

Title (en)

PLANISHING ROLL, METHOD FOR PLANISHING A FLAT PRODUCT THEREWITH AND FLAT PRODUCT THEREFROM

Title (de)

DRESSIERARBEITSWALZE, VERFAHREN ZUM DRESSIEREN EINES FLACHPRODUKTES HIERMIT UND FLACHPRODUKT HIERAUS

Title (fr)

CYLINDRE DE TRAVAIL D'ÉCROUISSAGE, PROCÉDÉ POUR L'ÉCROUISSAGE D'UN PRODUIT PLAT À L'AIDE DE CELUI-CI ET PRODUIT PLAT AINSI OBTENU

Publication

EP 3416760 B1 20200429 (DE)

Application

EP 17704763 A 20170213

Priority

- DE 102016102723 A 20160216
- EP 2017053110 W 20170213

Abstract (en)

[origin: WO2017140605A1] The invention relates to a planishing roll having a surface structure, in particular for producing flat products from a metallic material, in particular from a steel material. In order to devise an improved planishing roll having a surface structure, the surface structure according to the invention has a material ratio of 2% at a depth of 0.2 µm to 9 µm, preferably at a depth of 0.8 µm to 5.5 µm, the depth is measured, starting from a zero line, in the direction of an axis of rotation of the planishing roll, the zero line runs parallel to the axis of rotation of the planishing roll and, starting from the surface of the planishing roll, the zero line is displaced in the direction of the axis of rotation of the planishing roll until the material ratio of the planishing roll is 0.1%. The invention further relates to a method for planishing a flat product made of a metallic material, in particular from a steel material, by using said planishing roll, and to a flat product produced by said method.

IPC 8 full level

B21B 1/22 (2006.01); **B21B 27/00** (2006.01)

CPC (source: EP KR US)

B21B 1/227 (2013.01 - EP KR US); **B21B 27/005** (2013.01 - EP KR US); **B21B 2261/14** (2013.01 - EP KR US); **B21B 2267/10** (2013.01 - EP KR US)

Citation (opposition)

Opponent : Arcelor Mittal

- US 2015209848 A1 20150730 - KOPPLIN KARL-HEINZ [DE], et al
- US 4798772 A 19890117 - FURUKAWA KUSUO [JP]
- KARL MÜLL ET THOMAS ROUTSCHEK, TOPOCROM TEXTURING: TECHNOLOGY AND ADVANTAGES, June 2013 (2013-06-01), XP055777642
- ROUTSCHEK THOMAS, KARL MÜLL: "TOPOCROM® – Texturing: Technology and Advantages", PPPRESENTATION BAOSTEEL BAC, 2013, Shanghai en Chine, XP055777653, Retrieved from the Internet <URL:https://slideplayer.com/slide/4235799>

Opponent : Tata Steel IJmuiden B.V.

- HILGENBERG, K. STEINHOFF: "Texturing of skin-pass rolls by pulsed laser dispersing", JOURNAL OF MATERIALS PROCESSING TECHNOLOGY, vol. 225, November 2015 (2015-11-01), pages 84 - 92, XP055779301
- NAOKI NAGASE, SEIICHI SHIDO, IKUO YARITA: "The effect of lubricant on microwear of dull rolls in temper rolling by 4 Hi Rolling Mill", ISIJ INTERNATIONAL, vol. 49, no. 6, 2009, pages 874 - 880, XP055779305
- WENTINK D J; MATTHEWS D; APPELMAN N M; TOOSE E M: "A generic model for surface texture development wear and roughness transfer in skin-pass rolling", WEAR, vol. 328-329, 2015, pages 167 - 176, XP029226510
- KLAUS SIEGERT, DINA BECKER, STEFAN WAGNER: "EFB-Forschungsbericht Nr. 207 Strukturchrombeschichtung von Dressierwalzen zur Herstellung texturierter Aluminiumfeinbleche", BLE-X NAVIGATOR, 2003, pages 1 - 3, XP055779335, Retrieved from the Internet <URL:https://ble-x.de/mydocs/147>
- KARL MULL AND THOMAS ROUTSCHEK: "TOPOCROM Texturing: Technology and Advantages", pages 1 - 12
- ROUTSCHEK THOMAS; KARL MÜLL: "TOPOCROM® - Texturing: Technology and Advantages", PRESENTATION BAOSTEEL BAC 2013, 2013, Shanghai China, pages 1 - 35, XP055777653, Retrieved from the Internet <URL:https://slideplayer.com/slide/4235799>
- ANONYMOUS: "SEP 1941:2012-05 :Messung des Welligkeitskennwertes Wsa (1-5) an kaltgewalzten Flacherzeugnissen", STAHL-EISEN-PRÜFBLÄTTER (SEP) DES STAHLINSTITUTS VDEH., May 2012 (2012-05-01), pages 1 - 8, XP009195399
- DEUTSCHER O: "Characterising the surface waviness of hot dip galvanised steel sheets for optical high-quality paintability (Carsteel)", EUROPEAN COMMISSION, pages 1 - 133, XP002717503, Retrieved from the Internet <URL:https://op.europa.eu/en/publication-detail/-/publication/46f3c18b-60be-4db2-aef0-0f3d3c47a87/lanuage-en>
- M. BIGERELLE, A. IOST: "A numerical method to calculate the Abbott parameters: A wear application", TRIBOLOGY INTERNATIONAL, vol. 40, 2007, pages 1319 - 1334, XP022104963
- SCHMAHLING; HAMPRECHT J; F A: "Generalizing the Abbott-Firestone curve by two new surface descriptors", WEAR, vol. 262, 2007, pages 1360 - 1371, XP022034893, DOI: 10.1016/j.wear.2007.01.025
- "What's inside MountainsSEM®", pages 1, Retrieved from the Internet <URL:https://www.digitalsurf.com>
- WEIDEL S; ENGEL U: "Surface characterisation in forming processes by functional 3D parameters", THE INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY, vol. 33, no. 1-2, 2007, pages 130 - 136, XP019511379

