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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
22 May 2008 (22.05.2008)

PCT

(10) International Publication Number
**WO 2008/061137 A3**

(51) **International Patent Classification:**
***A61L 2/07*** (2006.01)

(21) **International Application Number:**
PCT/US2007/084667

**(22) International Filing Date:**
14 November 2007 (14.1 1.2007)

**(25) Filing Language:** English

**(26) Publication Language:** English

**(30) Priority Data:**

| | | |
|---|---|---|
| 60/858,944 | 15 November 2006 (15.1 1.2006) | US |
| 60/901,007 | 13 February 2007 (13.02.2007) | US |
| 60/907,944 | 24 April 2007 (24.04.2007) | US |
| 60/924,958 | 6 June 2007 (06.06.2007) | US |
| 60/929,637 | 6 M y 2007 (06.07.2007) | US |
| 60/935,160 | 27 July 2007 (27.07.2007) | US |
| 60/935,967 | 7 September 2007 (07.09.2007) | US |

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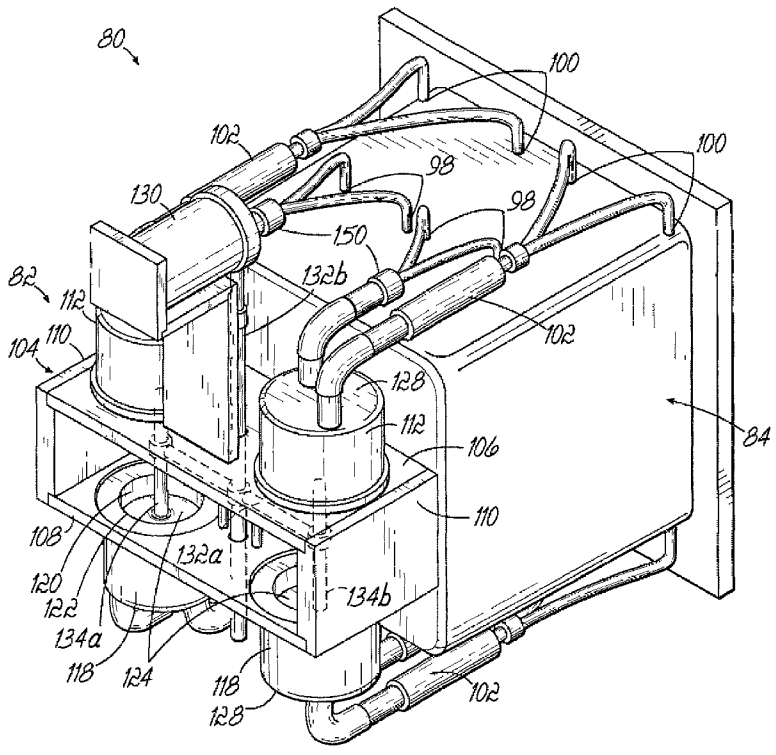
(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available):* AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY,

*[Continued on next page]*

**(54) Title:** APPARATUS AND METHOD FOR STERILIZING ITEMS




(57) **Abstract:** A sterilizing apparatus (10, 80) includes an enclosure (18, 84) defining an interior chamber (20, 86) and a door (22) for accessing the interior chamber (20, 86). A fluid source (42, 88) communicates with the chamber (20, 86) to supply a working fluid thereto. A heater (64, 102) heats the fluid in the chamber (20, 86) and a pump (62, 82) moves the fluid in the chamber (20, 86) by the heater (64, 102). A valve (50, 150) communicates with the chamber (20, 86) and with the exterior of the chamber (20, 86) and is configured to vent the fluid in the chamber (20, 86) to the exterior at a pressure of approximately one atmosphere. Such provides superheating and concentrating of the working fluid in the chamber (20, 86). A method of sterilization includes introducing a working fluid into an interior chamber (20, 86) and circulating the fluid through at least one recirculation loop (54, 96) having a heater (64, 102) for heating the fluid to an operational temperature suitable for killing microorganisms. The method further provides venting of the fluid from the chamber (20, 86) so as to maintain the pressure at approximately one atmosphere. The method further provides for killing of very high temperature resistant microorganisms.

