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Datasheet for the decision of 14 June 2018

Case Number: T 2423/12 - 3.4.01

Application Number: 08012169.2

Publication Number: 1983350

IPC: G01R33/58

Language of the proceedings: EN

Title of invention:
Magnetic resonance imaging using preparation scan for optimizing pulse sequence

Applicant:
Toshiba Medical Systems Corporation

Headword:

Relevant legal provisions:
EPC Art. 123(2), 76(1)
RPBA Art. 13(1)

Keyword:
Amendments - added subject-matter (yes)
Late-filed auxiliary requests - procedural economy

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 2423/12 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 14 June 2018

Appellant: (Applicant)	Toshiba Medical Systems Corporation 1385 Shimoishigami Otawara-shi, Tochigi-ken 324-0036 (JP)
Representative:	Moreland, David Marks & Clerk LLP Aurora 120 Bothwell Street Glasgow G2 7JS (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 10 July 2012 refusing European patent application No. 08012169.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	T. Zinke
Members:	P. Fontenay
	J. Geschwind

Summary of Facts and Submissions

I. The European patent application No. 08 012 169 is a divisional of the earlier application No. 02 255 709.

It was refused by the examining division.

II. In the "*Reasons*" for the decision, the examining division held that the main request and auxiliary request on file did not meet the requirements of Article 76(1) EPC and Article 84 EPC. The examining division further held that the method of independent claim 5 of both requests did not imply an inventive step. The same findings applied to the apparatus of claim 1 of both requests.

III. The appellant (applicant) filed an appeal against said decision.

With the grounds of appeal, the appellant requested that the decision of the examining division be set aside and that a patent be granted on the basis of a set of claims 1 to 5 according to a main request or, in the alternative, on the basis of a set of claims 1 to 5 according to an auxiliary request.

Both requests have been amended with regard to the requests underlying the impugned decision.

IV. In accordance with the appellant's request, a summons to attend oral proceedings was issued.

V. In a communication of the Board pursuant to Article 15(1) RPBA issued on 22 March 2018, the appellant was informed of the provisional opinion of the Board with regard to the requests then pending.

In this respect, it was acknowledged that the amended requests appeared to address the objections of added subject-matter and lack of clarity of the claimed subject-matter, which had been identified by the examining division, in a satisfactory manner.

However, a new objection under Article 84 EPC was raised. It applied to the independent claims of both requests. A certain confusion appeared namely to result from the fact that, according to claim 1 (or claim 4) of both requests, "each data acquisition starts after a delay time after an R-wave of an acquired ECG signal, the delay time being the same for all acquisition periods", in view of the definition of the data acquisition period. Claim 1, lines 10-12, indeed specified that each data acquisition period followed an inversion pulse after an inversion time TI, changed for every acquisition period.

A literal interpretation of the claims' wording would have implied that the inversion pulse be generated at a correspondingly varying time delay following the R-wave. Such an interpretation was considered to be deprived of any basis in the original disclosure.

VI. In a letter of reply, the appellant contested the Board's view regarding a possible confusion in the claim's wording. It was submitted that the wording objected to reflected the true intention of the appellant and defined a feature of the claimed inventions. Reference was made to paragraph [0055] of the original disclosure, as published, which provided a literal basis for said feature. A similar statement was to be found in the original parent application.

New second and third auxiliary requests were filed in order to more clearly define the inversion time (TI) separating the generation of the inversion pulse and the start of the acquisition period.

VII. At the oral proceedings before the Board on 14 June 2018, the appellant confirmed the requests on file.

In reaction to the position followed by the Board with regard to the issue of added subject-matter announced during the oral proceedings following the debate and deliberation regarding the main, first, second and third auxiliary requests, the appellant filed an additional fourth auxiliary request.

