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Datasheet for the decision of 23 June 2022

Case Number: T 1001/17 - 3.2.02

Application Number: 12174970.9

Publication Number: 2548509

IPC: A61B6/00

Language of the proceedings: EN

Title of invention:
X-ray device and method for controlling an X-ray irradiation area

Patent Proprietor:
Samsung Electronics Co., Ltd.

Opponent:
Siemens Aktiengesellschaft

Headword:

Relevant legal provisions:
EPC Art. 54, 56, 83, 123(2), 123(3)
EPC R. 99(2)
RPBA Art. 12(4)

Keyword:
Novelty - (yes)
Inventive step - (yes)
Sufficiency of disclosure - (yes)
Amendments - added subject-matter (no) - broadening of claim (no)
Admissibility of appeal - (yes)
Late-filed objection - should have been submitted in first-instance proceedings (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

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Case Number: T 1001/17 - 3.2.02

D E C I S I O N
of Technical Board of Appeal 3.2.02
of 23 June 2022

Appellant: (Opponent)	Siemens Aktiengesellschaft Werner-von-Siemens-Straße 1 80333 München (DE)
Representative:	Siemens AG Postfach 22 16 34 80506 München (DE)
Respondent: (Patent Proprietor)	Samsung Electronics Co., Ltd. 129, Samsung-ro Yeongtong-gu Suwon-si, Gyeonggi-do, 443-742 (KR)
Representative:	Jacobs, Bart Arnold & Siedsma Bezuidenhoutseweg 57 2594 AC The Hague (NL)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 27 February 2017 concerning maintenance of the European Patent No. 2548509 in amended form.**

Composition of the Board:

Chairman	M. Alvazzi Delfrate
Members:	S. Böttcher
	N. Obrovski

Summary of Facts and Submissions

I. The opponent filed an appeal against the interlocutory decision of the opposition division to maintain the patent on the basis of auxiliary request VII as filed during the oral proceedings before the opposition division.

II. Oral proceedings before the board took place on 23 June 2022.

III. The appellant (opponent) requested that the decision be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed.

IV. Claim 1 of auxiliary request VII reads as follows.

"An X-ray device comprising:
a camera (20) to image an object and output the image (42) of the object;
a display member (30) to display the image (42) of the object and an image (43) of an X-ray irradiation region of the object such that the image (43) of the X-ray irradiation region overlaps the image (42);
an X-ray generator (1) for generating X-rays;
an X-ray irradiation region controller (10) disposed in front of the X-ray generator (1) configured to control the X-ray irradiation region of the object to which the X-rays are irradiated,
said X-ray irradiation region controller (10) comprising an aperture (7) to control an irradiation passage and the irradiation region of the X-rays;
an input member (21) for enabling a user of the X-ray

device to input a variety of instructions for operations to perform X-ray imaging, wherein said input member is adapted to enable the user to change size and position of the image of the X-ray irradiation region; and
a control member (50) is adapted to enable the X-ray irradiation region controller to control the X-ray irradiation region, based on the image of the object and the image of the X-ray irradiation region displayed in the display member;
wherein the camera (20) is mounted to an outside of the X-ray irradiation region controller (10) to image the object present in the direction in which the X-rays are irradiated,
wherein the camera is mounted to an outside of an end of a length of the X-ray irradiation region controller, from which the X-rays are discharged to the outside from the X-ray irradiation region controller, to image at least a portion of or the entire shape of the object."

Claim 7 of auxiliary request VII reads as follows.

