Title (en)
SYSTEM AND METHOD FOR SUPPLYING CRYOGENIC REFRIGERATION

Title (de)
SYSTEME UND VERFAHREN FÜR TIEFTEMPERATURKÜHLUNG

Title (fr)
SYSTÈME ET PROCÉDÉ D'APPORT DE RÉFRIGÉRATION CRYOGÉNIQUE

Publication
EP 4078047 A1 20221026 (EN)

Application
EP 20828810 A 20201201

Priority
• US 201962950198 P 20191219
• US 2020062665 W 20201201

Abstract (en)
[origin: WO2021126513A1] Various systems and methods for suppling cryogenic refrigeration to supercomputing applications such as quantum computing operations are provided. The disclosed systems and methods are flexible, efficient and scaleable to meet the cryogenic refrigeration requirements of many supercomputing applications. The disclosed systems and methods include: (i) a liquid nitrogen based integrated refrigeration system that integrates a nitrogen refrigerator with a refrigeration load circuit; (ii) a closed loop liquid nitrogen based refrigerator that provides cooling to the refrigeration load circuit via indirect heat exchange between liquid nitrogen in a nitrogen refrigerator and a separate refrigerant in a closed-loop refrigeration load circuit; and (iii) a liquid air based integrated refrigeration system that integrates an air intake system with a refrigerator and a refrigeration load circuit.

IPC 8 full level
F25B 9/00 (2006.01); F25B 9/06 (2006.01); F25J 1/00 (2006.01)

CPC (source: EP US)
F25B 9/002 (2013.01 - EP); F25B 9/004 (2013.01 - EP); F25B 9/06 (2013.01 - EP); F25J 1/0012 (2013.01 - EP); F25J 1/0015 (2013.01 - EP US); F25J 1/0037 (2013.01 - EP); F25J 1/004 (2013.01 - EP); F25J 1/0042 (2013.01 - EP); F25J 1/0045 (2013.01 - EP); F25J 1/005 (2013.01 - EP); F25J 1/0052 (2013.01 - EP); F25J 1/0057 (2013.01 - EP US); F25J 1/007 (2013.01 - EP); F25J 1/0072 (2013.01 - EP); F25J 1/0202 (2013.01 - EP); F25J 1/0204 (2013.01 - EP); F25J 1/0236 (2013.01 - EP); F25J 1/0237 (2013.01 - US); F25J 1/0249 (2013.01 - EP); F25J 1/0265 (2013.01 - EP); F25J 1/0288 (2013.01 - EP); F25J 1/0292 (2013.01 - EP); F25J 1/0294 (2013.01 - EP); F25J 2210/40 (2013.01 - US); F25J 2210/42 (2013.01 - US); F25J 2220/02 (2013.01 - EP); F25J 2230/08 (2013.01 - US); F25J 2230/24 (2013.01 - US); F25J 2230/30 (2013.01 - EP); F25J 2240/40 (2013.01 - EP); F25J 2270/06 (2013.01 - EP); F25J 2270/16 (2013.01 - EP); F25J 2290/12 (2013.01 - US)

Citation (search report)
See references of WO 2021126513A1

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

Designated extension state (EPC)
BA ME

Designated validation state (EPC)
KH MA MD TN

DOCDB simple family (publication)
WO 2021126513 A1 20210624; EP 4078047 A1 20221026; US 2022404094 A1 20221222

DOCDB simple family (application)
US 2020062665 W 20201201; EP 20828810 A 20201201; US 202017251408 A 20201201