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**Datasheet for the decision
of 9 September 2010**

Case Number: T 0070/08 - 3.4.02

Application Number: 97905178.6

Publication Number: 1012585

IPC: G01N 23/02

Language of the proceedings: EN

Title of invention:

Method for analyzing characteristics of a moving wooden object,
such as a log

Applicant:

Bintec OY

Headword:

-

Relevant legal provisions:

EPC Art. 56, 83

EPC R. 103(1)(a)

Relevant legal provisions (EPC 1973):

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Keyword:

"Sufficiency of disclosure (yes)"

"Novelty and inventive step (yes - amended claims)"

"Reimbursement of appeal fee relating to a previous appeal
rectified by the examining division (no)"

Decisions cited:

T 0021/02, T 0242/05

Catchword:

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Case Number: T 0070/08 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 9 September 2010

Appellant: Bintec OY
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FIN-15870 Hollola (FI)

Representative: Graf Glück Habersack Kritzenberger
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 20 July 2007
refusing European patent application
No. 97905178.6 pursuant to Article 97(1) EPC
1973.

Composition of the Board:

Chairman: A. G. Klein
Members: F. J. Narganes-Quijano
D. S. Rogers

Summary of Facts and Submissions

- I. The appellant (applicant) lodged an appeal against the decision of the examining division refusing European patent application No. 97905178.6.
- II. In its decision the examining division held with regard to the sets of claims then on file that the claimed invention was not sufficiently disclosed within the meaning of Article 83 EPC and referred in this respect to document

D3 : "Detection of knots in logs using x-ray imaging" M. Pietikäinen; VTT Publications, No. 266 (1996), Technical Research Centre of Finland, Espoo (FI).

The examining division also held that the subject-matter of claim 1 of the sets of claims then on file was not new with regard to the disclosure of document

D1 : WO-A-9419681.

In addition, in a section of the decision entitled "matters which do not constitute reasons for the refusal" the examining division expressed its opinion that

- the claims then on file were not clear; and
- the request for reimbursement of the appeal fee relating to an appeal filed against a previous decision dated 15 July 2004 refusing the application and subsequently rectified on 28 December 2004 pursuant to Article 109(1) EPC was filed on 29 July 2005 (although wrongly dated

27 October 2004), after rectification of the decision, and therefore after completion of the corresponding appeal procedure, so that the request was "deemed not to have been filed".

III. With the statement setting out the grounds of appeal the appellant filed an amended set of claims and requested setting aside of the decision under appeal and the grant of a patent.

In addition, the appellant "asked to get the appeal fee reimbursed in consequence of a rectified decision of the EPO as put into question".

The appellant also requested oral proceedings on an auxiliary basis in case the request to set aside the decision under appeal and to grant a patent could not be allowed.

IV. In response to a communication of the Board, the appellant submitted with a letter dated 2 June 2010 a new set of claims 1 to 3 and an amended sheet 3/3 of the drawings and requested the grant of a patent on the basis of claims 1 to 3 as a main request or on the basis of claim 1 only as an auxiliary request, together with amended pages 1 and 2 of the description annexed to the aforementioned Board's communication, the amended drawing sheet 3/3 and the remaining application documents on file, i.e. pages 3 to 15 of the description as published, page 2a filed with the first of the letters dated 27 October 2004, and drawing sheets 1/3 and 2/3 as published.

In its letter of reply the appellant confirmed that the auxiliary request for oral proceedings did not concern the request for reimbursement of the appeal fee.

V. Claim 1 of the main request reads as follows:

"Procedure for determining the properties of a moving log (5), in which procedure the moving log (5) is radiographed by means of more than one radiation source (4) each emitting radiation capable of penetrating matter to form a respective radiographic projection, and each of the radiographic projections is received by means of one or more detector array(s) (8) each including more than one detector (9) wherein the procedure involves utilization of knowledge relating to the typical geometry, density and other properties of the moving log, such as the stemwood and knots in a log and anomalies associated with knots, as well as to the interdependencies between said properties, wherein to allow sorting according to quality, the radiographic information is analyzed to locate objects and parts of objects having the shape of a knot or other anomalies (11), that differ from the normal material of the log being inspected, and wherein:

- array sums are calculated from the radiation received by the detector array(s) (8), from which the positions of knots are to be determined;

- each knot mass is projected to volumetric elements (6) of sectors (3) in a system of cylindrical coordinates (α, r, z) , wherein each knot is lying within a sector that contains no other knots;

- stemwood portions are filtered out from radiographic projections; and

- back-projecting the filtered radiographic projections to a system of 3-D coordinates and repeating said back-projection but only for selected rotational angles by omitting those sectors that are not regarded as knot sectors."

