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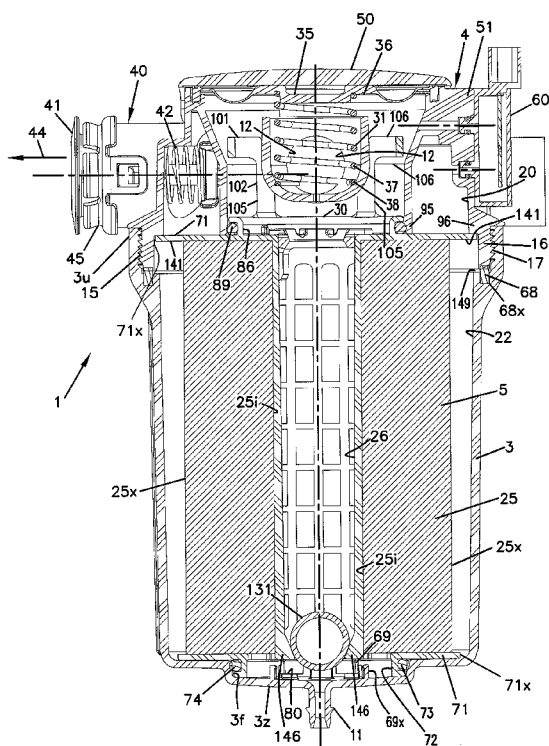
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(54) Title: CRANKCASE VENTILATION FILTER ASSEMBLY; COMPONENTS; AND, METHODS

FIG. 3



(57) Abstract: Crankcase ventilation filter arrangements and components therefore are described. Example arrangements are described. In one, a serviceable filter cartridge includes a check valve therein, for protection during vehicle rollover. Handle arrangements are also described. Methods of use are described.



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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER INV. B01D46/24 F01M13/04 B01D46/00		
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) F01M B01D		
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) EP0-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2007/053411 A2 (DONALDSON CO INC [US]; MOSSET WADE STEPHEN [US]; DAHLSTROM ROBERT LAWR) 10 May 2007 (2007-05-10) figures 23-26 page 21, line 4 - page 22, line 8 -----	1,2,10, 16,17
A	US 2001/054418 A1 (BURGESS STEPHEN F [US]) 27 December 2001 (2001-12-27) paragraphs [0002], [0064] - [0069] figures 10-14 -----	3,18-20
A	US 2003/226790 A1 (BROWN GENE W [US] ET AL) 11 December 2003 (2003-12-11) paragraphs [0028] - [0032], [0041] claim 4 figures 3,6 ----- -/--	1,2,4-6, 9-13
☒ 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 "E" 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 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 25 October 2010		Date of mailing of the international search report 22/02/2011
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Mallo López, Manuel

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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 6 248 236 B1 (HODGKINS DAVID H [US]) 19 June 2001 (2001-06-19) column 3, line 13 - column 4, line 13 figure 1 -----	1,2,10, 16,17
A	US 2005/035053 A1 (ENGELHARD ROLF [US] ET AL) 17 February 2005 (2005-02-17) figure 3 paragraphs [0034] - [0037] -----	1,2,10
A	US 5 702 602 A (BROWN GENE W [US] ET AL) 30 December 1997 (1997-12-30) column 4, line 40 - column 5, line 18 figures 2-5 -----	1,2,10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/071783

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 all searchable 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 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.:

see additional sheet(s)

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/US2008/071783

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-20

Crankcase ventilation system with a filter cartridge comprising a media pack positioned between a first end piece and a second end piece, wherein each end piece has an axial projection extending in a direction opposite the media pack and including a seal support with a seal mounted on it, the first end piece including a framework including an upper rail supported by spaced supports.

2. claims: 21-24

Filter cartridge comprising a central media support, a media pack positioned between a first end piece and a second end piece and a check valve arrangement including a first seat adjacent to the first end of the central support, a second seat adjacent to the second end of the central support and a valve member moving therebetween.
