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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RON BARAK, OREN P. WEINGARTEN, ALEXANDER GULBIT, and DORIAN AVERBUCH

Appeal 2020-002323
Application 12/780,678
Technology Center 3600

Before LARRY HUME, CATHERINE SHIANG, and JASON J. CHUNG, *Administrative Patent Judges*.

CHUNG, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals the final rejection of claims 1–26. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

INVENTION

The claimed invention relates to registration between a digital image of a branched structure and a real-time indicator representing a location of a sensor inside the branched structure. Spec. ¶ 16. Claim 1 is illustrative of the invention and is reproduced below:

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. According to Appellant, Covidien LP (i.e., Medtronic, plc is the parent of Covidien LP) is the real party in interest. Appeal Br. 1.

> 1. A method of registering a real-time position indicator of a sensor on a probe within a branched structure to a three-dimensional model formed from previously-acquired images of the branched structure, comprising:
>
> sensing movement of a probe containing a location sensor within a branched structure;
>
> storing, in a non-transitory computer readable storage medium, data pertaining to locations of the location sensor based on movement of the location sensor through the branched structure; and
>
> utilizing a processor to access the non-transitory computer readable storage medium storing a program that causes the processor to perform the steps of:
>
> *generating a cavity voxel representing a shape of an anatomical cavity of the branched structure based on the data*;
>
> comparing the cavity voxel representing the shape of the anatomical cavity of the branched structure to an interior geometry of passages of the three-dimensional model of the branched structure;
>
> determining a location correlation between the cavity voxel representing the shape of the anatomical cavity of the branched structure and the three-dimensional model based on the comparison; and
>
> *aligning the cavity voxel representing the shape of the anatomical cavity of the branched structure with the three-dimensional model of the branched structure based on the location correlation and an assumption that the location sensor remains located in non-tissue space in the branched structure*.

Appeal Br. 13 (Claims App.) (emphases added to contested limitations).

REJECTIONS

The Examiner rejects claims 1–3, 5–11, 13–24, and 26 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Soper (US 7,901,348 B2; filed Dec. 10, 2004) and Inoue (US 8,165,367 B2; continuation of application JP2007/052346, filed on Feb. 4, 2007). Final

Act. 2–10.

The Examiner rejects claims 4, 12, and 25 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Soper, Inoue, and Gattan (US 8,116,847 B2; filed Oct. 19, 2006). Final Act. 10–11.

ANALYSIS

A. Does the Combination of Soper and Inoue teach the Limitation "generating a cavity voxel representing a shape of an anatomical cavity . . . based on the data [pertaining to the locations of the location sensor based on movement of the location sensor through the branched structure]" Recited in Claim 1 (and Similarly Recited in claim 14)?

The Examiner finds Inoue teaches using an endoscope to obtain images such that the images are used to estimate a three-dimensional model, which the Examiner maps to the limitation "generating a cavity voxel representing a shape of an anatomical cavity . . . based on the data." Final Act. 3–5 (citing Inoue, 7:48–60, 9:66–10:63). The Examiner finds Soper teaches tracking a position of an endoscope on a generated three-dimensional model and navigation of longitudinal movement of the flexible endoscope through a lung, which the Examiner maps to the limitation "the data [pertaining to the locations of the location sensor based on movement of the location sensor through the branched structure]." Ans. 3–4 (citing Soper, 7:32–63, 8:56–9:6, 9:38–10:10, 15:49–67).

Appellant argues Soper merely teaches generating a three-dimensional model based on image data image data, but fails to teach the limitation the limitation "generating a cavity voxel representing a shape of an anatomical cavity . . . based on the data [pertaining to the locations of the location sensor based on movement of the location sensor through the branched structure]." Appeal Br. 6 (citing Soper, 3:62–64, Abst.); Reply Br. 1–2.

Appellant argues Inoue merely teaches estimating a three-dimensional model of living tissue based on a two-dimensional image input of a living tissue within a body cavity, but fails to teach that the three-dimensional model is based on data pertaining to locations of the location sensor based on movement of the location sensor through the branched structure. Appeal Br. 7 (citing Inoue, 1:67–2:3).

We disagree with Appellant. One cannot show nonobviousness "by attacking references individually" where the rejections are based on combinations of references. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981)). In this case, the Examiner relies on Inoue to teach using an endoscope to obtain images such that the images (i.e., based on the data) are used to estimate a three-dimensional model (i.e., generating a voxel), which teaches the limitation "generating a cavity voxel representing a shape of an anatomical cavity . . . based on the data." Inoue, 7:48–60, 9:66–10:63 (cited at Final Act. 3–5). The Examiner also relies on Soper to teach tracking a position of an endoscope (i.e., pertaining to the locations of the location sensor) moving through a lung (i.e., based on the movement through a branched structure) on a generated three-dimensional model and navigation of longitudinal movement of the flexible endoscope through a lung, which teaches the limitation "the data [pertaining to the locations of the location sensor based on movement of the location sensor through the branched structure]." Soper, 7:32–63, 8:56–9:6, 9:38–10:10, 15:49–67 (cited at Ans. 3–4).

