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Bezeichnung der Erfindung: A method and a device relating to a transmission
Title of invention: ion chamber
Titre de l'invention :

Klassifikation / Classification / Classement : G01T 1/29, H01J 47/02

ENTSCHEIDUNG / DECISION

vom / of / du 20 September 1988

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Instrument AB Scanditronix

Einsprechender / Opponent / Opposant :

Siemens AG

Stichwort / Headword / Référence :

EPU / EPC / CBE Articles 54 and 56 EPC

Schlagwort / Keyword / Mot clé :

"Disclosure of features solely by a
diagrammatic representation in a prior art
document (no)"; "Inventive step (yes)"

Leitsatz / Headnote / Sommaire

The technical teaching in a prior art document should be considered in its entirety, as it would be done by a person skilled in the art. It is not justified to arbitrarily isolate parts of such document from their context in order to derive therefrom a technical information, which would be distinct from or even in contradiction with the integral teaching of the document. Thus, a technical feature which is derived from or based on dimensions obtained from a diagrammatic representation and which technically contradicts the teaching of the description, does not form part of the disclosure of this document.

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Boards of Appeal

Chambres de recours

Case Number : T 56 /87 - 3.4.1



D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 20 September 1988

Appellant :
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Representative :

Decision under appeal : Decision of Opposition Division of the European
Patent Office dated 12 December 1986 revoking
European patent No. 0 040 589 pursuant to Article
102(1) EPC.

Composition of the Board :

Chairman : K. Lederer

Members : H. Reich

C. Payraudeau

Summary of Facts and Submissions

- I. The Appellant is owner of European patent 0 040 589 (application number 81 850 075.3).

The patent comprises two claims, which are both independent and read as follows:

"1. A method of controlling a divergent beam of rays, said method comprising the steps of:

- (a) inserting a rotationally symmetric primary collimator (9) in said beam;
- (b) locating a transmission ion chamber (11) in said beam emerging from the primary collimator, said ion chamber including at least four flat inner ion trapping electrodes (15 to 18) located near the center of the ion chamber and at least four flat outer ion trapping electrodes (19 to 22) located near the periphery of the ion chamber;
- (c) positioning the inner electrodes so that said beam steadily strikes the whole surface of said inner electrodes;
- (d) positioning the outer electrodes so that said beam steadily strikes a first part of the surface of said outer electrodes, the remaining part of the surface of said outer electrodes lying in the shadow of the primary collimator;
- (e) deriving electrical signals from said inner and outer electrodes;

(f) utilising said electric signals via control elements (3 to 6; 23 to 26) for correcting any deviation errors in the beam, i.e. any angular deviation of the beam in respect to the direction of rotational symmetry axis of the primary collimator, and for correcting any centering errors in the beam, i.e. any linear displacements of the beam in respect to said rotational symmetry axis with reference to the beam emission point (8), said step (f) being characterized by utilising the electric signals from the inner electrodes (15 to 18) for correcting said deviation errors in the beam and by utilising the electric signals from the outer electrodes (19 to 22) for correcting said centering errors in the beam.

2. A transmission ion chamber system for carrying out the method according to Claim 1, a rotational symmetric primary collimator being inserted in a divergent beam of therapeutic rays and said ion chamber (11) being located in said beam between the primary collimator (9) and a surface (12) to be irradiated with said beam, said chamber including at least four flat inner ion trapping electrodes (15 to 18) located near the center of the ion chamber and at least four flat outer ion trapping electrodes (19 to 22) located near the periphery of the ion chamber, the inner electrodes being positioned so that said beam steadily strikes the whole surface of said inner electrodes and the outer electrodes being positioned so that said beam steadily strikes a first part of the surface of said outer electrodes, the remaining part of the surface of said outer electrodes lying in the shadow of the primary collimator, said inner and outer electrodes emitting electrical signals which are fed to first and second control elements (3 to 6; 23 to 26) for correcting any deviation errors in the beam, i.e. any angular deviation of the beam in respect to the direction of the

rotational symmetry axis of the primary collimator, and for correcting any centering errors in the beam, i.e. any linear displacements of the beam in respect to said rotational symmetry axis with reference to the beam emission point (8), said system being characterized by the fact that the electric signals from the inner electrodes (15 to 18) feed the first control elements (3,4; 23,24) which correct said deviation errors in the beam and that the electric signals from the outer electrodes (19 to 22) feed the second control elements (5, 6; 25, 26) which correct said centering errors in the beam."

- II. The Respondent filed notice of opposition against the European patent and requested revocation of the patent in its entirety on the ground of lack of inventive step in view of the prior art disclosed, in particular, in the document:

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and in view of the normal skill of the expert.

