

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte LOUIS ANTHONY FERRI
and STEVEN MICHAEL MILANO,
APPELLANTS

Appeal 2007-3297
Application 10/224,983¹
Technology Center 1700

Decided: 31 March 2008

Before ADRIENE LEPIANE HANLON, CHARLES F. WARREN, and
MARK NAGUMO, *Administrative Patent Judges*.

NAGUMO, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ Application filed 21 August 2002, titled *Solar Panel Including a Low Moisture Vapor Transmission Rate Adhesive Composition*. The real party in interest is listed as TruSeal Technology, Inc. (Appeal Brief filed 26 October 2006 ("App. Br."), at 1.)

A. Introduction

Appellants (“Ferri”) appeal under 35 U.S.C. § 134(a) from the final rejection of claims 1–54, which are all of the pending claims in their application 10/224,983 (“983 application”). We have jurisdiction under 35 U.S.C. § 6. We AFFIRM.

The claimed subject matter relates to a solar panel. Claims 1 and 4 are representative of the issues necessary to resolve this appeal.

Claim 1 reads:

A solar panel comprising:
a front panel;
a photovoltaic material layer deposited either
 directly on the front panel or
 directly on an anti-reflective coating formed
 between the front panel and the photovoltaic
 material layer;
a backing panel; and
an adhesive layer adhering the photovoltaic material
layer to the backing panel,
 wherein the adhesive layer comprises an adhesive
 composition,
 the adhesive composition comprising a low MVTR
 polymer or copolymer and a silane-modified
 polymer or copolymer,
 wherein the silane-modified polymer or copolymer
 is provided to the adhesive preformed and is
 different from the low MVTR polymer or
 copolymer.

(App. Br. Claims App’x at 22; paragraphing and indentation added.)

(“MVTR” is an acronym for “moisture vapor transmission rate.”)
(Specification (“Spec.”) at 2:23–24.)

Claim 4 reads:

The solar panel of claim 1, wherein the adhesive composition has a MVTR less than about 3 grams per square meter per day.

(App. Br. Claims App’x at 22.)

The Examiner has maintained the following rejections² (the original labeling of the rejections (A, B, etc.) has been retained):

- A. Claims 1, 2, 4–8, 12, 16, 18, 19, 38, 41, 42, 46–49, and 51 have been rejected under 35 U.S.C. § 102(e) or under 35 U.S.C. § 103(a) in view of Yamada³. (Ans. at 3–6.)
- E. Claims 11, 14, and 15 have been rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Yamada, Kataoka⁴, and Wey (1997)⁵. (Ans. at 15–16.)

² Examiner’s Answer, mailed 22 February 2007 (“Ans.”).

³ Hiroshi Yamada *et al.*, *Protective Sheet for Solar Battery Module, Method of Fabricating the Same, and Solar Battery Module*, U.S. Patent 6,335,479 B1, issued 1 January 2002, based on application 09/418,193, filed 13 October 1999.

⁴ Ichiro Kataoka *et al.*, *Solar Cell Module having a Surface Side Covering Material with a Specific Nonwoven Glass Fiber Member*, EP 0,768,818 A2, published 23 April 1997.

⁵ Hans Günter Wey, *Polar and Reactive: VESTOPLAST with New Properties*, Munich Adhesives and Processing Seminar 1997 (20–22 October 1997).

- F. Claims 52 and 54 have been rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Yamada and Kataoka. (Ans. at 16–17.)
- B. Claims 1–5, 7–9, 11–13, 16, 18, 19–32, 34–46, and 48–54 have been rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Mimura⁶, Wey (1997), and Wey 474⁷. (Ans. at 6–10.) (Ans. at 10–11.)
- C. Claim 10 has been rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Mimura, Wey (1997), and Wey 474. (Ans. at 10–11.)
- D. Claims 1–3, 6–8, 11, 13, 15–19, 22, 24, 26–30, 33–35, 37, 52, and 53 have been rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Mimura, Baratuci⁸, and Wey (1997). (Ans. at 11–15.)

The dispositive issues in this appeal are:

- (1) What is the meaning of the term “front panel,” as used in claim 1 of the 983 application, and do the structures identified by the Examiner as “front panels” fall within the scope of that term?

⁶ Toshihiko Mimura *et al.*, *Solar Roof Member*, U.S. Patent 6,311,436 B1, issued 6 November 2001, based on application 09/092,872, filed 8 June 1998.

