Title (en)

CONTROLLED NUCLEATION DURING FREEZING STEP OF FREEZE DRYING CYCLE USING PRESSURE DIFFERENTIAL ICE CRYSTALS DISTRIBUTION FROM CONDENSED FROST

Title (de)

KONTROLLIERTE NUKLEIERUNG WÄHREND DES GEFRIERSCHRITTES EINES GEFRIERTROCKNUNGSZYKLUS MITTELS DIFFERENZIELLER EISKRISTALLVERTEILUNG VON KONDENSIERTEM FROST

Title (fr)

NUCLÉATION CONTRÔLÉE PENDANT L'ÉTAPE DE CONGÉLATION D'UN CYCLE DE LYOPHILISATION EN UTILIANT LA DISTRIBUTION DES CRISTAUX DE GLACE À DIFFÉRENTIEL DE PRESSION DU GIVRE CONDENSÉ

Publication

EP 3117165 A1 20170118 (EN)

Application

EP 14885084 A 20140918

Priority

- US 201414205802 A 20140312
- US 2014056192 W 20140918

Abstract (en)

[origin: WO2015138005A1] A method of controlling and enhancing the nucleation of product in a freeze dryer, wherein the product is maintained at a predetermined temperature and pressure in a chamber of the freeze dryer, and a predetermined volume of condensed frost is created on an inner surface of a condenser chamber separate from the product chamber and connected thereto by a vapor port. The opening of the vapor port into the product chamber when the condenser chamber has a pressure that is greater than that of the product chamber creates gas turbulence that breaks down the condensed frost into ice crystals that rapidly enter the product chamber for even distribution therein to create uniform and rapid nucleation of the product in different areas of the product chamber.

IPC 8 full level

F26B 5/06 (2006.01); **F26B 21/00** (2006.01); **F26B 25/00** (2006.01)

CPC (source: EP)

F26B 5/06 (2013.01)

Cited by

US11320200B1; US11480390B2; US11732965B2

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)

WO 2015138005 A1 20150917; CN 106255860 A 20161221; CN 106255860 B 20190618; CN 110108097 A 20190809; EP 3117165 A1 20170118; EP 3117165 A4 20171122; EP 3117165 B1 20200325; EP 3640573 A1 20200422; EP 3640573 B1 20240522; ES 2799600 T3 20201218; JP 2017508126 A 20170323; JP 6389270 B2 20180912

DOCDB simple family (application)

US 2014056192 W 20140918; CN 201480076298 A 20140918; CN 201910394343 A 20140918; EP 14885084 A 20140918; EP 19214972 A 20140918; ES 14885084 T 20140918; JP 2016557074 A 20140918