- III. The Opposition Division revoked the patent on the ground of lack of inventive step in the subject-matter of the claims.

It considered in particular that the positioning of the outer electrodes in the shadow of the collimator set out in step (d) of Claim 1 and in the corresponding part of Claim 2 was disclosed by Figure 1 of document D1, since it was easily seen that the prolongations of the generating lines defining the opening of the collimator as shown in the figure would intersect the outer electrodes of the ion chamber. Accordingly, the subject-matter of the claims was distinguished from the prior art disclosed in document D1 only by a different use of the respective signals from the

inner and outer electrodes to achieve correct beam alignment, which use however resulted from an obvious choice between two possible alternatives only, one of which was already known from document D1.

- IV. An appeal against this decision was lodged by the Proprietor of the patent.
- V. Oral proceedings were held at the end of which the Appellant (Proprietor of the patent) requested that the decision under appeal be set aside and that the opposition be rejected.

The Respondent (Opponent) requested that the appeal be dismissed.

- VI. The Respondent supported his request essentially by the following arguments:

(a) The essential feature of the present invention, which consists in positioning the outer electrodes of a ion chamber located downstream of a collimator in such a way that they partially lie in the shadow of the collimator, is already known from document D1. In particular:

(i) Figure 1 of document D1 shows a device in which the outer electrodes and the collimator are arranged in the claimed way, as may be ascertained without using a scale nor making any special measurements simply by prolonging the lines of the figure which define the inner opening of the collimator.

(ii) Although it is acknowledged that this Figure is purely diagrammatic, the skilled person normally assumes that it correctly reproduces at least the

general proportions and relative positions of the essential parts of the device.

(iii) The statement in document D1 that the outer set of radiation responsive electrodes is to be placed "at positions to monitor the extreme edges or shoulders, of the photon field" (column 2, lines 43 to 47) would confirm, if need be, this obvious interpretation of the Figure.

- (b) Accordingly, the claimed invention is distinguished from the subject-matter of document D1 only by the features directed to a specific use of the inner and outer electrodes for respectively correcting angular and lateral alignment errors of the beam. These features however cannot positively contribute to an assessment of inventive step, for the following reasons:

(i) Such specific use is clearly not essential to the present invention. This was acknowledged by the Appellant himself in a letter dated 3 June 1986 in which he stated that he did not claim such use per se (page 4, 4th paragraph). It also follows from the fact that the description of the patent lacks any details as to the way in which correction of alignment errors is actually achieved. In practice, a partial shadowing of the outer electrodes by the collimator is as effective for improving the angular beam alignment as for correcting the lateral alignment.

(ii) If the Board should be satisfied that the skilled person would be able to deduce solely from the description of the present patent the information on the working principles of the invention which were

submitted by the Appellant in his letter dated 8 April 1987, then it should also admit that the skilled person could as well derive the invention from the teachings of document D1, which differ from those of the present patent specification merely in that they are disclosed by a drawing.

VII. These arguments were contested by the Appellant who made essentially the following submissions:

(a) The shadow condition set out in the claims is not disclosed by the content of document D1 since, in particular:

(i) There is no mention whatsoever in the description of document D1 suggesting the use of the shadow of the collimator for improving beam alignment.

(ii) The document D1 requires explicitly that the outer electrodes shall be disposed in the radiation field (see for example, abstract, lines 11 to 14). Such a disposition excludes the use of a construction in which the electrodes would be partially shadowed by the collimator.

(iii) Document D1 discloses in fact a method according to which the outer electrodes are disposed at positions to monitor the extreme edges, or shoulders, of the photon field in order to measure the tilt of the radiation lobe (column 2, lines 43 to 47; column 5, lines 18 to 21). A tilt measurement would however not be possible if the outer electrodes were located partially in the shadow of the collimator, because such positioning selectively amplifies the error signal component which is due to lateral misalignment and consequently impairs the detection of angular errors.

(iv) The shadow condition set out in the present claims can only be derived from document D1 by using a ruler and measuring an angle on the schematic representation shown in Figure 1, which therefore does not provide an effective disclosure of the disputed features, as ruled already in the decision T 204/83 (OJ EPO, 1985, 310). The skilled person would see no more than a pure coincidence in the fact that notional extensions of the lines which in Figure 1 define the internal opening of the collimator intersect the outer electrodes, the more so since the respective intersections lie at a distance of less than 1mm from the edges of the outer electrodes.