The main request also includes dependent claims 2 and 3 both referring back to claim 1.

VI. The arguments submitted by the appellant in support of its requests can be summarized as follows:

The claimed method clearly defines the steps of the procedure for determining the properties of a moving log and the man skilled in the art is taught, in a way sufficiently clear and complete, how to carry out the claimed method. First, array sums from the radiation received by the detector array are calculated, one detector array being formed by the sum of detector elements receiving rays emitted by one X-radiation source (page 7, lines 24 to 30 of the description). The second paragraph on page 8 discloses what is important for calculating the radiation, i.e. the detector element receives information about a sector element of the log, but also about the entire distance covered by the ray. The information consists of X-ray attenuation data and from this attenuation data positions of knots can be determined (page 9, lines 29 to 31). Then, each knot mass is projected to volumetric elements of sectors in a system of cylindrical coordinates, wherein each knot is lying within a sector that contains no other knots. This method step, too, is clearly understandable for the man skilled in the art and it is carried out as disclosed on page 7, second paragraph

with reference to Figure 1. This is further one of the aspects according to which knowledge relating to the typical geometry of the log and knot is taken into consideration according to the present invention. As to how the knots were put in said coordinates, see page 9 lines 7 to 17. The description describes also the step of filtering out stemwood portions (page 10, line 27 to page 12, line 3). Subsequently, the filtered radiographic projections are back-projected to a system of 3-D coordinates, and the step is then repeated but only for selected rotational angles, meaning that those sectors that are not regarded as knot sectors are omitted. This method step is disclosed in the description, page 12, items a) and d) so that this method step is also clearly realisable.

Furthermore, the repeated back-projection has been incorporated as an essential feature into claim 1, thus overcoming the objection raised under Article 84 EPC in the decision under appeal with regard to the omission of this feature in the previous claims.

What makes the present method new and inventive over the prior art is the projection of the knot masses to volumetric elements of sectors in a system of cylindrical coordinates, wherein each knot is lying within a sector that contains no other knots, and repeating the back projection for those selected rotational angles which are regarded as knot sectors, i.e. omitting those sectors that are not regarded as knot sectors.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

The Board is satisfied that the application documents as amended according to the present main request satisfy the formal requirements of the EPC. In particular, claim 1 is based on claims 1, 3 and 4 of the application as published together with the passages on page 5, lines 10 to 18, page 7, lines 10 to 12 and 26 to 30, page 10, lines 14 to 17, page 12, lines 5 to 31, and page 15, lines 14 to 19 of the description of the application as published, and claims 2 and 3 are based on claims 2 and 4 of the application as published (Article 123(2) EPC).

Furthermore, the description has been brought into conformity with the invention defined in present claim 1 and the pertinent prior art has been appropriately acknowledged in the introductory part of the description (Article 84, second sentence and Rule 42(1), paragraphs (b) and (c) EPC).

3. *Clarity of the claims*

The Board is also satisfied that the subject-matter of the present claims is sufficiently clear within the meaning of Article 84 EPC. In particular, amended claim 1 now specifies both the step of back-projecting the filtered radiographic projections to a three-dimensional coordinate system and the further step of repeating the back-projection step upon omission of the

sectors not regarded as knot sectors (last paragraph of the claim), so that the objection raised by the examining division under Article 84 EPC with regard to the omission of these two steps in the independent claims then on file no longer applies.

4. *Sufficiency of disclosure*

4.1 In its decision the examining division held that the disclosure of the invention was insufficient within the meaning of Article 83 EPC with respect to features defined in the claims of the requests then on file, and in particular with respect to the feature according to which "wood type specific knowledge" was used in the step relating to the identification of knots and other anomalies in the moving logs. The objected features, however, have been omitted in the claims amended according to the present main request, and in this sense the objections raised by the examining division no longer apply to the presently claimed invention.

