# UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

*Ex parte* JENNIFER ANNE MARKET

Appeal 2017-010893
Application 12/922,978
Technology Center 3600

Before MICHAEL L. HOELTER, MICHAEL L. WOODS, and
NATHAN A. ENGELS, *Administrative Patent Judges*.

HOELTER, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

STATEMENT OF THE CASE[2]

This is a decision on appeal, under 35 U.S.C. § 134(a), from the

Examiner's final rejection of claims 27–38. App. Br. 4. Claims 1–26 have

been canceled. *See* Request for Continued Prosecution dated September 21,

2016. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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[1] Appellant identifies Halliburton Energy Services, Inc. as the real party in
interest. App. Br. 1.
[2] The present Application was the subject of a Board Decision (Appeal No.
2013-008143, dated July 30, 2015) which affirmed the Examiner's rejections
of claims 1–9, 13–22, and 26.

## THE CLAIMED SUBJECT MATTER

The disclosed subject matter relates to "Acoustic Anisotropy And Imaging By Means Of High Resolution Azimuthal Sampling." Spec. Title. Method claim 27 is the sole independent claim; is illustrative of the claims on appeal; and, is reproduced below.

27. A method comprising:

deploying an acoustic logging tool in a borehole having a borehole wall, the acoustic logging tool having:

a longitudinal tool body,

an X-axis acoustic source coupled to the longitudinal tool body,

a Y-axis acoustic source coupled to the longitudinal tool body,

an X-axis acoustic receiver coupled to the longitudinal tool body,

a Y-axis acoustic receiver coupled to the longitudinal tool body, and

a caliper to measure an X distance from the X-axis acoustic receiver to the borehole wall and a Y-distance from the Y-axis acoustic receiver to the borehole wall;

firing the X-axis acoustic source to produce X-axis surface waves on the borehole wall and receiving the X-axis surface waves at the X-axis acoustic receiver to produce an XX waveform and at the Y-axis acoustic receiver to produce an XY waveform;

firing the Y-axis acoustic source to produce Y-axis surface waves on the borehole wall and receiving the Y-axis surface waves at the X-axis acoustic receiver to produce a YX waveform and at the Y-axis acoustic receiver to produce a YY waveform;

removing delay caused by the transit of the X-axis surface waves and the Y-axis surface waves from the borehole wall to the X-axis acoustic receiver and the Y-axis acoustic receiver from the XX waveforms, the XY waveforms, the YX waveforms, and the YY waveforms using the X distance and the Y distance measured by the caliper to produce a corrected XX waveform, a

corrected XY waveform, a corrected YX waveform, and a
corrected YY waveform; and

     calculating a waveform function for waveforms at all
azimuths around the longitudinal tool body using the corrected
XX waveform, the corrected XY waveform, the corrected YX
waveform, and the corrected YY waveform.

## REFERENCES

| | | |
|---|---|---|
| Anderson et al. | US 5,311,484 | May 10, 1994 |
| Robbins et al. | US 5,678,643 | Oct. 21, 1997 |
| Mandal | US 6,188,961 B1 | Feb. 13, 2001 |
| Haugland | US 2006/0285439 A1 | Dec. 21, 2006 |

## THE REJECTIONS ON APPEAL

Claim 27 and 34–38 are rejected under 35 U.S.C. § 103(a) as
unpatentable over Mandal and Haugland.

Claims 28–31 are rejected under 35 U.S.C. § 103(a) as unpatentable
over Mandal, Haugland, and Anderson.

Claims 32 and 33 are rejected under 35 U.S.C. § 103(a) as
unpatentable over Mandal, Haugland, Anderson, and Robbins.

## ANALYSIS

*The rejection of claims 27 and 34–38 as*
*unpatentable over Mandal and Haugland*

Sole independent method claim 27 includes a limitation directed to
"removing delay caused by the transit" of the X and Y axis surface waves
"from the borehole wall to the" X and Y axis receivers. The Examiner
primarily relies on the teachings of Mandal for disclosing the limitations of
claim 27, and specifically references Mandal, 4:50–5:10, as disclosing this
"removing delay" limitation. Final Act. 3. The Examiner relies on

Haugland for teaching use of a caliper to measure X and Y axis distances between a borehole wall and a receiver. Final Act. 3.

