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D E C I S I O N
of 12 January 1994

Case Number: T 0968/91 - 3.3.3

Application Number: 82102464.3

Publication Number: 0062800

IPC: C08J 5/18

Language of the proceedings: EN

Title of invention:

Shrinkable polyamide film and process for its production

Patentee:

Unitika Ltd.

Opponent:

- (1) BASF Aktiengesellschaft
- (2) Sohta Asahina
- (3) Naturin-Werk Becker & Co.

Headword:

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Relevant legal norms:

EPC Art. 54, 56

Keyword:

"Novelty (yes) - implicit disclosure (no)"
"Inventive step (yes) - ex post facto analysis"

Decisions cited:

T 0219/83 (OJ EPO 1986, 211)

Catchword:

-



Case Number: T 0962/91 - 3.3.3

DECISION
of the Technical Board of Appeal 3.3.3
of 12 January 1994

Appellant:
(Opponent 03)

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Decision under appeal: Decision of the Opposition Division of the European Patent Office dated 11 September 1991, posted on 15 October 1991 rejecting the oppositions filed against European patent No. 0 062 800 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: F. Antony
Members: C. Gérardin
G. Davies

Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 062 800 in respect of European patent application No. 82 102 464.3 filed on 24 March 1982 and claiming the priority of 14 April 1981 from two earlier applications in Japan, was published on 26 November 1986 on the basis of four claims, the three independent claims reading as follows:

"1. Biaxially stretched shrinkable polyamide film composed of a copolymer of 6,6-nylon/6-nylon in a weight ratio within a range of from 5/95 to 25/75 and having a hydrothermal shrinking ratio of at least 30% in both MD and TD and a hydrothermal shrinkage stress of from 300 to 700 g/mm².

2. A biaxially stretched shrinkable polyamide film composed of a copolymer of 6,6-nylon/6-nylon in a weight ratio within a range of from 5/95 to 25/75, coated on at least one side thereof, with a polyvinylidene chloride resin so that its solid content after the stretching is at least 0.5 g/m² and having a hydrothermal shrinking ratio of at least 30% in both MD and TD, a hydrothermal shrinkage stress of from 300 to 700 g/mm² and an oxygen gas permeability of not more than 20 cm³/m²•24h.bar as measured by the Mocon method (ASTM-D 3985-81).

3. A process for producing a shrinkable polyamide film having a hydrothermal shrinking ratio of at least 30% in both MD and TD and a hydrothermal shrinkage stress of from 300 to 700 g/mm², which process comprises biaxially stretching a substantially amorphous film composed of a copolymer of 6,6-nylon/6-nylon in a weight ratio within a range of from 5/95 to 25/75 at a temperature of not higher than 120°C and at a stretching ratio of at least

2.5 times in both MD and TD, and subjecting the stretched film to stress relaxation at a temperature of from the stretching temperature to 170°C, followed by winding it up."

Claim 4 is a dependent process claim directed to a particular embodiment of the process according to Claim 3.

II. On 8 August 1987, 26 August 1987 and 26 August 1987, respectively, three notices of opposition were filed against the grant of the patent, and revocation thereof in its entirety was requested for non-compliance with the requirements specified under Article 100(a) EPC, more specifically for lack of novelty and inventive step of both the product and the process, as well as under Article 100(b) EPC, the latter point being raised by Opponent 1 only, and without being substantiated. These objections, which were emphasised and elaborated on in several later submissions as well as during oral proceedings, were based essentially on the following documents:

- (1) JP-A-53 037 773 (German translation) and
- (4) DE-A-2 850 182.

