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Datasheet for the decision of 13 May 2009

Case Number: T 0325/07 - 3.4.03

Application Number: 99956368.7

Publication Number: 1129369

IPC: G01V 1/38

Language of the proceedings: EN

Title of invention:
Seismic cable with sensor elements being heavier than the cable

Patentee:
Rokkan, Arne

Opponent:
Petroleum Geo-Services, Inc.

Headword:
-

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive Step (no): Main, 1st to 8th auxiliary request"
"9th auxiliary request not admitted since clearly not allowable"

Decisions cited:
-

Catchword:
-

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Case Number: T 0325/07 - 3.4.03

D E C I S I O N
of the Technical Board of Appeal 3.4.03
of 13 May 2009

Appellant I: (Patent proprietor)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 19 December 2006 concerning maintenance of the European patent No. 1129369 in amended form.

Composition of the Board:

Chairman: G. Eliasson
Members: V. L. P. Frank
T. Bokor

Summary of Facts and Submissions

I. These are appeals by the patent proprietor (appellant I) and the opponent (appellant II) against the maintenance of EP 1 129 369 in amended form on the basis of the 4th auxiliary claim request filed during the oral proceedings before the opposition division (Article 102(3) EPC 1973).

Grounds of opposition were lack of novelty and of inventive step (Article 100(a), 54 and 56 EPC 1973).

II. Appellant I (proprietor) requests that the decision under appeal be set aside and that the patent be maintained as granted, or in the alternative, that the patent be maintained on the basis of any one of the 1st to 7th auxiliary requests filed with the letter dated 3 September 2007, or on the basis of the 8th or 9th auxiliary requests filed during the oral proceedings before the board.

III. Appellant II (opponent) requests that the decision under appeal be set aside and that the patent be revoked.

IV. The independent claim of the patent as granted and as defended by the proprietor on appeal as main request reads:

"1. Seismic cable for positioning at the sea floor comprising at least two seismic sensor units (4) adapted to detect vibrations in the sea bottom and being separated by chosen lengths of cable (1), wherein

the weight ratio per length unit between the cable and the sensor units (4) is maximum 1/5,
the seismic sensor units (4) comprise at least one sensor, including at least one geophone (5), being integrated in the cable,
each sensor unit also comprises means for digitizing the signals from each sensor (5, 6), and
the cable comprises at least one conductor for transferring the digitized signals from the sensors, to a data assembly unit."

Claim 1 of the 1st auxiliary request reads:

"1. Seismic cable for positioning at the sea floor comprising at least two seismic sensor units (4) adapted to detect vibrations in the sea bottom and being separated by chosen lengths of cable (1),
the seismic sensors units (4) comprising at least one sensor including at least one geophone (5),
each seismic sensor unit (4) also comprising means for digitizing the signals from each sensor (5, 6), wherein
the cable comprises at least one conductor (10) for transferring the digitized signals from the sensors, to a data assembly unit,
characterised in that
said seismic sensor unit (4) constituting an integrated part of the seismic cable
the weight ratio per length unit between the cable and the sensor units (4) is maximum 1/5,
the cable has smaller physical dimensions than the sensor units (4) lateral to the longitudinal extension of the cable."

In claim 1 of the 2nd auxiliary request the last feature of claim 1 of the 1st auxiliary request (ie that the cable has smaller physical dimensions than the sensor units) is replaced by the feature:

> "said sensors units (4) are spaced at least six metres apart."

Claim 1 of the 3rd auxiliary request includes both features mentioned above and is thus a combination of claims 1 of the 1st and 2nd auxiliary requests.

In claim 1 of the 4th auxiliary request the last feature of claim 1 of the 1st auxiliary request (ie that the cable has smaller physical dimensions than the sensor units) is replaced by the feature:

> "the weight of the sensor units (4) is adapted to provide an acoustic coupling to the sea floor in the frequency range of 3 – 150 Hz."

In claim 1 of the 5th auxiliary request the last feature of claim 1 of the 1st auxiliary request is replaced by the feature:

> "the circumference of the cable (1) is less than the circumference of the seismic sensor units."

Claim 1 of the 6th auxiliary request includes both features mentioned above and is thus a combination of claims 1 of the 4th and 5th auxiliary requests.

