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Datasheet for the decision of 30 April 2013

Case Number: T 1130/10 - 3.3.09

Application Number: 99952615.5

Publication Number: 1131205

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Language of the proceedings: EN

Title of invention:
New high resistance heat-shrinkable thermoplastic film

Patent Proprietor:
Cryovac, Inc.

Opponents:
CFS Kempten GmbH
LUDWIG, Gabriele

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty (yes)"
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1130/10 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 30 April 2013

Appellant: (Opponent 2)	LUDWIG, Gabriele Nadisstraße 31 D-80809 München (DE)
Representative:	Isarpatent Patent- und Rechtsanwälte Postfach 44 01 51 D-80750 München (DE)
Respondent: (Patent Proprietor)	Cryovac, Inc. 100 Rogers Bridge Road Duncan, SC 29334 (US)
Representative:	UEXKÜLL & STOLBERG Patentanwälte Beselerstraße 4 D-22607 Hamburg (DE)
Party as of right: (Opponent 1)	CFS Kempten GmbH Roemerstraße 12 D-87437 Kempten (DE)
Representative:	Kutzenberger, Helga Kutzenberger & Wolff & Partner Patentanwaltssozietät Theodor-Heuss-Ring 23 D-50668 Köln (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted 16 March 2010 concerning maintenance of the European patent No. 1131205 in amended form.**

Composition of the Board:

Chairman: W. Sieber
Members: W. Ehrenreich
R. Menapace

Summary of Facts and Submissions

I. Mention of the grant of European patent No. 1 131 205 in respect of European patent application No. 99 952 615.5, which was filed on 19 October 1999 as International application No. PCT/EP1999/007941 in the name of Cryovac, Inc., was announced on 15 December 2004 in Bulletin 2004/51.

The patent was granted with 10 claims, independent claims 1 and 2 reading as follows:

"1. A seamless tubing of a multi-layer heat-shrinkable film comprising at least
a first outer heat-sealing layer (a) comprising one or more polyolefins;
a second outer abuse layer (b) comprising a polyamide with melting point $\geq$ 175°C; and
an intermediate gas barrier layer (c) comprising PVDC,
wherein the outer heat-sealing layer (a) is the innermost layer of the tubing."

"2. A container obtained from a multi-layer heat-shrinkable film comprising at least
a first outer heat-sealing layer (a) comprising one or more polyolefins;
a second outer abuse layer (b) comprising a polyamide with melting point $\geq$ 175°C; and
an intermediate gas barrier layer (c) comprising PVDC,
wherein all of the layers of the multi-layer heat-shrinkable film are oriented, by a welding involving the outer heat-sealing layer (a), whereby said outer layer (a) is the inside layer of the container and the

outer abuse layer (b) is the outside layer of the container."

Claims 3 to 10 were dependent claims.

II. Oppositions against the patent were filed by

CFS Kempten GmbH on 15 September 2005 - opponent I; and
Gabriele Ludwig on 14 September 2005 - opponent II.

The oppositions were based on the grounds of Article 100(a) EPC (lack of novelty and lack of inventive step), and Article 100(c) EPC.

The opponents relied on a number of documents, including

D2 US-A 4 399 181;
D4 EP-A 0 447 988;
D12 Ullmann's Encyclopedia of Industrial Chemistry, Fifth Edition, vol. 21, p. 196 (1992);
D14 US-A 4 777 095;
D15 Product Specification Nylon Resin "Amilan CM6041 XF"; and
D16 EP-A 0 107 854.

III. With its interlocutory decision announced orally on 17 December 2009 and issued in writing on 16 March 2010, the opposition division maintained the patent in amended form on the basis of claims 1 to 10 according to the auxiliary request filed during the oral proceedings at 13.41. The claims were based on the claims as granted, with the following amendments:

– in claim 1 the abuse layer (b) was defined as "comprising at least 50% by weight of polyamide with melting point ≥ 175°C";

– in claim 2 layer (b) was defined as above, and the orientation was now defined as "wherein the film has been oriented so that all of the layers of the multi-layer heat-shrinkable film are oriented, … " (amendment underlined).

