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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte GREGORY ERNEST PARKES and STIAN HEGNA

Appeal 2020-001123
Application 15/209,554
Technology Center 3600

Before JENNIFER D. BAHR, MICHAEL J. FITZPATRICK, and
GEORGE R. HOSKINS, *Administrative Patent Judges*.

FITZPATRICK, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant, PGS GEOPHYSICAL AS,¹ appeals under 35 U.S.C.
§ 134(a) from the Examiner’s final decision rejecting claims 1–5, 9–15, and
19–22. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm in part.

¹ “Appellant” refers to the applicant as defined in 37 C.F.R. § 1.42.
Appellant identifies itself as sole real party in interest. Appeal Br. 1.

STATEMENT OF THE CASE

The Specification

The Specification relates to geophysical prospecting and, in particular, marine seismic surveys. Spec. ¶2, claim 1 (as-filed).

The Claims

Claims 1–5, 9–15, and 19–22 are rejected. Final Act. 1. No other claims are pending. *Id.* Claims 1 and 11 are independent. Claim 1 is representative and reproduced below.

1. A system for mapping the earth's geology, comprising:
 - a seismic source comprising a plurality of seismic sub-sources disposed in a body of water at a plurality of depths and activated with different time delays;
 - seismic sensors disposed in the body of water to detect seismic energy reflected from the earth's subsurface in response to seismic signals generated by the seismic source and record the seismic energy as seismic data in a memory storage device; and
 - a programmable computer used to perform at least the following:
 - determining far-field signatures for the plurality of seismic sub-sources at each of the plurality of depths;
 - determining a composite ghost-free far-field signature of the seismic source from the far-field signatures for the plurality of seismic sub-sources at each of the plurality of depths and different time delays; and
 - removing a source response from the seismic data using the composite ghost-free far-field signature of the seismic source.

Appeal Br. 16.

The Examiner's Rejections

The Examiner's rejections are:

1. Claim 9, under 35 U.S.C. § 112 ¶4, as being of improper dependent form (Final Act. 4);
2. Claims 1, 4, 9–11, 14, 19, and 20, under 35 U.S.C. § 103(a), as unpatentable over Laws,² Davies,³ and Howlid⁴ (*id.* at 5);
3. Claims 2, 3, 5, 12, 13, and 15, under 35 U.S.C. § 103(a), as unpatentable over Laws, Davies, Howlid, and Parkes⁵ (*id.* at 8); and
4. Claims 21 and 22, under 35 U.S.C. § 103(a), as unpatentable over Laws, Davies, Howlid, and Kragh⁶ (*id.* at 10).

DISCUSSION

Rejection 1

Appellant does not argue against the rejection of claim 9 under 35 U.S.C. § 112 ¶4. The rejection has not been withdrawn. *See, e.g.*, Adv. Act. (dated Aug. 21, 2019); Ans. 3. Accordingly, we summarily affirm the rejection.

Rejection 2

Claims 1, 4, 9, and 10

The Examiner found that Laws teaches the subject matter of claim 1 except that “it does not teach the sub-sources are at a plurality of depths and activated with different time delays; the composite far-field signature is ghost-free; and removing a source response from the seismic data using the

² US 2012/0072115 A1, published Mar. 22, 2012 (“Laws”).

³ US 7,586,810 B2, issued Sept. 8, 2009 (“Davies”).

⁴ US 2004/0136266 A1, published July 15, 2004 (“Howlid”).

⁵ US 7,218,572 B2, issued May 15, 2007 (“Parkes”).

⁶ US 8,958,266 B2, issued Feb. 17, 2015 (“Kragh”).

composite ghost-free far-field signature of the seismic source.” Final Act. 5 (citing Laws ¶¶ 61, 64, 66–68, 70, 74, 80, and 81, Figs. 10 and 11). The Examiner relied on Howlid and Davies for teaching the limitations admittedly missing from Laws. *Id.* at 5 (citing Howlid ¶¶ 44, 45, 58), 6 (citing Davies 7:60–62, 9:39–42).

Critical to this Decision is the Examiner’s finding that Laws teaches “determining far-field signatures for the plurality of seismic sub-sources.” *Id.* at 5 (citing Laws ¶64, lines 1–4). The cited excerpt states: “At step 3, a *notional signature* is estimated for at least one of the sources of the source array, and preferably a *notional signature* is estimated for each source of the source array.” Laws ¶64 (emphasis added).

