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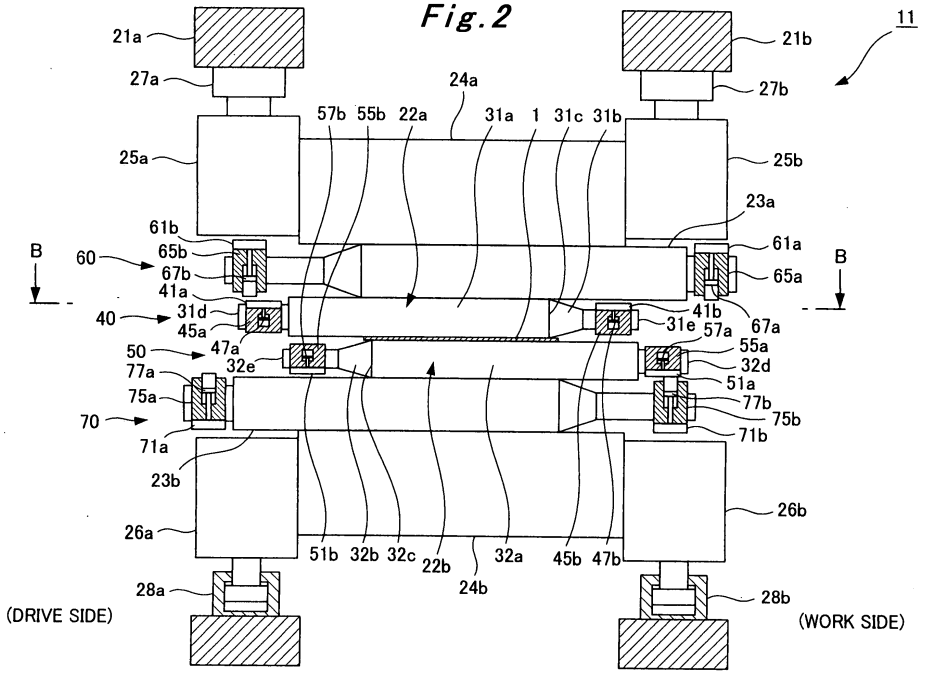
(54) Rolling mill having work roll shifting function

(57) A reversing rolling mill (11) includes a pair of upper and lower work rolls (22a, 22b) clamping a strip (1) and roll shifting devices (40, 50) for respectively shifting the work rolls (22a, 22b) in the axial direction thereof. The pair of upper and lower work rolls (22a, 22b) respectively have, at one ends of roll body portions (31a, 32a), tapering portions (31b, 32b) having roll diameters gradually decreasing toward roll tips, and disposed such that the tapering portions (31b, 32b) are located on opposite sides from each other in the axial direction thereof. The surfaces of the roll body portions (31a, 32a) of the work rolls (22a, 22b) are formed of a ceramic material or a cemented carbide.

Fig. 2



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PARTIAL EUROPEAN SEARCH REPORT

under Rule 62a and/or 63 of the European Patent Convention. This report shall be considered, for the purposes of subsequent proceedings, as the European search report

Application Number
EP 10 00 6802

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 2004/206147 A1 (NISHI HIDETOSHI [JP] ET AL) 21 October 2004 (2004-10-21) * column 4, paragraph 61 - column 5, paragraph 77; figures 1-7 *	2-6	INV. B21B13/14 B21B27/02 B21B27/03
Y	WO 2008/155320 A1 (SIEMENS AG [DE]; SOENTGEN THOMAS [DE]; WAGNER ROBERT [DE]) 24 December 2008 (2008-12-24) * page 5, paragraph 2; figures 1,3 *	2-6	
Y	US 2 674 140 A (EGER OSCAR A) 6 April 1954 (1954-04-06) * column 3, line 65 - column 4, line 10 *	3	
Y	DE 102 08 389 A1 (HITACHI LTD [JP]) 26 June 2003 (2003-06-26) * claims 1-2 *	4	
A	JP 8 215721 A (NIPPON STEEL CORP) 27 August 1996 (1996-08-27) * abstract *	2	

TECHNICAL FIELDS SEARCHED (IPC)

B21B

INCOMPLETE SEARCH

The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC so that only a partial search (R.62a, 63) has been carried out.

Claims searched completely :

Claims searched incompletely :

Claims not searched :

Reason for the limitation of the search:

see sheet C

1

Place of search	Date of completion of the search	Examiner
Munich	26 March 2012	Forciniti, Marco

CATEGORY OF CITED DOCUMENTS

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

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

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INCOMPLETE SEARCH
SHEET C

Application Number
EP 10 00 6802

Claim(s) completely searchable:
2-6

Claim(s) not searched:
1

Reason for the limitation of the search:

Claim 1 and claim 2 have been drafted as separate independent claims.

Under Article 84 in combination with Rule 43(2) EPC, an application may contain more than one independent claim in a particular category only if the subject-matter claimed falls within one or more of the exceptional situations set out in paragraph (a), (b) or (c) of Rule 43(2) EPC. This is not the case in the present application, however, for the following reasons:

Claim 1 and claim 2 are both directed to a rolling mill having a work roll shifting function, comprising at least one rolling stand including a pair of upper and lower work rolls and roll shifting means for shifting the work rolls in an axial direction thereof, the pair of upper and lower work rolls each having, at one end of a roll body portion thereof, a tapering portion having a roll diameter gradually decreasing toward a tip of the work roll, the pair of upper and lower work rolls clamping a strip while having the tapering portions located on opposite sides from each other in an axial direction thereof. Further, both claims disclose the same principle idea which idea is to form at least surfaces of the work rolls work so that they are more wear resistent.

Hence, it is possible to formulate a single independent apparatus claim disclosing this common idea. Further developments of such a claim as e.g. the provision of a ceramic material or of a certain Vickers hardness can be covered by dependent claim.

The search has been restricted to the subject-matter indicated by the applicant in his letter of 20-01-2011 filed in reply to the invitation pursuant to Rule 62a(1) EPC.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 00 6802

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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26-03-2012

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82