In the opposition division's view, the claims of the auxiliary request satisfied Articles 100(c)/123(2) EPC. The subject-matter as defined in independent claims 1 and 2 of this request was new over D2 and D4. As regards inventive step, the opposition division held that it appeared credible that the requirement in claims 1 and 2 of a melting point above 175°C for the polyamide was conductive to the solution of the problem of providing a film-type container having satisfactory stack/overlap sealing capability. Since none of the documents referred to by the opponents addressed this problem, inventive step was acknowledged.

IV. Notice of appeal against the decision were filed by

– the proprietor on 25 May 2010, and

– opponent II on 26 May 2010.

The respective appeal fee was paid on the day on which the notice of appeal was filed.

As the proprietor and opponent II are respectively appellant and respondent in these proceedings, for simplicity the board will continue to refer to them as the proprietor and opponent II.

V. On 19 July 2010 the proprietor filed the statement of grounds including the following initial requests:

- maintenance of the patent as granted (main request);
- maintenance of the patent on the basis of the set of claims filed during the oral proceedings on 17 December 2009 at 10.01h (first auxiliary request),
- maintenance of the patent on the basis of the claims as allowed by the opposition division (second auxiliary request).

VI. On 26 July 2010 opponent II filed its statement of grounds and requested that the patent be revoked.

Enclosed with the grounds was a new prior art document

D19 US-A 5 139 805.

VII. With its letter dated 9 February 2011 the proprietor filed claim set B as a third auxiliary request. Furthermore it requested that D19 should not be admitted into the proceedings.

VIII. On 19 February 2013 the board, in preparation for the oral proceedings scheduled for 30 April 2013, issued a communication and gave its preliminary observations on essential issues, in particular added subject-matter (Articles 100(c) and 123(2) EPC, novelty and inventive step (Articles 100(a), 54 and 56 EPC).

Concerning novelty the board raised *inter alia* the question whether the melting point of $\geq$ 175°C of the polyamide in layer (b) required by claims 1 and 2 of all requests was an inherent property of the polyamide of the type PA 66/6 disclosed in the documents D2 and D19.

With respect to the claims of the third auxiliary request (claim set B submitted with the letter dated 9 February 2011) the question was raised whether the use of the polyolefin/polyolefin blends now specified in claims 1 and 2 was obvious from the prior art.

IX. By letter dated 18 February 2013 opponent I (party as of right) informed the board that it would not attend the oral proceedings. Apart from that, opponent I did not file any submissions or requests.

X. Oral proceedings were held before the board on 30 April 2013. In accordance with its letter of 18 February 2013, opponent I did not attend. At the beginning of the oral proceedings the proprietor withdrew its main, first and second auxiliary requests so that claim set B filed with its letter of 9 February 2011 became its main request. Claim 1 of this request contains a more precise definition of the polyolefin component comprised in layer (a) and reads as follows:

"1. A seamless tubing of a multi-layer heat-shrinkable film comprising at least
a first outer heat-sealing layer (a) comprising one or more polyolefins;

a second outer abuse layer (b) comprising at least 50% by weight of a polyamide with melting point $\geq$ 175°C; and an intermediate gas barrier layer (c) comprising PVDC, wherein the outer heat-sealing layer (a) is the innermost layer of the tubing, and
wherein the heat-sealing layer (a) comprises a single polyolefin or a blend of two or more polyolefins with melting temperature < 140°C selected from heterogeneous or homogeneous ethylene-(C_4-C_8)-α-olefin copolymers having a density $\leq$ 0.915 g/cm^3 and blends thereof with minor amount of polyethylene homopolymers and/or ethylene-vinyl acetate copolymers."

The same definition of layer (a) is also part of claim 2.

A further claim set C was submitted as an auxiliary request. In distinction to the claims of the main request, the melting temperature and the density of the polyolefin component in layer (a) are limited to ranges "between 80 and 128°C" and "comprised between 0.895 g/cm^3 and 0.912 g/cm^3", respectively.

Both parties presented further documents concerning the melting point of nylon 6/66 copolymers, namely

D12a eXPRESS Polymer letters, vol. 1, No 10 (2007), pages 641-653 (proprietor), and

D12b "Nylon Plastics Handbook" 1995, page 71 (opponent II).

