UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RONALD E. MALMIN

Appeal 2007-1230
Application 10/633,935
Technology Center 2800

Decided: June 14, 2007

Before JOSEPH L. DIXON, ALLEN R. MACDONALD, and
JOHN A. JEFFERY, *Administrative Patent Judges*.

JEFFERY, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134 from the Examiner's rejection of claims 1-5, 7-15, 18, 19, and 21-25. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

Appellant invented a gamma camera for obtaining images of a patient's body organs. Specifically, the camera comprises a slat collimator that collimates gamma photons in one dimension to multiple elongated bar detector strips made of a scintillating material (i.e., a material that emits light photons in response to gamma radiation). Photodetectors are coupled to an end of each bar detector strip normal to the strips' elongated dimension. Due to the one-dimensional nature of the detection, high positional resolution is required only in the dimension perpendicular to the slat collimators.[1] Claim 11 is illustrative:

> 11. A gamma camera, comprising:
>
> a plurality of elongated bar detector strips made of scintillating material;
>
> at least one photodetector coupled to an end of each of said bar detector strips normal to said elongated dimension; and
>
> a slat collimator including a plurality of elongated slats, for collimating each of said plurality of bar detector strips to receive gamma photons in only a single dimension.

The Examiner relies on the following prior art references to show unpatentability:

Miraldi	US 3,688,113	Aug. 29, 1972
Iwanczyk	US 6,521,894 B1	Feb. 18, 2003
Zeng	US 6,762,413 B2	Jul. 13, 2004 (filed Nov. 27, 2002)

[1] *See generally* Specification 1:6-8; 5:3-6:27.

The Examiner's rejections are as follows:

1. Claims 1, 2, 4, 5, 7-11, 13-15, 18, 19, and 21-25 are rejected under 35 U.S.C. § 103(a) as unpatentable over Zeng in view of Miraldi.
2. Claims 3 and 12 are rejected under 35 U.S.C. § 103(a) as unpatentable over Zeng in view of Miraldi and further in view of Iwanczyk.

Rather than repeat the arguments of Appellant or the Examiner, we refer to the Briefs and the Answer[2] for their respective details. In this decision, we have considered only those arguments actually made by Appellant. Arguments which Appellant could have made but chose not to make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

Regarding representative claim 11,[3] the Examiner's rejection essentially finds that Zeng teaches a gamma camera with every claimed feature except for coupling a photodetector to an end of each bar detector strip normal to the elongated dimension as claimed. The Examiner, however, notes that Zeng leaves the specific arrangement of such coupling as a choice within the level of the skilled artisan. The Examiner further cites Miraldi as teaching a gamma camera that optically couples a photodetector to at least one end of multiple scintillation crystals. In view of the "good light collection" resulting from this arrangement, the Examiner concludes

[2] We note that the Answer contains misnumbered pages. Specifically, the pages following Page 7 are numbered Pages 2, 2, 3, 4, etc. For clarity, we have renumbered the pages of the Answer following Page 7 so that all pages consecutively follow Page 7 (i.e., Page 8, Page 9, etc.). Throughout this opinion, we refer to the Answer as renumbered.

[3] Appellant argues claims 1, 2, 4, 5, 7-11, 13-15, 18, 19, and 21-25 together as a group (Br. 8-10). Accordingly, we select the broadest independent claim – claim 11 – as representative. *See* 37 C.F.R. § 41.37(c)(1)(vii).

that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Zeng to couple the photodetectors to at least one end of the stack of bar detectors strips (Answer 5-7).

Appellant argues that the skilled artisan would not have been motivated by the disclosure of Miraldi to modify Zeng as the Examiner proposes. Specifically, Appellant contends that since Miraldi is not concerned with multiple scintillation elements between multiple slats as disclosed by Zeng, Miraldi cannot provide any suggestion to skilled artisans regarding placing the photodetectors in the apparatus of Zeng. According to Appellant, the embodiments of Zeng (i.e., utilizing either single or multiple scintillator elements) could not perform correctly with photodetectors mounted as shown by Miraldi for single one-dimensional scintillation crystals (Br. 8-10; Reply Br. 1-3).