⁷ Hans Günter Wey and Peter Bickert, *Use of Silane-Grafted Amorphous Poly- α -Olefins as Moisture-Crosslinking Adhesive Base Material or Adhesive*, U.S. Patent 5,994,474, issued 30 November 1999.

⁸ James L. Baratuci *et al.*, *Preformed Flexible Laminate*, WO 97/31769, published 4 September 1997. (Louis A. Ferri is listed as a coinventor.)

(2) What is the meaning of the limitation, “deposited directly on”?

(3) Does Yamada teach or suggest solar panels having an adhesive composition comprising a low MVTR polymer or copolymer and a silane-modified polymer or copolymer within the scope recited in claim 1?

(4) Does Yamada teach or suggest solar panels having adhesives meeting the MTVR limitations recited in claim 4?

B. Findings of Fact (FF)

Findings of fact throughout this Decision are supported by a preponderance of the evidence of record.

The 983 Application

1. The specification states that the invention “relates to a solar panel including an adhesive layer including an adhesive composition which has a low moisture vapor transmission rate [‘MVTR’].” (Spec. at 1:5–6.)
2. The specification describes some very general embodiments of the invention, e.g., “[i]n one embodiment, the present invention relates to a solar panel, in which the solar panel includes a photovoltaic material layer and a backing panel, with an adhesive layer adhering the photovoltaic material layer to the backing panel.” (Spec. at 5:28–30.)
3. The specification also indicates that “[t]he solar panel may be of any type known in the art” (Spec. at 6:4); and “the present invention is not limited to any particular type of solar panel” (*id.* at 20).
4. However, prior art solar panel designs “of primary interest” are said to employ a semiconductor material that is “deposited on a substrate in a thin

film. These thin film photovoltaic materials are typically deposited in a thin film on a glass substrate by a method such as sputtering, PVD [plasma vapor deposition] or CVD [chemical vapor deposition].” (Spec. at 1:16–21.)

5. After describing details that need not detain us, the specification states that, “[t]o complete the construction, an assembly adhesive is applied over the photovoltaic material, associated circuitry, and any protective layer which is present, and a backing material is applied. The backing material is typically glass, but may be metal, a composite, or a plastic material.” (Spec. at 1:26–29.)

6. According to the specification, “[t]he photovoltaic material layer is formed on a front panel of material which may be, for example, ordinary borosilicate glass.” (Spec. at 6:24–25.)

7. In other embodiments, tough plastic films having a high coefficient of visible light transmission, a low coefficient of infrared light transmission, and resistance to UV radiation are said to be useful as front and back panels for solar cells of the invention. (Spec. at 6:27 to 7:10, providing examples.)

8. In addition, the specification states that “[o]ther suitable materials may be used as the front panel and the backing panel, as known in the art.” (Spec. at 7:10–11.)

9. The specification states that “[t]he photovoltaic material layer **102** may be deposited by any appropriate means known in the art.” (Spec. at 8:16-17.)

10. The specification also teaches that “[a]s known in the art, other layers may be included, such as, for example, an anti-reflective coating formed

between the front panel and the photovoltaic material layer, to prevent reflection of incoming sunlight out of the solar panel.” (Spec. at 7:17-19.)

11. An embodiment of the invention is illustrated by Figure 1, which is reproduced *infra*:

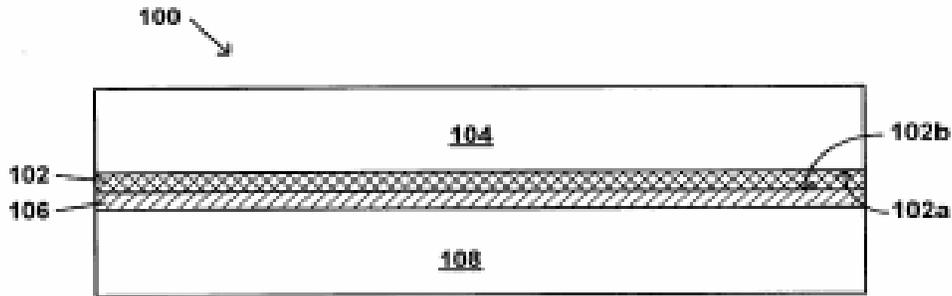


Fig. 1

{Spec. Figure 1 is said to show a solar panel of the invention.}⁹

12. In this embodiment, the front panel, **104**, is directly contacted by a photovoltaic material layer, **102**, which in turn is adhered via adhesive layer, **106**, to the backing panel, **108**. (Spec. at 7:23–30.)

