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D E C I S I O N
of 20 July 2005

Case Number: T 0789/01 - 3.3.9

Application Number: 95106578.8

Publication Number: 0729829

IPC: B32B 17/04

Language of the proceedings: EN

Title of invention:
Fiber reinforced funtionalized polyolefin composite

Applicant:
Azdel, Inc.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty (yes - after amendment)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0789/01 - 3.3.9

D E C I S I O N
of the Technical Board of Appeal 3.3.9
of 20 July 2005

Appellant: Azdel, Inc.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 15 March 2001 refusing European application No. 95106578.8 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P. Kitzmantel
Members: J. Jardón Alvarez
K. Garnett

Summary of Facts and Submissions

I. This appeal lies from the decision of the Examining Division refusing European patent application No. 95 106 578.8, published as EP-A-0 729 829. The decision was announced in oral proceedings held on 16 February 2001 and issued in writing on 15 March 2001.

II. The decision under appeal was based on Claims 1 to 20 of a main request and on Claims 1 to 26 of an auxiliary request, both filed on 12 January 2001.

Claim 1 of the main request read as follows:

"1. A laminated composite comprising:

chopped glass fibers of at least 1,27 cm (0.5 inch) in length or a glass mat made from glass fibers, said glass fibers being treated with a reaction product of a polymeric amine and an organosilane, a non-starch water-dispersible film-forming polymer and an emulsified polyolefin;

a functionalized polypropylene; and

a polypropylene;

wherein said chopped glass fibers or said glass mat treated with:

from 2 to 22 percent by weight of polymeric amine;

from 2 to 10 percent by weight of organosilane;

from 5 to 20 percent by weight of non-starch water-dispersible film-forming polymer; and

from 50 to 90 percent by weight of emulsified polyolefin."

Claim 1 of the auxiliary request was based on Claim 1 of the main request with the following feature added at the end:

"the composite laminated at a pressure of 48,26kPa to 620,53kPa (7 to 90 pounds per square inch)."

This decision referred inter alia to documents:

D1: EP-A-0 651 003,

D2: WO-A-94/15884, and

D6: US-A-5 354 829.

The Examining Division held that the subject-matter of Claim 1 of both requests lacked novelty over the disclosure of D1, which was to be considered as prior art according to Article 54(3), (4) EPC.

III. The Notice of Appeal including the statement setting out the Grounds of Appeal was filed on 15 May 2001; the appeal fee was paid simultaneously.

The Appellant requested that the Examining Division's Decision of 15 March 2001 be set aside and that a European patent be granted

– on the basis of Claims 1 to 20 of the main request as submitted with the letter of 12 January 2001 or

– on the basis of Claims 1 to 26 of the auxiliary request filed with the letter of 12 January 2001.

The Appellant further requested reimbursement of the appeal fee and the scheduling of a date for oral proceedings.

IV. In a communication dated 31 May 2005 the Board stated that the appealed decision did not involve a substantial procedural violation justifying reimbursement of the appeal fee and questioned the novelty of Claim 1 of the main and the auxiliary requests. The claimed subject-matter was considered not to fulfil the established criteria for the novelty of selection inventions.

V. In preparation for the oral proceedings, the Appellant by letter dated 28 June 2005 withdrew its request for reimbursement of the appeal fee and submitted new Claims 1 to 8 and an amended description page 8a as the basis for a second auxiliary request.

VI. Oral proceedings were held on 20 July 2005.

At the beginning of the hearing, the Appellant was informed that the novelty objections raised against the main and the auxiliary requests were maintained. The novelty of the claimed subject-matter was further questioned in the light of the document WO - 95/11800, cited on page 13, line 30, of the present application, as a co-pending application with Serial No. 08/146267.

Additionally, some formal objections against the second auxiliary request were noted.

The Appellant then withdrew its previous main and auxiliary requests and filed a new main request and a new auxiliary request, both based on the second auxiliary request on file.

