

12

EUROPEAN PATENT APPLICATION

21 Application number: 86305721.2

51 Int. Cl.³: C 21 D 9/573
 C 21 D 1/62

22 Date of filing: 25.07.86

30 Priority: 25.07.85 JP 162909/85
 17.06.86 JP 139115/86

43 Date of publication of application:
 04.02.87 Bulletin 87/6

88 Date of deferred publication of search report: 10.05.89

84 Designated Contracting States:
 BE DE FR GB IT NL SE

71 Applicant: KAWASAKI STEEL CORPORATION
 1-28, Kita Hon-Machidori 1-Chome
 Chuo-Ku, Kobe-Shi Hyogo-Ken(JP)

72 Inventor: Arai, Makoto c/o Chiba Works
 Kawasaki Steel Corporation 1, Kawasaki-cho
 Chiba City Chiba Pref.(JP)

72 Inventor: Sato, Kuniaki c/o Chiba Works
 Kawasaki Steel Corporation 1, Kawasaki-cho
 Chiba City Chiba Pref.(JP)

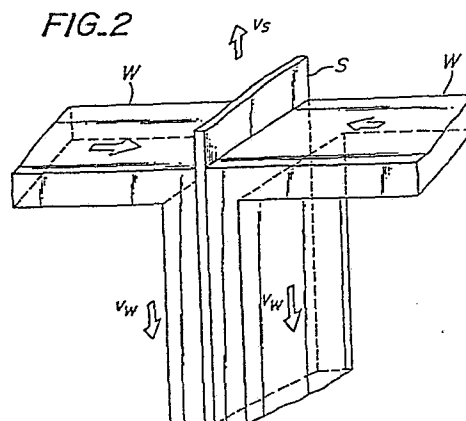
72 Inventor: Yamaguchi, Yasuhiro c/o Chiba Works
 Kawasaki Steel Corporation 1, Kawasaki-cho
 Chiba City Chiba Pref.(JP)

72 Inventor: Shiota, Isamu c/o Chiba Works
 Kawasaki Steel Corporation 1, Kawasaki-cho
 Chiba City Chiba Pref.(JP)

74 Representative: Kosmin, Gerald Emmanuel et al,
 HASELTINE, LAKE & CO. Hazlitt House 28 Southampton
 Buildings Chancery Lane
 London, WC2A 1AT(GB)

54 Method and apparatus for cooling steel strips.

57 A method and apparatus for cooling steel strips by means of a cooling liquid in a continuous annealing line. The cooling liquid is forced to flow as steady flows along both surfaces of a steel strip in directions opposite to moving directions of the steel strip. An apparatus comprises flow rectifier plates in opposition to both the surfaces of the steel strip to form flow passages between the steel strip and the flow rectifier plates for forcing the cooling liquid through the flow passages, at least one cooling liquid supply port on a downstream side of the moving steel strip and at least one cooling liquid exhaust port on an upstream side of the moving steel strip. In order to control the cooled steel strip temperature, part of the cooling liquid used for cooling the steel strip is mixed with fresh cooling liquid to control temperature of cooling liquid to be used for cooling by adjusting a mixing ratio of the used and fresh cooling liquids, thereby keeping temperature of the cooled steel strip within a predetermined target temperature range.



DOCUMENTS CONSIDERED TO BE RELEVANT					
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)		
X Y A	US-A-3 410 734 (H.L. TAYLOR) * Column 4, lines 53-61; figure 2 *	1,2,4,7 9 5 13	C 21 D	9/573	
	---		C 21 D	1/62	
X	EP-A-0 065 577 (KAWASKI STEEL) * Page 5, paragraph 2; figure 1 *	1			

X	FR-A-2 261 816 (ALUMINIUM PECHINEY) * Page 2, lines 13-16; figure 1 *	1			
Y	---	7,8			
X	US-A-3 000 109 (F.U. HILL et al.) * Column 1, lines 19-29 *	1			
Y	---	7,8			
Y	JP-B-57 011 931 (NIPPON KOKAN) * English translation, page 3; figure 1 *	5			

Y	PATENT ABSTRACTS OF JAPAN, vol. 4, no. 22 (C-74), 23rd February 1980, page 128 C 74; & JP-A-54 162 614 (NIPPON KOKAN K.K.) 24-12-1979 * Abstract *	5			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	US-A-3 358 980 (H.L. TAYLOR) -----				C 21 D
The present search report has been drawn up for all claims					
Place of search THE HAGUE		Date of completion of the search 27-02-1989	Examiner ASHLEY G.W.		
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document					

IPO FORM 1503 03.82 (P0401)