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Datasheet for the decision of 7 December 2009

Case Number: T 0422/07 - 3.4.01

Application Number: 03009692.9

Publication Number: 1361456

IPC: G01R 33/563

Language of the proceedings: EN

Title of invention:
Method and apparatus for magnetic resonance imaging of arteries using a magnetic resonance contrast agent

Applicant:
Prince, Martin R.

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)

Relevant legal provisions (EPC 1973):
EPC Art. 76(1), 54, 56

Keyword:
"Divisional appllication"
"Partiality (no)"
"Novelty and inventive step (yes)"
"Added subject-matter (no)"

Decisions cited:
T 0412/91

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0422/07 - 3.4.01

D E C I S I O N
of the Technical Board of Appeal 3.4.01
of 7 December 2009

Appellant: Prince, Martin R.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 17 October 2006 refusing European application No. 03009692.9 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: B. Schachenmann
Members: P. Fontenay
H. Wolfrum

Summary of Facts and Submissions

I. European patent application No. 03 009 692.9 was filed as a divisional application of European patent application No. 99 118 139.7 ("the parent") which in turn was divided out of European patent application No. 96 944 505.5 ("the root").

II. By decision dated 17 October 2006, the examining division rejected the application. In the reasons for its decision, the examining division held that the request then on file constituted an abuse of the instrument of a divisional application. To support its view, it relied on the interpretations of various provisions of the EPC and on certain passages of the Guidelines construed in the light of the case law of the boards of appeal. Particular reference was made in this respect to Rule 29(2) and Articles 84, 123(3), 125 and 69 EPC 1973 as well as to the passages of the Guidelines: C-VI, 9.1.4 and C-VI, 9.1.6 relating to the examination of a divisional application. The examining division further held that the application had to be rejected on the grounds of lack of inventive step (Article 56 EPC 1973), of added subject-matter (Article 76(1) EPC 1973) and of lack of clarity and support by the description (Article 84 EPC 1973).

III. The appellant (applicant/inventor) lodged an appeal against the above decision by notice of appeal filed on 25 October 2006 and paid the prescribed appeal fee on the same date. A written statement setting out the grounds of appeal was filed on 16 February 2007, in which the appellant stressed the absence of legal basis for refusing the application insofar as abuse of the

instrument of a divisional application was argued. In his view, none of the various norms referred to by the examining division did constitute, whether implicitly or explicitly, a valid basis for refusing the divisional application. A new set of claims, corresponding, in essence, to the set of claims originally filed with the current divisional application, was filed with the statement of grounds as a main request. The appellant also presented further arguments which, according to him, established that none of the other objections raised under Articles 56, 76 and 84 EPC 1973 applied.

IV. In the course of the examination procedure, the appellant had objected to the primary examiner due to a suspicion of partiality. Although no objection has been raised, as such, in the statement of grounds of appeal against this aspect of the decision in suit, the appellant has inquired about the ability of the primary examiner to have continued with the examination of the divisional application.

V. At his request, the appellant has been summoned to oral proceedings.

In the communication according to Article 15(1) of the Rules of Procedure of the Boards of Appeal (RPBA), annexed to the summons, the Board expressed its preliminary opinion that claim 1 then on file did not meet the requirements of Article 76(1) EPC 1973. This view was not contested by the appellant who filed, on 16 March 2009, a modified set of claims forming the basis of a new main request.

Oral proceedings were held on 15 April 2009, the appellant and his representative being both present. After discussion of the relevant issues with the Board, the appellant requested that the impugned decision be set aside and a patent be granted on the basis of claims 1 to 3 filed in the oral proceedings as sole request. He further requested that the proceedings be continued in writing so as to offer him the opportunity to file an adapted version of the description and drawings.

VI. Independent claim 1 filed at the oral proceedings reads as follows.

"1. A magnetic resonance imaging system for imaging an artery in a region of interest in a patient using a single injection of magnetic resonance contrast agent, the system comprising:
a magnetic resonance imaging unit (16) including means for applying a plurality of radio frequency pulses;
a detection system for detecting the response to said plurality of radio frequency pulses, said detection system contains a signal analyzer (114), said signal analyzer (114) being designed to enable an operator to observe a characteristic change in the response from the region of interest to the plurality of pulses when contrast agent arrives in the region of interest;
operator input means for instructing the magnetic resonance imaging system to initiate a 3D imaging sequence in response to the observation of said characteristic change
wherein the magnetic resonance imaging unit (16), in response to the operator input means, starts said imaging sequence by collecting image data which is

representative of the center of k-space and collects image data which is representative of the periphery of k-space after having collected the image data which is representative of the center of k-space; and
means for constructing an image, using the magnetic resonance image data."