In claim 1 of the 7th auxiliary request the corresponding feature of the preamble of claim 1 of the 6th auxiliary request has been modified to read (marking added by the board):

> "the seismic sensors units (4) comprising at least one sensor including [~~at least one geophone~~] three geophones (5)"

In claim 1 of the 8th auxiliary request the following feature has been appended to claim 1 of the 7th auxiliary request:

> "said seismic sensor unit (4) comprises walls (11) defines a water tight room (8) and is connected to said length of cable (1) via tension relievers (12); and in that said three geophones (5) are arranged inside said water-tight room."

At the end of the oral proceedings before the board appellant I (proprietor) submitted a 9th auxiliary request. Claim 1 of this request has the following feature appended to claim 1 of the 8th auxiliary request:

> "and in that the sensor units (4) comprise at least one hydrophone (6)."

V. The following prior art documents were cited *inter alia* in the opposition procedure:

D1: WO 98/07050 A

D4: US 5 265 066 A

The following prior art documents were filed with appellant's II (opponent) statement of grounds of appeal:

D7: US 4 276 619 A

D8: US 4 312 050 A

VI. In the decision under appeal the opposition division found that:

- The seismic cable of claim 1 as granted differed from the seismic cable disclosed in document D1 in that the weight ratio per length unit between the cable and the sensor units is maximum 1/5. According to the patent the problem addressed was to improve the acoustic coupling to the sea floor. However the differing feature did only contribute in part to the solution to this problem and was not suitable, without additional measures, to provide a sufficient acoustic coupling, since eg the weight of the seismic cable's components was not specified in the claim.

- The expression "integrated" appeared solely in claim 1. The opposition division considered thus that this expression had only the meaning that the sensor was connected to and arranged along the cable.

- Claim 1 of the 4th auxiliary request included inter alia the feature that the weight of the sensor units was adapted to provide an acoustic coupling to the sea floor in the frequency range of 3-150 Hz. As none of the prior art documents indicated to operate

in the specified frequency range, the division came to the conclusion that there was no hint in the prior art to modify the seismic cable of D1 such as to include all the features of claim 1 so that all the features collaborated in providing acoustic coupling to the sea floor in the specified frequency range. Consequently, the opposition division maintained the patent on the basis of this request.

VII. Appellant I (proprietor) argued essentially as follows:

– The invention related to a seismic cable including several seismic sensors that were to be positioned on the sea floor, the sensors being arranged to detect vibrations in the sea floor, shear waves in particular. To detect the shear waves it is necessary to obtain sufficient acoustic contact between the geophone sensors and the sea bed. Previous attempts to ensure good acoustic contact included making the geophone units heavy, providing geophones with the same specific weight as the material of the sea bed, vibrating the sensors to dig them into the sea bed and enclosing the geophone sensors in sand bags.

– The solution to the problem of achieving the required acoustic contact between the seismic sensors and the sea bed came from the realization that the sensors should be heavier than the cable between the sensors, and in particular that the weight per unit length of the sensors should be at least five times greater than the weight per unit length of the cable between the sensors. With this arrangement, the sensor units constituted well

defined contact points with the sea bed compared to the remainder of the cable, thereby achieving the required acoustic contact between the sensors and the sea bed, with the cable causing minimal influence on the contact between the sensor units and the sea bed. Further, the relative weight per unit length of the sensor and the interconnecting cable was such that parasitic couplings through the interconnecting cable to the sensors were reduced.

– None of the prior art on which the opponent relied suggested the importance of the relative weight per unit length of the sensor units and the cable. Whilst some of the prior art suggested that the weight of the sensor should be high, the prior art was generally silent on the weight of the cable connecting the sensors, and especially on the relative weight of the sensors and cable. There was no appreciation in the prior art that the weight per unit length of the sensors should be at least five times that of the interconnecting cable.

– Documents D7 and D8, filed by the opponent with his grounds of appeal, should not be admitted since late filed. The claim upheld by the opposition division was based on claim 4 as granted and the opponent should have prepared his opposition brief to include all the relevant prior art.