XI. The arguments of opponent II provided in writing and orally, as far as they concern the subject-matter of

the main request and the auxiliary request, are summarized in the following.

(a) Novelty

The tubular film characterised in table 5, Run No. 18 of D2 comprises a first (outer) layer consisting of Ny_2, which is a nylon 6/66 copolymer, a fourth gas barrier layer of PDC-1, which is a vinylidene chloride-vinyl chloride copolymer, and a fifth (outer) layer of SBC_{321}, which comprises 20% by weight of an ethylene-1-butene-elastomer having a Vicat softening point (VSP) of 52°C and a density of 0.88 g/cm^3. The VSP of 52°C implies that the melting temperature of the elastomer is <140°C as defined in claim 1 of the main request. Also, the density falls within the claimed range of $\leq$ 0.915 g/cm^3.

According to D12 the minimum melting point of a nylon 6/66 copolymer is about 180°C at a caprolactam content of 40 wt.%, which lies within the range of $\geq$ 175°C as required by claim 1. That nylon 6/66 copolymer generally has a melting point of 180°C or more is also confirmed by document D12b, which shows in table 4.1 on page 71 that nylon 6/66 copolymers with the ratios 80/20, 60/40 and 20/80 have melting points of 195°C, 180°C and 240°C, respectively. The melting point of $\geq$ 175°C is therefore an implicit feature of Ny_2 used in D2.

It is common to use the outer layer with the lowest melting point as the heat-sealing layer. Because of the relatively high melting point of

nylon 6/66 in comparison to the Vicat softening point of the polyolefin component in SBC_{321}, it is thus clear to a skilled person that the first Ny_2 layer is the outer abuse layer and the fifth SBC_{321} layer is the innermost heat sealing layer of the tubular film of Run No. 18, as required by claim 1.

Thus, the film of Run No. 18 explicitly and implicitly discloses all features of claim 1. D2 therefore anticipates the subject-matter of claim 1 of the main request.

Novelty of the subject-matter of the auxiliary request is acknowledged in view of the further limitations of the melting temperature and density of the polyolefin component, now being in the range between 80°C and 128°C and between 0.895 g/cm^3 and 0.912 g/cm^3, respectively.

(b) Inventive step

Apart from document D14, document D2 may be considered to represent the closest prior art. This is all the more so as claim set B, which includes in claims 1 and 2 the more precise definition of the polyolefin component in layer (a), now constitutes the main request. This document relates to multilayer heat-shrinkable thermoplastic films for food packaging purposes having good heat-sealing strength and barrier properties. It thus lies in the same technical filed as the claimed invention. According to example 4 of D2, a film is provided in tubular form, which, in the embodiment of Run No. 18, has

a layer sequence as claimed, including a nylon 6/66 copolymer (Ny_2) outer layer, a gas barrier intermediate layer comprising PVDC and a further outer layer comprising a thermoplastic ethylene-α-olefin copolymer having heat-sealing properties and therefore (as mentioned above under novelty) representing the innermost layer of the tube.

The tubular film according to claim 1 of the main request differs therefrom only in that the melting point of the polyamide has to be equal to or greater than 175°C. However, no specific technical effect has been shown by the respondent which is linked to the specific melting point of the polyamide. Thus, the problem to be solved by this difference merely consists in the provision of an alternative multilayer tubular film.

For a skilled person starting from D2 as the closest prior art it would therefore be a matter of routine to replace the outer Ny_2 layer in the example of D2 by another commercially available nylon 6/66 copolymer having a melting point above 175°C, like those disclosed in D12 and D15. The subject-matter of claim 1 of the main request thus lacks an inventive step over a combination of D2 with D12 or D15.

The limited melting temperature and density of the polyolefin component in layer (a) according to claim 1 of the auxiliary request do not provide a specific technical effect either. This limitation thus constitutes an arbitrary selection on which no inventive step can be based.

XII. The counter arguments of the proprietor are as follows:

(a) Novelty

No direct and unambiguous disclosure is found in D2 that the nylon 6/66 copolymer "Ny_2" used in the preparation of the film in Run No. 18 has a melting point within the claimed range of $\geq$ 175°C. The allegation of opponent II that nylon 6/66 copolymers generally have a melting point above 175°C is not correct in view of the disclosure in document D12b, from which it can be derived that nylon 6/66 copolymers with a melting point below 175°C exist. In this document a melting point of 148°C is reported for the commercially available polyamide 6/66 "Tufnyl 120".