13. The specification states that water penetration into solar panels has been a long-standing problem. (Spec. at 2:22–23.)

14. The specification further states that a presently used assembly adhesive is ethylene vinyl acetate (“EVA”), which is crosslinked on curing in solar panel assembly. (Spec. at 3:1.)

15. According to the specification, crosslinked EVA is strong, but suffers from a relatively high MVTR. (Spec. at 3:4–5.)

⁹ The text in curly braces following the Figures is provided to ensure compliance with section 508 of the U.S. Rehabilitation Act for publication of this Decision on the USPTO website pursuant to the Freedom of Information Act. It is not part of the Decision.

16. The specification describes an improved adhesive composition that includes a low MVTR polymer or copolymer and a silane-modified polymer or copolymer. (Spec. at 10:15–17.)

17. Throughout the remainder of the decision, we shall use the term “polymer” generically, to denote polymers from single as well as plural species of monomers.

18. Specific embodiments of low MVTR polymers are said to include polyisobutylene, an isobutylene-isoprene copolymer, and other polymers, including mixtures. (Spec. at 10:18 through 11:7.)

19. Examples of silane-modified polymers are said to include silane-modified amorphous α -olefin polymers. (Spec. at 11:8 to 16:18.)

20. According to the specification, “[i]n one embodiment, upon crosslinking, the silane-modified polymer or copolymer forms a network with the low MVTR polymer or copolymer interpenetrating therethrough.” (Spec. at 21:30 to 22:2.)

21. The MVTR of an adhesive film is said to be measured on a film 5 cm square by 0.050 to 0.060 inches (1.27 to 1.52 mm) thick, held in an aluminum mask, according to ASTM F 1249-90. (Spec. at 16:20 to 17:7.)

22. In the words of the specification:

As used herein, the term ‘low MVTR’ or ‘low moisture vapor transmission rate’ means that the rate at which water vapor or moisture is transmitted through the material to which this term is applied, as measured by ASTM F 1249-90, is less than 5 grams per square meter per day ($\text{g}/\text{m}^2/\text{d}$). This rate of moisture vapor transmission is generally regarded as ‘low’.

(Spec. at 17:8–12.)

C. Discussion

In order for claimed subject matter to be anticipated, “it is only necessary that the claims under attack, as construed by the court, ‘read on’ something disclosed in the reference, i.e., all limitations of the claim are found in the reference, or ‘fully met’ by it..” *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 772 (Fed. Cir. 1983). Claimed subject matter is not patentable if the differences between the claimed subject matter and the prior art are such that the invention as a whole would have been obvious to a person having ordinary skill in the art at the time the invention was made. 35 U.S.C. § 103(a). The legal conclusion of obviousness is based on underlying findings of fact including the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of ordinary skill in the pertinent arts. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734 (2007). “Secondary considerations such as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.” (*Id.*, quoting *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966)).

Claim Construction

Our reviewing court has stated repeatedly that, during prosecution: the PTO applies to the verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant’s specification.

In re Morris, 127 F.3d 1048, 1054 (Fed. Cir. 1997). The reason is that:

during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed. . . . An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process."

In re Zletz, 893 F.2d 319, 321–22 (Fed. Cir. 1989). Although “the inventor may be his own lexicographer, and may use common words in uncommon ways, provided only that the intended meaning is clear,” *In re Dance*, 160 F.3d 1339, 1344 (Fed. Cir. 1998), “mere inferences drawn from the description of an embodiment of the invention cannot serve to limit claim terms.” *Johnson Worldwide Assoc., Inc. v. Zebco Corp.*, 175 F.3d 985, 992, (Fed. Cir. 1999).

The most important dispute concerns the proper meaning of the term “front panel,” as it occurs in the claims. In the present case, we note that the specification contains many statements indicating the breadth of the disclosed inventions: e.g., “the solar panel may be of any type known in the art” (Spec. at 6:4; FF3); “the present invention is not limited to any particular type of solar panel” (Spec. at 6:20; FF3). Although the claimed subject matter on appeal is limited to solar panels that have a photovoltaic material deposited directly on the front panel, or directly on an antireflective coating between the front panel and the photovoltaic material, a clear definition of the term “front panel” is conspicuously absent from the specification.