(b) The subject-matter of the claims involves an inventive step in view of document D1 since:

(i) The inventors of the claimed subject-matter have discovered that the claimed positioning of the outer electrodes with respect to the collimator enhances, in the error signal delivered by these electrodes, the component which is specifically related to lateral alignment errors; this enhancement effect is independent from the type of equalizing filter used in the system, if any, and had never been suspected before.

(ii) There is no suggestion in document D1 that the outer electrodes might be used for lateral alignment correction rather than for tilt correction as disclosed.

(iii) The "same skilled man" argument raised by the Respondent (see point VI, (b), (ii)) is not conclusive, because document D1 neither discloses the

gist of the present invention, namely the claimed shadow condition and its enhancement effect on the error signal for lateral alignment correction, nor clearly explains how the alignment correction is actually obtained. Moreover, a skilled man would be unable to understand from the teaching of document D1 how detection of the "intensity of the radiation lobe pattern" leads to tilt measurement (column 5, lines 18 to 22), because it is not indicated how angular alignment errors can be distinguished from lateral alignment errors in the signals supplied by the outer electrodes.

(iv) The statement in Appellant's letter dated 3 June 1986 as put forward by the Respondent (point VI, (b), (i)) meant no more than that he was not the first to use electrode signals from an ion chamber located in the path of a beam for controlling the lobe position, and therefore cannot be construed as a recognition that the specific correction measures set out in the present claims were already part of the prior art.

Reasons for the Decision

1. The appeal is admissible.
2. The Board is satisfied that the patent in suit discloses the claimed subject-matter in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The Board regards a skilled person to be able to figure out without the exercise of any inventive activity, the correlation between lateral and angular alignment errors and the corresponding signals supplied by the respective sets of electrodes, when disposed as defined in the patent. Moreover, this correlation can as

well be derived from the performance of simple routine tests. Adequately using such correlation for controlling the beam via the electrode signals to minimize alignment errors cannot be considered to go beyond the normal competence of the specialist in the field of beam control.

3. Novelty

- 3.1 Document D1 indisputedly discloses a method for controlling a divergent beam of rays, which comprises the steps (a) to (c), (e) and (f) as set out in the preamble of present Claim 1, and over which the claimed method distinguishes at least in that the electric signals from the inner electrodes are used for correcting (angular) deviation errors while those from the outer electrodes are used for correcting (lateral) centering errors as set out in the characterizing portion of the claim, in contrast with the opposite utilisation of the respective electrode signals as disclosed in document D1 (column 4, line 57 to column 5, line 24).

Neither does document D1 in the Board's view anticipate step (d) of the claimed method, according to which the outer electrodes of the ion chamber are partially located in the shadow of the primary collimator, since, as set out in detail below, there can be seen no disclosure of these features in the mere fact that, in the schematic view shown in Figure 1, the segments representing the outer electrodes lie in the prolongations of the lines which represent the inner surface of the primary collimator.

It is generally accepted that for deciding on the novelty of a feature claimed in a patent or in a patent application it is necessary to determine whether this feature may be derived directly and unmistakably from a

prior art document by a person skilled in the art (see point 4 of decision T 204/83 already mentioned). In the Board's opinion, the man of the art who studies a document does not consider individually the various single items described therein but looks at their technical interrelation in order to try to understand the functioning of the disclosed apparatus or process. The man of the art is thus used to see all the detailed informations of a document in their technical context.

Therefore, the technical disclosure in a prior art document should be considered in its entirety, as it would be done by a person skilled in the art. It is not justified to arbitrarily isolate parts of such document from their context in order to derive therefrom a technical information, which would be distinct from or even in contradiction with the integral teaching of the document.

In the present case, it is not questionable that Figure 1 of document D1 is practically identical with Figure 1 of the patent in suit at least as far as the arrangement downstream the target is concerned. It has also not been disputed that these figures are purely schematic views drawn to illustrate "in basic form, a high energy X-ray system" (cf. document D1 col. 3, line 34). It would be equally immediately apparent to the skilled technician that the proportions and dimensions shown in Figure 1 of document D1 do not at all correspond to those of known apparatus used in practice. In particular he would be aware of the fact, that the scale of the diagramm is contracted in beam direction.

Already for these reasons, the skilled technician would need to refer to the other figures and to the written

description of document D1 in order to be able to interpret its Figure 1.

When reading this document, the skilled technician learns that a method is proposed for controlling the alignment of a charged particle beam which consists in :

- (a) measuring the tilt of the lobe of the radiation beam by placing an outer set of radiation responsive electrodes at positions to monitor the extreme edges, or shoulders, of the photon field (col. 2, lines 43-48);
- (b) detecting changes in the position of the lobe by means of a separate set of inner electrodes to measure radiation passing through the steepest slope of the flatness filter (col. 2, lines 48-51);
- (c) applying the signals developed by each set of electrodes to a corresponding positional servo mechanism (col. 5, lines 64-68 and col. 6, lines 1-13).

