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Datasheet for the decision of 6 March 2019

Case Number: T 1764/14 - 3.2.02

Application Number: 06004252.0

Publication Number: 1698280

IPC: A61B6/00

Language of the proceedings: EN

Title of invention:
X-ray diagnostic apparatus

Applicant:
Toshiba Medical Systems Corporation

Headword:

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
Novelty - main request (no)
Inventive step - auxiliary requests (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 1764/14 - 3.2.02

D E C I S I O N
of Technical Board of Appeal 3.2.02
of 6 March 2019

Appellant: (Applicant)	Toshiba Medical Systems Corporation 1385, Shimoishigami, Otawara-Shi, Tochigi-Ken 324-8550 (JP)
Representative:	Kramer Barske Schmidtchen Patentanwälte PartG mbB European Patent Attorneys Landsberger Strasse 300 80687 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 24 March 2014 refusing European patent application No. 06004252.0 pursuant to Article 97(2) EPC**

Composition of the Board:

Chairman	E. Dufrasne
Members:	D. Ceccarelli
	M. Stern

Summary of Facts and Submissions

I. The applicant has appealed against the Examining Division's decision to refuse European patent application No. 06 004 252.0. The written decision was despatched on 24 March 2014.

II. Notice of appeal was filed on 16 May 2014. The appeal fee was paid on the same day. The statement setting out the grounds of appeal was received on 28 July 2014.

III. The Board summoned the appellant to oral proceedings and provided its preliminary opinion in a communication accompanying the summons.

In the Board's view, the subject-matter of claim 1 of the main request appeared to lacked novelty, and the subject-matter of claim 1 of auxiliary request I appeared to lack inventive step in view of the following document:

D2: US-A-4,922,512

IV. Oral proceedings took place on 6 March 2019.

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of one of the main request, filed on 21 January 2014, auxiliary request I filed with letter dated 28 July 2014, auxiliary request II filed with letter dated 6 February 2019 and auxiliary request III filed during the oral proceedings.

V. **Claim 1 of the main request** reads as follows.

"An X-ray diagnostic apparatus characterized by

comprising:

a floor rotating arm (54), one end of the floor rotating arm being mounted on a floor surface so as to be rotatable around a substantially vertical first rotation axis (Z1);

a stand (53) mounted on the other end of the floor rotating arm so as to be rotatable around a substantially vertical second rotation axis (Z2);

an arm holder (52) mounted on the stand so as to be rotatable around a substantially horizontal third rotation axis (Z3);

a substantially C-shaped (51) C-arm mounted on the arm holder so as to be slidable around a substantially horizontal fourth rotation axis (Z4), with an isocenter at which the fourth rotation axis intersects the third rotation axis being located on the first rotation axis when the C-arm is located immediately above the floor rotating arm;

an X-ray generating unit (1) mounted on one end of the C-arm and comprising a collimator rotatable around an imaging axis (SA);

an X-ray detecting unit (2) mounted on the other end of the C-arm and rotatable around the imaging axis (SA);

a catheterization table (18) having a tabletop (17) which is movable in a longitudinal direction, and in which the first rotation axis intersects a central line of the table top; and

a control unit (33) which controls rotation of the floor rotating arm around the first rotation axis and rotation of the stand around the second rotation axis upon interlocking therebetween in accordance with a specific user instruction such that the C-arm is located immediately above the floor rotating arm and a first posture line (PL1) connecting the first rotation axis (Z1) to the second rotation axis (Z2) and a second

posture line (PL2) connecting the second rotation axis (Z2) to the imaging axis (SA) incline at a predetermined angle with respect to the central line of the table top, wherein the imaging axis (SA) coincides with the first rotation axis (Z1)."

