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D E C I S I O N
of 29 October 2002

Case Number: T 0381/98 - 3.4.1

Application Number: 91850280.8

Publication Number: 0487475

IPC: G21K 1/02

Language of the proceedings: EN

Title of invention:
Method and apparatus for radiography

Patentee:
PLANMED OY

Opponent:
Siemens AG

Headword:
-

Relevant legal provisions:
EPC Art. 100(a), 52(1), 54, 56 EPC

Keyword:
" EPC Article 102(3) Maintenance - in amended form"

Decisions cited:
-

Catchword:
-

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Case Number: T 0381/98 - 3.4.1

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 29 October 2002

Appellant: (Opponent)
Siemens AG
Postfach 22 16 34
D-80506 München (DE)

Representative:
-

Respondent: (Proprietor of the patent)
PLANMED OY
c/o Planmeca Oy
Asentajankatu 6
FI-00810 Helsinki (FIN)

Representative:
Kühn, Alexander
Patentanwälte Tiedke-Bühling-Kinne & Partner
Bavariaring 4
D-80336 München (DE)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 10 February 1998 rejecting the opposition filed against European patent No. 0 487 475 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: G. Davies
Members: G. Assi
M. G. L. Rognoni

Summary of facts and submissions

I. The appellant (opponent) lodged an appeal, received on 7 April 1998, against the decision of the opposition division, dispatched on 10 February 1998, rejecting the opposition against European patent No. 0 487 475 (application number 91 850 280.8). The fee for appeal was paid on 7 April 1998. The statement setting out the grounds of appeal was filed together with the notice of appeal.

II. Opposition had been filed against the patent as a whole and was based on Article 100(a) EPC, in particular on the grounds that the subject-matter of the patent was not patentable within the terms of Articles 52(1), 54 and 56 EPC.

In the decision under appeal, the opposition division held that the grounds of opposition did not prejudice the maintenance of the patent as granted, having regard *inter alia* to the following document:

(D1): US-A-4 380 086.

III. Oral proceedings before the Board were held on 29 October 2002.

IV. The appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the patent be maintained on the basis of the following documents:

Main request:

Claims: 1 to 14 filed at the oral proceedings on 29 October 2002,

Description: Columns 1, 2, 5, 6 of the granted patent,
Columns 3, 4, 7, 8 filed at the oral proceedings on 29 October 2002,

Drawings: Sheets 1/7 to 7/7 of the granted patent,

First auxiliary request:

Claims: 1 and 8 filed with letter of 30 September 2002 as third auxiliary request,

Claims: 2 and 4 to 7, 10 to 14 of the granted patent (to be renumbered),

Description: Columns 1 to 8 of the granted patent,

Drawings: Sheets 1/7 to 7/7 of the granted patent,

Second auxiliary request:

Claims: 1 and 8 filed with letter of 30 September 2002 as fourth auxiliary request,

Claims: 2 to 7, 9 to 14 of the granted patent,

Description: Columns 1 to 8 of the granted patent,

Drawings: Sheets 1/7 to 7/7 of the granted patent.

V. The wording of Claim 1 of the respondent's main request reads as follows:

"*A method of panoramic radiography, said method utilizing an x-ray source (13) whose beam (x) is focused onto the object (M) to be radiographed, whereby said beam (x) is used for imaging an x-ray picture of the radiographed object (M) onto a film (25) or similar imaging means, and in which method a grid assembly (20) adapted between the radiographed object (M) and the film (25) or similar means is used, said grid assembly serving the purpose of canceling the disturbing effect caused by backscattered or secondary radiation generated in the radiographed object (M) from the radiographed image, and further, said grid assembly (20) comprising a grid plate (22) having several parallel, essentially equidistantly spaced, x-ray opaque lamellas, whereby x-ray radiation can pass through the spaces (24) between said lamellas in the direction of the x-ray beam to act on the film (25), and in which method the grid plate (22) is set in a reciprocatingly oscillating motion in the plane of the grid plate (22) in a direction (T) perpendicular to the longitudinal direction of the grid lamellas in a controlled manner in regular cycles (T) of travel with a varying amplitude so that in each cycle the stops or changes of direction (K_1 - K_5) in the oscillating motion are distributed essentially evenly over the interlamallar spaces of the grid plate (22) so as to prevent the grid lamellas (23) from becoming imaged onto the film (25) or similar media in a disturbing manner even at shortest exposure times used in radiographic imaging, wherein the grid plate is moved in direction perpendicular to the longitudinal direction of its lamellas so that the total amplitude of the motion is maximally in order of 3 x l, l being interlamellar spacing of the grid lamellas, wherein the unidirectional motion of the grid plate (22) between*

two successive stop positions, preferably at a constant velocity, has a travel amplitude of the order of (1-2) x l, l being interlamellar spacing of the grid lamellas."