Claims 2 and 3 are dependent claims.

VII. After deliberation of the Board during the oral proceedings on 15 April 2009, the Chairman declared that the debate on the claims was closed and that the proceedings were to be continued in writing. In this respect, a time limit of two months from notification of the minutes was set for the appellant to file an amended description and drawings adapted to the claims on file.

By letter dated 20 April 2009, the appellant filed a clear copy of claims 1-3 which had been found allowable during the oral proceedings. An amended version of the description was filed on 3 July 2009; it consisted of new pages 1-4, 5a, 5b, 6-49, 51-65.

VIII. In a communication dated 25 August 2009 according to Rule 100(2) EPC, the attention of the appellant was drawn to various discrepancies between the amended description and the claims which had been found allowable during the oral proceedings. This communication contained a corrected version of the pending application which, in the Board's view, would meet the requirements of the EPC.

With a letter dated 19 October 2009, the appellant gave his approval to the proposed amendments and filed clear copies of new Figures 8, 9, 10A and 10B.

IX. The following documents were relied on during the appeal procedure:

D1: Article in "Radiology" by M. R. Prince et al., "Breath-hold Gadolinium-enhanced MR Angiography of the Abdominal Aorta and Its Major Branches", Vol. 197, 1 December 1995, pages 785-792;

D2: EP-A-0 543 468;

D3: Article in "Radiology" by T. L. Chenevert et al., "Dynamic Three-dimensional Imaging with Partial K- -Space Sampling: Initial Application for Gadolinium-enhanced Rate Characterization of Breast Lesions", Vol. 196, July 1995, pages 135-142.

X. In the following, reference is made to the provisions of the EPC 2000, which entered into force as of 13 December 2007, unless the former provisions of the EPC 1973 still apply to pending applications. In this latter case, the citation of Articles or Rules is followed by the indication "1973" (cf. EPC, page 4, "citation practice").

Reasons for the Decision

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

2. *Suspicion of partiality of the first examiner*

With regard to the objection which has been raised during the examination procedure against the primary examiner, the Board notes that this aspect is not challenged, as such, by the appellant in the statement of grounds of appeal. This issue is, therefore, only relevant for the present appeal proceedings insofar as it would have led to a fundamental deficiency justifying, *ex officio,* the remittal of the case to the examining division (cf. Art. 11 RPBA).

2.1 While it is acknowledged that the style of the first communication issued by the examining division on 7 October 2005 might have created the impression that the opinion expressed therein would have been definitive and hardly affected by later arguments to be presented by the appellant, the Board does not identify in the file wrapper any evidence that the right to be heard would have actually been denied in the course of the ensuing examination procedure. In particular, the detailed minutes of the oral proceedings before the examining division on 8 September 2006 reveal that the appellant had well the opportunity to defend his views before the first instance's department. There is also no evidence that the arguments put forward by the appellant/applicant would not have been considered by the examining division before it reached its decision. On the contrary, the decision to refuse the application does address such arguments which were put forward by the applicant during the preceding written and oral proceedings.

2.2 In conclusion, the suspicion of partiality appears to result essentially from the impression produced by the wording of the first communication, for which the primary examiner later apologized, and is not corroborated by any later behaviour which would have fundamentally affected the procedure before the examining division so as to bias its decision. For these reasons, the Board does not regard a remittal to the first instance's department under Article 11 RPBA to be justified.

