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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MICHAEL S. BITTAR, MARTIN D. PAULK, GARY ALTHOFF, PAUL F. RODNEY, and FRODE HVEDING[1]

Appeal 2015-005337
Application 12/295,158
Technology Center 2600

Before JOSEPH L. DIXON, MELISSA A. HAAPALA, and JAMES W. DEJMEK, *Administrative Patent Judges*.

DEJMEK, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from a Final Rejection of claims 1, 6–9, 12–18, 23–26, and 29–34. Claims 2–5, 10, 11, 19–22, 27, 28, and 35–41 have been canceled. Br. 17–20. We have jurisdiction over the remaining pending claims under 35 U.S.C. § 6(b).

We affirm-in-part.

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[1] Appellants identify Halliburton Energy Services, Inc. as the real party in interest. Br. 3.

STATEMENT OF THE CASE

Introduction

Appellants' claimed invention is directed to "borehole data presentation systems and methods that facilitate communication of volumetric logging data to a surface processing system for presentation to a driller or other user interested in visualizing the formations surrounding a borehole." Spec. 2–3.

Claim 1 is exemplary of the subject matter on appeal and is reproduced below with the disputed limitations emphasized in *italics*:

> 1. A logging system that comprises:
>
> a surface computing facility that receives formation measurements from at least one logging tool, *wherein the formation measurements are volumetric data measurements including at least one of a resistivity, a density, and a porosity measurement*; and
>
> a display coupled to the surface computing facility, wherein the display shows a three-dimensional holographic representation of the formation, and *wherein the representation shows the volumetric data's dependence on axial distance, azimuth, and radial distance*.

The Examiner's Rejections

1. Claims 1, 9, 14, 18, and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Abramov et al. (US 6,460,936 B1; Oct. 8, 2002) ("Abramov") and Cook (US 6,772,066 B2; Aug. 3, 2004). Final Act. 2–5.

2. Claims 6–8, 15–17, 23–25, and 32–34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Abramov, Cook, and Fleury et al. (US 2004/0204855 A1; Oct. 14, 2004) ("Fleury"). Final Act. 5–8.

3. Claims 12, 13, and 29–31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Abramov, Cook, and Chapellat et al. (US 5,528,029; June 18, 1996) ("Chapellat"). Final Act. 8–9.

Issues on Appeal

1. Did the Examiner err in finding Abramov teaches or suggests receiving "formation measurements from at least one logging tool, wherein the formation measurements are volumetric data measurements" and displaying a three-dimensional representation of a formation "wherein the representation shows the volumetric data's dependence on axial distance, azimuth, and radial distance," as recited in claim 1?

2. Did the Examiner err in finding Fleury teaches or suggests the three-dimensional representation shows gradients in formation property values "represented as being substantially transparent" if the gradients are below a given threshold, as recited in claim 8?

3. Did the Examiner err in finding Chapellat teaches or suggests "volumetric data measurements are averaged from higher-resolution volumetric measurements," as recited in claim 12?

4. Did the Examiner err in finding Chapellat teaches or suggests the "received volumetric data is determined by calculating differences between measured data values," as recited in claim 13?

ANALYSIS[2]

Claims 1, 6, 7, 9, 14–16, 18, 23, 24, 26, 32, and 33

Appellants contend the Examiner erred in finding Abramov teaches receiving volumetric data measurements from a logging tool. Br. 11–12. In particular, Appellants assert Abramov's data is not "volumetric data" (i.e., measured with respect to three independent dimensions), but rather is limited to only two independent dimensions. Br. 11–12. Appellants argue "[t]he measured radius *r* is not independent of depth and azimuth" and that Abramov is only mapping a two-dimensional surface as opposed to acquiring and displaying volumetric data. Br. 12.

According to the Specification, "volumetric data" means that the formation parameter is measured with respect to three independent dimensions. Spec. 5. The Specification gives an example coordinate system of depth, azimuthal angle, and radial distance. Spec. 5. The Examiner finds Abramov teaches the measurement of three-dimensional data. Ans. 5–8 (citing Abramov, col. 18, ll. 33–59); *see also* Final Act. 3–4; Adv. Act. 2. In particular, the Examiner finds Abramov teaches measuring data by "obtaining two dimensional slices driven or sampled by the rotation of the drilling rig and these slices are stacked or arranged along a third axis, the bore axis, to allow creation of three dimensional data structures of measurement data that allow computer processing and display of the collected three dimensional measurement data." Ans. 7.

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[2] Throughout this Decision, we have considered the Appeal Brief, filed November 24, 2014 ("Br."); the Examiner's Answer, mailed on February 12, 2015 ("Ans."); and the Final Office Action ("Final Act."), mailed on May 14, 2014, from which this Appeal is taken.

