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**Datasheet for the decision
of 15 February 2022**

Case Number: T 1616/19 - 3.4.02

Application Number: 11152431.0

Publication Number: 2388551

IPC: G01B11/06, G01N21/23,
G01N21/45, G07D7/16

Language of the proceedings: EN

Title of invention:

Method of Authenticating a Polymer Film

Applicant:

Innovia Films Limited

Relevant legal provisions:

EPC Art. 84, 56

Keyword:

Clarity (yes: amended claims)

Inventive step (yes: amended claims)



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Case Number: T 1616/19 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 15 February 2022

Appellant: Innovia Films Limited
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Representative: Brand Murray Fuller LLP
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 3 January 2019
refusing European patent application No.
11152431.0 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman R. Bekkering
Members: F. J. Narganes-Quijano
G. Decker

Summary of Facts and Submissions

- I. The appellant (applicant) lodged an appeal against the decision of the examining division refusing European patent application No. 11152431.0 filed as a divisional application of the earlier patent application No. 09738420.0.
- II. During the first-instance proceedings reference was made to the following documents:
- D1: GB 2 328 180 A
 - D2: WO 02 44985 A1
 - D3: WO 2007 072426 A2
 - D4: US 2005 110978 A1
 - D5: WO 2004 087795 A1
 - D6: US 2006 187452 A1
 - D7: US 4 849 623 A.
- III. In the decision under appeal the examining division held in respect of the requests then on file that
- claim 1 of the main and the first and second auxiliary requests was not clear (Article 84 EPC), and
 - the subject-matter of claim 1 of the third auxiliary request did not involve an inventive step over documents D5 and D7 (Article 56 EPC).
- IV. With the statement setting out the grounds of appeal the appellant submitted claims according to a main request and first to fourth auxiliary requests.
- V. In reply to the observations made by the board in a communication under Article 15(1) RPBA 2020 annexed to the summons to oral proceedings, the appellant filed by

letter dated 29 September 2021 claims 1 to 13 and amended pages 1 to 22 of the description.

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 13 and pages 1 to 22 of the description filed with the letter dated 29 September 2021 together with drawing sheets 1/3 to 3/3 of the application as originally filed (main request) or, as first to fifth auxiliary requests, on the basis of the respective claims of the main and the first to fourth auxiliary requests filed with the statement of grounds of appeal.

VI. In view of the main request submitted by the appellant, the oral proceedings were cancelled.

VII. Claim 1 of the main request reads as follows:

"A method of identifying an authentic birefringent polymer film comprising

measuring the birefringence of the film by measuring the variation in the intensity of light passing through crossed polarisers when the film is placed between the polarisers and either the film is rotated or the polarisers are rotated whilst maintaining the same rotational configuration with respect to one another, and

determining whether said film is authentic on the basis of the film meeting a specified pre-defined criterion of birefringence based upon the measurement obtained in said measuring step."

The claims of the main request also include claim 12 directed to a method of authenticating an object comprising a polymer film wherein authentication is carried out by authenticating the polymer film as

claimed in any preceding claim, and dependent claims 2 to 11 and 13 referring back to claims 1 and 12, respectively.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request - Amendments*

Claim 1 of the main request is based on claims 1, 14 and 15, together with Fig. 1 and the passage on page 16, line 25, to page 17, line 14, of the description of the application as filed. Claims 2 to 13 are respectively based on claims 2 to 13 of the application as filed.

The amendments made to the description relate to the adaptation of its content to the invention as defined in the present claims (Rule 42(1)(c) EPC) and to the acknowledgement of the documents of the prior art, and in particular of documents D5 and D7 (Rule 42(1)(b) EPC).

In addition, the application documents of the main request also satisfy the requirements of Article 76(1) EPC. In particular, claim 1 is based on the second alternative of independent claim 4, together with claims 18 and 19, the passage on page 6, line 27, to page 7, line 2, and Fig. 1 together with the corresponding description on page 16, line 21, to page 17, line 10, of the earlier application as filed; dependent claims 2 and 3 are based on the passage on

page 6, line 27, to page 7, line 2, of the description of the earlier application as filed; dependent claim 4 is based on the first alternative of independent claim 4 of the earlier application as filed; and claims 5 to 13 are respectively based on claims 5, 7 to 9, 6, 10, 11, 12, 13 and 14, 16, and 17 of the earlier application as filed.

The board concludes that the application documents amended according to the present main request of the appellant comply with the requirements of Articles 76(1) and 123(2) EPC.

3. *Main request - Article 84 EPC*

The objections of lack of clarity raised by the examining division in the decision under appeal in respect of the then main and first and second auxiliary requests related to features that are not present in the claims of the present main request and, therefore, the mentioned objections are no longer pertinent.

In addition, the board is of the opinion that the claims of the main request comply with the requirements of Article 84 EPC.

