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[Continued on next page]

(54) Title: SAFETY, MONITORING AND CONTROL SYSTEM FOR THERMAL REACTOR

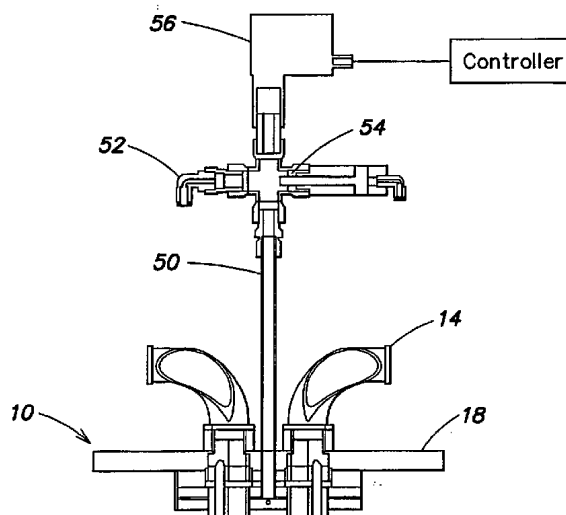


FIG. 3

(57) Abstract: In one or more aspects, a thermal reactor apparatus is provided that may be used to treat industrial effluent fluids, for example waste effluent produced in semiconductor and liquid crystal display manufacturing processes. Specifically, the present invention may include a system comprising a controller, a reaction chamber adapted to be controlled by the controller, a conduit into the reaction chamber, a pilot disposed at a first end of the conduit within the reaction chamber, a sensor disposed at a second end of the conduit outside of the reaction chamber that is coupled to the controller and adapted to provide an indication to the controller whether the pilot is lit, and an actuator operable to open and close the conduit. Numerous other aspects of the invention are disclosed.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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A. CLASSIFICATION OF SUBJECT MATTER
INV. F23G7/06 F23G5/50 F23N5/24 F23N5/08

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)
F23G F23N F23D F23K

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.
Y	US 3 276 506 A (MICKO OSWALD WALTER) 4 October 1966 (1966-10-04) column 1, line 30 - column 2, line 46; figure 1	1-9
Y	EP 0 919 773 A (MITSUBISHI HEAVY INDUSTRIES, LTD) 2 June 1999 (1999-06-02) paragraphs [0007], [0008], [0010], [0011], [0020] - [0032]; figures 1,2,6	1-9
A	GB 2 028 998 A (SATRONIC AG) 12 March 1980 (1980-03-12) figure 1	1-9
A	FR 2 062 565 A (ELECTRONICS CORP AMERICA) 25 June 1971 (1971-06-25) page 4, line 25 - line 28; figure 1	1-9
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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

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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.

S document member of the same patent family

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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 5 123 836 A (YONEDA ET AL) 23 June 1992 (1992-06-23) column 12, line 37 - column 13, line 28; figure 4	1-9
A	US 3 185 846 A (GILBERT LYMAN F ET AL) 25 May 1965 (1965-05-25) figure 9	1-9
X	US 5 419 358 A (SUN YUNG [US]) 30 May 1995 (1995-05-30)	20
A	column 3, line 26 - column 4, line 25; figures 1,2	10-19
A	US 4 443 793 A (HALL JR NORMAN M [US]) 17 April 1984 (1984-04-17) figure	10-20
X	US 2004/188360 A1 (ARMSTRONG JEFFREY P [US] ET AL ARMSTRONG JEFFREY A [US] ET AL) 30 September 2004 (2004-09-30) paragraphs [0032] - [0034], [0037], [0038]; figure 3	21-23, 26,27,29
X	GB 2 036 384 A (FERAKARN LTD) 25 June 1980 (1980-06-25) figure 1 page 2, line 122 - page 3, line 33	21,22, 26,27,29
X	GB 2 183 023 A (MICHIGAN CONS GAS MICHIGAN CONS GAS [US]) 28 May 1987 (1987-05-28) page 3, line 78 - page 5, line 9; figure 4	21-23, 26,28,29
X	EP 0 044 670 A (HONEYWELL INC [US]) 27 January 1982 (1982-01-27) claim 1	30,35
X	US 4 373 897 A (TORBORG RALPH H) 15 February 1983 (1983-02-15) claim 1	30,35
X	US 2003/189967 A1 (RUMELIN VOLKER [DE] ET AL) 9 October 2003 (2003-10-09) claim 1	30,35
X	US 4 828 484 A (YOUTZ STEPHEN E [US]) 9 May 1989 (1989-05-09) claim 1	30,35
X	US 4 087 229 A (TEICHERT ALLEN L ET AL) 2 May 1978 (1978-05-02) claim 1	30,34
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2005/042201

