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[Continued on next page]

(54) Title: ADJUSTABLE FILTER APPARATUS

(57) Abstract: A filter apparatus for removing contaminants from a fluid and having an internal chamber with an adjustable volume is provided. Filter media priming to dislodge trapped gas is facilitated by the filter apparatus. A method of priming a filter cartridge containing a filter media is also provided.

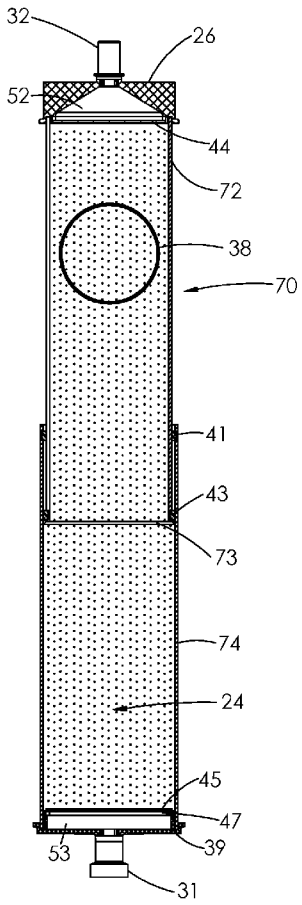


FIG. 3A

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NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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(88) Date of publication of the international search report:
18 June 2015

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 12/72222

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A61M 1/34 (2013.01)
USPC - 604/6.09
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)
USPC: 604/6.09

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 604/4.01, 5.01, 5.04, 6.1, 6.11, 6.12 (keyword limited; terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase; PubWEST(US, EPO, JPO); Google Scholar
Search Terms Used: filter, carbon, chemotherap*, hydrogel, methacryl*, prim*, volume, telescop*, adjust~, chang*, modif*, cartridge, var*, length, exten*, reduc*, piston, plunger, tub*, cassette, lever, screw, scissor, hand wheel screw adjuster, position, press*, compress*,...

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,312,950 B1 (OHMURA et al) 6 November 2001 (06.11.2001) fig 1, 2, 3, col 6, ln 51-64, col 7, ln 9-12, col 10, ln 7-45, col 11, ln 14-26, col 17, ln 26-51	1-2, 5, 10-15
Y		6-9, 16-21
X	US 6,120,474 A (OKUDA et al) 19 September 2000 (19.09.2000) fig 1, abstract, col 6, ln 28-36, col 6, ln 46-col 7, ln 3, col 7, ln 14-20	1, 3, 10-12
X	US 2010/0269462 A1 (BRENTALL) 28 October 2010 (28.10.2010), fig 1, 4, para [0004], [0017]	1, 4
Y		18-21
Y	US 6,610,024 B1 (BENATTI) 26 August 2003 (26.08.2003) fig 1, col 4, ln 28-36	6, 9
Y	US 2010/0012588 A1 (SIEWINSKI et al) 21 January 2010 (21.01.2010) para [0035]	7-8, 16-17
Y	WO 2011/053623 A2 (BRYAN et al) 05 May 2011 (05.05.2011) fig 1, pg 17, ln 28-pg 18, ln 7	19
Y	US 2011/0114905 A1 (MILICIC) 19 May 2011 (19.05.2011) fig 1, para [0098]	21

☐ Further documents are listed in the continuation of Box C. ☐

* 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 application or patent 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 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
06 April 2013 (06.04.2013)	26 APR 2013
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
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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:
This application contains the following species of the generic invention which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Species I: claims 1, 2, 3, 6-17 are directed to a filtration apparatus for removing contaminants from a fluid including a piston to adjust the volume of the cartridge. This species is illustrated in fig 1a and 2a of the application.

Species II: claims 1, 2, 4, 6-17 and 18-21 are directed to a filtration apparatus for removing contaminants from a fluid including a telescoping tube to adjust the volume of the cartridge. This species is illustrated in fig 3a and 4a of the application.

Species III: claim 1, 2, 5, 6-17 is directed to a filtration apparatus for removing contaminants from a fluid including an elastomeric material to adjust the volume of the cartridge. This species is illustrated in fig 10c of the application.

--------Continued on Supplemental Page-------

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 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 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 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.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 12/72222

Box III: Observations where unity of invention is lacking

Claims 1-2, 6-17 are considered to be generic to Species I-III. Species I-III share the technical features of claim 1. However, these shared technical features fail to make a contribution over the prior art of US 6,120,474 A to Okuda, et al. and US 6,312,950 B1 to Ohmura, et al.

Okuda teaches, with respect to claim 1, a filter apparatus for removing contaminants from a fluid, comprising:
a cartridge (4) having a first end and a second end, an inlet (10) and an outlet (11), and an internal chamber (3) having an adjustable volume (fig 1, col 6, ln 28-36, col 7, ln 14-20);
media (2) for extracting the contaminants from the fluid contained within the internal chamber of the cartridge (fig 1, col 6, ln 28-36), and means for adjusting the volume of the internal chamber (1, fig 1, col 6, ln 46-col 7, ln 3).

Additionally, Ohmura teaches, with respect to claim 1, a filter apparatus for removing contaminants from a fluid, comprising:
a cartridge (2) having a first end and a second end, an inlet (2211) and an outlet (2221), and an internal chamber (22) having an adjustable volume (fig 1, 2, 3, col 6, ln 51-64, col 17, ln 26-46);
media (21) for extracting the contaminants from the fluid contained within the internal chamber of the cartridge (fig 1, col 7, ln 9-12), and means for adjusting the volume of the internal chamber (24, fig 2, 3, col 17, ln 39-46).

Furthermore, with respect to claim 13, Ohmura teaches a method for priming a filter cartridge containing filter media contained within the filter cartridge in an internal chamber, comprising
providing the filter cartridge in a prime state (col 17, ln 26-46),
introducing fluid to hydrate the filter media (col 17, ln 26-46);
pumping fluid through the internal chamber of the filter cartridge (col 17, ln 26-46), and
reducing the volume of the internal chamber of the filter cartridge to a filter state, thus providing a primed filter cartridge (fig 2, 3, col 7, ln 24-31, col 17, ln 47-51).

The species listed as Species I-III do not relate to a single general inventive concept under PCT Rule 13.1 because under PCT Rule 13.2 they lack the same or corresponding technical features for the following reasons:

Species II-III do not include the special technical feature of Species I which is a piston to adjust the volume of the cartridge.

Species I and III do not include the special technical feature of Species II which is a telescoping tube to adjust the volume of the cartridge.

Species I and II do not include the special technical feature of Species III which is an elastomeric material to adjust the volume of the cartridge.

None of these special technical features are common to the other species, nor do they correspond to a special technical feature in the other species.

Therefore, the listed inventions lack unity of invention under PCT Rule 13 because they do not share a same or corresponding special technical feature.