(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 508 821 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
11.02.2015 Bulletin 2015/07

(43) Date of publication A2:
10.10.2012 Bulletin 2012/41

(21) Application number: **12163185.7**

(22) Date of filing: **04.04.2012**

(51) Int Cl.:
F25B 49/02 *(2006.01)* ***F25B 40/02*** *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **07.04.2011 JP 2011085142**

(71) Applicant: **Panasonic Corporation**
Osaka 571-8501 (JP)

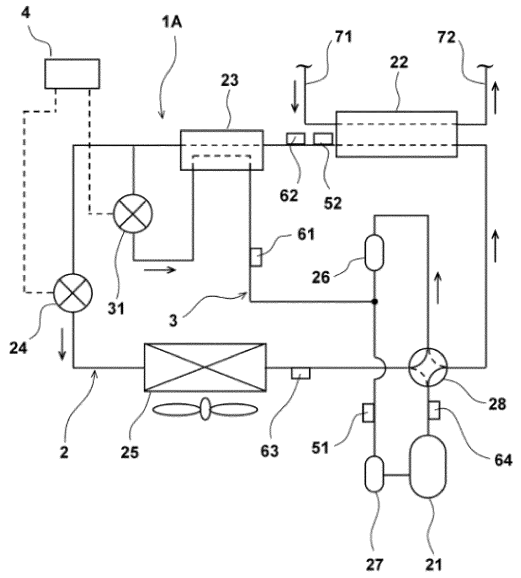
(72) Inventors:
- **Moriwaki, Shunji**
  Chuo-ku, OSAKA, 540-6207 (JP)
- **Aoyama, Shigeo**
  Chuo-ku, OSAKA, 540-6207 (JP)
- **Kusaka, Michiyoshi**
  Chuo-ku, OSAKA, 540-6207 (JP)

(74) Representative: **Eisenführ Speiser**
Patentanwälte Rechtsanwälte PartGmbB
Postfach 31 02 60
80102 München (DE)

(54) Refrigeration cycle apparatus and hydronic heater including the refrigeration cycle apparatus

(57) The present invention provides a refrigeration cycle apparatus 1A. When a temperature detected by the first temperature sensor 61 is higher than a temperature detected by the first saturation temperature detecting means 51, a control device 4 operates bypass expansion means 31 such that the temperature detected by the first temperature sensor 61 comes close to the temperature detected by the first saturation temperature detecting means 51. If the temperature detected by the first temperature sensor 61 is substantially equal to the temperature detected by the first saturation temperature detecting means 51, the control device 4 operates the bypass expansion means 31 such that a temperature detected by the second temperature sensor 6 becomes lower than a temperature detected by the second saturation temperature detecting means 52 by a predetermined temperature. Therefore, it is possible to enhance the heating ability and efficiency of the refrigeration cycle apparatus 1A.

[Fig. 1]



EP 2 508 821 A3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 12 16 3185

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2006/048539 A1 (TAKECHI RYOTA [JP] ET AL) 9 March 2006 (2006-03-09) * paragraphs [0049] - [0077]; figure 1 *	1-3	INV. F25B49/02 F25B40/02
A	EP 1 970 653 A1 (DAIKIN IND LTD [JP]) 17 September 2008 (2008-09-17) * paragraphs [0065] - [0067], [0075]; figure 1 *	1-3	
A	JP 2010 091135 A (TOKYO ELECTRIC POWER CO) 22 April 2010 (2010-04-22) * abstract; figure 1 *	1-3	
A	EP 1 876 403 A1 (DAIKIN IND LTD [JP]) 9 January 2008 (2008-01-09) * paragraph [0371] - paragraph [0413]; figure 31 *	1-3	
			TECHNICAL FIELDS SEARCHED (IPC) F25B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	19 December 2014	Gasper, Ralf

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 16 3185

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.

19-12-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006048539 A1	09-03-2006	AU 2004267299 A1	03-03-2005
		CN 1738995 A	22-02-2006
		EP 1659348 A1	24-05-2006
		JP 3757967 B2	22-03-2006
		JP 2005069566 A	17-03-2005
		US 2006048539 A1	09-03-2006
		WO 2005019742 A1	03-03-2005
EP 1970653 A1	17-09-2008	AU 2006324596 A1	21-06-2007
		CN 101331372 A	24-12-2008
		EP 1970653 A1	17-09-2008
		JP 4114691 B2	09-07-2008
		JP 2007163100 A	28-06-2007
		KR 20080081942 A	10-09-2008
		US 2009044550 A1	19-02-2009
		WO 2007069581 A1	21-06-2007
JP 2010091135 A	22-04-2010	NONE	
EP 1876403 A1	09-01-2008	AU 2006234263 A1	19-10-2006
		EP 1876403 A1	09-01-2008
		JP 3963190 B2	22-08-2007
		JP 2006313057 A	16-11-2006
		KR 20070120546 A	24-12-2007
		US 2009025406 A1	29-01-2009
		WO 2006109677 A1	19-10-2006

EPO FORM P0459

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