VIII. Claim 1 of the main request reads:

"1. A magnetic resonance imaging system characterized in that the system comprises:
an electrocardiography part for acquiring an ECG signal of a patient when said patient is placed within the magnetic resonance imaging system;
an input device (13) to receive an indication from an operator specifying an inversion time TI as a variable parameter used in a preparation scan among a plurality of parameters;
preparation scan performing means (1, 8T, 8R) configured to perform a preparation scan in a plurality of data acquisition periods to acquire data for a plurality of preparatory images at a desired region of the patient, each data acquisition period following an inversion pulse after an inversion time TI, changed every acquisition period, wherein a said preparatory image is acquired in each data acquisition period;

preparatory image producing means (6, 10, 11) configured to produce the plurality of preparatory images from the data acquired by the performance of the preparation scan;
displaying means (6, 12) configured to display the plurality of preparatory images;
selection means (6) for selecting a desired preparatory image from the plurality of preparatory images displayed; and
setting means (6) configured to set, into an imaging scan, a TI on the basis of the selected preparatory image,
wherein said preparation scan performing means is configured to perform each data acquisition period in a different heart beat, wherein each data acquisition starts after a delay time after an R-wave of an acquired ECG signal, the delay time being the same for all acquisition periods;
wherein the preparation scan performing means (1, 8T, 8R) is configured to perform the preparatory scan with an image matrix smaller in a matrix size than an MR image acquired through the imaging scan."

Claim 4 refers to the corresponding method of optimizing an inversion time TI.

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the definition of the preparation scan performing means has been amended and reads:
"preparation scan performing means (1, 8T, 8R) configured to perform a preparation scan in a plurality of data acquisition periods to acquire data for a plurality of preparatory images at a desired region of the patient, each data acquisition period following **fat saturation pulse after an inversion time** TI,

changed every acquisition period, wherein a said preparatory image is acquired in each data acquisition period" and in that the feature according to which "the preparation scan performing means (1, 8T, 8R) is configured to perform the preparatory scan with an image matrix smaller in a matrix size than an MR image acquired through the imaging scan" has been deleted.

Similar amendments have been made in claim 4 with regard to claim 4 of the main request.

The second and third auxiliary requests differ from the main and first auxiliary requests in that the independent claims have been amended so as to incorporate a definition of the inversion time TI. Concretely the independent claims of both requests recite at the end of the sections referring, respectively, to the preparation scan performing means (claim 1) and to the corresponding step of performing preparation scan (independent claim 4) that "**the inversion time TI is a time period between the inversion pulse and a start time of the data acquisition period**".

Claim 1 of the fourth auxiliary request differs from claim 1 of the main request in that the phrase "wherein said preparation scan performing means is configured to perform each data acquisition period in a different heart beat, wherein each data acquisition starts after a delay time after an R-wave of an acquired ECG signal, the delay time being the same for all acquisition periods" has been deleted.

A similar amendment was made in independent claim 4 of the fourth auxiliary request.

Reasons for the Decision

1. The appeal is admissible.

2. Added subject-matter (Article 76(1) EPC; Article 123(2) EPC)

2.1 Claim 1 of the main and first auxiliary requests recite that each data acquisition period follows an inversion pulse after an inversion time Tl, changed every acquisition period (cf. claim 1, lines 10-12). Claim 1 further recites that "each data acquisition starts after a delay time after an R-wave of an acquired ECG signal, the delay time being the same for all acquisition periods". Similar statements may be found in claim 4 of both requests as to the corresponding method of optimizing an inversion time TI.

These features were introduced into the claim wording of the independent claims during examination proceedings with a letter dated 28 May 2012 in response to summons to attend oral proceedings.

It follows from the combination of these two features that the inversion pulse must be generated at a time following the R-wave that varies for each acquisition period. Only then the delay time, which is the time period between the R-wave and the start of the acquisition period, is constant, and the inversion time (i.e. the time period between the inversion pulse and the start of the acquisition period) changes.

The earlier application as filed, as well as the present application as originally filed, does not

contain any basis for the recited combination of features. The following analysis relies primarily on the content of the present application as filed (Article 123(2) EPC). It is, however, emphasised that the same analysis would apply with regard to the earlier application as filed (Article 76(1) EPC).

