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**Datasheet for the decision
of 15 May 2024**

Case Number: T 0480/19 - 3.4.01

Application Number: 10766060.7

Publication Number: 2490765

IPC: A61N5/10, G21K1/02

Language of the proceedings: EN

Title of invention:

GANTRY COMPRISING BEAM ANALYSER FOR USE IN PARTICLE THERAPY

Patent Proprietor:

Ion Beam Applications

Opponent:

Varian Medical Systems, Inc.

Headword:

Gantry for beam therapy / Ion beams

Relevant legal provisions:

EPC Art. 83, 100(b), 113(1)

RPBA 2020 Art. 12(2), 13(2)

Keyword:

Sufficient disclosure - (no)

Late-filed auxiliary request admitted - (no)

Decisions cited:

R 0024/22, T 0995/18, T 0545/19



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Case Number: T 0480/19 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 15 May 2024

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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
19 December 2018 concerning maintenance of the
European Patent No. 2490765 in amended form.**

Composition of the Board:

Chairman P. Scriven
Members: P. Fontenay
C. Almborg

Summary of Facts and Submissions

- I. The appeals, by the proprietor and by the opponent, are of the Opposition Division's interlocutory decision, which found that the patent could be maintained in an amended form.

- II. The opposition was to the patent in its entirety. It relied on grounds under Article 100(a) EPC (lack of novelty, Article 54 EPC; lack of an inventive step, Article 56 EPC), Article 100(b) EPC (insufficiency of disclosure), and Article 100(c) EPC (added subject-matter).

- III. The Opposition Division held that claim 1 of the patent did not contain added subject-matter, that the claimed invention was sufficiently disclosed, but that it lacked novelty. The same conclusions applied to claim 1 of auxiliary request 1. However, they held that auxiliary request 2 was allowable.

- IV. In their statement of grounds, the proprietor requested, as a main request, that the decision be set aside and the opposition rejected, i.e. that the patent be maintained as granted. In the alternative, maintenance of the patent on the basis of claims for one of auxiliary requests 1, 2, 3, 4, 4A, 4B, 5, 6, 7, and 7A was requested. These requests were originally filed during opposition proceedings.

V. In the proprietor's view, none of the documents cited in the course of the opposition procedure anticipated the claimed subject-matter. The claimed invention was also not obvious in view of this prior art. The proprietor emphasised that the claimed invention related to a rotatable gantry that not only performed the function of transporting the beam to the treatment isocenter, but also performed the additional function of limiting the momentum spread to a selected maximum value. This was in contrast to the systems of the prior art, in which this additional function was typically performed upstream of the gantry, namely in an energy selection system (ESS) provided immediately after the energy degrader, itself arranged after the particle accelerator. Even if the use of slits in a gantry was known in the prior art, it was not known to use them to limit the momentum spread of the beam, and their exact position along the gantry line was unknown. The view of the Opposition Division, that this position depended on the characteristics of the particle beam was contested. It was further observed that the objection relied upon by the Opposition Division was based on an "intellectually constructed" beam, but there was no evidence, in the prior art, that feeding a gantry with such a beam would have worked in the sense that this would have led to a beam that was usable for therapeutic treatment.

VI. In their statement of grounds, the opponent requested that the decision of the Opposition Division be set aside and that the patent be revoked.

VII. The opponent reiterated the views put forward in the course of opposition proceedings. In particular, and

contrary to the opinion of the Opposition Division, they emphasised that the subject-matter that had been considered allowable was not disclosed sufficiently clearly and completely for it to be carried out by the skilled person. In their view, the disclosure was not sufficient because neither the configuration of the magnets, nor the magnets themselves, were part of the claimed subject-matter. Claim 1 of the patent merely required "a rotatable gantry for receiving, transporting and delivering a particle beam along a beam path to a target for use in particle therapy". In the absence, in apparatus claims 1 and 7, of any indication regarding the steering of the magnets or their settings for leading a particle beam to an irradiation target, the Opposition Division followed a wrong approach in that they overlooked that the position of the required momentum spread limiting means would change, shift, or disappear with a change in the characteristics of the input beam and of the gantry settings.

