-butyl-4-hydroxy-5-methylphenyl)butane, 1,1-bis(2-tert-butyl-4-hydroxy-5-methylphenyl)isobutene, 1,1-bis(2-tert-butyl-4-hydroxy-5-methylphenyl)heptane, 1,1-bis(2-tert-butyl-4-hydroxy-5-methylphenyl)-1-phenylmethane, 1,1-bis(2-tert-amyl-4-hydroxy-5-methylphenyl)butane, bis(3-chloro-4-hydroxyphenyl)methane, bis(3,5-dibromo-4-hydroxyphenyl)methane, 2,2-bis(3-chloro-4-hydroxyphenyl)propane, 2,2-bis(3-fluoro-4-hydroxyphenyl)propane, 2,2-bis(3-bromo-4-hydroxyphenyl)propane, 2,2-bis(3,5-difluoro-4-hydroxyphenyl)propane, 2,2-bis(3,5-dichloro-4-hydroxyphenyl)propane, 2,2-bis(3,5-dibromo-4-hydroxyphenyl)propane, 2,2-bis(3-bromo-4-hydroxy-5-chlorophenyl)propane, 2,2-bis(3,5-dichloro-4-hydroxyphenyl)butane, 2,2-bis(3,5-dibromo-4-hydroxyphenyl)butane, 1-phenyl-1,1-bis(3-fluoro-4-hydroxyphenyl)ethane, bis(3-fluoro-4-hydroxyphenyl) ether, 3,3'-difluoro-4,4'-dihydroxybiphenyl, 1,1'-bis(3-cyclohexyl-4-hydroxyphenyl)cyclohexane, 2,2-bis(4-hydroxyphenyl)hexafluoropropane, 2,2-bis(3-phenyl-4-hydroxyphenyl)propane, 1,1-bis(3-phenyl-4-hydroxyphenyl)cyclohexane, bis(3-phenyl-4-hydroxyphenyl) sulfone, 4,4'-(3,3,5-trimethylcyclohexylidene)diphenol, 4,4'-[1,4-phenylenebis(1-methylethylidene)]bisphenol, 4,4'-[1,3-phenylenebis(1-methylethylidene)]bisphenol, 9,9-bis(4-hydroxyphenyl)fluorene, 9,9-bis(3-methyl-4-hydroxyphenyl)fluorene, end-phenolpolydimethylsiloxane and α-trimethylsiloxy-ω-bis{3-(2-hydroxyphenyl)propyldimethylsiloxy}-methylsiloxy-2-dimethylsilylethyl-polydimethylsiloxane; and

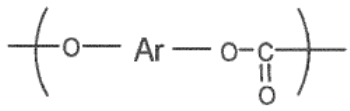
wherein the proportion of the repetitive unit represented by Formula (1) is 0.01 to 3.9 mass % based on the total amount of the repetitive unit represented by Formula (1) and the repetitive unit represented by Formula (2).

2. An electrophotographic photoreceptor in which a photosensitive layer is provided on a conductive substrate, wherein the above photosensitive layer comprises a polycarbonate resin comprising
(i) a repetitive unit represented by the following Formula (1):



(1)

wherein R represents an alkyl group having 1 to 3 carbon atoms; n1 is an integer of 2 to 4; and n2 is an integer of 1 to 200; and
(ii) a repetitive unit represented by the following Formula (2):



(2)

wherein Ar represents a divalent aromatic group and wherein the proportion of the repetitive unit represented by Formula (1) is 0.01 to 3.9 mass % based on the total amount of the repetitive unit represented by Formula (1) and the repetitive unit represented by Formula (2)."

III. The claims of the first auxiliary request corresponded to the claims of the main request to the exception that in claim 1 alternative b) for the definition of the divalent aromatic group Ar of the repetitive unit of formula (2) had been suppressed.

IV. The decision was taken having regard to the following documentary evidence amongst others:

D1: US 6,660,787 B2

D4: JP 2001-72847A and computer generated translation thereof
D9: EP 0 500 087 A1

V. According to the reasons for the contested decision the main request was not allowable, because the definition in claim 1 of the divalent aromatic group Ar for the repetitive unit of formula (2) contravened the requirements of Article 123(2) EPC as far as alternative b) was concerned. It was held referring to T 615/95 that the introduction of two lists of sizeable length for defining the units of formula (2) resulted in singling out a particular combination of specific meanings, the selective deletion of bisphenol A in list b) generating another invention. With respect to the claims of the first auxiliary request, neither the opponent, nor the opposition division had objections under Rule 80 EPC and Articles 123(2) and (3) EPC. Moreover, the objections that claim 1 lacked clarity and its subject-matter was anticipated by each of D1 and D4 were not found to be persuasive. As to inventive step, the closest prior art was represented by D9, in particular the disclosure of its Example 7 and not by D1 as submitted by the opponent, because D1 was silent on the technical effect of improving abrasion resistance. Having regard to the Examples and Comparative Example 2 contained in the patent in suit, the latter being almost identical to Example 7 of D9, the problem successfully solved over that prior art by the subject-matter of claim 1 or claim 2 of the first auxiliary request was the provision of a polycarbonate copolymer with increased abrasion resistance or of an electrophotographic photoreceptor comprising in the photosensitive layer a polycarbonate copolymer with increased abrasion resistance. The modification to be operated in D9 to arrive at the polycarbonate resin

defined either in claim 1 or in claim 2 was not obvious from D9 alone or in view of D1 or D4, which were not directed to the same or a similar purpose or even the same effect as the present invention. The subject-matter of claims 1 and 2 involved therefore an inventive step.

