

Title (en)
THERMAL ENERGY EXCHANGER

Title (de)
WÄRMEENERGIEAUSTAUSCHER

Title (fr)
ÉCHANGEUR D'ÉNERGIE THERMIQUE

Publication
EP 2976580 A4 20161026 (EN)

Application
EP 14784677 A 20140321

Priority
• NO 20130413 A 20130321
• NO 2014000027 W 20140321

Abstract (en)
[origin: WO2014171837A1] The present invention comprise a thermal energy exchanger comprising a closed loop with a level differential between top and bottom of more than 400 meters, and where the contents of the loop is circulating by means of applied energy. By circulating gas that is sent downwards in the loop will become compressed as a result of the increasing pressure in the loop at increasing depth Since gas has a small specific gravity the larger part of the pressure increase can be from piston devices which sections the contents in the loop, and that with its specific gravity and accompanying mass contributes to a pressure increase in the underlying gas sections. Compression of gases will lead to heat development and a temperature development in the gas sections. In order to limit the temperature development liquid particles will be part of the gas section in order to collect heat. The amount of liquid particles will influence the temperature development, and by regulating how many fluid particles which, in spray or droplet phase, takes up heat, the temperature development can be regulated to the desired level. The piston devices which functions as plugs that are circulating in the loop can gather heated liquid and transfer heat to the pipe walls of the loop when desired with heat exchange from the thermal energy exchanger to the accompanying energy system. In the same manner gas that is moving upwards in the loop will expand and develop cold as a result of the reduced pressure. Liquid particles will then be added in order to collect cold and reduce the negative temperature development, and then become transferred to the pipe walls by thermal heat exchange to an external medium outside of the loop. The present invention also concern a system comprising of a thermal energy exchanger and energy loop, which directly or indirectly receive thermal energy and converts this to power production, and which in addition has a level difference between the top and bottom of the loop of at least 800 meters. A heat loop can receive heat from the thermal energy exchanger, or from a system connected thereto, and transfer it to the lower part of the energy loop. In addition, a cold loop can receive cold and exchange thermal energy in the upper part of the energy loop. Thermal energy that is added to a medium in the energy loop can change the density of the medium, such that the medium has a low density when moving upwards and higher density when moving downwards in the energy loop. The density difference will result in a pressure difference in the energy loop that can be used for power production. In addition, a marine construction comprising a liquid filled heat loop in the lower part and a thermal energy exchanger in the upper part may be able to provide a stable construction with uplift at the top and ballast at the bottom.

IPC 8 full level
F24J 3/08 (2006.01); **F03G 7/04** (2006.01); **F24V 50/00** (2018.01); **F28D 15/00** (2006.01)

CPC (source: EP)
F03G 7/05 (2013.01); **F24V 50/00** (2018.04); **F28D 15/00** (2013.01); **Y02E 10/30** (2013.01)

Citation (search report)
• [X] US 4221115 A 19800909 - KRAUS ROBERT A, et al
• [X] US 4182124 A 19800108 - KRAUS EDMUND J [US], et al
• See references of WO 2014171837A1

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)
WO 2014171837 A1 20141023; EP 2976580 A1 20160127; EP 2976580 A4 20161026; NO 20130413 A1 20140922; NO 335643 B1 20150112

DOCDB simple family (application)
NO 2014000027 W 20140321; EP 14784677 A 20140321; NO 20130413 A 20130321