Thus, D2 does not implicitly and unambiguously disclose that the polyamide 6/66 "Ny_2" has a melting point above 175°C. For this reason alone D2 does not anticipate the subject-matter claimed in claim 1 of the main request.

The same applies to claim 1 of the auxiliary request.

(b) Inventive step

The problem to be solved by the claimed invention was the provision of tubular films having good optical and mechanical properties in combination with good heat shrink, sealability/seal strength and stack/overlap capability. According to claim 1

of the main and auxiliary requests, the innermost heat-sealing layer (a) of the tube is a specific polyolefin having a significantly lower melting point than the outermost abuse polyamide layer (b) in order to optimize puncture resistance and to balance the other properties of the tubular film.

D2, favoured by opponent II as the closest prior art, is not related to these objectives and in particular not to the problem of stack/overlap sealing capacity. Moreover, the opponent's view that there is an implicit disclosure in D2 that the first Ny_2 layer of the tubular film of Run No. 18 is the outermost layer and the fifth SBC_{321} layer comprising a specific olefin-copolymer is the innermost layer, is not accepted in view of the layer sequence of tubular films disclosed in D16. Examples 1 and 7 of this document disclose a 5-layer tubular film with the layer sequence in the order of D/B/A/B/C from the inner to the outer, wherein the inner layer D represents a nylon 6/66 copolymer and layer C is a low density polyethylene. The same applies to the film of example 8 with the order D/B/A/B/E. The disclosure in D16 that the polyamide layer D is the inner and C/E is the outer layer clearly implies that a polyamide layer generally can also constitute the innermost layer of a tubular film.

There is no disclosure found in D2, either alone or in combination with D16, which would incite the skilled person to provide a multilayer tubular film having an outermost polyamide layer and an innermost heat-sealing layer comprising a specific

polyolefin, wherein the melting point of the heat-sealing polyolefin layer is significantly different from that of the polyamide layer in order to provide films with good stack/overlap sealing capacity.

As far as the subject-matter of the auxiliary request is concerned, it was in particular not obvious from D2 to replace the ethylene-α-olefin component in the SBC_{321} layer of the film of Run No. 18 in D2 by a polyolefin component with the specific melting point and density range as defined in claim 1.

XIII. The appellant/proprietor requested that the decision under appeal be set aside and that the patent be maintained on the basis of the claims of Set B enclosed with the letter dated 9 February 2011 (main request) or on the basis of the claims of Set C as filed during the oral proceedings before the board (auxiliary request).

XIV. The appellant/opponent II requested that the decision under appeal be set aside and the patent be revoked.

Reasons for the Decision

1. The appeals are admissible.

2. Amendments - Articles 84 and 123(2) EPC

2.1 Opponent II had no objections of clarity and added subject-matter against the claims of the main request.

2.2 With regard to the claims according to the auxiliary request, opponent II argued that problems under Article 123(2) could arise because the introduced definitions of a specific density range and a melting temperature range for the polyolefin component in the heat-sealing layer (a) resulted from multiple selections from the disclosure in the application as filed.

However the board agrees with the proprietor that claims 6 to 8 as filed (represented by the WO-A 00/26024) provide a proper basis for the amendments in the auxiliary request. These claims not only disclose the individual features introduced into claims 1 and 2 of the auxiliary request, the claim structure also points towards the combination of these features. Thus claim 8 as filed supporting the density range between 0.895 g/cm^3 and 0.912 g/cm^3 refers back to claim 7 defining the polyolefin component, which in turn refers back to claim 6 supporting the melting temperature range between 80°C to 128°C. Thus, the amendments in the auxiliary request meet the requirements of Article 123(2) EPC.

In the board's view, the amendment also does not introduce a lack of clarity contrary to Article 84 EPC.

3. Novelty

3.1 An essential feature of the seamless tubing claimed in claim 1 according to the main and auxiliary requests is the presence of at least 50% by weight of a polyamide with a melting point $\geq$ 175°C in the abuse layer (b).

