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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DORIAN AVERBUCH¹

Appeal 2017-000769
Application 12/170,385
Technology Center 1600

Before DONALD E. ADAMS, RICHARD M. LEBOVITZ, and JEFFREY
N. FREDMAN, *Administrative Patent Judges*.

LEBOVITZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal involves claims directed to a method of modeling lung movements due to breathing in a patient. The Examiner rejected the claims as obvious under 35 U.S.C. § 103 and as ineligible for a patent under 35 U.S.C. § 101. Pursuant to 35 U.S.C. § 134, Appellant appeals the Examiner’s determination that the claims are unpatentable. We have jurisdiction under 35 U.S.C. § 6(b). We reverse the rejections.

¹ The Appeal Brief (“Appeal Br.”; entered March 11, 2016) identifies Covidien LP as the real party in interest.

STATEMENT OF THE CASE

Claims 1 and 8, the only claims in this appeal, stand finally rejected by the Examiner as follows:

1. Claims 1 and 8 under pre-AIA 35 U.S.C. § 103(a) as obvious in view of Nehrke et al. (*Magn. Reson. Med.*, 2005, 54:1130–1138) (“Nehrke”) and Zaporozhan et al. (*Invest. Radial.*, 2006, 41:468–475) (“Zaporozhan”) as evidenced by Manke et al. (*IEEE Transact. Med. Imag.*, 2002, 21 1132–1141) (“Manke”). Ans. 4.

2. Claims 1 and 8 under 35 U.S.C. § 101 because the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more. Ans. 2.

Claim 1, the only independent claim on appeal, is reproduced below:

1. A method of modeling lung movements due to breathing in a patient comprising:

- acquiring at least one static image of a patient’s lungs during a fully inhaled phase of the breathing cycle;
- acquiring at least one static image of a patient's lungs during a fully exhaled phase of the breathing cycle;
- generating at least one electromagnetic field;
- identifying locations of a plurality of points of interest on said static images, wherein location sensors are attached to said patient proximate said points of interest;
- detecting the at least one electromagnetic field with said location sensors;
- determining location data from signals received from said location sensors; and
- using said location data to model the lung movements by predicting mathematically locations of said plurality of points of interest at phases of the breathing cycle between said fully inhaled and fully exhaled phases of the breathing cycle.

REJECTION BASED ON OBVIOUSNESS

Claim 1 is directed to a method of modeling lung movement due to a patient breathing. The Specification explains that the method is useful when locating a medical tool, such as a catheter, endoscope, or needle, inside a patient's lung. Spec. ¶ 3. The method enables accurate representation of the tool in the lungs as the patient's body moves during a breathing cycle. *Id.* ¶¶ 3, 10.

The Examiner found that Nehrke describes a method of modeling lung movements due to breathing which includes all the steps recited in claim 1 (Final Act. 9–10), but does not specify acquiring static images of the lung at a “fully inhaled phase” and “fully exhaled phase” of the breathing cycle as recited in the first two steps of claim 1 (*id.* at 11). For this limitation, the Examiner further cited Zaporozhan which the Examiner found established it was routine when performing lung imaging to acquire static images, making it obvious to do so in Nehrke's method. *Id.* at 11. Manke was also cited by the Examiner for teaching the fully inhaled and fully exhaled points of the breathing cycle in a model correcting for respiratory motion when performing cardiac imaging. *Id.* at 10; Manke, Abstract.

The Examiner found that the “navigators” utilized in Nehrke's method serve as the “location sensors” recited in claim 1. Final Act. 9. Appellants contend that the navigators described by Nehrke do not perform the required function of the location sensors of claim 1, namely, “detecting the at least one electromagnetic field with said location sensors.” Appeal Br. 22.

Nehrke describes using navigators which produce “outputs.” Nehrke 1135 (first column in section titled “Discussion”). A navigator, according to Manke, is “pulse.” Manke 1133. The Examiner did not establish that the

navigator disclosed in Nehrke and Manke detects an electromagnetic field as required by claim 1. To the contrary, the Examiner found the navigators were “generated” by an MRI scanner and that detection was performed by a body coil of the system. Ans. 5 (“the radio frequency pencil beam navigators generated by MRI scanner served as instantly claimed location sensors and through radio transmitter, the body coil of the scanner system served as signal receiver/detector”). In other words, the Examiner did not find that the navigator, itself, detected the electromagnetic field.

The Examiner also cited Nehrke’s teaching that “the use of external motion sensors (e.g., respiration sensors, EKG signal, or microcoils) as a straightforward extension of the navigator concept could be considered.” Nehrke 1135 (column 1 under “Discussion”); *see* Ans. 13. The Examiner stated that “[i]t is clear that both navigators and external motion sensors were known in the art and obvious variants capable of detecting an electromagnetic field as instantly claimed.” Ans. 13. The Examiner further stated “[w]hen *Nehrke* states external motion sensors could be incorporated into the model, there must have been art known technology to detect the signal.” *Id.* at 14.

