

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [X] To Chairmen
(D) [] No distribution

D E C I S I O N
of 18 June 2002

Case Number: T 0138/00 - 3.4.2
Application Number: 92911202.7
Publication Number: 0587648
IPC: H05G 1/38, H05G 1/44, H05G 1/60,
A61B 6/14, H04N 5/32

Language of the proceedings: EN

Title of invention:
Method and device for triggering of X-ray image sensor

Patentee:
AFP Imaging Corporation

Opponent:
Sirona Dental Systems GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Inventive step (confirmed)"

Decisions cited:
-

Catchword:
-



Case Number: T 0138/00 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 18 June 2002

Appellant: Sirona Dental Systems GmbH
(Opponent) Fabrikstrasse 31
D-64625 Bensheim (DE)

Representative: Sommer, Peter
Sommer
Patentanwalt und European Patent
and Trademark Attorney
Am Oberen Luisenpark 5
D-68165 Mannheim (DE)

Respondent: AFP Imaging Corporation
(Proprietor of the patent) 250 Clearbrook Road
Elmsford, NY 10523 (US)

Representative: Svanfeldt, Hans-Ake
DR. LUDWIG BRANN PATENTBYRA AB
P.O. Box 1344
SE-751 43 Uppsala (SE)

Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 22 November 1999
rejecting the opposition filed against European
patent No. 0 587 648 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: E. Turrini
Members: A. G. Klein
B. J. Schachenmann

Summary of Facts and Submissions

I. European patent No. 0 587 648 (application number 92 911 202.7) was granted with a set of claims comprising five independent claims, of which independent claims 1, 8 and 10 read as follows:

"1. A method of triggering the generation of an X-ray image by an image sensing member (5) in an X-ray imaging arrangement, said X-ray imaging arrangement comprising said image sensing member (5), an X-ray source, preferably for dental X-ray, a control device for controlling the X-ray source, a radiation sensitive sensor means (2,3,4) for detecting X-ray radiation, and one or more electronic circuitry units for connection of the image sensing member (5) to a personal computer having a display screen,

wherein said sensor means (2,3,4), comprising at least two sensor elements placed on the rear side of the image sensing member (5), when sensing X-ray radiation, generates electric current signals which trigger the generation of the X-ray image,
and wherein an interfacing first electronic circuitry unit (10) interfaces the electric current signals obtained from said sensor means (2,3,4),

characterized by the use of a sensor arrangement, constituting said sensor means comprising at least two discrete sensor elements (2,3,4) spread out over said rear side of said image sensing member (5) at mutually distant locations such as

to ensure that at least one sensor element is accessed by sufficient X-ray radiation for triggering the generation of the X-ray image."

"8. An X-ray imaging arrangement comprising an X-ray source, preferably for dental X-ray, a control device for controlling the X-ray source, an image sensing member (5), preferably of the CCD type, a personal computer having a display screen, electronic circuitry units (10,20,40) between said image sensing member (5) and said personal computer, and a sensor means (2,3,4) comprising at least two sensor elements placed on the rear side of said image sensing member (5), wherein an interfacing first electronic circuitry unit (10), preferably at the rear side of said image sensing member (5), interfaces the electric signals obtained from said sensor means (2,3,4), wherein said sensor means (2,3,4), when subject to X-ray radiation, generates electric signals triggering the generation of the X-ray image, characterized in that said sensor means is a sensor arrangement comprising at least two discrete sensor elements (2,3,4) spread out over the rear side of the image sensing member (5) at mutually distant locations for ensuring that, in use, at least one sensor element may be accessed by sufficient X-ray radiation for triggering the generation of the X-ray image."

"10. Use of the X-ray imaging arrangement according to Claim 8, wherein said sensor elements (2,3,4) are arranged at the rear side of the image sensing member (5) facing away from the X-ray source, such as not to be blocked by a pattern of picture

elements produced by said X-ray radiation in said image sensing member, forming the imaging of tissue or bone lying between said X-ray source and said image sensing member."

II. The opposition filed against the patent and founded on the ground under Article 100(a) EPC that the subject-matter of independent claims 1, 8 and 10 did not involve an inventive step in view of the disclosure in document

D1: EP-A-0 415 075

was rejected by the opposition division.