III. By a decision delivered at the end of oral proceedings on 11 September 1991, with written reasons posted on 15 October 1991, the Opposition Division rejected the oppositions. In this decision novelty of the claimed subject-matter was first acknowledged; on the one hand, document (1) did not describe a hydrothermal shrinking ratio and a hydrothermal shrinking stress within the terms of the patent in suit, and, on the other hand, the composition of the polyamide according to document (4) did not fall within the ranges specified in the patent in suit. Further, the claimed subject-matter involved an

inventive step, in particular with regard to document (4), which was considered to be the closest state of the art; with regard to that teaching, the lower limit of 5% of the amount of polyamide 6,6 in the copolymer was not arbitrary. Nor would a combination with document (1) lead to the patent in suit, since this latter citation was not concerned with shrinkable films, but with thermally stabilised films having a low shrinkage.

IV. The Appellant (Opponent 3) thereafter filed a notice of appeal against this decision on 11 December 1991 and paid the prescribed fee at the same time.

(i) Together with the Statement of Grounds of appeal filed on 13 February 1992, the Appellant submitted an experimental test report, from which it appeared that the shrinking properties of a biaxially stretched film of polyamide 6 as described in Example 1 of document (4) were at least as good as, if not better than, those of a biaxially stretched film of polyamide 6,6 within the terms of the patent in suit. It followed that the properties of polyamide films were inherent.

(ii) During oral proceedings held on 12 January 1994, the Appellant maintained the objection of lack of novelty of the claimed subject-matter with regard to the teaching of document (4). The mention of various polyamides in that citation, such as polyamide 6 and polyamide 6,6 as well as copolymers thereof, could be equated with the disclosure of copolyamide 6/6,6 in various proportions, thus in particular of copolyamides according to the patent in suit.

(iii) Even if novelty were to be acknowledged, the claimed subject-matter would not involve an inventive step with regard to the combined teachings of documents (1) and (4). In particular, document (1) showed that the difficulties mentioned in document (4), which were obviously caused by a too high crystallinity, could be overcome by incorporating a small amount of polyamide 6,6; in the absence of any technical effect, that compositional feature could not be inventive.

V. In its written and oral submissions, the Respondent (Patentee) first relied on the grounds given by the Opposition Division in its decision regarding the issue of novelty; it then pointed out that the measurement conditions used in the Appellant's experiment, in particular the acid pH conditions, did not correspond to those indicated in the patent specification. Further, the difficulties reported in document (1) were not related to crystallinity, but to high speed of production causing instability; in fact, it was not legitimate to combine the teachings of documents (4) and (1), since the latter was not directed to shrinkable foils.

VI. Opponents 1 and 2 being parties to the procedure as of right had been duly summoned to oral proceedings, but informed the Board on 7 August 1993 and 23 August 1993, respectively, that they would not attend the hearing.

VII. The Appellant requested that the decision under appeal be set aside and that the patent be revoked.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is admissible.
2. The first point to be decided is the relevance of the test report submitted by the Appellant together with the Statement of Grounds of Appeal, since the experimental conditions of that test have been objected to by the Respondent.

According to this experiment, which is said to have been carried out in accordance with Example 1 of DE-A-2 850 182, i.e. document (4), the hydrothermal shrinking properties of a polyamide 6 film which had been stretched biaxially at a pH of 5.5 have been determined. The average of 10 measurements shows a longitudinal hydrothermal shrinking ratio of 33%, a transversal hydrothermal shrinking ratio of 30% and a hydrothermal shrinking stress of 522 g/mm². These three figures would meet the requirements expressed in Claim 1 of the patent in suit.

The experimental conditions applied, however, do not correspond to the working conditions indicated in the patent in suit. Whereas the samples in the patent specification are immersed in boiling water for the determination of the hydrothermal shrinking properties (page 3, lines 1 to 8), they are treated under acidic conditions in the comparative experiment. As correctly pointed out by the Respondent during oral proceedings, crystallinity of polyamides being achieved at least partially by hydrogen bonding, any increase in protons due to acidic conditions will affect the crystallinity of the polymer and thereby the mechanical properties of the sample, which makes the experimental results

provided by the Appellant inconclusive. This crucial argument has been left unanswered by the Appellant.

It follows that it cannot be assumed that a shrinkable film of polyamide 6 has shrinking properties within the terms of the patent in suit and that, more generally, these properties cannot be regarded as inherent, as will appear hereinbelow.