Appellant argues that paragraph 64 of Laws does not support the Examiner’s finding. Appeal Br. 4–7. Appellant explains that a “notional signature” (Laws ¶64) is distinct from a far-field signature. *Id.* at 5–6 (citing Spec. ¶22; Laws ¶8). In particular, Appellant explains: “A notional signature is the signature of an individual source element, such as the signature of an air gun, in the near field of the source element without the effects created by the other source elements. . . . The far-field signature, on the other hand, is the signature of a source array in the far field.” *Id.* at 6. Thus, Appellant urges, “the Examiner has erred in associating the notional signature of Laws with the far-field signature in the first step of claim 1” and “[m]oreover, nowhere does Laws teach or suggest determining far-field signatures for a plurality of source arrays (i.e., sub-sources).” *Id.*

The Examiner responds to Appellant’s argument by citing and quoting additional portions of Laws as follows:

Laws performs the same steps as the Appellant including determining the far-field signature of the array of sources (see [0012]: “The far field signature of the array may then be found, at any desired point, from the notional signatures of the two airguns” and [0066]: “The signature of the source array may then be estimated at step 4, by superposing the notional signatures estimated at step 3 for each source of the array”).

Ans. 5 (citing Laws ¶¶12, 66).

Appellant replies that “Paragraphs [0012] and [0066] describe determining a single far-field signature of a single source array from near-field notional signatures of the source elements comprising the source array.” Reply Br. 3.

Appellant’s arguments are persuasive of Examiner error. The record before us does not support the Examiner’s finding that “Laws teaches . . . determining far-field signatures for the plurality of seismic sub-sources.” Final Act. 5 (citing Law ¶64). Even considering the Examiner’s additional citations to paragraphs 12 and 66 of Laws (*see* Ans. 5), the Examiner has not supported adequately the finding that Law teaches “determining far-field signatures for the plurality of seismic sub-sources,” as recited in claim 1. Nor has the Examiner asserted, let alone explained why, it might have been obvious in light of what Laws does teach, for example, that “[t]he far field signature of the array may then be found, at any desired point, from the notional signatures of the two airguns.” Laws ¶12.

Appellant explicitly raised the issue of singular versus plural in the Appeal Brief. *See* Appeal Br. 6 (“Moreover, nowhere does Laws teach or suggest determining far-field signatures for a plurality of source arrays (i.e., sub-sources), as alleged by the Examiner.”), 7 (“There is no evidence that Laws teaches or suggests ‘determining far-field signatures for the plurality

of seismic sub-sources’ as alleged by the Examiner.”). The Examiner wholly failed to rebut Appellant’s arguments on this issue. We will not speculate on behalf of the Examiner as to what would have been obvious in view of Laws.

For the foregoing reasons, we reverse the obviousness rejection of claim 1, as well as that of claims 4, 9, and 10, which ultimately depend therefrom.

Claims 11, 14, 19, and 20

Like claim 1, independent claim 11 recites “determining far-field signatures for the plurality of seismic sub-sources at each of the plurality of depths.” Appeal Br. 17. The Examiner makes the same finding based on the same evidence with respect to this limitation. Final Act. 6; Ans. 5.

Accordingly, for the same reasons as with respect to claim 1, we reverse the obviousness rejection of claim 11, as well as that of claims 14, 19, and 20, which ultimately depend therefrom.

Rejections 3 and 4

The Examiner rejected dependent claims 2, 3, 5, 12, 13, 15, 21, and 22 as unpatentable over Laws, Davies, and Howlid, as discussed above, and additionally in view of either Parkes or Kragh. Final Act. 8–10. The Examiner does not rely on Parkes or Kragh in a manner that could cure the deficiency noted above in the rejection of independent claims 1 and 11. Accordingly, for essentially the same reason we reverse the rejection of claims 1 and 11, we likewise reverse the rejection of claims 2, 3, 5, 12, 13, 15, 21, and 22.

SUMMARY

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
9	112 ¶4	Improper dependent form	9	
1, 4, 9–11, 14, 19, 20	103(a)	Laws, Davies, Howlid		1, 4, 9–11, 14, 19, 20
2, 3, 5, 12, 13, 15	103(a)	Laws, Davies, Howlid, Parkes		2, 3, 5, 12, 13, 15
21, 22	103(a)	Laws, Davies, Howlid, Kragh		21, 22
Overall Outcome				

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED IN PART