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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ONUR S. YORDEM,
GILLES J.B. BENOIT, JINGFEI CHEN,
GUANGLEI DU, YAN YAN ZHANG, JIAO LIU,
BO GUO, and TIMOTHY J. HEBRINK

Appeal 2018-000151
Application 13/875,505
Technology Center 1700

Before MICHAEL P. COLAIANNI, GEORGE C. BEST, and
N. WHITNEY WILSON, *Administrative Patent Judges*.

BEST, *Administrative Patent Judge*.

DECISION ON APPEAL

The Examiner rejected claims 1–9 and 11–22 of Application
13/875,505 under 35 U.S.C. § 103 as obvious. Final Act. (June 22, 2016).
Pursuant to 35 U.S.C. § 134(a), Appellants¹ seek reversal of these rejections.
We have jurisdiction under 35 U.S.C. § 6(b).

For the reasons set forth below, we *reverse*.

¹ 3M Innovative Properties Company is identified as the applicant and real party in interest; 3M Company is identified by the applicant as another real party in interest. Appeal Br. 2.

BACKGROUND

The '505 Application describes multi-layered solar cell devices having at least one solar cell, a graphics layer, and a reflective layer. Spec. 2:20–21. The graphics layer described in the '505 Application facilitates the customization of the solar cell device appearance by incorporating, for example, graphics that provide advertising, aesthetics, etc. *Id.* at 2:21–23, 25. Claims 1 and 13 are representative of the '505 Application's claims and are reproduced below from the Claims Appendix:

1. A multi-layered solar cell device, comprising:
 - a reflector;
 - a plurality of solar cells positioned adjacent the reflector;
 - and
 - a partially transmissive graphic film positioned adjacent the plurality of solar cells on a side opposite the reflector,
 - wherein a first gap separates the reflector and the plurality of solar cells, a second gap separates the partially transmissive graphic film and the plurality of solar cells, and the plurality of solar cells are spaced apart from each other such that open areas of the reflector are not covered by the plurality of solar cells, and
 - wherein the partially transmissive graphic film comprises a perforated laminate comprising a graphic film layer and a reflective layer, the perforated laminate having a plurality of perforations that extend entirely through a thickness of the perforated laminate.
13. A multi-layered solar cell device, comprising:
 - a solar cell;
 - a spectrally selective reflector adjacent the solar cell;
 - a diffuser adjacent the spectral selective reflector opposite the solar cell; and

a graphics layer adjacent the diffuser opposite the spectrally selective reflector,

wherein the spectrally selective reflector has a reflectivity of at least about 80 percent throughout a range of wavelengths from 400 nm to 700 nm.

Appeal Br. 13, 14 (Claims App.)

REJECTIONS

On appeal, the Examiner maintains the following rejections:

1. Claims 1–6 and 9 are rejected under 35 U.S.C. § 103 as unpatentable over the combination of Stock,² Kothari,³ and Whitehead.⁴ Final Act. 3.
2. Claim 7 is rejected under 35 U.S.C. § 103 as unpatentable over the combination of Stock, Kothari, and Weber.⁵ Final Act. 10.
3. Claim 8 is rejected under 35 U.S.C. § 103 as unpatentable over the combination of Stock, Kothari, and Wheatley.⁶ Final Act. 11.
4. Claims 13–15, 18, 19, and 22 are rejected under 35 U.S.C. § 103 as unpatentable over the combination of Kothari, Stock, and Jonza.⁷ Final Act. 11.

² US 2007/0277810 A1, published Dec. 6, 2007.

³ US 2009/0101192 A1, published Apr. 23, 2009.

⁴ US 2006/0268554 A1, published Nov. 30, 2006.

⁵ US 2010/0238686 A1, published Sep. 23, 2010.

⁶ US 5,278,694, issued Jan. 11, 1994.

⁷ US 5,882,774, issued Mar. 16, 1999.