The wording of Claim 8 of the respondent's main request reads as follows:

"*A radiographic apparatus, in particular for medical use, said apparatus comprising an x-ray radiation source (13) whose beam (x) is focused onto the object (M) to be radiographed, said apparatus further comprising a film cassette (40) or similar imaging device, said apparatus further comprising a grid assembly (20) composed of a grid plate (22) formed of a multitude of parallel and/or crossed grid lamellas of x-ray opaque material, whose plane is aligned parallel with the axis of the beam (x) so as to allow the x-ray radiation to pass through their interlamallar spaces (24) to focus on the film (25) or similar media, and said apparatus finally comprising a transfer mechanism, with which said grid plate can be oscillated along its guides (19b) in a direction perpendicular to the longitudinal axis of the grid lamellas, wherein said apparatus comprises such a drive mechanism connected to the grid plate (22) that it brings the grid plate to a reciprocatingly oscillating motion in a controlled manner in regular cycles (T) of travel with a varying amplitude in the plane of the grid plate so that the grid lamellas (23) are subjected to a plurality of changes of direction distributed essentially evenly over the interlamallar spaces of the grid plate even at shortest exposure times used in radiographic imaging wherein the grid plate is forced to perform the reciprocatingly oscillation motion in its plane with the maximum total amplitude in order of 3 x l, l being interlamallar spacing of the grid lamellas, wherein the unidirectional motion of the grid plate (22) between*

two successive stop positions, preferably at a constant velocity, has a travel amplitude of the order of (1-2) x l, l being interlamellar spacing of the grid lamellas."

Claims 2 to 7 and 9 to 14 of the respondent's main request are dependent.

VI. The appellant submitted that document D1 represented the closest state of the art. D1 disclosed a radiographic method and dealt with the problem of preventing images of the radiation absorbing grid from being created on the film. This problem was solved by setting the grid assembly in an oscillating motion. The claimed invention of the patent in suit solved the same problem by providing a grid motion characterised by a first feature that the stops or changes of direction were distributed "*essentially evenly*" over the interlamellar spacings of the grid plate. Such a feature was implicitly disclosed, or rendered obvious, by D1 (see Claim 1 and column 12, lines 3 to 10), considering that the expression "*essentially evenly*" could be broadly interpreted. The claimed grid motion was also defined by a total amplitude of the order of three times the interlamellar spacing and a unidirectional travel amplitude between two successive stop positions of the order of one to two times the interlamellar spacing. However, D1 indicated on column 12, lines 3 to 8, that the difference in distance between the maximum grid displacement from the exposure position and the minimum grid displacement was "*preferably*" less than the grid interlamellar spacing. This feature implied that the disclosure of D1 did not exclude the case of a grid motion having a total amplitude at least equal to the interlamellar spacing. In view of this disclosure, the claimed ranges for the total amplitude and the unidirectional travel amplitude were obvious to the skilled person. Therefore, the

subject-matter of Claim 1 of the respondent's main request did not involve an inventive step. Having regard to Claim 8 of the same request, a similar reasoning led to the same conclusion of lack of inventive step as for Claim 1.

VII. The respondent submitted that D1 did not clearly disclose the feature that the stops or changes of direction in the grid motion should be distributed essentially evenly over the interlamellar spacings, whereby the term "*essentially*" was clear *per se* and related to an unavoidable technical tolerance. Even assuming that the known distribution could be even to a certain extent, D1 did not disclose that it was so "*over the interlamellar spaces of the grid plate*". Moreover, the disclosure on column 12, lines 3 to 8, of D1 permitted to conclude that the total amplitude of the grid oscillating motion should be less than the interlamellar spacing contrary to the teaching of the claimed invention. As regarded the unidirectional travel amplitude, D1 did not give any information. Thus, starting from D1, the claimed ranges for the total amplitude and the unidirectional travel amplitude could be arrived at with hindsight only.

