

Title (en)
REFRIGERATION AND/OR LIQUEFACTION DEVICE AND METHOD THEREOF

Title (de)
KÜHLANLAGE UND/ODER VERFLÜSSIGUNGSANLAGE UND VERFAHREN DAFÜR

Title (fr)
DISPOSITIF DE RÉFRIGÉRATION ET/OU DE LIQUÉFACTION ET PROCÉDÉ CORRESPONDANT

Publication
EP 2936006 A1 20151028 (FR)

Application
EP 13803115 A 20131108

Priority
• FR 1262186 A 20121218
• FR 2013052683 W 20131108

Abstract (en)
[origin: WO2014096585A1] A device for refrigerating and/or liquefying a working gas comprising helium, the device comprising a looped working circuit for the working gas comprising, in series, a compression station (1), a cold box (2), a heat exchange system (14) exchanging heat between the cooled working gas and a user (10), the device further comprising an additional pre-cooling system comprising at least one tank (3) of auxiliary cryogenic fluid, such as liquid nitrogen, the cold box (2) comprising a first cooling stage of the working gas comprising a first (5) exchanger disposed at the output of the compression station (1) as well as a second (15) heat exchanger and a third (25) heat exchanger, the first (5) heat exchanger being of the aluminium plate-fin type, the second (15) heat exchanger being of the tube or welded plate type, characterised in that the second (15) and third (25) heat exchangers are connected both serially and in parallel on the working circuit downstream of the first (5) heat exchanger.

IPC 8 full level
F25B 9/00 (2006.01); **F25B 9/10** (2006.01); **F25B 40/02** (2006.01); **F25J 1/00** (2006.01); **F25J 1/02** (2006.01)

CPC (source: CN EP US)
F25B 9/002 (2013.01 - EP US); **F25J 1/0007** (2013.01 - US); **F25J 1/0065** (2013.01 - CN EP US); **F25J 1/0268** (2013.01 - CN EP US); **F25J 1/0276** (2013.01 - EP); **F25B 9/10** (2013.01 - EP US); **F25B 40/02** (2013.01 - EP US); **F25B 2339/024** (2013.01 - EP US); **F25B 2339/046** (2013.01 - EP US); **F25J 2210/42** (2013.01 - CN EP US); **F25J 2250/02** (2013.01 - EP US); **F25J 2270/904** (2013.01 - CN EP US); **F25J 2270/912** (2013.01 - CN EP US); **F25J 2290/44** (2013.01 - EP)

Citation (search report)
See references of WO 2014096585A1

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

DOCDB simple family (publication)
FR 2999693 A1 20140620; **FR 2999693 B1 20150619**; CN 104854413 A 20150819; CN 104854413 B 20170201; EP 2936006 A1 20151028; EP 2936006 B1 20171108; JP 2016503876 A 20160208; JP 6495177 B2 20190403; KR 102119918 B1 20200605; KR 20150099523 A 20150831; US 10465981 B2 20191105; US 2015316315 A1 20151105; US 2020041201 A1 20200206; WO 2014096585 A1 20140626

DOCDB simple family (application)
FR 1262186 A 20121218; CN 201380065911 A 20131108; EP 13803115 A 20131108; FR 2013052683 W 20131108; JP 2015548700 A 20131108; KR 20157015863 A 20131108; US 201314651833 A 20131108; US 201916583594 A 20190926