

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte STEPHEN C. SCHULZ

Appeal 2009-002837
Application 11/591,160
Technology Center 2800

Decided:¹ June 30, 2009

Before KENNETH W. HAIRSTON, MAHSHID D. SAADAT,
and ROBERT E. NAPPI, *Administrative Patent Judges*.

SAADAT, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

Appellant appeals under 35 U.S.C. § 134(a) from a Final Rejection of claims 1-3, 5, and 6. Claims 4 and 7-16 have been canceled. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

STATEMENT OF THE CASE

Appellant's invention relates to a grating-based biomedical sensor device which operates based on photonic crystal technology (Spec. 2). According to Appellant, the lines of the biosensor grating are aligned with one of the optical axes of a substrate sheet, such that no significant phase shift may occur for light with polarization, which is important to the resonance phenomenon when such light travels to or from the grating (Spec. 9). Claim 1, which is illustrative of the invention, reads as follows:

1. A photonic crystal biosensor comprising:

a substrate, the substrate comprising an optically transparent material having an optical axis; and

a grating applied to the substrate,

wherein the grating comprises features arranged in a plurality of parallel lines and wherein the lines of the grating are in substantial alignment with the optical axis of the substrate.

The Examiner relies on the following prior art in rejecting the claims:

Pien	US 2003/0077660 A1	Apr. 24, 2003
Murata	US 6,618,116 B1	Sep. 9, 2003
Yarussi	US 6,665,070 B1	Dec. 16, 2003

Claims 1, 5, and 6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yarussi and Pien.

Claims 2 and 3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yarussi, Pien, and Murata.

Rather than repeat the arguments here, we make reference to the Briefs and the Answer for the respective positions of Appellant and the Examiner.

ISSUE

Appellant argues that Yarussi does not disclose a substrate having an optical axis and that the optical axis 103, cited in Figure 1 of Yarussi by the Examiner, is not the optical axis of the substrate (App. Br. 9). Appellant further asserts that the proposed modification to Yarussi, based on the transparent substrate of Pien, does not result in alignment of an optical axis of the substrate with the lines of the grating (App. Br. 11-12). Therefore, Appellant's contentions present the following issue:

Has Appellant shown that the Examiner erred in combining the teachings of Yarussi and Pien to arrive at the claimed invention? The issue specifically turns on whether the combination of references teaches or suggests alignment of the grating lines with the optical axis of the transparent substrate.

FINDINGS OF FACT

The following findings of fact (FF) are relevant to the issue involved in the appeal.

1. The Examiner characterizes the optical axis 103 of Yarussi's Figure 1 as an axis of the substrate material 108 that is perpendicular to the substrate surface (Ans. 7).

2. The Examiner asserts that since no specific alignment orientation is defined in claim 1, the lines of the grating in Yarussi are aligned with axis 103 in a perpendicular direction (*id.*).

3. Yarussi relates to a metrology device with a rotatable polarizer that is calibrated to align the transmission axis of the polarizer with the axis of orientation of a sample, such as a diffraction grating. (Abstract.)

4. As shown in Figure 1 of Yarussi, light source 102 of the spectrometer 100 generates a light beam along the optical axis 103. The light beam is directed towards a diffraction grating 106 on a substrate 108. (Col. 4, ll. 3-10.)

5. Yarussi further discloses that spectrometer 100 is combined with stage 110 that holds and positions substrate 108 so that diffraction grating 106 is aligned with the *optical axis 103 of spectrometer 100*. (Emphasis added.) (Col. 41, ll. 20-28.)

6. Yarussi discloses in Figure 3 that the lines of the grating are positioned along the transmission axis of polarizer 114 in spectrometer 100, as marked and defined by notch 130 on the substrate. (Col. 5, ll. 31-37.)

7. Pien relates to a resonant optical biosensor including a grating surface structure formed over a substrate of plastic sheet or glass material. (¶¶ [0027] – [0028] and [0127].)

PRINCIPLES OF LAW

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis in order to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in

Graham v. John Deere Co., 383 U.S. 1, 17 (1966) (stating that 35 U.S.C. § 103 leads to three basic factual inquiries: 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 art). “[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability.” *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. *See In re Kahn*, 441 F.3d 977, 987-88 (Fed. Cir. 2006); *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

ANALYSIS

After reviewing the references, we find that the evidence of record supports Appellant’s position that the combination of the references does not teach or suggest alignment of the grating lines with the optical axis of the transparent substrate. The Examiner’s characterization of axis 103 as an axis related to the substrate (FF 1) is not based on the teachings of Yarussi. Yarussi describes axis 103 as the optical axis of spectrometer 100 along which the light beam from the light source travels towards grating 106 (FF 3-6). Therefore, although axis 103 has a perpendicular relationship with the grating surface (FF 4), it has nothing to do with the substrate, which has no optical axis, as it is not an optically transparent substrate.

As argued by Appellant (App. Br. 11-13), we find that even if Yarussi is modified by using the transparent substrate of Pien, the teachings of Yarussi do not direct one of ordinary skill in the art to align the grating lines

with the optical axis of the substrate. While Pien discloses using an optically transparent substrate (FF 7), no discussion of the optical axis of such a substrate and its relationship with the lines of the grating can be found in the reference. Contrary to the Examiner's argument that no specific alignment orientation is required by claim 1 (FF 2), the optical axis is recited to be that of the substrate.

We also agree with Appellant (Reply Br. 4) that the alignment made in Yarussi is with respect to the arbitrary physical axis of the substrate defined by notch 130 (FF 6). As further argued by Appellants (*id.*), the axis of the substrate is not the optical axis, and in fact, is merely related to the relative orientation of the grating with respect to the polarizer in spectrometer 100 (FF 6).

Therefore, we agree with Appellant that, since Yarussi does not align the lines of grating 106 with any optical axis of a transparent substrate and Pien provides no teachings with respect to the orientation of the grating, the proposed combination fails to render obvious claim 1, as well as claim 5 which includes a similar limitation. We also agree with Appellant's arguments regarding claims 2 and 3 (App. Br. 14-15) that Murata provides no teachings to cure the deficiencies of the Yarussi and Pien combination as discussed above.

CONCLUSION

On the record before us, we find that the Examiner fails to make a prima facie case that the combination of Yarussi and Pien renders claim 1 obvious since the combination does not teach or suggest alignment of the grating lines with the optical axis of the transparent substrate. Therefore, in

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view of our analysis above, the 35 U.S.C. § 103 rejection of claim 1, 5, and 6 over Yarussi and Pien cannot be sustained. Additionally, we do not sustain the 35 U.S.C. § 103 rejection of claims 2 and 3 over Yarussi, Pien, and Murata since the Examiner has not identified any modification suggested by Murata to overcome the deficiencies of Yarussi and Pien discussed above.

ORDER

The decision of the Examiner rejecting claims 1-3, 5, and 6 is reversed.

REVERSED

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