Reasons for the decision

1. The appeal is admissible.

2. *Respondent's main request*

2.1 Amendments

2.1.1 Claim 1 results from the combination of Claims 1, 2, 3 (feature concerning the total amplitude of motion) and 5 (feature concerning the travel amplitude of

unidirectional motion) of the application as filed. Claim 1 also includes the feature that the unidirectional motion of the grid plate is "*between two successive stop positions*", this feature being inferable from Figures 15A or 15C of the application as filed, and the further feature that the grid lamellas are prevented from becoming imaged onto the film "*even at shortest exposure times used radiographic imaging*", this feature being disclosed in Claim 6 of the application as filed.

Claim 8 has been amended so as to correspond *mutatis mutandis* to the independent method claim.

In the dependent claims, the features already recited by Claims 1 and 8 have been deleted.

The description has been amended so as to be brought into conformity with the amended claims and to acknowledge the prior art document D1.

2.1.2 Hence, the patent has not been amended in such a way that it contains subject-matter which extends beyond the content of the application as filed (Article 123(2) EPC).

2.1.3 Moreover, since features have been added to the independent claims, these have not been amended in such a way as to extend the protection conferred (Article 123(3) EPC).

2.2 Novelty

The appellant has not raised an objection under Article 100(a) EPC on the ground that the subject-matter of Claims 1 and 8 is not patentable within the terms of Articles 52(1) and 54 EPC.

The Board takes the same view that the claimed subject-matter is novel having regard to the closest state of the art represented by document D1.

2.3 Inventive step

2.3.1 Document D1 (see column 3, lines 52 to 66, column 4, lines 10 to 17, column 10, lines 19 to 37, Figures 1, 3) discloses a radiographic method utilizing an x-ray source whose beam is focused onto an object to be radiographed, thus creating an x-ray picture of the radiographed object onto a film. A grid assembly is placed between the object and the film and serves the purpose of eliminating the disturbing effect caused by backscattered or secondary radiation generated in the radiographed object. The grid assembly comprises a grid plate having several parallel, equidistantly spaced, x-ray opaque lamellas. X-ray radiation passes through the spaces between the lamellas in the direction of the x-ray beam to act on the film. The grid plate is set in a reciprocatingly oscillating motion in the plane of the grid plate itself and in a direction perpendicular to the longitudinal axis of the lamellas. Such an oscillating motion, by its own nature, consists of a sequence of "*unidirectional*" motions, each being defined between two successive stop positions. The motion is, in particular, controlled so as to have regular cycles with a varying motion amplitude. In each cycle, the stops or changes of direction are distributed over the interlamellar spacings of the grid plate.

Therefore, the subject-matter of Claim 1 differs from the radiographic method known from D1 in the following features:

(i) The changes of direction in the oscillating motion are distributed "*essentially evenly over the interlamellar spaces*" of the grid plate.

(ii) The total amplitude of the motion is "*maximally in order of 3 x l, l being interlamellar spacing of the grid lamellas*".

(iii) The unidirectional motion of the grid plate between two successive stop positions has a "*travel amplitude of the order of (1-2) x l, l being interlamellar spacing of the grid lamellas*".

2.3.2 All these features define the oscillating motion of the grid plate. Feature (i), concerning the distribution of the stop positions, solves the technical problem of preventing the grid lamellas from becoming imaged onto the film in a disturbing manner. Such a problem is already known from D1 (see the sentence bridging columns 1 and 2).

As regards features (ii) and (iii), concerning the total motion amplitude and the travel amplitude of the unidirectional motions, they bring the additional effect that the oscillation motion of each lamella is not confined to the same narrow interlamellar spacing as defined with regard to the grid at its rest position (see Figures 15A and 15C of the patent in suit). Considering the extension of the motion, it may be assumed that its control is easier.