VI. Appeals against that decision were lodged by the patent proprietor and by the opponent.

VII. The opponent submitted with the statement setting out the grounds of appeal the following items of evidence:

D4d: man made translation of JP2001-72847A
D12: JP2000-280414A
D12a: machine translation of D12.

VIII. A communication of the Board of 15 March 2018 sent in preparation of oral proceedings was issued, which oral proceedings took place on 24 April 2018.

IX. Although having been duly summoned the opponent did not attend the oral proceedings, as announced with letter of 22 March 2018. According to Rule 115(2) EPC and Article 15(3) RPBA, the proceedings were continued without that party.

X. As far as relevant to the present decision, the submissions of the opponent, as far as the main request is concerned, can be summarized as follows:

Allowability of the amendments

(a) The amendment which consisted in defining a numerical range of 0.01 to 3.9 mass % for the amount of repeating units (1) based on a general

(0.0001 and 0.30 mass ratio) and a preferred range (0.005 to 0.039 mass ratio) both disclosed in paragraph [0029] of the application as filed was in violation of Article 123(2) EPC, because the established case law with respect to forming a range by combination of end-points of disclosed ranges did not apply in the present case, where the two ranges disclosed referred "*to two different viewpoints: one very general and one for the physical properties*".

(b) The application as filed did not make any distinction between bisphenol A and any other mentioned bisphenol, which meant that there was no basis in the original disclosure for not using bisphenol A when one bisphenol had to be employed and allowing the use of bisphenol A when two or more kinds of bisphenol compounds were employed. Accordingly, even if T 615/95 were not applicable in the present case the requirements of Article 123(2) EPC were not met.

Novelty over D12

(c) D12 which was to be admitted into the proceedings described all features of claim 1. D12 in particular described the use of 0.01 mol% of siloxane carbonate repeating units, which use when applied to the copolymers described in Examples 2, 3 and 4 of D12 would lead to an amount of siloxane carbonate repeating units expressed in mass% being in the range of 0.01 to 3.9 as defined in operative claim 1. Also Working Example 9 described with formula 22 a polymer with 0.02 mol% siloxane units. Starting from Working Example 2, which disclosed an amount of siloxane units outside the range of the

opposed patent and taking an amount of 0.01 mol%, only two changes had to be made to come to the claimed polycarbonate, namely using two bisphenols instead of one and selecting the second bisphenol from bisphenols used in the examples. That choice was not purposive and therefore could not confer novelty. Starting from Working Example 3 or Working Example 4, only two changes had to be made to come to the claimed polycarbonate units, namely a siloxane unit and a relative amount thereof in accordance with present claim 1. Accordingly, D12 anticipated the subject-matter of claim 1.

Novelty over D1

(d) Example 2 of D1 when read in conjunction with the passage at column 3, lines 3 to 17 of the same document took away the novelty of the resin of operative claim 1. More specifically, D1 taught in column 3, line 16 to use additional dihydroxy compounds such as those described in column 3, lines 5 to 15 of D1. The selection of additional bisphenol units made by the patent proprietor was non purposive and accordingly, novelty over D1 could not be acknowledged.

Novelty over D4

(e) A modification of preparation example 3-4 of D4 describing a polymer made of bisphenol A units and of an eugenol-capped polymethylsiloxane, which modification consisted in the use of two bisphenol compounds instead of one would be implicit in the light of paragraphs [0021] and [0023] of D4. Since the selection of the additional bisphenol units was non purposive novelty could not be acknowledged.

Inventive step

(f) Claim 1 would grant the patentee exclusive rights for the use of the claimed resins regardless of their application, although the resins of claim 1 not only fell within the general definition of the resins described in D1, D4 and D12, but resembled very closely the structure of the resins exemplified in those documents. Although D1, D4 and D12 "*did not mention the abrasion resistance of the claimed polycarbonate resins*" there was no reason to believe that their abrasion resistance would be significantly different from the abrasion resistance of the resins claimed in the opposed patent. Accordingly, D1, D4 or D12 should be considered as the closest prior art.

