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D E C I S I O N
of 25 January 2006

Case Number: T 0504/03 - 3.2.02

Application Number: 96931194.3

Publication Number: 0796059

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Language of the proceedings: EN

Title of invention:
Determining a dimension from a density distribution

Applicant:
Koninklijke Philips Electronics N.V.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 52(1), (4), 56

Keyword:
"Diagnostic method (no)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0504/03 - 3.2.02

D E C I S I O N
of the Technical Board of Appeal 3.2.02
of 25 January 2006

Appellant: Koninklijke Philips Electronics N.V.
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Decision under appeal: **Decision of the Examining Division of the**
                             European Patent Office posted 27 December 2002
                             refusing European application No. 96931194.3
                             pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: T. Kriner
Members: S. Chowdhury
                 E. Dufrasne

Summary of Facts and Submissions

I.   This appeal is against the decision of the examining
        division dated 27 December 2002 to refuse European
        patent application No. 96 931 194.3.

        The ground of refusal was that claims 1 and 5 of the
        main request and the first auxiliary request and
        claim 4 of the second auxiliary request then on file
        related to diagnostic methods performed on the human
        body, which fell under the exclusion of Article 52(4)
        EPC, and claims 1 and 5 of the third auxiliary request
        were unclear.

        During the examination procedure the examining division
        had argued that the subject-matter of claims 6 and 7
        lacked novelty having regard to:

        D1: "Technical Optimisation of Spiral CT for Depiction
        of Renal Artery Stenosis: In Vitro Analysis"; Brink J.
        et al.; Cardiovascular Radiology; 1995; **194**: pages 157-
        163.

II.   On 13 February 2003 the appellant (applicant) lodged an
        appeal against the decision and paid the prescribed fee
        on the same day. On 8 April 2003 a statement of grounds
        of appeal was filed.

        The appellant requests that the decision under appeal
        be set aside and that a patent be granted on the basis
        of claims 1 to 4 filed on 24 January 2006, and amended
        as agreed by telephone on 26 January 2006.

III.   IV.   Independent claims 1, 3, and 4 read as follows:

"1. A method of measuring a dimension of a detail (20)
of an object from a density distribution of the object
to be examined
- by using the density distribution of a part (P1) of
the object outside said detail, which part (P1) has a
dimension which is larger than that of said detail (20)
in the object to be examined and
- of which part the density is substantially the same
as the density of said detail, wherein
- the maximum value (dmax)of the density distribution
of said larger part (P1) is derived,
- a corrected maximum value of the density distribution
of said detail is derived from the maximum value (dmax)
of said larger part and
- the value of the dimension of the detail (20) in the
object is derived from the width of the density
distribution of said detail, at a density value
amounting to a predetermined fraction of said corrected
maximum value.

3. An imaging system including
— a device for reconstructing a density distribution of
an object to be examined and
— an arithmetic device arranged to derive a dimension
of a detail of the object from the density distribution
of the object to be examined
— by using the density distribution of a part (P1) of
the object outside said detail, which part (P1) has a
dimension which is larger than that of said detail (20)
in the object to be examined and

— of which part the density is substantially the same
as the density of said detail, wherein the arithmetic
device is further arranged to
— derive the maximum value (dmax) of the density
distribution of said larger part (P1)
— derive a corrected maximum value of the density
distribution of said detail from the maximum value
(dmax) of said larger part and
— derive the value of the dimension of the detail (20)
in the object from the width of the density
distribution of said detail, at a density value
amounting to a predetermined fraction of said maximum
value (dmax).

4. A computer tomography device, comprising
— an X-ray source (1) for irradiating an object (2) to
be examined by means of X-rays,
— an X-ray detector (3) for detecting X-rays having
traversed the object to be examined,
— the X-ray source and the X-ray detector being
positionable together in a number of orientations
relative to the object,
— a reconstruction unit (4) for reconstructing a
density distribution of the object to be examined on
the basis of X-ray images detected in separate
orientations, and
— an arithmetic device (5) arranged to derive a
dimension of a detail of the object from the
reconstructed density distribution of the object to be
examined
— by using the density distribution of a part (P1) of
the object outside said detail, which part (P1) has a
dimension which is larger than that of said detail (20)
in the object to be examined and

— of which part the density is substantially the same
as the density of said detail, wherein the arithmetic
device is further arranged to
— derive the maximum value (dmax) of the density
distribution of said larger part (P1)
— derive a corrected maximum value of the density
distribution of said detail from the maximum value
(dmax) of said larger part and
— derive the value of the dimension of the detail (20)
in the object from the width of the density
distribution of said detail, at a density value
amounting to a predetermined fraction of said maximum
value (dmax)."

Claim 2 is a dependent claim.

IV.   The appellant argued as follows:

The independent claims included the feature of the
value of the dimension of the detail being derived from
both density values of the density distribution of the
detail and density values outside the detail, whereas
D1 only mentioned computing the diameter of a stenosis
model on the basis of the full width at one-tenth
maximum (FWTM) or the full width at one-tenth area
(FWTA) methods. This did not pertain to the derivation
of the dimension of the detail but rather to the
relative comparison of sizes of several portions of the
density distribution. Hence D1 did not give the skilled
person any incentive to change the way the measurement
of the stenotic part was made.

The method of the invention was applied to a dataset
which was not practised on the living body. The Boards
of Appeal had consistently reasoned that steps limited
to operation of a technical device falling under the
competence of a technician do not fall in the exclusion.
The present method relates to the analysis of a dataset
and was limited to the operation of an arithmetic unit
and was consequently not a diagnostic method within the
meaning of Article 52(4) EPC.