Appellant also disputes the Examiner's statement that the placement of photodetectors in Zeng is left as a design choice. According to Appellant, the photodetectors must be within the detector head 22 (*Id.*).

The Examiner argues that Miraldi's solution for coupling multiple photodetectors to at least one end of a stack of elongated bar detector strips is relevant to Zeng which teaches a similar configuration. In this regard, the Examiner indicates that Miraldi discloses multiple scintillation elements that are closely aligned with individual channels in the collimator – channels that are each aligned with corresponding scintillation crystal (Answer 4).

Regarding claims 3 and 12, Appellant argues that Iwanczyk fails to cure the basic deficiency in the proposed combination of references since the silicon drift photodetector (SDP) in Iwanczyk is mounted along the long dimension of the scintillator (Br. 10-11). The Examiner responds that

Iwanczyk teaches that the SDP is coupled to an elongated, rod-shaped scintillator normal to its elongated dimension (Answer 6).

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the invention set forth in the claims on appeal. Accordingly, we affirm.

ISSUES

(1) Has Appellant established that the Examiner erred in combining Zeng and Miraldi in establishing a prima facie case of obviousness for representative claim 11?

(2) Has Appellant persuasively rebutted the Examiner's prima facie case of obviousness for representative claim 12?

FINDINGS OF FACT

At the outset, we note that the Examiner's findings regarding the specific teachings of the cited references (Answer 3-10) are not in dispute except with respect to the disputed points noted above. Accordingly, we will adopt the Examiner's factual findings regarding the cited references as they pertain to the undisputed claim limitations.

Zeng discloses a slat-collimated gamma camera with a detector head 22 with a radiation-receiving side that faces an object (e.g., patient) being studied. The detector head 22 includes an array of detection elements 106 that each individually detect radiation incident thereon. The detector elements are made of scintillating materials and are in optical communication with a photodiode or other appropriate photodetector. A

collimator 100 is arranged on the radiation receiving side of the detector head 22. The collimator includes multiple slats 102 spaced apart from each other such that multiple detector elements 106 are arranged between adjacent pairs of slats (Zeng, abstract, col. 6, ll. 57-67; col. 7, ll. 23-41; Figs. 4, 5A, 5B, 8).

Miraldi discloses a radiation sensitive device comprising a collimator and a scintillation crystal. Specifically, Miraldi teaches mounting photomultipliers 96, 98 (20, 22 in Fig. 2) to opposite ends of a scintillation crystal 86 having a rectangular cross section (18 in Fig. 2) (Miraldi, Figs. 2 and 7; col. 4, ll. 17-32; col. 5, l. 55 – col. 6, l. 49).

PRINCIPLES OF LAW

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (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, 148 USPQ 459, 467 (1966). Furthermore, "'there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness' . . . . [H]owever, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006)).

If the Examiner's burden is met, the burden then shifts to the Appellant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. *See In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

ANALYSIS

Representative Claim 11

We will sustain the Examiner's rejection of representative claim 11. Zeng states that a photodetector optically communicates with the detector elements 106 (Zeng, col. 7, ll. 32-35). The reference, however, does not show the photodetector, let alone the details of the optical communication between the photodetector and the detector elements.

Nevertheless, Zeng's omission of the specific details regarding the mounting and orientation of the photodetector relative to the detector elements strongly suggests that Zeng considered such details to be within the level of skilled artisans – electrical engineers with several years of related industry experience. Accordingly, we agree with the Examiner that the specific details regarding the orientation and mounting of the photodiode with respect to the detector elements would have been within the level of skilled artisans.

The issue, therefore, turns on a relatively narrow question: On this record, would the skilled artisan have reasonably coupled the photodetector in Zeng to an end of each elongated detector element normal to the detectors' elongated dimension as claimed? Based on the record before us, we answer this question in the affirmative.

Turning to the claim language, we note that the scope and breadth of the term "coupled" does not preclude optical coupling. That is, nothing in the claim requires physically mounting or attaching the photodetector to the end of the bar detector strips. Rather, the limitation is fully met so long as some optical coupling exists between the detector strips' ends and the photodetector in the manner claimed.