VIII. In their reply to the opponent's statement of grounds, the proprietor filed eight additional auxiliary requests: 2A, 2B, 2B1, 4A1, 5A, 5B, 5B1 and 7A1. Auxiliary request 4B was withdrawn.

IX. Regarding sufficiency of disclosure, the proprietor stressed that the patent discussed in detail, from paragraphs [0037] to [0040] of the description, examples of how the invention could be put into practice, including a description of the approach followed for determining the position of the momentum spread limiting means. Reference was made to the beam optics solution commonly employed when designing a

gantry. The beam optics solution defined the relative settings of the sets of steering magnets such that the beam could be transported from the entry to the treatment isocenter, thus making it suitable for particle therapy. The reference, in the claims, to a gantry implied the existence of the corresponding beam optics arrangement, that is, the presence of the required sets of magnets with their respective field settings. This also included the presence of a control system that determined and set the various operating parameters to adequate values. Reference was made, more particularly, to figure 5 of the patent, that showed the results of beam optics calculations including curves indicative of the nominal dispersion and nominal size of the particle beam for the gantry of Figure 4.

X. In their response to the proprietor's statement of grounds, the opponent stressed that the comments that were made in the grounds of appeal under Article 83 EPC in respect of auxiliary request 2 also applied to the proprietor's main request.

XI. In a communication under Article 15(1) RPBA 2020, the parties were informed of the Board's preliminary opinion. The Board considered that the definitions regarding the nominal dispersion and the nominal beam size in claim 1 of the patent, in the absence of any further indication as to the characteristics of the particle beam, did not permit the skilled person to determine the correct location of the momentum limiting means. The analysis of the prior art relied on by the Opposition Division depended on the preliminary finding that claim 1 of the patent was limited to a gantry, with the consequence that the particle beam did not

form part of the claimed subject-matter. This allowed an analysis of known gantries that depended on intellectually constructed beams. The fact that such a beam may have had drawbacks in terms of safety due to hazardous secondary radiation, both at the entrance side or downstream, along the beam path, as emphasised by the proprietor, did not deprive such an analysis of its relevance. Although far from perfect in terms of safety, such an arrangement was technically feasible.

XII. At oral proceedings before the Board, both the proprietor and opponent reiterated their submissions regarding the interpretation of claim 1. In the proprietor's view, the reference, in the claims, to a gantry implied the presence of the components necessary for it to operate, that is, to receive, transport, and deliver a beam of particles at the treatment isocenter. This included the steering magnets for defining the beam path, but also the control system that determined and adjusted the magnetic field, depending on the energy of the beam entering the gantry. This was contested by the opponent, who relied on the wording of the claims, which were not limited by the presence, in the gantry, of any of the elements referred to by the proprietor.

XIII. In addition to their requests on file, the proprietor submitted auxiliary request 4.1, directed to a computer-implemented method for designing a particle therapy apparatus. It was to be ranked immediately after auxiliary request 4. In the proprietor's view, a failure to admit auxiliary request 4.1 would violate their right to be heard, including their right to

present their full case, thus giving ground for a petition for review.

XIV. The parties' final requests are as follows.

The proprietor's main request is that the appealed decision be set aside and that the opposition be rejected, i.e. that the patent be maintained as granted.

In the alternative, the proprietor requests that the patent be maintained based on claims for one of auxiliary requests 1, 2, 2A, 2B, 2B1, 3, 4, 4.1, 4A, 4A1, 5, 5A, 5B, 5B1, 6, 7, 7A, and 7A1.

- Auxiliary requests 1, 3, 4, 5, 6, and 7 were initially filed with the reply to the notice of opposition. Auxiliary requests 4 and 7 were later corrected.
- Auxiliary request 4.1 was filed during oral proceedings before the Board.
- Auxiliary requests 4A and 7A were filed in the course of the opposition proceedings.
- Auxiliary request 2 was filed during oral proceedings before the Opposition Division.
- Auxiliary requests 2A, 2B, 2B1, 4A1, 5A, 5B, 5B1, and 7A1 were filed with the proprietor's reply to the opponent's appeal.

- All requests rely on the description and drawings of the patent, except that auxiliary requests 2, 2A, 2B, and 2B1 include a modified version of page 3 of the description.

