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Datasheet for the decision of 30 June 2011

Case Number: T 1725/06 - 3.4.01

Application Number: 02760899.1

Publication Number: 1425596

IPC: G01R 33/28

Language of the proceedings: EN

Title of invention:
A method of using spectral-spatial exitation at magnetic resonance imaging

Applicant:
GE HEALTHCARE AS

Opponent:
-

Headword:
-

Relevant legal provisions:
-

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

Keyword:
"Inventive step (no; all requests)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1725/06 **-** 3.4.01

D E C I S I O N
of the Technical Board of Appeal 3.4.01
of 30 June 2011

Appellant: GE HEALTHCARE AS
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 7 July 2006 refusing European patent application No. 02760899.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: B. Schachenmann
Members: H. Wolfrum
G. Assi

Summary of Facts and Submissions

I. European patent application 02 760 899.1 (publication No. WO 03/023432 / EP 1 425 596) was refused by a decision of the examining division dispatched on 7 July 2006, on the grounds of exclusion from patentability under Article 52(4) EPC 1973 and/or of lack of inventive step (Articles 52(1) and 56 EPC 1973) of the subject-matter of the requests then on file.

II. The applicant lodged an appeal against the decision on 7 September 2006 and paid the prescribed fee on the same day. A statement of grounds of appeal with three sets of claims according to a main request and two auxiliary requests was received on 6 November 2006.

III. On 14 February 2011, in response to a corresponding request, the appellant was summoned to oral proceedings.

In an annex accompanying the summons pursuant to Article 15(1) RPBA, the Board pointed to problems concerning the exclusion from patentability under now Article 53(c) EPC for the appellant's main request and first auxiliary request and identified the question of inventive step as a major obstacle to the grant of a patent for all requests on file. In the latter context, the Board made reference to documents :

D1 : WO-A-99/35508;
D6 : A. Oppelt et al; "FISP: eine neue schnelle Pulssequenz für die Kernspintomographie", electromedica, vol. 54, no. 1, 1986, pages 15 - 18; and

D11: J. Svensson et al, "Hyperpolarized ^{13}C MR Angiography Using TrueFISP", Magnetic Resonance in Medicine, vol. 50, 2003, pages 256 - 262.

IV. The appellant informed the Board by facsimile of 24 May 2011 that it had decided not to attend the oral proceedings and that no written submissions would be made.

V. Oral proceedings were held on 30 June 2011 in the absence of the appellant.

VI. The appellant has requested in writing that the decision under appeal be set aside and that a patent be granted on the basis of a set of claims 1 to 10, according to a main request, or on the basis of respective sets of claims 1 to 20, according to a first and second auxiliary request, all filed with the statement of grounds of appeal.

VII. Claim 1 of the appellant's **main request** reads as follows :

"1. A method of magnetic resonance imaging of a sample said method comprising:
i) administering to said sample a hyperpolarised MR imaging agent in liquid phase wherein the MR imaging agent comprises a compound of interest in metabolic studies which comprises non-zero nuclear spin nuclei;
ii) exposing said sample to a radiation at a frequency selected to excite nuclear spin transitions in said non-zero nuclear spin nuclei, the excitation being a spectral-spatial excitation;

iii) detecting MR signals from said sample wherein different metabolites of said MR imaging agent are detected separately; and
iv) optionally generating an image, physiological data or metabolic data from said detected signals,
characterized in that for the detection in step iii) a FISP or PSIF or true FISP pulse sequence with a flip angle of 45 to 90 degrees is utilised and wherein, if the sample is a human or non-human animal body and metabolic data are generated from said detected signals, MR signals according to step iii) are detected after the imaging agent has left the vascular bed."

Claim 1 of the **first auxiliary request** is a variant of claim 1 of the main request in which the phrase "*wherein the sample is a human or non-human animal body pre-administered with a hyperpolarised MR imaging agent in liquid phase wherein the MR imaging agent comprises a compound of interest in metabolic studies which comprises non-zero nuclear spin nuclei,*" further defines the sample and replaces feature i) of claim 1 of the main request.

Claim 11 of the **first auxiliary request** is another variant of claim 1 of the main request in which the sample is qualified as being "*not a human or non-human animal body*".

Claim 1 of the **second auxiliary request** is identical to claim 11 of the first auxiliary request.

Claim 11 of the **second auxiliary request** is directed to the "*Use of a compound of interest in metabolic studies said compound comprising non-zero nuclear spin nuclei*

for the manufacture of a hyperpolarised MR imaging agent in liquid phase for use in a method of magnetic resonance imaging", the said method being defined substantially by steps i) to iv) and the characterizing portion of claim 1 of the main request.

Reasons for the Decision

1. In the light of the entry into force of the EPC 2000, reference is made to Article 7(1), 2nd sentence of the Revision Act of 29 November 2000 ("Act revising the Convention on the Grant of European Patents (European Patent Convention) of 5 October 1973, last revised on 17 December 1991") and the transitional provisions for the amended and new provisions of the EPC (Decision of the Administrative Council of 28 June 2001), from which it may be derived which Articles of the EPC 1973 are still applicable and which Articles of the EPC 2000 shall apply.

