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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte BENYAMIN BULLER

Appeal 2011-010307
Application 11/934,327
Technology Center 1700

Before JEFFREY T. SMITH, LINDA M. GAUDETTE, and
DONNA M. PRAISS, *Administrative Patent Judges*.

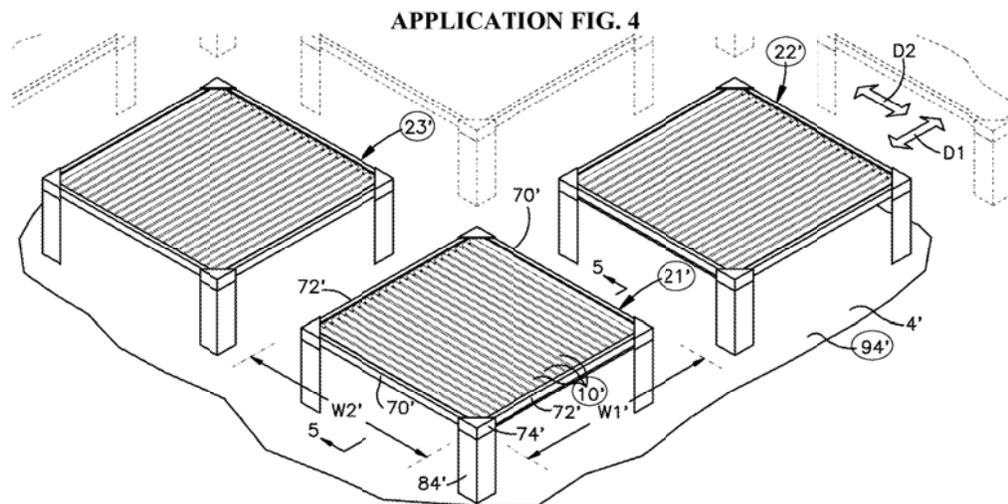
PRAISS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134 from the final rejection of claims 25 through 40. We have jurisdiction under 35 U.S.C. § 6.

Appellant's claimed invention relates to solar panels. Spec. 1. Figure 4 depicts three solar panels (21', 22', 23') having cylindrical photovoltaic cells (10') arranged above a reflective surface (94) and is said to exemplify claim 25, the sole independent claim on appeal:



App. Br. 4.

Appellant presents arguments for the patentability of only claims 25 and 40, which are representative:¹

25. An apparatus comprising:

¹ Appellant does not present separate substantive arguments for claims 25-39, therefore we select claim 25 as the representative claim for this group, and the remaining claims 26-39 stand or fall with claim 25. 37 C.F.R. § 41.37(c)(1).

first, second and third solar panels mounted in an operative position, each panel including a series of cylindrical parallel photovoltaic surfaces that are elongated in a common horizontal elongation direction and spaced apart from each other in a horizontal surface to surface-spacing direction that is perpendicular to the elongation direction and that are spaced above a reflective surface, such that each surface has an upward-facing surface section and a downward-facing surface section, and for each panel, some downwardly-directed light rays strike the upward-facing photovoltaic surface sections of the panel and other light rays pass downward between adjacent photovoltaic surfaces of the panel to be reflected upward by the reflective surface to strike the downward-facing surface sections of the photovoltaic surfaces of the same panel, and for yet other light rays to be reflected by one of the photovoltaic surfaces to strike an adjacent photovoltaic surface of the same panel;

the first and second panels being spaced apart in a first panel-to-panel spacing direction by a spacing distance that is 25%-100% of a width of the first panel in the first panel-to-panel direction, for some downwardly-directed light rays to pass between the first and second panels and be reflected upward by the reflective surface to strike the downward-facing photovoltaic surface sections of the photovoltaic surfaces of the first and second panels; and

the first and third panels being spaced apart in a second panel-to-panel spacing direction, perpendicular to the first panel-to-panel spacing direction, by a spacing distance that is about 35% to about 100% of a width of the first panel in the second panel-to-panel spacing direction, for some downwardly-directed light rays to pass between the first and third panels and be reflected

upward by the reflective surface to strike the downward-facing surface sections of the photovoltaic surfaces of the first and third panels.

40. The apparatus of claim 38 wherein the second and third panels' photovoltaic surfaces are aligned in a direction that is perpendicular to the direction in which the first panel's photovoltaic surfaces are aligned.

The Examiner relied on the following references in rejecting the appealed subject matter:

Shimizu	JP 11-330523	Nov. 30, 1999
Yoshimura	JP 07-312441	Nov. 28, 1995
Sugita	JP 2000-294821	Oct. 20, 2000
Jetter	US 4,537,838	Aug. 27, 1985
Aylaian	US 6,515,217	Feb. 4, 2003

The Examiner maintains, and Appellant appeals, the following rejections:

1. independent claim 25 and its dependent claims 27-34, 36-38, and 40 as unpatentable under 35 U.S.C. § 103(a) over Shimizu in view of Yoshimura;
2. claim 26 as unpatentable under 35 U.S.C. § 103(a) over Shimizu in view of Yoshimura and further in view of Sugita;
3. claim 35 as unpatentable under 35 U.S.C. § 103(a) over Shimizu in view of Yoshimura and further in view of Jetter;
4. claim 39 as unpatentable under 35 U.S.C. § 103(a) over Shimizu in view of Yoshimura and further in view of Aylaian.

