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Datasheet for the decision of 11 October 2012

Case Number: T 1221/11 - 3.3.09

Application Number: 06801668.2

Publication Number: 1940991

IPC: C09J 123/14

Language of the proceedings: EN

Title of invention:
Hot melt sealant and foam-in-place gasketing material

Applicant:
Bostik, Inc.

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1221/11 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 11 October 2012

Appellant: (Applicant)
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Decision under appeal:
Decision of the Examining Division of the European Patent Office posted 24 November 2010 refusing European patent application No. 06801668.2 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: W. Sieber
Members: W. Ehrenreich
F. Blumer

Summary of Facts and Submissions

I. European patent application No. 06 801 668.2 filed as international application PCT/US2006/032046 on 17 August 2006 in the name of Bostik, Inc. was refused by the decision of the examining division announced orally on 9 November 2010 and issued in writing on 24 November 2010. The decision was based on the set of claims 1 to 14 filed with the letter dated 22 March 2010.

Claim 1 read as follows:

"1. A hot melt adhesive composition, comprising a blend of the following components:
at least one rubber in an amount of about 5% to 50% by weight said at least one rubber selected from the group consisting of ethylene-propylene rubber (EPR), ethylene-propylene-diene material (EPDM), and blends thereof;
at least one semi-crystalline olefinic polymer in an amount of about 5% to 40% by weight wherein said at least one semi-crystalline olefinic polymer is selected from the group consisting of polyethylene, polypropylene, ethylene-propylene random and impact copolymers, ethylene-acrylic acid copolymers, ethylene-alkyl acrylate or methacrylate copolymers, ethylene-vinyl acetate copolymers, ethylene-vinyl alcohol copolymers, and mixtures of the above olefinic polymers;
at least one amorphous poly-α-olefin polymer in an amount of about 0% to 70% by weight wherein said at least one amorphous poly-α-olefin polymer is selected from the group consisting of propylene homopolymer, propylene-ethylene copolymer, propylene-butene-1

copolymer and propylene-ethylene-butene-1 terpolymer, and blends of the above polymers;
a compatible tackifier in an amount of about 0% to 50% by weight;
a plasticizer in an amount of at least 32% by weight;
a wax in an amount of about 0% to 30% by weight;
a filler in an amount of about 0% to 60% by weight; and
a stabilizer in an amount of about 0% to 5% by weight,
the above components adding up to 100% by weight of the composition."

Claims 2 to 11 were dependent claims. Claim 12 was directed to a method of manufacturing a laminate structure, one step being the application of the composition of any of claims 1 to 11. Claims 13 and 14 concerned a laminate structure and a foam-in-place gasketing material respectively, including the composition of claims 1 to 11.

II. The relevant documents referred to by the examining division are:

D1 WO 2004/039907 A1
D2 WO 01/10967 A1
D3 WO 00/37553 A1
D4 US 2003/0195287 A1.

The examining division found that the claimed composition was novel over D3 but did not involve an inventive step when starting either from D2 or D4 as the closest prior art.

With regard to D2 the examining division argued that no evidence had been presented that the distinguishing

feature of the claimed composition over D2, i.e. the amount of the plasticizer of at least 32% by weight, provided a technical effect. Therefore, the problem to be solved had to be seen in the provision of an alternative. It was however known from D4 to add a plasticizer in an amount of up to 50% by weight to hot-melt adhesive compositions based on EPDM rubbers.

The examining division saw the polyisobutylene polymer component in the hot-melt adhesive composition of D4 as a semi-crystalline olefinic polymer in the sense of the claimed invention, and stated that the only difference of the claimed composition over D4 was the presence of specific semi-crystalline olefinic polymers as defined in claim 1. Because no effect based on these specific semi-crystalline polymers had been shown, the problem to be solved, when starting from D4, was again seen in the provision of an alternative. The semi-crystalline polymers of the claimed composition were, however, already used in the EPDM hot-melt adhesive compositions of D2 in order to improve their cohesive strength.

III. On 1 February 2011 the applicant (hereinafter appellant) filed a notice of appeal against the decision, paying the prescribed fee on the same day. The statement of the grounds of appeal was received on 4 April 2011, including arguments in favour of inventive step of the subject-matter of the claims on which the appealed decision was based. A copy of claims 1 to 14 which formed the basis of the decision of the examining division was enclosed.