3. Even if, for the sake of argument, it were assumed that the shrinking properties of the polyamide films disclosed in document (4) implicitly met the requirements specified in Claim 1 of the patent in suit, such a teaching would not be novelty destroying.

According to the broadest definition in document (4), the polymer regarded as suitable to prepare films for wrapping can be any polyamide, provided the glass transition temperature thereof is at least 48°C for the dry product and at most 3°C for the wet product (Claim 1). According to a more specific definition, appropriate polyamides comprise various homopolyamides, such as polyamide 6 and polyamide 6,6, as well as mixtures and copolymers thereof (Claim 2; page 6, paragraph 2). Specifically, only polyamide 6 (Example 1), a copolyamide of polyamide 6, polyamide 6,6 and polyamide 6,10 in the weight ratios 16:55:29 (Example 2), and a **mixture** of polyamide 6 and polyamide 6,6 in the weight ratio 19:81 (Example 3) are exemplified. There is thus no explicit disclosure of any **copolymer** of polyamide 6 and polyamide 6,6 in document (4). Even if, however, following the Appellant's argument, an implicit disclosure of such a product were to be assumed, this would amount, in the absence of any weight proportions, merely to a generic disclosure, whereas by contrast the range limiting the weight ratio of the two components of the copolymer in the patent in

suit defines a more specific product. It follows that, even on the basis of that assumption which the board does not accept, the claimed subject-matter could still be regarded as a selection within the prior art disclosure, and thus as novel.

4. Like the patent in suit, thus, document (4) concerns a biaxially stretched shrinkable polyamide film. The polyamide, which is not defined by its structural recurring units, but by the glass transition temperatures in the wet and dry states, is first extruded, then biaxially stretched at a stretching ratio between 1.5 and 4 (Claim 1 in conjunction with page 6, last paragraph). In practice, a homopolymer of polyamide 6, a copolyamide of polyamide 6 or a mixture based on polyamide 6 is biaxially stretched at a stretching ratio of 3 or slightly more (Examples 1 to 3). Although these films are said to be suitable in the food industry for wrapping sausage and cheese (page 1, paragraph 1 to page 2, paragraph 6), the balance of hydrothermal ratio and hydrothermal shrinking stress properties cannot be regarded as optimal.

In the light of this shortcoming, the problem underlying the patent in suit can thus be seen in the provision of a polyamide film having an improved balance of shrinking properties.

According to the patent in suit, this problem is solved by a biaxially stretched polyamide film of a copolymer of polyamide 6,6/polyamide 6 in a weight ratio within a range of from 5/95 to 25/75, whereby a hydrothermal shrinking ratio of at least 30% in both longitudinal and transversal directions as well as a hydrothermal shrinkage stress of from 300 to 700 g/mm² can be achieved.

In view of the experimental results in Table 8 of the patent in suit, which show that these conditions are met simultaneously only by copolymers of polyamide 6,6/polyamide 6 within the terms of Claim 1, the Board is satisfied that the above-defined technical problem is effectively solved. Additionally, these results provide evidence that, contrary to the Appellant's assertion, these properties are not independent from the polymer composition.

5. It remains to be decided whether the claimed subject-matter involves an inventive step having regard to the teaching of the documents relied upon by the Appellant.

5.1 Neither the general teaching of document (4) in isolation, nor the specific embodiments illustrated in Example 1 would lead the person skilled in the art to a solution as defined in the patent in suit.

5.1.1 Although the introduction of this citation makes reference to many desirable properties (page 1, paragraph 2 to page 2, paragraph 6 and page 7, paragraph 1 to page 8, paragraph 1), there is no mention of hydrothermal shrinking ratio or hydrothermal shrinking stress, let alone of a control of these two parameters. On the contrary, closer examination of the requirements to be met by the polyamide films shows that strength at high temperatures and flexibility at low temperatures are clearly of particular interest; this is confirmed by the general definition of the polyamides, which is not given in terms of compositional features, but by means of a range between two glass transition temperatures, the lower one being 3°C, preferably -5°C and more preferably -20°C (Claim 1). This is further confirmed by the experimental data of Table 1, page 12, wherein various mechanical properties of the polyamide films according to document (4) and of previously known

films are compared, but not their shrinking properties. It is thus evident that no information useful to improve the balance of shrinking properties can be derived from this disclosure.

