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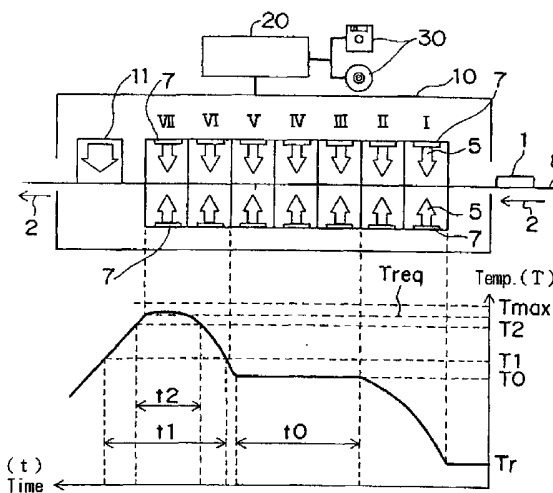
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30 September 2004

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.

(54) Title: METHOD, APPARATUS AND PROGRAM OF THERMAL ANALYSIS, HEAT CONTROLLER AND HEATING FURNACE USING THE METHOD



(57) Abstract: Heating characteristic value at any measuring point of an object at any measuring location of an heating furnace is determined as a single invariable by using temperature (Tint and Ts) measured at the measuring point of the object and heating temperature (Ta) and heating time (t) at the measuring location of the heating furnace. The heating characteristic value (m-value) may be calculated without using physical characteristics of the object. By using the m-value, temperature profile of the object heated under modified heating condition may be simulated in a short period of time without actually heating and measuring temperature of the object at high accuracy level. By using such simulation, appropriate heating condition for heating an object in accordance with desired heating condition may easily be determined.

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INTERNATIONAL SEARCH REPORT

International Application No  
PCT/JP 03/09648

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G05D23/19

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)  
IPC 7 G05D H05K

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**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 927 068 A (NAKA HIROYUKI ET AL) 22 May 1990 (1990-05-22) column 3, line 10 - column 8, line 23 claims 1,2 figures 1-3	1,8,42
A	US 6 283 379 B1 (KAZMIEROWICZ PHILIP C ET AL) 4 September 2001 (2001-09-04) abstract figures 1A-4 column 2, line 51 - column 9, line 45	1,42
X	US 6 206 265 B1 (YAMAOKA NOBUYOSHI) 27 March 2001 (2001-03-27) column 4, line 15 - column 7, line 65 claim 1 figures 3-10	12-16, 20,21
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Further documents are listed in the continuation of box C.  Patent family members are listed in 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 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
- \*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 22 June 2004	Date of mailing of the international search report 02.08.2004
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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 Helot, H
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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 03/09648

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 775 776 A (DROUIN MARCEL ET AL) 4 October 1988 (1988-10-04) column 2, line 16 - column 10, line 28; figures 1,2,8,12,13 -----	12-16, 20,21
X	US 5 099 442 A (ASHAHI IWAO ET AL) 24 March 1992 (1992-03-24) column 1, line 25 - column 2, line 10 column 2, line 13 - column 19, line 25 figures 1-24 -----	12-16, 20,21
X	MORALES S ET AL: "A pole-placement partial state reference model adaptive control of a rapid thermal processor" PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON SYSTEMS, MAN AND CYBERNETICS. LE TOUQUET, OCT. 17 - 20, 1993, NEW YORK, IEEE, US, vol. VOL. 3, 17 October 1993 (1993-10-17), pages 19-24, XP010132092 ISBN: 0-7803-0911-1 the whole document -----	12-16, 20,21

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/JP 03/09648

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 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.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
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 II Observations where unity of invention is lacking (Continuation of item 2 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.:

### Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-11,35-38,42,43

Method and apparatus for thermal analysis wherein a heating or cooling characteristic of an object is determined  
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2. claims: 12-34,39-41

Method and apparatus for heating an object with a required temperature profile  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 03/09648

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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