

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
13 June 2002 (13.06.2002)

PCT

(10) International Publication Number  
**WO 02/045819 A3**

- (51) International Patent Classification<sup>7</sup>: **B01D 46/52**, 46/24
- (21) International Application Number: PCT/US01/46277
- (22) International Filing Date:  
29 November 2001 (29.11.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
09/729,033 4 December 2000 (04.12.2000) US
- (71) Applicant: **DONALDSON COMPANY, INC.** [US/US];  
1400 West 94th Street, P.O. Box 1299, Minneapolis, MN  
55440-1299 (US).
- (72) Inventors: **GIESEKE, Steven, Scott**; 6329 3rd Avenue  
South, Richfield, MN 55423 (US). **MURRAY, Peter, J.**;  
9132 Logan Avenue South, Minneapolis, MN 55431 (US).
- (74) Agent: **BRUESS, Steven, C.**; Merchant and Gould P.C.,  
P.O. Box 2903, Minneapolis, MN 55402-0903 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,  
SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU,  
ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, 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, TR), OAPI patent  
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,  
NE, SN, TD, TG).
- Published:**  
— *with international search report*
- (88) Date of publication of the international search report:  
21 August 2003
- 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.*



**WO 02/045819 A3**

(54) Title: AIR FILTER

(57) Abstract: An air cleaner comprises a cylindrical filter element having a first open end cap, a second closed end cap, and a cylindrical media pack extending therebetween. The first end cap defines an internal radial seal region. The second, closed end cap has a central region including a circular recessed portion. The air cleaner also includes an end cover. The end cover includes an inner side including a central projection thereon. The central projection is sized and shaped to matably engage the recessed portion of the second end cap, when the filter element is operably installed in the end cover. Methods for installing a filter element in an air cleaner.

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 01/46277

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 B01D46/52 B01D46/24		
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 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)  WPI Data, PAJ, EPO-Internal		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 897 676 A (D.F.ENGEL ET AL.) 27 April 1999 (1999-04-27) claim 1; figure 8	1-6
A	US 6 099 606 A (T.G.MILLER ET AL.) 8 August 2000 (2000-08-08) cited in the application the whole document	1, 15, 20
A	US 5 755 842 A (J.U.PATEL ET AL.) 26 May 1998 (1998-05-26) cited in the application the whole document	1
A	US 4 728 423 A (S.KUWAJIMA) 1 March 1988 (1988-03-01) claim 1; figure 3	1, 14
<input 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  <p style="text-align: center;">22 May 2003</p>	Date of mailing of the international search report  <p style="text-align: center;">30/05/2003</p>	
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  <p style="text-align: center;">Bertram, H</p>	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/46277

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
US 5897676	A	27-04-1999	US 5938804 A	17-08-1999
			US 5690712 A	25-11-1997
			US 5613992 A	25-03-1997
			AU 741548 B2	06-12-2001
			AU 7983898 A	19-01-1999
			BR 9810303 A	04-12-2001
			CN 1261291 T	26-07-2000
			EP 0991459 A1	12-04-2000
			JP 3220172 B2	22-10-2001
			JP 2001511704 T	14-08-2001
			WO 9900174 A1	07-01-1999
			US 6004366 A	21-12-1999
			US 6258145 B1	10-07-2001
			US 2001020419 A1	13-09-2001
			US 2002092282 A1	18-07-2002
			US 2002014058 A1	07-02-2002
			ZA 9805657 A	10-01-2000
			AU 696053 B2	27-08-1998
			AU 4105196 A	17-06-1996
			BR 9509763 A	07-07-1998
			CA 2206268 A1	30-05-1996
			CN 1174516 A	25-02-1998
			DE 29521599 U1	27-11-1997
			DE 29522112 U1	16-12-1999
			DE 69509786 D1	24-06-1999
			DE 69509786 T2	16-09-1999
			EP 0793525 A1	10-09-1997
			ES 2133830 T3	16-09-1999
			JP 2001515395 T	18-09-2001
			WO 9615841 A1	30-05-1996
<hr/>				
US 6099606	A	08-08-2000	AU 3093499 A	11-10-1999
			WO 9947237 A1	23-09-1999
<hr/>				
US 5755842	A	26-05-1998	CA 2197794 A1	23-01-1997
			EP 0779832 A1	25-06-1997
			WO 9702084 A1	23-01-1997
<hr/>				
US 4728423	A	01-03-1988	JP 1603029 C	29-03-1991
			JP 2026523 B	11-06-1990
			JP 62019217 A	28-01-1987
			EP 0209348 A2	21-01-1987
			PH 24408 A	13-06-1990