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D E C I S I O N
of 22 March 2001

Case Number: T 1092/97 - 3.2.6

Application Number: 90900366.7

Publication Number: 0457905

IPC: D04H 1/56

Language of the proceedings: EN

Title of invention:
Extensible non-woven fabric and its production method

Patentee:
Asahi Kasei Kogyo Kabushiki Kaisha

Opponent:
Heinz Lehner

Headword:
-

Relevant legal provisions:
EPC Art. 83, 84, 123(2), 123(3), 52(1), 54, 56, 102(3)

Keyword:
"Obvious errors - yes"
"Novelty and inventive step - yes"

Decisions cited:
-

Catchword:
-

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Case Number: T 1092/97 - 3.2.6

D E C I S I O N
of the Technical Board of Appeal 3.2.6
of 22 March 2001

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 20 August 1997 concerning maintenance of European patent No. 0 457 905 in amended form.**

Composition of the Board:

Chairman: P. Alting van Geusau
Members: G. C. Kadner
M. J. Vogel

Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 457 905 in respect of European patent application No. 90 900 366.7 filed on 25 December 1989 as an international application claiming a Japanese priority of 27 December 1988 was published on 8 March 1995.

II. Notice of opposition was filed on 8 December 1995 by the Appellant (Opponent), on the grounds of Article 100(a) and (b) EPC. The Appellant relied mainly upon the following prior art documents:

(D4) US-A-4 663 220

(D9) JP-A-61-155 446

III. By decision announced on 17 July 1997 and posted on 20 August 1997 the Opposition Division maintained the European patent in amended form.

The Opposition Division was of the opinion that the amended claim 1 together with dependent claims 2 to 4 was allowable under Article 123(2) and (3) EPC, and also met the requirements of Article 52(1), 54 and 56 EPC.

IV. On 22 October 1997 a notice of appeal was lodged against the decision together with payment of the appeal fee.

The statement of grounds of appeal was filed on 22 December 1997.

The Appellant additionally relied upon:

(D11) English translation of JP-A-61-155 446 (D9)

V. In a communication dated 20 July 2000 the Board expressed the provisional opinion that an important issue to be discussed during oral proceedings would be the qualification and knowledge of the skilled person dealing with the subject-matter of the patent in suit and whether he would combine the teachings of D4 with those of D2 or D11.

VI. Oral proceedings were held on 22 March 2001.

The Appellant (Opponent) requested that the decision under appeal be set aside and that the European patent No. 0 457 905 be revoked.

The Respondent (Patentee) requested that the appeal be dismissed and that the patent be maintained on the basis of

Claims: 1 to 4,

Description: pages 2, 2a to 20,

Drawings: Figures 1 to 4,

as presented during the oral proceedings.

Claim 1 reads as follows:

"A stretchable, meltblown nonwoven fabric having a weight per unit area of 5 to 500 g/m^2, a mean diameter of fibers of 0.5 to 30 μm, composed of a thermoplastic fiber comprising

- a hydrogenated block copolymer C obtained by hydrogenating a block copolymer including at least two polymer blocks A constituted mainly of a vinyl aromatic compound and at least two polymer blocks

B constituted mainly of a conjugated diene compound, at least one polymer block B being arranged on an end of a polymer chain thereof, the number-average molecular weight of said block copolymer being between 30,000 and 65,000, the content S of the vinyl aromatic compound in the block copolymer being between 15 wt% and 40 wt%, and the 1,2-vinyl content of the conjugated diene structure in the conjugated diene compound being between 20 wt% and 50 wt% before hydrogenation is applied, and

- a polyolefin D,

wherein the blending ratio of the polyolefin D to the total weight of the Polymer is 1 to 60 wt%."

VII. In support of its requests the Appellant essentially relied upon the following submissions:

The disclosure of the amended patent was not sufficiently clear to enable a skilled person to carry out the invention. The feature concerning the 1,2-vinyl content V was not related to unsaturation but rather an indication of how the polymerisation proceeded. A "polymerisation ratio" of the granted claims 16 and 17 was not understandable. The expression of a blending ratio of 1 to 60 wt% was not a ratio because the relation was missing. Even presuming it to be a ratio in relation to 100% it was further not clear whether the blending ratio of the polyolefin D was indicated on the basis of the block copolymer C or of the total weight of the blended polymer because the claims and the description were contradictory. A ratio of 60 wt% was not derivable from the examples since none of them specified this value. The term "additional amount" of polyethylene e.g. in table 8 rather indicated it as an addition in relation to the amount of block copolymer.

On the other hand table 12 with the term "blending ratio" of polyethylene meant the contrary of the ratio indicated in table 8.