5. Claim 16 is rejected under 35 U.S.C. § 103 as unpatentable over the combination of Kothari, Stock, Jonza, and Liu.⁸ Final Act. 15.
6. Claim 17 is rejected under 35 U.S.C. § 103 as unpatentable over the combination of Kothari, Stock, Jonza, and Hao.⁹ Final Act. 16.
7. Claim 20 is rejected under 35 U.S.C. § 103 as unpatentable over the combination of Kothari, Stock, Jonza, and Ziegler.¹⁰ Final Act. 17.
8. Claim 21 is rejected under 35 U.S.C. § 103 as unpatentable over the combination of Kothari, Stock, Jonza, and Hanoka.¹¹ Final Act. 18.

DISCUSSION

Appellants argue for the reversal of the obviousness rejections to claims 2–9, 11, 12, 14, and 16–22 on the basis of limitations present in independent claims 1 and 13. *See* Appeal Br. 4–11; *see also* Reply Br. 1–5. We select claims 1 and 13 as representative. Claims 2–9, 11, 12, 14, and 16–22 will stand or fall with each of their respective independent claims. 37 C.F.R. § 41.37(c)(1)(iv). Appellants provide separate arguments for the reversal of the obviousness rejection of claim 15. *See* Appeal Br. 9.

Rejection 1–Rejection 3. In rejecting claim 1, the Examiner found that Stock describes the claimed multi-layered solar cell device comprising a

⁸ US 6,208,466 B1, issued Mar. 27, 2001.

⁹ US 2012/0038990 A1, published Feb. 16, 2012.

¹⁰ US 2001/0004900 A1, published June 28, 2001.

¹¹ US 5,478,402, issued Dec. 26, 1995.

reflector, a plurality of solar cells, and a partially transmissive graphic film (element **660** having a visually distinguishable feature). Final Act. 3 (citing Stock ¶ 190). The Examiner further found that Stock does not disclose or suggest, *inter alia*, that the described partially transmissive graphic film comprises a perforated laminate. Final Act. 4.

The Examiner, however, found that Kothari

teaches a multi-layered solar cell device having a multilayered film comprising a perforated laminate (*laminate is 'perforated' due to the depressions formed in the upper surface . . . and a reflective layer, . . . ; here, 'perforate' is broadly interpreted as to make a hole in something; and a 'hole' is broadly interpreted as a cavity or pit, see THE FREE DICTIONARY references for the [E]xaminer's definitions; the [E]xaminer further concludes that the definition of 'hole' encompasses a pit that does not extend entirely through the thickness of the layer in which it is formed*).

Id. at 5 (citing Kothari Figs. 6C, 6D, and 6E) (emphasis added).

The Examiner found that Stock does not teach or suggest that a perforated laminate further comprises the requisite graphic film layer and a reflective layer. Final Act. 4. The Examiner, however, found that Kothari's multi-layered solar cell device comprises "a multilayered film comprising a perforated laminate comprising a film layer (interferometric stack **501**) and a partially reflective layer (additional layer **641** that may be a diffusor[])." *Id.* at 5 (citing Kothari ¶ 98); *see also id.* at 6 (depicting Kothari Fig. 8b).

Kothari's Figure 8b, which illustrates a cross sectional view of a photovoltaic device, is reproduced below.

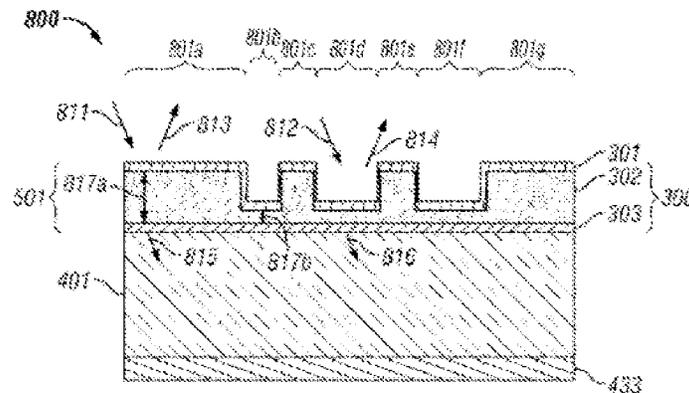


FIG. 8B

Figure 8b illustrates features of patterned interferometric stack **501**, which displays different colors in different regions to form images over a static display.