(g) The polycarbonate resins of D9, which differed from those of operative claim 1 solely by the absence of a -OR group in the siloxane unit, had a good abrasion resistance like the resins of the opposed patent as demonstrated in the examples and Table 1 of D9. However, the comparison made in the patent in suit with comparative examples 1 and 2 was not made with a polycarbonate resin based on the teaching of D9 that had the best possible abrasion resistance, but with a resin that was expected to have a lower abrasion resistance. Accordingly, there were no data available in the opposed patent providing a fair comparison with the data in D9, so that the problem solved over D9 by the subject-matter of claim 1 was the provision of an alternative to the known resins of D9. This alternative was obvious in the light of D1, D4 and D12 which described the same type of resins with

-OR groups in the siloxane unit. Accordingly, claim 1 lacked an inventive step over D1.

(h) Claim 2 referred to an electrophotographic photoreceptor with a photosensitive layer comprising a polycarbonate resin. Such photoreceptors were known from D9, in particular claim 16. In the absence of a comparison between the claimed subject matter and the best result of D9, there was no evidence that the problem to provide a photoreceptor with a polycarbonate layer exhibiting a better abrasion resistance was solved. Accordingly, the photoreceptor of claim 2 was a mere alternative to the known photoreceptors of D9. The choice of the resin defined in claim 2 was obvious in the light of D1, D4 or D12.

Request to refer questions to the Enlarged Board of Appeal

(i) The present case was analogous to the so-called inventions of selection, when a restricted range of numerical values for a specific parameter was selected from a broader known range. In case the Board were inclined to decide that claim 1 was novel over D1, D4 or D12, it was requested to refer the following question to the Enlarged Board of Appeal:

"In a case where a general chemical formula is claimed for a polymer in which several parts of the chemical formula can be selected from standard lists of possibilities and the prior art describes a polymer with a similar partly overlapping general formula with a partly overlapping list of possibilities for the same parts of the chemical formula and gives some specific examples outside

the scope of the claimed general formula, shouldn't it be required that a specific selection from the standard list of possibilities fulfills the threefold requirements of a selection invention and be in any case a purposeful selection to establish novelty?"

(j) In case the board were inclined not to consider D1, D4 or D12 as the closest prior art and were inclined to decide that the claimed subject matter of the opposed patent were inventive over D9, it was requested to refer the following question to the Enlarged Board of Appeal:

"Is it correct in a case where a polymer per se is claimed with a structure selected within a generally defined structure to consider in the analysis of inventive step only prior art documents describing a polymer with a structure falling within the generally defined structure directed to a similar purpose or effect or should prior art documents describing specific examples of a polymer more similar in structure to the claimed polymer also be considered?".

In case the board decided that the subject matter of present claim 1 were novel and inventive over D9, the patentee would obtain an unjustified exclusive right for a subgroup of polycarbonate resins that was generally known and free to all for all kinds of use.

Alternative b) of claim 1

(k) In the event the Board decided that the main request complied with the requirements of

Article 123(2) EPC, the case should be remitted to the opposition division since that request had not been examined with respect to the further raised objections, primarily lack of novelty and lack of inventive step.

XI. As far as relevant to the present decision, the submissions of the patent proprietor, as far as the main request is concerned, can be summarized as follows:

Allowability of the amendments

(a) The passages of the application as filed forming the basis for amended claim 1 were claims 1 and 2, the paragraph bridging pages 20 and 21 for the definition of the amount of repeating units of Formula (1) and the passage from page 23, line 10 to page 25, line 22 for the list of bisphenol compounds to be used for forming the divalent aromatic group Ar. Contrary to the opinion of the opposition division, the deletion of bisphenol A from the list of bisphenol compounds disclosed in said passage of the description did not result in any singling out of any compound not disclosed therein. Accordingly, the definition of two independent alternatives a) and b) in claim 1 was based on the application as filed. Moreover, the ranges defining the amount of repeating units of Formula (1) concerned the same properties. Accordingly, claim 1 met the requirements of Article 123(2) EPC.

Novelty

(b) The objection that claim 1 lacked novelty over each of D1, D4 and D12 was based on an inadmissible reading of those documents arrived at by arbitrarily combining several isolated and unrelated passages of those documents. Novelty of the claimed subject-matter was therefore to be acknowledged.

Inventive step

(c) D9 constituted the closest prior art, contrary to D1, D4 and D12, because it concerned the same problem and the same use as addressed in the patent in suit. The sole structural difference between the resins of operative claim 1 and the resins described in D9 was the presence of an alkoxy group in the siloxane unit. According to the Case Law, an experimental comparison made to demonstrate the existence of an effect arising from a distinguishing feature had to be made with the closest structural approximation. As correctly pointed out in the contested decision the comparison between example 16 and comparative example 2 which differed only in respect of the presence of the alkoxy substitution on the phenyl rings of the siloxane repeating unit showed that this distinguishing feature led to an increase in abrasion resistance of the polycarbonate resin. Hence, the problem solved over D9 by the subject-matter claimed in the patent in suit could be seen in the provision of a resin having an improved abrasion resistance. This was not suggested by any of D1, D4 and D12. Hence, the claimed subject-matter met the requirements of Article 56 EPC.