Appellant, therefore, does not persuade us of error in the Examiner's analysis.

B. Does the Combination of Soper and Inoue teach the Limitation "aligning the cavity voxel . . . with the three-dimensional model of the branched structure based on the location correlation and an assumption that the location sensor remains located in non-tissue space in the branched structure" Recited in Claim 1 (and Similarly Recited in claim 14)?

The Examiner finds Inoue teaches using an endoscope to obtain images of the tubes of an organ such that the images are used to estimate a three-dimensional model, which the Examiner maps to the limitation "aligning the cavity voxel representing the shape of the anatomical cavity of the branched structure with the three-dimensional model of the branched structure based on . . . an assumption that the . . . sensor remains located in non-tissue space in the branched structure." Final Act. 3–5 (citing Inoue, 7:48–60, 9:66–10:63). The Examiner finds Soper teaches tracking a position of an endoscope moving through a lung on a generated three-dimensional model and navigating longitudinal movement of the flexible endoscope through a lung, which the Examiner maps to the limitation "location correlation and an assumption that the location sensor remains located in non-tissue space in the branched structure." Ans. 3–4 (citing Soper, 7:32–63, 8:56–9:6, 9:38–10:10, 15:49–67). The Examiner concludes a person having ordinary skill in the art (hereinafter "PHOSITA") at the time of the invention would have combined Soper and Inoue to utilize three-dimensional image modeling as an automated registration. Final Act. 5.

Appellant argues Soper merely teaches generating a three-dimensional graphical surface model of airways and showing a position and orientation of a marker in the model, but fails to teach the limitation "aligning . . . based on the location correlation and an assumption that the location sensor remains located in non-tissue space in the branched structure." Appeal

Br. 8–9; Reply Br. 3–4. Appellant argues Inoue merely teaches estimating a three-dimensional model of a tubular organ and living tissue using image data, but fails to teach the limitation "aligning the cavity voxel . . . with the three-dimensional model of the branched structure based on the location correlation and an assumption that the location sensor remains located in non-tissue space in the branched structure." Appeal Br. 9–10; Reply Br. 3–4. Appellant argues there is no teaching, suggestion, or motivation as to why it would have been obvious to a PHOSITA would combine Soper and Inoue to "align[] the cavity voxel . . . with the three-dimensional model of the branched structure based on the location correlation and an assumption that the location sensor remains located in non-tissue space in the branched structure." Appeal Br. 10.

We disagree with Appellant. As an initial matter, one cannot show nonobviousness "by attacking references individually" where the rejections are based on combinations of references. *In re Merck & Co., Inc.*, 800 F.2d at 1097 (citing *In re Keller*, 642 F.2d at 425). In this case, the Examiner relies on Inoue to teach using an endoscope to obtain images of tubes of an organ (i.e., based on an assumption that the sensor remains located in non-tissue space) such that the images are used to estimate (i.e., aligning) a three-dimensional model, which teaches the limitation "aligning the cavity voxel representing the shape of the anatomical cavity of the branched structure with the three-dimensional model of the branched structure based on . . . an assumption that the [] sensor remains located in non-tissue space in the branched structure." Inoue, 7:48–60, 9:66–10:63 (cited at Final Act. 3–5).

Soper teaches tracking a position (i.e., location correlation) of an endoscope moving through a lung (i.e., an assumption that the location

sensor remains located in non-tissue space of a branched structure) on a generated three-dimensional model and navigation of longitudinal movement of the flexible endoscope through a lung, which teaches the limitation "location correlation and an assumption that the location sensor remains located in non-tissue space in the branched structure." Soper, 7:32–63, 8:56–9:6, 9:38–10:10, 15:49–67 (cited at Ans. 3–4).

We disagree with Appellant's argument that there is no teaching, suggestion, or motivation as to why it would have been obvious to a PHOSITA would combine Soper and Inoue to "align[] the cavity voxel . . . with the three-dimensional model of the branched structure based on the location correlation and an assumption that the location sensor remains located in non-tissue space in the branched structure." Appeal Br. 10. The teaching, suggestion, and motivation test is not required test. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). In addition, the Examiner concludes a PHOSITA at the time of the invention would have combined Soper and Inoue to utilize three-dimensional image modeling as an automated registration. Final Act. 5. We, therefore, conclude the Examiner has set forth sufficient "articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. at 418 (quoting *Kahn*, 441 F.3d at 988). Moreover, Appellant does not persuade us of error in the Examiner's analysis.

Appellant does not argue claims 1–26 separately with particularity. Accordingly, we sustain the Examiner's rejection of: (1) independent claims 1 and 14; and (2) dependent claims 2–13 and 15–26 under 35 U.S.C. § 103(a).

We have only considered those arguments that Appellant actually

raised in the Briefs. Arguments 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)(iv).

CONCLUSION

Claim(s) Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–3, 5–11, 13–24, 26	103(a)	Soper, Inoue	1–3, 5–11, 13–24, 26	
4, 12, 25	103(a)	Soper, Inoue, Gattan	4, 12, 25	
Overall Outcome			1–26	

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). *See* 37 C.F.R. § 41.50(f).

AFFIRMED