

The opinion in support of the decision being entered today
is *not* binding precedent of the Board

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JERRY R. KUKULKA
and DAVID R. LILLINGTON

Appeal 2007-3964
Application 10/295,060
Technology Center 1700

Decided: September 11, 2007

Before CHARLES F. WARREN, PETER F. KRATZ, and
CATHERINE Q. TIMM, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

DECISION ON APPEAL

Applicants appeal to the Board from the decision of the Primary Examiner finally rejecting claims 1 through 19 in the Office Action mailed April 12, 2006 (Office Action). 35 U.S.C. §§ 6 and 134(a) (2002); 37 C.F.R. § 41.31(a) (2006).

We reverse the decision of the Primary Examiner.

Claims 1, 7, 9, and 13 illustrate Appellants' invention of a solar cell structure which has a bypass diode, and are representative of the claims on appeal:¹

1. A solar cell structure comprising:

a solar cell having a front side and a back side and comprising an active semiconductor structure, wherein the solar cell produces a voltage when the front side is illuminated; and

a by-pass diode structure, wherein the by-pass diode structure comprises

a by-pass diode positioned at the back side of the solar cell, wherein the by-pass diode has a first diode terminal and a second diode terminal,

a first electrical interconnection structure extending between the back side of the solar cell and the first diode terminal, and

a second electrical interconnection structure extending between the front side of the solar cell and the second diode terminal, wherein an entire length of the second electrical interconnection structure extending between the front side of the solar cell and the second diode terminal contacts the solar cell.

7. A solar cell structure comprising:

a solar cell having a front side and a back side, wherein the solar cell comprises

a substrate facing the back side of the solar cell, and

an active semiconductor structure having a first side contacting the substrate in facing relation thereto and a second side facing the front side of the solar cell, wherein the active semiconductor structure comprises two semiconductor layers in facing contact with each other to form a semiconductor junction producing a voltage between the two semiconductor layers when illuminated; and

¹We reproduce claim 1 as it stands of record because the copy in the Claims Appendix of the Brief contains error as the Examiner points out. *See Answer at 3.*

a by-pass diode structure, wherein the by-pass diode structure comprises

a by-pass diode positioned at the back side of the solar cell, wherein the by-pass diode has a first diode terminal and a second diode terminal,

a first electrical interconnection structure extending between the back side of the solar cell and the first diode terminal, and

a second electrical interconnection, [sic] structure comprising a metallic layer upon the solar cell and extending between the front side of the solar cell and the second diode terminal.

9. The solar cell structure of claim 7, wherein the solar cell has a solar cell edge, and wherein the second electrical interconnection structure comprises

an insulation layer overlying at least a portion of the solar cell edge, and

the metallic layer overlaying the insulation layer and extending from the front side of the solar cell, along the solar cell edge, and to the second diode terminal.

13. A solar cell structure comprising:

a solar cell having a front side, a back side, and an integral pathway extending between the front side and the back side, and wherein the solar cell comprises an active semiconductor structure, wherein the solar cell produces a voltage when the front side is illuminated; and

a by-pass diode structure, wherein the by-pass diode structure comprises

a by-pass diode positioned at the back side of the solar cell, wherein the by-pass diode has a first diode terminal and a second diode terminal,

a first electrical interconnection structure extending between the back side of the solar cell and the first diode terminal, and

a second electrical interconnection structure extending between the front side of the solar cell and the second diode terminal and in contact with the integral pathway of the solar cell along a length of the second

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electrical interconnection structure extending between the front side of the solar cell and the second diode terminal.

The Examiner relies on the evidence in these references:

Feinberg	US 4,636,578	Jan. 13, 1987
Cavicchi	US 5,425,816	Jan. 20, 1995
Kukulka	US 5,616,185	Apr. 1, 1997
Glenn ²	US 6,531,653 B1	Nov. 6, 2001
Müller ³	US 6,452,086 B1	Sep. 17, 2002

Appellants request review of the following grounds of rejection advanced on appeal (Br. 4):

claims 7, 11 through 13, 15, 18, and 19 under 35 U.S.C. § 102(b) as anticipated by Kukulka (Answer 4);

claims 7, 11 through 13, 15, 18, and 19 under 35 U.S.C. § 102(e) as anticipated by Müller (*id.* 5);

claims 1 through 19 under 35 U.S.C. § 102(b) as anticipated by Cavicchi in view of Kukulka (*id.* 6);

claim 9 under 35 U.S.C. § 103(a) as unpatentable over Kukulka in view of Feinberg (*id.* 8);

² The Examiner cites Glenn in stating the ground of rejection (Answer 9), but cites Glenn US 6,313,396 B1 in the section (8) Evidence Relied Upon (Answer 3). We consider Glen as applied by the Examiner and argued by Appellants (*see* Office Action 9; Br. 38).

³ We have considered Müller with respect to the ground of rejection advanced on appeal, which reference is applicable under § 102(e) (2002). This is the reference applied in fact by the Examiner and argued by Appellants (*see*, e.g., Office Action 3; Answer 5; Br. 11-12). We note that a translation of Müller WO 00/21138 A1 prepared for the USPTO by Ralph McElroy Translation Company (PTO 07-1615 January 2007) was not entered into the official electronic records of the USPTO until the Office Communication of July 26, 2007 in response to the Order by the Board entered July 3, 2007.