Request to refer questions to the Enlarged Board of Appeal

(d) The request of the opponent to refer questions to the Enlarged Board of Appeal should be rejected, since the questions addressed neither represented a fundamental point of law, nor needed to be answered to ensure a uniform application of the law.

Alternative b) of claim 1

(e) The reasons why the resins in accordance with alternative a) of claim 1 were novel over each of D1, D4 and D12 also apply in respect of the resins of claim 1 according to its alternative b), i.e. an inadmissible combination of isolated features within each of those documents had to be made in order to arrive at the claimed subject-matter. Concerning inventive step, the same argumentation applied for both alternatives a) and b) of claim 1 so that an inventive step was also to be acknowledged with respect to alternative b). Hence, the Board could decide novelty and inventive step also for alternative b) of claim 1 so that there was no need to remit the case to the opposition division for further examination of that alternative.

XII. The opponent (appellant II) requested in writing that the decision under appeal be set aside and that the patent be revoked. It also requested in writing that the case be remitted to the opposition division for further examination should the main request be found to comply with the requirements of Article 123(2) EPC. It also requested to refer two questions to the Enlarged Board of Appeal according to the conditions and questions reported in above sections X h) and i).

XIII. The patent proprietor (appellant I) requested that the decision under appeal be set aside and the patent be maintained on the basis of the main request, or alternatively on the basis of any of the first to seventh auxiliary requests, all requests filed with letter dated 28 August 2014. It also requested to reject the opponent's request to refer two questions to the Enlarged Board of Appeal.

Reasons for the Decision

Main request

Article 123(2) EPC

1. In accordance with the established Case Law of the Boards of Appeal of the EPO, the relevant question to be decided in assessing whether the subject-matter of an amended claim extends beyond the content of the application as filed, is whether after the amendment the skilled person is presented with new technical information (see G 2/10 (OJ 2012, 376), point 4.5.1 of the Reasons and Case Law of the Boards of Appeal of the EPO, 8th edition 2016, II.E.1). In other words, the above mentioned amendment is only allowable if the skilled person would derive the resulting claimed subject-matter directly and unambiguously, using common general knowledge from the application as filed.

1.1 It is not disputed that claim 1 of the main request is a combination of claims 1 and 2 as filed, wherein (i) the amount of repeating units defined by formula (2) has been defined to be from 0.01 to 3.9 wt.% based on the total amount of repeating units of formulae (1) and (2) and (ii) the Ar in formula (2) has been specified.

1.2 Feature (i) is based on a general range (0.0001 and 0.30 mass ratio) and a narrower preferred range (0.005 to 0.039 mass ratio) defining in paragraph [0029] of the application as filed the amount of repetitive units (a), whereby the amounts corresponding to said preferred range and the amounts within one of the part-ranges lying within the disclosed general range on one side of the preferred range have been retained, leading to a range of 0.01 to 3.9 mass % for the amount of repeating units (a). The reason indicated in paragraph [0029] to select the preferred range for the amount of repetitive units (a) is the achievement of physical properties of the binder and a balance between the cleaning property, the lubricity and the abrasion resistance. As can be seen from paragraphs [0004] to [0006] of the original disclosure the means to achieve those properties is the introduction of a specific siloxane structure into the polycarbonate resin, namely that represented by formulae (1) in original claim 1, also named repetitive unit (a) in the description (see paragraphs [0017] to [0019]). Accordingly, both the general range and the preferred range disclosed in paragraph [0029] are understood by the skilled reader to concern the achievement of the same properties and are closely associated, contrary to the argument submitted by the opponent. On that basis their combination is directly and unambiguously derivable from the original disclosure.

1.3 Whether the proposed lower and upper limits of this range can be considered to be critical to solve the objective problem of the patent is a question solely relating to inventive step. That argument has therefore no impact on the allowability of the amendments.

1.4 Thus, the objection of the opponent that amendment (i) contravenes the requirements of Article 123(2) EPC does not convince.

1.5 Concerning amendment (ii), operative claim 1 defines with lists a) and b) two alternative features defining separate embodiments of the subject-matter of claim 1 and not two features of the same embodiment. Accordingly, the case law based on T 615/95 which concerns situations wherein deletions are operated in independent lists of sizeable length defining features which have to be read in combination (see Case Law, *supra*, II.E.1.4.2; in the case underlying T 0615/95 three lists defined in a claim three residues in a generic formula) is not applicable to the patent in suit.

1.6 The application as filed defines in paragraph [0035] a list of bisphenol compounds for providing the divalent aromatic group Ar, which bisphenol compounds can be used alone or in a mixture of two or more (page 25, three last lines of paragraph [0035]). It is not disputed that the insertion of list a) as defined in claim 1 of the main request (use of two or more bisphenol compounds from that list) is in keeping with the requirements of Article 123(2) EPC. It is also not disputed that any of the bisphenol compounds defined in the same paragraph can be used alone. This means also that the skilled person is given the implicit information that he can decide not to use any of the the bisphenol compounds listed in paragraph [0035]. Accordingly, the use of all bisphenol compounds listed in paragraph [0035] alone to the exception of bisphenol A is disclosed to the skilled person as an alternative of the invention defined in the application

as filed. Therefore, the objection of the opponent concerning amendment (ii) does not convince either.