"A method for controlling an X-ray irradiation region comprising:
displaying an image (42) of the object obtained by a camera (20) of an X-ray device in a display member (30) of the X-ray device, said X-ray device comprising an X-ray generator (1) for generating X-rays, and an X-ray irradiation region controller (10) disposed in front of the X-ray generator (1) and to control an X-ray irradiation region of the object to which the X-rays are irradiated, said X-ray irradiation region controller (10) comprising an aperture (7) to control an irradiation passage and the irradiation region of the X-rays, wherein the camera (20) is mounted to an

outside of the X-ray irradiation region controller (10) to image the object present in the direction in which the X-rays are irradiated, wherein the camera is mounted to an outside of an end of a length of the X-ray irradiation region controller, from which the X-rays are discharged to the outside from the X-ray irradiation region controller, to image at least a portion of or the entire shape of the object;
displaying an image (43) of the X-ray irradiation region in the display member such that the image (43) of the X-ray irradiation region overlaps the image (42);
changing size and position of the image of the X-ray irradiation region; and
controlling a region of the object to which X-rays are irradiated, based on the image of the X-ray irradiation region displayed in the display member."

V. The following documents are referred to in this decision.

E1 US 5,539,798
B1 US 7,494,276
B2 DE 10 2005 036 852 A1
B3 DE 101 18 183 A1

VI. The arguments of the appellant may be summarised as follows.

Admissibility of the appeal

The statement of grounds set out the reasons why the patent should be revoked. Hence, the appeal was admissible.

Admittance of the objections relating to Articles 54,

83, 123(3) and 123(2) EPC and documents B1 to B3

The opposition had been based on the grounds pursuant to Article 100(a), (b) and (c) EPC. Hence, the objections under Articles 54, 83, 123(2) and 123(3) EPC did not relate to new grounds for opposition. The objections were justified, since the patent as maintained had to meet all the requirements of the EPC. They could not have been filed earlier, since the feature that the camera was mounted to the outside of the collimator, which gave rise to some of the above objections, had been added only in claim 1 of auxiliary request VII, which had been filed during the oral proceedings before the opposition division.

Extension of protection conferred - Article 123(3) EPC

The addition of the term "image of the" in line 20 of claim 1 extended the protection beyond the scope of claim 1 as granted.

The image of the X-ray irradiation region could not be equated with the X-ray irradiation region itself. Hence, the subject-matter defined by claim 1 of auxiliary request VII was broader than the subject-matter of claim 1 as granted because it no longer included the statement that the input member enabled the user to change the size and position of the X-ray irradiation region.

Furthermore, the change of the size and position of the image of the X-ray irradiation region on the display did not necessarily mean that the actual X-ray irradiation region was changed, too. The causal link between the change of the image of the X-ray irradiation region and the change of the X-ray

irradiation region, which was present in claim 1 as granted, had been eliminated by the deletion of the term "in that".

The same reasoning applied to claim 7.

Thus, claims 1 and 7 of auxiliary request VII did not meet the requirements of Article 123(3) EPC.

Added subject-matter - Article 123(2) EPC

The feature "the input member is adapted to enable the user to change size and position of the image of the X-ray irradiation region" was not disclosed in the application as originally filed. It was merely disclosed that the user was able to change the size and position of the X-ray irradiation region.

The passages cited by the respondent (page 13, line 24 to page 14, line 1 and page 4, lines 23 to 31) did not support the above-mentioned feature either.

Hence, claims 1 and 7 included added subject-matter.

Sufficiency of disclosure - Article 83 EPC

The feature "the camera is mounted to an outside of the X-ray irradiation region controller to image the object present in the direction in which the X-rays are irradiated" of claim 1 was not disclosed in a manner sufficiently clear to be carried out by the person skilled in the art. If the camera was mounted to the outside of the collimator, there was always a parallax between the camera axis and the axis of the X-ray radiation. The camera could thus not image the object in the same direction as the X-ray irradiation. Due to

these contradictory requirements, the subject-matter of the claim was not achievable.

Furthermore, it was not possible to mount the camera to the outside of an end of a length of the collimator, since an end of a (two-dimensional) length was a (one-dimensional) point which did not have an outside or inside. Figures 1 and 2 of the patent disclosed neither a length nor an end of a length. Since the person skilled in the art was not taught at which position of the collimator the camera should be placed, the invention could not be carried out.

Hence, the invention defined in claims 1 and 7 was not disclosed in a manner sufficiently clear and complete to be carried out by the person skilled in the art.