III. The appellant (opponent) lodged an appeal against the opposition division's decision.

IV. Oral proceedings were held on 18 June 2002 at which, in addition to document D1 the following further citations as filed by the appellant with its statement of the grounds of appeal were also referred to:

B1: Textbook "Halbleiter-Schaltungstechnik"; U.Tietze, Ch.Schenk; 5th Edition; Springer Verlag Berlin, Heidelberg, New York 1980; pages 184 to 187, 189 and 190;

B3: Databook 1981/1982 "Opto-Halbleiter"; Siemens Aktiengesellschaft; pages 148, 149, 158, 159, 236, 237 and 277; and

B4: Databook 1985/1986 "Si-Fotodioden und IR-Lumineszenzdioden"; Siemens Aktiengesellschaft, pages 193, 324 and 325.

At the end of the oral proceedings, the appellant requested that the decision under appeal be set aside and that the patent be revoked to the extent of the independent claims 1, 8 and 10.

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

After deliberation, the Chairman announced the board's decision.

- V. The appellant's arguments in support of its request can be summarised as follows.

Document D1 discloses a dental X-ray image sensing member to be inserted into the mouth of a patient. In order to control operation of the X-ray image sensing member without the need for a direct signal connection between the X-ray source and the imaging arrangement, an X-ray sensor is provided at the image sensing member so as to detect the presence of X-ray radiation.

In this prior art arrangement, X-ray detection by the sensor might be impaired by the presence of obstacles like metallic fillings or dental implants located on the radiation path between the X-ray source and the sensor.

The X-ray sensor of document D1 may expressly comprise several phototransistors, so that it already extends over a certain surface area as illustrated on the drawing quoted B2, filed with appellant's letter of 30 March 2000. Documents B3 and B4 also show that at the filing date of the patent photodetectors comprising a number of adjacent, individually addressable

detection areas were available to the skilled person. Electronic circuits for adding the signals delivered by such individual detection areas so as to trigger a signal if any of these receives radiation were known as well, as is evidenced for instance by document B1.

When implementing the X-ray sensor means of document D1 using the components then available as shown in documents B1, B3 and B4, the skilled person would without the exercise of any inventive ingenuity have been capable of determining the most convenient arrangement of the individual detection areas relatively to each other, so as to avoid the obvious difficulty of the sensor being shaded from X-ray radiation by anatomical obstacles.

VI. The respondent for its part submitted that document D1 only taught the provision of an X-ray sensor at a single small region of the X-ray image sensing member. The skilled person confronted with a sporadic malfunction of the imaging device would not have readily realised that this difficulty could be overcome by an adequate re-arrangement of the sensor areas. He would instead have simply proceeded to a new exposure whenever required.

Moreover, had the skilled person actually realised that incorrect exposure of the X-ray image was caused by the sensor being shaded from X-ray radiation by an anatomical obstacle, he would at most have envisaged increasing the active area of the sensor to overcome this problem. This would however not have yielded the claimed solution of providing several sensor elements spread out over the image sensing surface at mutually distant locations.

Reasons for the Decision

1. The appeal is admissible.
2. *Novelty of the subject-matter of claim 1*

Document D1 undisputedly discloses a method of triggering the generation of an X-ray image by an image sensing member in an X-ray imaging arrangement as is set out in the preamble of claim 1 of the patent in suit, said X-ray imaging arrangement comprising an image sensing member 7, an X-ray source 4, preferably for dental X-ray, a control device 6 for controlling the X-ray source, a radiation sensitive sensor means 15, 15' for detecting X-ray radiation, and one or more electronic circuitry units 11 for connection of the image sensing member 7 to a personal computer having a display screen 14, wherein said sensor means 15, 15' comprising at least two sensor elements placed on the rear side of the image sensing member 7, when sensing X-ray radiation, generates electric current signals which trigger the generation of the X-ray image, and wherein an interfacing first electronic circuitry unit 10 interfaces the electric current signals obtained from said sensor means 15, 15' (see the figure and column 2, line 28 to column 3, line 32, in particular column 3, lines 18 to 21 for the use of at least two sensor elements and column 3, lines 22 to 27 for the placing of the sensor elements on the rear side of the image sensing member 7).