- 5.1.2 As far as Example 1 is concerned, the difficulties mentioned as occurring occasionally during stretching are not further specified (cf. lines 12 to 14), which leaves the interpretation thereof open to conjecture. Whereas the Appellant argued that a skilled person would be aware that these difficulties were caused by the use of a polycaprolactam homopolymer, were thus related to the composition and the crystalline structure, and that, therefore, the use of a copolymer instead would be self-evident, the Respondent contended that this instability merely resulted from the high production speed of the continuous process. In the Board's view, the passage referred to is in fact so vague that a clear-cut interpretation is impossible.

This situation corresponds to that discussed in Decision T 219/83 "Zeolite/BASF" OJ EPO 1986, 211, where a Board was faced with contradictory assertions made by two parties. In that case, the Board decided that (i) it was not sufficient in opposition proceedings for an opponent to impugn a granted patent with an assertion which could not be substantiated; (ii) if the European Patent Office was unable to establish the facts of its own motion, it was the party whose arguments rested on these alleged facts who lost thereby; and (iii) in such cases the ruling went against the opponent as appellant if he was unable to substantiate an assertion which could disprove the existence of an inventive step (Reasons for the Decision, point 12, paragraphs 4 and 5).

For the same reasons, the Board concludes that in the present case the Appellant's assertion regarding the

interpretation of the difficulties mentioned in Example 1 can only be treated as an unproven supposition.

- 5.1.3 It follows that document (4) taken in isolation cannot contribute to the solution of the above-defined technical problem.
- 5.2 Document (1) describes a process for the preparation of polyamide films by biaxially stretching substantially amorphous films composed of a copolyamide obtained by polymerising ϵ -caprolactam in the presence of 0.5 to 20 mol% of a salt of an aliphatic diamine and an aliphatic or aromatic dicarboxylic acid (Claim 1). According to a preferred embodiment, this salt derives from hexamethylene diamine and adipic acid (page 6, paragraph 2) giving rise to polyamide 6,6.

Although these compositional features would at first sight seem to constitute the missing link between document (4) and the patent in suit, this teaching cannot in fact be considered in combination with that of document (4) for the solution of the above-defined problem. As mentioned in document (1), the biaxial stretching treatment aims at the preparation of a polyamide film having a good dimensional stability, in particular thus a **small** shrinking ratio (page 9, paragraph 3). This is best illustrated by Example 4, according to which a film obtained from a copolymer of polyamide 6 and polyamide 6,6 in a molar ratio of 92:8 has a longitudinal hydrothermal shrinking ratio of 2.1% and a transversal hydrothermal shrinking ratio of 1.8%, the hydrothermal shrinkage stress not even being indicated. Such figures, which correspond to thermofixed films, show that, contrary to the object of the patent in suit, shrinkability has to remain low. Under these circumstances, the fact that in this citation a

copolyamide within the terms of the patent in suit is used is irrelevant for the solution of the above-defined technical problem. A combination of the teachings of documents (1) and (4), as made by the Appellant in both its written and oral submissions, results from an analysis based on hindsight, which is inadmissible.

5.3 It follows that the subject-matter as defined in Claim 1 of the patent in suit cannot be derived in an obvious manner from the prior art documents relied upon by the Appellant and, therefore, involves an inventive step.

6. Similar considerations apply to the other two independent claims, namely Claims 2 and 3, which comprise all the features of Claim 1 and are thus based on the same inventive concept. Claim 4, which is directed to a preferred embodiment of the process according to Claim 3, is therefore allowable as well.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

F. Antony