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**TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.**

**(84) Designated States** *(unless otherwise indicated, for every kind of regional protection available):* ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— *with international search report*

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

**(88) Date of publication of the international search report:**
25 September 2008

# INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/084667

**A. CLASSIFICATION/^ SUBJECT MATTER**
INV . A61L2/07

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)
A61L

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 | WO 2006/101467 A (STERIS INC [US]; CENTANNI MICHAEL A .[US]; HILL AARON L [US]; ZELINA FR) 28 September 2006 (2006-09-28) paragraphs [0003], [0005], [0006], [0049], [0050], [0055], [0057], [0061], [0064], [0067], [0068], [0073], [0074], [0077] | 1-13,27, 40-45, 48,50 |
| X | GB 2 074 872 A (JENNINGS S w ; FROUD D R A ) 11 November 1981 (1981-11-11) page 1, lines 8-35; figures page 1, lines 77-124 page 2, lines 8-12 page 3, lines 109-122 | 1-3,6,8, 11,12 |

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

[1]A" document defining the general state of the art which is not considered to be of particular relevance

"E[1] 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 docu¬ments, 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 |
|---|---|
| 31 March 2008 | 25/07/2008 |

| Name and mailing address of the ISA/ | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswi]k<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016 | Ni ssen , Vagn |

# INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/084667

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 2002/100433 A1 (UCHIYAMA MITSURU [JP])<br>1 August 2002 (2002-08-01)<br>the whole document | .1,40 |
| X | DE 32 36 635 A1 (EMDA [DE]) " "<br>5 April 1984 (1984-04-05)<br>the whole document | 1,40 |
| A | US 2 771 644 A (MCK MARTIN WILLIAM)<br>27 November 1956 (1956-11-27)<br>column 1, lines 15-30,59-72<br>column 2, lines 1-13<br>column 3, lines 9,10,24,25,59-63<br>column 4, lines 10-15 | 1-29,<br>40-62 |
| E | WO 2008/003177 A (SCICAN LTD [CA];<br>ZWINGENBERGER ARTHUR [CH]; NAGHI GABRIEL<br>GHEORGHE [CA) 10 January 2008 (2008-01-10)<br>page 14, line 27 - page 15, line 10<br>the whole document | 1,40 |

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/084667

**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. [Y] 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.:

see additional sheet

**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/SA/ 210

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

1. claims: 1-29, 40-62

A sterilising apparatus comprising a door and a fluid source, and essentially corresponsing method, wherein the apparatus is particularly defined by the presence of a heater for heating the fluid in the interior of the apparatus to an operational temperature greater than the saturation temperature of the fluid, a pump for moving the fluid past the heater and a valve capable of venting the apparatus to ambient pressure.

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2. claims: 33-39, 65-72

A "multimode" sterilising apparatus comprising a door, and essentially corresponsing method, wherein the apparatus is particularly defined by the presence of two fluid sources, a heater for heating the fluid in the interior of the apparatus, a pump for moving the fluid past the heater and a valve capable of venting the apparatus to ambient pressure.

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3. claims: 30-32, 63-64

An apparatus and corresponding method for continuous concentration of a working fluid with a chamber containing a fluid particularly defined by the presence of a one-way valve and the capability of achieving a certain concentration of the working fluid in the chamber.

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4. claims: 73-75, 76-78

A retrofitting kit and corresponding method of installing such comprising a heater, a pump and a valve.

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5. claims: 79-81

A sterilising apparatus comprising a door and a fluid source, and essentially corresponsing method, wherein the apparatus is particularly defined by the presence of a heater for heating the fluid in the interior of the apparatus and being associated with a recirculation loop a pump for moving the fluid through the recirculation loop and a valve capable of venting the apparatus to ambient pressure. The apparatus capable of operating two temperatures.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2007/084667

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