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**Datasheet for the decision
of 16 November 2017**

Case Number: T 2028/12 - 3.4.02

Application Number: 01993837.2

Publication Number: 1332383

IPC: G02B1/04, C08G18/10, C08G77/04

Language of the proceedings: EN

Title of invention:
ELASTICAL OPTICAL STRUCTURE

Applicant:
ORAFOL Americas Inc.

Headword:

Relevant legal provisions:
EPC 1973 Art. 56

Keyword:
Inventive step - (yes)

Decisions cited:

Catchword:



Beschwerdekammern
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Chambres de recours

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Case Number: T 2028/12 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 16 November 2017

Appellant: ORAFOL Americas Inc.
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Representative: Pfenning, Meinig & Partner mbB
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted on 10 April 2012 refusing European patent application No. 01993837.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman R. Bekkering
Members: H. von Gronau
T. Karamanli

Summary of Facts and Submissions

- I. The appeal of the applicant is directed against the decision to refuse European patent application No. 01993837.2. The examining division refused the application on the ground that the subject-matter of the independent claims of the then main and auxiliary requests did not involve an inventive step.
- II. The appellant requested that the decision of the examining division be set aside and a patent be granted on the basis of the claims of a main request or on the claims of an auxiliary request, both requests filed with letter dated 20 February 2012 and filed again with the statement of grounds of appeal. As a precautionary measure oral proceedings were requested.
- III. In a communication annexed to the summons to oral proceedings, the board expressed its provisional opinion that the subject-matter of independent claim 1 of the main request then on file appeared to involve an inventive step but that the claims of that request were not clear.
- IV. With a letter dated 22 September 2017, the appellant filed amended claims 1 - 12, replacing the previous claims of the main request, and amended pages 1 - 4 of the description, which replaced the then corresponding description pages. It was requested that a communication according to Rule 71(3) EPC be issued. As an auxiliary measure it was requested to hold the scheduled oral proceedings.
- V. During phone conversations on 2 October 2017 and 6 October 2017, respectively, the rapporteur informed the appellant that the document US 4 101 698 was not

correctly cited in the description and that the claims then on file still appeared to be unclear.

- VI. With a letter dated 10 October 2017, the appellant filed amended claims 1 - 11, replacing the previous claims 1 - 12 of the main request, and an amended page 2 of the description.
- VII. In a communication dated 2 November 2017 the board noted inter alia the following:
In the course of the appeal proceedings, the appellant had not specified in its main request the application documents that were not replaced. The contested decision was based amongst others on description pages 5 - 9 "as published" and drawing sheet 1/1 "as published". The application was published under the PCT with international publication number WO 02/039148 on 16 May 2002. On 19 December 2002, however, a corrected version of the publication WO 02/039148 was issued. Since the appellant had not specified in a clear and complete manner which description pages formed part of its main request, the board was not in a position to decide on the main request.
- VIII. In a letter dated 3 November 2017, the appellant stated that it requested as main request that a patent be granted on the basis of the following application documents:
- Description pages 5 - 9 as published in the corrected version of WO 02/039148, description pages 1, 3 and 4 filed with letter of 22 September 2017, and description page 2 filed with letter of 10 October 2017.
 - Claims Nos. 1 - 11 of the main request filed with letter of 10 October 2017.

- Drawing sheet 1/1 as published in the corrected version of WO 02/039148.

IX. Subsequently, the board cancelled the oral proceedings.

X. The following documents were cited in the contested decision:

D1: US 5 578 693 A

D2: US 4 576 850 A

D3: US 4 668 558 A

D8: US 4 101 698 A.

XI. The independent claims of the main request as filed with letter dated 10 October 2017 read as follows:

"1. A reboundable optical structure (10) comprising:

a) a base layer (12) which includes a polymer selected from a polyester, polycarbonate, polyacrylate and polyolefin or combination thereof; and

b) an optical element layer (14) formed from a reboundable, elastomeric polymeric material and attached to the base layer,

wherein said reboundable, elastomeric polymeric material includes a multifunctional terminally unsaturated urethane oligomer from the reaction product of a terminally unsaturated isocyanate-containing polyurethane oligomer with an alkoxyated polyhydric alcohol."

"9. A method for forming a reboundable optical structure of any of the preceding claims comprising:

- a) providing a base layer (12); and
- b) attaching an optical element layer (14) formed from said reboundable, elastomeric polymeric material to said base layer (12), thereby forming said reboundable optical structure (10)."

