

Title (en)
HYBRID COOLING NOZZLE APPARATUS, AND METHOD FOR CONTROLLING COOLING NOZZLE OF CONTINUOUS CASTING EQUIPMENT USING SAME

Title (de)
HYBRIDKÜHLUNGSDÜSENVORRICHTUNG UND VERFAHREN ZUR STEUERUNG EINER KÜHLDÜSE FÜR EINE STRANGGUSSVORRICHTUNG DAMIT

Title (fr)
APPAREIL DE BUSE DE REFROIDISSEMENT HYBRIDE ET PROCÉDÉ PERMETTANT DE COMMANDER UNE BUSE DE REFROIDISSEMENT D'UN ÉQUIPEMENT DE COULÉE CONTINUE QUI UTILISE CE DERNIER

Publication
EP 2937162 A4 20160824 (EN)

Application
EP 13864279 A 20131219

Priority

- KR 20120151257 A 20121221
- KR 2013011854 W 20131219

Abstract (en)
[origin: EP2937162A1] A hybrid cooling nozzle apparatus is provided. The apparatus includes hybrid nozzles provided in a segment of a continuous casting machine to spray cooling water in a mist-spraying mode or a water-jet spraying mode onto a metal strip passing through the segment. At least one speed sensor is installed in the segment to detect the speed of the metal strip passing through the segment. A controller is configured to select the spraying mode of the hybrid nozzles depending on the received speed of the metal strip, and control a pressure and a flow rate of the cooling water and air, respectively, to be supplied to the hybrid nozzles by controlling a cooling water supply and an air supply.

IPC 8 full level
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CPC (source: EP KR)
B22D 11/124 (2013.01 - KR); **B22D 11/1246** (2013.01 - EP); **B22D 11/22** (2013.01 - KR); **B22D 11/225** (2013.01 - EP)

Citation (search report)

- [AD] KR 20120074744 A 20120706 - POSCO [KR]
- [Y] KAWASAKI S ET AL: "Effect of secondary cooling on the quality of continuous cast blooms", CAHIERS D'INFORMATIONS TECHNIQUES - REVUE DE MÂ CR TALLURGIE., vol. 85, no. 3, 1 March 1988 (1988-03-01), pages 237 - 243, XP001315738
- [A] BOYLE R ET AL: "AUDITS OF SECONDARY COOLING SYSTEMS IN EXISTING CASTERS AS A METHOD TO ENHANCE PRODUCT QUALITY AND PRODUCTIVITY", IRON & STEEL TECHNOLOGY, AIST, WARRENDALE, PA, US, vol. 3, no. 7, 1 July 2006 (2006-07-01), pages 50 - 66, XP001245146, ISSN: 1547-0423
- [Y] "DYNAMIC CONTROL SYSTEM FOR SECONDARY COOLING OF CONTINUOUS CASTING MACHINES", STEEL TIMES INTERNATIONAL, DMG WORLD MEDIA, LEWES, GB, vol. 23, no. 6, 1 November 1999 (1999-11-01), pages 38/39, XP000896259, ISSN: 0143-7798
- [Y] CHAUDHURI S ET AL: "Design and implementation of an automated secondary cooling system for the continuous casting of billets", ISA TRANSACTIONS, INSTRUMENT SOCIETY OF AMERICA. PITTSBURGH, US, vol. 49, no. 1, 1 January 2010 (2010-01-01), pages 121 - 129, XP026819838, ISSN: 0019-0578, [retrieved on 20091006]
- [A] KUKLEV A V ET AL: "Rebuilding the secondary cooling system on the continuous slab caster at the Kamastal' Metallurgical Plant", METALLURGIST, KLUWER ACADEMIC PUBLISHERS-PLENUM PUBLISHERS, NE, vol. 51, no. 11-12, 1 November 2007 (2007-11-01), pages 612 - 616, XP019611615, ISSN: 1573-8892
- See references of WO 2014098490A1

Cited by
CN105642854A; CN113165060A; US11577306B2

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