Desirable properties of the front panel are said to include high transparency to visible light, low coefficient of infrared light transmission,

and resistance to ultraviolet light. (*Id.* at 6:29 to 7:3.) The specification states that the front panel “may be, for example, ordinary borosilicate glass” (Spec. at 6:24–25), or low-iron glass (*id.* at 6:26), or polyvinylfluoride (*id.* at 6:29). According to the specification, “[o]ther suitable materials may be used as the front panel and the backing panel, as known in the art.” (*Id.* at 7:10–11.) Ferri has not, however, directed our attention to any clear statement that would exclude laminated structures that transmit visible light, such as automobile window glass, from the term “front panel.”

Claim 1 further recites “a photovoltaic material layer deposited . . . directly on the front panel” or directly on an antireflective coating on the front panel. The phrase “deposited directly on” is an example of the use of a process limitation (deposition) being used to define a structural limitation (what is next to what) in the claimed product (a solar panel). It is well settled law that in an application for patent, product-by-process claims define a product that is met by any product, no matter how made, that has the same structures and substances that result from the recited process steps. *SmithKline Beecham Corp. v. Apotex Corp.*, 1439 F.3d 1312, 1317 (2006). According to the specification, “[t]he photovoltaic material layer **102** may be deposited by any appropriate means known in the art.” (Spec. at 8:16-17.) Accordingly, absent a demonstration that the deposition step results in a different structure, a photovoltaic material layer will be deemed to meet the limitation “deposited directly on the front panel” if, in a complete solar panel, the photovoltaic material layer touches the front panel.

Considering the breadth of the materials disclosed as being suitable for the front panel, the disclosed properties and functions of the front panel, the absence of specific structure for the front panel, and the disclosed

relation of the photovoltaic material layer to the front panel, we conclude that the front panel of the claimed solar panel is whatever structures lie between the photovoltaic material and the external world in the finished solar panel.

Yamada

The Examiner finds that Yamada describes, in Figure 15, a solar panel that meets the limitations of claims 1, 2, 4-8, 12, 16, 18, 19, 38, 41, 42, 46-49, and 51 (Ans. at 3-5); or that, where the disclosure is broad as to adhesive materials, selection of the specifically recited materials, and therefore the solar panel as claimed, would have been obvious (*id.* at 5-6).

Yamada Figure 15 is reproduced below:

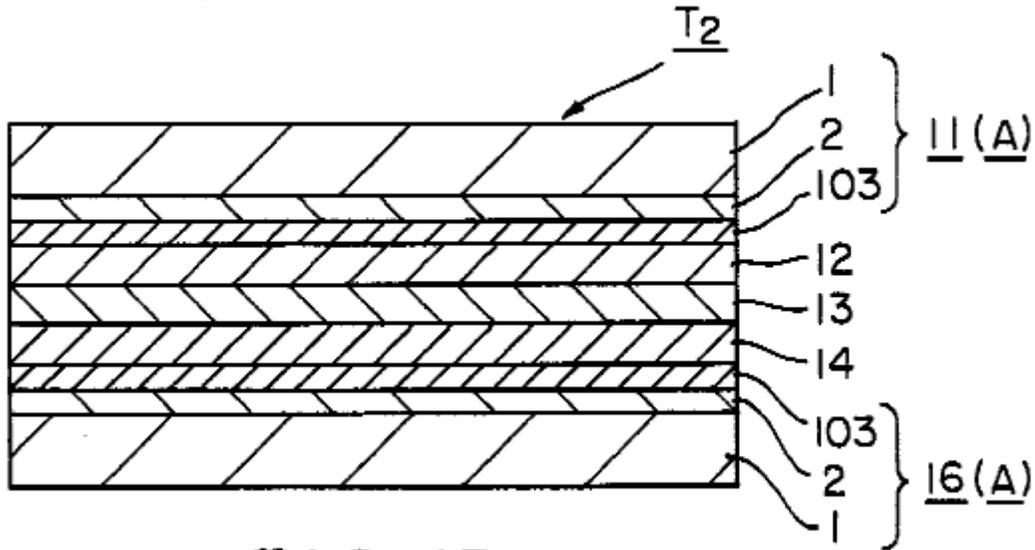


FIG. 15

{Yamada Figure 15 is said to show a solar cell.}

The examiner finds that Yamada describes (Ans. at 4–5):

- a front panel that is the combination of elements **1**, **2**, **103**, and **12**;
- a photovoltaic material layer **13** deposited directly on the front panel;
- a low MVTR polymer and silane modified polymer adhesive layer (**14** + **103**) adhering the photovoltaic material to
- a backing panel (**2** + **1**).