The Examiner determined that

it would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to add [Kothari's] perforated laminate . . . immediately beneath S[tock]'s visually distinguishable feature because the interferometric stack can be made to reflect any of a broad range of colors . . . and diffusers help make the color or image reflected from the stack more aesthetically pleasing.

Final Act. 7 (citing Kothari ¶¶ 8, 98).

Although neither Stock nor Kothari discloses the requisite extent of the claimed perforations, the Examiner found that Whitehead cures this deficiency. Final Act. 6. According to the Examiner, Whitehead “teaches a perforated multi-layer optical film having a plurality of perforations that extend entirely through a thickness of the perforated film.” *Id.* (citing Whitehead ¶ 20). Thus, the Examiner concluded that it would have been obvious to the ordinary skilled artisan to have added Whitehead's

perforations that extend entirely through a thickness of Stock’s perforated laminate as modified by Kothari “in order to produce high dynamic range stati[c] images.” Final Act. 7 (citing Whitehead ¶ 1).

Appellants argue that the rejection of claim 1 should be reversed because, *inter alia*, Whitehead’s perforated film “does not correspond in any reasonable way to Kothari’s interference film.” Appeal Br. 5. With respect to Kothari, Appellants argue that

[t]he Examiner uses a definition of ‘perforate’ that includes ‘holes’ and a definition of ‘holes’ that includes a cavity or pit” However, while a perforation in a film such as [Kothari’s] interferometric stack . . . might be reasonably described as a hole through the film, and a hole in the ground, for example, might be reasonably described as a cavity or a pit, a cavity or a pit *in a film* such as [Kothari’s] interferometric stack . . . cannot reasonably be described as a perforation in the film. The plain meaning of the term perforate, as applied to a film, means that the film includes holes through the film.

Id. at 9 (citing Final Act. 5).¹²

Appellants’ arguments are persuasive.

During prosecution, the PTO gives the language 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

¹² Appellants raise these issues in separate arguments directed to reversing the Examiner’s **Rejection 4** of claim 15. In both **Rejection 1** and **Rejection 4**, the Examiner relies on Kothari for teaching the “perforated” feature recited in claims 1 and 15. *Compare* Final Act. 5–6 and 14 (each rejection citing Kothari Fig. 8B). Thus, we find that Appellants’ separate arguments for reversing the Examiner’s **Rejection 4** of claim 15 are pertinent to our disposition of the presently appealed **Rejection 1 of claim 1**.

may be afforded by the written description contained in the applicant’s specification.” *In re Morris*, 127 F.3d 1048, 1054–55 (Fed. Cir. 1997). “[A claim] construction is unreasonable [when] it comports with neither the plain meaning of the term nor the specification.” *In re Imes*, 778 F.3d 1250, 1254 (Fed. Cir. 2015).

Thus, the question before us is whether the Examiner’s interpretation of the claim language “perforated laminate” is reasonable.

We begin by considering the ordinary meaning of the claim term “perforated” to a person of ordinary skill in the art at the time of the invention. In particular, we must consider whether such a person would have considered Kothari’s depressions formed in the upper surface of interferometric stack **501** as “perforated.”

Contrary to the Examiner’s proffered definitions, our review of various dictionaries demonstrates that the plain meaning of the claim term “perforated” encompasses holes that are not merely cavities or pits. *See, e.g., perforated – Dictionary Definition: Vocabulary.com, Vocabulary.com* (November 20, 2018), <https://www.vocabulary.com/dictionary/perforated> (defining perforated as “having a hole cut *through*” (emphasis added)); *Shorter Oxford English Dictionary* (6th ed. Oxford University Press) 2159 (2007) (defining: (i) perforate as to “[m]ake a hole or holes *through*: pierce with a pointed instrument” and (ii) perforated as “pierced with a hole or holes” (emphasis added)); *Webster’s Ninth New Collegiate Dictionary*, 873 (1989) (defining perforate as “to make a hole *through*” (emphasis added)).

