



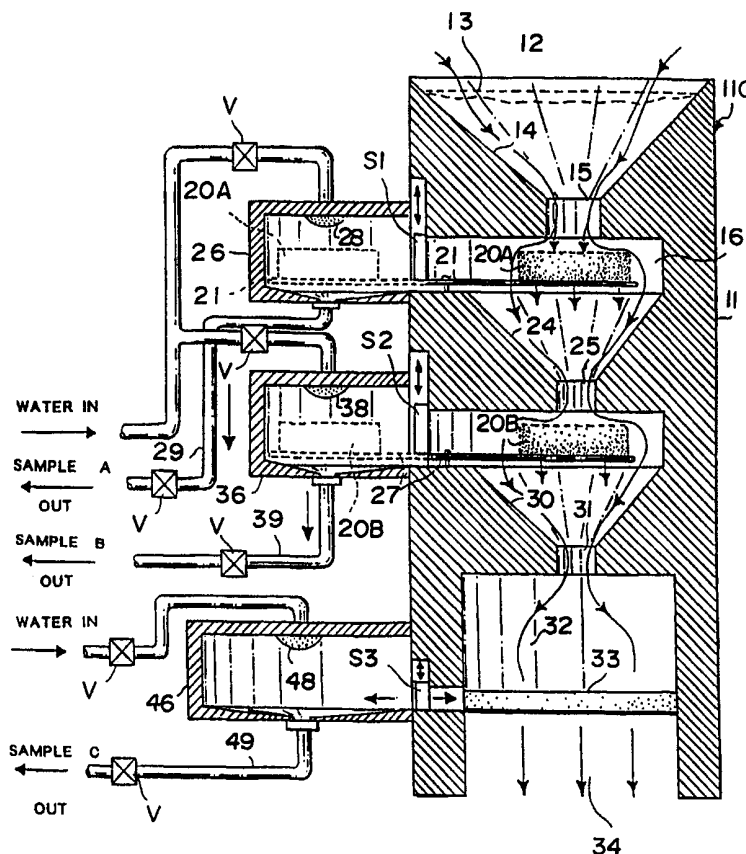
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification : G01N 01/00, B01D 39/14, 50/00, 45/04, 45/08</p>	<p>A3</p>	<p>(11) International Publication Number: WO 99/26464</p> <p>(43) International Publication Date: 3 June 1999 (03.06.99)</p>
<p>(21) International Application Number: PCT/US98/25214</p> <p>(22) International Filing Date: 25 November 1998 (25.11.98)</p> <p>(30) Priority Data: 60/066,592 26 November 1997 (26.11.97) US 60/070,279 30 December 1997 (30.12.97) US</p> <p>(71) Applicants: PACIFIC SIERRA RESEARCH CORPORATION [US/US]; Suite 700, 1400 Key Boulevard, Arlington, VA 22209 (US). UNIVERSITY OF VIRGINIA PATENT FOUNDATION [US/US]; Suite 1-110, 1224 West Main Street, Charlottesville, VA 22903 (US).</p> <p>(72) Inventors: BRENIZER, Jack, S.; Suite 1-110, 1224 West Main Street, Charlottesville, VA 22903 (US). DAITCH, Charles; Suite 700, 1400 Key Boulevard, Arlington, VA 22209 (US). HOSTICKA, Bouvard; Suite 1-110, 1224 West Main Street, Charlottesville, VA 22903 (US). MASON, L., Roger, Jr.; Suite 700, 1400 Key Boulevard, Arlington, VA 22209 (US). NORRIS, Pamela, M.; Suite 1-110, 1224 West Main Street, Charlottesville, VA 22903 (US).</p> <p>(74) Agent: WAGNER, John, E.; Wagner Middlebrook and Kimbell, 3541 Ocean View Boulevard, Glendale, CA 91208 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p> <p>(88) Date of publication of the international search report: 15 July 1999 (15.07.99)</p>	