IV. On 13 August 2012 the board issued a communication in which preliminary observations concerning novelty,

inventive step and clarity were made. The board acknowledged novelty over the relevant prior art but expressed its doubts as to the presence of an inventive step starting from D2 as the closest prior art. The board held *inter alia* that the only difference of the claimed composition over D2 was the presence of a plasticizer in an amount of at least 32% by weight instead of a maximum of 30% by weight. It was questionable whether the experimental evidence presented in the application showed any technical effect for a plasticizer content of at least 32% by weight over a composition with a plasticizer content of 30% by weight disclosed as the upper limit in D2.

With regard to the general term "plasticizer" in claim 1 the board held that the single comparison experiment in the application related only to a specific plasticizer, namely "Nyplast 222B", and concluded that a technical effect for plasticizers in general had not been plausibly shown in the application.

The board also raised objections under Article 84 EPC.

V. With its letter of response dated 26 September 2012 the appellant submitted sets of claims for a new main request and auxiliary requests 1 to 3, and presented arguments in favour of inventive step.

VI. On 11 October 2012 oral proceedings were held before the board. In these oral proceedings the appellant withdrew all requests presented with letter dated 26 September 2012 and filed as a sole request a revised auxiliary request 1. Claim 1 is reproduced in point 2.1 below.

VII. The arguments concerning inventive step provided in writing and orally, as far as they are related to the new auxiliary request 1, are summarised as follows:

D2, which is considered to represent the closest prior art, does not disclose any technical effect achieved by a hot-melt adhesive composition containing 30% by weight of a plasticizer. Although the upper limit of the plasticizer in D2 can be 30% by weight, the preferred plasticizer amounts are at considerably lower levels, namely 5% to 15% by weight. The skilled person would therefore have been motivated to use a plasticizer only in amounts significantly less than 30% by weight based upon the disclosure in D2.

D2 lies in a different technical field, namely the provision of hot-melt adhesives useful in manufacturing non-woven disposable articles such as diapers and feminine care products. In contrast thereto, the hot-melt compositions of the present invention are hot-melt sealant and gasketing materials and are used in manufacturing windows, doors, air filters etc. It is therefore clear that the required characteristics and the advantageous properties of the compositions according to the claimed invention are distinct from those described in D2. Accordingly, the experimental examples of the application, in contrast to those of D2, measure adhesion to relevant materials such as polyethylene, polypropylene and glass, and also sag resistance together with an impact resistance test. The technical effects achieved by the claimed composition would never be derived by a skilled person from the disclosure of D2.

D1 lies in the same technical field as D2. Accordingly, the experimental examples in D1 rely upon functional testing of the compositions in terms of creep retention and peel strength. The plasticizer is an optional compound and may or may not be included. Most preferably, the plasticizer in D1 is included at 10% to 25% by weight in order to provide a desired viscosity control and to impart flexibility to the composition. Thus, whilst D1 indicates the maximum possible level of plasticizer as being 40% by weight, it is apparent that in the context of the compositions disclosed therein the skilled person would not be motivated to utilize the plasticizer at this high level.

Thus, when considering D2 and D1 either alone or in combination, there is simply no motivation to utilize levels of plasticizer falling within the claimed subject-matter.

D4 highlights the plasticizer as an entirely optional component in compositions useful for adhering roofing sheets to a roof area. The compositions of D4 are structurally very different from those of the claimed invention and also from those of D2. For these reasons the skilled person would not turn to the disclosure of D4 when attempting to modify the compositions described in D2.

With regard to the objection in the board's communication concerning the general term "plasticizer" in claim 1, the appellant argued that the term plasticizer was utilised consistently in the art. There was therefore a reasonable expectation that the various

types of plasticizer encompassed by the claim would be expected, by one skilled in the art, to operate in the same manner and to the same degree as to fall within the term "plasticizer".

VIII. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of auxiliary request 1 (claims 1 to 13) as filed in the oral proceedings before the board (sole request).