The opponent requests that the appealed decision be set aside and that the patent be revoked.

XV. Claims 1 of the main request (the patent) reads:

A rotatable gantry (15) for receiving, transporting and delivering a particle beam along a beam path to a target for use in particle therapy, said gantry (15) comprising an entrance point (45) for entering the particle beam in a direction substantially along a rotation axis of the gantry, characterized in that the gantry (15) comprises means (43) for limiting a momentum spread of the particles of the beam to a selected maximum value, whereby said means are located at a position along the beam path where a nominal dispersion according to a momentum of a particle is larger than a nominal beam size at said position, said nominal dispersion being defined as a transversal displacement of a particle whose momentum differs by 1% (one percent) of an average momentum P of all particles of the beam, said nominal beam size being defined as a one sigma beam size value of a mono-energetic particle beam having the average momentum P .

XVI. Claim 1 of auxiliary request 1 includes the additional limitation that:

[... a selected maximum value] the means (43) for limiting the momentum spread of

the particles of the beam are located at a position along the beam path where the particles of the beam are dispersed according to their momentum, [whereby said means ...]

XVII. Claim 1 of auxiliary request 2 differs from claim 1 of the main request in that the two-part form has been abandoned (*characterized in that* is replaced by *wherein*) and in that it contains an additional limitation. The added feature corresponds to claim 5 of the granted patent. Claims 1 and 7 read:

*[1. ... average momentum P];
wherein the means (43) for limiting the momentum spread of the particles of the beam are momentum analysing slits or momentum analyzing apertures or momentum analyzing collimators.*

*7. A particle therapy apparatus (100) comprising a particle beam generator (40), an energy degrader (41) for reducing a momentum of said particle beam and a gantry (15),
wherein the gantry (15) is a rotatable gantry (15) for receiving, transporting and delivering a particle beam along a beam path to a target for use in particle therapy, said gantry (15) comprising an entrance point (45) for entering the particle beam in a direction substantially along a rotation axis of the gantry,
wherein the gantry (15) comprises means (43) for limiting a momentum spread of the*

particles of the beam to a selected maximum value, whereby said means are located at a position along the beam path where a nominal dispersion according to a momentum of a particle is larger than a nominal beam size at said position, said nominal dispersion being defined as a transversal displacement of a particle whose momentum differs by 1% (one percent) of an average momentum P of all particles of the beam, said nominal beam size being defined as a one sigma beam size value of a mono-energetic particle beam having the average momentum P .

- XVIII. Auxiliary request 2A differs from auxiliary request 2 solely in that dependent claim 11 depends on "any one of claims 7 to 10", instead of any one of the preceding claims.
- XIX. Auxiliary request 2B differs from auxiliary request 2A in that the apparatus of claim 7 comprises a *stationary particle beam generator* rather than simply a *particle beam generator*.
- XX. Auxiliary request 2B1 differs from auxiliary request 2B in that *stationary particle beam generator* in claim 7 has been replaced by *stationary particle accelerator for outputting a particle beam*.

- XXI. The claims of auxiliary request 3 are the same as claims 1 to 6 of auxiliary 2, except that *characterized in that* is retained (cf. point XVII.).
- XXII. The claims of auxiliary request 4 are limited to the particle therapy apparatus. Claims 1 to 4 and 6 are identical to claims 7 to 10 and 11 of auxiliary request 2, respectively, except for the retention of *characterized in that* (cf. points XVII. and XXI.). Claim 5 is new and incorporates the limitations of claim 5 of the patent as granted regarding the nature of the momentum spread limiting means.
- XXIII. Claim 1 of auxiliary request 4.1 differs from claim 1 of auxiliary request 4 in that the designation of the invention has been changed to a *Computer-implemented method for designing a particle therapy apparatus*. The dependent claims have been amended, accordingly, to refer to a method.
- XXIV. Claim 1 of auxiliary requests 4A differs from claim 1 of auxiliary request 4 in that the particle beam generator is stationary (cf. point XIX.).
- XXV. Auxiliary request 4A1 differs from auxiliary request 4A in that *stationary particle beam generator* has been replaced by *stationary particle accelerator for outputting a particle beam*.
- XXVI. Claim 1 of auxiliary request 5 combines the amendments of auxiliary requests 1 and 2, except for retaining

characterized in that. Claims 7 to 11 are the same as in auxiliary request 2 except for the retention of *characterized in that.*