1.7 Accordingly, the subject-matter of claim 1 has not been shown to extend beyond the content of the application as filed.

Procedural issues

2. The opponent requested that the case should be remitted to the opposition division should the Board decide that the main request complies with the requirements of Article 123(2) EPC, because the main request had not been "*examined with respect to the further raised objections, primarily lack of novelty and lack of inventive step*". The present main request differs from to the first auxiliary request underlying the contested decision only in that claim 1 contains additional alternative b) for defining the divalent aromatic group Ar of the polycarbonate unit of formula (2). Independent claim 2 and dependent claims 3 to 6 thereof of the present main request and the first auxiliary request underlying the contested decision are identical. In other words the sole subject-matter encompassed by the main request which was not examined by the opposition division beyond the objection that it was not in keeping with the requirements of Article 123(2) EPC is the polycarbonate resin of claim 1 with respect to alternative b).

Accordingly, before considering whether the case should be remitted to the opposition division for further prosecution of the main request, it is first necessary for the Board to decide whether the subject-matter of the main request other than the polycarbonate resin according to alternative b) of claim 1 is allowable

having regard to the objections raised by the opponent. Unless otherwise specified the use in the next sections of the wording "claim 1" is meant to define the subject-matter relating to its embodiment a).

Novelty

3. Claim 1 was objected to lack novelty over each of D12, D1 and D4.

Novelty over D12

3.1 The submissions made by the opponent rely on the combination of several passages of D12 without any indication of a pointer in this document for said combination of features. The Board is even not able to identify in the submissions of the opponent where D12 provides an unambiguous and direct disclosure to employ repetitive units of formula (1) as defined in operative claim 1, i.e. units which comprise methyl groups on the silicone atoms, an alkoxy group as substituent of the phenyl group in ortho position relative to the oxygen substituent, in an amount as defined in present claim 1. The siloxane units described in paragraph [0060] of Working Example 2 of D12 (see chemical formula 16) is the sole disclosure in D12 for siloxane units corresponding to those of operative claim 1, but they are employed in a proportion of 13 mol%, the remaining 87 mol% consisting in non-siloxane polycarbonate repeating units having much lower molecular weight, which means that the amount of siloxane repeating units disclosed in Working Example 2 of D12 is much higher than that defined in operative claim 1 (the amounts of polymeric units indicated in formula 16 are molar fractions as follows from the wording of claim 1 and paragraph [0009] of D12). The

other Working Examples cited by the opponent do not contain repetitive siloxane units of formula (1) as defined in operative claim 1.

3.2 Nothing more than the bare disclosure of the specific characteristics of the resins described therein can be derived from the Working Examples cited by the opponent. D12 has not been shown to disclose even implicitly that specific Working Examples described therein have to be repeated using either another amount of siloxane repeating units or a different type of siloxane repeating units in accordance with the definition in operative claim 1. In the absence of a corresponding teaching in D12 the modification of the Working Examples cited by the opponent is to be seen as the result from an *ex post facto* and therefore inadmissible interpretation of document D12 made in the light of the knowledge of the present invention. In view of the above, D12 is not prejudicial to the novelty of claim 1.

Novelty over D1

3.3 It is undisputed that Example 2 of D1 alone is not novelty destroying, as it describes a resin consisting of units derived from bisphenol A, 1,1,1-tris(4-hydroxyphenyl)ethane (THPE) and of the eugenol-capped polymethylsiloxane fluid described in the paragraph bridging columns 5 and column 6 of the document, i.e. a resin which does not contain a second divalent aromatic group. Also in the case of D1, the skilled person derives from Example 2 or the preparation of resin E used for that example nothing more than the bare disclosure of the specific characteristics of the resin and composition prepared, namely the use of specific monomeric units. There is no disclosure that this

specific example is to be modified as to incorporate any of the monomeric units defined in column 3, lines 5 to 15, as alleged by the opponent. Unless use is made of an inadmissible hindsight knowledge of the present invention, the passage in column 3, lines 5 to 15 can only be read in the context of the general disclosure described in column 2, lines 10 to 65, but not in the specific context of the examples. Accordingly, in view of the argumentation submitted by the opponent it cannot be concluded that D1 anticipates the subject-matter of claim 1.

Novelty over D4

3.4 Again the opponent is arguing that D4 discloses the modification of a specific example (preparation example 3-4 describing a polymer made of bisphenol A units and of an eugenol-capped polymethylsiloxane), which modification would be implicit in view of paragraphs [0021] and [0023] of D4. Paragraph [0021] defining the dihydric phenol to be employed and the possibility to use copolymers as defined in paragraph [0023] refer to the general formula (5) described in paragraph [0018], but not to a specific example of D4, so that there is no reason for the skilled reader to read preparation example 3-4 in the light of paragraphs [0021] and [0023] of D4, as was done by the opponent. Hence, based on similar reasons as for D12 and D1, D4 cannot be held to be novelty destroying.