VIII. Appellant II (opponent) argued essentially as follows:

– Emphasis had been placed by the patentee upon the feature of claim 1 that: "*The weight ratio per length unit between the cable and the sensor units*

is maximum 1/5". This feature however did not mean that the sensor unit was at least five times as heavy as the cable and had in fact no significant limiting effect, since it could be found in structures in which the cable length between sensor units was heavier, lighter or indeed the same as the sensor units. A ratio between "weight per length" values did not ensure that the correct parts were actually "weighed down", since it did not exclude cases where the cable was heavier than the sensor unit. Furthermore, there were clear teachings in the prior art to ensure that the seismic sensor unit was weighed down.

– It was also important to consider the construction of the meaning of the phrase *"said seismic unit constituting an integrated part of the seismic cable".* The term "*integrated*" was mentioned nowhere in the specification apart from claim 1 and it should not be given any special or unusual meaning.

– The opposition division gave their reason for allowing claim 1 that despite allegations by the opponent that the frequency range specified was a standard frequency range, there was no evidence to support that statement. In particular, the opposition division felt that the lower end of the range 3Hz was unusual. The detection of seismic signals in this range was however common general knowledge as evidenced by documents D7 and D8. There was therefore no inventive step in detecting frequencies in the range 3-150 Hz and the weight of the sensor units would have been adapted to achieve acoustic coupling in that range.

– The 1st to 8th auxiliary requests submitted by the patent proprietor with letter of 3 September 2007 should not be admitted into the proceedings before the board, since they were not a proper response to the opponent's grounds of appeal.

Reasons for the Decision

1. The appeals are admissible.

2. *Admissibility of documents D7 and D8*

2.1 Documents D7 and D8 were filed by appellant II (opponent) with his grounds of appeal to overcome the view of the opposition division, expressed in the decision under appeal at point 8, that there was no indication in the prior art about operating in the frequency range of 3 to 150 Hz.

2.2 Appellant I (proprietor) objected to the introduction of these documents as being late filed. The feature incorporated into claim 1 during the oral proceedings before the opposition division was already specified in dependent claim 4 of the granted patent. The opponent should have therefore prepared his case during the nine months of the opposition period so that he could have contested the allowability of a claim comprising this feature on the basis of the material filed with the grounds for opposition.

2.3 The relevant facts of the opposition procedure can be summarized as follows:

2.3.1 The grounds of opposition state with respect to dependent claim 4: "The frequency range specified is a standard frequency range used in seismic survey and in any event no advantage has been advanced by the Patentee for using this range" (page 5).

2.3.2 The patent proprietor replied in the letter of 14 October 2004 that claim 4 was not directed to any seismic survey conducted at this frequency, but to the limitation that the sensor unit was weighted so that it was suited to acoustic coupling at this frequency (page 12).

2.3.3 The annex to the summons to oral proceedings issued by the opposition division did not address the dependent claims, as it is common practice not to address the dependent claims when the independent claim is considered to be not allowable.

2.3.4 The patent proprietor submitted during the oral proceedings before the opposition division a 4^{th} auxiliary request in which the features of dependent claim 4 where incorporated into claim 1. When considering this request, the opposition division found that there was no indication in the prior art about operating in the frequency range of 3 to 150 Hz and thus found claim 1 allowable (reasons, point 8). This, however, had not been argued by the patent proprietor in the written proceedings and the minutes of the oral proceedings state that the proprietor instead argued that a prejudice existed against adapting the weight of

the sensor unit to this specific frequency range (point 7.2).

2.4 The opponent was thus confronted for the first time in the decision under appeal with the argument that there was no evidence in the prior art that oceanic seismic surveys were carried out in the specified frequency range. The filing of documents D7 and D8 is therefore a valid reaction to this objection, done at the earliest possibility, namely with the filing of the grounds of appeal. The board thus admits these documents into the proceedings.

3. *Admissibility of the 1st to 9th auxiliary claim requests*

3.1 Appellant I (proprietor) filed with the letter of 3 September 2007 amended 1st to 8th auxiliary requests replacing the 1st to 4th auxiliary requests filed with his grounds of appeal on 29 March 2007. The grounds of appeal of appellant II (opponent) were filed with letter of 24 April 2007.

3.2 Article 12(1) (b) RPBA states that appeal proceedings shall be based, in cases where there is more than one party, *inter alia* on any written reply of the other party filed within four moths of notification of the grounds of appeal.

