A METHOD AND APPARATUS TO DIRECT RADIATION TREATMENT TO A SPECIFIC REGION OF THE BRAIN

Abstract: A system and method are provided for delivering radiation therapy to a target inside the head of a patient. A first reference coordinate system is defined in relation to anatomical landmarks on the patient's head which are visible externally and in images of the patient. The coordinates of a target are translated from the first reference coordinate system to a second reference coordinate system. The second reference coordinate system is defined in relation to an external locator device that is attached to the patient's head. The system comprises a treatment cap, locator device, sensor, ultrasound transducer, holder, and a variety of computer readable media. Angles are calculated to direct radiation to the target from the external locations selected with the locator device. Further, a treatment cap is produced that fits around the patient's head and holds interface units at certain positions and orientations. Each interface unit includes a movable transducer holder that holds a radiation source, and by rotating the transducer holders by the calculated angles, radiation is delivered to the target.
Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
23 August 2007
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61N5/10 A61B19/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61N A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim</th>
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<td>WO 01/21085 A (ELEKTA AB [SE]; ERICSSON; PER [SE]; JAKOBSSON ANDERS [SE]; HUGOSSON) 29 March 2001 (2001-03-29) the whole document</td>
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<td>GB 2 370 778 A (ELEKTA AB [SE]) 10 July 2002 (2002-07-10) the whole document</td>
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See patent family annex

D. Further documents are listed in the continuation of Box C

X

* Special categories of cited documents

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the International filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search
19 February 2007

Date of mailing of the international search report
28/06/2007

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Authorized officer

RODRIGUEZ COSSIO, J

Form PCT/ISW210 (second sheet) (April 2005)
### Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. **X** Claims Nos.: 1-25 because they relate to subject matter not required to be searched by this Authority, namely:
   - Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy
   - Rule 39.1(vi) PCT - Program for computers

2. **☐** Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. **☐** Claims Nos. because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. **☐** As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. **☐** As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. **☐** As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.

4. **☐** No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims. It is covered by claims Nos. 26-28.

**Remark on Protest**

- **☐** The additional search fees were accompanied by the applicant's protest.
- **☐** No protest accompanied the payment of additional search fees.
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 26-28

   A locator device comprising a contact plate attached to a head ring by a plurality of guides including markings that indicate the position of the plate

2. Claims: 29-47

   A device (treatment cap) for delivery of radiation comprising a holder for a radiation source to be fit around the head of a patient
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