Claim 1 of auxiliary request I differs from claim 1 of the main request only in the definition of the control unit, which is as follows (differences highlighted by the Board):

"a control unit (33) ~~which controls~~ for controlling rotation of the floor rotating arm around the first rotation axis and rotation of the stand around the second rotation axis upon interlocking therebetween in accordance with a specific user instruction based on an operation of a button (229, 230, 231) such that the C-arm is automatically and quickly shifted to a posture where the C-arm is located immediately above the floor rotating arm and a first posture line (PL1) connecting the first rotation axis (Z1) to the second rotation axis (Z2) and a second posture line (PL2) connecting the second rotation axis (Z2) to the imaging axis (SA) incline at a predetermined angle with respect to the central line of the table top, wherein the imaging axis (SA) coincides with the first rotation axis (Z1) and the predetermined angle is finely adjustable by manually operating a button (211, 212)."

Claim 1 of auxiliary request II differs from claim 1 of auxiliary request I only in the addition of the following wording at the end of the claim:

"wherein the control unit controls rotation of the floor rotating arm around the first rotation axis (Z1) after controlling, in accordance with the specific user

instruction, rotation of the stand around the second rotation axis (Z2) so that the imaging axis (SA) substantially coincides with the first rotation axis (Z1)."

Claim 1 of auxiliary request III differs from claim 1 of auxiliary request I only in the addition of the following wording at the end of the claim:

"wherein the control unit performs to control rotation of the floor rotating arm around the first rotation axis (Z1) and performs control to correct a direction of an image in accordance with rotation of the X-ray detecting unit or the collimator after controlling, in accordance with the specific user instruction, rotation of the stand around the second rotation axis (Z2) so that the imaging axis (SA) substantially coincides with the first rotation axis (Z1)."

VI. The appellant's arguments, where relevant to the present decision, may be summarised as follows.

Main request

D2 did not disclose a floor rotating arm with one end being mounted on a floor surface so as to be rotatable around a substantially vertical rotation axis, wherein a stand is mounted on the other end of the floor rotating arm. D2 did not disclose either that the rotation of the floor rotating arm and the rotation of the stand were controlled upon interlocking therebetween such that the floor rotating arm and the stand were rotated together in an interlocked state to a predetermined position. There was no disclosure of a control unit altogether. Moreover, the cited documents of the prior art did not disclose a C-arm that was

rotated in accordance with a specific (single) user instruction at a single move to the predetermined position. Figure 4 of D2, which showed two positions of an X-ray diagnostic apparatus with respect to an examination table, only had the purpose of showing how the scan of the whole body of a patient lying on the examination table could be done by a combined rotation around two axes, without moving the table, as described in column 5, lines 44 to 52 of D2. There was no disclosure that each of the possible rotations about the respective axes could be independently controlled.

Auxiliary request I

Claim 1 of auxiliary request I specified the provision of a specific user instruction for automatically and quickly moving the C-arm of the apparatus to a predetermined posture and the adjustment of a predetermined angle by operating two different buttons, i.e. an approach position button and another button. Such buttons were not disclosed in D2. The order of the steps in the claim made clear that the specific user instruction, causing rotation of the floor rotating arm and the stand, was imparted before a further instruction which caused the adjustment of the predetermined angle. The term "finely", referring to the adjustment of the predetermined angle, made clear that that adjustment was the final operation controlled by the control unit. It followed that the subject-matter of claim 1 of auxiliary request I was inventive, since an X-ray apparatus was provided which could quickly and safely be moved away from the patient so as to quickly ensure, if needed, a large working space for an operator to approach a jugular position of a subject to be examined.

Auxiliary request II

In claim 1 of auxiliary request II, it had been made clear that the rotation of the floor rotating arm was controlled after the rotation of the stand. It followed that the isocenter did not move during rotation of the floor rotating arm. In contrast, D2 was directed to a technique of moving the isocenter linearly.

