

Title (en)

COOLING APPARATUS FOR COOLING A METAL MATERIAL AND METHOD FOR THE PRODUCTION AND USE THEREOF

Title (de)

KÜHLEINRICHTUNG ZUM KÜHLEN EINES METALLISCHEN GUTES SOWIE VERFAHREN ZU DEREN HERSTELLUNG UND BETRIEB

Title (fr)

DISPOSITIF DE REFROIDISSEMENT SERVANT À REFROIDIR UN PRODUIT MÉTALLIQUE ET PROCÉDÉ PERMETTANT SA FABRICATION ET SON FONCTIONNEMENT

Publication

EP 3774100 B1 20220629 (DE)

Application

EP 19715872 A 20190401

Priority

- DE 102018205619 A 20180413
- DE 102018211177 A 20180706
- EP 2019058124 W 20190401

Abstract (en)

[origin: WO2019197182A1] The invention relates to a cooling apparatus (100) for cooling a metal material and to methods for operating and producing the cooling apparatus. The cooling apparatus has at least one cooling beam (110) having a plurality of coolant application elements (112) for applying a coolant to the metal material, wherein each coolant application element (112) has an outlet opening having a cross-sectional area (112') for the outlet of the coolant. In order to be able to adapt such known cooling apparatuses more precisely to different temperature distributions over the width of the metal material to be cooled, according to the invention the density of the cross-sectional areas (112') of the outlet openings of the coolant application elements (112) in the width direction y of the cooling beam (110) is adapted and dimensioned in accordance with the magnitude of the slope of the distribution of the temperature T(y) of the metal material over the width of the latter before running in under the cooling beam (110).

IPC 8 full level

B21B 45/02 (2006.01); **B21B 37/74** (2006.01)

CPC (source: EP US)

B21B 37/74 (2013.01 - EP US); **B21B 45/0233** (2013.01 - EP US); **C21D 1/60** (2013.01 - EP); **C21D 1/667** (2013.01 - EP US); **C21D 8/0263** (2013.01 - EP US); **C21D 9/46** (2013.01 - EP); **C21D 11/005** (2013.01 - EP US); **B21B 45/0215** (2013.01 - EP); **B21B 2261/21** (2013.01 - EP); **C21D 2221/00** (2013.01 - US)

Citation (opposition)

Opponent : Primetals Technologies Austria GmbH

- WO 2015113832 A1 20150806 - LOI THERMPROCESS GMBH [DE]
- WO 2014170139 A1 20141023 - SIEMENS VAI METALS TECH GMBH [AT]
- EP 3395463 A1 20181031 - PRIMETALS TECHNOLOGIES AUSTRIA GMBH [AT]
- EP 3308868 A1 20180418 - PRIMETALS TECHNOLOGIES AUSTRIA GMBH [AT]
- US 6062056 A 20000516 - GROCH ANDRZEJ G [US]
- EP 0449003 A2 19911002 - SCHLOEMANN SIEMAG AG [DE]
- DE 2855906 A1 19800710 - LECHLER GMBH & CO KG
- DE 2805172 A1 19780817 - CENTRE RECH METALLURGIQUE [BE]
- JP 2012177145 A 20120913 - JFE STEEL CORP

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 2019197182 A1 20191017; CN 112041098 A 20201204; CN 112041098 B 20221028; DE 102018211177 A1 20191017; EP 3774100 A1 20210217; EP 3774100 B1 20220629; JP 2021517866 A 20210729; JP 7074883 B2 20220524; US 11446720 B2 20220920; US 2021154713 A1 20210527

DOCDB simple family (application)

EP 2019058124 W 20190401; CN 201980025719 A 20190401; DE 102018211177 A 20180706; EP 19715872 A 20190401; JP 2020555900 A 20190401; US 201917047053 A 20190401