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**Datasheet for the decision
of 17 July 2013**

Case Number: T 1516/09 - 3.4.03

Application Number: 99973354.6

Publication Number: 1150357

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B32B27/28

Language of the proceedings: EN

Title of invention:
COVER MATERIAL FOR SOLAR CELL

Patent Proprietor:
Bridgestone Corporation

Opponent:
ISOVOLTAIC AG

Headword:

Relevant legal provisions:
EPC 1973 Art. 56, 100(a)

Keyword:
Inventive step - (yes)

Decisions cited:

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 1516/09 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 17 July 2013

Appellant: ISOVOLTAIC AG
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 27 May 2009
rejecting the opposition filed against European
patent No. 1150357 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman: G. Eliasson
Members: S. Ward
T. Bokor

Summary of Facts and Submissions

I. An opposition based on the ground of Article 100(a) EPC in combination with Article 56 EPC was filed against the European patent No. 1 150 357. The present appeal is against the decision of the Opposition Division rejecting the opposition.

II. Claim 1 as granted (which is identical to claim 1 of the main request on which the decision of the Opposition Division was based) reads as follows:

A covering member for solar battery, to be used as a transparent protective member for protecting solar cells of a solar battery, comprising:
a transparent fluoro-resin film,
a transparent film laminated on the transparent fluoro-resin film and formed of two transparent polyethylene terephthalate films and inorganic oxide coatings coated on the respective two films, said inorganic oxide coatings being formed of at least one material selected from the group consisting of silica and alumina, and having coating surfaces bonded to each other, and
an ethylene-vinyl acetate copolymer adhesive disposed between said transparent fluoro-resin film and said transparent PET film for integrally connecting the same,
said ethylene-vinyl acetate copolymer adhesive containing an ultraviolet absorbing agent and an organic peroxide as a cross-linking agent.

III. The following documents (among others) were cited in the opposition procedure:

D1: EP 0 631 328 A
D4: US 5 582 653 B1
D5: EP 0 792 846 B1

- IV. In the decision under appeal the Opposition Division held that the subject-matter of claim 1 of the granted patent would not be obvious to a skilled person in the light of the cited prior art, and in particular on the basis of the combination of documents D1 and D5.
- V. The opponent/appellant (hereinafter, the opponent) filed a notice of appeal which incorporated a statement of the grounds on which the appeal was based. The arguments of the opponent are considered in detail below. However, briefly summarized, the opponent maintained that the invention lacks an inventive step as the subject-matter of claim 1 of the granted patent would be obvious to a skilled person in the light of a combination of the documents D1 and D5. In a subsequent letter dated 29 May 2013 further arguments were set out and reference was made to the document D4 in relation to the claimed use of organic peroxide as a cross-linking agent.
- VI. The respondent/proprietor (hereinafter, the proprietor) sent a letter of response dated 19 October 2009 enclosing new claims representing first to fifth auxiliary requests. The proprietor argued that the skilled person would not combine the documents D1 and D5. Even if such a combination were contemplated, it would not lead the skilled person to the subject-matter of claim 1 of the granted patent. In a further letter dated 11 June 2013 additional arguments were provided, and it was stated that the document D4 "should be rejected as being late filed".

- VII. At oral proceedings before the Board, the opponent requested that the decision under appeal be set aside and the patent revoked.
- VIII. The proprietor requested that the appeal be dismissed (main request). Failing this, it was requested that the patent be maintained on the basis of one of the first to fifth auxiliary requests filed with the letter dated 19 October 2009.

Reasons for the Decision

1. The appeal is admissible.
2. Main Request: Inventive step
 - 2.1 Differences over the prior art

Both parties consider the document D1 to be the closest prior art. The Board concurs that the embodiment of figure 12 of D1 (referred to by the opponent) and the associated text is the most suitable starting point for discussing the question of inventive step.

It is undisputed that a first difference between claim 1 of the granted patent and the document D1 is that the claimed transparent film comprises:

- "two transparent polyethylene terephthalate films and inorganic oxide coatings coated on the respective two films, said inorganic oxide coatings...having coating surfaces bonded to each other".

This will be referred to in the following as the "first difference".

