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- (54) Title: ACCUMULATOR FOR AUTOMOTIVE REFRIGERATION SYSTEM
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(54) Title: ACCUMULATOR FOR AUTOMOTIVE REFRIGERATION SYSTEM

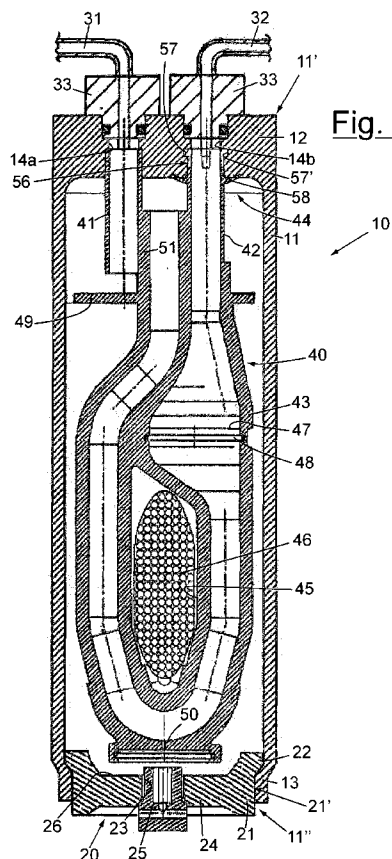


Fig. 1a

(57) Abstract: An accumulator (10) for an automotive refrigeration system comprises a tubular casing element (11) adapted to accommodate a pipes assembly (40,60) within which the refrigerant flows, the accumulator being provided with a bottom (12) which closes a first end (11') thereof, and in which a pair of connections (14a, 14b) is provided respectively for refrigerant inlet (31) and outlet (32) pipes and closable in a sealed manner at a second end (11''), opposite to the first, by means of a cap (20).

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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) F25B F16J F28F				
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) EPO-Internal				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	US 2005/229632 A1 (OBRIST FRANK [AT] ET AL) 20 October 2005 (2005-10-20) the whole document	1,2		
Y	----- US 4 887 849 A (BRIET GILLES [FR]) 19 December 1989 (1989-12-19) abstract claims 1-9 figures 1,3,5-7	8-20 8-14,20		
Y	----- US 5 477 919 A (KARUBE TOSHIKATSU [JP]) 26 December 1995 (1995-12-26) column 5, line 55 - column 5, line 63 figures 4-6 ----- -/--	15-20		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. </td> <td style="width: 50%; border: none;"> <input checked="" type="checkbox"/> See patent family annex. </td> </tr> </table>			<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.			
* Special categories of cited documents :				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> *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 </td> <td style="width: 50%; border: none;"> *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 </td> </tr> </table>			*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
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	Date of mailing of the international search report			
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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 Correia dos Reis, I			

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2008/000049

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 651 540 A (MORSE ROBERT L [US]) 24 March 1987 (1987-03-24) column 5, line 44 - column 5, line 51 figures 1,8	1,2,5
X	EP 1 437 563 A (HANSA METALLWERKE AG [DE]) 14 July 2004 (2004-07-14) paragraph [0018] paragraph [0024] figures 1,2,5	1,5
Y A		3,4,28 2
Y	WO 2004/073913 A (BALL BURNISHING MACHINE TOOL L [GB]; LINZELL GEOFFREY ROBERT [GB]) 2 September 2004 (2004-09-02) page 1, line 18 - page 1, line 32 page 22, line 1 - page 22, line 4	3,4,28
X	EP 0 854 328 A (CARRIER CORP [US]) 22 July 1998 (1998-07-22) the whole document	1
X	DE 10 2004 055342 A1 (BEHR GMBH & CO KG [DE]) 18 May 2006 (2006-05-18) the whole document	1
X	US 5 038 582 A (TAKAMATSU YOSHIKAZU [JP]) 13 August 1991 (1991-08-13) column 1, line 14 - column 1, line 22 figure 4	1
A	US 2005/023828 A1 (TAKEUCHI MASAYUKI [JP] ET AL) 3 February 2005 (2005-02-03) paragraph [0040] paragraph [0059] - paragraph [0061] figures 1,9	1,8-20
A	EP 0 922 602 A (MAN NUTZFAHRZEUGE AG [DE]) 16 June 1999 (1999-06-16) paragraph [0028] figures 1,3,5	1,8
A	US 4 773 474 A (STAY KEVIN E [US]) 27 September 1988 (1988-09-27) figures 1-3 column 2, line 24 - column 2, line 32 column 3, line 17 - column 5, line 26	1,8
A	US 4 957 158 A (ANDO NOBUYASU [JP]) 18 September 1990 (1990-09-18) figures 15-17	1,15-17
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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2008/000049

