

Title (en)  
REFRIGERATION DEVICE

Title (de)  
KÜHLVORRICHTUNG

Title (fr)  
DISPOSITIF DE REFRIGERATION

Publication  
**EP 1990587 A4 20141119 (EN)**

Application  
**EP 07714753 A 20070222**

Priority  
• JP 2007053255 W 20070222  
• JP 2006053431 A 20060228

Abstract (en)  
[origin: EP1990587A1] A refrigerant circuit ( 10 ) includes a gas-liquid separator ( 15 ) and a compressor ( 30 ) including a low pressure side compression mechanism ( 34 ) and a high pressure side compression mechanism ( 35 ) connected to each other by means of a drive shaft ( 33 ). In the refrigerant circuit ( 10 ), a two-stage compression/two-stage expansion refrigeration cycle is performed with CO<sub>2</sub> refrigerant utilized as that at its critical pressure. In the compressor ( 30 ), a volume ratio V<sub>2</sub>/V<sub>1</sub> of the displacement volume V<sub>2</sub> of the second compression mechanism ( 35 ) to that V<sub>1</sub> of the first compression mechanism is set within a range between 0.8 and 1.3, both exclusive.

IPC 8 full level  
**F25B 1/00** (2006.01); **F25B 1/04** (2006.01); **F25B 1/10** (2006.01)

CPC (source: EP KR US)  
**F25B 1/00** (2013.01 - KR); **F25B 1/04** (2013.01 - KR); **F25B 1/10** (2013.01 - EP KR US); **F25B 9/008** (2013.01 - EP US); **F25B 13/00** (2013.01 - EP US); **F25B 2309/061** (2013.01 - EP US); **F25B 2313/0272** (2013.01 - EP US); **F25B 2313/02741** (2013.01 - EP US); **F25B 2400/13** (2013.01 - EP US); **F25B 2400/23** (2013.01 - EP US)

Citation (search report)  
• [I] JP 2003074999 A 20030312 - DAIKIN IND LTD  
• [A] JP 2003065615 A 20030305 - DAIKIN IND LTD  
• [X] JAKOBSEN A: "Improving efficiency of trans-critical CO<sub>2</sub> refrigeration systems for reefers", IIF-IIR COMMISSION D2 D3., 1 February 1998 (1998-02-01), pages 130 - 138, XP001168660  
• [X] HUFF H-J ET AL: "OPTIONS FOR A TWO-STAGE TRANSCRIPTIONAL CARBON DIOXIDE CYCLE", IIR GUSTAV LORENTZEN CONFERENCE ON NATURAL WORKING FLUIDS.JOINT CONFERENCE OF THE INTERNATIONAL INSTITUTE OF REFRIGERATIONSECTION B AND E, XX, XX, 17 September 2002 (2002-09-17), pages 158 - 164, XP001176579  
• [A] INOKUTY H: "NEUE KREISPROZESSE AN KALTDAMPFMASCHINEN THEORIE UND VERSUCHE", ZEITSCHRIFT FUER DIE GESAMTE KAELTE-INDUSTRIE, VDI VERLAG, BERLIN, DE, vol. 36, no. 2, 1 February 1929 (1929-02-01), pages 21 - 26, XP001169158, ISSN: 0372-879X  
• See references of WO 2007105440A1

Cited by  
US2011232325A1; US9068765B2; WO2011091014A3; EP2339272A1

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