

Title (en)

MODULATED ELECTROMAGNETIC STIRRING OF METALS AT ADVANCED STAGE OF SOLIDIFICATION

Title (de)

MODULIERTES ELEKTROMAGNETISCHES RÜHREN VON METALLEN IM FORTGESCHRITTENEN STADIUM DES ERSTARRENS

Title (fr)

BRASSAGE ÉLECTROMAGNÉTIQUE MODULÉ DE MÉTAUX À UN STADE AVANCÉ DE SOLIDIFICATION

Publication

**EP 2268431 A1 20110105 (EN)**

Application

**EP 08783247 A 20080722**

Priority

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- US 7695408 A 20080325

Abstract (en)

[origin: WO2009117803A1] A method and apparatus for electromagnetic stirring of molten metals at an advanced stage of solidification, as may be used in continuous casting of steel billets and blooms, are disclosed. At least first and second stirrers are provided for generating first and second rotating magnetic fields of a differing frequency about an axis of solidifying molten metal. The stirrers are arranged about the molten metal in sufficiently close proximity to each other so that their respective magnetic fields superpose to produce a modulated magnetic field. The magnetic fields of the respective stirrers may either have common or opposing rotational directions. The modulated stirring produced by the magnetic fields results in oscillating primary and secondary flows and hence turbulence within the melt bulk in the region wherein temperature of the melt on its central axis is below the liquidus level and at least 10% of substantially solidified material is formed. Turbulent flow created by this stirring method disrupts formation of crystalline structures in the melt bulk and mixes solute enriched melt of the central region with the bulk volume which subsequently results in improvements of the solidification structure and overall internal quality of the cast products.

IPC 8 full level

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CPC (source: EP US)

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