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**Datasheet for the decision  
of 24 October 2019**

**Case Number:** T 1887/15 - 3.4.03

**Application Number:** 09166566.1

**Publication Number:** 2116871

**IPC:** G01V3/28, G01V3/30, G01V3/38

**Language of the proceedings:** EN

**Title of invention:**  
Electromagnetic wave resistivity tool with tilted antenna

**Patent Proprietor:**  
Halliburton Energy Services, Inc.

**Former Opponent:**  
SCHLUMBERGER TECHNOLOGY CORPORATION

**Headword:**

**Relevant legal provisions:**  
EPC Art. 52(1), 54(3)  
EPC 1973 Art. 54(1), 54(4), 76(1), 89, 100(c)

**Keyword:**

Amendments - extension beyond the content of the parent application (no)

Novelty - prior European application - (yes)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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Case Number: T 1887/15 - 3.4.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.03**  
**of 24 October 2019**

**Appellant:** Halliburton Energy Services, Inc.  
(Patent Proprietor) 10200 Bellaire Boulevard  
Houston, TX 77072 (US)

**Representative:** Jennings, Michael John  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted on 20 July 2015  
revoking European patent No. 2116871 pursuant to  
Article 101(2) and (3)(b) EPC.

**Composition of the Board:**

**Chairman** G. Eliasson  
**Members:** T. M. Häusser  
T. Bokor

## Summary of Facts and Submissions

- I. The appeal of the proprietor concerns the decision of the opposition division revoking the European patent No. EP-B-2 116 871 (Article 101 (2) and (3)(b) EPC).
- II. The opposition had been filed against the patent as a whole. Grounds of opposition were insufficiency of the disclosure, extension of subject-matter and lack of novelty and inventive step (Articles 100(a), (b), (c), 54(1), (2), (4) and 56 EPC 1973 and Articles 52(1) and 54(3) EPC).
- III. Reference is made to the following document:
- E4: WO 00/50926.
- IV. At the oral proceedings before the board the appellant (patent proprietor) requested the setting aside of the decision under appeal and the maintenance of the patent in an amended form on the basis of the following documents:

Description:

Pages 3, 5 to 11 of the patent specification, with pages 13 to 18 deleted,  
pages 2, 4, and 12 filed during the oral proceedings before the board;

Claims:

No. 1-4 filed during the oral proceedings before the board;

Drawings:

Figures 1-37 of the patent specification.

With letter dated 11 May 2016 the former respondent (former opponent) withdrew its opposition and is therefore no longer party to the proceedings.

- V. The wording of independent claim 1 of the sole request is as follows (board's labelling "(A)", "(A1)", ... "(E) ") :

"1. A method of evaluating resistivity of an earth formation for steering a downhole drilling apparatus during a drilling operation, comprising the acts of:  
(A) providing a resistivity logging tool on a drill string, the logging tool comprising,  
    (A1) a tool body having a longitudinal axis,  
    (A2) a first transmitter antenna extending in a cutout around the tool body,  
    (A3) a first receiver antenna extending in a cutout around the tool body, spaced apart from said first transmitter antenna along the longitudinal axis,  
    (A4) a rotational position indicator, and  
    (A5) a processor assembly in communication with said transmitter antenna, said receiver antenna and said rotational position indicator, and  
    (A6) wherein the first transmitter antenna is oriented at a first angle relative to the longitudinal axis of the tool body, and wherein the first receiver antenna is oriented at a second angle relative to the longitudinal axis, and wherein the first and second angles are not the same;  
(B) during the drilling operation, rotating the logging tool relative to the longitudinal axis;  
(C) transmitting an electromagnetic wave into the earth formation through use of the first transmitter antenna;

(D) receiving electromagnetic energy from the earth formation at the first receiver antenna; and  
(E) using said processor assembly to evaluate a parameter indicative of resistivity of the earth formation with reference to the received electromagnetic energy at the first receiver antenna and the rotational position indicator, to indicate whether the tool is approaching a zone of said formation of higher or lower resistivity than a current formation zone."

VI. The appellant argued essentially as follows:

(a) Amendments

The appellant argued that the amendments effected in relation to claim 1 did not extend beyond the parent application as filed.

(b) Novelty

The appellant was of the opinion that the claimed subject-matter was new over document E4, since this document did not disclose a downhole processor performing the claimed operations.