From the reference in document D1 to the sensor means detecting X-ray radiation at a point ("in einem Punkt") the skilled person would in the board's opinion

understand that the active area of the sensor means is limited to a small region, which in the case of the sensor means being constituted by several phototransistors implies that these are located closely adjacent to each other, as in the prior art devices disclosed for instance in documents B3 (see page 236) and B4 (see page 325). The board cannot in this respect endorse the appellant's view, illustrated by the drawing B2 filed with its letter of 30 March 2000 that document D1 already discloses sensor means having a substantial surface area.

In contrast, the method set out in claim 1 involves the use of sensor means comprising at least two discrete sensor elements spread out over the rear side of the image sensing member at mutually distant locations such as to ensure that at least one sensor element is accessed by sufficient X-ray radiation for triggering the generation of the X-ray image.

The appellant did not identify any prior art arrangement which would come closer to the claimed subject-matter than document D1.

For these reasons, the subject-matter of claim 1 is novel within the meaning of Article 54 EPC.

3. *Inventive step involved by the subject-matter of claim 1*

3.1 A drawback of the closest prior art method of document D1 is that the single radiation detector may be shaded from X-ray radiation by an anatomic obstacle like bone, a tooth, a filling or an implant, when the imaging device is placed into the oral cavity of a

patient and that it will then detect little or no radiation at all (see the specification of the patent in suit, column 2, lines 27 to 33).

This drawback is considerably alleviated by the provision of at least two discrete sensor elements spread out over the rear side of the image sensing member at mutually distant locations such as to ensure that at least one sensor element is accessed by sufficient X-ray radiation for triggering the generation of an X-ray image, in accordance with the characterising features of claim 1.

Thus, the technical problem underlying the claimed subject-matter, when formulated so as not to unfairly comprise pointers at the claimed solution, can be seen in improving the X-ray investigation method of document D1 in such a way as to reduce the number of unsatisfactory exposures.

- 3.2 None of the documents relied upon by the appellant is dedicated to the above problem, nor do they establish any relationship between the position of an X-ray sensor in an X-ray imaging arrangement, the risk of it being shaded by anatomic obstacles and the quality of the exposures taken.

Such relationship could not in the board's view have been readily established by the skilled person in normal use of the apparatus. As a matter of fact, anatomic characteristics vary from patient to patient, and the position of the image sensing member when taking successive images from a same patient would also be subject to variations. In these circumstances, a systematic correlation between the occurrence of

unsatisfactory exposures and the precise position of the radiation sensor means in relation to a patient's particular anatomic structure could not have been easily observed.

In addition, even if the skilled person had actually been made aware of the above technical problem posed by the prior art method of document D1, the board cannot find in the documents relied upon the appellant any obvious hint towards the claimed solution, which involves the use of at least two discrete sensor elements arranged at mutually distant locations.

In particular, the photodetectors on pages 184 to 187 of document B1 comprise single sensor elements only, and pages 189 and 190 are dedicated to linear and non-linear analog circuits using operational amplifiers for adding signals, there being no suggestion to combine them with any kind of radiation sensors.

Documents B3 and B4 disclose photodetectors comprising several closely adjacent sensor elements for use *inter alia* as position detecting or encoding means. In such applications a dense packing together of the individual sensor elements is essential, as is stressed expressly for instance on page 236 of document B3 ("Die Einzeldioden sind durch einen Abstand von nur 12 µm voneinander getrennt. Dadurch ist eine sehr genaue Positionierung mit hoher Auflösung möglich"). This can hardly be considered to suggest the claimed spreading out of the sensor elements over the image sensing area.

For these reasons, the subject-matter of independent claim 1 is considered to involve an inventive step within the meaning of Article 56 EPC in view of the

citations in the file.

4. The above conclusion equally applies to the subject-matter of independent claims 8 and 10, which substantially define the same technical limitations in terms of an X-ray imaging arrangement and of its use, and to the dependent claims as appended thereto.

The remaining independent claims 2 and 9 were not encompassed by the opposition filed against the patent. The board therefore has no power to examine these claims (see G 9/91, OJ EPO 1993, 408).

Since for the above reasons the grounds for opposition invoked against the patent do not prejudice its maintenance in unamended form, rejection of the opposition by the opposition division was justified.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

P. Martorana

E. Turrini