Auxiliary request III

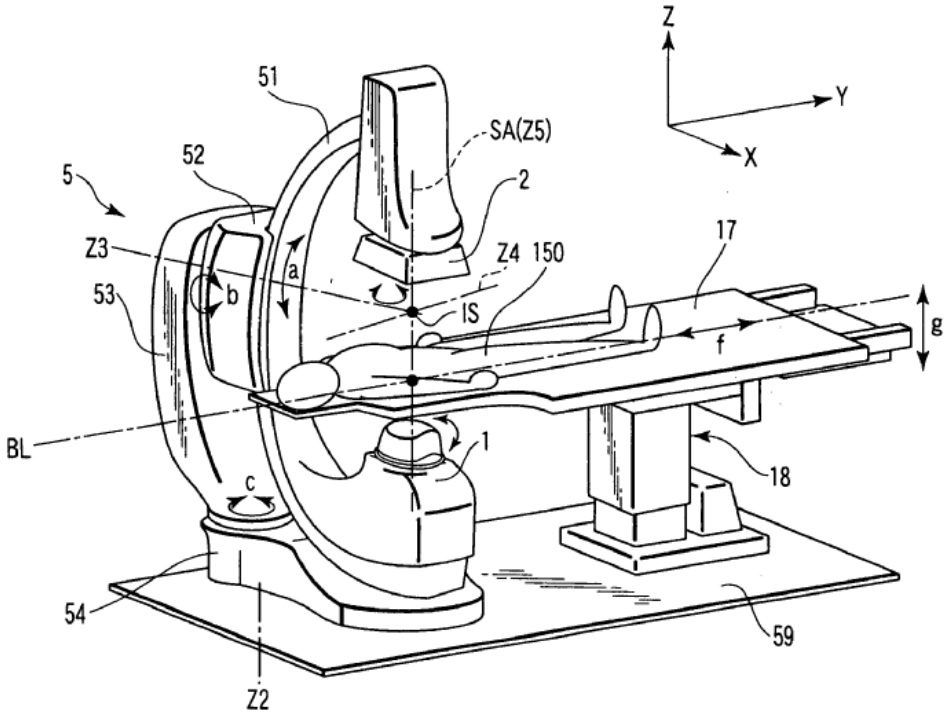
Claim 1 of auxiliary request III specified further, that the control unit performed control to correct a direction of an image in accordance with the rotation of the X-ray detecting unit or the collimator. Such an important correction was not disclosed in the cited prior art and rendered the subject-matter of the claim inventive. The claim had also been amended for consistency in that it specified that the control unit "performs to control rotation" instead of "controls rotation".

Reasons for the Decision

1. The appeal is admissible.

2. The invention

The invention relates to an X-ray diagnostic apparatus for positioning an X-ray generating unit and an X-ray detecting unit around a patient lying on a catheterization table, for example as shown in figure 2 of the application, reproduced below.



The X-ray units (1, 2) are held on opposite ends of a C-arm (51) and are rotatable around the same imaging axis (SA). The C-arm is held by an arm holder (52) and can rotate with respect to the arm holder around a substantially horizontal axis (Z4). The arm holder is mounted on a stand (53) and can rotate with respect to the stand around a further substantially horizontal axis (Z3), perpendicular to Z4. SA can assume various directions but always passes through the point of intersection of Z3 and Z4, the isocenter (IS). The stand is mounted on a floor rotating arm (54) and can rotate around a substantially vertical axis (Z2) with respect to the floor rotating arm. The floor rotating arm can rotate around a further substantially vertical axis (Z1, coinciding with SA in the figure) with respect to the floor. The catheterization table (18) has a table top (17) with a central line (nearly coinciding with BL) intersecting Z1.

The X-ray diagnostic apparatus further comprises a control unit for controlling the rotation of the floor rotating arm around its axis Z1 and the rotation of the stand around its axis Z2 to bring the C-arm into a position in which axes Z1 and SA coincide. In that position, a first and a second posture lines, respectively connecting axes Z1 and SA with axis Z2, incline at a predetermined angle with respect to the central line of the table top. Figures 5B, 5C and 6A, reproduced below, illustrate configurations of the apparatus satisfying this condition.