- XXVII. Auxiliary request 5A introduces, to auxiliary request 5, the same amendment as in auxiliary request 2A. This means that dependent claim 11 has been made dependent on any one of claims 7 to 10.
- XXVIII. Auxiliary request 5B is the same as auxiliary request 5A except that, in, claim 7, the particle beam generator is stationary (cf. points XIX. and XXIV.).
- XXIX. Auxiliary request 5B1 replaces *stationary particle beam generator*, in claim 7, by *stationary particle accelerator for outputting a particle beam*.
- XXX. Auxiliary request 6 deletes claims 7 - 11 from auxiliary request 5.
- XXXI. Auxiliary request 7 combines the amendments of auxiliary requests 1 and 4.
- XXXII. Auxiliary request 7A differs from auxiliary request 7 in that the particle beam generator is stationary (cf. points XIX., XXIV., and XXVIII.).
- XXXIII. Auxiliary request 7A1 replaces *stationary particle beam generator* in claim 1 of auxiliary request 7A by

stationary particle accelerator for outputting a particle beam.

Reasons for the Decision

Main request - sufficiency of disclosure (Article 100(b) EPC)

1. Claim 1 specifies that the means for limiting momentum spread are located at a position along the beam path where a nominal dispersion according to a momentum of a particle is larger than a nominal beam size at said position, said nominal dispersion being defined as a transversal displacement of a particle whose momentum differs by 1% (one percent) of an average momentum P of all particles of the beam, said nominal beam size being defined as a one sigma beam size value of a mono-energetic particle beam having the average momentum P .
2. The claimed gantry is intended to receive, transport, and deliver charged particles to the treatment isocenter. Claim 1 contains no indications regarding the beam transport system. Concretely, that means that the claim contains no information as to the various devices within the gantry, that deliver the particles to a predetermined location, and as to their respective settings.
3. Gantries to receive, transport, and deliver charged particles to a target location are well known in the art. The movement of the particles within the gantry is obtained by appropriately controlling forces that various sets of magnets within the gantry apply to the charged particles. It is thus implicit, that the gantry

receives charged particles and comprises various control means, positioned at appropriate positions along the gantry line, to steer the particles along their trajectories until they reach the target site. Similarly, the gantry implies the presence of an associated control system to manage and coordinate the actions of the various steering means, depending on the characteristics of the incident beam (inter alia, energy, size, and momentum spread).

4. The Board thus concurs with the proprietor that the gantry of claim 1 implies an associated beam transport system, as commonly known in the prior art, for receiving, transporting, and delivering the charged particles; and further, that the various steering elements needed for receiving, transporting, and delivering the particle beams, as well as their settings, are inherent parts of the claimed gantry. In the context of medical therapy, this implies that the beam transport system is adapted for directing and shaping the beam so that the particles can be deposited at precise locations within a patient's body.
5. The location of the means for limiting momentum spread is defined by reference to characteristics of the particle beam: its nominal dispersion and nominal size. This means that the recited location does not depend only on the structure of the gantry and its beam transport system with its multiplicity of steering and shaping means, but also on its particular use. That means that this location depends on an entity - the particle beam - that is not part of the claimed subject-matter.
6. The question of whether the invention is disclosed in a manner sufficiently clear and complete for it to be

carried out by a skilled person hinges on whether or not the patent contains sufficient information as to how the control system within the gantry is capable of determining the location of the momentum spread limiting means. Concretely, this requires assessing whether the patent contains all the necessary information regarding the processing within the control system and its ability to determine the nominal dispersion and nominal beam size along the transport line.

7. As underlined by the proprietor, the claimed gantry with its inherent control system is designed to cope with energies within a certain range. The control system is accordingly conceived based on calculations made according to the beam optics solution for a given selected energy in the operating energy range. By appropriately selecting this energy, for example in the middle of the operating range, the scaling of the various magnets within the gantry will have negligible impact on the dispersion and size of the beam, independently of its actual energy. These slight variations do not affect the validity of the beam optics solution, as long as the incident energy is within the operating range.

