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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MICHAEL C. STECKNER, PETER BOERNERT, and KAY NEHRKE

Appeal 2011-004730
Application 10/573,727
Technology Center 3700

Before TONI R. SCHEINER, ERIC GRIMES, and ERICA A. FRANKLIN, *Administrative Patent Judges*.

GRIMES, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims related to a radiotherapy apparatus and method, which have been rejected for anticipation and obviousness. We have jurisdiction under 35 U.S.C. § 6(b). We reverse.

STATEMENT OF THE CASE

"One of the factors in planning oncological procedures is accurately aligning an interventional tool with the internal tumor" (Spec. 1: 15-16).

"The more precisely the size, shape, and position of the tumor are known, the more precisely the treatment beam can be shaped to minimize the exposure of surrounding tissue while assuring the treatment of all cancerous tissue" (*id*. at 1: 28-30).

The Specification states that, in one known technique, "to track the movement of the target, one or more internal markers have been attached to or placed near various locations on or near the target organ. . . . From the placement of the internal markers, it is possible to determine the position of the target using imaging techniques such as x-ray or ultrasound." (*Id*. at 2: 25-30.) "A drawback to this method of tumor tracking, however, is that it involves the invasive procedure of implanting the internal markers" (*id*. at 3: 1-2).

The Specification discloses a system in which "external reference, or fiducial, markers 210 are placed on the subject such that they are positioned within the [MRI] imaging region 110 and in a desired proximity to the region of interest 130" (*id*. at 5: 17-19). An "MRI localizer 150 . . . localizes the region of interest 130, such as an internal tumor, and optionally the reference markers 210" (*id*. at 5: 23-25) and "a reference marker localizer 160 . . . localiz[es] the reference marker positions" (*id*. at 6: 1-2). A "tracking processor . . . generates a model relating the position of the tumor with respect to the external markers" (*id*. at 6: 18-19), so that treatment can be directed specifically to the tumor (*id*. at 6: 20 to 7: 2).

Claims 1-15 are on appeal. Claims 1 and 6 are representative and read as follows:

1. A target treatment apparatus for treating a target region within a subject, the apparatus comprising:

an MRI apparatus for generating MR images during an MR scan of the subject disposed within an examination region;

an MRI localizer for receiving the image data from the MRI apparatus wherein the target is localized;

a reference marker localizer for non-invasively receiving reference data from a plurality of reference points disposed in proximity to the target wherein the reference points are localized; and

a tracking processor for receiving localized data from the MRI localizer wherein a relationship between the reference points and the target region is generated.

6. A method of treating a target region within a subject, the method comprising:

generating magnetic resonance images of the subject disposed within an examination region;

localizing the target region from the MR images;

non-invasively localizing a plurality of reference points disposed In proximity to the target; and

generating a relationship between the reference points and the target region.

The Examiner has rejected claims 1-4, 6-9, and 11-14 under 35 U.S.C. § 102(b) as anticipated by Schweikard[1] (Answer 3), and has rejected claims 5, 10, and 15 under 35 U.S.C. § 103(a) as obvious based on Schweikard and Acker[2] (Answer 4). The same issue is dispositive for both rejections.

The Examiner finds that "Schweikard discloses an apparatus and a method for tracking and treatment of [a] target region" that includes all of the limitations of the independent claims on appeal (*id*. at 3).

Appellants argue, however, that "**Schweikard** is exemplary of th[e] acknowledged prior art . . . [that] requires the implantation of internal

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[1] Schweikard et al., US 6,501,981, Dec. 31, 2002
[2] Acker et al., US 6,374,132 B1, Apr. 16, 2002

markers **152**" (Appeal Br. 10). Appellants argue that, by contrast, "**Claim 1** calls for a reference marker localizer for non-invasively receiving reference data from a plurality of reference points disposed in proximity to the target, wherein the reference points are localized" (*id*.). Similarly, with regard to claim 6, Appellants argue that Schweikard discloses internal reference markers that are invasively implanted into the patient, so that "localizing the internal markers **152** is an invasive rather than a non-invasive localizing process" (*id*. at 14).

We agree with Appellants that Schweikard does not disclose a system or method that includes "a reference marker localizer for non-invasively receiving reference data from a plurality of reference points disposed in proximity to [a] target" within a subject (claim 1), or the corresponding limitation of claim 6 or claim 11, the only other independent claims.

The Specification distinguishes the inventive method from prior art methods requiring implantation of internal markers (Spec. 2: 25 to 3: 8) and discloses that an "advantage of the present invention is that it is non-invasive" (*id*. at 4: 13). We agree with Appellants that the broadest reasonable interpretation of "non-invasively receiving reference data from a plurality of reference points" (claim 1) or "non-invasively localizing a plurality of reference points" (claims 6 and 11) excludes an invasive step of implanting internal markers.

Schweikard discloses "an apparatus and method for compensating for breathing and other motion of a patient . . . which combines *internal markers placed on the target organ* with one or more external sensors to accurately track the position and motion of a moving target region" (Schweikard, col. 2,

ll. 10-15, emphasis added). Although Schweikard discloses that its method can include the use of "one or more external markers 180" (*id*. at col. 6, l. 55), it expressly states, as Appellants point out, that the "external markers are not sufficiently precise to compensate for the motion of the patient. Therefore, the combination of the internal markers and the external markers is necessary in order to accurately track the motion of the target organ." (*Id*. at col. 7, ll. 3-7.) Schweikard therefore requires the use of invasive internal markers.

The Examiner argues that Schweikard's system and method meet the claim limitations because "the reference markers/points are the external sensors that transmit reference data to the reference marker localizer in order to determine the position of the external sensors non-invasively on the patient; examiner interprets target as the patient under examination" (Answer 5).

We do not agree that this claim interpretation is reasonable, based on the claim language and the Specification. Each of claims 1, 6, and 11 recites treating "a target region within a subject," and therefore the target region cannot fairly be interpreted as the subject (patient) itself. The Specification's disclosure is also consistent with requiring the target region of the claims to be a discrete area within a patient rather than the patient himself. *See, e.g.*, Spec. 5: 15-16 (distinguishing between "region of interest 130" and "subject 140"), and *id*. at 7: 4-5 ("the markers are placed on the subject 140 in the vicinity of the target tissue to be treated 130").

SUMMARY

We reverse the rejection of claims 1-4, 6-9, and 11-14 as anticipated by Schweikard. We also reverse the rejection of claims 5, 10, and 15 as obvious based on Schweikard and Acker because the obviousness rejection relies on the same findings as the anticipation rejection.

REVERSED

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