Reasons for the Decision

- 1. Main request -amendments (Article 123(2) EPC)
 - 1.1 The examining division did not raise any objection under Article 123(2) EPC in the contested decision.
 - 1.2 The board agrees with the appellant that the subject-matter of independent claim 1 is based on the originally filed claim 1 which has been specified with respect to the base layer and its materials. This feature is disclosed in original claim 3. Moreover, claim 1 has been specified by the feature that the optical element layer is formed from a reboundable, elastomeric polymeric material. The disclosure of this feature can be found on page 1, line 21, and on page 2, line 29, of the originally filed description. In claim 1, the feature of the originally filed claim 7 has been added saying that the reboundable polymeric material includes a multi-functional terminally unsaturated urethane oligomer from the reaction product of a terminally unsaturated isocyanate-containing polyurethane oligomer with an alkoxyated polyhydric alcohol.
 - 1.3 Dependent claims 2 to 8 are based on originally filed claims 2, 8, 10 to 14 respectively. Method claim 9 is

based on claim 16 as originally filed, and dependent claims 10 and 11 are based on claims 17 and 18 as originally filed, respectively.

1.4 Consequently, the subject-matter of the claims does not extend beyond the content of the application as filed.

2. Main request - claim 1 - novelty (Article 54 EPC 1973)

Lack of novelty was not an issue in the contested decision. The board also comes to the conclusion that none of the cited documents discloses all the features of claim 1 in combination.

3. Main request - claim 1 - inventive step (Article 56 EPC 1973)

3.1 The examining division came to the conclusion that the subject-matter of claim 1 did not involve an inventive step in view of document D1. It found that document D1 disclosed an optical structure (see e.g. column 5 lines 25-30) comprising a base layer (see column 5 lines 28-30) and an optical element layer formed from a reboundable elastomeric polymeric material and attached to the base layer, wherein said reboundable polymeric material included a multi-functional terminally unsaturated urethane oligomer from the reaction product of a terminally unsaturated isocyanate-containing polyurethane oligomer with an alkoxyated polyhydric alcohol (see e.g. column 2 lines 54-57, column 3 line 61 column 4 line 13 and column 5 lines 1-4).

The subject-matter of claim 1 of the main request differed in that the base layer included a polymer selected from a polyester, polycarbonate, polyacrylate and polyolefin or combination thereof. However, as document D1 already disclosed a plastic substrate (see

column 5, lines 27-30), polycarbonate or polyester were straightforward examples of plastics that came to mind of the skilled person.

- 3.2 The appellant is of the opinion that document D1 referred to multifunctional oligomers without any reference to optical structures. The person skilled in the art would therefore not consider this document as closest prior art document. Instead document D2 should be considered as closest prior art document since it showed the highest structural similarity in view of the optical structure and taught a similar use. The subject matter of claim 1 differed from document D2 by the feature that the optical element layer was attached to a base layer which was selected from specific polymer types, i.e. polyester, polycarbonate, polyacrylate, polyolefin or its combinations. Moreover, it differed from document D2 by the specific polymeric material of the optical element layer. The combination of the specific materials of the base layer and the optical element layer allowed to provide an optical structure which was resistant to scratches and abrasions and could essentially recover to its original configuration over a period of minutes or hours (cf. page 2, lines 2 to 11, of the description). It was therefore the objective technical problem for a skilled person starting from document D2 to provide an optical structure having an improved micro structure which could essentially recover to its original configuration over a period of minutes or hours. Starting from D2, there was no motivation for the skilled person in document D1 or any other prior art document cited by the examining division to choose such a specific combination of materials for the base layer and the optical element layer to arrive at an optical

structure which could recover to its original configuration after a short period.

At first, it had to be noted that D1 did not comprise any advice for "reboundability". Moreover, D1 referred to a totally different technical problem which was to increase the oligomer functionality and the urethane character while decreasing the viscosity of the oligomer (column 2, lines 23-26). This posed the question why the skilled person should consult this document for solving the above-mentioned objective technical problem, in particular as document D1 was surrounded by a huge number of prior art documents teaching multifunctional urethane oligomers. Should the skilled person still have consulted document D1 and analysed document D1 in view of the above mentioned objective technical problem he would have received no advice which of the polymers cited in D1 he had to choose and no advice to combine the claimed polymers of the optical element layer with the claimed specific polymer types of the base layer to provide a "reboundable" optical structure.

- 3.3 The board agrees with the appellant that document D1 cannot be regarded as the closest prior-art document. Document D1 does not refer to an optical structure comprising a base layer and an optical element layer. It relates to selected multifunctional terminally unsaturated urethane oligomers useful for curing by radiation such as UV light or electron beam. It also relates to the process for making these oligomers as well as radiation curable polymer formulations containing these oligomers. It provides an approach whereby oligomer functionality and urethane character are both increased while viscosity is decreased. Document D2 however refers to an optical structure comprising a shaped, plastic, monolithic layer (or

body) comprising a certain cross-linked polymer and having one or more, like or different, replicated microstructure-bearing surfaces (cf. column 2, lines 24 - 28). The layer can be formed with a wide variety of desired properties, such as toughness, flexibility, optical clarity or homogeneity, and resistance to common solvents, the microstructure of such articles having high thermal dimensional stability, resistance to abrasion and impact, and integrity even when the articles are bent, e.g. 180°. The physical properties of the cross-linked polymer can be varied by proper selection of the oligomeric composition (cf. column 2, lines 53 - 62).