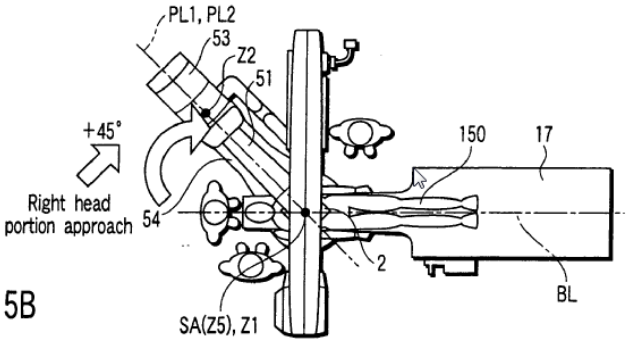


FIG. 5B

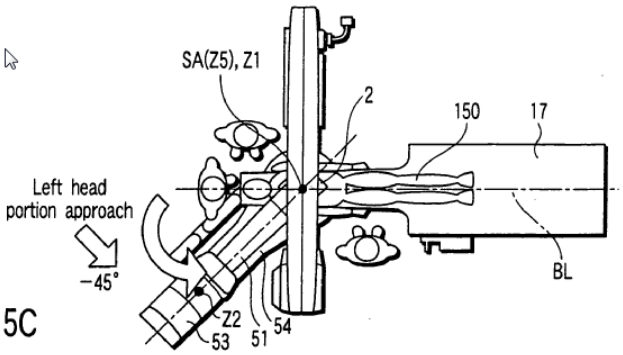


FIG. 5C

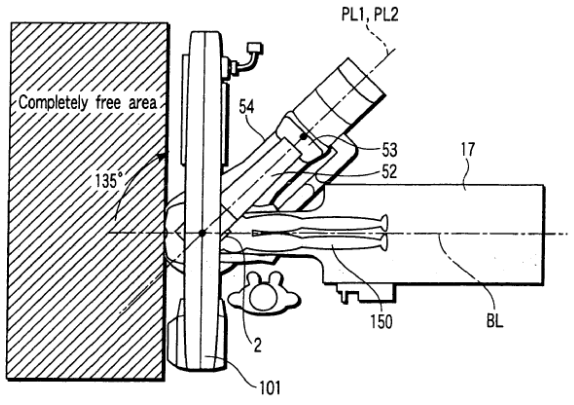


FIG. 6A

According to the application (paragraph [0011] of the published version), especially this last feature makes it possible to easily free working space around particular regions of the patient.

3. Main request

The subject-matter of claim 1 of the main request lacks novelty over D2.

D2 relates to an X-ray apparatus which permits isocentric scanning of a patient at multiple angles of incidence (column 1, lines 7 to 10). With reference to figures 1 and 4, reproduced below, the apparatus comprises a floor rotating arm (24), a stand (25), an arm holder (14), a C-arm (13), an X-ray generating unit (11) comprising a collimator (column 5, lines 20 to 24 and 59 to 61), an X-ray detecting unit (12), and a catheterization table (15) as defined in claim 1.

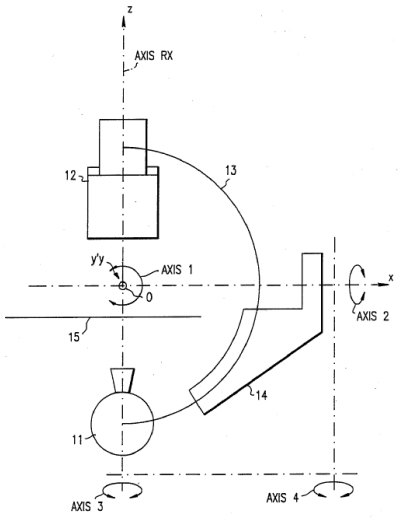


FIG. 1

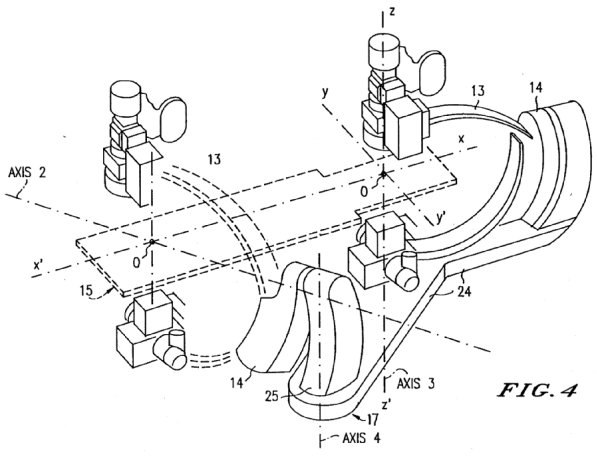


FIG. 4

The axes of relative rotation of these elements correspond to the claimed ones according to the following scheme:

