

Title (en)
MONOCRYSTALLINE WELDING OF DIRECTIONALLY COMPACTED MATERIALS

Title (de)
EINKRISTALLINES SCHWEISSEN VON DIREKTIONAL VERFESTIGTEN WERKSTOFFEN

Title (fr)
SOUDURE MONOCRISTALLINE DE MATÉRIAUX À SOLIDIFICATION DIRECTIONNELLE

Publication
EP 2501516 A1 20120926 (DE)

Application
EP 10779539 A 20101115

Priority

- EP 09014307 A 20091116
- EP 2010067486 W 20101115
- EP 10779539 A 20101115

Abstract (en)

[origin: EP2322314A1] The method for directional solidification of a welding seam for deposit welding of a substrate (4) of a component, comprises hardening the component having dendrites (31), which extend itself into substrate dendrites direction. The process parameter such as laser power, welding beam diameter, powder-beam focus and/or powder flow is formed related to feed so that it leads to a local orientation of the temperature gradient on a solidification front (19), where the temperature gradient is smaller than 45[deg] for the substrate dendrites direction in the substrate. The method for directional solidification of a welding seam for deposit welding of a substrate (4) of a component, comprises hardening the component having dendrites (31), which extend itself into substrate dendrites direction. The process parameter such as laser power, welding beam diameter, powder-beam focus and/or powder flow is formed related to feed so that it leads to a local orientation of the temperature gradient on a solidification front (19), where the temperature gradient is smaller than 45[deg] for the substrate dendrites direction in the substrate. The relative velocity is 50 mm/minute and/or the power is 300 W and/or the diameter of the laser beam on the surface of the substrate is 4 mm and/or the mass flow rate is 400 mg/minute. A melt (16) is produced on the substrate and emerges in the substrate by the supply of powder (7) and/or material. The melt is completely covered by a laser beam and is overlapped. The powder is applied in layers. The substrate has a single crystal structure. The diameter of the powder particles is so smaller so that it has sufficiently high temperature in welding laser beam. The temperature of the molten powder particles is 20[deg] C above the melting temperature of the powder. A laser is used for welding.

IPC 8 full level
B23K 26/34 (2006.01); **C30B 13/24** (2006.01)

CPC (source: EP US)
B23K 26/32 (2013.01 - EP US); **B23K 26/342** (2015.10 - EP US); **B23K 35/0244** (2013.01 - EP US); **B23K 35/3033** (2013.01 - EP US); **C30B 11/005** (2013.01 - EP US); **C30B 13/22** (2013.01 - EP US); **C30B 29/52** (2013.01 - EP US); **B22F 2007/068** (2013.01 - EP US); **B23K 2101/001** (2018.07 - EP US); **B23K 2103/08** (2018.07 - EP US); **B23K 2103/26** (2018.07 - EP US); **B23K 2103/50** (2018.07 - EP US); **C22C 19/058** (2013.01 - EP US); **C22C 19/07** (2013.01 - EP US); **F05D 2230/313** (2013.01 - EP US); **F05D 2300/606** (2013.01 - EP US)

Citation (search report)
See references of WO 2011058174A1

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)
EP 2322314 A1 20110518; EP 2322314 A8 20110928; CN 102612421 A 20120725; CN 102612421 B 20151216; EP 2501516 A1 20120926; RU 2012125028 A 20131227; RU 2509639 C2 20140320; US 2012285933 A1 20121115; WO 2011058174 A1 20110519

DOCDB simple family (application)
EP 09014307 A 20091116; CN 201080051861 A 20101115; EP 10779539 A 20101115; EP 2010067486 W 20101115; RU 2012125028 A 20101115; US 201013509879 A 20101115