Claim 1 of the new main request as filed during the oral proceedings read as follows:

"1. A method of producing a laminated composite comprising the steps of:

(a) supplying a first sheet (50) of functionalized propylene and a second sheet (51) of functionalized polypropylene;

(b) placing a glass mat (52, 52') made from glass fibers treated with a reaction product of from 2 to 22 percent by weight of a polymeric amine and from 2 to 10 percent by weight of an organosilane, from 5 to 20 percent by weight of a non-starch water-dispersible film-forming polymer and from 50 to 90 percent by weight of an emulsified polyolefin between said first sheet (50) of functionalized polypropylene and said second sheet (51) of functionalized polypropylene;

(c) heating said first sheet (50) of functionalized polypropylene, said glass mat (52, 52') and said second sheet of functionalized polypropylene (51);

(d) applying pressure to said heated first sheet (50) of functionalized polypropylene, said glass mat (52, 52') and said second sheet (51) of functionalized polypropylene to form a laminated composite; and

(e) cooling said laminated composite to ambient temperature."

Claim 1 of the new auxiliary request as filed during the oral proceedings was further restricted to a more preferred embodiment.

VII. In essence, the Appellant's arguments in support of the main request were as follows:

- Concerning novelty, the Appellant noted that Claim 1 defined a method of producing a laminate composite, according to which a first sheet and a second sheet of functionalized propylene were supplied, a glass mat was placed between the two sheets, the sheets and the glass mat were heated and a pressure was applied thereon and as a last step the laminate was cooled to ambient temperature. Document D1 did not describe the specific steps of producing the laminated composite and it did not therefore anticipate the claimed subject-matter.

- Concerning inventive step, the Appellant noted that the difference between the present invention and the prior art cited in documents D2 and D6 was the novel use as components of the glass fibre sizing agent of a reaction product of polymeric amine and organosilane. The advantageous effect achieved by

the use of this reaction product in conjunction with a non-starch water-dispersible film-forming polymer could not be derived from the available prior art.

VIII. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request filed during the oral proceedings or on the basis of the auxiliary request filed during the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

MAIN REQUEST

2. *Amendments (Article 123(2) EPC)*

2.1 Claim 1 is a combination of Claims 23 and 24 as originally filed. It has further been amended as follows:

- the polyolefin has been limited to "polypropylene" in accordance with the preferred embodiment disclosed through the application as originally filed (see, for instance, page 17, lines 5 to 7);

- in step (b) the words "reaction product" have been added (support: page 9, line 25); and

- the film-forming polymer in step (b) has been defined as "non-starch" as disclosed on page 11, lines 37 to 38.

2.2 The dependent claims 2 to 7 are also supported by the original disclosure:

2.2.1 Claim 2 is supported by page 16, lines 7 to 10 and 18 to 21;

2.2.2 Claims 3 and 4 are supported by page 16, lines 21 to 24;

2.2.3 Claims 5 and 6 are based on page 16, lines 4 to 7; and

2.2.4 Claim 7 is supported by page 16, line 41 to page 17, line 2.

2.3 The Board is therefore satisfied that the amendments do not introduce subject-matter which goes beyond the contents of the application as originally filed.

3. *Novelty (Article 54 EPC)*

3.1 Document D1, filed on 7 March 1994, was published on 3 May 1995, after the filing date of the present application (2 May 1995). It is to be considered as state of the art according to Article 54(3), (4) EPC.

3.2 Claim 1 of the main request is now directed to a method of producing a laminated composite by sandwiching a glass mat, made from glass fibers treated with a sizing agent, between two sheets of functionalized propylene (steps (a) and (b)), heating said two sheets and the glass mat (step (c)), pressing them (step (d)) and cooling the formed laminated composite to ambient temperature (step (e)).

3.3 Document D1 also discloses a laminated composite comprising a glass mat, functionalized polypropylene and polypropylene wherein the glass mat has been made from glass fibers treated with a sizing agent comprising the same ingredients (see Claims 11, 12 and 16). However, D1, although referring to "composite products", does not disclose the method for their preparation (see examples; see also page 8, line 10).

Thus, the subject-matter of Claim 1 of the patent differs from the disclosure of D1 in that it defines a method for the preparation of such laminated composites and in the specific process steps which are used in the method.

3.4 The Examining Division concluded in the attacked decision that the subject-matter of the claims then pending lacked novelty because the laminated composites disclosed in D1 and in the present application were identical. As all the claims directed to laminated compositions have been deleted from the present set of claims, the conclusions in the decision no longer apply to the present set of claims. In fact, present Claim 1 corresponds to Claim 20 of the set examined by the Examining Division and no objections were raised in the decision against this claim.