Appellant disagrees with the Examiner's reliance on Mandal stating, **"Mandal describes adjusting a calculation to account for arbitrary receiver spacing, not 'removing delay ...'"**. App. Br. 4; *see also* Reply Br. 1. Appellant states:

> [a]djusting a calculation that assumes a 90-degree receiver spacing on the tool to account for arbitrary (i.e., non-90 degree) spacing *is not the same as and does not hint at* adjusting a calculation to remove delay caused by the transit of the X-axis surface waves and the Y-axis surface waves from the borehole wall to the receivers, as required by independent claim 27.

App. Br. 5 (emphasis added); *see also* Reply Br. 2. Thus, according to Appellant, "Mandal does not teach or suggest" this "removing delay" limitation. App. Br. 5; *see also* Reply Br. 2.

As indicated above, the Examiner references Mandal, 4:50–5:10. as disclosing this limitation. Final Act. 3. This portion of Mandal sets forth four equations (together identified as Equation 1), each directed to one of four receivers. Mandal, 4:50–62. Mandal further states, "[i]n the case of adjacent receivers which are separated by a[n] arbitrary angle, Equation (1) must be modified to include this angular separation between the adjacent receivers." Mandal. 5:3–6. Thus, Mandal's modification to Equation 1 arises if there is arbitrary spacing between the receivers themselves. *See also* Ans. 5. Accordingly, Appellant contends that there is no indication that Mandal's modification is the same as or hints at removing delay in signal wave transit and, specifically, removing transit delay based on a distance from the borehole wall to the receiver. *See* App. Br. 5.

The Examiner, however, responds, "appellant clearly ignores the entirety of the specification and disclosure of the Mandal reference" because "Mandal clearly defines and distinguishes fast and slow directions in anisotropic media." Ans. 4. The Examiner specifically references where Mandal teaches "[t]ransit time anisotropy is the arrival-time difference between the fast and slow shear waves at the receivers." Ans. 4 (referencing Mandal, 2:7–23). However, the Examiner does not explain how the above modification of Mandal's Equation 1 (which arises if there happens to be arbitrary receiver spacing) somehow equates to or suggests removing delay in the transit of a signal based on the distance the signal travels "from the borehole wall to the" receiver as recited.

The Examiner also indicates where Appellant's own Specification discloses, in the Examiner's words, that "well-known mathematical techniques allow one having ordinary skill in the art to remove any transit delays due to irregular spacing." Ans. 4 (referencing Spec. ¶ 90). Paragraph 90 of Appellant's Specification states, "the flexural mode can be measured at each azimuth, and each measurement can be corrected for the tool position and hole size affecting the receiver array at each azimuth independently." This disclosure in Appellant's Specification seems to be consistent with Mandal's teachings regarding a known need for a modification due to arbitrary receiver spacing or tool position. The Examiner is silent as to how this disclosure in Appellant's Specification addresses removing delay arising from the transit of the wave "from the borehole wall to the" receiver as recited.

Accordingly, and based on the record presented, we are not persuaded the Examiner has established by a preponderance of the evidence that the

combination of Mandal and Haugland renders claims 27 and 34–38 obvious. We do not sustain their rejection.

*The rejections of (a) claims 28–31 as unpatentable over Mandal, Haugland, and Anderson; and, (b) claims 32 and 33 as unpatentable over Mandal, Haugland, Anderson, and Robbins*

Each of these claims (i.e., claims 28–33) depend, directly or indirectly, from claim 27. The Examiner relies on the teachings of Mandal and Haugland as discussed above. *See* Final Act. 5–6. Accordingly, we likewise do not sustain these rejections as well.

## DECISION

The Examiner's rejections of claims 27–38 are reversed.

## REVERSED