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97/45677 A (AIR LIQUIDE [FR]; AIR LIQUIDE AMERICAN [US]) 4 December 1997 (1997-12-04) page 5, line 1 - page 6, line 15 page 13, line 16 - line 23 -----	37-42
X	EP 0 752 557 A (ATWOOD IND INC [US]) 8 January 1997 (1997-01-08) column 8, line 11 - column 9, line 24 -----	37-42

INTERNATIONAL SEARCH REPORT

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Box No. 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 No. 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 allsearchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search reportcovers 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 and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ 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: 1-9

A system comprising a thermal reactor and a flame sensor disposed in a conduit provided with an operable actuator to open/close the conduit.

2. claims: 10-20

A system comprising a reaction chamber associated with two enclosures, a sensor within the first enclosure to detect flammable gas leakage within the first enclosure.

3. claims: 21-29

A system comprising a shared fuel source, and a fuel circuit including a meter, a pump and a regulator.

4. claims: 30-36

A system comprising a reaction unit and two controllers to monitor components of the reaction unit.

5. claims: 37-43

A system comprising a processing tool, a detector and a controller to determine an amount of waste effluent generated based on the indication from the detector.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2005/042201

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3276506	A	04-10-1966	DE 1221755 B GB 1034767 A NL 6403999 A	28-07-1966 06-07-1966 21-06-1965
EP 0919773	A	02-06-1999	CA 2261744 A1 WO 9853254 A1 JP 3294151 B2 JP 10318540 A US 6141957 A	26-11-1998 26-11-1998 24-06-2002 04-12-1998 07-11-2000
GB 2028998	A	12-03-1980	DE 2932129 A1 FR 2434340 A1 IT 1122840 B SE 7907083 A	28-02-1980 21-03-1980 23-04-1986 26-02-1980
FR 2062565	A	25-06-1971	BE 756604 A1 DE 2046509 A1	01-03-1971 15-04-1971
US 5123836	A	23-06-1992	NONE	
US 3185846	A	25-05-1965	GB 1008941 A	03-11-1965
US 5419358	A	30-05-1995	NONE	
US 4443793	A	17-04-1984	NONE	
US 2004188360	A1	30-09-2004	NONE	
GB 2036384	A	25-06-1980	NONE	
GB 2183023	A	28-05-1987	AU 584657 B2 AU 5151885 A BR 8605608 A CA 1254124 A1 CN 86100474 A DE 3600407 A1 DK 1286 A FR 2589989 A1 FR 2589990 A1 IL 77422 A IN 164136 A1 IT 1209684 B JP 1661559 C JP 3025693 B JP 62119313 A MX 168022 B NO 855209 A NZ 214717 A SE 468404 B SE 8603199 A US 4776366 A	01-06-1989 11-06-1987 18-08-1987 16-05-1989 20-05-1987 14-05-1987 14-05-1987 15-05-1987 15-05-1987 31-08-1988 21-01-1989 30-08-1989 19-05-1992 08-04-1991 30-05-1987 29-04-1993 14-05-1987 30-06-1987 11-01-1993 14-05-1987 11-10-1988
EP 0044670	A	27-01-1982	CA 1156098 A1 JP 1015768 B JP 1532298 C JP 57052720 A US 4334855 A	01-11-1983 20-03-1989 24-11-1989 29-03-1982 15-06-1982

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2005/042201

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 4373897	A	15-02-1983	CA	1169754 A1	26-06-1984
			JP	57082618 A	24-05-1982
US 2003189967	A1	09-10-2003	DE	10214879 A1	16-10-2003
US 4828484	A	09-05-1989	NONE		
US 4087229	A	02-05-1978	NONE		
WO 9745677	A	04-12-1997	AU	3299597 A	05-01-1998
			CA	2254868 A1	04-12-1997
			EP	0901598 A1	17-03-1999
			JP	2001527632 T	25-12-2001
			US	6244857 B1	12-06-2001
EP 0752557	A	08-01-1997	US	5632614 A	27-05-1997