4.2 Notwithstanding, according to present claim 1 "knowledge relating to the typical geometry, density and other properties of the moving log, such as stemwood and knots in a log and anomalies associated with knots" is used in the claimed procedure, and thus the question arises whether the objection raised by the examining division with regard to the use of "wood type specific knowledge" in the former claims casts doubts on sufficiency of disclosure of the invention as defined in present claim 1.

According to the description of the application, knowledge on typical wood structure - and in particular

the information listed on page 8, line 32 to page 9, line 18 - is used at different stages of the procedure of the invention (page 6, line 3 to page 4, line 3, page 8, line 32 *et seq.*, and page 12, lines 9 to 21), and in particular - as already noted by the examining division in its decision - in the claimed step of back-projecting the filtered radiographic projections and identifying the possible knot sectors of the log. More particularly, the description specifies that the claimed step of back-projecting the filtered radiographic projections can be carried out in terms of back-projection coefficients that take into account the typical geometric properties of knots and trunk (page 12, lines 9 to 15), and that the further step of identifying stemwood and knots in the log on the basis of knowledge of the typical geometry and density of stemwood and knots defined in present dependent claim 2 can be carried out on the basis of truth values for possible knot sectors obtained from evidence values determined in terms of experimental parameters and the measured density values and representing probability values as to whether the corresponding volumetric element is part of a knot (page 12, lines 16 to 33).

Thus, the description teaches how knowledge of typical wood structure is taken into account in the aforementioned claimed steps, and although the description does not provide detailed guidance or exhaustive examples as to how the back-projection coefficients or the evidence values are determined, the Board is of the opinion that the competent skilled person working in the technical field of analysing by means of imaging techniques the inner structure of objects such as moving logs has good overall knowledge

of the techniques commonly used in object identification by image data processing and is therefore in a position to implement the claimed invention by taking appropriately into account - for instance, using appropriate graphical techniques and/or computational algorithms known in the art - the typical wood structure of a log when processing the radiographic measurement data for identifying the knot regions in the specific log being measured and in particular when calculating the aforementioned back-projection coefficients and evidence values.

- 4.3 This conclusion is not affected by the view also expressed by the examining division in its decision that the application did not provide a description in full detail of one way of carrying out the invention defined in the claims then on file within the meaning of Rule 42 (1) (e) EPC and that a detailed disclosure of a particular way of implementing it could only be found in document D3, this document having been published according to the examining division after the priority date of the application.

First of all, as regards the invention defined in the present claims, the description explains in detail the different aspects of the steps of the invention (see in particular page 10, line 28 to page 15, line 21) and also illustrates with reference to Figures 5 to 8 an example of implementation of the claimed invention; the description therefore does provide a sufficiently detailed description of at least one way of carrying out the presently claimed invention, using examples and referring to the drawings as stipulated by Rule 42 (1) (e) EPC.

Secondly, document D3 - a PhD thesis by one of the named inventors of the application - is directed to the detection of knots in logs using x-ray imaging techniques, discloses a method of determination of the properties of a moving log involving aspects similar to those of the claimed method, and - as pointed out by the examining division - contains an exhaustive and extensive detailed description of some processing techniques and algorithms that can be used in the procedure and involving, among others, the use of shape mask functions in the reconstruction of the knot structure (section 3.5 of D3) and of equations for deriving the truth values from the evidence values (section 3.5.2 of D3). However, the standards of disclosure required by Article 83 and Rule 42 (1) (e) EPC do not necessarily correspond to those generally met by a PhD thesis such as document D3, and the mere fact that document D3 discloses specific implementations of some of the aspects of the claimed invention with a higher degree of detail than the present application is not detrimental to the issues under consideration; more particularly, the extensive and exhaustive disclosure in the PhD thesis D3 does not by itself imply that the description of the application would - contrary to the conclusion in the former paragraph - not describe in sufficient detail at least one way of carrying out the claimed invention within the meaning of Rule 42 (1) (e) EPC, let alone that the invention is not sufficiently disclosed within the meaning of Article 83 EPC since for the purposes of this article it is sufficient if the application as a whole discloses (as the present application does, see points 4.1 and 4.2 above) the invention with a degree

of detail such that the person skilled in the particular art under consideration can perform the claimed invention.