4. *Main request - Claim 1 - Novelty*

4.1 Document D5 discloses a method of identifying as authentic an oriented polymeric film (abstract and page 1, lines 3 to 17; see also claim 1). The method consists in illuminating the oriented polymeric film with electromagnetic radiation - in particular with UV radiation - having a predetermined polarisation state - in particular, having a polarisation aligned in the orientation direction of the oriented polymeric film - ,

and detecting the spectral intensity of the radiation reflected, transmitted or fluoresced by the film, the detected spectral intensity being a function of the absorption and dichroic characteristics of the film (page 1, lines 19 to 33, page 17, lines 10 to 13, together with page 3, lines 17 to 28; and the paragraph bridging pages 11 and 12). The detected spectral intensity is then compared with a specified pre-defined criterion constituted by a known spectral profile of radiation in order to verify whether the film is authentic (claim 8, together with claim 3, and page 7, third paragraph).

The polymeric film of document D5 is an oriented film (in particular, a biaxially oriented film, see page 1, lines 27 to 33), and therefore the film has birefringent properties. However, while document D5 involves the detection of the spectral intensity of the light from the film - i.e. the measurement of the intensity as a function of wavelength -, the claimed method requires the measurement of the birefringence of the film, and this measurement involves the determination of the difference of the refractive index of the film for two light beams having a predetermined wavelength and being linearly polarised in two planes orthogonal to each other, as well as the determination of the orientation of the two orthogonal principal planes of birefringence of the film, i.e. the planes of polarisation for which the refractive index of the film has respectively a maximum and a minimum value.

Therefore, the method defined in claim 1 of the main request differs from the method of document D5 in that

- the measurement involves measuring the birefringence of the film,

- the radiation measurement is carried out by measuring the variation in the intensity of light passing through crossed polarisers when the film is placed between the polarisers and the set of polarisers and the films are rotated with respect to each other, and

- the specified pre-defined criterion is a criterion of birefringence.

4.2 Document D7 discloses determining the anisotropy of a birefringent light-transmitting sheet (abstract, column 2, lines 20 to 27, and Fig. 4 and 5, together with the corresponding description) by irradiating the sheet (specimen S in Fig. 4 and 5) with light polarised by a first polariser (polariser 14) and directing the light emerging from the sheet to a second polariser (analyzer 15) having a predetermined polarisation direction with respect to that of the polarised light, rotating the sheet relative to the first and second polarisers (column 1, lines 46 to 62, and column 4, lines 12 to 17), and determining the anisotropy of the sheet in terms of the relationship between the rotation angle and the output measured light. More particularly, the anisotropy is determined in terms of the difference of the refractive index of the sheet for light polarised along two orthogonal planes and having a predetermined wavelength, and therefore in terms of the birefringence of the sheet (see column 2, lines 23 to 27, together with column 3, line 63, to column 4, line 9, column 5, lines 8 to 16, together with claims 1, 2, 8 to 10, and 15).

The method defined in claim 1 differs from the method of document D7 in that the claimed method involves the identification of an authentic birefringent polymer film, the determination of whether the film is

authentic being carried out on the basis of the film meeting a specified pre-defined criterion of birefringence based upon the measured birefringence of the film.

4.3 The remaining documents on file are less pertinent. In particular:

- Document D1 discloses a method of authentication of a film having regions with different birefringence characteristics, the regions being viewable as a pattern when the film is illuminated with polarised light (abstract, and Fig. 4 and 6, together with the corresponding description). The document, however, is silent as to the measurement of the birefringence of the regions of the film.

- Document D2 discloses the identification of polymeric strings in an object, such as a banknote, the strings having birefringence properties so that the contrast of the strings is improved when viewed with polarised light (paragraph bridging pages 5 and 6, and Fig. 1, together with the corresponding description). The document, however, is silent as to the measurement of birefringence.

- Document D3 discloses the use of a polymeric polarisation retardation film having a random structure of isotropic and anisotropic micro-regions for authentication purposes (Fig. 3 and 4; page 3, lines 25 to 30; page 4, lines 3 to 10; and page 6 lines 4 to 9). The non-homogeneous structure of the film, and in particular its non-homogeneous birefringence, is viewable through crossed polarisers (paragraph bridging pages 3 and 4; page 4, lines 18 to 21; page 6, lines 18 to 20; page 7, lines 4 to 31; page 15, lines 12 to 16; and claim 12; see also Fig. 6 and 7 and the corresponding description). However, no measurement of birefringence is disclosed in the document.

- Document D4 discloses the authentication of polymers (paragraph [0002]) having a heat-induced electromagnetic radiation signature optically detectable upon heating a portion of the polymer (abstract, paragraph [0039], and claims 37 to 42) and cites birefringence among the properties of the material of the signature that vary upon heating (paragraph [0067] and claim 44). However, there is no disclosure in document D4 of the measurement of the birefringence of the polymer.