Yamada describes the layers as follows: the front and back protective sheets **11** and **16** (Yamada at 47:14-16), respectively, are formed from a plastic sheet **1**, a deposited inorganic oxide film **2**, and a coating film **103** of a condensation polymer produced by hydrolysis of a silicon compound formed on the inorganic oxide film **2** (*id.* at 46:16–23). Layers **12** and **14** are described as filler layers and layer **13** is said to be a photovoltaic layer of solar cells. (*Id.* at 47:18-19.) Yamada describes layer **12** as transparent to sunlight, adhesive to the front surface protective sheet, thermoplastic (*id.* at 15:4–13), and weather resistant (light-, heat-, and water-resistant) (*id.* at 15:31–36). Suitable materials for layer **12** include fluorocarbon resins, ethylene-vinyl acetate, and other resins. (*Id.* at 15:14–23 and at 15:34–35.) Layer **14** is described as being similar to layer **12**, but not necessarily transparent. (*Id.* at 15:51 through 16:15, esp. 15:61–54.)

The Examiner finds further that the adhesive layer comprises an MVTR polymer or copolymer (the backside ethylene-vinyl acetate copolymer sheet disclosed at Yamada column 58, lines 38-53) and a silane modified polymer or copolymer that is formed prior to application of the

coating because it is formed by the procedure shown at Yamada column 55, lines 31-45. (Ans. at 4.) As evidence of the required MVTR property, the examiner cites Yamada Table 3-1 (Yamada 65:5-38), as well as Examples 2 and 6. The Examiner concedes that Yamada does not describe the layers as adhesive layers, but argues that the hot press lamination described by Yamada at column 47, lines 17-25 “would clearly result in all disclosed layers adhering together, and through their adhesion, bonding the cells (13) to the back surface protective sheet (2+1). Therefore, this series of layers clearly reads on the claimed ‘adhesive layer’.” (Ans. at 4.) It appears that the Examiner applies the following argument, made with reference to claims 6 and 47, which recite a Markush group of numerous adhesives, to the MVTR properties of all the disclosed adhesives disclosed by Yamada: “[s]ince the combined layers achieve low MVTR (Table 4-1)^[10], all polymers in the layers read on the term ‘low MVTR polymer’.” (Ans. at 5.)

Regarding claims 4, 5, and 46, which require low MVTR adhesive compositions, the Examiner relies on the disclosure of Table 3-1 and Example 6. (Ans. at 4.)

The Examiner makes numerous other findings regarding the disclosure of Yamada relevant to specific claim limitations, but we need not describe them as Ferri has not disputed their accuracy.

Aside from the two objections discussed next, Ferri does not dispute any of the Examiner’s findings as to the disclosures of Yamada and the relevance of those disclosures to the claims on appeal.

¹⁰ Table 4-1 is found at Yamada column 82, line 60 through column 83, line 25, and is similar to Table 3-1.

First, Ferri argues that the Examiner erred in identifying the front panel as the combination of elements **1**, **2**, and **103**. (App. Br. at 7–10.) According to Ferri, “the element of Yamada that corresponds to the claimed ‘front panel’ can only be the front surface protective sheet **11(A)**, which does not include the filler layer **12**, such as shown in Fig. 15 of Yamada.” (App. Br. at 10.)

Ferri’s arguments are not persuasive. What Yamada chooses to call the components of its solar panels is irrelevant. In the present case, Ferri has not directed our attention to any definition of the term “front panel” in the specification. Ferri’s implicit argument appears to be that because the only “front panels” that are disclosed are single layers of materials (e.g., of borosilicate glass), such monolithic sheets must be “front panels.” It is improper, however, to read limitations from specific disclosures into the claims. Moreover, Ferri has not drawn our attention to any credible evidence that the term “front panel” is a recognized term of art having the narrow meaning Ferri attributes to it. On review of the specification, we find that the broadest reasonable interpretation of the term “front panel” is, as the Examiner argues (Ans. at 18), what ever structure lies in front of the photovoltaic layer **13**, i.e., layers **1**, **2**, **103**, and **12**.