2.2 In reaction to the comments of the Board in the communication pursuant to Article 15(1) RPBA regarding a possible lack of clarity of the claimed subject-matter resulting from the combination of said two features, the appellant stressed that the wording objected to actually reflected the true intention of the appellant and that the original parent and divisional applications did provide the required basis for said features in combination. With regard to the feature of the data acquisition starting at the same time delay from the R-wave of the ECG signal, reference was made to paragraphs [0055] and [0059] of the present original application as published. Concerning the inversion time TI being changed for every data acquisition period, reference was made to paragraph [0074] in said published application. This definition was introduced in the claims of amended versions of the main and first auxiliary requests filed as second and third auxiliary requests.

It is acknowledged that the passages cited by the appellant provide a literal basis for the recited features. However, the passages referred to do not provide any clear and unambiguous basis for combining the features in question.

The preparatory scan and associated acquisition of data are performed on the basis of the ECG gating technique (cf. paragraphs [0047], [0050]; Figure 3, published

application). This technique appears to be used in the context of the original present disclosure for all parameters to be determined in the preparatory scans, that is, also for the determination of the optimal inversion time TI, now constituting the object of the claimed invention. The invention appears thus to rely on the disclosure of Figures 7 and 10.

The feature according to which each data acquisition starts after a delay time after an R-wave of an acquired ECG signal, the delay time being the same for all acquisition periods, is disclosed in paragraph [0055] of the published application. It thus relates to another aspect of the original disclosure, namely the determination of the optimal strength of a dephase pulse. The determination of said parameter does not incorporate the generation of an inversion pulse and is thus not associated with the determination of any optimal inversion times TI.

For these reasons the passages cited by the appellant as basis for the recited combination of features are not conclusive.

2.3 Moreover, with regard, more specifically, to the embodiments of Figures 7, or 10, doubts are raised as to whether the processes which are disclosed actually reflect the claims' wording. As a matter of fact, the sequence illustrated in the upper part of Figure 7, or 10, suggests that the acquisition period changes with regard to the beginning of the repetition time (TR). During the oral proceedings before the Board, the appellant confirmed that the vertical arrows, symbolizing the beginning of each TR interval, were meant to refer to the R-wave of the ECG signal. The inversion pulse would thus immediately follow the R-

wave. As a consequence, Figure 7 would contradict the claim's wording since it suggests that the acquisition period is changed with regard to the occurrence of the R-wave in accordance with the value of the TI parameter selected for each new acquisition cycle.

