(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
8 November 2001 (08.11.2001)

PCT

(10) International Publication Number
WO 01/82995 A3

(51) International Patent Classification[7]: A61M 5/05

(21) International Application Number: PCT/US01/11886

(22) International Filing Date: 12 April 2001 (12.04.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/200,493 28 April 2000 (28.04.2000) US
09/636,551 11 August 2000 (11.08.2000) US

(71) Applicant: ALPHA INTERVENTION TECHNOLOGY, INC. [US/US]; Building 1B, 2024 W. Henrietta Road, Rochester, NY 14623 (US).

(72) Inventors: CHENG, Gang; 805 Univerity Park, Rochester, NY 14620 (US). LIU, Haisong; 411 Quilby Road, Rochester, NY 14623 (US). YU, Yan; 3 Miller Court, Rochester, NY 14618 (US).

(74) Agents: GREENBAUM, Michael, C. et al.; Blank Rome Comisky & McCauley LLP, The Farragut Building, Suite 1000, 900 17th Street, NW, Washington, DC 20006 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

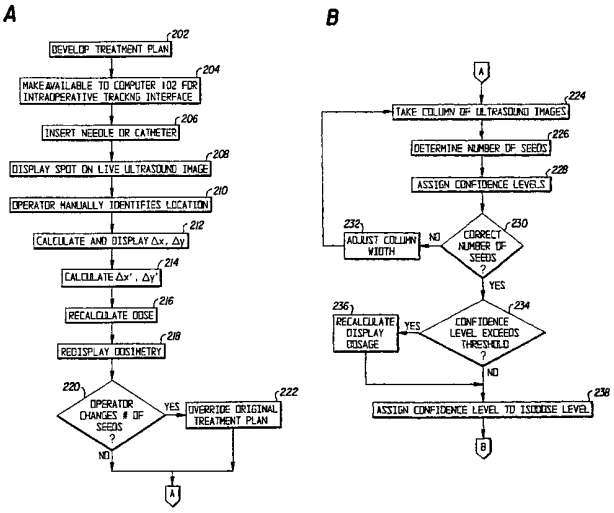
(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(88) Date of publication of the international search report:
4 April 2002

[Continued on next page]

(54) Title: IDENTIFICATION AND QUANTIFICATION OF NEEDLE DISPLACEMENT



(57) Abstract: A placement plan (202) is developed for the placement of radioactive seeds in a prostrate for brachytherapy. The placement plan (202) is made available to an intraoperative tracking interface (204) which also shows a live ultrasound image (208) of the needle or catheter placement in the prostate. The difference in the x-y plane between the planned and actual locations of the needle or catheter is calculated, and from that difference, the error in position of each seed is calculated (212). The seeds are moved, or the operator changes the number of seeds (220), and the dose is recalculated. A small column of ultrasound images is taken (224), and each seed located in the column of images is given a confidence level (228). If the confidence level exceeds a threshold set by the operator (234), the dosimetry is recalculated. Periodically throughout the seed placement, fluoroscopic x-rays are taken, and the seed coordinates are matched to the x-ray image. Seed locations with low confidence levels are adjusted based on the x-ray locations, and the dosimetry is recalculated.

WO 01/82995 A3

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/11886

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61B 5/05
US CL : 600/407

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)
U.S. : 600/407,1,3,7,8; 128/898

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 practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, P	US 6,200,255 B1 (YU) 13 March 2001, see entire document	1-27
A, P	US 6,083,167 A (FOX et al.) 04 July 2000, see entire document	1-27
A	US 5,391,139 A (EDMUNDSON) 21 February 1995, see entire document	1-27

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* 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 application or patent 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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 September 2001 (29.09.2001)	02 JAN 2002
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Brian L Casler Telephone No. 703-308-0858

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/11886

Continuation of Item 4 of the first sheet:
The title is too long in that it exceeds 7 words(see PCT Rule 4.3): The new title is: ---IDENTIFICATION AND QUANTIFICATION OF NEEDLE DISPLACEMENT---