Z1=AXIS 3
Z2=AXIS 4
Z3=AXIS 2
Z4=AXIS 1
SA=AXIS RX

The appellant argued that D2 did not disclose a floor rotating arm as claimed. However, element 24 in figure 4 is such a floor rotating arm since it has one end mounted on a floor surface and rotatable around vertical axis 3, and an opposite end supporting stand 25 (column 5, line 61 to column 6, line 4).

The presence of a control unit, disputed by the appellant, is implicit for apparatuses of the kind disclosed in D2 in view of the disclosed possibility of obtaining "a scan of the isocenter over a patient's entire body without having to displace the examination table" (column 5, lines 48 to 52) by a combined rotation around two axes. It is technically unreasonable that such a combined rotation should be performed manually. Moreover, column 2, lines 62 to 64, mentions a movement taking place "under the control of the operator", which equally presupposes the presence of a control unit.

The appellant further argued that D2 did not disclose that each of the possible rotations about the respective axes could be independently controlled. The Board does not share this view. First of all, the presence of those distinct axes of rotation alone makes it technically reasonable to associate them with distinct degrees of freedom of the X-ray apparatus, which implies an independent control of each possible rotation. Moreover, the description in D2 of all the possible movements which can be obtained by angular

movements about AXES 1, 2, 3 and 4 (column 3, line 22 to column 4, line 62) presupposes that each of the possible rotations about the respective axis can be independently controlled. In this context, the particular movement to obtain a scan of the whole body of a patient lying on the examination table by a combined rotation around two axes (column 5, lines 44 to 52), referred to by the appellant, is only one of the possible movements obtainable with the apparatus of D2.

Since the claimed configuration with the C-arm located immediately above the floor rotating arm (AXIS RX coinciding with AXIS 3) is shown in figure 1, and AXES 3 and 4 can rotate (independently from each other) in a broad angle range (column 3, lines 55 to 58) to permit freedom of access to the patient's head (column 5, lines 52 to 55), the apparatus of D2 can be controlled to reach, in the defined interlocked state, the predetermined position defined by reference to a predetermined angle of the posture lines with respect to the central line of the table top, according to claim 1. The mere possibility of such a control implies the possibility of instructing the apparatus accordingly, i.e. by means of a "specific user instruction" as defined in the claim.

Hence, D2 anticipates all the features of claim 1 of the main request.

The appellant argued on the basis of a "specific (single) user instruction" allegedly requiring that the claimed configuration be reached by rotating the C-arm "at a single move". However, the claim merely requires that the control be performed in accordance with a specific user instruction. There is no definition of

how the specific user instruction is imparted. Hence, the appellant's references to a "single move" and a "single instruction" is of no relevance.

It follows that the main request cannot be allowed since, contrary to the requirements of Article 52(1) EPC, the subject-matter of claim 1 is not patentable for lack of novelty over D2 (Article 54(1) and (2) EPC).

4. Auxiliary request I

Claim 1 of auxiliary request I further requires that the specific user instruction is based on an operation of a button and causes the C-arm to "automatically and quickly" reach the posture in which the C-arm is located immediately above the floor rotating arm, and that the predetermined angle of the posture lines with respect to the central line of the table top is "finely adjustable by manually operating a button".

The Board agrees with the appellant that D2 does not disclose that instructions can be imparted by operating buttons.

As regards the suitability of the control unit of D2 for automatically and quickly moving the C-arm and for finely adjusting the predetermined angle, the Board considers that this suitability is inherent to D2, in particular since "quickly" and "finely" are relative and unprecise terms.