8. The proprietor referred to Figure 5 of the patent and its corresponding description in paragraph [0038]. Figure 5 showed the nominal beam size and nominal dispersion of a proton beam for a specific embodiment. They stressed that the adjective "nominal" had to be construed in the context of such beam optics solutions. The figure reflected the result of beam transport calculations for a proton beam of 170 MeV along the entire path followed by the beam within a gantry, illustrated in Figure 4. These had been previously

elaborated on the basis of a beam optical study performed by software called "TRANSPORT". In the proprietor's view, Figure 5 provided clear teaching as to how the skilled person could use known beam optics software to calculate the values of all relevant parameters and thus decide on the location of the momentum spread limiting means. The effects of variations of scaling for the steering magnets, as a result of variations in the level of energy of the incident particle beams, were negligible and the curves of nominal dispersion and nominal beam size were essentially identical for a given beam optics solution.

9. The proprietor's arguments are not persuasive.
10. In the Board's judgment, the knowledge of certain preferred arrangements according to the beam optics solution is not sufficient to allow the skilled person to program the control system so that it is adapted to define, for all foreseeable configurations of the incoming particle beam, the appropriate location for the momentum spread limiting means.
11. Figure 5 shows results for the nominal dispersion and the nominal size (envelopes in the X and Y directions) obtained according to beam optics calculations for the gantry of Figure 4. This corresponds to a gantry configuration obtained by the software program "TRANSPORT" (cf. paragraph [0038] in the patent specification).
12. Figure 5 shows the results of calculations that were performed on the basis of the gantry configuration of Figure 4, that is a solution that had been defined beforehand according to a specialised software embodying the beam optics solution (paragraph [0038]).

The configuration according to Figure 4 happens to be compatible with the further requirements regarding the location of the momentum spread limiting means, as recited in claim 1. This corresponds, in effect, to a range of locations located around the intersection of the horizontal axis with line 43 in Figure 5.

13. There is no guarantee, however, that a specific solution elaborated by the beam optics software fulfils the additional criteria of claim 1 as to the location of the momentum spread limiting means. If it is straightforward to verify that an existing solution meets some additional criteria, the alternative approach consisting in incorporating said additional criteria in the search for a solution for the gantry is not obvious.
14. The Board further notes that the solution for the determination of the gantry configuration is not unique. Independently of the fact that the existence of a configuration fulfilling all conditions is not guaranteed, the review by the skilled person of a multiplicity of possible solutions, as proposed by a specialised software such as the "TRANSPORT" program, with the hope that one also fulfils the criteria of claim 1, extends beyond mere trial and error.
15. In effect, the patent disclosure is silent as to how the various conditions regarding the necessity for the particle beam to reach a certain target location are combined with the conditions regarding the position of the momentum spread limiting means within the gantry. The mere fact that a solution for the configuration of the magnets within the gantry could be found (Figure 4) and appeared to be compatible with the recited criteria in claim 1 regarding the position of the momentum

spread limiting means (Figure 5) is not sufficient. It cannot replace a complete teaching, advising the skilled person of how to proceed to elaborate a gantry that delivers particles at a predetermined treatment site and define a range of positions for the momentum spread limiting means.

16. Another difficulty in defining the position of the momentum spread limiting means results from the fact that the particle beams entering the gantry are defined not only by their energies but also by their geometries. This means that particle beams entering the gantry with various shapes have various nominal sizes. This directly affects the calculations for this parameter over the whole gantry line. The patent description is, however, devoid of any information regarding whether and how this parameter is taken into account by the control system in order to derive the correct location for the momentum spread limiting means. This is, in particular, the case considering that a relatively small incident beam size leads to large sizes along the gantry line (cf. Figure 5) thus suggesting that minor changes affecting the incident beam size lead to accordingly large variations in the nominal beam sizes along the gantry line.

17. In this respect, the Board concurs with the proprietor that, independently of the incoming energy of the incoming beam, the scaling of the various magnets within the gantry allows appropriate guiding of the particle beam until it leaves the gantry to reach the treatment isocenter. Similarly, the Board also considers that various shapes of the incoming particle beam will negligibly affect the size of the delivered particle beam at the treatment isocenter in the same way as the focus of an optical lens will not be

affected by the size or shape of an incident optical ray.