(54) Title: AEROGEL ENVIRONMENTAL SAMPLER AND CONCENTRATOR

(57) Abstract

Atmospheric samplers are disclosed using aerogel or other frangible filter material. The samplers include one or more cascaded impact sample stations (16) with discs of aerogel (20) as the targets. Ambient air carrying particulate matter is introduced into the sampler (10) and the particles are captured by the aerogel (20) in its pore structure. In certain embodiments, the aerogel filter (20) is next transported to a position (26) where it is fragmented by a spray of water. The fragmented aerogel (20) and the captured particles are transported (29) in the fragmenting water from the sampler for analysis. In one embodiment, the sampler (80) is segmented with alternate nozzle (86) and filter segments (90) for easy assembly, sampling and disassembly for analysis of the captured particles in aerogel filters (90AG) positioned below the nozzles (86N).



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/25214

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G01N 01/00; B01D 39/14, 50/00, 45/04, 45/08
US CL : Please See Extra Sheet.

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)

U.S. : 73/863.22, 863.23, 863.25, 864.31, 864.71; 55/308, 321, 325, 421, 442, 446

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,387,603 A (Nelson) 14 June 1983, (14/06/83) general description and Figure 4.	22
Y	US 5,343,767 A (Marple et al.) 06 September 1994, (06/09/94) Abstract and Figure 1.	22
Y ---	US 4,570,494 A (Dunn et al.), 18 February 1986 (18/02/86A) Abstract and Figure 1.	22 ---
A		1-15
A	US 4,211,116 A (Pilat et al.) 08 July 1980, (08/07/80) Abstract, col. 8, lines 5-15, Figures.	1-15
A	US 4,725,294 A (Berger) 16 February 1988, (16/02/88) Abstract and Figures.	1-15

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	*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
A document defining the general state of the art which is not considered to be of particular relevance	*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
B earlier document published on or after the international filing date	*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
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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

20 APRIL 1999

Date of mailing of the international search report

12 MAY 1999¹

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

Hezron Williams *J Macalester*
Telephone No. (703) 305-4705

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/25214

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 3,693,457 A (Pilat) 26 September 1972, (26/09/72) Abstract and Figures.	1-21
▲	US 4,640,140 A (Burghoffer et al.) 03 February 1987, (03/02/87) Abstract, Figures, column 3, lines 1-15.	1, 16-21
A	US 4,391,151 A (Nelson et al.) 05 July 1983, (05/07/83) Abstract and Figures.	16-21
A	US 4,827,779 A (Marple et al.) 09 May 1989, (09/05/89) Abstract and Figures.	16-21
A	US 3,693,457 A (Pilat) 26 September 1972, (26/29/72) Abstract and Figures 2-3.	1-15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/25214

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international 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:

Please See Extra 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.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/25214

A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

73/863.22, 863.23, 863.25, 864.31, 864.71; 55/308, 321, 325, 421, 442, 446

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows:

This application contains claims directed to more than one species of the generic invention. These species are deemed to lack Unity of Invention because they are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for more than one species to be searched, the appropriate additional search fees must be paid. The species are as follows:

Species I - Figures 1-3;

Species II - Figures 4-9;

Species III - Figures 10-15.

The claims are deemed to correspond to the species listed above in the following manner:

Figs. 1-3 - claims 1 through 15;

Figs. 4-9 - claims 16 through 21;

Figs. 10-15 - claims 22 through 26.

The following claims are generic: NONE.

The species listed above do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons:

species I includes a collector body, cavity, inlet, means for exhausting filtered air, and frangible filter material in path of air flow, all of which are not contributions over the prior art such as to define a special technical feature; species II includes a multiple sample collector, including a rotatable plate with a plurality of openings and means and means for sequentially rotating the plate from a position to pass air through one of the filter bodies mounted in at least some of the openings to a position exposed to a supply of fragmenting fluid, of which species I and III do not have the same or corresponding technical features; species III includes a sampler for particles having a body comprising a plurality of removable segments constituting the sampler and at least one of the segments defining a nozzle for directing fluid to the next succeeding segment, of which species I and II do not have the same or corresponding technical features.