3. *Abuse of the instrument of a divisional application*

In decision G 1/06 (OJ EPO 2008, 307) the Enlarged Board of Appeal ruled that: "*In the case of a sequence of applications consisting of a root (originating) application followed by divisional applications, each divided from its predecessor, it is a necessary and sufficient condition for a divisional application of that sequence to comply with Article 76(1), second sentence, EPC that anything disclosed in that divisional application be directly and unambiguously derivable from what is disclosed in each of the preceding applications as filed*" (cf. G 1/06, headnote and section 13.5, first sentence). It further held in section 13.3, with regard to the principle according to which the public should have a fair knowledge of the extent of the exclusive rights conferred by a patent, that this principle "*is no basis for the boards of appeal or other instances of the EPO themselves to restrict the rights of applicants in a manner not warranted by any specific provision of the EPC, such as Rule 25(1) EPC*".

Applied to the decision in suit, the conclusion arrived at by the Enlarged Board of Appeal implies, contrary to the view expressed by the examining division in its refusal, that no abuse can be identified in the mere fact that the claims of the application on which the examining division had then to decide had a broader scope than the claims granted in relation with the parent application. The same conclusion applies to current claims 1 to 3 according to the current sole request on file, the subject-matter of which partly overlaps with the subject-matter of the claims granted in relation with the parent application.

It follows that the issues that have to be decided in relation with the current request concern the requirements set out in Articles 123(2) EPC and 76(1) EPC 1973 regarding added subject-matter, Article 56 EPC 1973 as to inventive step and clarity in the sense of Article 84 EPC 1973.

4. *Added subject-matter (Articles 123(2) EPC, 76(1) EPC 1973)*

4.1 Neither original claims 1-10, which were objected to under Article 76(1) EPC 1973 by the Board in its preliminary opinion, nor the list of "embodiments" 1-35 recited at the end of the original description, which reproduce the content of original claims 1-35 in the root application, provide a sufficient basis for amended claim 1.

4.2 Answering the question whether amended claims 1 to 3 according to the current request contain added subject-matter or not amounts to identifying in the original

description of the current application (Article 123(2) EPC) and in the original descriptions of the parent and root applications (Article 76 EPC 1973) a teaching disclosing all the features of claims 1 to 3 in combination. The term "teaching" being here understood as the content of information that is directly and unambiguously derivable from a disclosure; it encompasses information derivable from any specific embodiment when understood in the light of the whole disclosure.

Since the original descriptions of the current and the parent application are identical and correspond to the combination of the original disclosure of the root application with its corresponding claims - listed as embodiments 1-35 in both the current and the parent application - no distinction is to be made in the following, when addressing the issue of added subject-matter, between Articles 123(2) EPC and 76(1) EPC 1973.

4.3 Paragraph [0036] of the original current application as published relates to a magnetic resonance imaging system which is controlled by an operator. The operator may instruct the imaging system to initiate an imaging sequence when observing a characteristic change in the response from the region of interest to a plurality of pulses generated by the imaging system. More specifically, by monitoring a detection system, the operator may observe a change in the shape of the radio frequency signal envelope and react accordingly. Subsequent paragraphs [0037] and [0038] define the sequence of operations which follow the initiation by the operator of the imaging sequence. It is specified that the magnetic resonance imaging unit starts the

imaging sequence by collecting image data which is representative of the center of k-space and then completes this first acquisition step by collecting image data representative of the periphery of k-space.

Paragraphs [0036] to [0038] of the original description (i.e. as published) appear therefore to constitute the principal basis for new claim 1.

Paragraphs [0186] and [0187] contain additional information concerning the possibility for the system to be, at least partly, controlled by an operator. They establish that a signal analyzer is actually required in the detection system to enable the operator to observe the characteristic change in the response from the region of interest to the plurality of pulses, while the additional features of the microcontroller and visual and/or audible means, referred to in these paragraphs, are actually optional.

The reference to a single injection of magnetic resonance contrast agent in claim 1, although not literally supported by the description, is nevertheless considered allowable, considering that the description consistently refers to injections carried out in a bolus type manner or alternatively according to a predetermined infusion rate (cf. description, section "injection").

4.4 Paragraphs [0036] to [0038], [0186] and [0187] of the description do not contain any explicit reference to the feature of the means for constructing an image. However, in the Board's opinion, the presence in claim 1 of this feature is not only rendered possible

by the content of the description but is indeed required in the definition of the claimed system in view of the original disclosure when considered in its entirety. The Board observes, in this respect, that the general statements concerning the problems to be solved by the invention (cf. paragraphs [0011] and [0012]) underline the necessity to obtain images fulfilling certain criteria. Furthermore, the description consistently refers to a magnetic resonance imaging system comprising means for constructing an image, using the magnetic resonance image data. There is no indication that the means for constructing an image would not pertain to the definition of the imaging system. In particular, the mere fact that these means are not systematically recited in relation with each and every "embodiment" disclosed in the original description does not constitute evidence that the means for constructing an image do not form part of the imaging system.