As regards the requirement of inventive step, the claimed features were obvious through a combination of D4 with D2 or D11. A stretchable meltblown nonwoven fabric containing a blend of a styrenic block copolymer of an A-B-A structure and a polyolefin was disclosed in D4. A skilled person having experience in the field of styrenic compounds A and diene compounds B and knowledge of their influence on the properties of copolymers would clearly recognize that the compounds in D2 or D11 were suitable to improve strength and elasticity, and therefore would replace the A-B-A structure of D4 by the B-S-B-S structure of D2 or the A-B-A-B structure of D11 thus arriving at the claimed subject-matter without involving an inventive step. Since the skilled person also knew that the molecular weight of polymers has an important influence on their melt-spinning properties, in respect of the range up to 1 000 000 indicated in D11 the selection of a lower molecular weight up to 65 000 was obvious. The claimed range of molecular weight could also be derived from the molecular weight of melt spinnable polymers KRATON GX1657 and KRATON G1652 used in D4 as indicated in table 2 of the patent having values of 64 000 and 50 000.

VIII. The submissions of the Respondent are summarised as follows:

In respect of the Appellant's objections regarding clarity a skilled person to whom the patent was addressed would recognize the expression "polymerisation rate" to be obviously erroneous. Clarification would immediately be provided by the description, particularly with respect to the numerical

values of the blending ratio corresponding with those of the wrong expression. From the description (page 3, lines 36 to 37; page 5 line 55 to page 6, line 1; lines 33 to 41) the meaning of the blending ratio was clearly derivable. Further the 1,2-vinyl content of the conjugated diene structure being between 20 wt% and 50 wt% was to be understood as applying to a state before hydrogenation was applied, and the claim was clarified by insertion of that term.

The skilled person in this case was not a theoretically educated high-grade chemist with analytic knowledge of particular properties in polymer chemistry but a materials processing engineer who dealt with the application of polymers and their blends in melt blown fibers in practical use. Starting from D4 the underlying problem was to create a nonwoven web with optimal balance of strength, elasticity and soft handling. The problem of soft handling was not mentioned in any of the cited documents and none of them contained an incentive to find out the special combination of features of the claimed subject matter. Since there were a lot of other possibilities for improvement of certain properties of the web, e.g. to increase the strength by various blends, obviousness could only be assumed ex-post facto. There was no hint or reason to replace the A-B-A structure of D4 by the A-B-A-B structure of D11 because this document was completely silent about using its polymer material for meltblowing of fibers. Its indicated range of molecular weight from 20 000 to 1 000 000 could not lead a skilled person in an obvious manner to the claimed fabric because further consideration and selection was necessary to arrive at the claimed particular parameters and no indication for such selection was hinted at.

Reasons for the Decision

1. The appeal is admissible.

2. *Admissibility of the amendments*

2.1 Considering the Appellant's objection with regard to lack of clarity of the 1,2-vinyl content V of the conjugated diene structure in the conjugated diene compound being between 20 wt% and 50 wt% the insertion, according to which these percentages apply to the state before hydrogenation, clarifies the issue. This further specification is disclosed in the patent, page 9, lines 2 to 4, corresponding with the originally filed documents, page 20, lines 6 to 11 (Article 123(2) EPC). This further specification of the 1,2-vinyl content V does not extend the protection of the patent (Article 123(3) EPC).

2.2 Considering the further objections in respect of lack of clarity and lack of sufficient disclosure of the invention as regards the basis, on which the content of polyolefin D is calculated (polymerization ratio versus blending ratio), the Board is of the opinion that a skilled person, to whom the teaching of the patent is addressed, can clearly derive this basis from the description. The skilled person, who in the present case is taken to be a materials processing engineer is immediately aware of the fact that the term "polymerisation ratio" of original filed claims 16 and 17 and repeated in the introduction of the patent specification (page 3, lines 36 to 37) is the wrong term to be used, since this expression does not exist linguistically in the technical field of the patent. Consequently he would try to find out the correct technical meaning of this term and have recourse to the supporting description of the patent. Continuing in

reading the patent specification similar expressions appear in the text of page 5 line 55 to page 6, line 1 and lines 33 to 41. Having in mind the meaning of a "ratio" it appears to be clear that the correct expression must be a "blending ratio" particularly because the materials to be blended are the same as are mentioned in connection with the wrong expression "polymerisation ratio". After having recognized the correct meaning it becomes clear that parts of a blend defined by wt% as usual in the art are based on the weight of the whole blend after having brought all parts together (compare also D4, column 14, line 57 to column 15, line 9). The added amount of polyethylene of the examples lies within the claimed range of 20 wt% to 60 wt% whereas only the comparative examples exceed this range. Since no contradictions are present with respect to the examples of the patent, the Board is satisfied that the claims comply with Article 84 EPC and that the skilled person would not encounter any difficulty in carrying out the claimed invention (Article 83 EPC).

2.3 The dependent claims 2 and 3 are mere repetitions of the subject-matter of the granted claims 17 and 19 whereas claim 4 is based on preferred range disclosed on page 6 line 53 of the patent or page 14 line 17 of the originally filed application. The description was amended to take account of the subject-matter now claimed, the introduction of the closest prior art as represented by US-A-4 663 220 (D4) and some corrections of obvious errors, and also does not give rise to objections under the EPC

3. *Novelty*

Novelty of the subject-matter of claim 1 follows from the fact that none of the cited documents discloses a stretchable, meltblown nonwoven fabric with the

structural parameters defined in claim 1 and the composition of the hydrogenated block copolymer C and polyolefin D, in particular a block copolymer including at least two polymer bocks A and at least two polymer blocks B.

