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D E C I S I O N
of 6 December 1993

Case Number: T 0107/91 - 3.2.5

Application Number: 84305491.7

Publication Number: 0147912

IPC: B22D 11/06

Language of the proceedings: EN

Title of invention:

Melt overflow system for producing filamentary and film products directly from molten materials

Patentee:

Ribbon Technology Corporation

Opponent:

- 01) Pechiney, S.A.
02) Mönch Unternehmensberatungs-Aktiengesellschaft

Headword:

-

Relevant legal norms:

EPC Art. 56, 100(b), 100(c)

Keyword:

"Claims not supported by the description as filed (main request)"

"Claims supported by the description and their subject-matter novel and inventive (auxiliary request)"

Decisions cited:

-

Catchword:

-



Case Number: T 0107/91 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 6 December 1993

Appellant: Ribbon Technology Corporation
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Respondent: Pechiney, S.A.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office delivered orally on
5 November 1990 with written reasons posted on
5 December 1990 revoking European patent
No. 0 147 912 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: C.V. Payraudeau
Members: M.H.M. Liscourt
A. Burkhart

Summary of Facts and Submissions

- I. Two oppositions were filed against the European patent No. 0 147 912 (application No. 84 305 491.7).
- II. The Opposition Division revoked the patent, considering that neither Claim 1 as granted nor independent Claim 3 as amended during the opposition proceedings, satisfied the requirements of Articles 52 and 56 EPC.
- III. The Appellants (Patentees) appealed from this decision.
- IV. Among the numerous documents cited during the opposition proceedings, only the following ones were considered as relevant in the appeal proceedings:
- D1: US-A-3 871 439
D2: GB-A-0 026 260
D6: EP-A-0 040 072.
- VI. During the oral proceedings which took place on 30 October 1992, the Appellants requested the maintenance of the patent in amended form on the basis of Claims 1 to 7 filed by telecopy on 29 September 1992 and Claims 8 to 10 of the granted patent, with the addition in Claim 1, line 8 of the expression "forming a melt front" after the word "edge".
- VII. The independent claims according to the main request of the Appellants read as follows:
- "1. A method for producing ribbon, filaments, fiber or film from molten material, said method comprising rotating a heat extracting substrate (20,34,56,80)

about its substantially horizontal axis of symmetry (22,86) and moving its outer surface (18,36,54,60,82) past a region of contact with an edge forming a melt front (16,40,58) of the upper surface of a pool of said molten material (12,32,64,92) so that said molten material (12,32,64,92) solidifies on the outer surface (18,36,54,60,82) and is then removed therefrom, characterised in that helically disposed adjacent ridges (81) formed on the outer surface of the heat extracting substrate (20,34,56,80) are caused by the rotation of substrate (20,34,56,80) to carry out an apparent motion with respect to the surface edge (16,40,58) transversely migrating along a generating line of said substrate (20,34,56,80) interfacing the melt front.

3. An apparatus for producing filament, fiber, ribbon or film from a molten material, the apparatus comprising: (a) a receptacle (10,30,48,88,106,122) for containing a pool of molten material (12,32,64,92), said receptacle including a wall portion having an upper generally horizontal edge (16,40,58) relatively lower than the top of said receptacle and over which molten material may be overflowed; (b) a heat extracting substrate (20,34,56,80) spaced from said edge (16,40,58) and mounted to be contacted by the overflowed molten material (12,32,64,92) at the level of the upper surface (62) of the molten material, the substrate being formed as a symmetrical substrate (20,34,56,80) about its axis (22,86); and (c) means for continuously moving the surface (18,36,54,60,82) of said substrate past the region of its contact with said melt (12,32,64,92) by drivingly rotating it about its substantially horizontal axis of symmetry (22,86); characterised in that helically disposed adjacent ridges (81) are provided on the outer surface (18,36,54,60,82) of the substrate (20,34,56,80) and

are caused to carry out an apparent motion with respect to the surface edge transversely migrating along a generating line of said substrate interfacing the melt front by the rotation of the substrate (20,34,56,80)."

VIII. Auxiliarily, the Appellants requested the maintenance of the patent on the basis of the claims of the main request but with the deletion of the words "ribbon" and "or film" in Claim 1, lines 1 and 2 and in Claim 3, lines 23,24.

IX. The Respondents requested the rejection of the appeal and submitted essentially that the subject-matter of the European Patent according to the main request of the Appellants extended beyond the content of the application as filed (Art. 100(c) EPC), that the European patent did not disclose the invention in a manner sufficiently clear and complete to be carried out (Art. 100(b) EPC) and that the claimed invention resulted from an obvious combination of the teaching of Documents D2 and D1 (Art. 100(a) EPC). The same reasoning was held against the auxiliary request except as concerns the objection of undue extension under Article 100(c) EPC.