3.2 Novelty over D2

D2 was the only document which was considered by opponent II to be novelty-destroying for the subject-matter of the main request.

Run No. 18 in example 4 of D2 discloses a five-layer tubular film wherein the first layer is "Ny_2", which, according to column 35, line 19, represents a "nylon 6/66 copolymer". However its melting point is not indicated. In this context opponent II referred to D12 and D12b (point XI (a)) in order to demonstrate that nylon 6/66 copolymers generally have a melting point above 175°C and therefore the Ny_2-layer in Run No. 18 anticipates the abuse layer (b) according to claims 1 and 2.

However, in view of document D12a provided by the proprietor, the board cannot accept the argument of opponent II that D12 and D12b provide evidence that any nylon 6/66 has a melting point above 175°C. D12a indeed discloses a nylon 6/66 with the trade name "Tufnyl 120" which has a melting point of 148°C, i.e. well below 175°C. This disclosure implies that not any polyamide 6/66 has a melting point above 175°C. The mere disclosure in D2 that the polyamide "Ny_2" is a "nylon 6/66 copolymer" is therefore not considered to be an unambiguous implicit disclosure that a polyamide 6/66 with a melting point above 175°C is used in D2. For this reason alone, D2 does not anticipate the subject-matter claimed in the main request or, by the same token, that of the auxiliary request.

3.3 Since, in the board's judgment and in agreement with the parties, none of the other documents cited anticipates the subject-matter claimed in the main and auxiliary requests, novelty is acknowledged.

4. Inventive step - main request

4.1 The patent in suit lies in the technical field of heat-shrinkable thermoplastic multilayer tubular films having good shrink properties, good optical properties, good mechanical properties and heat-sealing performance, and containers made therefrom (patent specification, paragraphs [0001] and [0002]). In particular, the films should have good gas barrier properties and mainly good sealing performance (paragraph [0004]).

4.2 In view of the limitation in claims 1 and 2 of the new main request concerning the polyolefin component in layer (a), the board agrees with opponent II that D2 represents the closest prior art.

4.2.1 D2 relates to thermoplastic multilayer shrinking films having good mechanical, optical and heat-sealing properties (column 7, lines 8 to 36). According to example 4 of D2, multilayer tubular films are prepared having good thermal shrinkage, good mechanical properties (tensile strength, tensile elongation, modulus of elasticity) and sealing strength (tables 5 and 6 in columns 33/34 and 35/36). As is apparent from table 5, the tubular film obtained in Run No. 18 is a five-layered film comprising a first outer layer of Ny_2, which is a nylon 6/66 copolymer (column 35, line 19), a fourth intermediate PDC-1 gas barrier layer, which is a vinylidene chloride-vinyl chloride copolymer (column 35,

lines 5 to 8), and a fifth outer SBC_{321} layer, which is a blend of 60% by weight of an ethylene-ethylacrylate copolymer and 20% by weight of a thermoplastic ethylene-1-butene copolymer elastomer with a melt index (MI) of 2.0, a Vicat softening point of 52°C and a density of 0.88 g/cm^3.

4.2.2 In view of documents D12, D12a and D12b submitted by the parties concerning the melting points of polyamide 6/66 copolymers, it is evident that the melting point of Ny_2 according to Run No. 18 of D2 lies well above 140°C and is therefore above the melting point of the ethylen-1-butene copolymer in SBC_{321} because its Vicat softening point of 52°C implies, as pointed out by opponent II, a melting point well below 140°C.

The board agrees with opponent II that in multilayer films with heat-sealing properties the heat-sealable layer is the external layer with the lowest melting point and that the SBC_{321} layer of the film in Run No. 18 of D2 is thus the innermost heat-sealing layer of the tube. The board is therefore satisfied that the layer sequence of the film of Run No. 18 in D2 comprising a first Ny_2-layer, a fourth PDC-1 layer and a fifth SBC_{321}-layer corresponds to the layer structure of the tubular film as required by claim 1 of the main request.