18. This is different for the nominal size of the particle beam along the gantry line that serves as reference parameter to define the location of the momentum spread limiting means. The nominal size is, in effect, dependent on the size of the incoming particle beam when entering the gantry and on the forces applied by the various magnets present along the gantry that depend on the momentum of the particles within the beam, implying that the nominal beam size depends on the position along the gantry line (cf. e.g. Figure 5 in the patent). The determination of the range of possible positions for the momentum spread limiting means along the gantry line thus requires that the control system within the gantry is able to determine the beam size along the whole gantry line before determining the range that is available for the location of the momentum spread limiting means along said axis.

19. In the absence of information in the patent specification regarding the manner in which the characteristics of the incoming particle beam are considered within the control system to determine a possible location for the momentum spread limiting means, the invention is insufficiently disclosed. An assumption regarding the level of energy of the particles generated by the accelerator might permit the design of a gantry system as, for example, illustrated in Figure 4, with sets of magnets at positions calculated by specialised software. It would, however, not suffice for a gantry as defined in claim 1 that would meet the recited conditions for any arbitrary particle beam entering the gantry.

20. The difficulties faced by the skilled person are further exacerbated by the fact that the particle beam generator does not form part of the claimed subject-matter. Assumptions concerning the size of the entering beam of particles might also permit design of the profile of beam sizes along the gantry line as, for example, illustrated in Figure 5. It is, however, unclear how the control system of an existing gantry can be conceived so that it can deal with arbitrary beam sizes. Concretely, the patent specification is silent as to how the control system identifies the size of an incoming beam and how it selects the various settings for the steering magnets within the gantry so that a location for the momentum spread limiting means can be determined.
21. In conclusion, the patent specification does not contain sufficient information allowing the skilled person to program the control system of the gantry to determine the location of the momentum spread limiting means. Hence, the invention is not disclosed in a sufficient way (Article 100(c) EPC).

Auxiliary requests 1, 2, 2A, 2B, 2B1, 3 - Article 83 EPC

22. The added feature in claim 1 of auxiliary request 1, according to which the means for limiting the momentum spread of the particles of the beam are located at a position along the beam path where the particles of the beam are dispersed according to their momentum, does not add any technical limitation to the claim. The following feature in the claim, already present in claim 1 of the patent, specifies that the location along the beam path depends on the beam dispersion, that is, on a location along the beam path where the

particles of the beam are dispersed according to their momentum.

23. The invention according to claim 1 of auxiliary request 1 is not sufficiently disclosed for the reasons developed above with regard to claim 1 of the main request (Article 83 EPC).
24. Claim 1 of auxiliary request 2 further incorporates features regarding the structural means for limiting the momentum spread of the particles within the beam. This does not affect the Board's findings regarding the absence of information in the patent specification regarding the operation of the control system within the gantry and, in particular, the absence of information regarding the determination of the location of the momentum spread limiting means. The subject-matter of claim 1 according to auxiliary request 2 is not sufficiently disclosed for the reasons provided above (Article 83 EPC).
25. Auxiliary request 2A differs from auxiliary request 2 solely in that dependent claim 11 depends on any one of claims 7 to 10. Auxiliary requests 2B and 2B1 differ from auxiliary request 2A, in that their respective claim 7 defines the source to be a "stationary particle beam generator" or a "stationary particle accelerator for outputting a particle beam".
26. The amendments in auxiliary requests 2A, 2B, and 2B1 are without any bearing on the location of the momentum spread limiting means according to claim 1 of auxiliary request 2. These requests are thus not allowable under Article 83 EPC.