A second difference is that organic peroxide is used as the cross-linking agent for the EVA adhesive.

The proprietor argues for the existence of a third difference (see e.g. letter of 7 June 2013, passage bridging pages 2 and 3). The Board's understanding of the proprietor's argument is as follows. Document D1 discloses:

- EVA as one of five examples of resins for use as the filler (page 9, lines 18-19);
- the possible use of a cross linking agent (page 9, lines 20-21); and
- the desirability of an ultraviolet absorbing agent (page 9, lines 22-23).

However, these three elements are not specifically disclosed in combination, hence (it is alleged) this establishes a further difference over D1.

2.2 First difference

In relation to the first difference, the corresponding arrangement in document D1 (see figure 12; page 10, lines 8-11) is the moisture preventive layer comprising a *single* SiO₂ layer (1208) deposited on a *single* layer of PET (1207). The question is therefore whether it would be obvious for a skilled person to modify this arrangement to one which includes the features of the first difference.

Two technical problems have been mentioned in the submissions of the parties in relation to the first difference. In the letter dated 29 May 2013 and in the oral proceedings held before the Board, the opponent focused on the problem of providing improved barrier

properties (with the protection of the oxide layers being a second consideration).

Reference has also been made, however, to the statement in paragraph [0026] of the patent in suit that the purpose of providing two coated films with coating surfaces bonded to each other is to overcome the tendency of the inorganic oxide layer to become "easily separated in service". On this basis the proprietor concluded that the technical problem is the prevention of delamination, and this problem was also referred to by the opponent in the statement of grounds for the appeal (paragraph bridging pages 3 and 4).

In addition, two different lines of argument can be discerned in the opponent's submissions in relation to the problem of providing improved barrier properties. A first argument appears to be based on general technical considerations and/or the common knowledge of the skilled person, and a second on the combination of documents D1 and D5.

In total, therefore, the Board identifies three separate arguments in the opponent's submissions that the first difference referred to above is obvious:

- a first argument based on the problem of improving the barrier properties in relation to moisture and relying on document D1 in combination with the general knowledge of the skilled person;
- a second argument based on the problem of improving the barrier properties in relation to moisture and relying on document D1 in combination with document D5; and
- a third argument based on the problem of preventing delamination and relying on document D1 in combination with document D5.

These three arguments will now be considered in turn.

2.2.1 First argument

The opponent argues that starting from a moistureproof layer comprising a single polymer layer with a single oxide coating, and confronted with the problem of improving the moistureproofing effect, it would be obvious to use *two* such layers. Furthermore, it would be obvious to arrange these layers with the sensitive oxide coatings facing each other and bonded with a laminating adhesive to protect them from external damage. The result would be a moistureproof layer in the following form: polymer/oxide/bonding adhesive/oxide/polymer, with both polymer materials and both oxide materials being the same.

In the case of document D1, therefore, it would be obvious to improve the barrier properties of the PET/SiO₂ moisture preventive layer by extending it to a moisture preventative layer in the form of PET/SiO₂/bonding adhesive/SiO₂/PET, which would correspond to a transparent film as defined in claim 1 of the opposed patent.

A first objection to this line of argument concerns the definition of the technical problem. Within the context of the problem-solution approach, it is well-established that the objective problem should be based on the technical effect of the features distinguishing the claim from the closest prior art. It is equally well-established that the definition of the objective problem generally starts from the problem described in the contested patent as being solved by these distinguishing features (see "Case Law of the Boards of Appeal of the European Patent Office", 6th edition,

2010, I.D.4.3.2). A reformulation of the problem is generally only necessary or appropriate in the case where examination shows that either the problem posed is not solved by the claimed features or that the prior art used to define the problem is unsuitable.

While it is certainly clear from the opposed patent (see e.g. paragraphs [0006],[0008] and [0025]) that an important general function of the covering member is to prevent moisture or water permeation, it is nowhere stated or implied that the features of the first difference (i.e. *two* PET films and *two* oxide coatings) provide, or are intended to provide, an improvement in this respect. On the contrary, the claimed arrangement of the transparent film (PET/oxide/bonding adhesive/oxide/PET) is consistently said to be a means to prevent layer separation (see e.g. paragraphs [0026] and [0074]).