4.2.3 Nor can the proprietor's reference to examples 1 and 7 of D16 which describe a tubular film of the layer sequence D/B/A/B/C wherein the innermost layer D is a nylon 6/66, cast doubt on the above conclusion on the layer sequence for the film obtained in Run No. 18 of D2, because

- D16 is not concerned with heat-sealing the tubular films, but rather
- a package made by the tubular film of examples 1 and 7 is closed by clipping (page 34, paragraph 3 and page 41, last paragraph).

Furthermore, example 8 of D16 does not provide evidence that the nylon 6/66 layer D in the layer sequence D/B/A/B/E is a heat sealing layer because the disclosure *"after filling ... and sealing the ends"* does not mention which of the outer layers D or E are sealed and whether or not they are sealed under heat.

4.2.4 In summary, D2 discloses all features of a seamless tubing as claimed in claim 1 of the main request apart from a melting point $\geq$ 175°C for the polyamide of the second outer abuse layer (b)

4.3 In the light of D2 as the closest prior art, the proprietor saw the problem underlying the claimed invention as being the provision of a film having a good stack/overlap sealing capacity.

4.4 As a solution to this problem the main request provides a tubular multilayer film wherein the second outer abuse layer (b) comprises at least 50% by weight of a polyamide with melting point $\geq$ 175°C.

4.5 The experimental evidence presented in the patent specification investigates properties such as free shrink, haze, gloss, modulus, tensile strength, elongation at break, puncture resistance and in-line abuse resistance of multilayer films prepared in

examples 1 to 28 according to the invention (tables 1, 2 and 3). However, the experimental results do not demonstrate that a specific technical effect is linked to a minimum melting point of 175°C for the polyamide in layer (b). Thus it has not been demonstrated that the problem defined by the proprietor is credibly solved by selecting a specific lower limit for the melting point of the polyamide in layer (a).

4.6 Therefore a less ambitious problem has to be defined for the invention claimed in claim 1 of the main request, namely the provision of an alternative multilayer tubular film. There can be no doubt that this problem is solved by a tubular film according to the main request.

4.7 It remains to be decided whether the solution to this problem, namely the use of a polyamide with a minimum melting point of $\geq$ 175°C in the abuse layer (b), is obvious from the prior art.

In the absence of a technical effect caused by the claimed range of $\geq$ 175°C, this range is an arbitrary selection, and it would be a matter of routine for a skilled person to select any common polyamide 6/66 component for the "Ny_2"-layer in D2, for instance those mentioned in D12 or D12b having melting points above 175°C.

The subject-matter of claim 1 of the main request is therefore not based on an inventive step.

5. Inventive step - auxiliary request

5.1 In claim 1 of the auxiliary request, the density and the melting point of the polyolefin component in the first outer heat-sealing layer (a) are limited to ranges between 0.895 g/cm^3 and 0.912 g/cm^3, and between 80°C and 128°C respectively. This limitation brings the film of claim 1 of the auxiliary request further away from Run No. 18 of example 4 of D2, because the ethylene-1-butene elastomer in the fifth outer SBC_{321} layer of Run No. 18 is no longer covered by the definition of claim 1.

Nevertheless D2, and in particular Run No. 18 of example 4, remains the closest prior art for the assessment of the inventive step of the subject-matter of the auxiliary request.

5.2 Since it has not been shown that a reduced density and melting point of the polyolefin component in layer (a), alone or in combination with a melting point $\geq$ 175° for the polyamide in the second outer abuse layer (b), have a specific effect, the objective technical problem remains the provision of an alternative to the multilayer tubular film of D2.

5.3 In view of the disclosure in column 11, lines 29 to 39 of D2 that the density of the ethylene-α-olefin copolymer should not exceed 0.91 g/cm^3 and that the Vicat softening point can be as low as 40°C (which implies that its melting point can be lower than that of the ethylen-1-butene copolymer used in Run No. 18), the skilled person would not be prevented from replacing the ethylen-1-butene elastomer in the SBC_{321}-

layer of Run No. 18 by an ethylen-α-olefin of reduced density and melting point.

Consequently, the further limitation has to be considered an arbitrary selection from the general teaching of D2.

The subject-matter of claim 1 of the auxiliary request is therefore not inventive either.

6. In summary, both the main and auxiliary request are not allowable because the subject-matter of the respective claim 1 does not involve an inventive step.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar The Chairman

M. Cañueto Carbajo W. Sieber