Reasons for the Decision

1. The appeal is admissible.

2. The decision is based on the set of claims 1 to 13 of auxiliary request 1 presented in the oral proceedings.

2.1 Claim 1 reads as follows:

"1. A hot melt sealant and/or foam-in-place gasket composition, comprising a blend of the following components:
at least one rubber in an amount of 5% to 50% by weight said at least one rubber selected from the group consisting of ethylene-propylene rubber (EPR), ethylene-propylene-diene material (EPDM), and blends thereof;
at least one semi-crystalline olefinic polymer in an amount of 5% to 40% by weight wherein said at least one semi-crystalline olefinic polymer is selected from the group consisting of polyethylene, polypropylene, ethylene-propylene random and impact copolymers, ethylene-acrylic acid copolymers, ethylene-alkyl

acrylate or methacrylate copolymers, ethylene-vinyl acetate copolymers, ethylene-vinyl alcohol copolymers, and mixtures of the above olefinic polymers;
at least one amorphous poly-α-olefin polymer in an amount of 0% to 70% by weight wherein said at least one amorphous poly-α-olefin polymer is selected from the group consisting of propylene homopolymer, propylene-ethylene copolymer, propylene-butene-1 copolymer and propylene-ethylene-butene-1 terpolymer, and blends of the above polymers;
a compatible tackifier in an amount of 0% to 50% by weight;
a plasticizer in an amount of at least 32% to 70% by weight;
a wax in an amount of 0% to 30% by weight;
a filler in an amount of 0% to 60 % by weight; and
a stabilizer in an amount of 0% to 5% by weight, the above components adding up to 100% by weight of the composition."

Claims 2 to 10 are dependent claims. Claim 11 is directed to a method of manufacturing a laminate structure, one step being the application of the composition of any of claims 1 to 10. Claims 12 and 13 concern a laminate structure and a foam-in-place gasketing material respectively, including the composition of claims 1 to 10.

2.2 Claim 1 was amended in that the claimed composition is now a "hot melt sealant and/or foam-in-place gasket" composition, and in that the amount of the plasticizer is in the range of "at least 32% to 70%". The basis for this amendment is found in paragraphs [0014] and [0055] of the application as filed (represented by the

WO-A 2007/022308). The amendments therefore comply with Article 123(2) EPC.

2.3 Furthermore, in the whole claim set the term "about" has been deleted and in claim 10 the temperature values in "°F" have been supplemented with the corresponding values in "°C". Thus, the requirements of Article 84 EPC are also met.

3. Novelty

Novelty was not an issue. In the communication dated 13 August 2012 the board gave reasons as to why the subject-matter on which the decision of the examining division is based is novel over D1 to D4. This equally applies to the subject-matter of auxiliary request 1 presented in the oral proceedings before the board.

4. Inventive step

4.1 The application is concerned with hot-melt sealant and gasketing material compositions based on rubber together with at least one semi-crystalline olefinic polymer (WO publication 2007/022308, paragraph [0002]). The composition should have good adhesion to various substrates, high green strength, low tack, good flexibility and high tolerance to temperature fluctuation. The composition should also have good foamability to make it suitable as foam-in-place gasket material (paragraph [0014]).

4.2 The board agrees with the appellant that D2 is the closest prior art. D2 discloses a hot-melt adhesive composition based on ethylene propylene rubber (EPR)

and a semi-crystalline olefinic polymer and used in manufacturing non-woven disposable articles such as diapers and feminine care products (D2, first paragraph on page 1). The composition comprises as essential components:

- a rubber component selected from EPR and EPDM rubbers (5% to 65% by weight),
- a semi-crystalline olefinic polymer (5% to 40% by weight),
- a tackifier (15% to 75% by weight).

Furthermore, a plasticizer may be present as an optional component in an amount of 0% to 30% by weight (cf. claim 1 of D2). The upper limit of the plasticizer amount is below the minimum level of 32% by weight according to the claimed invention.

4.3 In the light of this closest prior art, the appellant saw the problem to be solved as being the provision of compositions which can be applied as a sealant and foam-in-place gasket material for the manufacture of windows, doors, air filters, auto weather strips, speakers, etc. The composition should in particular have good adhesion to the substrate to be joined, good flexibility, resistance to temperature fluctuation and sag or slump resistance.

As a solution to this problem, claim 1 proposes a composition comprising the following essential components:

- at least one specific rubber selected from EPR or EPDM in an amount of 5% to 50% by weight;

- at least one specific semi-crystalline olefinic polymer in an amount of 5% to 40% by weight;
- a plasticizer in an amount of 32% to 70% by weight.

Further optional components (amorphous poly-α-olefin, compatible tackifier, wax, filler, stabilizer) may be present in defined amounts.

