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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DORIAN AVERBUCH[1]

Appeal 2017-006431
Application 13/286,977
Technology Center 3700

Before DONALD E. ADAMS, JEFFREY N. FREDMAN and ROBERT A. POLLOCK, *Administrative Patent Judges*.

POLLOCK, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) involving claims to a method of navigating a probe through airways of the lungs of a patient, which have been rejected as obvious. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] According to Appellant, the real party-in-interest is Coviden LP, and the ultimate parent of Coviden LP is Medtronic, plc. App. Br. 1.

STATEMENT OF THE CASE

"The method of the present invention relates generally to the accurate registration of a detected sensor located in moving lungs to a static image of the lungs." Spec. ¶ 2. This method

> provides a representative modeling of the human lungs, based on statistical anatomical data, which can be tailored to the size and shape of an individual patient. The method of the present invention also utilizes a compilation of statistical anatomical data regarding lung movement in order to predict the movement of an individual patient's lungs during the breathing cycle.

Id. ¶ 8.

The Specification describes embodiments of the invention with respect to the reference numbers of Figure 1. For example, "[a]t 80 the procedure begins on the patient. The patient movement sensors are placed on or in the patient. The physician intubates the patient and the LG [locatable guide] is inserted and tracked. The CT scan from 40 is displayed and registered to the superimposed LG display." *Id.* ¶ 26. "[T]he data acquired at 80 may be used to determine which CT scan most accurately depicts the configuration of the lungs and can thus be superimposed onto the LG display." *Id.* ¶ 29.

> As the LG is being inserted, the location(s) of the patient location sensors are constantly monitored and entered into the algorithm to provide three dimensional location data on the AOI(s) [areas of interest]. This information is then used at 90 to ensure that the display is modified such that the LG display maintains an accurate registration with the CT scan, despite the movement of the lungs, which cause the LG to move.

Id. ¶ 27.

> The measured location of the LG can be corrected using the data acquired at 80. Rather than displaying the real-time data acquired by the LG system, which represents the position of the

> LG in relation to a magnetic field filling the AOI, the real-time data is manipulated so the LG appears in the correct location on the CT scan, which may be static or dynamic. In this way the tool may be localized more correctly inside the CT volume. The geometric model derived from the CT volume can thus be more accurately represented relative to the tool inside the body.

Id. ¶ 30.

Claims 15 and 17–22 are on appeal. Claim 22, the only independent claim at issue, is reproduced below with key limitations emphasized:

> 22. A method of navigating a probe through airways of the lungs of a patient comprising:
>
> measuring patient characteristics;
>
> imaging the patient to acquire a plurality of images;
>
> collecting data regarding positions of sensors on the patient's body while the patient is breathing;
>
> developing a mathematical model of said patient's breathing cycle using said data;
>
> inserting a probe into said patient;
>
> detecting a position of the probe;
>
> selecting one of said plurality of acquired images corresponding to a position of said patient's lungs in said patient's breathing cycle using said mathematical model;
>
> displaying said selected one of said plurality of acquired images;
>
> displaying a real-time indication of a position of said probe on said displayed one of said
>
> plurality of acquired images as said probe is navigated through an airway of said patient; and
>
> *using said mathematical model to manipulate said real-time indication such that said probe appears in the correct location on said displayed one of said acquired plurality of images in accordance with the position of said patient's lungs in said patient's breathing cycle.*

The Examiner rejects claims 15, 17, 19, and 22 under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Soper[2] and Edwards.[3] Fin. Rej. 5–10.

The Examiner rejects claims 18 and 21 under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Soper, Edwards, and Vilsmeier.[4] *Id.* at 8–10.

The Examiner rejects claim 20 under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Soper, Edwards, and Armato.[5] *Id.* at 10.

ANALYSIS

The Examiner rejects claims 15 and 17–22 over, *inter alia*, Soper and Edwards. Appellant argues that the cited art fails to teach or suggest the step of "using said mathematical model to manipulate said real-time indication such that said probe appears in the correct location on said displayed one of said acquired plurality of images in accordance with the position of said patient's lungs in said patient's breathing cycle," as recited in independent claim 22. *See* App. Br. 3. As Appellant does not argue the independent claims separately, we limit our discussion to claim 22. In sum, we adopt the Examiner's findings of fact and reasoning regarding the scope and content of the prior art. (Final Act. 2–10; Advisory Action dated 6/29/2016 at 2; Ans. 2–4) and agree that claim 22 is obvious over Soper and Edwards.

