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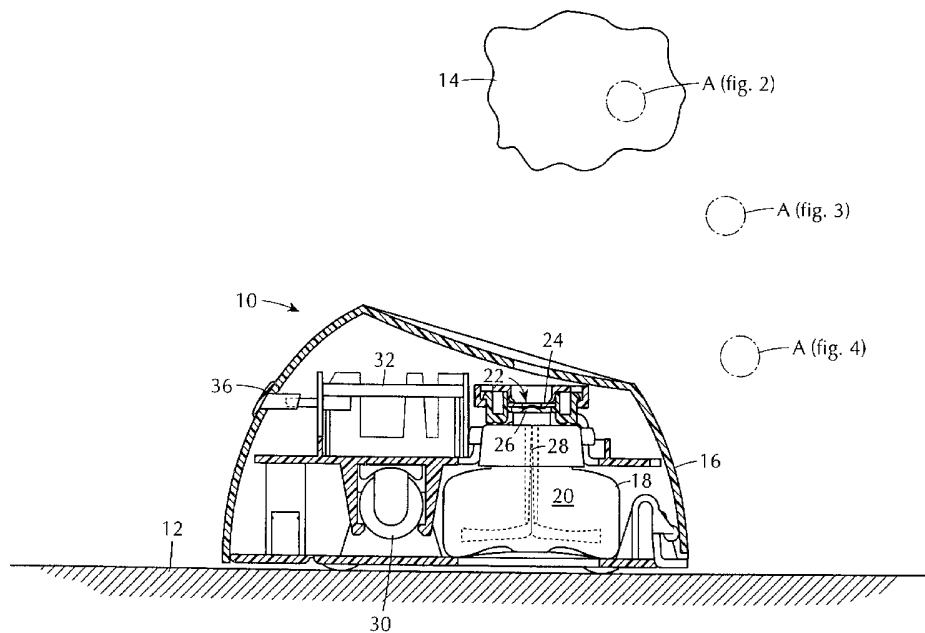
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10/066,814 4 February 2002 (04.02.2002) US
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30 October 2003

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR EVAPORATING MULTI-COMPONENT LIQUIDS



(57) Abstract: An atomizer 10 atomizes a multi-component liquid from a reservoir 20 into a cloud 14 comprising small droplets 38 which are ejected into the atmosphere to a certain height and allowed to fall toward a surface 12. Essentially complete evaporation is assured by maintaining the size of the droplets, the liquid's component vapor pressures and the height through which the droplets fall according to a predetermined relationship. Also, the suitability of a liquid for evaporation in a vibrating plate atomizer is determined by measuring the rate of size decrease and the surface tension of a pendant drop of the liquid after a predetermined amount of the liquid has evaporated from the drop.



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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/US 03/03253

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC 7	A61L9/14 G01N5/04	B01D1/16 A61L9/00 G01N25/02 G01N13/02
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) IPC 7 A61L B01D B05B G01N		
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, WPI Data, PAJ		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 897 755 A (FUMAKILLA LTD) 24 February 1999 (1999-02-24) paragraphs '0012!', '0013!', '0049!', '0064! - '0077!', '0088! - '0092!', '0148!; figure 2	1-24, 39-42
A	US 2 607 571 A (HESSION JR JOHN W) 19 August 1952 (1952-08-19) column 1, lines 26-55	1-24, 39-42
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A	US 6 296 196 B1 (CLARK GEORGE A ET AL) 2 October 2001 (2001-10-02) cited in the application the whole document	1-24, 39-42
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<input checked="" type="checkbox"/>	Further documents are listed in the continuation of box C.	<input checked="" type="checkbox"/>
	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	"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	
"E" earlier document but published on or after the international filing date	"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	
"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)	"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.	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search  17 July 2003	Date of mailing of the international search report  29.07.03	
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  Persichini, C.	

## 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.
X	WO 00 58709 A (BRITISH NUCLEAR FUELS PLC ; ASH DEAN CHRISTOPHER (GB); JOYCE MALCOLM J) 5 October 2000 (2000-10-05) abstract; claims -----	25
X	DE 34 41 317 A (KOPECKY PETER PROF DR ; HAHN AXEL DR (DE)) 7 August 1986 (1986-08-07) abstract -----	33

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 03/03253

## 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: 1-24

Method for evaporating a multi-component liquid solution wherein the diameter of the largest droplets, the ejection height and the vapour pressure of the less volatile component must fulfill a certain relation and apparatus for carrying through the method

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2. claims: 25-38

Method and apparatus for evaluating the evaporation rate of a liquid

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3. claims: 39-42

Method for evaporating a multi-component liquid solution wherein the evaporation rate of a pendant droplet of the solution must exceed a predetermined value

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## INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/US 03/03253

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