Novelty in view of B1 - Article 54(1) and (2) EPC

B1 disclosed an X-ray device comprising all the features of claim 1 up to the camera mounting position defined in the last paragraph of the claim.

It was possible to derive from Figure 1 of B1 that the camera was arranged on the outside of the housing of the X-ray generator. B1 further mentioned that the camera might be arranged at any location from which it could generate the desired optical image of the object (column 2, lines 35 to 36). A mounting position at the front end of the collimator was therefore implicitly disclosed.

Hence, the subject-matter of claims 1 and 7 lacked novelty over B1.

Inventive step starting from B1 in combination with the

common general knowledge of the person skilled in the art or in combination with either of B2 and B3 - Article 56 EPC

Starting from B1, the problem to be solved was to provide a simpler device which was easier to maintain, in that it did not require a mirror in the X-ray irradiation path.

The statement in B1 (column 2, lines 35 and 36) that the camera might be arranged at any location from which it could generate the desired optical image of the object prompted the person skilled in the art to arrange the camera on the outside of the collimator and at the front thereof to solve the problem.

Furthermore, both B2 and B3 disclosed a camera (B2: 29; B3: 41) which was mounted to an outside of an end of a length of the collimator (B2: Figure 3, paragraph [0046]; B3: Figure 1, paragraphs [0031] to [0040]). Thus, B2 and B3 suggested providing a camera position which did not require a mirror in the X-ray generator housing. Therefore, the mounting position of claim 1 was rendered obvious by each of B2 and B3.

Consequently, the subject-matter of claims 1 and 7 lacked an inventive step.

Inventive step starting from E1 in combination with either of B2 and B3 - Article 56 EPC

E1 also did not disclose the mounting position of the camera at the front end of the collimator. The problem to be solved by this document was also to provide a simpler device which did not require any mirror in the X-ray irradiation path. It was rendered obvious by B2

and B3 to arrange the camera at the front end of the collimator.

Hence, the subject-matter of claims 1 and 7 lacked an inventive step.

VII. The arguments of the respondent may be summarised as follows.

Admissibility of the appeal

The appeal was mainly based on new objections referring to new prior-art documents that should not be admitted. Therefore, the appeal was not properly substantiated and should be considered inadmissible.

Admittance of the objections relating to Articles 54, 83, 123(3) and 123(2) EPC and documents B1 to B3

Since the feature that the camera was mounted to the outside of the collimator had already been present in claim 1 of auxiliary request VI filed in the opposition proceedings (point 22 of the decision, feature c)), the new objections under Articles 54, 83, 123(2) and 123(3) EPC could have been raised earlier. Documents B1 to B3 were not prima facie more relevant than the prior art already on file. Their submission was not occasioned by an amendment of the patent as granted and should be considered an unjustified late filing. In particular, the feature concerning the camera position on the outside of the front end of the collimator had already been present in auxiliary request VI, which had been filed (as auxiliary request V) prior to the oral proceedings in opposition. Hence, these objections and these documents should not be admitted.

Extension of protection conferred - Article 123(3) EPC

All the features of claim 1 had to be considered. In particular the feature that the control member is adapted to enable the X-ray irradiation region controller to control the X-ray irradiation region, based on the image of the object and the image of the X-ray irradiation region, rendered it clear that a change in the size and position of the image of the X-ray irradiation region also resulted in a change in the size and position of the X-ray irradiation region. Hence, the latter feature, although not literally recited in the claim, was still implicitly present, and the scope of protection had not been extended in respect of granted claim 1.

Thus, the amendment made to claims 1 and 7 did not infringe Article 123(3) EPC.

Added subject-matter - Article 123(2) EPC

The feature that the user could control the size and position of the second image 45 of the X-ray irradiation region displayed in the second region 44 was disclosed in particular on page 17, lines 5 to 10 in connection with Figure 4.

Hence, claims 1 and 7 met the requirements of Article 123(2) EPC.