With this construction, we turn to the prior art. Even assuming, without deciding, that the at least one photodetector must be located within the detector head 22 as Appellant argues, we nonetheless find the Examiner's combination of Miraldi with Zeng reasonable. Miraldi teaches mounting photomultipliers 96, 98 (20, 22 in Fig. 2) to opposite ends of a scintillation crystal 86 having a rectangular cross section (18 in Fig. 2) (Miraldi, Figs. 2 and 7; col. 4, ll. 17-32; col. 5, l. 55 – col. 6, l. 49). Significantly, the photomultipliers disposed at both ends convert the light in the scintillation crystal to electrical pulses whose amplitudes are converted to logarithms for finding the location of the scintillation in the crystal. Detecting the locations of scintillations in the crystal in this manner ultimately improves resolution (Miraldi, abstract; col. 3, ll. 4-10; col. 6, l. 41 – col. 7, l. 4).

The clear import of this discussion is that coupling the photodetectors to the end of the scintillation crystal is critical to determine the location of the scintillation in the crystal. In our view, this teaching would have provided ample reason for the skilled artisan to provide such a photodetector mounting in the arrangement of Zeng. Such a coupling would, at least in part, dispose each photodetector normal to the elongated dimension of the detector elements.

Although Appellant argues that Zeng's camera could not perform correctly with Miraldi's photodetector mounting (Br. 10), Appellant has provided no evidence on this record to support this assertion apart from mere conclusory statements. It is well settled that mere lawyer's arguments and conclusory statements, which are unsupported by factual evidence, are entitled to little probative value. *In re Geisler*, 116 F.3d 1465, 1470, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984). Appellant has simply not persuasively rebutted the Examiner's prima facie case in this regard. For the reasons noted above and given the inferences and creative steps that the skilled artisan would employ,[4] we find ample reason on this record for the skilled artisan to couple the photodetectors to the ends of the detector elements 106 of Zeng, particularly noting the detector elements' rectangular cross-section in Fig. 4.

For at least these reasons, we will sustain the Examiner's rejection of representative claim 11. Since Appellant has not separately argued the patentability of claims 1, 2, 4, 5, 7-10, 13-15, 18, 19, and 21-25, these claims fall with representative claim 11. *See In re Nielson*, 816 F.2d 1567, 1572, 2 USPQ2d 1525, 1528 (Fed. Cir. 1987); *see also* 37 C.F.R. § 41.37(c)(1)(vii).

Representative Claim 12

We will also sustain the Examiner's rejection of representative claim 12. In short, Appellant has simply not persuasively rebutted the Examiner's prima facie case based on the collective teachings of the references. Significantly, Appellant does not dispute that Iwanczyk teaches using a

[4] *See KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. at 1741, 82 USPQ2d at 1396.

silicon drift photodetector (SDP), but merely argues that the reference fails to cure the basic deficiency in the Examiner's proposed combination of references (Br. 10-11).

Such an argument, however, does not overcome the Examiner's prima facie case of obviousness for the reasons previously discussed. Furthermore, we see no reason why skilled artisan would not have relied on the teachings of Iwanczyk in using an SDD in conjunction with gamma-ray detectors employing scintillators essentially for the reasons stated by the Examiner (Answer 10, 13). Moreover, Iwanczyk constitutes analogous art.

For at least these reasons, the Examiner's rejection of representative claim 12 is sustained. Likewise, we also sustain the Examiner's rejection of claim 3 as it falls with claim 12.

CONCLUSIONS OF LAW

On the record before us, Appellant has not established that the Examiner erred in combining Zeng and Miraldi in establishing a prima facie case of obviousness for representative claim 11. Moreover, Appellant has not persuasively rebutted the Examiner's prima facie case of obviousness for representative claim 12.

DECISION

We have sustained the Examiner's rejections with respect to all claims on appeal. Therefore, the Examiner's decision rejecting claims 1-5, 7-15, 18, 19, and 21-25 is affirmed.

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)(iv).

AFFIRMED

tdl/gw

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