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(71) Applicant (for all designated States except US): **MASSACHUSETTS INSTITUTE OF TECHNOLOGY**
[US/US]; Technology Licensing Office-Room NE25-230,

Five Cambridge Center, Kendall Square, Cambridge, MA 02142-1493 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **ANTAYA, Timothy, A.** [US/US]; 26 Brimmer Lane, Hampton Falls, NH 03844 (US).

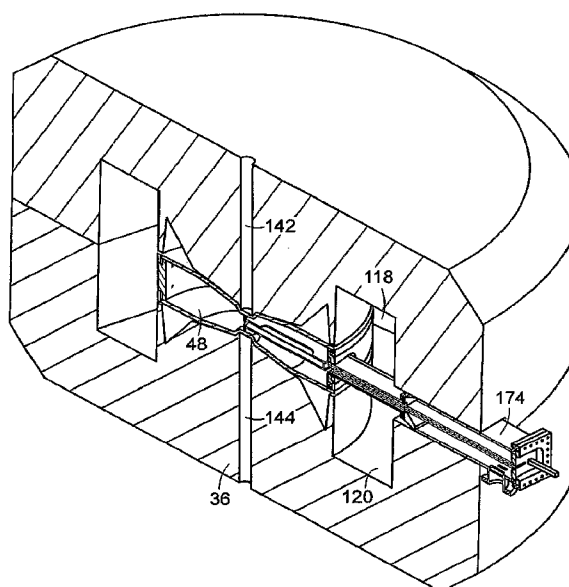
(74) Agent: **SAYRE, Robert, J.**; Modern Times Legal, One Broadway, 14th Floor, Cambridge, MA 02142 (US).

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[Continued on next page]

(54) Title: HIGH-FIELD SUPERCONDUCTING SYNCHROCYCLOTRON



(57) Abstract: The magnetic field in an acceleration chamber defined by a magnet structure is shaped by shaping the poles of a magnetic yoke and/or by providing additional magnetic coils to produce a magnetic field in the median acceleration plane that decreases with increasing radial distance from a central axis. The magnet structure is thereby rendered suitable for the acceleration of charged particles in a synchrocyclotron. The magnetic field in the median acceleration plane is "coil-dominated," meaning that a strong majority of the magnetic field in the median acceleration plane is directly generated by a pair of primary magnetic coils (e.g., superconducting coils) positioned about the acceleration chamber, and the magnet structure is structured to provide both weak focusing and phase stability in the acceleration chamber. The magnet structure can be very compact and can produce particularly high magnetic fields.



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B. FIELDS SEARCHED

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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, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 925 676 A (BIGHAM CLIFFORD B ET AL) 9 December 1975 (1975-12-09)	1,6,7, 9-14, 18-24, 26, 28-30, 32, 35-38, 40,43, 44,46, 49,51
Y	figures 1-4 column 2, lines 66,67 column 3, lines 23-34 column 4, lines 52-56 column 6, lines 9-11	2-5,8, 15-17, 25,27, 31,33,
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

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E earlier document but published on or after the international filing date

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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

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Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Crescenti, Massimo

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	KIM J W ET AL: "Trim coil system for the RIKEN superconducting ring cyclotron" PROCEEDINGS OF THE 1997 PARTICLE ACCELERATOR CONFERENCE (CAT. NO.97CH36167) IEEE PISCATAWAY, NJ, USA, vol. 3, 1998, pages 3422-3424 vol., XP002467835 ISBN: 0-7803-4376-X table 1	34
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