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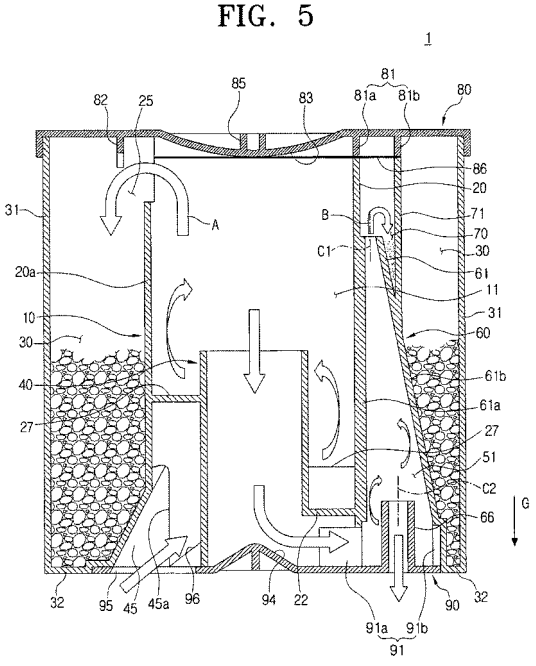
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## (54) A multi cyclone dust collector for a vacuum cleaner

(57) A multi-cyclone dust collector including at least one first cyclone (10) forcing contaminants-laden air that is entered into a lower portion (22) of the at least one first cyclone (10) to whirl so as to centrifugally separate contaminants from the contaminants-laden air; and at least one second cyclone (60) being disposed around the at least one first cyclone (10), the at least one second cyclone (60) forcing semi-clean air that is discharged from the at least one first cyclone (10) and is entered into a lower portion of the at least one second cyclone (60) to whirl so as to centrifugally separate fine contaminants from the air.

FIG. 5




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# EUROPEAN SEARCH REPORT

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## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| X<br>Y | EP 0 018 197 A (DYSON JAMES)<br>29 October 1980 (1980-10-29)<br>* page 6, line 15 - page 20, line 12 * | 1,3-6,<br>8-12,44<br>2,13,15,<br>18-20,<br>22,23,<br>33,37,40 | INV.<br>A47L9/16<br>B04C5/13 |
| Y | DE 10 2004 034015 A1 (SAMSUNG GWANGJU ELECTRONICS CO [KR])<br>1 September 2005 (2005-09-01)<br>* paragraphs [0004] - [0011] * | 2,13,15,<br>18-20,<br>22,23,<br>33,37,40 | |
| A | US 2002/116907 A1 (GAMMACK PETER DAVID [GB] ET AL GAMMACK PETER DAVID [GB] ET AL)<br>29 August 2002 (2002-08-29)<br>* paragraphs [0019] - [0046] * | 1-44 | |
| A | JP 08 322768 A (SHARP KK)<br>10 December 1996 (1996-12-10)<br>* abstract * | 1-44 | |
| | | | TECHNICAL FIELDS SEARCHED (IPC) |
| A | FR 2 778 546 A1 (SEB SA [FR])<br>19 November 1999 (1999-11-19)<br>* page 9, line 25 - page 15, line 24 * | 1-44 | B04C<br>A47L |
| A | EP 1 371 318 A (HITACHI HOME & LIFE SOLUTIONS [JP])<br>17 December 2003 (2003-12-17)<br>* paragraphs [0008] - [0020] * | 1-44 | |
| A | WO 01/95780 A (FANTOM TECH INC [CA]; CONRAD WAYNE ERNEST [CA])<br>20 December 2001 (2001-12-20)<br>* page 2, line 10 - page 4, line 15 * | 1-44 | |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 19 October 2007 | MARTIN GONZALEZ, G |

CATEGORY OF CITED DOCUMENTS

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19-10-2007

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| EP 0018197 A | 29-10-1980 | CA 1159610 A1 | 03-01-1984 |
| | | JP 1056772 B | 01-12-1989 |
| | | JP 1582142 C | 11-10-1990 |
| | | JP 55141227 A | 05-11-1980 |
| | | US 4373228 A | 15-02-1983 |
| DE 102004034015 A1 | 01-09-2005 | AU 2004202917 A1 | 25-08-2005 |
| | | CA 2472673 A1 | 11-08-2005 |
| | | CN 1654002 A | 17-08-2005 |
| | | EG 23545 A | 07-05-2006 |
| | | ES 2251869 A1 | 01-05-2006 |
| | | FR 2865918 A1 | 12-08-2005 |
| | | GB 2410912 A | 17-08-2005 |
| | | JP 2005224590 A | 25-08-2005 |
| | | KR 20050080916 A | 18-08-2005 |
| | | US 2005172585 A1 | 11-08-2005 |
| US 2002116907 A1 | 29-08-2002 | AT 326896 T | 15-06-2006 |
| | | CA 2438077 A1 | 06-09-2002 |
| | | CN 1556683 A | 22-12-2004 |
| | | DE 60211663 T2 | 10-05-2007 |
| | | EP 1370173 A1 | 17-12-2003 |
| | | ES 2265036 T3 | 01-02-2007 |
| | | WO 02067754 A1 | 06-09-2002 |
| | | JP 2004529682 T | 30-09-2004 |
| JP 8322768 A | 10-12-1996 | NONE | |
| FR 2778546 A1 | 19-11-1999 | AU 3935199 A | 06-12-1999 |
| | | BR 9906376 A | 11-07-2000 |
| | | CN 1272048 A | 01-11-2000 |
| | | DE 69919106 D1 | 09-09-2004 |
| | | EP 0996355 A1 | 03-05-2000 |
| | | WO 9959458 A1 | 25-11-1999 |
| | | PL 337924 A1 | 11-09-2000 |
| | | RU 2198581 C2 | 20-02-2003 |
| | | TR 200000094 T1 | 21-09-2000 |
| | | US 6332239 B1 | 25-12-2001 |
| EP 1371318 A | 17-12-2003 | CN 1473543 A | 11-02-2004 |
| | | US 2006123751 A1 | 15-06-2006 |
| | | US 2003226232 A1 | 11-12-2003 |
| WO 0195780 A | 20-12-2001 | AT 273653 T | 15-09-2004 |
| | | AU 6886801 A | 24-12-2001 |
| | | CA 2412881 A1 | 20-12-2001 |

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 29 1062

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The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-10-2007

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| WO 0195780 A | | DE 60105004 D1 | 23-09-2004 |
| | | DE 60105004 T2 | 18-08-2005 |
| | | EP 1274337 A2 | 15-01-2003 |
| | | GB 2381484 A | 07-05-2003 |
| | | US 6344064 B1 | 05-02-2002 |

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82