2.3.3 According to the appellant's submissions, the skilled person derives from D1 (see column 12, lines 3 to 10, and Figure 3 showing the composite electric signal fed to the motor driving the grid) that the changes of direction in the oscillating motion of the grid plate are "*preferably*" located within the same interlamellar

spacing and, moreover, are "*essentially evenly*" distributed over the whole spacing, not just over a portion thereof. In its view, the expression "*less than*" in lines 5 and 6 of column 12 of D1 reflects the fact that the total motion amplitude of a lamella should not be equal to the interlamellar spacing so as to avoid that the lamella changes direction at the initial position of a next lamella, which may create an image on the film. On the other hand, the fact that the "*different grid strips do not stop at the same location during the grid oscillation period*" (see lines 6 to 8 of column 12) makes clear that the changes of direction should be located far apart from one another, this leading to the conclusion that they should extend over substantially the whole interlamellar spacing. The appellant, therefore, considers feature (i) to be either implicitly disclosed by D1 or an obvious consequence of its disclosure.

As to features (ii) and (iii), the appellant argues that the text on column 12, lines 3 to 10 of D1 describes only a preferred alternative. Hence, D1 implies other options according to which the total amplitude of the oscillating motion is at least the interlamellar spacing. In the light of this, features (ii) and (iii) do not produce any surprising effect and are obvious.

2.3.4 The appellant's view regarding the obviousness of feature (i) in the light of D1 appears to be convincing. Indeed, considering that D1 also solves the problem that the grid is imaged when stopping or moving slowly (see the sentence bridging columns 1 and 2), it is intuitive and anyhow clear to the skilled person that the more unevenly the changes of direction in the oscillating motion are distributed over the interlamellar spaces of the grid plate, the higher is the risk that an image of the grid plate is formed.

Thus, feature (i), which does not explicitly result from the cited quotations of D1, is anyhow obvious for the skilled person.

As to features (ii) and (iii), the appellant's argumentation rests on the assumption that D1 discloses, at least implicitly, that the total amplitude of the oscillating motion of the grid could be greater than the interlamellar spacing. This assumption does not appear to be convincing. First, the requirement that the total amplitude should be "*preferably less*" than the interlamellar spacing is related to the statement at the end of the sentence in column 12, lines 3 to 8, that "*different grid strips do not stop at the same location during the grid oscillation period*". In the light of this, the skilled person understands the teaching of D1 as excluding a "*total amplitude*" of the oscillation motion equal to the interlamellar spacing, otherwise a lamella at its maximum amplitude would overlap with the initial position of the next lamella. Moreover, it cannot be stated that the disclosure of D1 indeed contemplates, either explicitly or implicitly, a total amplitude greater than the interlamellar spacing. Anyhow, even if it were, D1, in particular Figure 3, does not give any indication as to the travel amplitude of the unidirectional motions of the grid plate between two successive stop positions being greater than the interlamellar spacing. Thus, it would imply hindsight to conclude that features (ii) and (iii) are obvious in view of the D1.

2.3.5 Therefore, the subject-matter of Claim 1 involves an inventive step. Claims 2 to 7, being dependent on Claim 1, also fulfil the requirement of inventive step.

2.3.6 Independent Claim 8 is directed to a radiographic apparatus which is suitable to carry out the method according to Claim 1. In particular, the apparatus includes, *mutatis mutandis*, the features (ii) and (iii). For the same reasons explained above, the subject-matter of Claim 8 involves an inventive step. Claims 9 to 14, being dependent, also fulfil this requirement.

2.4 Hence, the respondent's main request is allowable.

3. *Respondent's auxiliary requests*

Since the respondent's main request is allowable, there is no need to examine the auxiliary requests.

4. Taking into consideration the amendments according to the respondent's main request, the patent and the invention to which it relates meet the requirements of the EPC (Article 102(3) and Rule 66(1) EPC).

Order

For these reasons it is decided:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent as amended with the following documents according to the respondent's main request:

Claims: 1 to 14 filed at the oral proceedings on 29 October 2002,

Description: Columns 1, 2, 5, 6 of the granted patent,
Columns 3, 4, 7, 8 filed at the oral proceedings on 29 October 2002,

Drawings: Sheets 1/7 to 7/7 of the granted patent.

The Registrar: The Chairman:

R. Schumacher G. Davies