X. In support of the main request, the Appellants submitted essentially that the original application had indicated in Example V that, according to the speed of the rotating wheel, filaments or ribbons were produced; therefore, the objection of undue extension under Article 100(c) EPC was not tenable. The objection of insufficiency of disclosure (Art. 100(b) EPC) could also not validly be sustained because the person skilled in the art knew how to adapt the various parameters involved without having to be informed by examples of the precise possible values of

these parameters. As concerns the objection of lack of inventive step under Article 100(a) EPC, the nearest state of the art was considered to be Document D2 which was a very old patent dated 1911. The long period which had elapsed between this publication and the invention of the patent in suit although a long felt need existed, as established by the commercial success of the invention, showed in itself that the present invention was not obvious. Document D1 showed a ridge wheel but which was used with a very different technique (dip technique) and its teaching could not be combined with the teaching of Document D2.

XI. At the end of the oral proceedings, the Board announced its decision to reject the main request of the Appellants and to continue the proceedings in writing on the basis of the auxiliary request of the Appellants who were invited to file new independent Claims 1 and 3 according to this auxiliary request written in one-part form and a correspondingly amended description comprising a discussion of the document D1 and in which the embodiments which were no longer covered by the claims should be deleted.

XII. In the course of the following written proceedings, the Appellants filed the requested amended specification and amended claims with a letter dated 25 June 1993 on which the Respondents did not comment.

The documents on file are the following ones:

Main request:

Claims 1 to 7 filed by telecopy on 29 September 1992;
Claims 8 to 10 of the granted patent with the addition in Claim 1, line 8 of the expression "forming a melt

front" after the word "edge", together with a description to be adapted to these claims;

Auxiliary request:

Claims 1 to 10 filed with letter of 25 June 1993 after correction of the clerical mistakes contained in this new copy of the set of claims by adding in Claim 1, after the word "edge" in line 7, the expression "forming a melt front" and by cancelling in Claim 3, last line, the word "either", as requested by the Respondents by telecopy filed on the 28 October 1993.

The independent Claims 1 and 3 according to the auxiliary request of the Appellants read thus as follows:

"1. A method for producing filaments or fibers from molten material, said method comprising rotating a heat extracting substrate (20,34,56,80) about its substantially horizontal axis of symmetry (22,86) and moving its outer surface (18,36,54,60,82) having helically disposed adjacent ridges (81) formed thereon past a region of contact with an edge forming a melt front (16,40,58) of the upper surface of a pool of said molten material (12,32,64,92) so that said molten material (12,32,64,92) solidifies on the outer surface (18,36,54,60,82) and is then removed therefrom, said helically disposed adjacent ridges (81) being caused by the rotation of substrate (20,34,56,80) to carry out an apparent motion with respect to the surface edge (16,40,58) transversely migrating along a generating line of said substrate (20,34,56,80) interfacing the melt front.

3. An apparatus for producing filaments or fibers from a molten material, the apparatus comprising a

receptacle (10,30,48,88,106,122) for containing a pool of molten material (12,32,64,92), said receptacle including a wall portion having an upper generally horizontal edge (16,40,58) forming a melt front relatively lower than the top of said receptacle and over which molten material may be overflowed, a heat extracting substrate (20,34,56,80) spaced from said edge (16,40,58) and mounted to be contacted by the overflowed molten material (12,32,64,92) at the level of the upper surface (62) of the molten material, the substrate being formed as a symmetrical substrate (20,34,56,80) about its axis (22,86) and having helically disposed adjacent ridges (81) formed on the outer surface thereof and means for continuously moving the surface (18,36,54,60,82) of said substrate past the region of its contact with said melt (12,32,64,92) by drivingly rotating it about its substantially horizontal axis of symmetry (22,86), said helically disposed adjacent ridges (81) being caused to carry out an apparent motion with respect to the surface edge transversely migrating along a generating line of said substrate interfacing the melt front by the rotation of the substrate (20,34,56,80)."

Description:

pages 1 to 4, 7, 8, 10 to 12, 18 filed with letter dated 16 November 1992;
pages 5 and 5A, filed with letter dated 25 June 1993;
pages 6, 13 to 17, filed by telecopy on 17 February 1993;
page 9, filed with letter dated 26 March 1993.

Drawings:

those of the granted patent.