3.3 The 1st to 7th auxiliary requests where filed in response to the grounds of appeal of appellant II (opponent) and within the four month period which, considering the ten days notification period (Rule 126(2) EPC), expired on 4 September 2007. The question of whether the requests

were a proper response to the grounds of appeal of appellant II (opponent) is therefore irrelevant.

3.4 The present 8th auxiliary request, although formally filed at the oral proceedings before the board, merely comprises a minor editorial amendment of the 8th auxiliary request filed together with the 1st to 7th auxiliary requests (replacement of "at least one geophone" by "three geophones" in the last line of claim 1). Its consideration did therefore not involve any efforts either to the opposing party or to the board.

3.5 The appeal proceedings are therefore based *inter alia* on the 1st to 8th auxiliary claim requests.

3.6 The 9th auxiliary request was filed at a very late stage of the proceedings. It was not admitted for the reasons given later under point 14.

4. *Terminology*

In order to clarify the terminology used in this decision the term *"cable"* refers only to the cable joining the sensor units, while *"seismic cable"* will be used for the system formed by the sensor units and the cable joining them. *"Sensor"* will be used for the geophones or hydrophones themselves, while *"sensor unit"* will be reserved for the whole housing in which the sensors are located together with the electronic equipment and other parts. That the terms must be construed in this manner is also supported by the description ([0001] of the patent specification).

5. *Document D1*

It is common ground that document D1 is the closest prior art on file. It discloses a seismic cable for ocean-bottom seismic survey comprising sensor units, wherein each sensor unit comprises a sensor of seismic signals having three orthogonally oriented gimballed geophones, a hydrophone, and sufficient weight for embedding the sensors in the soil of the sea floor. The sensor stations 13 are attached to the cable 17 at specific intervals and each station 13 comprises a four channel, 24 bit crystal digitizer for converting analog seismic signals to digital signals. In one embodiment the cable has a length of about 6,500 feet (about 1,980 m) and comprises 17 sensor stations. The separation between stations is thus about 116 m (Figure 1; page 2, line 34 to page 3, line 1; page 5, lines 25 to 36; page 6, lines 1 to 15)

6. *Main request – Inventive step*

6.1 It is also common ground that the seismic cable of claim 1 of the main request differs from the seismic cable disclosed in document D1 in that:

a) the seismic sensor units are integrated in the cable, and in that

b) the weight ratio per length unit between the cable and the sensor units is at maximum 1/5,

since D1 is silent on how the seismic sensor units are linked to the cable, ie whether they are directly attached to it or positioned outside the cable, and

since neither the weight of the components of the seismic cable nor their weight ratio is disclosed.

6.2 The meaning of features (a) and (b) will be discussed below to determine how the claim shall be construed.

6.2.1 In relation to the term "integrated", appellant I (proprietor) presented an excerpt of a dictionary in which this term was defined as: composed of separate parts which make a unity; composite; of or pert. to a whole so constituted; made complete, whole or perfect. To integrate was defined as: 1) to form into one whole; to make entire; to complete; to round out; to perfect and 2) to unite (parts or elements), so as to form a whole; to unite (a part or element) with something else, esp. something more inclusive (G. & C. Merriam Co., 1950).

Consequently, appellant I (proprietor) argued that in D1 the sensor units were not integrated in the cable, but were attached to it by a given length of cable. This was shown in all the figures of D1 in which the sensor units were schematically drawn as spheres located sideways to the cable.

6.2.2 Appellant II (opponent) argued that the patent did not disclose what should be understood by "integrated in the cable", as this expression was only used in claim 1, and that therefore no special meaning should be attributed to this expression. This view was also the one of the opposition division (page 6 of the decision under appeal).

6.2.3 The board considers that in the present context the expression "integrated" means that the sensor units and the cable form a unit or a whole in which the sensors units are directly attached to or are part of the cable. It distinguishes the claimed cable from a seismic survey system in which the sensors are sideways positioned outside the cable and joined to it by a certain length of cable. The "integration" of the sensor units in the cable avoids that these outer sensor units, when laid on the ocean floor, come underneath, beside or over the cable, something which to a large degree affects the measurements (opposed patent, [0006]). This expression however does not imply that the sensor units are coaxial with the cable or that they have any kind of rotational symmetry with the cable's axis or that they possess any other special property with respect to the cable.