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 06 229696 A (SHOWA ALUMINUM CORP) 19 August 1994 (1994-08-19) (see http://dossier1.ipdl.inpit.go.jp/AIPN/aipn_call_transl.ipdl?N0000=7413&N0120=01&N2001=2&N3001=H06-229696) abstract figure 7 -----	1,8

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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:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable 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.:

1-5, 8-20, 28
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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-5,28

Accumulator for an automotive refrigeration system and method for its assembly, directed at structural features

2. claims: 1,6

Accumulator for an automotive refrigeration system, directed at safety features

3. claims: 1,7,21-27

Accumulator for an automotive refrigeration system, directed at functional features

4. claims: 1,8-20

Accumulator for an automotive refrigeration system, directed at connection features

INTERNATIONAL SEARCH REPORT

International application No
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 2005229632	A1	20-10-2005	AT 393904 T DE 202005021558 U1 EP 1564510 A2 JP 2005233606 A	15-05-2008 06-11-2008 17-08-2005 02-09-2005
US 4887849	A	19-12-1989	DE 68900044 D1 DE 327440 T1 EP 0327440 A1 FR 2626660 A1	25-04-1991 08-02-1990 09-08-1989 04-08-1989
US 5477919	A	26-12-1995	JP 3159805 B2 JP 6123523 A	23-04-2001 06-05-1994
US 4651540	A	24-03-1987	AU 585795 B2 AU 6821387 A BR 8700783 A CA 1272384 A1 FR 2596143 A1 IT 1207536 B JP 1788392 C JP 4080314 B JP 62228850 A	22-06-1989 24-09-1987 29-12-1987 07-08-1990 25-09-1987 25-05-1989 10-09-1993 18-12-1992 07-10-1987
EP 1437563	A	14-07-2004	AT 392593 T DE 10300801 B3	15-05-2008 24-06-2004
WO 2004073913	A	02-09-2004	EP 1592531 A2	09-11-2005
EP 0854328	A	22-07-1998	BR 9800359 A DE 69832741 T2 ES 2251063 T3 JP 2944976 B2 JP 10205928 A US 5787728 A	13-07-1999 10-08-2006 16-04-2006 06-09-1999 04-08-1998 04-08-1998
DE 102004055342	A1	18-05-2006	EP 1814749 A1 WO 2006053720 A1 JP 2008520941 T	08-08-2007 26-05-2006 19-06-2008
US 5038582	A	13-08-1991	JP 2120673 U JP 6048283 Y2	28-09-1990 12-12-1994
US 2005023828	A1	03-02-2005	DE 102004035210 A1 JP 4096832 B2 JP 2005042815 A	10-03-2005 04-06-2008 17-02-2005
EP 0922602	A	16-06-1999	DE 19755297 A1	24-06-1999
US 4773474	A	27-09-1988	AU 594626 B2 AU 2099388 A BR 8804081 A CA 1279639 C DE 3868773 D1 EP 0303456 A1 ES 2030172 T3 JP 1127898 A JP 2729634 B2 MX 165774 B	08-03-1990 16-02-1989 07-03-1989 29-01-1991 09-04-1992 15-02-1989 16-10-1992 19-05-1989 18-03-1998 03-12-1992

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2008/000049

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	Publication date	Publication date
US 4957158	A	18-09-1990 JP JP	2100085 U 7011335 Y2	09-08-1990	15-03-1995
JP 6229696	A	19-08-1994 JP	3212730 B2	25-09-2001	