Sufficiency of disclosure - Article 83 EPC

Claims 1 and 7 did not require that the recording direction of the camera was identical to the direction of the X-ray irradiation. The feature "the camera is mounted (...) to image the object present in the

direction in which X-rays are irradiated" merely stated that the object to be imaged was present in the direction in which X-rays are irradiated.

Furthermore, the interpretation of the definition "outside of an end of a length" in a theoretical and mathematical way was rather unusual and unconventional. The person skilled in the art, presented with the instructions of claim 1, would be able to mount the camera as prescribed, in particular taking into account the additional guidance provided by Figures 1 and 2 and the description on page 11, lines 17 to 25.

Hence, the invention was sufficiently disclosed to be carried out by the person skilled in the art.

Novelty in view of B1 - Article 54(1) and (2) EPC

B1 did not disclose the specific positioning of the camera as featured in the claim. B1 instead suggested positioning the camera in such a way that the "desired optical image" was generated through the shutters of the collimator to avoid errors due to parallax (column 3, lines 44 to 51). Hence, B1 taught against a camera position on the outside of the collimator.

Inventive step starting from B1 in combination with the common general knowledge of the person skilled in the art or in combination with either of B2 and B3 - Article 56 EPC

The appellant's line of argument was based on hindsight, since no incentive could be found in B1 to position the camera at the end of the X-ray irradiation controller such that the optical path of the camera did not pass through the shutter opening.

The laser camera 29 in Figure 3 of B2 referred to by the appellant was used to obtain a three-dimensional profile of the examination area. In detail, the laser scanner provided information about the position of the patient relative to the focal plane. B2 did not refer to the correlation between the image obtained by the laser scanner 28, 29 and the image of the X-ray irradiation region. Hence, this camera provided another functionality compared to the camera according to claim 1. Therefore, the person skilled in the art would not combine the disclosure of B1 with that of B2.

In B3, the image of the camera 41 was not displayed on a display member such that it overlapped with an image of an X-ray irradiation region. The element 47 in B3 referred to by the appellant did not display the actual generated camera image. Hence, the camera 41 served a different purpose compared to the camera in claim 1 or the camera in B1. Therefore, a combination of the disclosures of B1 and B3 would not lead to the features of claim 1.

It followed from this that the subject-matter of claim 1 involved an inventive step over a combination of B1 with the common general knowledge of the person skilled in the art or with either of B2 and B3.

A similar reasoning was applicable to refute the objection concerning claim 7.

Inventive step starting from E1 in combination with either of B2 and B3 - Article 56 EPC

E1 did not motivate the person skilled in the art to alter or improve the positioning of the camera 17.

Based on a similar reasoning as presented in view of the combination of B1 with B2 and B1 with B3, the subject-matter of claims 1 and 7 involved an inventive step.

Reasons for the Decision

1. Subject-matter of the invention

The invention relates to an X-ray device comprising an X-ray generator (1), an X-ray irradiation region controller (collimator) (10) disposed in front of the X-ray generator, a camera (20), a display member (30), an input member (21) and a control member (50) (Figures 1 to 4). The camera is mounted "to an outside of an end of a length" of the collimator (Figure 2) to image at least a portion of the object to be X-rayed. The image of the object is displayed on the display member together with an overlapping image of the intended X-ray irradiation region. Via the input member, the user can change the size and position of the image of the intended X-ray irradiation region. The control member enables the collimator to control the X-ray irradiation region, based on the two images.

By forming an image with the camera, the position and gesture of the patient in a radiation region can be guided, and thus radiography can be more accurately and easily performed (paragraphs [0038] and [0039]).

2. Admissibility of the appeal

The statement of grounds sets out the reasons why the

patent should be revoked. Rule 99(2) EPC does not prohibit references to new objections and prior-art documents in such reasons. Hence, the appeal is admissible.