Ferri’s complaint that it amended its claims in reliance on an interpretation offered by the Examiner, which was then withdrawn in a subsequent Office Action (App. Br. at 10) has been made by many applicants over the years and was answered many years ago by Judge Rich, who observed that “[t]here is nothing unusual, certainly, about an examiner changing his viewpoint as to the patentability of claims as the prosecution of a case progresses, and, so long as the rules of Patent Office practice are duly

complied with, an applicant has no legal ground for complaint because of such change in view. The life of a patent solicitor has always been a hard one.” *In re Ruschig*, 379 F.2d 990, 993 (CCPA 1967) (citation omitted).

Ferri’s second objection is that Yamada does not disclose an adhesive composition comprising a low MVTR polymer and a silane modified polymer. (App. Br. at 11.) With respect to claims 4, 5, 31, 32, and 46, Ferri argues that Table 3-1, on which the Examiner relies for low MVTR values, tests front protective sheets, not adhesive compositions. (*Id.* at 11–13.)

On review of the record, we find the preponderance of the evidence does not support the Examiner’s findings of fact regarding the alleged disclosure by Yamada of adhesives meeting the limitations recited in the claims on appeal. The Examiner’s identification of the ethylene vinyl acetate sheet as the low MVTR polymer is contradicted by Ferri’s specification, which states that “[c]rosslinked EVA provides high strength, but suffers from a relatively high MVTR.” (Spec. at 3:1-5; FF 14.) The Examiner has not explained why a material considered to have a high MVTR value should be considered to have a low MVTR, except by reference to Yamada Table 3-1. According to Yamada, however, Table 3-1 reports the “moisture permeabilities of the protective sheets in Examples 1 to 22.” (Yamada at 64:61–65.) In Examples 2 and 6, the only examples to which the Examiner has drawn our attention, the protective sheets comprise polyvinylfluoride. (Yamada at 55:2–11 and at 58:37–41.) The disclosure of Table 4-1 appears to be similar to that of Table 3-1 in all relevant respects. Even if the Examiner’s argument (that the MTVR of the combined layers, including an EVA layer, were measured (Ans. at 5)) were correct, the conclusion that the layers, including the adhesive layer (however defined),

have that MTRV value, would not follow. The rate of transmission through a series of layers of materials is determined by the rate through the least transmissive layer.

Moreover, the Examiner's identification of the "adhesive layer" in Example 6 as comprising the "coating film" (prepared in part (2) of Example 2 at 55:31-50) and the 400 μm thick ethylene vinyl acetate sheet (part of the back surface protective sheet) is contradicted by the description in Example 6 that the "solar battery module was fabricated by superposing" the various sheets "and laminating those component layers by using adhesive layers of an acrylic resin." (Yamada at 58:41-53; cf. 55:51-65, esp. 63-65.) Something more than a merely superficial involvement of a layer in adhesion is required to denominate that layer as part of the adhesive. Here, the Examiner has not provided a reasonable basis for calling the EVA layer an "adhesive layer" in the devices described by Yamada.

Ferri has shown that the Examiner has failed to show that Yamada describes a solar cell meeting every limitation of the claims. Accordingly, the rejection for anticipation is REVERSED.

The Examiner's arguments that the claimed subject matter would have been obvious are not persuasive in view of the Examiner's failure to identify layers that function as adhesives and that have the required MTRV. The first argument, that Yamada "sometimes list[s] large numbers of suitable materials for a component," and that the suggestion of their use suffices to establish the obviousness of the claimed subject matter, is, on the present record, too vague to affirm without developing the argument from scratch. Our role, however, is review, not examination *de novo*. The second

argument, that a person having ordinary skill in the art would have selected an adhesive thickness that would provide the recited MVTR values is not persuasive because it is not consistent with the claim language, e.g. “the adhesive composition has an MVTR of . . .” (emphasis added), which implies that MVTR is an intrinsic value, i.e., a characteristic of the material, rather than an extrinsic value (a characteristic of the amount of material). Moreover, the Examiner does not address the definition of the measurement of MVTR provided in the specification at pages 16–17. (FF21.). This definition appears to determine MVTR based on films having a certain thickness (0.050 to 0.060 inches (1.27 to 1.52 mm)). Thus, thickening the adhesive layer will change the amount of moisture vapor getting through the layer, but it will not change the MVTR for that substance.