27. The same applies to auxiliary request 3, which is limited to claims 1 to 6 of auxiliary request 2.

Auxiliary request 4 - Article 83 EPC

28. Auxiliary request 4 is limited to a particle therapy apparatus. Claim 1 differs from claim 1 of the lower ranking requests, in essence, in that it refers to a particle therapy apparatus comprising a particle beam generator, a degrader, and a gantry.
29. The change is a major amendment in that it corresponds to a substantial limitation of the claimed subject-matter, which now incorporates a generator for a beam particle and a degrader. This implies that the control system that is implicitly present within the gantry is itself implicitly adapted to cope with the particle beams that can be generated by the particle generator and associated degrader. Contrary to claim 1 of the lower ranking requests, the beam is a part of the claimed subject-matter, when it is in operation.
30. However, the patent does not provide any indication regarding the manner in which the control system can determine, for a particle beam with a predetermined energy and a predetermined size, as generated by the accelerator with the associated degrader, the location for the momentum spread limiting means.
31. As emphasised above, the trajectories followed by the particles of a beam can be determined with high accuracy as long as the configuration of the gantry has been determined in the first place and the settings for the various magnets within the gantry and the beam size entering the gantry are known. It follows that the

determination of the nominal dispersion of the beam as well as its nominal size, for a given energy and beam size, can be identified, thus determining the range of possible locations for the momentum spread limiting means (cf. Figure 5).

32. However, this is only possible if the control system is fed with all relevant parameters regarding the received beam, that is, its shape and average energy. This aspect of the invention would require measurements to be carried out on the incident particle beam so as to determine the relevant parameters. It is not addressed in the patent specification. It is not even indicated how the scaling of the various magnets within the gantry is adapted in view of the levels of energy delivered by the generator and associated degrader.
33. For these reasons, the claimed subject-matter of claim 1 of auxiliary request 4 is not sufficiently disclosed (Article 83 EPC).

Auxiliary request 4.1 - Admission

34. Auxiliary request 4.1 was first filed during the oral proceedings before the Board. It constitutes an amendment to the proprietor's appeal case, the admission of which is at the Board's discretion under all relevant parts of Articles 12 and 13 RPBA, in particular Article 13(2).
35. Under Article 12(2) RPBA, the primary object of these proceedings is to review the appealed decision - of which Auxiliary request 4.1 is not a subject.

36. Under Article 13(2) RPBA, any amendment made at this late stage of the appeal proceedings, *shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.*

37. The proprietor argued that Auxiliary request 4.1 was occasioned by the Board's surprising finding, at oral proceedings, that the invention of claim 1 of the lower ranking requests was not sufficiently disclosed, essentially because the skilled person would not know how the nominal dispersion and the nominal beam size were built into the control system that was an implicit part of the claimed gantry. In particular, since the opponent had always based their objection on the view that the control system was not part of the claimed subject-matter, the linking of those nominal values and the control system being part of the gantry was a new development, and an exceptional circumstance. In addition, according to the proprietor, the amendment was a straightforward and reasonable way of addressing the Board's concern and required no further search. Lastly, if Auxiliary request 4.1 were not admitted, the proprietor's right to be heard would be violated.

38. The opponent argued that the objection of insufficient disclosure had been part of proceedings from the outset, and the determination of the location of the momentum spread limiting means had always been the key question. By contrast, Auxiliary request 4.1 was a late amendment. It was also the first method claim appearing in the proceedings. In addition to being divergent in that way, it was also detrimental to procedural economy.

39. The proprietor's arguments are unpersuasive.

40. There was nothing exceptional about the Board's finding, at oral proceedings, on the disclosure of the claimed invention. Rather, it was a normal consequence of the debate, falling well within the factual and legal framework of the case thus far.
41. The nominal dispersion and the nominal beam size were express subjects of the claims. The opponent had long stressed the dependence on the characteristics of the beam in the key determination of the location of the means for limiting a momentum spread (statement of grounds, section IV, in particular pages 16 and 18; reply to appeal, section II, page 8). The proprietor themselves had already suggested (during the written procedure) and convincingly argued (at oral proceedings) that the control system was implicitly part of the claimed subject matter (reply to appeal, pages 12 and 13, 2nd paragraphs). The Board's finding merely connects these dots.
42. Oral proceedings must allow a certain leeway within the discussion that does not amount to a justification for further amendment (cf. T 545/19, Reasons 19.3). In particular, the proprietor's convincing argument that the control system was implicitly a part of the gantry entailed the need for the parties, and the Board alike, further to elaborate on the consequences implied by that view.
43. Therefore, the Board cannot recognise any exceptional circumstances within the meaning of Article 13(2) RPBA.
44. This conclusion is not affected by the Board's change of heart, after the non-binding, positive preliminary opinion concerning the disclosure of the claimed

invention (communication, points I, 3 to 11, and 20; T 995/18, Reasons 1.4).

