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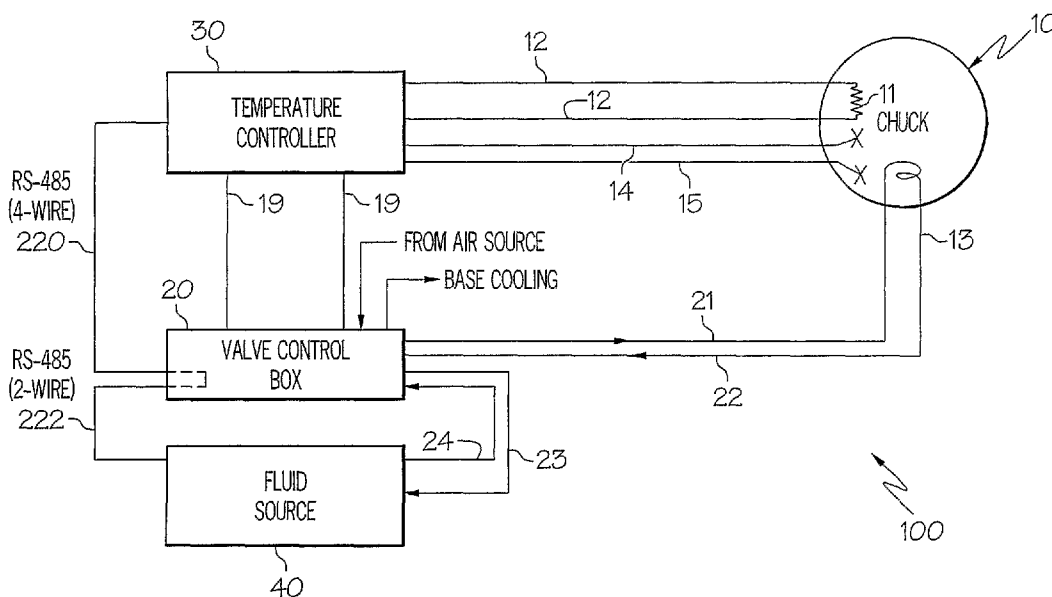
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Published:  
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[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR CONTROLLING TEMPERATURE IN A CHUCK SYSTEM



(57) Abstract: An apparatus and method of controlling the temperature of a thermal chuck system are disclosed. The system includes a temperature controller which controls a temperature transition in a thermal chuck. The temperature controller comprises inputs that receive air and fluid from an air source and water source, respectively, and an output for alternately transferring the air and fluid in proportions to the thermal chuck. A time proportional controller generates the proportions by computing a proportion band in each of a plurality of control regions. The proportion bands are used by the temperature controller to manage the flow of air and fluid to the chuck such that a minimum undershoot of the temperature transition is realized.

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*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/US2006/006810

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. G05D23/00 G05B11/00 G01R31/28

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)  
G05D G05B G01R

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.
A	US 3 710 251 A (HAGGE ET AL.) 9 January 1973 (1973-01-09)  abstract; figures 1-3	1, 2, 4, 5, 8, 13, 14, 21, 29, 30, 33, 36
A	US 4 056 708 A (SOODAK ET AL.) 1 November 1977 (1977-11-01) column 1, lines 23-26 column 2, lines 18-21; figures 1, 3, 4, 6	1, 29, 33
A	US 2002/003037 A1 (COUSINEAU ET AL.) 10 January 2002 (2002-01-10) paragraph [0010] paragraph [0047] paragraphs [0052] - [0054] paragraph [0069]; figure 1	1, 29, 33
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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 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

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- "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

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## INTERNATIONAL SEARCH REPORT

International application No

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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.
A	US 6 700 099 B2 (COLE ET AL.) 2 March 2004 (2004-03-02) cited in the application abstract; figure 5 -----	1,29,33
X	US 5 205 132 A (FU) 27 April 1993 (1993-04-27)	23,25, 27,28
A	column 12, lines 15-24; figures 4,5 -----	44
A	US 2003/155939 A1 (LUTZ ET AL.) 21 August 2003 (2003-08-21) abstract; figure 1 -----	23,25, 27,28,44
A	US 6 549 026 B1 (DIBATTIESTA ET AL.) 15 April 2003 (2003-04-15) abstract; figures 2a-2c,4,6,7,9 -----	23,44

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2006/006810

## 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.  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 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.:

### 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: 1-22, 29-43

Devise and method for temperature control of a chuck,  
characterised by alternating flow of air and liquid.  
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2. claims: 23-28, 44-49

Devise and method for temperature control of a chuck,  
characterised by having a plurality of control regions.  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/006810

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3710251	A	09-01-1973	NONE
US 4056708	A	01-11-1977	CA 1047141 A1 23-01-1979 CH 598652 A5 12-05-1978 DE 2631700 A1 17-02-1977 FR 2319154 A1 18-02-1977 GB 1546131 A 16-05-1979 IT 1067394 B 16-03-1985 JP 1296133 C 26-12-1985 JP 52014268 A 03-02-1977 JP 60018460 B 10-05-1985 NL 7608081 A 25-01-1977 NO 762519 A 25-01-1977 SE 7608294 A 23-01-1977
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