3.5 It follows from the above that the question whether the resins defined in operative claim 1 represent a purposive selection from a larger group of resins allegedly disclosed in D12, D1 or D4 though the combined reading by the skilled person of some Working Examples of each of those documents with specific other

passages of the same document (see above sections 3.1 to 3.4) needs not to be answered, because this argumentation is based on an *ex post facto* and therefore inadmissible interpretation of any of documents D12, D1 and D4.

3.6 In view of the above novelty of the subject-matter of claim 1 in respect of alternative a) is therefore acknowledged.

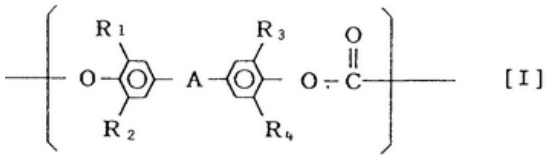
Inventive step

4. The opponent raised objections of lack of inventive step of the polycarbonate resin according to claim 1 in respect of alternative a) and of the electrophotographic photoreceptor of claim 2. As will shown below it is more appropriate in the present case to start with the assessment of inventive step of the subject-matter of claim 2.

Inventive step - Claim 2

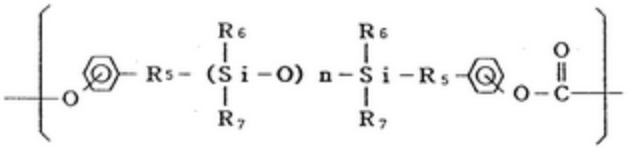
Closest prior art

4.1 In line with the contested decision, it is not disputed that the electrophotographic photoreceptor described in D9, in particular in its claim 16, constitutes an appropriate starting point for assessing inventive step. The Board has no reason to take a different view, since the photosensitive layer defined in claim 16 is described to be formed from a copolymer having the structure units represented by the formulas [I] and [II]:



[I]

where A is a linear, branched or cyclic alkylidene group of 1 to 10 carbon atoms, an aryl-substituted alkylidene group, arylene-dialkylidene group, -O-, -S-, -CO-, -SO-, or $-SO_2-$; and R_1, R_2, R_3, and R_4 are respectively hydrogen, halogen, or an alkyl or alkenyl group of 1 to 4 carbons;



[II]

where R_5 is an alkylene or alkylidene group of 2 to 6 carbons; R_6 and R_7 are respectively an alkyl group of 1 to 3 carbons, a phenyl or substituted phenyl group; and n is an integer of from 1 to 200,
the copolymer containing the structure unit of the formula [II] in an amount of from 0.1 to 50 % by weight of the total weight of the copolymer.

4.2 It is not disputed that the polycarbonate resin from which the photosensitive layer is formed in D9 does not contain siloxane repeating units whose phenyl moieties bear an alkoxy substituent. The electrophotographic photoreceptor described in D9 which comes structurally the closest to that of operative claim 2 and therefore has to be taken as the closest prior art for assessing inventive step is an electrophotographic photoreceptor using a photosensitive layer whose amount of siloxane repeating units is not higher than allowed by present claim 2, i.e. an amount of units of formula (II) at the bottom of the numerical range defined in claim 16, which overlaps with the amounts defined in operative claim 2.

Problem successfully solved and solution

4.3 Having regard to the disclosure of D9 representing the closest prior art, the patent proprietor, in line with

the contested decision, submitted that the technical problem solved by the subject-matter of operative claim 2 was the provision of an electrophotographic photoreceptor comprising in the photosensitive layer a polycarbonate with improved abrasion resistance. That problem is meant to be solved by the use of siloxane repeating units of formula (1) defined in operative claim 2, characterized inter alia by the presence of an alkoxy substituent on the phenyl groups at the ortho position relative to the oxygen atom as shown in formula (1).

4.4 As to whether evidence has been provided that the claimed subject-matter provides a successful solution to the problem mentioned above, the patent proprietor referred to a comparison between example 16 and comparative example 2 of the patent in suit. The comparison made is indicated by the patent proprietor to show that a modification of the siloxane repeating units of the closest prior art by incorporating a methoxy group substituent on the phenyl group at the ortho position relative to the oxygen atom brings about an increase in abrasion resistance, which was not disputed by the opponent. Accordingly, based on the submissions on file, the Board has no reason to question the probative value of the comparison provided in the specification.