2. The appeal complies with the requirements of Articles 106 to 108 and Rule 64 EPC 1973 and is, therefore, admissible.

3. As far as the issue of exclusion from patentability under Article 54(2) EPC 1973/ Article 53(c) EPC is concerned, the reasoning of the contested decision as well as the considerations of the Board in the annex accompanying the summons to the oral proceedings applies only to part of the claims of the requests on file, whereas the objections concerning lack of inventive step apply equally to the subject-matter of all independent claims of all requests on file. For the

purpose of the present decision the question of exclusion from patentability is therefore left undecided and only the matter of inventive step is addressed.

3.1 The examining division considered the subject-matter of a claim corresponding to claim 1 of the present main request to be rendered obvious by a combination of the teachings of documents D1 and D6.

In its observations annexed to the summons to oral proceedings, the Board stated that it did not find fault with the assessment of lack of inventive step in the contested decision and explained why it considered unconvincing the arguments which the appellant had presented in the statement of the grounds of appeal. Given the fact that appellant did not comment on the Board's observations, the Board sees no reason to judge the matter differently.

3.2 The appellant does not dispute that document D1 (see in particular pages 1 to 10) shows a method of magnetic resonance imaging with all the features comprised in the preambles of each of the independent claims of the main request and the first auxiliary request as well as of claim 1 of the second auxiliary request and a corresponding use of a compound of interest in metabolic studies with the features comprised in the preamble of claim 11 of the second auxiliary request.

According to the appellant, the invention was distinguished from the teaching of document D1 by the choice of a specific pulse sequence in combination with a specific range of flip angles as specified in the

characterising portions of the independent claims of all requests on file. Document D1 did not motivate the skilled person to use a claimed pulse sequence for hyperpolarised liquids and lacked any hint or indication as to how to modify a pulse sequence used for hyperpolarised gases in order to make it a suitable and favourable sequence for hyperpolarised liquids. The teaching of document D6 and in particular the formula relating to the flip angle concerned the case of thermally polarised liquids for which the relaxation times T_1 and T_2 were equal and was not applicable to hyperpolarised liquids, for which no steady-state magnetisation was established. Document D11, a scientific publication from the inventors of the application, showed that a more complicated theoretical approach was required for determining the optimal flip angle in the case of hyperpolarised liquids.

3.3 The Board shares the examining division's view that the passage in lines 1 to 6 of page 10 of document D1 : "*for gaseous high T_1 agents the imaging sequence used generally has to be FLASH or GRASS while in contrast, more efficient imaging sequences may be used for liquids*", provides the general information that a FSIP (which is synonymous to GRASS) pulse sequence would, *inter alia*, be suitable for the detection in step iii). The appellant's argument that the cited passage dissuaded the skilled person from contemplating the use of a sequence like GRASS for metabolic MR imaging with hyperpolarized agents in liquid phase, or that it would even be perceived by the skilled person as a prejudice against the use of GRASS for liquids with hyperpolarized agents does not convince the Board since

it ignores the plain technical information given in the cited passage.

3.4 In consequence, as far as the obligatory features in the characterizing portions of the independent claims of the requests on file are concerned, the subject-matter of these claims differs from the prior art according to document D1 only by the choice of the flip angle in the pulse sequence in the range of 45 to 90°.

Given the fact that document D1 is silent as to the parameter settings when applying for instance the GRASS/FISP imaging sequence, the skilled person faces the routine task to choose appropriate settings. As regards the choice of suitable flip angles, document D6 (see the whole document), which, incidentally, proposes FISP as an advantageous imaging sequence for fluid containing tissues over sequences such as EPI or RARE, teaches a relationship between the pulse angle providing optimal signal strength and the relaxation times T_1 and T_2. In case the two relaxation times would have equal values, the optimum flip angle would be exactly 90 degrees.

3.5 The appellant's argument, accompanied by a reference to document D11, that the formula for the optimum flip angle which is taught by D6 was not applicable to the case of hyperpolarized liquids and thus could not inspire the skilled person is not convincing.

First of all, the formula for the optimum flip angle α_{opt} given in D6 applies to any value of the ratio T_1/T_2 so that its validity does not depend on the specific case of $T_1=T_2$. Moreover, although it is true that

document D6 does not contemplate imaging with hyperpolarized MR imaging agents, it nevertheless deals with the question of finding the optimum flip angle for one of the pulse sequences (*ie* FISP) claimed in the requests on file. Already for this reason, it would have been obvious for the skilled person, in pursuing the aforementioned task, to take into consideration the model and associated formula for the optimum flip angle known from document D6 so as to obtain at least a rough guess as to suitable flip angles. By such a straightforward course of actions the skilled person would have immediately arrived at the subject-matter of the independent claims of the requests on file.

This finding is not put into question by the appellants reference to document D11. Firstly because of the fact that the teaching of this document was not available to the skilled person at the filing date of the present application. Moreover, the appellant has failed to explain why, even though according to this document, the optimum flip angle for a trueFISP sequence would be 180° (see page 258, first paragraph and Figure 4), the range claimed in the requests on file is 45 to 90°. This question was raised in the Board's communication (point 4.5) but was left unanswered by the appellant.

4. Therefore, the Board has come to the conclusion that the appellant's requests on file do not comply with the requirement of inventive step within the meaning of Articles 52(1) and 56 EPC 1973 and thus are not allowable.

Order

For these reasons it is decided that :

The appeal is dismissed.

The Registrar | The Chairman

S. Sánchez Chiquero | B. Schachenmann