- 3.4 The board concurs with the appellant that the subject matter of claim 1 **differs** from D2 by the feature that the optical element layer is attached to a base layer which is selected from specific polymer types, i.e. polyester, polycarbonate, polyacrylate, polyolefin or its combinations. Moreover, claim 1 differs from document D2 by the specific reboundable, elastomeric polymeric materials of the optical element layer. These differing features allow to provide an optical structure which is resistant to scratches and abrasions and can essentially recover from injuries, which can occur from handling, to its originally configuration over a period of minutes or hours (cf. application as filed, page 2, lines 2 to 11). The board agrees with the appellant that the technical **problem** for a skilled person starting from document D2 can be seen as to provide an optical structure having an improved micro structure which can essentially recover from injuries, due to handling, to its original configuration over a period of minutes or hours.

3.5 Document D1 does not address this problem. Document D1 deals with the experience that flexible films obtained in radiation curing had not performed as well as conventional moisture cured or two-component urethane counterparts. There was, therefore, a constant challenge in the radcure industry to achieve oligomer performance more similar to that obtainable by conventional flexible urethanes while maintaining a low enough viscosity to permit practical use (cf. D1, column 1, line 62, to column 2, line 2). The board is therefore of the opinion that the person skilled in the art would not look in document D1 for a solution to the above problem and document D1 does not provide either a hint to the claimed solution. It only discloses the same group of polymeric materials but without indicating the specifically claimed qualities that some elements of that group can have. Therefore, the subject-matter of claim 1 involves an inventive step starting from document D2 in view of document D1.

3.6 Even if the person skilled in the art were to start from document D1, he would not arrive at the claimed subject-matter in an obvious manner. Document D1 discloses a multifunctional terminally unsaturated urethane oligomer comprising the reaction product of (a) a terminally unsaturated isocyanate containing polyurethane oligomer with (b) an alkoxyated polyhydric alcohol (cf. claim 1 of document D1). The subject-matter of present claim 1 differs from the material disclosed in document D1 in that it is used as a reboundable optical element layer and attached to a base layer which includes a polymer selected from a polyester, polycarbonate, polyacrylate and polyolefin or combination thereof. The board concurs with the appellant that the specific selection of the material of the base layer, which is

compatible to the reboundable polymeric material of the optical element layer, is able to provide an optical structure which is resistant to scratches and abrasions and can essentially recover from injuries to its originally configuration over a period of minutes or hours (cf. application as filed, page 2, lines 2 to 11).

Still, any hint to the solution should be avoided in the formulation of the problem. Accordingly, in the board's view the objective technical problem for a person skilled in the art starting from document D1 is to find an application where the disclosed material can be used advantageously.

The person skilled in the art would have to find out that the material disclosed in document D1 can have this reboundable characteristic and that it would be suitable to form an optical element layer in an optical structure. Document D1 does not provide any motivation to use the disclosed polymeric material for this purpose. Furthermore, the skilled person would have to find a suitable base layer. There is nothing in document D1 suggesting this. Document D1 therefore does not suggest the claimed optical structure in an obvious manner.

- 3.7 The examining division during the examination proceedings also cited document D8. This document addresses the problem that an optically reflective surface for bumpers should be elastically deformable during an impact and return to its original form after the deformation load is released (cf. column 1, lines 14 - 26) and proposes an elastomeric film made of polyurethane film (cf. column 2, lines 14 - 28). The person skilled in the art would consider this material for the optical layer in document D2, but not arrive at the claimed solution because Document D8 does not

suggest the particular elastomeric polymeric material of the claimed structure.

- 3.8 The board comes to the conclusion that the subject-matter of claim 1 involves an inventive step.
4. Independent method claim 9 defines a method for forming a reboundable optical structure of any of the preceding claims. It uses the same layers as those defined in claim 1 or the claims dependent on claim 1. The subject-matter of claim 9 therefore also involves an inventive step.
5. Claims 2 to 8 and 10 and 11 are dependent on claims 1 and 9, respectively. Therefore, their subject-matter also involves an inventive step.
6. The description has been adapted to the amended claims and the relevant prior art documents are cited in the description. It therefore meets the requirements of Rule 27(1)(b), (c) EPC 1973.
7. The board comes to the conclusion that the application documents according to the main request meet the requirements of the EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent in the following version:

Description:

Pages 5 - 9 as published in the corrected version of
WO 02/039148,

Pages 1, 3 and 4 filed with letter of
22 September 2017, and

Page 2 filed with letter of 10 October 2017.

Claims:

Nos. 1 - 11 of the main request filed with letter of
10 October 2017.

Drawing:

Sheet 1/1 as published in the corrected version of
WO 02/039148.

The Registrar:

The Chairman:



M. Kiehl

R. Bekkering

Decision electronically authenticated