6.2.4 As already mentioned, document D1 discloses that the sensor units are attached to the cable without however specifying whether they are directly attached to it or whether they are sideways attached to the cable via a further piece of cable.

However, ocean-bottom seismic survey systems in which the sensor units are directly attached to or are part of the cable were already known before the priority date of the opposed patent as shown eg in document D4, figures 1A, 3 and 8. The sensor units of D4 are therefore "integrated in the cable" within the meaning the board accords to this expression. The skilled person would, absent any detailed information in document D1 regarding the construction of the sensor

units, consider the teaching of document D4 for this purpose.

6.3 The second differentiating feature concerns the weight ratio per unit length between the sensor unit and the cable, ie that the sensor unit is at least five times heavier than a portion of the cable with the same length as the sensor unit. Considering a portion of the seismic cable surrounding the sensor units, this feature results in that the sensor unit weighs at least five times as much as the portion of the cable at its sides having the same length as the sensor unit. Consequently, the weight of the seismic cable in the regions surrounding the sensor units is concentrated on the sensor units, making in these regions a point-like contact with the sea-bed.

6.3.1 Appellant II (opponent) argued that the requirement on the weight ratio is insufficient to assure that the seismic cable sinks to the ocean bottom, as the seismic cable's density could be the same or even less than the density of water while fulfilling the cable/sensor weight ratio requirement. However, the board considers the "sinking requirement" implicit and thus fulfilled, since the claim is directed to a "seismic cable for positioning at the sea floor". A skilled person would understand from this not only that the seismic cable sinks, but also that it will lie with some weight on the sea floor.

6.3.2 By specifying the cable/sensor weight ratio, however, the pressure exercised by the sensor unit on the sea floor remains undetermined. The pressure on the sea floor mainly determines the acoustic coupling to the

sea-bed, since a sensor unit lying heavily on the sea-bed follows its movement better than one that is only slightly in contact with it.

6.3.3 The feature defining the sensor/cable weight ratio per unit length does therefore not address the problem of improving the acoustic coupling and the board judges this feature as arbitrary. Moreover, documents D1 and D4 already disclose making the sensor units heavy to thereby ensure good contact with the sea-bed (D1, page 2, line 34 to page 3, line 1; D4, column 2, lines 22 to 23; column 5, lines 17 to 20). Making the sensor units heavy results also in a point-like contact with the sea-bed and in the board's view feature (b) of claim 1 does not amount to more than that.

6.4 The skilled person would employ the sensor units disclosed in document D4 (which are heavy and integrated in the cable) in the seismic survey system disclosed in document D1, as the latter does not contain any information about the construction of the sensor units. Hence the board judges for these reasons that the seismic cable of claim 1 does not involve an inventive step in the sense of Article 56 EPC 1973.

7. *1st and 5th auxiliary requests*

7.1 Apart from having been cast into the two-part form, claim 1 of the 1st auxiliary request differs from claim 1 of the main request in the further feature that:

"the cable has smaller physical dimensions than the sensor units (4) lateral to the longitudinal extension of the cable."

7.2 In claim 1 of the 5th auxiliary request this feature is replaced by:

"the circumference of the cable (1) is less than the circumference of the seismic sensor units."

7.3 These two features have exactly the same meaning for spherical or axially symmetric configurations of the sensor units and cable. Appellant I (proprietor) affirmed that for deep sea use only sensor units with spherical or nearly spherical shape were possible, while all the cables of the prior art have a cylindrical shape. Consequently, claim 1 of the 1st and 5th auxiliary requests will be dealt simultaneously as they cover the same subject-matter.

7.4 In all the figures in which a seismic cable is shown in document D1 the cable is drawn as a thin line while the sensor units are indicated by larger spheres. Although these figures are schematic they suggest that the sensor units have a larger circumference than the cable. The same is true for figures 1A, 3 and 8 of D4 in which the sensor units and the cable are shown. Figure 3 in particular is an exploded view of the sensor sphere 6 and it is hard to imagine with this type of construction, in which the clamping rings 62, 63 have a conical end surrounding the cable, how the sensor spheres could have a smaller circumference than the cable (column 5, lines 37 to column 6, line 6).

