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D E C I S I O N
of 13 April 2000

Case Number: T 1037/97 - 3.2.5

Application Number: 92118615.1

Publication Number: 0540024

IPC: B29C 43/18

Language of the proceedings: EN

Title of invention:

Multilayer molded article and production thereof

Applicant:

Sumitomo Chemical Company, Limited

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 1037/97 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 13 April 2000

Appellant: Sumitomo Chemical Company, Limited
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Osaka 541-8550 (JP)

Representative: VOSSIUS & PARTNER
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 2 May 1997 refusing European patent application No. 92 118 615.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: A. Burkhart
Members: W. R. Zellhuber
M. K. S. Aúz Castro

Summary of Facts and Submissions

I. The appellant lodged an appeal against the decision of the Examining Division refusing application No. 92 118 615.1.

II. The European Search Report cited the following documents as being particularly relevant:

D1: GB-A-2 006 667;

D2: EP-A-0 333 198 and

D3: DE-A-21 14 181

The Examining Division held that the subject-matter of the claims according to the main request and the auxiliary requests filed on 31 January 1997 did not involve an inventive step having regard to the prior art as disclosed in document D2.

According to the Examining Division, Figure 2, page 3, lines 50 to 58 and Example 1 of that document described a multilayer moulded article comprising a core of a thermoplastic resin and a skin material made of a fabric lined with a nonwoven fabric.

The subject-matter of claim 1 differed from the known article only in that the nonwoven fabric had a weight of at least 50 g/m² and an elongation at break of 20% to 80%.

The person skilled in the art would obviously select a nonwoven fabric having the above mentioned properties when producing a moulded article comprising a skin

material made of a fabric.

III. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of following documents (main request):

Description: Pages 1, 5 to 13 as originally filed;
page 2 as filed with letter of 6 June 1995;
page 3 as filed with telefax of 7 April 2000;
page 4 as filed with letter of 29 February 2000.

Claims: 1 to 5 filed with letter of 16 March 2000.

Drawings: pages 1/2 to 2/2 as originally filed.

The auxiliary requests filed on 31 January 1997 were maintained unamended.

IV. Independent claims 1 and 3 according to the main request read as follows:

"1. A multilayer molded article comprising a core of a thermoplastic resin (7) and a skin material (1) laminated on the resin core characterized in that the skin material (1) is made of a fabric (9) which is lined with a nonwoven fabric (10) having a weight of at least 50 g/m² and an elongation at break of 20 % to 80 %."

"3. A method for producing a multilayer molded article comprising the steps of placing a skin material (1)

between unclosed upper (2) and lower (3) molds, supplying a mass of a molten thermoplastic resin (7) and closing the molds (2,3) to integrate the skin material (1) and the thermoplastic resin (7), characterized in that the skin material (1) is made of a fabric (9) which is lined with a nonwoven fabric (10) having a weight of at least 50 g/m² and an elongation at break of 20 % to 80 %."

V. The appellant argued as follows:

Document D2 did not relate to the problems underlying the present application, i.e. lying down of the fabric, exudation of the resin or properties of the skin materials. In particular, D2 did not teach that these problems could be solved by the adjustment of the properties of the skin material.

Therefore, there was no motivation for a skilled person to select a nonwoven fabric having the claimed properties.

Reasons for the Decision

1. *Novelty*

The subject-matter of claims 1 and 3 according to the main request is novel with regard to the prior art as disclosed in the documents cited in the European Search Report, because none of these documents describe a moulded article and a method for producing the article wherein the article comprises a skin material made of a fabric which is lined with a nonwoven fabric (10) having a weight of at least 50 g/m² and an elongation

at break of 20% to 80%

- 1.1 In particular, document D2 does not describe a moulded article comprising a skin material made of a **fabric** which is lined with a **nonwoven fabric**.

According to the examples given on page 3, lines 50 to 58, the skin material may be a woven **or** nonwoven material, or a laminate comprising at least two layers of same or different materials. In the latter case, D2 does not specify the materials.

The example 1 on page 4 describes a skin material being a laminate of a raised tricot and a **sheet of polypropylene foam**, and according to examples 2 and 3, the skin material comprises a **polyvinyl chloride sheet** laminated to a sheet of woolly nylon or a cloth of woolly polyester.

- 1.2 Documents D1 and D3 describe a multilayer material comprising a nonwoven fabric serving as backing layer.

However, D1 does not disclose that the nonwoven fabric should have a weight of at least 50 g/m² and D3 indicates neither the weight of the nonwoven fabric nor its elongation at break.

Therefore, the subject matter of independent claims 1 and 3 is novel.

2. *Inventive step*

- 2.1 Document D2 may be regarded as closest prior art, as relating to a multilayer moulded article wherein the skin material is a fabric laminated on a resin core.

Document D2 further mentions the problems of wrinkles and breakage of the skin material and fibre lying of such a skin material, cf. page 2, lines 14 to 16.

2.2 The problem underlying the present invention can be seen in providing a multilayer moulded article and a method for producing such an article having a skin material made of a fabric wherein the skin material has a good visual appearance. In particular wrinkles and breakage of the skin material, fibre lying of the skin material as well as an exudation of the resin and flow wrinkles due to flow of the thermoplastic resin should be avoided; cf. page 2, lines 30 to 32 of A2-publication of the application.