The Board agrees with the Appellant's view that the skilled technician would deduce from the above summarized disclosure that the outer electrodes have to be entirely in the radiation field in order to be able to detect the change in intensity due to the tilt of the lobe without any influence of the collimator. A collimator shadow on the outer electrodes would enhance their signal component due to lateral misalignment and thus make the integral signal output from the outer set of electrodes less effective in controlling the angular alignment coils, to which they are connected.

The Board considers consequently that Figure 1 of document D1 interpreted, as it should be, in the light of the written text of this document does not disclose the feature (d) of Claim 1 of the patent in suit according to which the outer electrodes are partially shadowed by the collimator.

Moreover, contrary to the Respondent's view summarized in point IV (a) (ii) above, the Board is convinced, that the partial shadowing of the outer electrodes can only be derived from Fig. 1 by interpreting apparent dimensions of a diagrammatic representation. Thus, a technical feature which is derived from or based on dimensions obtained from a diagrammatic representation and which technically contradicts the teaching of the description, does not form part of the disclosure of this document.

3.2 The remaining prior art documents cited during the examining or opposition procedures do not come closer to the subject-matter of Claim 1.

3.3 For these reasons, the subject-matter of Claim 1 is considered to be novel within the meaning of Article 54 EPC.

4. Inventive step.

4.1 The nearest prior is constituted by the disclosure of document D1, from which the method defined in Claim 1 is distinguished by the features set out respectively in step (d) and in the characterizing portion of the claim (see point 3 above).

4.2 With respect to this prior art, the technical problem to which the invention affords a solution is to propose a method of controlling a divergent beam of rays which is not dependent on the presence and properties of an

equalizing filter disposed in the beam path between the primary collimator and the ion chamber.

This problem is solved in accordance with the invention essentially by positioning the outer electrodes of the ion chamber partially in the shadow of the primary collimator, and by utilising the electric signals from the inner and outer electrodes for respectively correcting any angular and lateral alignment errors of the beam.

- 4.3 There is no suggestion neither in document D1 nor in any of the other cited documents that would incite a person skilled in the art to use the shadow of the primary collimator in a beam controlling method, for obtaining from the outer electrodes amplified lateral alignment error signals independently of the presence and properties of an equalizing filter interposed in the beam path.

In the absence of such suggestion, the skilled man had no obvious reason to depart from the known arrangement of the alignment correction means as described in document D1, in which the outer and inner electrodes are used respectively for angular and for lateral alignment correction, and to replace it by the very opposite arrangement. The more so since document D1 teaches that the inner electrodes are only responsive to lateral alignment errors because the angular alignment error component of the inner electrodes is compensated for by increased absorption in the equalizing (flattening) filter (column 5, lines 1 to 6), and that the outer electrodes are disposed to detect the large changes in intensity produced at the shoulders of the lobe pattern by angular alignment errors (column 6, lines 17 to 21). The filter absorption and the position of the shoulder establish a necessary functional link between the nature of a respective alignment error detected by a respective set of electrodes and its position in the

radiation field as specified in the document. The Board regards a skilled person to be able to recognise that the inverse control function of each set of electrodes to the detection of the other type of alignment error as defined in the characterizing portion of Claim 1 is technically not equivalent and therefore cannot be considered as a choice of an obvious alternative.

Neither could the Respondent's arguments in favour of obviousness of the invention (point VI (b)) succeed, since they are all based on the incorrect assumption that the shadow condition was already known from document D1.

- 4.4 For these reasons, the subject-matter of Claim 1 is considered to involve an inventive step within the meaning of Article 56 EPC.
5. Accordingly, Claim 1 defines patentable subject-matter (Article 52 EPC). So does Claim 2 which, despite its designation as a "transmission ion chamber system", is actually directed to analogous subject-matter which comprises all the features of Claim 1.
6. For the above reasons, the grounds for opposition laid down in Article 100 (a) and (b) EPC do not prejudice the maintenance of the European patent.

Moreover, although it is apparent from point 3.1 above that the claims are not correctly drafted in the two-part form since the shadow condition set out in the preamble of the claims is not part of the nearest prior art as disclosed in document D1, the Board sees no ground at this stage of the procedure for redrafting the claims (decision T 99/85, OJ EPO, 1987, 413, point 4).

Accordingly, the Appellant's request can be allowed.

Order

For these reasons, it is decided that:

1. The appealed decision is set aside.
2. The opposition is rejected.

The Registrar:

The Chairman:

F. Klein

K. Lederer