The Board does not see why a reformulation of this problem is necessary. Both parties agree that document D1 is the appropriate prior art to define the problem, and the opponent has not contested that the layer arrangement of the first difference is a solution to the problem of delamination. As mentioned above, the opponent relied upon precisely this technical problem in the statement of grounds for the appeal.

Subsequently the opponent has argued that this arrangement protects the sensitive oxide coatings, which is also mentioned in the opposed patent as the means by which delamination is avoided (paragraphs [0026],[0074]).

The first argument therefore relies on a reformulation of the technical problem for which no proper justification has been given and which is

inappropriate. For this reason alone, this argument must be regarded as unconvincing.

Moreover, even if it were considered that improving the barrier properties of the film to moisture permeation is the appropriate technical problem, the opponent's argument that it would be a trivial or commonplace matter for the skilled person to solve this problem by providing the features of claim 1 of the main request is unconvincing.

The Board considers this argument to be essentially speculative, and to rest on mere assertion. If this assertion were true, it would presumably be possible to furnish suitable supportive examples from the prior art. At the very least, a single example of a prior art moistureproof film having the form: polymer/oxide/bonding adhesive/oxide/polymer (with both polymer materials and both oxide materials being the same) could presumably be cited.

However, despite the fact that the first difference of claim 1 over document D1 has been acknowledged from the very beginning of the opposition procedure, not one example of a moistureproof film having such a layer arrangement has been cited by the opponent.

In the present case where the proprietor disputes the opponent's contention that such an arrangement would be trivial for a skilled person and/or commonly known in the art, it is incumbent on the opponent to adduce supporting evidence. As no such evidence has been submitted, the assertions of the opponent cannot be accepted. For this reason also, the first argument fails to convince the Board.

2.2.2 Second argument

The second argument based on the problem of improving the barrier properties of the moistureproof layer of document D1 relies on a combination with the document D5. The comments made above on the unsuitability of this problem apply *mutatis mutandis*.

However, even if *arguendo* this problem were adopted, the argument made by the opponent would fail to convince the Board.

The document D5 discloses in embodiment 4 (figure 3 and paragraph [0034]) an arrangement of five layers in the following order: LDPE/SiOx/ORMOCER/SiOx/PETP, where LDPE is a known abbreviation for Low-Density Polyethylene, PETP (also abbreviated PET) is polyethylene terephthalate and ORMOCER is a known class of inorganic-organic hybrid polymers. In this arrangement the ORMOCER layer functions as a laminating adhesive (i.e provides bonding) between the two SiOx-coated polymer layers (paragraph [0034]).

It is not disputed that if, firstly, the PET/SiO₂ moisture preventive layer (1207,1208) of D1 were replaced by the arrangement of five layers disclosed in figure 3 of D5, and if, secondly, the LDPE layer were replaced by a second PETP layer, the resulting arrangement would correspond to a transparent film as defined in claim 1 of the opposed patent. The question is whether such adaptations would be obvious to the skilled person.

The opponent argues that the first of these measures would be obvious to improve the barrier properties of the layer, and that the second measure would be obvious

in the context of solar cells, as PETP is known to have better weather-resistant properties than LDPE.

The Board notes that it is mentioned in document D5 that the films disclosed may be used *inter alia* as protective films for "sensors" (see column 1, lines 9-11), and that they also act as barriers against gases and water vapour (see e.g. column 2, lines 47-49). It is therefore arguable that a skilled person might look to this document for a solution of the above problem.

However, in examining the embodiments and examples of document D5 to identify potential solutions, the skilled person would clearly pay close attention to what is actually disclosed in the text in relation to these embodiments, in particular their properties and envisaged applications.

It must also be recalled that the problem is said to be improving the barrier properties of the "moisture preventive layer" of document D1, in other words it is the barrier effect *against moisture or water* which is important in covering members for solar cells, as is also apparent from the general discussion of the background technology in the opposed patent (e.g. paragraphs [0001],[0007]).

With this in mind, it may legitimately be asked why a skilled person looking to reduce water vapour permeation would bypass embodiment 3, the only embodiment in which low water vapour permeability is mentioned, and turn instead to embodiment 4, an example presented as having a particularly low permeability to oxygen.