4.4 The experimental evidence in the application, in the form of a number of examples, shows the following results:

A composition including the above essential components in the amounts specified in claim 1 passes the sag resistance test at 230°F (110°C) and the impact resistance test at -40°F (-40°C) (see in particular example 7). That the amount of the plasticizer in the claimed composition is critical for the performance of the invention can be derived from the comparison of compositions 13 and 14 with composition C1. It is shown that composition C1, in which the plasticizer amount is 28 wt% (i.e. within the range disclosed in D2), does not pass the impact resistance test.

As regards the breadth of the term "plasticizer", the board agrees with the appellant that this term is used consistently in the art and that there is, therefore, a reasonable expectation that the various types of plasticizer encompassed by the claim would be expected by one skilled in the art to operate in the same manner and to the same degree in order to fall within the term "plasticizer".

The board is therefore satisfied that the objective technical problem, namely to provide a composition with good resistance to temperature fluctuation and sag resistance, is plausibly solved by the claimed invention.

4.5 It remains to be decided whether the claimed solution, namely the provision of the hot-melt sealant and/or foam-in-place gasket composition according to claim 1, is obvious from the prior art.

4.5.1 D2 concerns hot-melt adhesive compositions suitable for manufacturing non-woven disposable articles such as diapers and feminine care products. The technical field of D2 is therefore unrelated to the field of sealant and gasket materials used in manufacturing windows, doors, air filters, auto weather strips, speakers, etc. according to the claimed invention. Thus, the profile of properties required for the claimed composition, namely high green strength, good adhesion to various substrates, flexibility, resiliency and temperature fluctuation tolerance, is different from that of the compositions described in D2 which are stated to be particularly useful in applications where non-contact patterned coating techniques, such as spiral spray, melt-blown and multi-bead techniques are involved.

Although the amount of plasticizer in D2 can be as high as 30% by weight, the plasticizer is an optional component and the preferred plasticizer levels are 5% to 15% by weight (D2, page 12, lines 6 to 8) in order to provide the desired viscosity control. The highest plasticizer amount exemplified in D2 is 20% by weight (Tables I, II). Thus, there was no motivation for a

skilled person following the teaching of D2 to incorporate into the compositions plasticizer amounts which are considerably higher than 20% by weight.

In contrast thereto, it was shown in the application that for the claimed compositions the plasticizer level has to be above 32% by weight in order to provide good sag resistance and low temperature resistance, properties which make the composition of the invention suitable as sealant and gasketing material.

4.5.2 Although the plasticizer level in the hot-melt compositions of D1 can be 40% by weight (D1, claim 1), the plasticizer is again an optional component and 10 of 11 examples relate to compositions with plasticizer amounts within the range of 5% to 20% by weight. Only example 5 describes a composition with 30% by weight of plasticizer. Moreover, D1 lies in the same technical field as D2 and relates to compositions for manufacturing non-woven disposable articles such as diapers and feminine hygiene products. A skilled person was therefore not induced by the teaching of D1 to enhance the plasticizer level above the amount of 30% by weight in order to adapt the hot-melt adhesive composition of D2 to properties which are required for the hot-melt sealant and foam-in-place gasket compositions claimed in claim 1.

Thus a combination of D2 with D1 does not lead to the claimed invention.

4.5.3 D4 discloses hot-melt adhesive compositions for adhering roofing sheets to a roof area (claim 1) and therefore lies in an entirely different technical field

from D2. The composition of D4 may contain less than 50% by weight of a plasticizer (claim 5 in conjunction with paragraph [0018]). The plasticizer is therefore an optional compound. Moreover, the composition of D4 comprises, as one rubbery polymer, a polyisobutylene which, as was convincingly argued by the appellant in its grounds of appeal (points 4.2.1 to 4.2.11), is not a semi-crystalline polymer.

In the board's judgment, there is therefore no motivation for a skilled person to combine D2 and D4 which come from different technical fields, to enhance the plasticizer level of the compositions according to D2 above 30% by weight and thus arrive at the claimed hot-melt sealant and foam-in-place gasket composition.

4.6 The composition of claim 1 is therefore based on an inventive step. The same applies to the method of manufacturing a laminate structure according to claim 11, applying in one step the composition of claim 1, the laminate structure of claim 12 and the foam-in-place gasketing material of claim 13, both including the composition of claim 1.

5. The claims of auxiliary request 1 are therefore allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the examining division with the order to grant a patent on the basis of auxiliary request 1 (claims 1 to 13) as filed during the oral proceedings before the board and a description yet to be adapted.

The Registrar The Chairman

M. Canueto Carbajo W. Sieber