- Document D6 discloses the measurement of the birefringence of polymeric films using crossed polarisers (abstract, and Fig. 1 and 3 together with the corresponding description). The document, however, is silent as to the use of the measurements for authentication purposes.

4.4 Therefore, the method defined in claim 1 of the main request is new over the available documents of the prior art (Articles 52(1) and 54(1) EPC).

5. *Main request - Claim 1 - Inventive step*

5.1 As held by the examining division in its decision, the closest state of the art is constituted by the method of document D5.

The distinguishing features of the claimed method over the method of document D5 have the technical effect that the authentication of the film is carried out not according to a complex comparison of the measured spectral intensity of radiation from the film with a predetermined known spectral profile of radiation, but according to the comparison of the birefringence of the film (i.e. of a physical characteristic defined in terms of discrete values expressing a difference of

diffractive indices and the orientation of the principal planes of birefringence, see point 4.1 above, second paragraph) with a specified pre-defined criterion of birefringence, thus simplifying the step of verifying whether the film is authentic.

Therefore, contrary to the opinion expressed by the examining division in the decision under appeal in respect of the then third auxiliary request, the objective technical problem solved by the claimed method does not reside in the provision of an alternative way of detecting the orientation of the birefringent polymeric film considered in document D5, but - as submitted by the appellant - in the provision of a simpler method of authentication of the film.

- 5.2 The skilled person confronted with the objective problem formulated above would look for a solution in the technical field to which document D5 pertains, i.e. in the technical field of authentication of objects. Document D7 pertains to the technical field of the determination of the anisotropy of light-transmitting sheets for the purpose of controlling the quality of the production of the sheets (column 1, lines 12 to 38), and - contrary to the opinion expressed by the examining division in its decision in respect of the then third auxiliary request - the board does not see why the skilled person confronted with the objective problem would have consulted the technical field to which document D7 pertains, let alone why the skilled person would have seen in document D7 a possible solution to the objective problem formulated above.

In addition, document D5 and document D7 involve respectively the measurement of the dichroic and of the birefringence characteristics of relatively thin

transparent specimens (films and sheets) made of an anisotropic material, and although both dichroism and birefringence reflect the anisotropy of the material and both can be measured, among other techniques, by analysing the light from the specimen using crossed polarisers, they constitute different, non-equivalent properties of an anisotropic material and they require, in addition, the measurement and the determination of different and non-equivalent physical quantities, i.e. the differences in absorption for light beams having both different wavelengths and different polarisation states in the case of dichroism (see document D5, page 3, line 3, to page 4, line 4; page 6, lines 13 to 28; page 15, line 26, to page 16, line 31; and page 17, lines 10 to 13, and lines 32 to 33) and, in the case of birefringence, the difference in the refractive index of the material for light beams having a predetermined wavelength and different polarisation states (see document D7, column 3, line 1, to column 4, line 9, and claim 8). For these reasons, even assuming that the skilled person would have considered document D7, the board does not see why the skilled person working in the technical field of authentication of objects would have considered the possibility of replacing the measurements of dichroism of document D5 by the measurements of birefringence of document D7 as a possible solution to the objective problem, especially as the oriented polymeric films considered in document D5 have intrinsically birefringent properties, but the document is silent as to the birefringence characteristics of the films and focuses on improving the dichroic characteristics of the sheets by dispersing in the film a radiation-absorbing colourless additive exhibiting a detectable difference in the spectral response when illuminated with

polarised light (see document D5, page 1, lines 19 to 33, page 2, lines 26 to 28, and claim 1).

The remaining documents on file, and in particular the documents referred to in point 4.3 above, do not suggest either the claimed solution to the objective problem. In particular, documents D1 to D4 involve the authentication of films having birefringent properties, but none disclose or suggest verifying whether the film is authentic by measuring the birefringence of the film; and document D6 discloses methods of measuring the birefringence of a polymeric film, but is silent as to the application of the method for authentication purposes.

5.3 In view of these considerations, the board is of the opinion that the method defined in claim 1 of the present main request does not result in an obvious way from the available documents of the state of the art (Article 56 EPC).

6. *Main request - Claims 2 to 13 - Novelty and inventive step*

Claim 12 is directed to a method of authenticating an object comprising a polymer film and involving the method defined in claim 1. Therefore, the subject-matter of claim 12 of the present main request is also new and involves an inventive step over the documents of the prior art on file (Articles 52(1), 54 and 56 EPC). The same conclusion applies to dependent claims 2 to 11 and dependent claim 13 of the main request by virtue of the reference in these claims to claims 1 and 12, respectively.

6.1 The board concludes that the present main request of the appellant is allowable.

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:
 - claims: Nos. 1 to 13 filed with the letter dated 29 September 2021;
 - description: pages 1 to 22 filed with the letter dated 29 September 2021; and
 - drawings: sheets 1/3 to 3/3 of the application as originally filed.

The Registrar:

The Chairman:



L. Gabor

R. Bekkering

Decision electronically authenticated