4.5 The description consistently refers to the possibility of injecting the contrast agent in a bolus type manner (cf. e.g. paragraphs [0034], [0055]). The skilled person would also derive from the description and the problem to be solved that the type of injection is not linked to the type of operation of the imaging system, whether manual or automatic. Dependent claim 2 is, thus, supported by the original description.

The presence of a pump as recited in dependent claim 3 is supported by paragraphs [0112] and [0144] to [0149] in the original description.

4.6 Claims 1-3 of the request are, thus, supported by the original description and meet, consequently, the requirements of Article 123(2) EPC. A corresponding support existing in the original parent and in the root application, the requirements of Article 76(1) EPC 1973 are also met.

5. *Novelty - Inventive step*

5.1 Novelty - Article 54 EPC 1973

None of the available prior art documents discloses a magnetic resonance imaging system comprising a detection system, as recited in claim 1, in combination with a magnetic resonance imaging unit which, upon activation by an operator of dedicated input means, starts the acquisition scheme by first collecting image data representative of the center of k-space.

5.1.1 In Document D1, the author of the article - who is also the inventor and applicant for the present invention - discloses an imaging process and system adapted to maximize arterial signal intensity. This result is achieved by means of an imaging unit relying on a classical acquisition scheme, i.e. filling in k-space linearly from bottom to top and by timing the bolus injection so that the arterial phase occurs during acquisition by the imaging unit of the central portion of the k-space. The last portion of the paragraph bridging left and middle columns on page 791, reads as follows: "*there may be potential for improvement by measuring the actual circulation time in advance with use of dehydrocholic acid, saccharin, magnesium sulfate [...] or a test bolus of gadolinium chelate. An even*

greater improvement would be development of a pulse sequence that could depict the arrival of the bolus of contrast material in the arteries of interest. This might facilitate synchronization of the center of k-space and the peak arterial gadolinium concentration".

In the Board's view, this reference to further possible improvements of the method and system of D1, insofar as it merely defines a general principle, is only relevant with regard to the inventive merits of the invention and should be disregarded when deciding on the novelty issue. The strict standards of "photographic novelty" namely require an enabling disclosure, i.e. a clear teaching complete enough to allow its execution by the skilled person. This is not the case for the passage cited above (see also point 5.2.2 below).

5.1.2 Document D2 discloses a magnetic resonance imaging process in which a first low resolution phase, corresponding to the acquisition of signals in the center of k-space, may be followed by a high-resolution acquisition phase, during which signals relating to the periphery of the k-space are collected. D2 is, however, silent as to the means actually used in order to carry out said method. There is, in particular, no mention in D2 of a detection system as recited in claim 1, enabling an operator to identify a characteristic change in the response to a plurality of pulses upon arrival of contrast agent in the region of interest and to react accordingly.

5.1.3 In Document D3, it is suggested to repeatedly sample the center of k-space and to possibly complement the thus obtained data with previously acquired data

corresponding to the full k-space. The system of D3 seeks to improve the temporal resolution of the imaging method. It does not therefore address the problem of a precise synchronization between the arterial phase of contrast enhancement and the collection of data representative of the center of k-space. In this respect, D3 does not disclose any means allowing an operator to observe a characteristic change in the response from a region of interest and to instruct the imaging system accordingly.

5.1.4 The other prior art documents cited in the search report are even less relevant. Consequently, the subject-matter of claim 1 is new in the sense of Article 54 EPC 1973 in view of the available prior art.

5.2 Inventive step - Article 56 EPC 1973

5.2.1 The Board concurs with the examining division in its finding that document D1 represents the closest prior art. It discloses a magnetic resonance imaging system for imaging an artery in a region of interest in a patient and emphasizes the advantages to have the arterial phase occurring during acquisition of the central portion of k-space. Moreover, as derivable from the passage bridging left and medium columns on page 791, reproduced above under section 5.1.1, the author suggests improving the imaging method by depicting the arrival of the bolus of contrast material in the region of interest by monitoring the response of said region of interest to a pulse sequence foreseen for that purpose.

