

Title (en)
CONTINUOUS STEEL CASTING METHOD

Title (de)
VERFAHREN ZUM KONTINUIERLICHEN STAHLGIESSEN

Title (fr)
PROCÉDÉ DE COULÉE CONTINUE D'ACIER

Publication
EP 3488947 A4 20190821 (EN)

Application
EP 17853092 A 20170920

Priority
• JP 2016183726 A 20160921
• JP 2017009906 W 20170313
• JP 2017033955 W 20170920

Abstract (en)
[origin: EP3488947A1] Surface cracking caused by nonuniform cooling of a solidifying shell at the initial stage of solidification is prevented, and the occurrence of center segregation in a thicknesswise central portion of a strand is reduced. Metal-filled portions with different thermal conductivity filled with a metal having a thermal conductivity that differs by at least 20% from the thermal conductivity of a mold copper plate of a continuous casting mold are disposed on an inner wall surface of the mold copper plate in a region extending from a position at least 20 mm above the position of a meniscus to a position at least 50 mm and at most 200 mm below the position of the meniscus. The area fraction of the total area of the metal-filled portions with different thermal conductivity relative to the area of the inner wall surface on which the plurality of metal-filled portions with different thermal conductivity are disposed is from 10% to 80% inclusive. A distance (D1) and an oscillation mark pitch (OMP) that is derived from the frequency of oscillation (f) and a casting speed (Vc) satisfy formula (1) below, and a distance (D2) satisfies formula (2) below. In formula (2), r is the radius (mm) of a circle having a center at the center of gravity of one of the metal-filled portions with different thermal conductivity and having the same area as the one of the metal-filled portions with different thermal conductivity.

IPC 8 full level
B22D 11/04 (2006.01); **B22D 11/059** (2006.01); **B22D 11/128** (2006.01); **B22D 11/16** (2006.01); **B22D 11/20** (2006.01)

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Citation (search report)
• [X1] EP 2839901 A1 20150225 - JFE STEEL CORP [JP]
• [E] EP 3488946 A1 20190529 - JFE STEEL CORP [JP]
• [AD] JP H09206903 A 19970812 - SUMITOMO METAL IND
• [A] US 5176197 A 19930105 - HAMAGUCHI CHIYOKATSU [JP], et al
• See references of WO 2018056322A1

Cited by
US11759851B2

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

Designated extension state (EPC)
BA ME

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EP 3488947 A1 20190529; EP 3488947 A4 20190821; EP 3488947 B1 20200819; BR 112019004155 A2 20190528;
BR 112019004155 B1 20230411; JP 6947737 B2 20211013; JP WO2018056322 A1 20191017; KR 102245010 B1 20210426;
KR 20190029757 A 20190320; TW 201813739 A 20180416; TW 201813740 A 20180416; TW I630961 B 20180801; TW I655979 B 20190411;
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