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[2] Soper et al., US 2006/0149134 A1, published July 6, 2006.
[3] Edwards et al., US 2009/0281566 A1, published Nov. 12, 2009.
[4] Vilsmeier, US 2003/0185346 A1, published Oct. 2, 2003.
[5] Armato et al., US 2003/0086599 A1, published May 8, 2003.

With respect to the disputed limitation, Soper teaches a system for guiding an endoscope within a lung during a bronchoscopy procedure including a continually updated visual display showing the present position and orientation of the endoscope tip in a 3-D graphical airway model generated from image reconstruction. Soper, Abstact. "The visual display also includes windows depicting a virtual fly-through perspective and real-time video images acquired at the head of the endoscope." *Id.*

According to the Examiner, although "it is not entirely clear if the virtual fly through [of Soper] selects a single image . . . Edwards teaches a method where [the] location can be indicated by identifying a single image from a plurality during at least one period of the respiration cycle." Fin. Rej. 6–7 (citing Edwards ¶ 32). The Examiner further finds that Edwards'

> system chooses an image associated with a particular dataset/vector (Fig. 5, steps 98, 101, 102), but after this image is selected and displayed (102, Fig. 5) the system receives the position of the instrument reference marker (step 106, this reference marker is located on the instrument and its position is determined in space). The position of the instrument is then transformed to image space and then a representation of the instrument is superimposed on the instrument (see [0085] - [0087]). Therefore Edwards teaches similarly to Soper the step of using a mathematical model to adjust the location of the probe on the selected image as claimed (the mathematical model in this case is the transformation process). Edwards also notes that images corresponding to various phases of breathing are captured initially as well (see [0050]), such images being necessary to accurately place the probe during respiration. This is all performed in real time (see [0088]). It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify Soper's image guidance fly through to select the image and accurately place a marker on the image in real time

> based on a mathematical model, as taught by Edwards, for assisting a doctor in navigating the lungs of a patient.

Id. at 7.

According to Appellant, the Examiner misunderstands "the differences between the registration steps taught by Edwards and the manipulation of the location of the probe as recited in independent claim 22." Reply Br. 2. In particular, Appellant argues that "Edwards merely teaches registration (or correlation) of the real time location of the probe to a gated image (i.e., a particular image of a gated image set).[6] In contrast, the real-time indication of the probe recited in independent claim 22 is manipulated (i.e., changed) such that the correct location of the probe appears on the identified image, rather than the real-time location of the probe itself." *Id.* at 2–3 (referencing App. Br. 4–6).

We do not find Appellant's argument persuasive for the reasons set forth on pages 2–4 of the Examiner's Answer. In particular,

> it is unclear how the claimed limitations do not reflect common registration as taught in the cited teachings of Soper and Edwards. The cited part of the specification appears to teach that a real time position is acquired and then manipulated to appear on the correct location of the image. In Soper and Edwards, a real time position of the sensor on the probe is acquired (i.e. an "absolute coordinate" or "tracking space" coordinate). This value is then mapped or transformed into the corresponding model coordinate or image space coordinate, such mapping resulting in placement of the marker taught by both Soper and Edwards to appear in the correct position and orientation in the image used (in Soper, the marker is placed relative to a particular representation in a 3D model while in Edwards, a particular

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[6] Insofar as Edwards characterizes gated images as those associated with periodic human characteristics and including the output from ECG, MRI, or CT devices, we do not consider this a patentable distinction. *See* Edwards ¶¶ 12, 49, 52.

> image, see box 110 in Fig. 5 of Edwards; such mapping uses a mathematical model which operates on the absolute or tracking space to transform the location to model coordinate or image space coordinate, see [0078]). To use the words of Applicant's specification, "rather displaying the real time image data acquired ... which represents the position of the LG in relation to a magnetic field," (i.e. the absolute coordinates), the location is manipulated to depict the correct location in the image (i.e .. transformed to image space). Again, the transformation from the location in the magnetic field area of interest (AOI) is manipulation that results in the correct depiction in the 3D model space (Soper) or image (Edwards).

Ans. 3; *see also* Advisory Action dated 6/29/2016, noting that

> Edwards's position tracking system can account for breathing motion (i.e. in accordance with position of the patient's lungs in said breathing cycle) and place a probe on an image in the right location based on position tracking data. So in the particular image shown, the indication of the probe is placed in the right spot (i.e. not just anywhere in the image).

Accordingly, we affirm the Examiner's rejection of claim 22. Claims 15 and 17–21, which are not separately argued, fall with claim 22. 37 C.F.R. § 41.37(c)(1)(iv).

SUMMARY

For the reasons above, we affirm the Examiner's decision rejecting claims 15 and 17–22.

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED