

Title (en)  
CRYOGENIC REFRIGERATION DEVICE

Title (de)  
KRYOGENE KÜHLVORRICHTUNG

Title (fr)  
DISPOSITIF DE RÉFRIGÉRATION CRYOGÉNIQUE

Publication  
**EP 3414498 B1 20200108 (FR)**

Application  
**EP 17706538 A 20170117**

Priority  
• FR 1650962 A 20160208  
• FR 2017050098 W 20170117

Abstract (en)  
[origin: WO2017137674A1] Cryogenic refrigeration device comprising a working circuit intended to cool a working fluid circulating in the said circuit, the working circuit comprising, arranged in series in a loop: a compression portion (3), a cooling portion (5, 6, 22, 23, 24, 26, 27), a portion with valve(s) (9), an expansion portion (10, 25, 28) and a reheating portion, in order to subject the working fluid to a recuperative working cycle comprising compression, then cooling, then expansion and then reheating to prepare for a new cycle, wherein the compression portion comprises at least one compressor (3, 20, 21) having a linear piston driven by a linear motor (1), the expansion proportion comprises at least one expander (10, 25, 28) with a linear piston, the portion with valve(s) comprises at least one regulating valve (9) linearly actuated by a linear motor and controlled in order to supply or extract the working fluid from the at least one expansion piston.

IPC 8 full level  
**F25B 9/14** (2006.01); **F25B 9/00** (2006.01)

CPC (source: EP KR US)  
**F25B 9/002** (2013.01 - EP KR US); **F25B 9/14** (2013.01 - EP KR US); **F25J 1/0005** (2013.01 - EP); **F25J 1/0007** (2013.01 - EP); **F25J 1/001** (2013.01 - EP); **F25J 1/0015** (2013.01 - EP); **F25J 1/0017** (2013.01 - EP); **F25J 1/002** (2013.01 - EP); **F25J 1/0022** (2013.01 - EP); **F25J 1/0035** (2013.01 - EP); **F25J 1/0037** (2013.01 - EP); **F25J 1/004** (2013.01 - EP); **F25J 1/0202** (2013.01 - EP); **F25J 1/0257** (2013.01 - EP); **F25J 1/0279** (2013.01 - EP); **F25J 1/0288** (2013.01 - EP); **F25B 1/02** (2013.01 - KR); **F25B 2309/001** (2013.01 - EP KR US); **F25B 2400/073** (2013.01 - EP KR US); **F25J 2230/20** (2013.01 - EP); **F25J 2240/02** (2013.01 - EP)

Cited by  
FR3107103A1; WO2021160326A1

Designated contracting state (EPC)  
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

DOCDB simple family (publication)  
**FR 3047551 A1 20170811**; **FR 3047551 B1 20180126**; CN 108603701 A 20180928; CN 108603701 B 20201127; EP 3414498 A1 20181219; EP 3414498 B1 20200108; JP 2019510184 A 20190411; JP 6847966 B2 20210324; KR 102675446 B1 20240613; KR 20180108666 A 20181004; RU 2018130607 A 20200225; US 11156388 B2 20211026; US 2019063791 A1 20190228; WO 2017137674 A1 20170817

DOCDB simple family (application)  
**FR 1650962 A 20160208**; CN 201780008099 A 20170117; EP 17706538 A 20170117; FR 2017050098 W 20170117; JP 2018538871 A 20170117; KR 20187023550 A 20170117; RU 2018130607 A 20170117; US 201716075792 A 20170117