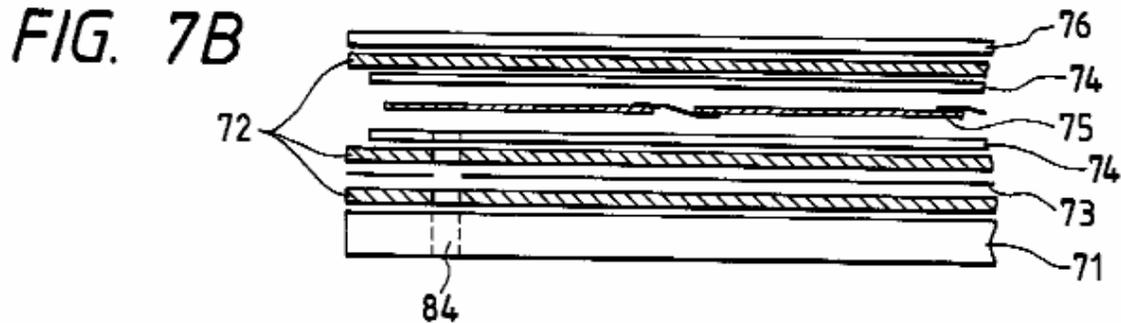
Thus, the Examiner’s rejection of the claims under § 103(a) in view of Yamada is also REVERSED.

The Examiner relies on Kataoka and on Wey (1997) for teachings to reject certain dependent claims having limitations not met by Yamada (rejections E and F, *supra*). Thus, the Examiner has not relied on either Kataoka or on Wey (1997) to remedy any of the deficiencies of Yamada.

Accordingly, the rejections over the combined teachings of Yamada, Kataoka, and Wey, however combined, are REVERSED.

Mimura

The Examiner finds that Mimura describes a solar panel, shown in Figure 7B, which is reproduced below.



{Mimura Figure 7B is said to depict a solar cell.}

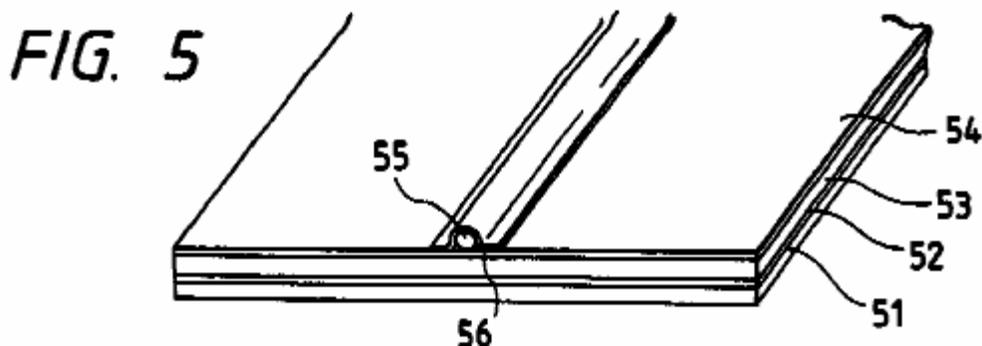
In particular, the Examiner finds that Figure 7B shows a solar cell comprising a front panel (76, 72, and 74), having a photovoltaic material layer (75) deposited on the front panel. The Examiner finds that Mimura describes numerous additional limitations of the subject matter claimed in the independent claims and in the dependent claims (Ans. at 6-7), but for an adhesive composition comprising a low MVTR polymer and a silane-modified polymer (Ans. at 7).

The Examiner relies on Wey (1997) for disclosure of adhesive compositions meeting the limitations recited in claims 1-5, 7-9, 11-13, 16, 18, 19-32, 34-46, and 48-54. (Ans. at 7-9.) The Examiner reasons that it would have been obvious for one of ordinary skill in the art to use the adhesives taught by Wey in the solar panels taught by Mimura, given the requirements for weatherability and durability that appear to be met by Wey, and the flexibility in choice of adhesive materials taught by Mimura. (Ans. at 9, citing Mimura at 10:6-15; rejection B, *supra*.)

Moreover, the Examiner finds that Wey (1997) and Wey 474 suggest adhesive compositions within the scope recited by claim 10 that would have been obvious to use in the solar panels described by Mimura. (Ans. at 10-11, rejection C, *supra*.)

Similarly, the Examiner finds that Baratuci describes adhesive compositions within the scope of claims 1-3, 6-8, 11, 13, 15-19, 22, 24, 26-30, 33-35, 37, 52, and 53, and reasons that the combined teachings of Mimura and Baratuci would have rendered these claims obvious to a person having ordinary skill in the relevant arts. (Ans. at 11-15, rejection D, *supra*.)