5.2.2 The board notes, however, that the wording of the passage on page 791, in D1, is ambiguous in that it is unclear whether the bolus referred to in the penultimate sentence of this passage relates to the bolus of contrast agent required for imaging the region of interest or to the test bolus of the preceding sentence, which is injected during the preparation phase in order to estimate, in advance, the actual circulation time needed by the contrast agent to reach said region of interest. At the oral proceedings before the Board, the appellant, who is also the author of D1, stressed that the article, as a whole, made it clear that the evaluation, in advance, of the delay between injection of the contrast agent and the start of the arterial phase in the region of interest, was essential for the success of the imaging process to be later performed. The passage on page 791, referred to above, should be understood in this context, i.e. as referring to alternatives concerning the preparation phase in order to obtain, in advance of the actual imaging phase, more reliable estimations of the circulation time of the contrast agent. It follows that the reference to a bolus in the penultimate sentence of this paragraph is to be understood, in the appellant's view, as referring to the test bolus required for such an estimation to be performed.

The Board is not convinced by this approach and notes that none of these interpretations would be in conflict with the teaching of the article which is, more generally, to optimize the timing of the imaging sequence with the arrival of contrast agent in the region of interest. Moreover, since at least from today's perspective both interpretations make technical

sense, none of them can be ruled out. The Board is also not convinced by the appellant's argument that the second interpretation, equating said bolus with the bolus of material required for imaging purposes, would *a priori* be excluded by the skilled person because, at the date of publication of D1, adapted computing means were not available.

What really matters is what the publication reveals to the skilled person as a matter of technical reality at the priority date (cf. decision T 412/91, not published). In the Board's view, this principle applies independently of the actual author's intention, which intention is normally not known to the skilled reader. However, it would be unfair to the appellant/applicant in a case like the present one, in which the technical reality underlying the disclosure of a prior art document can not be ascertained with certainty, to interpret the document precisely in a way which is most likely to lead to the conclusion that the claimed invention lacks inventive step. In fact, such an approach would clearly amount to ex-post facto analysis, interpreting the prior art document in the light of the disclosure underlying the invention on the merits of which a decision is to be taken. In a situation like the present one, in the absence of evidence as to which of both interpretations would have been made by the skilled reader, the Board is of the opinion that the doubt should benefit to the appellant/applicant. Only if both possible interpretations lead to the same conclusion as to lack of inventive step, should the Board conclude that the requirements of Article 56 are not met. This is presently not the case, since the interpretation

defended by the appellant would not render the claimed system obvious (cf. below).

The following analysis relies on the interpretation according to which the term bolus, in the penultimate paragraph reproduced above, refers to the test bolus required to measure the circulation time during the preparation phase, in advance of the actual imaging process.

5.2.3 Although acquisition schemes starting with the acquisition of the center of k-space are known, as such, as for example illustrated in document D2 (cf. D2, column 8, lines 18-38; claim 4), there is no suggestion in the prior art to monitor the arrival of the bolus of contrast material, required for imaging, to control the acquisition process. Consequently, the provision in the system of D1 of a detection system with a signal analyzer being designed to enable an operator to observe a characteristic change in the response from the region of interest to a plurality of pulses in combination with an operator input means for allowing the operator to initiate a 3D imaging sequence, is not rendered obvious by the available prior art.

Therefore, the claimed subject-matter meets the requirements of Article 52(1) EPC and Article 56 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 examining division with the order to grant a patent on the basis of:

claims: 1-3 as forwarded by the Board to the appellant for approval with the communication of 25 August 2009 and approved by the applicant with letter dated 19 October 2009;

description pages: 1-4, 5a, 5b, 6-49, 53-65 as forwarded by the Board to the appellant for approval with the communication of 25 August 2009 and approved by the applicant with letter dated 19 October 2009;

Figures: 1-7 as forwarded by the Board to the appellant for approval with the communication of 25 August 2009 and approved by the applicant with letter dated 19 October 2009;
8, 9, 10A and 10B as filed on 19 October 2009.

The registrar: The Chairman:

R. Schumacher B. Schachenmann