4.5 The Board does not share the opponent's view that an improvement should have been demonstrated over the embodiment of D9 showing the best result in terms of abrasion resistance. As recognized by the Case Law as early as in T 0181/82 (see point 4 of the Reasons for the decision), regarding only the preferred compounds from a citation as the necessary comparative composition in a comparative test implies that one

concentrates on the technical progress obtained vis-à-vis the known substances considered most effective. Technical progress, however, is not a requirement for a patent under the European Patent Convention. What counts is that an effect demonstrated by means of a suitable comparative test can be regarded as an indication of inventive step. As indicated in T 0181/82 (see point 5 of the reasons for the decision) "*The requirement for a comparison with the closest prior art is based on the principle of the structural dependence of the properties of chemical substances i.e. on the fact that these properties reflect the structure of the substances. Given the similar properties to be expected in view of the structural similarity of two substances, evidence of an abrupt improvement can be regarded as unexpected. The greater the structural difference between the compounds being compared, the less unexpected are any differences in their effects. So if a meaningful statement is to be made in order to render an inventive step plausible, compounds having a maximum structural resemblance must be compared with one another*".

4.6 The claimed invention lies in the finding that the abrasion resistance brought about by the siloxane moieties contained in the polycarbonate of the closest prior art could be further improved by the incorporation of alkoxy substituents at a specific position at the phenyl rings of said siloxane moieties. This is shown on the basis of the comparison submitted by the patent proprietor by proving that all other things being equal the alkoxy substituent on the phenyl groups as defined in present claim 1 leads to an increase of the abrasion resistance, which is in accordance with the case law. The argument of the opponent that the polycarbonate resin as defined in

claim 1 of the main request cannot exhibit a better abrasion resistance than those providing the best result in D9 is not relevant to the question as to whether the problem formulated by the patent proprietor is successfully solved, because those best embodiments of D9 also differ from those of operative claim 1 by an additional distinguishing feature, i.e. a higher amount of siloxane repeating units, and therefore do not represent the closest prior art, as being structurally more remote (see above section 4.2).

4.7 In these circumstances the Board is satisfied that the subject-matter of claim 2 provides with the use of the polycarbonate resin defined in that claim a successful solution to the problem identified in above section 4.3.

Obviousness

4.8 It remains to be decided whether or not the proposed solution to the above problem is obvious in view of the state of the art. As already indicated in relation to novelty, D9 does not disclose the presence of an alkoxy substituent, so that D9 itself cannot suggest the solution to the problem mentioned in section 4.3. The opponent did not indicate any document that would teach that the use of an alkoxy substituent on the phenyl moiety of repetitive unit of formula (1) as defined in operative claim 2 would increase the abrasion resistance. It was even acknowledged by the opponent that D1, D4 and D12 do not not mention the abrasion resistance of the polycarbonate resins claimed in those documents.

4.9 For these reasons, the Board concludes that the subject-matter of claim 2, and by the same token that

of dependent claims 3 to 6, involves an inventive step within the meaning of Articles 52(1) and 56 EPC.

Inventive step - Claim 1

Closest prior art

5. The opponent argued that, as far as operative claim 1 was concerned, a different starting point from that used for assessing inventive step of claim 2 should be taken, namely any of D1, D4 and D12. It is however established Case Law that the closest prior art for the purpose of assessing inventive step is normally a prior art document disclosing subject-matter conceived for the same purpose or aiming at the same objective as the claimed invention and having the most relevant technical features in common, i.e. requiring the minimum of structural and functional modifications (Case Law, *supra*, I.D.3.1).

5.1 According to paragraphs [0001] to [0004] of the patent in suit the purpose of the present invention is to provide a polycarbonate resin having suitable durability when used as photosensitive layer in a electrophotographic photoreceptor, which implies in particular abrasion resistance. As indicated in the contested decision D9 is concerned with the same problem and describe polycarbonate resins adapted for his purpose, which was not disputed by the parties. In contrast, none of D1, D4 and D12, all proposed by the opponent as closest prior art has been shown to relate to the same purpose or even to concern the surface durability of the polycarbonate. The opponent even acknowledged that these documents do not mention the abrasion resistance of the polycarbonate resins disclosed therein, but argued that there is no reason

to believe that their abrasion resistance would be significantly different from the abrasion resistance of the resins claimed in the opposed patent, because their structure "*very closely resembles the structure of the examples of D1, D4 and D12 and falls within the general scope of the description of each of the mentioned prior art documents*". Hence, the argument of the opponent demonstrates that the sole reason to start from any of D1, D4 and D12 as the closest prior art, is a knowledge gained from the teaching of the patent in suit, concerning the relation between the properties sought to be obtained in the patent in suit and the structural features required for this purpose. The use of such hindsight knowledge of the invention in order to select the closest prior art, however, does not ensure an objective assessment of inventive step and is therefore not allowable (Case Law, *supra*, I.D.3.3 and I.D.6). Accordingly, in the absence of any argument as to why the skilled person would have immediately recognized based on the common general knowledge in the art that the resins described in D1, D4 and D12 must exhibit suitable durability when used as photosensitive layer or must be considered at least to exhibit a suitable abrasion resistance for this purpose the skilled person has objectively no reason to consider the teaching of those documents as a promising starting point for achieving the goal of the present invention.