The Board further notes that the claim does not define an approach position or an approach position button. The claim does not specify either that two distinct and sequential instructions, for first moving the C-arm of

the apparatus to a predetermined posture and then adjusting a predetermined angle, are imparted. In this respect, the fact that the two functional features of the control unit (i.e. its suitability for "automatically and quickly" moving the C-arm to the predetermined position defined by reference to a predetermined angle of the posture lines with respect to the central line of the table top, and for enabling a fine adjustment of that predetermined angle) are defined one after the other, does not imply that the fulfilment of the two functional features depends on sequential instructions. Contrary to the appellant's arguments, there is not even a definition of a time scale or sequence in claim 1 of auxiliary request I, in particular since it is a device claim. The term "finely", referred to by the appellant, has nothing to do with a time scale or sequence, as it qualifies how the predetermined angle can be adjusted.

In view of the above, the defined possibility of imparting instructions by operating buttons is in no direct relation to the effect, mentioned by the appellant, of quickly and safely moving the X-ray apparatus away from the patient. Rather, it has to be seen as addressing the problem of imparting specific user instructions for moving the C-arm to the predetermined position defined by reference to a predetermined, yet adjustable, angle of the posture lines with respect to the central line of the table top.

D2 is silent on how user instructions for moving the X-ray apparatus are to be imparted. The skilled person, desiring to devise an input interface for the apparatus of D2, would have to choose one of a number of equivalent, known technical means. For example,

providing a touch screen with a virtual button (virtual buttons are also contemplated in the present application - figure 4 and paragraph [0028] of the published version) for setting angles of rotation around a certain axis, and with a further button for imparting the order of performing the set movement, would be one of several equally obvious possibilities. The fact that such a touch screen is per se known, put forward by the Board during the oral proceedings, was not disputed by the appellant.

It follows that the skilled person would arrive at the subject-matter of claim 1 of auxiliary request I in an obvious way.

Hence, auxiliary request I cannot be allowed since, contrary to the requirements of Article 52(1) EPC, the subject-matter of claim 1 is not patentable for lack of inventive step (Article 56 EPC).

5. Auxiliary request II

Compared with claim 1 of auxiliary request I, claim 1 of auxiliary request II merely adds the suitability of the control unit for controlling rotation of the floor rotating arm after controlling the rotation of the stand. This suitability depends on a specific user instruction only qualified by the fact that it can be imparted by operating buttons. In particular, the claim does not specify that distinct and sequential instructions are imparted.

The suitability of the control unit of D2 for controlling rotation of the floor rotating arm after controlling the rotation of the stand in accordance with a specific user instruction is given, since each

of the possible rotations about the respective axes can be independently controlled, as explained above.

It follows that the subject-matter of claim 1 of auxiliary request II is not inventive for the same reasons as those provided in relation to auxiliary request I.

Hence, auxiliary request II cannot be allowed since, contrary to the requirements of Article 52(1) EPC, the subject-matter of claim 1 is not patentable for lack of inventive step (Article 56 EPC).

6. Auxiliary request III

Compared with claim 1 of auxiliary request II, claim 1 of auxiliary request III essentially adds the suitability of the control unit for correcting a direction of an image in accordance with rotation of the X-ray detecting unit or the collimator after controlling the rotation of the stand. This suitability, which amounts to the suitability for performing a certain rotation about the imaging axis, depends on a specific user instruction only qualified by the fact that it can be imparted by operating buttons. In particular, the claim does not specify that distinct and sequential instructions are imparted. The further amendment of the claim, reciting that the control unit "performs to control rotation" instead of "controls rotation" does not introduce any further limitation of the subject-matter claimed. The appellant did not argue otherwise.

The suitability of the control unit of D2 for performing any rotation about the imaging axis after controlling the rotation of the stand in accordance

with a specific user instruction is given, since each of the possible rotations about the respective axes can be independently controlled, as explained above.

It follows that the subject-matter of claim 1 of auxiliary request III is not inventive for the same reasons as those provided in relation to auxiliary request I.

Hence, auxiliary request III cannot be allowed since, contrary to the requirements of Article 52(1) EPC, the subject-matter of claim 1 is not patentable for lack of inventive step (Article 56 EPC).

7. Since none of the appellant's requests can be allowed, the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Hampe E. Dufrasne

Decision electronically authenticated