## **Reasons for the Decision**

1. Amendments

1.1 Claims 1 to 4 of the sole request essentially correspond to claims 1 to 4 of the first auxiliary request underlying the contested decision with further amendments to address added subject-matter objections raised in the contested decision (see points 3.7.4, 3.7.8, and 3.7.10 of the Reasons) without extending beyond the

parent application as filed (see parent application: original claims 8 and 37; page 8, lines 23-25; page 12, lines 16-19; and page 29, lines 1-6).

1.2 In the contested decision the opposition division further held that the subject-matter of feature (A) in combination with feature (A4) extended beyond the parent application as filed (see point 3.7.7 of the Reasons). No objections were raised in this respect against the subject-matter of dependent claims 2 to 4.

1.3 The board agrees with the appellant in that the indication that the rotational position indicator is *comprised* in the logging tool has a basis in the parent application as filed, namely in original claim 8 and in the original description of the parent application (page 28, lines 5-7 and 22-25).

The description has been brought into conformity with the amended claims and supplemented with an indication of the relevant content of the prior art without extending beyond the parent application as filed.

Accordingly, the board is satisfied that the subject-matter of the patent as amended does not extend beyond the content of the parent application as filed (Articles 76(1) and 100(c) EPC 1973).

2. Novelty

2.1 Document E4 is an International (PCT) application with a filing date (10 February 2000) before the priority date of the contested patent (13 July 2000) and a publication date (31 August 2000) after that priority date. Hence, the European patent application based on the PCT application E4 belongs to the state of the art

according to Article 54(3) EPC for the contracting states under Article 54(4) EPC 1973 as far as the priority of the contested patent is valid, which had not been questioned (Article 89 EPC 1973).

- 2.1.1 Document E4 discloses (page 7, line 2 - page 8, line 31; page 11, line 9 - page 12, line 28; page 20, lines 3-5; Figures 1, 4, 9) a drill string 14 comprising coil tubing 24 and a bottom hole assembly ("BHA") 26 coupled to the lower end of the coil tubing 24. In particular, the BHA 26 includes an azimuthally tunable resistivity tool, directional sensors for indicating the rotational angle about the tool axis, and a downhole data signaling unit 35. The resistivity tool 202 comprises transmitter coils 104, 108 and skewed receiver coils 216, 218, 220.
- 2.1.2 In the contested decision the opposition division held that the subject-matter of claim 1 of the eighth auxiliary request underlying the decision was not new over document E4 (see point 4 of the Reasons). This claim corresponds essentially to present claim 1 except that feature (E) is replaced by a feature that is formulated in slightly narrower terms.
- 2.1.3 The board agrees with the appellant in that there is no disclosure in document E4 that the processor in the logging tool on a drill string is used to evaluate a parameter indicative of resistivity of the earth formation with reference to the received electromagnetic energy at the first receiver antenna and the rotational position indicator, to indicate whether the tool is approaching a zone of said formation of higher or lower resistivity than a current formation zone (see features (A), (A5), and (E) of claim 1). Rather, in the method of document E4 amplitude and phase measurements are



transmitted to the surface for further processing to determine formation resistivity, distance and direction to the bed boundary and the resistivity of the adjacent beds (see document E4, page 9, lines 9-18; paragraph bridging pages 18-19).

The subject-matter of claim 1 and dependent claims 2 to 4 is therefore new over the European patent application based on the PCT application E4 (Articles 52(1) and 54(3) EPC and Articles 54(1) and (4) and 89 EPC 1973).

3. Inventive step

In the annex to the summons to oral proceedings the opposition division had expressed the opinion that the subject-matter of granted claim 1 involved an inventive step over the documents cited by the opponent (see point 8 of the communication dated 20 November 2014). The board sees no reason to differ from this assessment, so that the same conclusion also holds for the subject-matter of present claim 1, which is formulated in somewhat narrower terms than granted claim 1.

4. Conclusion

For the above reasons the board is of the opinion that the patent - in the version according to the appellant's sole request - and the invention to which it relates meet the requirements of the EPC. Hence, the patent is to be maintained as amended in that version (Article 101(3) (a) EPC and Article 111(1) EPC 1973).

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent as amended in the following version:

#### Description:

Pages 3, 5 to 11 of the patent specification, pages 2, 4, and 12 filed during the oral proceedings before the board;

#### Claims:

No. 1-4 filed during the oral proceedings before the board;

#### Drawings:

Figures 1-37 of the patent specification.

The Registrar:

The Chairman:



S. Sánchez Chiquero

G. Eliasson

Decision electronically authenticated