Abramov teaches a formation measurement with respect to radius and azimuthal angle. Abramov, col. 18, ll. 50–52 ("Thus, each gauging (penetration) of the cavern **82** gives the R—radius of the cavern **82** and the A—azimuth, that are complete linear and angular positioning information."). Further, Abramov teaches that in addition to radius and azimuth information, depth information, Z, is also measured for processing. Abramov, col. 18, ll. 55–59. "The sum [of] all incoming data (R, A[,] and Z) is used to generate the 3D image of the stope [(i.e., logging tool)]." Abramov, col. 18, ll. 62–63. Thus, we agree with the Examiner that Abramov teaches or suggests receiving "formation measurements from at least one logging tool, wherein the formation measurements are volumetric data measurements," as recited in claim 1.

For the reasons discussed *supra*, we are unpersuaded of Examiner error. Accordingly, we sustain the Examiner's rejection of claim 1 and, for similar reasons the rejection of independent claims 9, 18, and 26, which recite similar limitations and were not separately argued. *See* Br. 11–12. Further, we sustain the Examiner's rejections of claims 6, 7, 14–16, 23, 24, 32, and 33, which depend therefrom and were not argued separately. *See* Br. 12–13.

Claims 8, 17, 25, and 34

Claim 8 depends from claim 1 and further recites "wherein the representation shows gradients in formation property values, and wherein formation regions having gradients below a given threshold are represented as being substantially transparent."

Appellants assert Fleury, as relied upon by the Examiner, fails to teach or suggest that formation property value gradients (or any other form of derivative) are used as a basis for the transparency with which a region of the formation is displayed. Br. 13. Instead, Appellants assert Fleury suggests the transparency attribute is directly based on the formation property values. Br. 13.

Fleury teaches, *inter alia*, "the transparency may be set according to selected functions that depend on measurement values being displayed." Fleury ¶ 38. Fleury also provides an example, in the case of formation resistivities, transparent regions may indicate low resistivities, whereas opaque regions may indicate high resistivities. Fleury ¶ 38. The transparency may be progressively increasing to indicate changes in the formation resistivities. Fleury ¶ 39. Thus, we agree with the Examiner's findings that Fleury teaches this disputed limitation. *See* Ans. 10–11; Final Act. 7.

For the reasons discussed *supra*, we are unpersuaded of Examiner error. Accordingly, we sustain the Examiner's rejection of claim 8 and, for similar reasons, the rejection of claims 17, 25, and 34, which recite similar limitations and were not argued separately. Br. 13.

Claims 12 and 29

Claim 12 recites, in relevant part, "volumetric data measurements are averaged from higher-resolution volumetric measurements." Appellants contend Chapellat, as relied upon by the Examiner, teaches "the processing occurs at the surface rather than downhole." Br. 14. Appellants assert, therefore, Chapellat fails to teach that data received from the tool be averaged from higher-resolution volumetric measurements. Br. 14.

The Examiner notes, as do we, "[n]either the independent claims from which these claims depend [n]or the subject claims directly specify or even suggest the location at which this averaging is accomplished." Ans. 11–12. Rather, the formations *measurements* are received from the logging tool. Accordingly, Appellants' arguments are not commensurate with the scope of claims 12 or 29 and, thus, do not persuade us of error in the Examiner's rejection. *See In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (limitations not appearing in the claims cannot be relied upon for patentability).

Further, the Examiner finds, and we agree, Chapellat teaches the volumetric data measurements are averaged from higher-resolution measurements. Ans. 12 (citing Chapellat, col. 3, ll. 47–51 ("the 'high resolution' measurements are combined by averaging 'high resolution' measurements coming from the very near detector over a total longitudinal distance")).

For the reasons discussed *supra*, we are unpersuaded of Examiner error. Accordingly, we sustain the Examiner's rejection of claim 12 and, for similar reasons, claim 29, which recites a similar limitation and was not argued separately. Br. 13–14.

Claims 13, 30, and 31

Appellants contend the Examiner erred in relying on Chapellat as teaching or suggesting determining volumetric data "by calculating differences between measured data values," as recited in claim 13. Br. 14–15. In particular, Appellants argue the cited portions of Chapellat teach a comparison of real measurements to theoretical measurements. Br. 14–15 (citing Chapellat, col. 3, ll. 52–56, col. 8, ll. 35–46, 55–59, col. 9, ll. 2–12, 23–27, 40–50).

Chapellat teaches a "low resolution" real measurement combines the measurements from all three detectors whereas the "high resolution" real measurement combines the measurements from two of the detectors. Chapellat, col. 3, ll. 18–20, 26–28. The value of the parameter "is determined by minimizing . . . the difference between the real measurements and the theoretical measurements calculated by applying the model to the parameter." Chapellat, col. 3, ll. 52–56.

In response, the Examiner relies on the explanations provided with respect to Appellants' other arguments and does not provide sufficient evidence or technical reasoning to support the finding that Chapellat teaches the disputed limitation of claim 13. Ans. 12.

Accordingly, on this record, we are persuaded of Examiner error and do not sustain the Examiner's rejection of claim 13 or claim 30, which recites a similar limitation. Additionally, we do not sustain the Examiner's rejection of claim 31, which depends from claim 30.

DECISION

We affirm the Examiner's decision to reject claims 1, 6–9, 12, 14–18, 23–26, 29, and 32–34.

We reverse the Examiner's decision to reject claims 13, 30, and 31.

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-IN-PART