3. Admittance of the new objections relating to Articles 54, 83, 123(3) and 123(2) EPC and documents B1 to B3

The opposition was based on the grounds of Article 100(a), (b) and (c) EPC. Hence, the new objections under Articles 54, 83, 123(2) and 123(3) EPC do not relate to new grounds for opposition. The filing of the new objections and of B1 to B3 with the statement of grounds of appeal can be regarded as a reaction to the filing of auxiliary request VII during the oral proceedings before the opposition division.

The board does not agree with the respondent's view that claim 1 of auxiliary request VI (filed as auxiliary request V on 28 October 2016) already included the claimed feature concerning the camera arrangement on the outside of the collimator. Claim 1 of auxiliary request VI merely specifies that the camera is mounted on the X-ray irradiation controller without requiring, as presently claimed, that it is mounted "to an outside of an end of a length" of said controller.

Hence, the board decided to admit these objections and documents (Article 12(4) RPBA 2007). The opponent could not have been expected to file them earlier, since the feature that the camera is mounted to the outside of the collimator was added only in claim 1 of auxiliary request VII, which was filed during the oral

proceedings before the opposition division.

4. Extension of protection conferred - Article 123(3) EPC

According to claim 1 as granted, the input member is adapted to enable the user to change the size and position "of the X-ray irradiation region". This feature is not explicitly recited by claim 1 of auxiliary request VII, which recites instead that the input member is adapted to enable the user to change the size and position "of the image of the X-ray irradiation region" (emphasis added).

Claim 1 of auxiliary request VII also includes the feature that the control member is adapted to enable the X-ray irradiation region controller to control the X-ray irradiation region, based on the image of the object and the image of the X-ray irradiation region. Hence, a change of the size and position of the image of the X-ray irradiation region via the input member also results in a change of the size and position of the irradiation region itself. The link between this feature and the preceding feature is not eliminated by the omission of the term "in that". The feature that the input member is adapted to enable the user to change the size and position "of the X-ray irradiation region" is thus, although not explicitly recited, still present in claim 1. Hence, the scope of the claim has not been extended by replacing the feature "said input member is adapted to enable the user to change size and position of the X-ray irradiation region" of granted claim 1 with the feature "said input member is adapted to enable the user to change size and position of the image of the X-ray irradiation region" of claim 1 of auxiliary request VII.

The same applies to independent claim 7.

Hence, the scope of protection of claims 1 and 7 has not been extended by the addition of the term "the image of".

5. Added subject-matter - Article 123(2) EPC

The feature "said input member is adapted to enable the user to change size and position of the image of the X-ray irradiation region" can be derived from page 15, lines 7 to 14, page 16, lines 21 to 27 and page 17, lines 5 to 10 of the application as filed. Claim 1 does not require that the input member itself is adapted to directly change the size and the position of the image but merely that the input member is "adapted to enable the user" to change said size and position, as was the case in the cited passages of the original description. The omission of the term "in that" cannot result in the claim comprising added subject-matter, since this term was only present in claim 1 as granted but not in claim 1 as originally filed.

The same applies to independent claim 7.

Hence, claims 1 and 7 meet the requirements of Article 123(2) EPC.

6. Sufficiency of disclosure - Article 83 EPC

Claim 1 does not require that the recording direction of the camera is identical to the direction of the X-ray irradiation. Rather, the camera has to be positioned so as to be able to image the object present in the direction of the X-ray irradiation. This is also possible with a camera which is mounted as shown in

Figure 1 of the patent, which discloses an embodiment of the invention. Hence, contrary to the appellant's view, the camera and the X-ray irradiation source do not interfere with each other.

Furthermore, it is clear to the person skilled in the art reading the claim that "an end of a length" is not meant in a strictly mathematical sense - as a point - but rather to indicate a region at the end of the controller. Figures 1 and 2 show how the camera is mounted to an end region of the longitudinal outside of the collimator. The camera is regarded as being mounted "to an outside of an end of a length" of the controller, as required by the claim.

Hence, the invention as defined in claims 1 and 7 is sufficiently disclosed to be carried out by the person skilled in the art.