The applied prior art, furthermore, provides evidence that the ordinary skilled artisan would not have understood Kothari’s interferometric stack **501** as having been “perforated.” We note Whitehead explicitly discloses that film may be “damage[d]” by thermal degradation or lasers “to render

the film substantially transparent in such regions, *without perforating the film.*” Whitehead ¶ 26 (emphasis added). Thus, Whitehead distinguishes the features that are found in damaged film, such as bores, cavities, pits, bleached regions, etc., from holes, which extend through the entire thickness of a film after perforation.

Moreover, the Specification describes that “perforations were made by laser cutting holes about 0.8 mm in diameter into a sheet of ESR.” Spec. at 17:10–11; *see also id.* at 11:21. Jonza describes ESR as a multilayer polymeric film in which the thickness of an exemplified film is only 0.0005 inches (i.e., 0.0127 mm).¹³ *See* Jonza 16:10. In view of the greater than 60-fold difference in the disclosed film’s thickness and the holes’ diameter, the Specification thus describes laser-formed holes extending entirely through the laminate’s thickness.

Thus, we determine that the Examiner incorrectly construed the claim term “perforated laminate” recited in claim 1 as encompassing the depressions on Kothari’s interferometric stack **501** surface.

We, therefore, reverse the Examiner’s rejections of claims 1–9, 11, and 12 of the ’505 Application.

Rejection 4–Rejection 8. The Examiner determines that it would have been obvious to the ordinary skilled artisan to have replaced Kothari’s reflector (interferometric stack **501**) with Jonza’s multilayered polymeric film having a light reflectivity of at least about 80 percent throughout a range of wavelengths from 400 nm to 700 nm. Final Act. 12–13. According to the Examiner, the proposed “modification is only a simple substitution of

¹³ The Specification has incorporated by reference the entirety of Jonza’s disclosure. Spec. 6:1–2.

one known element for another to obtain predictable results, namely, selective reflection of incident light.” *Id.* at 13.

Appellants argue, *inter alia*, that the rejection of claim 13 should be reversed because “[o]ne of ordinary skill would have expected substantially *degraded efficiency* by making the Examiner’s proposed substitution since much more of the light that is incident of [Kothari’s] device . . . would then be reflected away from the photovoltaic cell by [Jonza’s] reflector.” Appeal Br. 8. Appellants thus conclude that the Examiner’s proposed modification “would not have had any reasonable expectation of success” in converting solar power efficiently. *Id.*

In response, the Examiner agrees that such “[s]killed artisans would [have] instantly recognize[d] that preventing light from entering a solar cell would reduce its overall efficiency,” however “the trade-off of improved aesthetics (from the graphic image now visible on the surface of the solar cells) for potentially decreased electrical efficiency is obvious and acceptable.” Ans. 7.

We agree that a person of ordinary skill in the art would have understood and weighed this tradeoff in benefits. *Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) (“The fact that the motivating benefit comes at the expense of another benefit, . . . should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. Instead, the benefits, both lost and gained, should be weighed against one another.”).

In this instance, Appellants’ argument provides a line of reasoning tending to show that the Examiner’s proposed modification would have discouraged a person of ordinary skill in the art of multi-layered solar cell devices from replacing the reflector to attain advantages in device aesthetics.

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See Appeal Br. 8. We thus find the Examiner's conclusion unreasonable that such an artisan would have chosen improved aesthetics over any potential decreased electrical efficiency, particularly if at least about 80 percent of light throughout a range of wavelengths from 400 nm to 700 nm is reflected away from the solar cell.

Accordingly, we reverse the Examiner's rejection of claim 13. Claim 15 will stand with claim 13. 37 C.F.R. § 41.37(c)(1)(iv). We, therefore, reverse the rejections of claims 13–22 of the '505 Application.

CONCLUSION

For the reasons set forth above, we *reverse* the § 103 rejections of claims 1–9 and 11–22 of the '505 Application.

REVERSED