

Title (en)

Pouring tube structure and pouring method for uphill casting

Title (de)

Ausgussdüsenstruktur und Verfahren zum steigenden Gießen

Title (fr)

Structure d'une busette de coulee et methode de coulee en contre gravite

Publication

EP 1759789 A1 20070307 (EN)

Application

EP 06018010 A 20060829

Priority

- JP 2005248718 A 20050830
- JP 2006014033 A 20060123

Abstract (en)

In an uphill casting process of molten metal, the present invention makes it possible to stabilize a molten metal surface in a mould during pouring without lowering a pouring rate, so as to suppress oxidization of the molten metal due to formation of "open eye" and reduce an amount of slags and nonmetallic inclusions to be dispersed into the steel and spread over the molten metal as substances causing deterioration in quality of metal ingots, to achieve enhanced quality of metal ingots. A pouring tube structure for use in an uphill casting process designed to spout molten metal into a mould 5 from an inlet port 6 located in a lower portion of the mould 5, which comprises a pouring tube internally defining a flow channel for molten metal to provide fluid transport between a molten metal transfer vessel and said inlet port and feed molten metal from said molten metal transfer vessel to said mould and a single or a plurality of swirling-flow generation means provided in said pouring tube and adapted to generate a swirling flow in said molten metal.

IPC 8 full level

B22D 41/50 (2006.01)

CPC (source: EP)

B22D 41/507 (2013.01)

Citation (search report)

- [YD] JP H09239494 A 19970916 - JAPAN STEEL WORKS LTD
- [Y] EP 1025933 A1 20000809 - MARUKAWA KATSUKIYO [JP], et al
- [A] JP H07303949 A 19951121 - KAWASAKI STEEL CO
- [A] JP H0474820 A 19920310 - SUMITOMO METAL IND
- [T] HALLGREN L ET AL: "EFFECT OF NOZZLE SWIRL BLADE ON FLOW PATTERN IN RUNNER DURING UPHILL TEEMING", ISIJ INTERNATIONAL, IRON AND STEEL INSTITUTE OF JAPAN, TOKYO,, JP, vol. 46, no. 11, 2006, pages 1645 - 1651, XP001248721, ISSN: 0915-1559
- [A] ERIKSSON R ET AL: "Determination of inclusion characteristics in 'low-carbon' steel during up-hill teeming (DOI: 10.1111/j.1600-0692.2004.00680.x)", SCANDINAVIAN JOURNAL OF METALLURGY MUNKSGAARD INTERNATIONAL PUBLISHERS DENMARK, vol. 33, no. 3, June 2004 (2004-06-01), pages 160 - 171, XP002415538, ISSN: 0371-0459
- [A] ERIKSSON ROBERT ET AL: "Effect of entrance nozzle design on the fluid flow in an ingot mold during filling", ISIJ INT; ISIJ INTERNATIONAL 2004, vol. 44, no. 8, 2004, pages 1358 - 1365, XP002415539
- [A] YOKOYA S ET AL: "Numerical study of immersion nozzle outlet flow pattern with swirling flow in continuous casting", ISIJ INT; ISIJ INTERNATIONAL 1994 IRON & STEEL INST OF JAPAN, TOKYO, JPN, vol. 34, no. 11, 1994, Tokyo, Japan, pages 889 - 895, XP002415540
- [A] YOKOYA SHINICHIRO ET AL: "Swirling effect in immersion nozzle on flow and heat transport in billet continuous casting mold", ISIJ INT; ISIJ INTERNATIONAL 1998 IRON & STEEL INST OF JAPAN, TOKYO, JAPAN, vol. 38, no. 8, 1998, pages 827 - 833, XP002415541
- [A] YOKOYA S ET AL: "Swirling flow effect in bottomless immersion nozzle on bulk flow in high throughput slab continuous casting mold", ISIJ INT; ISIJ INTERNATIONAL 2001, vol. 41, no. 10, 2001, pages 1201 - 1207, XP002415542

Cited by

CN111421118A; CN102794408A

Designated contracting state (EPC)

DE SE

Designated extension state (EPC)

AL BA HR MK YU

DOCDB simple family (publication)

EP 1759789 A1 20070307; EP 1759789 B1 20080326; DE 602006000811 D1 20080508; DE 602006000811 T2 20080703

DOCDB simple family (application)

EP 06018010 A 20060829; DE 602006000811 T 20060829