7. Novelty in view of B1 - Article 54(1) and (2) EPC

B1 relates to a very similar device to the invention in the present case. It comprises an X-ray generator 13 with a collimator 12 having four shutters, a camera 21 and a computer which displays the image 27 taken by the camera together with an overlay 29 representing the X-ray irradiation region (column 3, line 16 to column 4, line 13, Figure). It is clear from the figure that the camera is mounted to the X-ray generator and not to the collimator as erroneously stated in column 3, lines 44 to 45. The camera is arranged at an angle of 90° with respect to the optical path of the X-ray system, and a mirror 14 deflects light coming from the collimator towards the camera.

B1 does not disclose that the camera is mounted to an

outside of the X-ray irradiation region controller (i.e. the collimator 12). In B1, the camera 21 is mounted to the outside of the X-ray generator (X-ray source 13). Even if, in view of the statement in column 3, lines 44-48 ("[i]n the depicted embodiment said camera 21 is fixed to the collimator 12"), the X-ray source 13 and the collimator were considered to be arranged in one single housing, the mounting position of the camera would not be at the front end of the housing. Hence, B1 also does not disclose that the camera is mounted to an outside of an end of a length of the collimator.

The statement in column 2, lines 35 to 36 that the camera may be arranged at any location from which it can generate the desired optical image does not amount to a direct and unambiguous disclosure of the claimed camera mounting position.

Hence, B1 does not anticipate the subject-matter of claim 1 or 7.

8. Inventive step starting from B1 in combination with the common general knowledge of the person skilled in the art or in combination with either of B2 and B3 - Article 56 EPC

The objective technical problem, starting from B1, cannot be regarded as to merely find an alternative mounting position of the camera. Rather, the claimed mounting position provides the effect that an optical image can be generated independently of the shutter opening of the collimator such that a larger image of the patient can be taken by the camera. The objective technical problem solved starting from B1 is thus considered that of providing an image which is

independent of the shutter position.

In B1, the camera is fixed to the X-ray generator, and a mirror deflects the light coming in through the shutters of the collimator towards the camera. Thus, an appropriate mounting position, which avoids errors due to parallax, has been provided, and B1 teaches against a camera position on the outside of the collimator. The general statement in B1 that "[t]he camera may in principle be arranged at any place from where it can generate the desired optical image of the object" (column 2, lines 35 to 36) does not motivate the person skilled in the art to mount the camera on the collimator in the position as defined in claims 1 and 7 to solve the problem described above.

Furthermore, the invention as claimed in claims 1 and 7 is not rendered obvious by the teaching of B2 or B3. B2 relates to an apparatus for automatically determining the position of a patient in a medical image (Figure 3) and does not refer to any correlation between the image obtained by the laser scanner 28, 29 and the image of the X-ray irradiation region. B3 discloses an X-ray device including a device for measuring the distance between the X-ray source and the patient. This measuring device comprises a camera 41 (Figure 1). However, the image generated by this camera is not displayed to a user such that it overlaps with an image of an X-ray irradiation region. Hence, the cameras in B2 and B3 are provided for a different purpose and exhibit a different functionality from the camera according to claim 1. Therefore, the person skilled in the art, when seeking a solution to the problem of providing an image which is independent of the shutter position, would not take the teaching of these documents into account.

Consequently, the subject-matter of claims 1 and 7 is based on an inventive step starting from B1.

9. Inventive step starting from E1 in combination with either of B2 and B3 - Article 56 EPC

E1 also does not disclose the mounting position of the camera at the front end of the collimator.

Considering this combination too, the board does not agree with the appellant that the problem to be solved is to provide a simpler device. The objective technical problem is instead to provide a camera position from which the patient can be imaged without any influence by the shutters of the collimator. For the reasons mentioned under point 8 above, the solution to this problem as defined in claim 1 is not rendered obvious by B2 or B3.

Consequently, the subject-matter of claims 1 and 7 also involves an inventive step starting from E1.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

D. Hampe M. Alvazzi Delfrate

Decision electronically authenticated