

Title (en)
CRYOGENIC REFRIGERATION METHOD AND DEVICE

Title (de)
KRYOGENES KÜHLVERFAHREN UND ENTSPRECHENDE VORRICHTUNG

Title (fr)
DISPOSITIF ET PROCÉDÉ DE RÉFRIGÉRATION CRYOGÉNIQUE

Publication
EP 2225501 A2 20100908 (FR)

Application
EP 08852903 A 20081023

Priority

- FR 2008051919 W 20081023
- FR 0759243 A 20071123

Abstract (en)
[origin: WO2009066044A2] The invention relates to a cryogenic refrigeration device intended to transfer heat from a cold source (15) to a hot source (1) via a working fluid flowing through a closed working circuit (200) including the following portions in series, namely: a portion for the substantially isothermal compression of the fluid, a portion for the substantially isobaric cooling of the fluid, a portion for the substantially isothermal expansion of the fluid, and a portion for the substantially isobaric heating of the fluid. The compression portion of the working circuit (200) includes at least two compressors (7, 5, 3) disposed in series and the expansion portion of the working circuit (200) includes at least one expansion turbine (9, 11, 13), said compressors (7, 5, 3) and expansion turbine(s) (9, 11, 13) being driven by at least one high-speed motor (70) including an output shaft. One end of the output shaft supports and rotates, by means of direct coupling, a first compressor (7, 5, 3), while the other end of the output shaft supports and rotates, by means of direct coupling, a second compressor (7, 5, 3) or an expansion turbine (9, 11, 13).

IPC 8 full level
F25B 1/10 (2006.01); **F25B 9/06** (2006.01); **F25B 9/10** (2006.01); **F25B 9/14** (2006.01)

CPC (source: EP US)
F25B 1/10 (2013.01 - EP US); **F25B 9/06** (2013.01 - EP US); **F25B 9/10** (2013.01 - EP US); **F25B 9/14** (2013.01 - EP US); **F25J 1/005** (2013.01 - EP US); **F25J 1/0062** (2013.01 - EP US); **F25J 1/0065** (2013.01 - EP US); **F25J 1/0072** (2013.01 - EP US); **F25J 1/0075** (2013.01 - EP US); **F25J 1/0077** (2013.01 - EP US); **F25J 1/0082** (2013.01 - EP US); **F25J 1/0095** (2013.01 - EP US); **F25J 1/0097** (2013.01 - EP US); **F25J 1/0257** (2013.01 - EP US); **F25J 1/0276** (2013.01 - EP US); **F25J 1/0279** (2013.01 - EP US); **F25J 1/0284** (2013.01 - EP US); **F25J 1/0287** (2013.01 - EP US); **F25J 1/0288** (2013.01 - EP US); **F25B 2309/1401** (2013.01 - EP US); **F25J 2230/20** (2013.01 - EP US); **F25J 2230/22** (2013.01 - EP US); **F25J 2240/02** (2013.01 - EP US); **F25J 2270/16** (2013.01 - EP US); **F25J 2270/912** (2013.01 - EP US)

Citation (search report)
See references of WO 2009066044A2

Designated contracting state (EPC)
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR

Designated extension state (EPC)
AL BA MK RS

DOCDB simple family (publication)
WO 2009066044 A2 20090528; **WO 2009066044 A3 20090716**; **WO 2009066044 A4 20090911**; CN 101868677 A 20101020; CN 101868677 B 20121003; DK 2225501 T3 20181119; EP 2225501 A2 20100908; EP 2225501 B1 20180905; EP 3410035 A1 20181205; EP 3561411 A1 20191030; ES 2693066 T3 20181207; FR 2924205 A1 20090529; FR 2924205 B1 20130816; HU E040042 T2 20190228; JP 2011504574 A 20110210; KR 20100099129 A 20100910; PL 2225501 T3 20190228; US 2010263405 A1 20101021

DOCDB simple family (application)
FR 2008051919 W 20081023; CN 200880116682 A 20081023; DK 08852903 T 20081023; EP 08852903 A 20081023; EP 18178529 A 20081023; EP 19174805 A 20081023; ES 08852903 T 20081023; FR 0759243 A 20071123; HU E08852903 A 20081023; JP 2010534519 A 20081023; KR 20107011068 A 20081023; PL 08852903 T 20081023; US 74275108 A 20081023