Opponent : Tenova S.p.A., Milano

- EP 2006037 A1 20081224 - THYSSENKRUPP STEEL AG [DE], et al
- EP 2116311 A1 20091111 - JFE STEEL CORP [JP]
- "Development of an innovative hybrid procedure for combining tension-level-ling and skin pass rolling (HYPROCROM)", EUROPEAN COMMISSION REPORT, 1 July 2007 (2007-07-01), XP055780502
- NAOKI NAGASE, SEIICHI SHIDO, IKUO YARITA: "Imprinting of Dull Roll Surface Texture to Carbon Steel Strips in Temper Rolling by Dry Condition", ISIJ INTERNATIONAL, vol. 49, no. 4, 2009, pages 539 - 545, XP055792733
- NAOKI NAGASE; SEIICHI SHIDO; IKUO YARITA: "The Effect of Lubricant on Microwear of Dull Rolls in Temper Rolling by 4 Hi Rolling Mill", ISIJ INTERNATIONAL, vol. 49, no. 6, 2009, pages 874 - 880, XP055779305
- HILGENBERG K; STEINHOFF K: "Texturing of skin-pass rolls by pulse laser dispersing", JOURNAL OF MATERIALS PROCESSING TECHNOLOGY, vol. 225, 2015, pages 84 - 92, XP055779301
- ANONYM: "Oberflächenbeschaffenheit: Tastschnittverfahren", DEUTSCHE NORM EN ISO 13565-2, April 1998 (1998-04-01), XP055478733
- DEUTSCHER O: "Characterising the surface waviness of hot dip galvanized steel sheets for optical high-quality paintability (Carsteel)", EUROPÄISCHE ATOMGEMEINSCHAFT, EURATOM, ISSN 1018-5593 ; 23854,, 2009, XP002717503

- EDUARDO MUNES: "Inter-relationship of skin pass, 2D and 3D roughness parameters, stampability and paintability on cold rolled steel sheets for the automotive industry", DOCTORAL THESIS, 12 December 2013 (2013-12-12), pages 25pp, 222 - 235, XP055792739
- ANONYMOUS: "Geometrische Produktspezifikation (GPS) Oberflächenbeschaffenheit: Tastschnittverfahren Benennungen, Definitionen und Kenngrößen der Oberflächenbeschaffenheit (ISO 4287:1997 + Cor 1:1998 + Cor 2:2005 + Amd 1:2009); Deutsche Fassung EN ISO 4287:1998 + AC:2008 + A1:2009", DEUTSCHE NORM, November 2009 (2009-11-01), XP055780513

Opponent : ThyssenKrupp Steel Europe AG

- JP S6350488 A 19880303 - KAWASAKI STEEL CO
- US 4798772 A 19890117 - FURUKAWA KUSUO [JP]
- US 5532051 A 19960702 - NISHIURA TETSUYA [JP], et al
- DE 102012017703 A1 20140313 - DAETWYLER GRAPHICS AG [CH], et al
- DE 102012112109 A1 20140626 - THYSSENKRUPP STEEL EUROPE AG [DE]
- DE 102009051673 B3 20110414 - VOESTALPINE STAHL GMBH [AT]
- WO 2012091385 A2 20120705 - POSCO [KR], et al
- "Development of an innovative hybrid procedure for combining tension-levelling and skin pass rolling (HYPROCOM)", EUROPEAN COMMISSION, January 2012 (2012-01-01), XP055780502
- "Verzinken", WIKIPEDIA, 15 April 2005 (2005-04-15), XP055780508
- "DIN EN ISO 4287", DEUTSCHE NORM, July 2010 (2010-07-01), XP055780513

Cited by

DE102022122775A1; WO2024052449A1; DE102022122772A1; WO2024052447A1; DE102022122773A1; WO2024052448A1;
DE102022122771A1; WO2024052446A1

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)

DE 102016102723 B3 20170601; EP 3416760 A1 20181226; EP 3416760 B1 20200429; KR 102189421 B1 20201211;
KR 20180113533 A 20181016; RU 2705187 C1 20191105; US 2019176198 A1 20190613; US 2020368800 A1 20201126;
WO 2017140605 A1 20170824

DOCDB simple family (application)

DE 102016102723 A 20160216; EP 17704763 A 20170213; EP 2017053110 W 20170213; KR 20187023553 A 20170213;
RU 2018129885 A 20170213; US 201715999453 A 20170213; US 202016990663 A 20200811