The only challenge Ferri raises to the Examiner's findings regarding the teachings of Mimura is that the photovoltaic material layer is not "directly deposited" on the "front panel." (App. Br. at 14-16.) In particular, Ferri objects that element **75**, identified by the examiner as the photovoltaic material layer, is actually a layer of solar cell blocks, each solar cell having the structure shown in Mimura Figure 5, which is reproduced below:



{Mimura Figure 5 is said to show an amorphous silicon solar cell.}

According to Mimura, **51** is a stainless steel conductive substrate, **52** is an Al-ZnO deposited film (a back reflective layer), **53** is an amorphous silicon

semiconductor layer, and **54** is an ITO (indium tin oxide) sputtered film that forms a transparent conductive layer. (Mimura at 5:13–30.) Thus, Ferri argues, layer **75** includes at least three layers, **52**, **53**, **54**, of which the inner layer **53** is the photovoltaic material layer, which is “not deposited on the front panel **76/72/74**, but is instead deposited on the layer **52** or **54**.” (App. Br. at 16, first full paragraph.)

Ferri concludes that because Mimura does not describe the relationship between the photovoltaic material layer and the front panel, and because the other references do not remedy this defect, all of the rejections based on Mimura must fail. (App. Br. at 16.)

Ferri does not challenge any of the Examiner’s findings regarding the teachings of Wey (1997), Wey 474, or Baratuci. Thus, Ferri has waived all challenges to these references.

Ferri’s arguments are not well taken. The claim language, “photovoltaic material layer deposited . . . directly on the front panel” is an example of the use of a process limitation (deposition) being used to define structural limitations (what is next to what) in the claimed product (a solar panel). It is well settled law that in an application for patent, product-by-process claims define a product that is met by any product, no matter how made, that has the same structures and substances that result from the recited process steps. In the absence of a definition of the term “front panel” in the specification or the prior art, which has not been established on the present record, as discussed *supra* with respect to the rejection over Yamada, the general meaning—what ever structure is in front of the photovoltaic material layer—provides the broadest reasonable meaning consistent with the

disclosure. Here, the step of depositing results in a structure in which the photovoltaic material is directly next to—i.e., touching—the “front panel.”

Accordingly, we find that Ferri has not shown reversible error in the Examiner’s finding that Mimura describes a solar panel meeting the limitations, other than the adhesive layer, recited in claim 1.¹¹ As Ferri did not contest the Examiner’s findings regarding the secondary references, and thus waived argument as to those issues, we AFFIRM the rejections based on Mimura.

E. Summary

In view of the record and the foregoing considerations, it is:

ORDERED that the rejection of claims 1, 2, 4–8, 12, 16, 18, 19, 38, 41, 42, 46–49, and 51 under 35 U.S.C. § 102(e) or under 35 U.S.C. § 103 in view of Yamada is REVERSED;

FURTHER ORDERED that the rejection of claims 11, 14, and 15 under 35 U.S.C. § 103 in view of the combined teachings of Yamada, Kataoka, and Wey (1997) is REVERSED;

FURTHER ORDERED that the rejection of claims 52 and 54 under 35 U.S.C. § 103 in view of the combined teachings of Yamada and Kataoka is REVERSED;

¹¹ The Examiner’s argument in rebuttal, that the “photovoltaic material layer” limitation recited in the claims is not the same as a photovoltaic material (Ans. at 19), is not supported by substantial evidence in the record, and we reject it. As it does not form part of the prima face case of unpatentability, however, it is a harmless error.

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FURTHER ORDERED that the rejection of claims 1–5, 7–9, 11–13, 16, 18, 19–32, 34-46, and 48-54 under 35 U.S.C. § 103 in view of the combined teachings of Mimura, Wey (1997), and Wey 474 is AFFIRMED;

FURTHER ORDERED that the rejection of claim 10 under 35 U.S.C. § 103 in view of the combined teachings of Mimura, Wey (1997), and Wey 474 is AFFIRMED;

FURTHER ORDERED that the rejection of claims 1–3, 6–8, 11, 13, 15–19, 22, 24, 26–30, 33–35, 37, 52, and 53 under 35 U.S.C. § 103 in view of the combined teachings of Mimura, Baratuci, and Wey (1997) is AFFIRMED;

FURTHER ORDERED that no time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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