Reasons for the Decision

1.   The appeal is admissible.

2.   *Amendments*

Present claim 1 is based on claims 1 and 2 of the
application as originally filed (WO-A-97/13457),
amplified by the features that the part (P1) has a
dimension which is larger than that of said detail (20)
in the object to be examined, and the part has a
density which is substantially the same as the density
of said detail. These features are supported by page 4,
lines 11 to 13 and 23 and 24.

Claim 2 corresponds to original claim 4.

Claims 3 and 4 correspond to original claims 6 and 7,
with amendments corresponding to those in claim 1.

All the amendments satisfy the requirement of
Article 123(2) EPC, accordingly.

3.   *Article 52(4) EPC*

3.1   The headnote of the opinion G 1/04 of the Enlarged
         Board of Appeal reads, inter alia, as follows:

         1. In order that the subject-matter of a claim relating
         to a diagnostic method practised on the human or animal
         body falls under the prohibition of Article 52(4) EPC,
         the claim is to include the features relating to:

         (i) the diagnosis for curative purposes stricto sensu
         representing the deductive medical or veterinary
         decision phase as a purely intellectual exercise,

         (ii) the preceding steps which are constitutive for
         making that diagnosis, and

         (iii) the specific interactions with the human or
         animal body which occur when carrying those out among
         these preceding steps which are of a technical nature.

         3. In a diagnostic method under Article 52(4) EPC, the
         method steps of a technical nature belonging to the
         preceding steps which are constitutive for making the
         diagnosis for curative purposes stricto sensu must
         satisfy the criterion "practised on the human or animal
         body".

3.2   The claimed method does not include any features
         relating to the diagnosis for curative purposes stricto
         sensu representing the deductive medical or veterinary
         decision phase as a purely intellectual exercise, nor
         are the method steps of claim 1 practised on the human
         or animal body. The presently claimed method pertains

to the analysis of a data set and the information which
it yields provides intermediate results which, on their
own, do not enable a decision to be made on the
treatment necessary.

For these reasons the claimed method is not to be
considered a diagnostic method practised on the human
or animal body which is excluded from patentability by
Article 52(4) EPC.

4.   *The application*

The application relates to a method of measuring a
dimension of a detail of an object from a density
distribution of the object obtained from a shadow image,
and to corresponding apparatus.

Such a method known from D1 uses a density distribution
profile of the object obtained by computer tomography
and measures the FWTM and the FWTA of averaged profiles
to determine the dimension of the object. The technical
problem with this known method is that owing to
blurring of the image, which may be caused by different
technical factors (page 2, line 31 to page 3, line 1),
the maximum density of the profile of a detail is
reduced and the dimension of the detail tends to be
overestimated, accordingly.

The solution, as reflected in the method according to
present claim 1, is based on the recognition of the
fact that relatively larger parts of an object are less
affected by the blurring, and uses this fact to
compensate for the reduction of the maximum density of
the profile of a smaller part of the object, and hence

for the disturbance of the measurement of the dimension owing to blurring of the image.

According to this method the maximum value of the density distribution of the larger part is derived and a corrected maximum value of the density distribution of the smaller part is derived from the maximum value of the larger part. The dimension of the smaller part is then derived from the width of the density distribution of the smaller part, at a density value amounting to a predetermined fraction of the corrected maximum value. In an example the full width of the profile of smaller part of the density distribution of an object is measured, not at the half maximum of the density distribution of the profile of the smaller part itself, but at the half maximum of the density distribution of the profile of the larger part.

5.   *Novelty*

D1 describes the construction of computed tomography images of polyester tubes (pipettes) provided with constrictions of different dimensions and filled with an X-ray attenuating liquid. The pipettes simulate vascular constrictions in a patient to be examined, and two pipettes with constrictions of 45% and 85% (Figure 1), corresponding to critical and non-critical artery stenosis, respectively, are examined.

Spiral CT images of the pipettes were made using 12 different scan parameters and scanning techniques, and the results are presented in Figures 3 and 4, respectively for the non-critical and critical artery stenosis.

The diameters of the normal and stenotic portions of the test images were measured from the attenuation profiles, and as measures of tube diameter the FWTM and the FWTA were computed for each profile. The results show that the measured diameters using FWTM and FWTA are consistently too high (Figures 3a, 3b, 4a, 4b).

There is no disclosure in D1 of employing a compensation scheme in which the density profile of a structure that is larger than the object to be measured is used for any reason. For this reason the method of claim 1 is novel over the method disclosed in D1.

6.   *Inventive step*

Although D1 recognises that there are various causes for the underestimation or overestimation of tube diameters in spiral CT, it does not discuss the technical problem of the application as set out in point 4, second paragraph above. Nor does D1 disclose the present solution.

Since neither the problem of distortion of the density profile nor the solution of invoking the density profile of a structure that is larger than the detail of the object in order to compensate for the blurring effect is disclosed in D1 the method of claim 1 involves an inventive step.

7.   The same arguments apply to the subject-matter of independent Claims 3 and 4, which claim apparatus for implementing the method of claim 1.

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 the first
        instance to grant a patent on the basis of the
        following documents:

        −   Claims 1 to 4 filed by telefax on 24 January 2006,
                claim 3 being amended as agreed with the
                representative by telephone on 26 January 2006

        −   Description pages 1 and 6 to 10 as published

        −   Description pages 2, 3, and 4 filed by letter
                dated 13 May 2005, page 4 being amended as agreed
                with the representative by telephone on 26 January
                2006

        −   Description page 5 filed by telefax dated
                24 January 2006

        −   Figures 1 to 3 as published.

The Registrar: The Chairman:

V. Commare   T. K. H. Kriner

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