3.5 None of the other documents cited during the proceedings discloses a method of producing a laminated composite as defined in Claim 1, wherein the glass fibers have been treated with a sizing agent as defined in step (b) of Claim 1.

3.6 In view of the above findings, the subject-matter of Claim 1 of the main request is novel over the available prior art.

4. *Inventive step (Article 56 EPC)*

4.1 Closest prior art.

From the available pre-published prior art, D2 can be considered as the closest document. It discloses glass fibers for reinforcing thermoplastics such as polypropylene (page 2, lines 25 to 31), wherein the fibers have been sized with an aqueous formulation of a special film-former, a silane coupling agent, an emulsified polypropylene, a lubricant and an adhesion promoter (page 3, lines 12 to 21). The preferred lubricants are polyether polyols and polyether resins (page 6, line 12 - page 7, line 24).

The method according to Claim 1 of the application differs from the disclosure of D2 in the use of a sizing agent including the reaction product of a polymeric amine and an organosilane.

4.2 Problem to be solved.

4.2.1 The Appellant argued on pages 11 to 13 of its Statement of Grounds that the application demonstrates unknown favourable results related to the use of polymeric amine and organosilane reaction products.

However, the Board notes that the application is silent about the nature of the sizing agent used in the comparative examples and the Appellant has not provided

any further evidence indicating how the examples have been carried out.

Thus, the examples in the application do not show a comparison with the closest state of the art as disclosed in D2 and cannot be used to show a superior effect originating in the distinguishing feature of the invention.

Therefore, the Board considers that, on the basis of the present experimental evidence, improved properties for the laminated composites have not been established.

4.2.2 Having in mind these considerations, the technical problem underlying the invention is to provide a further method for the preparation of laminated composites using glass fibers treated with an alternative sizing agent.

4.3 Solution to the problem.

4.3.1 This problem is credibly solved by the method of Claim 1 wherein a laminated composite is prepared using functionalized polypropylene and the new sizing agent including the reaction product of a polymeric amine and an organosilane (see step (b) of Claim 1). The method allows the preparation of laminated composites showing good physical properties such as tensile strength, flexural strength and impact strength (see page 18, line 30 - page 19, line 19 of the original application).

4.3.2 It remains to be decided whether or not the proposed solution to the problem underlying the invention is obvious in view of the cited state of the art.

Document D2 is silent about the use of a polymeric amine with an organosilane as part of the sizing agent and consequently does not provide any motivation to the skilled person for the use of such a sizing agent.

Document D6 discloses glass fibers treated with a lubricant and a sizing agent comprising silylated polyamine prepared by reacting polymeric amine and amine reactable organoalkoxy silane (see Claim 1). However, the sizing compositions of D6 do not include an emulsified polyolefin as required by Claim 1. Moreover they contain starch as a main film-forming material (see Claims 30 and 31), which is excluded from the scope of the present claims.

Having in mind that the properties of glass fibre sizing compositions are dependent on the combination of its ingredients, there is no incentive for the skilled person to replace an essential component of the sizing agent of D2, i.e. the film-forming mixture of an epoxy-functional acrylic polymer and vinyl acetate polymer, used together with a silane coupling agent, by the silylated polyamine polymer used in the sizing compositions of D6, together with different further mandatory components, including starch. Consequently, documents D2 and D6 do not render obvious the use of the sizing composition used in Claim 1.

4.3.3 For these reasons the Board finds that the subject-matter of Claim 1 of the main request involves an inventive step (Article 56 EPC).

5. The subject-matter of dependent Claims 2 to 7, which relates to particular embodiments of the method according to Claim 1, is also novel and involves an inventive step. It is noted that the reference to step (f) in Claim 7 is wrong and should read step (e).

AUXILIARY REQUEST

6. Since the subject-matter of the main request is allowable, there is no need to comment on the auxiliary request.

Order

For these reasons it is decided that:

1. The decision appealed from is set aside.

2. The case is remitted to the first instance with the order to grant a patent on the basis of Claims 1 to 7 of the main request (after correction of Claim 7: see point 5 of the Reasons) and any necessary consequential amendment of the description.

The Registrar: The Chairman:

G. Röhn P. Kitzmantel