7.5 The board judges for these reasons that the seismic cable of claim 1 of the 1st and the 5th auxiliary requests does not involve an inventive step having

regard to the combination of documents D1 and D4 for the same reasons as for the main request.

8. *2nd auxiliary request*

8.1 Claim 1 of this request differs from claim 1 of the main request in that it further specifies that:

"said sensors units (4) are spaced at least six metres apart".

8.2 However, as already mentioned under point 4 above, document D1 discloses exemplarily that the sensor units are about 116 m apart. Consequently, the feature appended to claim 1 of the main request does not differentiate the seismic cable from the one disclosed in D1.

8.3 The board judges for these reasons that the seismic cable of claim 1 of the 2nd auxiliary request does not involve an inventive step for the same reasons as for the main request.

9. *3rd auxiliary request*

9.1 Claim 1 of this request is a direct combination of claims 1 of the 1st and 2nd auxiliary requests.

9.2 The board cannot recognize any synergy between (a) the sensor unit's separation and (b) their circumference. Appellant I (proprietor) argued that these features related all to the physical properties of the seismic cable and solved therefore the same problem. However, the fact that features relate to the same problem is a

necessary condition for a possible synergetic effect, but is not sufficient (providing on a door eg different kinds of independent locks makes the door more secure, all the locks addressing thus the same problem. However, this does not create a synergetic effect, since it is merely a juxtaposition of different locking means wherein the whole is nothing more than the sum of the parts).

9.3 The board judges therefore that the seismic cable of this request does not involve an inventive step for the same reasons as those given for the 1st and 2nd auxiliary requests (points 7 and 8 above).

10. *4th auxiliary request*

10.1 Claim 1 of this request adds to claim 1 of the main request the feature that:

"the weight of the sensor units (4) is adapted to provide an acoustic coupling to the sea floor in the frequency range of 3 – 150 Hz."

10.2 Appellant I (proprietor) argued that the seismic survey's frequency band was usually from some Hertz to about 1000 Hz and that the present invention limited the frequency range to the region below 150 Hz by adapting the sensor's weight to it. This lower frequency range had not been previously used for seismic survey and there existed a certain prejudice to limit the collected information to this lower range.

10.3 According to appellant II (opponent), documents D7 and D8 disclosed that the seismic range of operation was usually from 5 to 120 Hz (D7, column 5, lines 35 to 39) or 20 to 100 Hz (D8, column 4, lines 49 to 50), very close to the range specified in the claim.

10.4 The opposed patent does not disclose any technical effect associated with the claimed frequency range and merely discloses that the weight of the senor units is chosen "preferably to optimize the coupling to the sea bottom in the frequency range of 3-150 Hz" (column 4, lines 21 to 24). Moreover, no evidence for a prejudice against working in this frequency range or even against limiting data evaluation to this range (although this is in fact not specified in the claim, since adapting to a range is not the same as limiting to it) was presented and both parties confirmed that the chosen frequency range mainly depended on the depth to be surveyed.

10.5 Both parties agreed at the oral proceedings before the board that the skilled person would know how to select the sensor unit's weight to adapt it to a desired frequency range, such adaptation not being disclosed in the opposed patent or in any of the prior art documents.

10.6 The board judges for the above reasons and the ones given in relation to the main request that the seismic cable of this request does not involve an inventive step, since the claimed frequency range is disclosed in the prior art as usually used for seismic surveys, no evidence for a prejudice against working in this range was presented and the skilled person would know how to

adapt the sensor unit's weight to optimize the acoustic coupling to the sea floor in a desired frequency range.

11. *6th auxiliary request*

11.1 The seismic cable of this request is a combination of the features of claim 1 of the 4th and 5th auxiliary requests, namely (a) the adaptation of the sensor unit's weight to a desired frequency range and (b) the relation between the circumference of the sensor units and the cable.

11.2 The board cannot recognize any synergy between these two features and judges therefore that the seismic cable of this request does not involve an inventive step for the same reasons as given individually for the 4th and 5th auxiliary requests (see point 9.2 above).