4. *Inventive step*

4.1 The closest prior art is represented by D4 which discloses a stretchable, meltblown nonwoven fabric having a weight per area of not more than about 300 grams per square meter, preferably from about 5 grams per square meter to about 100 grams per square meter (column 6, lines 40 to 49), an average fiber diameter of no greater than about 100 microns, preferably of from 5 microns to about 50 microns (column 8, lines 52 to 56). It is composed of an extrudable elastomeric composition formed by a blend of at least 10 wt% of an A-B-A block copolymer wherein A is a thermoplastic polymer end block which includes a styrenic moiety and B is an elastomeric poly-(ethylene-butylene) midblock, with up to 90 wt% of a polyolefin (column 4, lines 34 to 48 and 60 to 62).

Starting from this nonwoven fabric the problem underlying the subject-matter of claim 1 of the patent in suit relates to the improvement of its strength, extendable characteristics, i.e., elongation and elastic recovery of elongation, weathering resistance, light resistance, heat resistance, chemical resistance, and a soft handling (see page 2a, last two lines and page 3, first two lines of the patent description). The solution of these combined effects is achieved by the features of claim 1.

4.2 The Appellant was of the opinion that the subject-matter of claim 1 mainly differs by the A-B-A-B structure of the block copolymer. Since some of the

objects e.g. strength, elasticity, weatherability, thermal resistance of the patent were similar to those underlying the compound of D11 a skilled person would have replaced the A-B-A structure of D4 by one of the A-B-A-B structure compounds thus arriving at the claimed subject-matter without involving an inventive step.

4.3 The Board cannot agree with this opinion because of the lack of any suggestion which would lead the skilled person in an obvious manner to undertake these measures.

The skilled person in the present case is deemed to be a materials processing engineer having knowledge in polymer materials usually applied in melt-blowing. This skilled person acknowledges the extrudable elastomeric composition with an A-B-A structure of D4 as to be suitable to form nonwoven webs having sufficient elasticity, stretchability and elastic recovery. Since this document deals with a complete solution, and it does not contain any hint or incentive in another direction, there was no reason to replace the claimed material of the A-B-A type by another block copolymer.

4.4 With regard to the polymer materials of D11, their use in various fields such as chaussures, parts for industrial use, automobile parts, consumer electronics, wire covering and modifying agents for plastics is mentioned where rubber elasticity or rubber-like property is particularly important (see page 1, last paragraph). No disclosure or teaching of a use in a composition for a nonwoven fabric, where particular soft-handling properties are required, can be derived from D11. These block copolymers are applied as molding materials e.g. in injection molding and usually they are obtained in the form of the pellet preparation. Any indication is missing that they are applied in melt

spinning, particularly to obtain micro fibers of a mean diameter of 0.5 μm to 30 μm. Also with regard to their average molecular weight of up to 1 000 000 the practitioner in the preparation of nonwovens produced by melt-blowing would not be led to use these materials in this technical field. The numbers of average molecular weight indicated in the description of the examples of D11 are mostly in the range of 120 000 to 150 000 except example 17 (Table 4-1) indicating a value of 30 000 which lies within the claimed range of 30 000 to 65 000 of the patent. However, the properties of example 17 with respect to tensile strength, stretchability or elasticity are not remarkably different from those of all other examples having the higher molecular weight. Therefore the skilled person was not induced to select one of a great number of examples and to use it, even experimentally, in the very different application of melt-blowing or in the production of a nonwoven fabric either.

4.5 The object of the styrene-butadiene block copolymer composition of an A-B-A-B type of D2 also relates to strength, weatherability, heat resistance, whereas soft-handling is not mentioned. The compound of its composition is used in mechanical or electrical parts, toys, belts, hoses, shoes, medical appliances, films, blow-molded articles, hot-melt adhesives, laminated articles, but its use in melt-blown micro-fibers or nonwovens consisting of those fibers is not mentioned. Additionally, the ethylenic unsaturation degree of the olefin compound polymer block before hydrogenation is applied should not exceed 20 % because weatherability decreases in that case, and this value lies outside of the claimed range between 20 wt% and 50 wt% of the patent. Therefore this document cannot provide a contribution to lead the skilled person to the combination of features of claim 1 (Article 56 EPC).

5. Summarizing, in the Board's judgment, the proposed solution to the technical problem underlying the patent in suit defined in the independent claim 1 is inventive and therefore this claim as well as its dependent claims 2 to 4 relating to particular embodiments of the invention in accordance with Rule 29 (3) EPC, can form the basis for maintenance of the patent (Article 52(2) EPC).

Thus taking into account the amendments made by the Appellant, the patent and the invention to which it relates meet the requirements of the EPC and the patent as amended is maintained in this form (Article 102(3) EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent on the basis of the following documents:

   Claims: 1 to 4

   Description: pages 2, 2a to 20

   Figures: 1 to 4

   as submitted during the oral proceedings.

The Registrar: The Chairman:

M. Patin P. Alting van Geusau