Reasons for the Decision

1. Main request

1.1 Allowability of the new set of claims under Article 100(c) EPC

1.1.1 During the examination of the patent application, the claims of the patent have been limited to a method and an apparatus for producing ribbon, filaments, fibre or film in which a heat extracting substrate has a helically formed spiral shaped ridge (see page 5, lines 42 to 45 of the granted patent). In the original application and in the patent as granted, the embodiment of the invention using a ridged substrate has been disclosed as being used for fabricating discrete or continuous fibres of material (see original patent application, page 14, lines 27 to 28 and patent specification page 5, line 47).

1.1.2 No mention that the said ridged substrate may be used for fabricating ribbons or films may be found in the application as filed.

„ 1.1.3 The Appellants have argued that, in the description, the text of Example V which relates to experiments made with the substrates shown in Figures 10 and 11 of the application as filed and Figure 8 of the granted patent having a ribbed surface, contained a passage (page 18, lines 24 to 29 of the application as filed and page 6, lines 59 to 60 of the granted patent) which reads as follows: "Experience has shown that higher speeds will produce better fibers and filaments whereas lower speeds of rotation of the substrate are preferred for ribbons and films". The Appellants have submitted that this passage should be understood as

indicating that the said substrates could be used indifferently for making fibres and filaments or ribbons and films, the only condition to be satisfied for obtaining either of these materials being to adapt appropriately the speed of rotation of the substrate.

1.1.4 The Board cannot agree with the argumentation of the Appellants in this respect. This interpretation is in complete contradiction with the clear statement of the description cited above that the substrate of Figure 8 is used to fabricate fibres or filaments. In view of this contradiction, the Board of appeal considers that the person skilled in the art would understand the mentioned passage as being a general indication, applicable to all embodiments of the invention, that the lower speeds of rotation **tend** to produce ribbon or film-like structures as also explained in document D1 (column 6, lines 58 to 62) but not as implying that **usable** ribbons or films may be produced with the substrate shown in Figure 8.

1.1.5 Claims 1 and 3 of the main request cover therefore embodiments which were not contained in the application as filed so that the conditions of Article 100(c) EPC are not met and these claims are not allowable.

2. *Auxiliary request*

2.1 Allowability of the new set of claims under Article 123(2) and (3) EPC (opposition ground under Article 100(c) EPC)

2.1.1 The claims according to the auxiliary request have been limited to the embodiment in which only fibres or filaments are obtained. This embodiment was already fully disclosed in the application as filed and

claimed in the granted patent. Therefore, the claims according to the auxiliary request satisfy the conditions of Article 123(2) and (3) EPC and are not objectionable under Article 100(c) EPC.

2.2 Sufficiency of disclosure (Art. 100(b) EPC)

2.2.1 It has been objected by one of the Respondents that the invention was not sufficiently disclosed since although it was mentioned that many parameters were to be considered (see page 6, lines 10 to 15 and lines 25 to 29 of the printed specification) no precise information was given as to the range of values of these parameters except as concerns the induction power and the speed of the substrate. As regards the speed range given, no indication was given as to the values to be used to obtain usable fibres except that "higher speed produce better fibers and filaments". This information was not sufficient to allow the person skilled in the art to reproduce the invention without undue experimentation.

2.2.2 The Board is, however, of the opinion that the person skilled in the art is aware that the mentioned parameters have to be adapted in particular to the nature of the melt and that such an adaptation is a matter of routine. As regards the speed range the information that the higher speeds give better results together with the general range of 1500 to 1800 rpm mentioned in Example 1 appears sufficient for allowing the person skilled in the art in each particular case to choose the appropriate speed.

2.2.3 Therefore, the subject-matter of the invention as claimed and described according to the auxiliary request is not objectionable under Article 100(b) EPC.

2.3 Allowability of the claims under Article 52(1) EPC
(opposition ground under Art. 100(a) EPC)

2.3.1 Novelty

2.3.1.1 The document considered as representing the closest prior art is document D1 which discloses a method of making fine filamentary material directly from molten material by rotating the peripheral edge of a machine-threaded cylindrical heat-extracting member in contact with the surface of the molten material. The speed of rotation of the substrate and the dimensions of the ridges as well as the melt temperature have an influence on the average diameter of the filaments or fibres which are obtained.

2.3.1.2 According to this document, the molten material is contained in a vat located below the heat-extracting means. Document D1 does not mention the possibility of disposing the vat in another way.

2.3.1.3 The method which is subject-matter of Claim 1 differs therefore from this state of the art *inter alia* in that the substrate is brought into contact with an edge of the upper surface of the molten material forming a melt front, the helically disposed ridges being caused by the rotation of the substrate to carry out an apparent motion with respect to the surface edge.