2.3 The problem is solved by the combination of the features of claim 1 and claim 3, respectively, especially in that the skin material which is made of a fabric is lined with a nonwoven fabric (10) having a weight of at least 50 g/m² and an elongation at break of 20% to 80%

2.4 The solution is not rendered obvious by the disclosure of the prior art documents cited in the European Search Report for the following reasons:

2.4.1 Document D2 does not teach that the problems of wrinkles, breakage and fibre lying of the skin material could be solved by lining the fabric with a nonwoven fabric, in particular, with a nonwoven fabric having predetermined properties.

In example 3, D2 suggests the use of a backing cloth of woolly polyester having a thickness of 0.2 mm, but the backing cloth is used in combination with a polyvinyl

chloride sheet rather than with a fabric. D2 does not teach that such a backing sheet may help to solve the problems mentioned above, and accordingly, D2 does not further define the properties of the backing cloth.

On the contrary, document D2 suggests a process and specifically defined conditions for supplying the resin in order to provide an article with good quality, cf. page 2, lines 30 to 31 and page 4, lines 8 to 15.

2.4.2 Document D1 describes a surface layer for a cushion body comprising a knitted or woven fabric 1, a foam resin sheet 2 and a nonwoven fabric serving as backing sheet 13. The elongation rate of the backing sheet should be not more than 30% (cf. page 3, lines 9 and 10) and in the example, given on pages 3 and 4, a backing sheet having an elongation rate of 12% is proposed.

Thus, D1 suggests a backing sheet of low elasticity. Furthermore, D1 does not indicate the weight of the backing sheet. Finally, document D1 uses a process for producing the article wherein, in a first step, the surface layer of the cushion body is hot pressed between matched moulds and, in a second step, cushioning material, e.g. foam resin, is applied to the surface layer thus formed.

According to the present invention, cf. claim 3, however, the skin material is placed between unclosed upper and lower moulds, then a mass of a molten thermoplastic resin is supplied and the moulds are closed to integrate the skin material and the thermoplastic resin. A minimum weight of 50 g/m² of the nonwoven fabric is selected, because one of the

functions of the fabric is seen in the thermal insulation of the skin material against the heat of the molten thermoplastic resin. Furthermore, the elongation at break of the nonwoven fabric is selected to be between 20% and 80%, because in the process according to the present invention, on the one hand, the nonwoven fabric has to follow the shape of the article and on the other hand, the nonwoven fabric should not flow together with the molten thermoplastic resin.

As the method for producing the article described in D1 is different from that of the present invention, and as the role and the function of the backing layer described in D1 also are different from that of the nonwoven fabric of the present invention, D1 does not suggest the use of a nonwoven fabric having the properties as defined in claims 1 and 3. In particular, D1 does not teach that, in a process as used in the present invention, the problems mentioned above may be solved by selecting a specific backing layer.

2.4.3 Document D3, cf. Figure 1, describes a multilayer moulded article comprising a core of a thermoplastic resin 3 and a skin material 1,2,4 laminated on the resin core wherein the skin material comprises a foamed cushion-forming plastic layer 1 and optionally a cover foil 2 and an elastic, stretchable backing layer, which among others might be a nonwoven fabric 4 ("Vlies").

D3 further teaches that the backing layer provides an anchoring effect between the layers and that the backing layer serves as a heat barrier for the protection of the foam material during the injection of the thermoplastic resin, cf. page 3, second paragraph and page 4, lines 18 to 26.

A person skilled in the art may learn from D3 that the properties of the backing layer, e.g. the material, the thickness, the weight per surface area etc. should be appropriately selected so that the layer is suitable for serving as a heat barrier layer.

However, D1 teaches the use of a skin material comprising a cover foil or a cover material 2 suitable for forming a sleek surface, cf. page 4, lines 16 to 18 rather than the use of a skin element which is made of a fabric as claimed in claims 1 and 3. Furthermore, D3 does not specify the backing layer being made of a nonwoven fabric having a minimum weight of 50 g/m² and an elongation at break of not more than 80%.

Moreover, D3 does not mention the problem of flow wrinkles due to flow of the thermoplastic resin into the mould. Accordingly, document D3 does not suggest solving that problem by selecting a nonwoven fabric having a minimum weight of 50 g/m² and an elongation at break of not more than 80%.

Summarizing, document D3 suggests the use of an elastic barrier layer suitable for serving as heat barrier, but does not suggest the use of a skin material having in combination all the features mentioned in claims 1 and 3.

2.4.4 The other documents cited in the Search Report are of less relevance than the above mentioned documents.

3. Therefore, the subject-matter of independent claims 1 and 3 according to the main request is novel and involves an inventive step within the meaning of Articles 54 and 56 EPC, respectively, with regard to

the cited prior art.

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 grant a patent in the following version:

Description: Pages 1, 5 to 13 as originally filed;
page 2 as filed with letter of 6 June 1995;
page 3 as filed with telefax of 7 April 2000;
page 4 as filed with letter of 29 February 2000

Claims: 1 to 5 according to the main request filed with letter of 16 March 2000.

Drawings: pages 1/2 to 2/2 as originally filed.

The Registrar:

The Chairman:

A. Townend

A. Burkhart