Moreover, it is clear from the whole of document D5 that the improved barrier effects disclosed therein are obtained chiefly as a result of the provision of an ORMOCER film. There is no justification for the opponent's argument that it is the five layer geometrical arrangement of figure 3 which is the key to achieving superior barrier properties. Not only is this not stated anywhere in the document, but in the second example falling under embodiment 4 (paragraph [0035]), good barrier properties are achieved even when the oxide layers are omitted, and the three layer arrangement depicted in figure 4 is adopted.

Furthermore, replacing the LDPE layer in figure 4 by a second PETP layer cannot be considered to be an obvious measure. While all of the films of document D5 are disclosed as having good barrier characteristics, the specific technical advantage achieved by the first example falling under embodiment 4 is that it is sealable and can therefore be used as a packaging material for foodstuffs. This is achieved by means of the sealable LDPE layer, as acknowledged by the opponent. In the light of this, for a skilled person to modify this embodiment by omitting the very layer by which the stated technical advantage of this embodiment is achieved goes beyond what could be considered to be an obvious application of the teachings of document D5.

In summary, the essential teaching of the document D5 is that improved barrier effects to water vapour and/or gases may be achieved by the provision of an ORMOCER film (in combination with one other film). From this, the skilled person might, at most, derive the idea of incorporating an ORMOCER film somewhere within the the layer arrangement of figure 12 of document D1, for example, overlying the oxide layer (as in figure 2 of

D5). It has not, however, been demonstrated, nor is it plausible, that the skilled person would incorporate the arrangement depicted in figure 3 of document D5 with the further modification of the LDPE layer being replaced by a second PETP layer.

2.2.3 Third argument

The argument based on the combination of documents D1 and D5 is also unconvincing if the objective problem is formulated as preventing delamination.

Starting from the document D1, and for the reasons mentioned above in connection with the first argument, the problem of preventing delamination is considered to be the most plausible problem associated with the features of the first difference.

However, on the basis of this problem, invoking document D5 in an attempt to demonstrate the obviousness of these features is doomed to failure by the fact that there is no reference anywhere in the document D5 to the problem of delamination.

It is stated at the end of paragraph [0003] of document D5 that vaporized films are very sensitive to mechanical stress, a term which includes, but is in no way limited to, delamination. In fact, in the light of the first sentence of the next paragraph (paragraph [0004]), it would appear that document D5 is concerned with mechanical stress in the form of scratches or abrasions. Other passages making reference to mechanical properties (e.g. paragraph [0010]) similarly fail to mention the problem of delamination.

Even if (again, for the sake of argument) the more general problem of preventing mechanical stress were taken as the problem, the conventional solution acknowledged in document D5 (end of paragraph [0003]) is to laminate the coated substrate with a foil, and the solution according to the teaching of document D5 is to apply a film of ORMOCER (paragraph [0010]). The particular arrangement of figure 3 is not disclosed as providing any specific mechanical advantages.

As mentioned above in connection with the second argument, the document D5 might, at the very most, prompt a skilled person to include an ORMOCER film within the arrangement of figure 12 of document to enhance the mechanical stability (D5, paragraph [0010]), but it has not been plausibly demonstrated that it would be obvious to employ the arrangement depicted in figure 3 (or a modification thereof) for this (or any other) purpose.

Finally, the conclusion drawn above in relation to the second argument that the skilled person would not replace the LDPE layer by a PETP layer applies also to the third argument for the same reasons *mutatis mutandis*.

2.2.4 First difference: Conclusion

The Board concludes that, having regard to the state of the art, it would not be obvious for a skilled person to modify the closest prior art to include the features referred to above as the "first difference". For this reason alone claim 1 of the main request is considered to involve an inventive step in the sense of Article 56 EPC 1973.

2.3 Other matters

In the light of the above conclusion, it is not necessary to discuss the second difference or the (alleged) third difference mentioned above.

Furthermore, the Board has not found it necessary to refer to the document D4, and hence the question of the admissibility of this document into the proceedings does not need to be addressed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



S. Sánchez Chiquero

G. Eliasson

Decision electronically authenticated