45. At oral proceedings before the Board, the parties were heard as to whether the invention of claim 1 of the main request and of auxiliary request 4 is sufficiently disclosed. As regards the other requests with a ranking higher than auxiliary request 4.1, the parties relied on their written submissions (see minutes, page 2, 2nd and 4th to 6th paragraphs). Later, the parties were heard as to whether auxiliary request 4.1 should be admitted into the proceedings (minutes, page 2, last paragraph). This debate centred on the Board's reason for finding the disclosure insufficient - essentially that the skilled person would not know how the nominal dispersion and the nominal beam size were built into the control system that is an implicit part of the claimed gantry (minutes, page 1, 1st paragraph).
46. This opportunity for the parties to present their comments in respect of the matter of the admission of Auxiliary request 4.1, together with these reasons for its non-admission, fulfil the parties' right to be heard (Article 113(1) EPC). That right does not encompass a right to have Auxiliary request 4.1 admitted into these proceedings (cf. R 24/22, point VIII(iv), and Reasons 7 to 14, in particular 14).
47. For these reasons, auxiliary request 4.1 is not admitted into the appeal proceedings.

Auxiliary request 4A and 4A1 - Article 83 EPC

48. The further indication that the particle beam generator is stationary, in claim 1 of auxiliary request 4A; or,

in claim 1 of auxiliary request 4A1, the "stationary particle accelerator for outputting a particle beam", compared with claim 1 of auxiliary request 4, does not affect the above analysis.

49. The subject-matter of claim 1 of each of auxiliary requests 4A and 4A1 is not sufficiently disclosed for the reasons provided above with regard to auxiliary request 4 (Article 83 EPC).

Auxiliary requests 5, 5A, 5B, 5B1, 6 - Article 83 EPC

50. Claim 1 of auxiliary request 5 combines the amendments of auxiliary requests 1 and 2. Concretely, claim 1 differs from claim 1 of the main request, essentially, in that the means for limiting the momentum spread of the particles of the beam are located at a position along the beam path where the particles of the beam are dispersed according to their momentum and that said means are momentum analysing slits or momentum analyzing apertures or momentum analyzing collimators.
51. The amendments do not affect the analysis made above with regard to the main request and auxiliary requests 1 and 2.
52. The amendments in auxiliary request 5A, 5B, and 5B1 do not concern claim 1 of said requests, which is identical to claim 1 of auxiliary request 5. The same applies to the amendments in auxiliary request 6, which is limited to claims 1 to 6 of auxiliary request 5.
53. The invention of claim 1 of each of auxiliary requests 5, 5A, 5B, and 5B1 is not sufficiently disclosed (Article 83 EPC).

Auxiliary requests 7, 7A and 7A1 - Article 83 EPC

54. Claim 1 of auxiliary request 7 refers to a particle therapy apparatus comprising a particle beam generator, an energy degrader, and a gantry. It combines the amendments introduced in auxiliary requests 2 and 4.
55. The fact that the means for limiting the momentum spread of the particles of the beam are located at a position along the beam path, where the particles of the beam are dispersed according to their momentum, does not affect the above findings, as developed above with regard to claim 1 of auxiliary request 4. This is particularly true considering that the added feature is redundant with the subsequent feature in the claim, according to which that location along the beam path depends on the beam dispersion. As observed with regard to claim 1 of auxiliary request 1, this implies that the particles of the beam are dispersed according to their momentum.
56. The stationary particle beam generator in claim 1 of auxiliary requests 7A and the *stationary particle accelerator for outputting a particle beam* in claim 1 of auxiliary request 7A1 are without any bearing on the question of disclosure as set out in respect of auxiliary request 7.
57. The invention of claim 1 of each of auxiliary requests 7, 7A, and 7A1 is not sufficiently disclosed for the reasons provided above with regard to auxiliary requests 7 and 4 (Article 83 EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



C. Spira

P. Scriven

Decision electronically authenticated