

Title (en)  
Laboratory freezer appliance.

Title (de)  
Gefriergerät für Laborzwecke.

Title (fr)  
Appareil de congélation pour laboratoire.

Publication  
**EP 0454491 A2 19911030 (EN)**

Application  
**EP 91303808 A 19910426**

Priority  
US 51476890 A 19900426

Abstract (en)  
A laboratory freezer appliance providing a usable storage space on the order of 5 to 20 cubic feet (0.14 to 0.57 cubic metres) capable of storage temperatures of -160 DEG C and lower including an insulated freezer chamber (12), heat transfer tubes (60) in proximity to the freezer chamber (12) carrying liquid argon at ultra-low temperatures which absorbs heat from the freezer chamber (12) thereby vaporising the argon in the heat transfer tubes (60); a closed cycle, hermetically-sealed free piston Stirling cycle heat pump (20) providing a cold end (32) above a vertical displacer (154) driven by a linearly reciprocating piston at a temperature differential to the freezer chamber (12) of about -13 DEG C; a condensing chamber (90) surrounding the cold end (32) of the heat pump (20) for condensing argon vapour to the argon liquid; and a distributor (70) for distributing liquid argon from the condensing chamber (90) to the heat transfer tubes (60) and returning argon vapour to the condensing chamber (90), all without mechanical pumping of the argon, in a continuous, closed cycle refrigeration system.

IPC 1-7  
**F25B 9/14**; **F25B 25/00**; **F25D 11/04**

IPC 8 full level  
**F02G 1/043** (2006.01); **F25B 9/14** (2006.01); **F25B 25/00** (2006.01); **F25D 11/04** (2006.01); **F28D 15/02** (2006.01); **F25B 23/00** (2006.01); **F25D 23/00** (2006.01)

CPC (source: EP)  
**F02G 1/0435** (2013.01); **F25B 9/14** (2013.01); **F25B 25/005** (2013.01); **F25D 11/04** (2013.01); **F28D 15/0266** (2013.01); **F05C 2225/08** (2013.01); **F25B 23/006** (2013.01); **F25D 23/003** (2013.01); **F25D 2400/10** (2013.01)

Cited by  
EP1167900A1; US6758056B1; EP1312875A4; EP1255087A1; EP1016701A3; US6442959B1; US6363727B1; WO2004029526A1; US6751963B2

Designated contracting state (EPC)  
AT BE CH DE DK ES FR GB GR IT LI LU NL SE

DOCDB simple family (publication)  
**EP 0454491 A2 19911030**; **EP 0454491 A3 19920311**

DOCDB simple family (application)  
**EP 91303808 A 19910426**