5.2 Consequently, in agreement with the opinion of the patent proprietor the polycarbonate resin described in claim 1 of D9 represents the closest prior art and the starting point for assessing inventive step of the subject-matter of operative claim 1. The resin is the same as that used in the electrophotographic photoreceptor of claim 16 of D9 representing the starting point for assessing inventive step of the

subject-matter of claim 2 (see sections 4.1 and 4.2 above). The polycarbonate resins subject-matter of operative claim 1 differ from those described in D9 in particular in that they contain siloxane repeating unit of formula (1), characterized among others by the presence of an alkoxy substituent on the phenyl groups at the ortho position relative to the oxygen atom.

Problem successfully solved and obviousness of the solution

5.3 The polycarbonate resin defined in operative claim 1 differs from that defined in operative claim 2 in that the definition of the divalent aromatic group Ar contained in repeating unit of formula (2) was restricted in accordance with list a) and list b) provided in claim 1. It is not disputed that the only purpose for the limitation introduced into claim 1 of the main request for the definition of divalent aromatic group Ar was to overcome an objection for lack of novelty. Considering that the submissions made by the parties in respect of the problem successfully solved over D9 and the obviousness of the claimed solution are based both for claim 2 and claim 1 with respect to alternative a) on the same issues, i.e. (i) whether the experimental evidence contained in the patent in suit is suitable to demonstrate an increase of the abrasion resistance of the polycarbonate resin brought about by the siloxane units whose definition is the same for both claim 2 and claim 1 and (ii) whether this would be suggested by the prior art, the Board concludes that the subject-matter of claim 1 with respect to alternative a) which defines a more restricted group of polycarbonate resins than in claim 2 also involves an inventive step within the meaning of Articles 52(1) and 56 EPC for the same reasons as those indicated in respect of claim 2.

Request for referral of questions to the Enlarged Board

6. Under Article 112(1)(a) EPC it is for the Boards of Appeal to refer a case to the Enlarged Board of Appeal if this appears necessary for ensuring uniform application of the law or if a point of law of fundamental importance arises. A board of appeal, during proceedings on a case, may refer a question of law to the Enlarged Board of Appeal if it considers that a decision is required (see G 3/98 (OJ EPO 2001, 62), Reasons No. 1.2.3).

6.1 The first question which the opponent requested to be referred to the Enlarged Board concerns the issue of novelty. Considering the importance of applying a uniform concept of disclosure with reference to Articles 54, 87 and 123 EPC using the so-called "gold standard" as was stressed by the Enlarged Board of Appeal (Case Law, supra, II.E.1), the question to be answered in relation to documents D12, D1 and D4 was therefore whether a skilled person would derive from these documents directly and unambiguously, using common general knowledge, and seen objectively and relative to the date of publication of these documents, from the whole of these documents, a disclosure falling within the ambit of present claim 1. As detailed in above points 3.1 to 3.5 applying this "gold standard" to the factual context of prior art documents D12, D1 or D4 leads to the conclusion that the larger group of resins from which the subject-matter of claim 1 would represent a selection is not disclosed in any of those documents, so that the first question which the opponent requested to be referred to the Enlarged Board is not relevant for deciding the present case.

6.2 The second question addressed by the opponent refers to the choice of the closest prior art in the assessment of inventive step. The opponent seeks confirmation that a disclosure directed to a purpose or effect similar to that addressed in the patent in suit constitutes a more appropriate starting point for assessing inventive step than a disclosure which is structurally closer, but does not concern said purpose or effect. According to established case law, in selecting the closest prior art, a central consideration is that it must be directed to the same purpose or effect as the invention, otherwise it cannot lead the skilled person in an obvious way to the claimed invention (Case Law, *supra*, I.D.3.2). The Board is not aware of decisions affirming the contrary.

6.3 Consequently, the questions addressed by the opponent have not been shown to concern a point of law of fundamental importance and uniform application of the law was not at issue since the Board did not intend to disregard the established jurisprudence with respect to the two points indicated above. Consequently, the Board did not see any necessity to refer the two questions submitted by the opponent to the Enlarged Board of Appeal.

Remittal

7. Since the opposition division had not taken any decision on whether the subject-matter of claim 1 concerning alternative b) was novel and involved an inventive step and the submissions of the parties on appeal did not address those issues, the Board in its communication of 15 March 2018 asked the parties whether any objection in respect of alternative b) of claim 1 had been raised during the opposition

proceedings and was still outstanding. In response hereto the opponent with letter of 22 March 2018 did not submit any further objection, but requested the Board "*to take a decision based on the documents on file*". Under those circumstances and considering that the submissions made in relation to alternative a) of claim 1 do not cast any doubt on the allowability of alternative b), the Board has no reason to remit the case to the opposition division for further prosecution, but no further objections being outstanding, has to remit the case with the order to maintain the patent on the basis of the main request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The request of appellant II to refer two questions to the Enlarged Board of Appeal is rejected.

3. The case is remitted to the opposition division with the order to maintain the patent in amended form on the basis of the main request (claims 1 to 6) filed with letter 28 August 2014 and after any necessary consequential amendment of the description.

The Registrar: The Chairman:

L. Stridde D. Semino

Decision electronically authenticated