OPINION

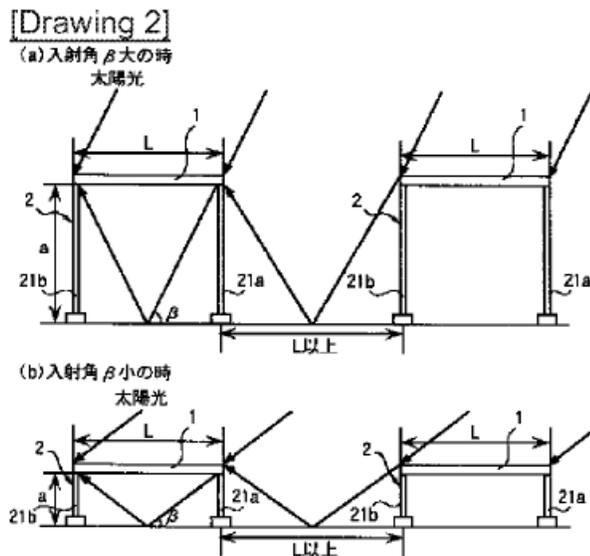
The dispositive issues for the prior art rejections are:

Did the Examiner err in determining that the cylindrical photovoltaic cells of Yoshimura are interchangeable for the flat photovoltaic cells in the solar cell array of Shimizu as claimed in claim 25?

Did the Examiner err in determining that the claimed alignment of three solar panels is a duplication of parts and a design choice as claimed in claim 40?

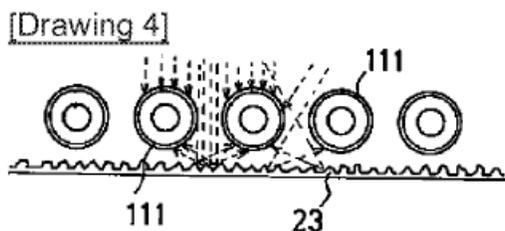
After review of the arguments and evidence presented by both Appellant and the Examiner, we affirm the stated rejections.

The Examiner finds that Shimizu describes a solar panel structure comprising two panels spaced apart from each other and above a reflective surface with each panel having photovoltaic surfaces that are struck by light rays reflected upward by the reflective surface after passing between adjacent panels. Ans. 6. Shimizu specifically discloses in Drawing 2, reproduced below, “the relation between the incident light of the sun in the solar battery device of [the] invention, and mount height and a solar cell array gap . . .” Shimizu, Brief Description of the Drawings; para. [0026]:



The Examiner acknowledges that Shimizu does not specifically teach a third solar panel and “each panel including a series of cylindrical parallel photovoltaic surfaces that are elongated in a common horizontal elongation direction and spaced apart from each other in a horizontal surface-to-surface-spacing direction that is perpendicular to the elongation direction, and the first and third panels being spaced apart in a second panel-to-panel spacing direction, perpendicular to the first panel-to-panel spacing direction.” Ans. 5-6. The Examiner finds that it would have been obvious to one of ordinary skill in the art to employ a third solar panel for the reason that “using an additional solar panel would increase the output voltage.” *Id.* at 6.

The Examiner also finds that it would have been obvious to one of ordinary skill in the art to use the cylindrical solar cell elements of Yoshimura, for the advantage of improving power generation efficiency, in place of the panel with flat bifacial solar cell elements of Shimizu “since both type[s] of solar panel[s] can absorb light coming from all directions and it is well-known in the art to have a series of cylindrical parallel photovoltaic surfaces spaced apart for the ray passing between the adjacent photovoltaic surfaces to be reflected from the reflective surface (Fig. 4).” *Id.* Figure 4 of Yoshimura illustrates light rays passing between spaced cylindrical parallel photovoltaic surfaces (111) and up from a reflective surface (23):



Appellant argues that one skilled in the art would not have spaced apart photovoltaic surfaces within each panel in Shimizu's solar panel system because to do so would be "redundant" of the spaced apart solar panels of Shimizu and also "counterproductive" since some reflected light would pass upward between adjacent cylindrical surfaces and escape into the air. App. Br. 6-7.