- 4.4 The remaining claimed features are sufficiently clear and self-explanatory and the Board sees no reason to doubt that the application contains a sufficient disclosure for them to be carried out without undue burden by the person skilled in this art. The Board concludes that the application documents as presently amended meet the requirements of Article 83 EPC.

5. *Novelty and inventive step*

- 5.1 The Board agrees with the examining division that, as regards the patentability of the invention, document D1 is the only pertinent prior art disclosure.

As regards document D3 considered in point 4.3 above, the Board notes that this document bears the imprint "1996" in the bibliographic data on pages 1 and 2 and refers on page 1 to its disclosure as "a dissertation [...] to be presented [...] on March 8th, 1996" (page 1); thus, in the absence of any conclusive evidence that its content was effectively made available to the public before the priority date of the application in suit (27 February 1996), the content of the document cannot be considered as constituting state of the art within the meaning of Article 54 EPC as already found by the examining division in the first-instance proceedings.

- 5.2 Document D1 discloses a method of sorting moving logs according to their quality on the basis of information

on the distribution of knots and other anomalies in the logs obtained by radiographic imaging techniques (page 1, lines 4 to 12 and line 24 *et seq.*, page 4, lines 11 to 23, and page 5, line 4 *et seq.* together with page 13, lines 3 to 23). The determination of this information is based on general knowledge of the typical properties (geometry, density, etc.) of the stemwood and knots in a log (abstract and page 9, lines 12 to 29 together with page 12, lines 22 to 30) and involves the steps of obtaining radiographic projections of each of the logs by means of detector arrays (Figures 2 and 3 and the corresponding description), projecting the measured knot masses to volumetric elements of sectors of a coordinate system (Figures 4 to 7 and page 6, line 1 to page 7, line 1), filtering out the stemwood portions (page 6, lines 1 to 7 together with page 8, lines 6 to 14 and page 9, lines 23 to 26), and back-projecting the filtered projections to a three-dimensional coordinate system (Figures 7 and 11 together with claim 7, page 9, lines 6 to 8, and page 13, lines 1 to 14), whereby the back-projection procedure is additionally carried out by omitting those sectors that are identified as not representing knot sectors (see claims 1 and 2 together with page 9, lines 23 to 26, page 10, line 20 to page 13, line 2, and the disclosure relating to Figures 3, 7 and 10).

Claim 1 is also directed to a method of sorting moving logs, the method consisting in extracting from radiographic projections information on the distribution of knots in the logs by projecting the knot masses to volumetric elements of sectors of a coordinate system, filtering out the stemwood portions,

back-projecting the filtered projections to a three-dimensional coordinate system and repeating the back-projection procedure after omission of the sectors that are not regarded as knot sectors. However, while in document D1 the sectors into which the knot masses are projected are the sectors of a rectangular (i.e. Cartesian) coordinate system (Figures 4 and 7), according to claim 1 as amended according to the main request this projection is carried out into the sectors of a cylindrical coordinate system (Figures 1 to 3 of the application).

The use of sectors of a cylindrical coordinate system for the aforementioned volumetric projection does not constitute in the context of the claimed subject-matter a mere alternative of a purely mathematical character to the use of sectors of a rectangular coordinate system disclosed in document D1, but involves a technical contribution to the claimed invention. Indeed, the general shape of a log displays a cylindrical symmetry about and along its longitudinal axis and, in addition, the knots in the log are generally distributed conically in the radial direction of the log, and the claimed use of a cylindrical coordinate system of longitudinal, radial and angular coordinates (coordinates z , r and α in the terminology of the application) not only provides a more natural mathematical setting for modelling a log and the knots within the log (page 8, line 35 to page 9, line 18), but also results, through its interaction with the remaining claimed features, in that the projection, filtering-out and back-projection steps are simpler and less cumbersome. In particular, the radially extending knot mass of a knot has a predetermined value range of