2.3.1.4 The other cited documents are further away from the invention as is document D1 and do not disclose a method comprising all the features of Claim 1.

The method which is the subject-matter of Claim 1 is therefore novel.

2.3.2 Inventive step

2.3.2.1 It is already known from document D2, which belongs to the same technical field as the invention, to produce sheets by using a cooled substrate provided with a surface which is brought into contact with an edge of the surface of a molten liquid contained in a vessel having the form of a tray in the region of contact with the substrate.

2.3.2.2 Said document D2 discloses a device having the same general structure as the one described in the present patent except that it is restricted to the fabrication of metal strips, foils, sheets, or ribbons on the surface of a rotating cylinder which is represented as being smooth. The aim of the method according to D2 is "to provide means whereby the molten metal is supplied in a regulated and very even manner without disturbance, so that an equal and steady flow of the molten metal is secured such that the metal strips, sheets, or ribbons, are of equal thickness throughout." (see page 2, lines 18 to 22).

2.2.3.3 Starting from document D1, which is inherently limited to the production of discontinuous filament (see document D1, column 4, lines 43 to 44), the person skilled in the art would not have any reason to consider the teaching of document D2, conceived for making sheets or ribbons with an equal thickness throughout, a problem which does not exist in the case of the production of filamentary material.

2.2.3.4 It has been objected that Document D1 disclosed in its Example 2 (column 6, lines 55 to 62) that it was possible to obtain a sheet-like product with a ridged cylinder at rotational speeds less than 500 rpm so that this would suggest to the skilled person that the

methods for making sheets and the methods for making fibres or filaments were similar and that the result obtained depended only of the speed of rotation of the cylinder. The Board cannot agree with this interpretation. The Board is of the opinion that the person skilled in the art would interpret the information given in Example 2 of Document D1 like the similar information given in Example V of the patent in suit as generally indicating that low speeds of rotation should not be used for obtaining usable fibres or filaments with a ridged cylinder nor high speeds for obtaining usable films or ribbons with a smooth cylinder but not as an information that both cylinders could be used indifferently for obtaining usable fibres, filaments, ribbons or films according to the rotational speed of the cylinder. Therefore, the Board is of the opinion that the Document D1 does not give any information which could lead the person skilled in the art to combine the information of this document with the teaching of Document D2.

2.2.3.5 Starting, on the other hand, from document D2, the person skilled in the art would not have any reason to combine the teaching of this document with the teaching of document D1 since no obvious advantages could be seen in this combination, for the production of sheets or ribbons of equal thickness throughout, in comparison with the use of a smooth surface.

2.2.3.6 It is to be noted in this respect that although document D2 is a very old publication dated 1911, the melt overflow technique which it discloses is a technique well known to the skilled person as evidenced by document D6 (see for example page 2, lines 4 to 15 of this document) which is a European patent application having as priority date the 9 May 1980 and from the same inventor as document D1. In the

span of time between the publication of D1 (18 March 1975) and the priority date of the present patent (14 December 1983), nobody, including the inventor of D1, although he was well aware of the existence of this technique, came to the idea of combining the teachings of these two documents. This fact is also to be taken into account for considering the inventiveness of the subject-matter of the present Claim 1.

2.4 The method which is subject-matter of Claim 1 satisfies therefore the requirements of Articles 52(1) and 56 EPC.

2.5 Claim 2 is referring to Claim 1 and deals with a special embodiment of the method according to Claim 1 and is therefore also allowable.

2.6 The independent Claim 3 concerns an apparatus for producing filaments or fibre.

As said apparatus contains the essential device features corresponding to the method according to Claim 1, said apparatus is also novel and inventive for the same reasons as those which are given for the method claim.

2.7 Claims 4 to 10 refer to Claim 3 and cover particular embodiments of the apparatus. These dependent claims are therefore also allowable for the same reasons.

Order

For these reasons, it is decided that:

1. The main request of the Appellant is rejected.
2. The case is remitted to the first instance with the order to maintain the patent as amended on the basis of the following documents:

Description:

pages 1 to 4, 7, 8, 10 to 12 and 18, filed with the letter dated 16 November 1992,
pages 5 and 5A, filed with letter dated 25 June 1993,
pages 6, 13 to 17, filed with the letter dated 11 January 1993,
page 9 filed with the letter dated 26 March 1993.


Drawings:

those of the granted patent.

Claims:

Claims 1 to 10 filed with letter dated 25 June 1993 with the addition in Claim 1, after the word "edge" in line 7, of the expression "forming an melt front" and deletion in Claim 3, last line, of the word "either".

The Registrar:



A. Townend

The Chairman:



C. Payraudeau