Appellant also argues that the combination of Shimizu's spaced panels with Yoshimura's spaced cylindrical photovoltaic cells would not result in the invention as claimed in claim 25 because Yoshimura's photovoltaic surfaces 111 are "functionally linked" to Yoshimura's contoured reflector 23 below the photovoltaic surfaces. *Id.* at 7. Appellant asserts without explanation that Yoshimura's "reflector 23 would preclude claim 25's requirement for light passing between adjacent panels to be reflected upward and strike the photovoltaic surfaces from below." *Id.*

Appellant further argues, without explanation or support, that it is unlikely that one skilled in the art would (1) add a third panel, (2) space the panels apart, (3) replace "non-spaced-apart photovoltaic surfaces with Yoshimura's cylindrical, spaced-apart photovoltaic surfaces" and (4) align the photovoltaic surfaces "parallel to others within the same panel but perpendicular to those in adjacent panels" absent hindsight. *Id.* at 7-8.

In the Reply Brief, Appellant maintains the argument that "the Examiner may not selectively incorporate Yoshimura's panel into Shimizu, without also incorporating Yoshimura's reflector that Yoshimura characterizes as central to his panel's operation and that would preclude a limitation of claim 25." Reply Br. 2.

We do not find the Appellant's arguments persuasive.

A prima facie case of obviousness is established where the Examiner demonstrates that the invention is nothing more than the predictable result of a combination of familiar elements according to known methods. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

We have reviewed the Final Office Action and Answer and find the Examiner provided detailed facts and reasons in support of the obviousness determination. In our view, the Examiner has not relied on unsupported, conclusory statements, but has fully explained the motivation to modify Shimizu solar panel apparatus based on the teachings of Yoshimura. (*See, e.g.*, Ans. 5-10, 12-14). Appellant has not explained, with any degree of specificity, why the Examiner's reasons to modify the references are not supported by the evidence of record. In the absence of a more detailed explanation, we are not convinced of error on the part of the Examiner in concluding the claimed invention would have been obvious within the meaning of 35 U.S.C. § 103(a). *See In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (“[I]t has long been the Board’s practice to require an applicant to identify the alleged error in the examiner’s rejections.” (citing *Ex Parte Frye*, 94 USPQ2d 1072 (BPAI 2010) (precedential) (“The panel then reviews the obviousness rejection for error based on the issues identified by appellant, and in light of the arguments and evidence produced thereon.”))).

As explained by the Examiner, the reason for substituting the cylindrical photovoltaic cells of Yoshimura for the flat solar panels of Shimizu is for improved power generation efficiency. Ans. 6. Appellant has not provided any evidence to rebut the stated advantage of cylindrical photovoltaic cells over flat solar panels.

Appellant also has not provided any evidence to rebut the reasons provided by the Examiner for adding a third solar panel, namely, to increase the output voltage (*see* Ans. 6, 13) and for aligning the three panels to be in a second direction, perpendicular to the first direction in order to avoid shading by the first panel. (*see* Ans. 6-7).

Appellant does not challenge the Examiner's response that the incorporation of Yoshimura's reflector would *not* preclude a limitation of claim 25. Specifically, the Examiner explains that even if the contoured reflector of Yoshimura is incorporated under each solar panel in the combination of Yoshimura with Shimizu, the reflector of Shimizu between the solar panels would reflect the light passing between adjacent panels. Ans. 13. Accordingly, that finding is deemed undisputed.

The above-described combination of the cylindrical photovoltaic surfaces of Yoshimura in the place of the flat bifacial solar cell elements of Shimizu is no more than a combination of familiar elements according to known methods yielding no more than predictable results likely to render a claim obvious. *KSR*, 550 U.S. at 416. Moreover, Yoshimura suggests that cylindrical photovoltaic surfaces above a reflective surface yield greater efficiency (*see* Ans. 6). Appellant provides no evidence to rebut the Examiner's finding that it would have been obvious to one of ordinary skill in the art to employ a third solar panel for the purpose of increasing voltage output (*see id.*). Therefore, we find no error in the rejection of claim 25 as obvious in view of Shimizu in view of Yoshimura.

Having found that it would have been obvious to replace the flat solar cells in Shimizu's spaced-apart solar panels with Yoshimura's spaced-apart series of cylindrical solar cells and increase the number of solar panels from

two to three, supra, Appellant's argument with respect to dependent claim 40 boils down to whether the claimed perpendicular orientation of the series of cylindrical solar cells in adjacent solar panels is obvious over Shimizu in view of Yoshimura. Given that the square shape of the solar panels disclosed in Shimizu, there are only two choices for the directional orientation of solar panels substituted with cylindrical solar cells: parallel or perpendicular. As the Examiner finds, choice of orientation is within the purview of one of ordinary skill in the art and depends on the application or environment in which the solar panels are installed (*see* Ans. 10). In the absence of any evidence of unexpected results offered by Appellant, we find no error in the rejection of claim 40 as obvious in view of Shimizu in view of Yoshimura.

CONCLUSION

In sum, for the reasons expressed in the Answer and above, we find a preponderance of the evidence favors the Examiner's conclusion of obviousness. Therefore, we affirm the rejection of claims 25 through 40 as being unpatentable under 35 U.S.C. § 103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(v).

AFFIRMED

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