12. *7th auxiliary request*

12.1 The seismic cable of this request differs from claim 1 of the 6th auxiliary request in that the preamble specifies that the sensor units comprise at least three geophones.

12.2 Document D1, however, already discloses sensor units comprising three geophones (see point 4 above; D1, page 5, lines 25 to 28) and the same is true for document D4 (Figure 4, geophones 52, 53 and 54; column 4, lines 63 to 65).

12.3 The inclusion of this feature in the claim does not alter the board's view on inventive step, since a seismic cable with this feature would still result from

an obvious combination of documents D1 and D4. Claim 1 of this request does not involve therefore an inventive step for the same reasons as given for the 6th auxiliary request.

13. *8th auxiliary request*

13.1 Claim 1 of this request differs from claim 1 of the 7th auxiliary request in that:

(a) said seismic sensor unit comprises walls which define a water-tight room and said three geophones are arranged inside said water-tight room, and

(b) said seismic sensor unit is connected to said length of cable via tension relievers.

13.2 Feature (a) is self-evident, since known geophones cannot work under water and have to be kept in a water-tight room. Document D4, moreover, explicitly discloses a water-tight geophone cavity 48, 51 (figure 4 and column 4, lines 34 to 65).

13.3 The use of tension relievers, ie feature (b), is a direct consequence from the double function of the cable of an ocean-bottom seismic survey system. There is on the one hand the pulling function which allows several tens or even hundreds of seismic sensors, each weighing about 20 to 30 kg, from being dragged over the sea bottom and, on the other hand, the function of delivering power to the sensors and transmitting the acquired data to the processing unit, usually located on the dragging ship. These two functions are usually performed by different components of the cable, as it

would not be possible to drag all the sensor units only with the "data cable". Document D4 discloses exemplarily that the seismic cable comprises a sleeve 10 with three cables inside it, two "pulling cables" 11 and one "data cable" 12 (Figure 3; column 3, lines 46 to 53). Only the "data cable" 12 is partly interrupted to make contact to the geophones, while the "pulling cables" 11 run through all the sensor units.

13.4 There exist therefore two options for the cable's "pulling" function: either an uninterrupted pulling cable is used as in D4 along the data cable or the pulling cable is interrupted and the pulling function is transferred to the sensor unit's housing. It is obvious for a skilled person that tension relievers have to be used with the second option, since otherwise the housing could not take over the pulling function from the pulling cable and it would remain solely on the data cable.

13.5 Moreover, as argued by appellant II (opponent) tension relievers were standard components used in underwater seismic cable constructions in order to protect the connections between the seismic sensor units and the cables and the opposed patent acknowledges that such tension relievers were known at the priority date ([0020]).

13.6 The board can also not recognize any synergy between features (a) and (b), since the use of tension relievers has no relation with the requirement of geophones not to be in contact with water. There is furthermore no synergy between these features and the features of the 7th auxiliary request.

13.7 The board judges for these reasons and the reasons given in relation to claim 1 of the 7th auxiliary request that the seismic cable of claim 1 of this request does not involve an inventive step.

14. *9th auxiliary request*

14.1 At a very late stage in the oral proceedings before the board appellant I (proprietor) submitted a 9th auxiliary request in which the feature that the sensor units comprised at least one hydrophone was added to claim 1 of the 8th auxiliary request.

14.2 Among the criteria applied by the boards in exercising discretion pursuant to Article 13 RPBA to admit a belated request is that of *clear allowability.* This criterion can be applied in a stricter form as admitting a request only if it is *clearly allowable* or in a less strict form as not admitting a request if it is *clearly not allowable*. Given the lack of complexity of the new subject-matter the board considered it appropriate to apply the above-mentioned criterion in its less strict form.

14.3 The feature added to claim 1 of this request does not distinguish the seismic cable from the one of document D1, since this document already discloses sensor units comprising three geophones and a hydrophone (page 2, lines 31 to 36).

14.4 Since the 9th auxiliary request was clearly not allowable for the same reasons as for the 8th auxiliary request the board did not admit it into the proceedings.

15. Thus in the absence of an allowable request the patent stands to be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

Registrar: Chair:

S. Sánchez Chiquero G. Eliasson