US009636724B2

(12) **United States Patent**
Hermes et al.

(10) **Patent No.: US 9,636,724 B2**
(45) **Date of Patent: May 2, 2017**

(54) **METHOD FOR HOT ROLLING Z-SECTIONS SHEET PILES**

(75) Inventors: **Aloyse Hermes**, Differdange (LU); **François Robinet**, Lottert (BE)

(73) Assignee: **ArcelorMittal Investigación Y Desarrollo S.L.**, Sestao (Bizkaia) (ES)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 15 days.

(21) Appl. No.: **14/389,986**

(22) PCT Filed: **Apr. 2, 2012**

(86) PCT No.: **PCT/IB2012/000658**

§ 371 (c)(1),
(2), (4) Date: **Oct. 1, 2014**

(87) PCT Pub. No.: **WO2013/150324**

PCT Pub. Date: **Oct. 10, 2013**

(65) **Prior Publication Data**

US 2015/0052961 A1 Feb. 26, 2015

(51) **Int. Cl.**

B21B 1/09	(2006.01)
B21B 1/098	(2006.01)
B21B 1/082	(2006.01)

(52) **U.S. Cl.**

CPC ***B21B 1/098*** (2013.01); ***B21B 1/082*** (2013.01)

(58) **Field of Classification Search**

CPC .. B21B 1/08; B21B 1/082; B21B 1/09; B21B 1/095; B21B 1/098

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,291,564	A	9/1981	Muckli	
5,671,630	A	9/1997	Grober	
6,293,133	B1 *	9/2001	Svejkovsky et al.	72/225

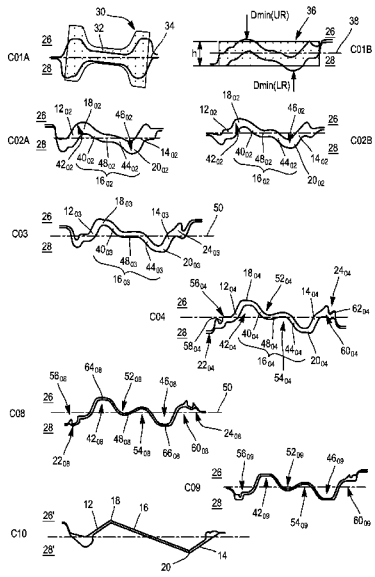
FOREIGN PATENT DOCUMENTS

DE	121718	A5	8/1976
DE	2529405	A1	8/1976
EP	0 284 827	A2	10/1988
EP	0 890 395	A1	1/1999
GB	2018656	A	10/1979
JP	H04288903	A	10/1992
JP	H07124602	A	5/1995
JP	2004-288903	A	10/2004

* cited by examiner

Primary Examiner — Debra Sullivan
(74) *Attorney, Agent, or Firm* — Reinhart Boerner Van Deuren P.C.

(57) **ABSTRACT**

A method for rolling a Z-section sheet pile comprises rolling a curved preform of a web (**16**) in successive roll gaps defined by at least one roll pair comprising a grooved upper roll (**26**) and a grooved lower roll (**28**), wherein: a first corner (**18**) and an adjoining first part of the curved preform of the web (**16**) are formed in a first groove (**42**) of an upper roll (**26**); and a second corner (**20**) and an adjoining second part of the curved preform of the web (**16**) are formed in a first groove (**46**) of a lower roll (**28**). In the last roll gaps forming the curved preform of the web (**16**), the diameter of the lower roll (**28**) decreases in a discontinuous manner in the interval between the first groove (**42**) in the upper roll (**26**) and the first groove (**46**) in the lower roll (**26**), and the diameter of the upper roll (**26**) increases in this interval in a complementary manner.

19 Claims, 4 Drawing Sheets