the longitudinal and angular coordinates in the cylindrical coordinate system and is projected into the corresponding volumetric sector which does not contain other knot projection (second of the steps listed in claim 1 and page 7, second paragraph together with Figure 1), and accordingly the omission in the claimed back-projection procedure of those sectors considered not to represent a knot sector can simply be carried out in terms of the longitudinal and angular coordinate values of the corresponding sectors (last of the steps listed in claim 1). As a consequence, the determination of the distribution of knots in the logs according to the claimed procedure is more reliable and requires less data processing capacity and time than in the case of document D1, a technical effect especially advantageous in view of the fact that the determination of the distribution of knots in the logs and the sorting of the same are to be carried out in an effective way while the logs move and therefore in a relatively short time (description of the application, second paragraph of page 2, paragraphs bridging pages 2 and 3, and first paragraph of page 4).

None of the documents on file discloses or suggests the claimed distinguishing features identified above, let alone the technical improvements achieved therewith and mentioned above.

- 5.3 In view of the above considerations, the Board concludes that the subject-matter of claim 1 amended according to the present main request, as well as that of dependent claims 2 and 3 appendant thereto, is new and involves an inventive step over the available prior

art (Article 52(1) together with Articles 54(1) and 56 EPC).

6. The application documents amended according to the present main request and the invention to which they relate also meet in the Board's view the remaining requirements of the EPC within the meaning of Article 97(1) EPC, and the Board concludes that the decision under appeal is to be set aside and a patent be granted on the basis of the application documents amended according to the present main request of the appellant.

7. *Request for reimbursement of the appeal fee relating to a previous appeal*

The appellant has requested the reimbursement of the appeal fee relating to an earlier notice of appeal dated 13 September 2004 filed against a previous decision dated 15 July 2004 refusing the application and subsequently rectified by the examining division under Article 109(1) EPC on 28 December 2004. This request was already formulated before the examining division during the subsequent first-instance proceedings following rectification of the first decision and in its second decision (point II above, last paragraph) the examining division considered the request as "deemed not to have been filed" on the grounds that the request was filed on 29 July 2005 (although wrongly dated 27 October 2004) and thus after rectification of the decision, i.e. after completion of the corresponding appeal procedure.

As already noted by the Board in its communication dated 22 March 2010, the request for reimbursement of

the appeal fee is not allowable because the request was formulated by the appellant for the first time after the examining division had already decided to rectify the first decision under Article 109(1) EPC.

Consequently, neither the examining division nor the Board are able to order under Rule 103 (1) (a) EPC the reimbursement of the appeal fee of an appeal that has been fully allowed by the first-instance department and therefore closed before the appellant requested for the first time the reimbursement of the corresponding appeal fee (see in this respect decisions T 21/02 (points 3 to 8 of the reasons) and T 242/05 (points 1 and 2)).

This preliminary opinion of the Board was not disputed by the appellant in its letter of reply, and the Board sees no reason to depart from it. In addition, the appellant confirmed during the proceedings that the auxiliary request for oral proceedings concerned the allowability of the appeal itself and not the request for reimbursement of the appeal fee relating to the previous appeal (last paragraph of each of points III and IV above), and in these circumstances there is no reason for the Board to arrange oral proceedings.

In view of all these considerations, the request for reimbursement of the appeal fee relating to the earlier appeal is refused for the reasons given above and already communicated to the appellant in the Board's communication.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent on the basis of the following documents:
 - claims: claims 1 to 3 filed with the letter dated 2 June 2010,
 - description: pages 1 and 2 annexed to the Board's communication dated 22 March 2010, pages 3 to 15 of the application as published, and page 2a filed with the first of the letters dated 27 October 2004, the text on page 2a being for insertion in the text of page 2 between the first and second paragraphs, and
 - drawings: sheets 1/3 and 2/3 of the application as published and sheet 3/3 filed with the letter dated 2 June 2010.
3. The request for reimbursement of the appeal fee paid in respect of the earlier appeal initiated by the notice of appeal dated 13 September 2004 is refused.

The Registrar:

The Chairman:

M. Kiehl

A. G. Klein