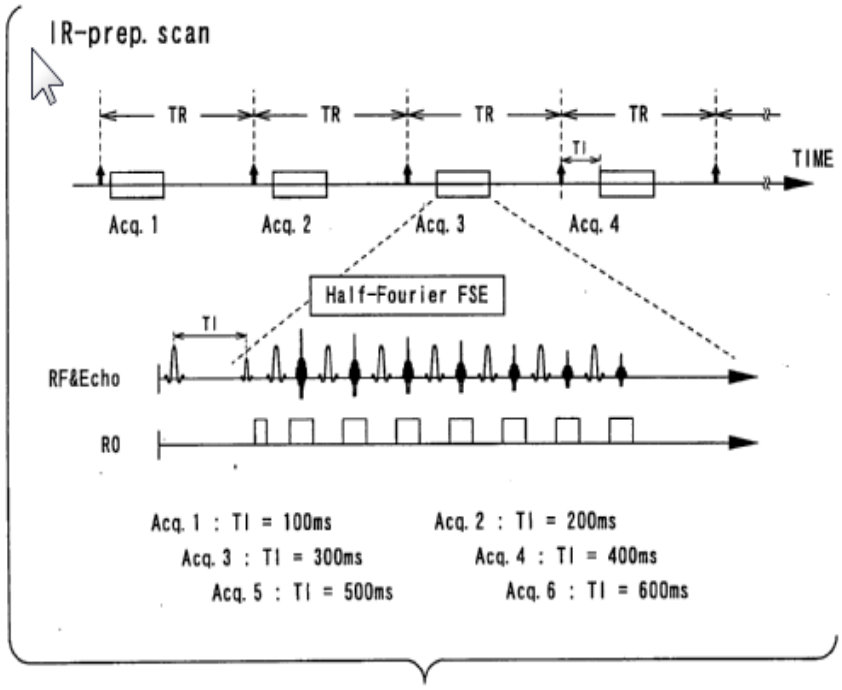

FIG. 7

It could still be argued, in favour of the appellant, that the vertical arrows appearing in the sequence of Figures 7, or 10, do not in fact refer to the occurrence of the R-wave of the ECG signal but to a certain event following such occurrence at a time varying for each heartbeat and calculated so that the total time delay separating the R-wave from the data acquisition be the same.

Independently of the fact that both Figures 7 and 10 appear to contradict this interpretation by suggesting perfectly regular TR intervals, it is observed that the original application as a whole does not contain any

indication supporting this interpretation. As a matter of fact, Figures 7 and 10 suggest that each repetition period is defined by the generation of an inversion pulse at regular intervals which would be selected so as to correspond to the average period of an heartbeat as determined by the ECG monitoring unit. The condition that amendments made to an application must derive directly and unambiguously from the original disclosure in order to be admissible under Article 123(2) EPC is thus not met, under the circumstances.

2.4 The independent claims of the second and third auxiliary requests differ from the corresponding claims of the main and first auxiliary requests in that they include an explicit definition of the inversion time TI. Such amendments do not affect the findings set out above which thus apply *mutatis mutandis* to said requests.

2.5 The passages of the original disclosure referred to above correspond to those of the earlier application in its original version. This also applies to the Figures mentioned above which reflect the corresponding Figures in the earlier application. It follows that the same conclusion applies vis-à-vis the earlier application. The main request and first, second and third auxiliary requests contain therefore subject-matter extending beyond the content of the earlier application as filed, contrary to Article 76(1) EPC.

3. Fourth auxiliary request

The fourth auxiliary request was filed during the oral proceedings before the Board in reaction to the statement by its Chairman that the claims of the requests then pending were considered to contain

subject-matter extending beyond the content of the original and earlier applications as filed.

The appellant could not be surprised by the Board's view regarding said requests since it actually reflected the position of the Board as exposed in its communication pursuant to Article 15(1) RPBA with regard to the main and first auxiliary requests. Although presented as a contradiction in the claims' wording under Article 84 EPC, the Board had also explicitly indicated that a literal interpretation of the claims would have appeared to be deprived of any basis in the original disclosures and that an objection under Article 123(2) EPC or Article 76 EPC could have been raised instead.

With its letter of reply, the appellant opted unambiguously for one line of argumentation, attempting to convince the Board that a basis for the claims' wording could be found in the original present and earlier applications. At that time, second and third auxiliary requests were filed. They were in conformity with this approach in that they differ from the requests on file solely in that they include an explicit definition of the inversion time TI.

Article 13(1) RPBA specifies in its first paragraph that "Any amendment to a party's case after it has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject matter submitted, the current state of the proceedings and the need for procedural economy."

The fourth auxiliary request reflects the intention of the appellant to adopt a new line of argumentation, fundamentally different from the one initially adopted following the communication of the preliminary opinion of the Board. At this particularly late stage of the proceedings a decision to admit said request would be contrary to the principle of procedural economy referred to in Article 13(1) RPBA. In particular, a new assessment of novelty and inventive step (Art. 54(1), (2) and 56 EPC) would be necessary, since the examining division considered the removed feature when analysing inventive step of the claims then pending.

Consequently, the Board decided not to admit the fourth auxiliary request into the proceedings (Article 13(1) RPBA).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

R. Schumacher T. Zinke

Decision electronically authenticated