However, as argued by Appellants, the Examiner did not explain how the external motion sensors detect an electromagnetic field or make it obvious to do so. Rather, the Examiner states the technology to detect the “signal” must have been known. The Examiner did not meet the burden of establishing that the external motion sensor, itself, detects the “signal,” and how it would be modified to detect an electromagnetic field as required by the claim. An examiner bears the initial burden of presenting a *prima facie* case of obviousness. *In re Huai-Hung Kao*, 639 F.3d 1057, 1066 (Fed. Cir.

2011). Since this burden was not met, we are compelled to reverse the obviousness rejection of claim 1 and dependent claim 8.

REJECTION UNDER § 101

The Examiner found that the claimed method of modeling lung movements due to breathing in a patient “is carried out by mathematic formulas that are deemed to be law of nature or abstract ideas, hence claims recite judicial exceptions” to patent eligibility under 35 U.S.C. § 101. Ans.

2. The Examiner further found the claimed method does not

include additional elements that are sufficient amounting to significantly more than the judicial exception because the recited “using said location data to model the lung movements by predicting mathematically” is merely an instruction to implement an abstract idea in a specific technical environment generally (equivalent to “apply it”), and because the recited “modeling” requires “*predicting mathematically*”, involving application of mathematic relationships/formulas (as listed in pages 11–15), which may be executed by a generic computer (e.g. platforms in a commonly used MRI machine).

Final Act. 3.

As found by the Examiner, the claimed method collects data from images and location sensors, and uses the collected data to model lung movement due to breathing. The modeling is accomplished mathematically (“using said location data to model the lung movements by predicting mathematically locations”), but no specific mathematical formula is recited in claim 1. While these steps could be considered “abstract” to the extent that they do not generally involve physical manipulations, the claim also has explicit physical steps of “generating at least one magnetic field” and “detecting the at least one electromagnetic field with said location sensors” which are “attached to said patient proximate said points of interest.”

Under the two part test of *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2355 (2014) for determining whether a claim is eligible for a patent under 35 U.S.C. § 101, it is first asked whether the claims are directed to patent *ineligible* subject matter, such as an abstract idea or law of nature. When the claim is found to be directed to an ineligible “concept,” the second step of *Alice* is invoked in which “a search” of the claims as a whole is made “for an inventive concept—*i.e.*, an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself.” *Id.*

We proceed directly to the second step of *Alice*’s two-part test because, when that step is applied to the claim, it is evident that the Examiner failed to establish that when the claim is considered in its entirety it is not “significantly more than a patent” on an abstract idea.

Specifically, as discussed above in the obviousness analysis, claim 1 requires the use of “location sensors” which are devices that are enabled to detect an electromagnetic field. *See* Substitute Spec. ¶ 2 (referencing, *inter alia*, U.S. Pat. No. 6,380,732); Appeal Br. 2. The claimed method employs the data from the location sensors to predict the movement of the lung. As explained in the Specification:

In one embodiment of the present invention, one or more static images, such as a CT data set, may be “brought to life” by applying a mathematical model that predicts how a given point in the lungs will move during the breathing cycle, based on a large sample of statistical data. The mathematical model is tied to one or more external position sensors on the patient’s chest. Hence, by monitoring the external sensor(s), and applying the

mathematical movement model, an instantaneous position of a given point in the lungs can be predicted.

Substitute Spec. ¶ 10. The location sensor of the claims is an example of an external sensor.

The Specification further explains:

The data from these sensors are not only used as an entering argument for the upcoming mathematical modeling step 70, but also to monitor the physical location of the patient in order to register a real-time image (such as that acquired to show the position of the locatable guide) to the CT scan image(s).

Id. ¶ 24.

Thus, it is evident from reading the Specification that the location sensors, which are physical devices attached to a patient, are a significant and required element necessary to enable the claimed method. *See Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1349 (Fed. Cir. 2017). (“The claims specify a particular configuration of inertial sensors and a particular method of using the raw data . . . Far from claiming the equations themselves, the claims seek to protect only the application of physics to the unconventional configuration of sensors as disclosed.”) The claim is not merely an abstract idea, but the practical application of the steps to a location sensor to locate breathing movements in a patient, useful when imaging a medical tool in the patient’s body.

While “well-understood, routine, conventional activity previously engaged in by scientists who work in the field” is not enough to establish patent eligibility for an otherwise ineligible claim (*Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 79 (2012)), the Examiner did not establish that the claimed location detectors are used in a routine, conventional way to enable the claimed method to modeling lung

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movements due to breathing in a patient. Rather, as discussed above, the obviousness rejection was reversed because the Examiner did not provide persuasive evidence that the claimed location sensors had been used by those who work in the field to locate detect and electromagnetic field and model breathing movements as they are required to do so in claim 1.

For this reason, we conclude that the claimed method is eligible for a patent under 35 U.S.C. § 101. The rejection of claims 1 and 8 under § 101 is reversed.

REVERSED