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claim 9 under 35 U.S.C. § 103(a) as unpatentable over Müller in view of Feinberg (*id.* 9); and

claim 9 under 35 U.S.C. § 103(a) as unpatentable over Kukulka in view of Glenn (*id.* 9).

We decide this appeal based on independent claims 1, 7, and 13, and on claim 9, dependent on claim 7, as representative of the grounds of rejection and Appellants' groupings of claims. 37 C.F.R. § 41.37(c)(1)(vii) (2006).

The issues in this appeal are whether the Examiner has carried the burden of establishing a *prima facie* case in each of the grounds of rejection advanced on appeal.

We interpret representative claims 1, 7, 9, and 13 by giving the terms thereof the broadest reasonable interpretation in their ordinary usage in context as they would be understood by one of ordinary skill in the art, in light of the written description in the Specification unless another meaning is intended by Appellants as established therein, and without reading into the claim any disclosed limitation or particular embodiment. *See, e.g., In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827, 1830 (Fed. Cir. 2004); *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1666-67 (Fed. Cir. 2000); *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989).

The dispositive issue in this appeal is the interpretation of the “second electrical interconnection structure” limitation in each of claims 1, 7, 9, and 13. We agree with Appellants that the plain language of each of these claim limitations requires that the second electrical interconnection structure

extends the entire length from the front of the solar cell to the second diode terminal and further contacts the cell in claim 1; is a metallic layer upon the solar cell in claim 7, with layer along the solar cell edge in claim 9; and is in contact with the integral pathway extending between the front side and the back side of the solar cell in claim 13 (Br., e.g., 2-4, 5-7, 8, and 22-23).

With respect to the grounds of rejection based on anticipation under §§ 102(b) and 102(e), we find that neither Kukulka (Kukulka, e.g., col. 3, l. 54 to col. 4, l. 56; col. 5, ll. 8-53; and Figs. 2, 3 and 5-7) nor Müller (Müller, e.g., col. 2, l. 27 to col. 3, l. 21; and Figs. 1 and 3) describes to one skilled in the art a second interconnection structure falling within claims 7 and 13, as we have interpreted this language above, as Appellants argue (Br., e.g., 5-6 and 12-13; *cf.* Answer 4, 5-6, and 10-11). We further observe that the Examiner did not respond to Appellants' arguments with respect to Müller (Answer 11-12). Thus, Appellants' arguments rebutted the prima facie case, and the Examiner did not reestablish a prima facie case. *See, e.g., In re Spada*, 911 F.2d 705, 707 n.3, 15 USPQ2d 1655, 1657 n.3 (Fed. Cir. 1990).

Accordingly, in the absence of a prima facie case of anticipation we reverse the grounds of rejection under 35 U.S.C. §§ 102(b) and 102(e).

Turning now to the grounds of rejection under § 103(a), we first consider the rejection of all of the appealed claims over the combined teachings of Cavicchi and Kukulka. The Examiner determines it would have been obvious to one of ordinary skill in the art to modify Cavicchi's solar cell device (Cavicchi, e.g., col. 6, l. 33 to col. 7, l. 65; and Figs. 6 and 7) by incorporating Kukulka's bypass diode on the back side thereof and wiring

the diode terminals as taught by Kukulka, motivated by the recognized value of a bypass diode in preventing cell damage (Answer 7-8, citing Kukulka, col. 2, ll. 58-67 and col. 3, ll. 39-53). Appellants contend the references would not have been combined because there is no suggestion coupled with a reasonable expectation of success therein to wire Cavicchi's conductive via to accommodate Kukulka's bypass diode structure and wiring (Br., e.g., 20-22, 23-24, 27, and 30-31). *See, e.g., In re Kahn*, 441 F.3d 977, 985-88, 78 USPQ2d 1329, 1334-37 (Fed. Cir. 2006). The Examiner did not respond to these arguments which address the thrust of the rejection (Answer 12-13). Thus, Appellants' arguments rebutted the prima facie case of obviousness, and the Examiner did not reestablish a prima facie case. *See, e.g., In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

Accordingly, in the absence of a prima facie case of obviousness, we reverse this ground of rejection under 35 U.S.C. § 103(a).

We agree with Appellants' arguments that the combined teachings of Kukulka in view of Feinberg and of Glenn do not result in the limitations with respect to the second electrical interconnection of claim 7 which are included in dependent claim 9 (Br. 34 and 38-39; *see* Answer 13-14 and 14).

Accordingly, we reverse these two grounds of rejection of claim 9 under 35 U.S.C. § 103(a).

Finally, the Examiner has not stated and explained the cited ground of rejection of claim 9 over the combined teachings of Müller and Feinberg in a

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manner specific to the teachings of these two references (Answer 9 and 11-12).

Accordingly, the Examiner has not carried the burden of establishing a *prima facie* case of obviousness in the first instance of the claimed invention encompassed by claim 9 over this combination of references, and thus, we reverse this ground of rejection under 35 U.S.C. § 103(a). *See, e.g., Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444; *Piasecki*, 745 F.2d at 1472, 223 USPQ at 788.

The Primary Examiner's decision is reversed.

REVERSED

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