



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**01.06.2005 Bulletin 2005/22**

(51) Int Cl.7: **F28D 7/00**

(43) Date of publication A2:  
**24.11.2004 Bulletin 2004/48**

(21) Application number: **04010816.9**

(22) Date of filing: **06.05.2004**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
 HU IE IT LI LU MC NL PL PT RO SE SI SK TR**  
 Designated Extension States:  
**AL HR LT LV MK**

(72) Inventor: **Takano, Akihiko**  
**Zexel Valeo Climate Control Corp**  
**Ohsato-gun Saitama 360-0193 (JP)**

(30) Priority: **23.05.2003 JP 2003146347**

(74) Representative: **HOFFMANN - EITLÉ**  
**Patent- und Rechtsanwälte**  
**Arabellastrasse 4**  
**81925 München (DE)**

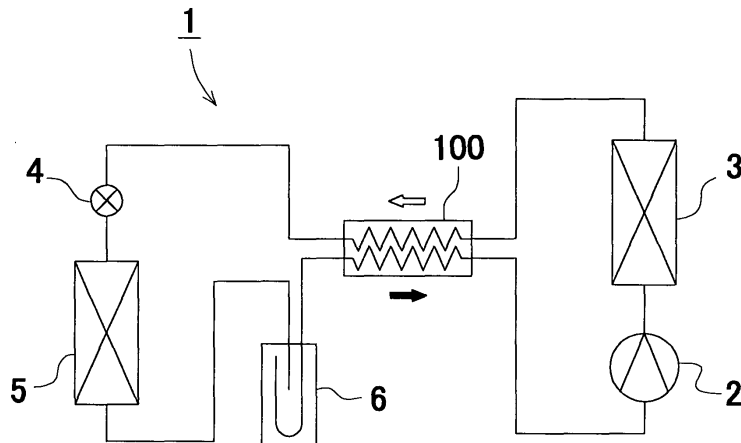
(71) Applicant: **Zexel Valeo Climate Control  
 Corporation**  
**Ohsato-gun, Saitama 360-0193 (JP)**

(54) **Heat exchanger**

(57) A heat exchanger which is used for a compression type refrigerating cycle for circulating a refrigerant and executes heat exchange between a high-pressure side and a low-pressure side of the refrigerant, wherein the heat exchanger is provided with a tube body 200 for flowing the refrigerant on the high-pressure side and the refrigerant on the low-pressure side and executes the heat exchange through heat conducted to the tube body; the tube body is comprised of a lamination of first

tubes 210 of a flat type for flowing the refrigerant on the high-pressure side and second tubes 220 of a flat type for flowing the refrigerant on the low-pressure side; ends 201 of the tube body are formed by bending the ends 211 of the first tubes and those 221 of the second tubes to one side of a lamination direction; and the ends of the first tubes and the ends of the second tubes are provided with headers 310, 320, 330, 340 which become an inlet or an outlet for the refrigerant.

**FIG.1**





European Patent  
Office

EUROPEAN SEARCH REPORT

Application Number  
EP 04 01 0816

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 6 386 277 B1 (WATTELET JONATHAN P ET AL) 14 May 2002 (2002-05-14) * column 5, line 13 - line 21; figure 5 *	1,2	F28D7/00 F28D7/00 F28F9/02
A	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 08, 5 August 2002 (2002-08-05) -& JP 2002 098424 A (ZEXEL VALEO CLIMATE CONTROL CORP), 5 April 2002 (2002-04-05) * abstract; figures 2-9 *	1-5	
A	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 03, 5 May 2003 (2003-05-05) -& JP 2002 340485 A (MITSUBISHI HEAVY IND LTD), 27 November 2002 (2002-11-27) * abstract; figures 1-4 *	1-3	
A	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 12, 12 December 2002 (2002-12-12) -& JP 2002 243374 A (MITSUBISHI HEAVY IND LTD), 28 August 2002 (2002-08-28) * abstract; figures 1-8 *	1-3	
A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 19, 5 June 2001 (2001-06-05) -& JP 2001 050681 A (MATSUSHITA ELECTRIC IND CO LTD), 23 February 2001 (2001-02-23) * abstract; figure 2 *	1-3	
A	DE 40 12 046 A1 (BEHR GMBH & CO, 7000 STUTTGART, DE) 17 October 1991 (1991-10-17) * column 2, line 36 - column 5, line 30; figures 1-12 *	1,2	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 April 2005	Examiner Beltzung, F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

1  
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 01 0816

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-04-2005

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6386277	B1	14-05-2002	AU 2031502 A	31-10-2002
			BR 0200783 A	11-02-2003
			CA 2377844 A1	24-10-2002
			DE 10217581 A1	05-12-2002
			FR 2823839 A1	25-10-2002
			JP 2002333294 A	22-11-2002
			MX PA02003281 A	30-10-2002
-----				
JP 2002098424	A	05-04-2002	NONE	
-----				
JP 2002340485	A	27-11-2002	NONE	
-----				
JP 2002243374	A	28-08-2002	NONE	
-----				
JP 2001050681	A	23-02-2001	NONE	
-----				
DE 4012046	A1	17-10-1991	NONE	
-----				

EPO FORM P0459

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