Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 9 June 2015

Case Number: T 0350/12 - 3.2.03

Application Number: 04720150.4

Publication Number: 1607149

IPC: B21B37/30

Language of the proceedings: EN

Title of invention:
METHOD AND APPARATUS FOR ROLLING METALLIC PLATE MATERIAL

Patent Proprietor:
Nippon Steel & Sumitomo Metal Corporation

Opponents:
Siemens Aktiengesellschaft
SMS Siemag AG

Headword:
Novelty (yes), Inventive step(yes), late filed documents (not admitted), unsubstantiated/unspecified objections (not considered)

Relevant legal provisions:
EPC Art. 54, 56
RPBA Art. 12(2), 12(4)

Keyword:

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 0350/12 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 9 June 2015

Appellant: (Opponent 2)	SMS Siemag AG Eduard-Schloemann-Strasse 4 40237 Düsseldorf (DE)
Representative:	Klüppel, Walter Hemmerich & Kollegen Patentanwälte Hammerstraße 2 57072 Siegen (DE)
Respondent: (Patent Proprietor)	Nippon Steel & Sumitomo Metal Corporation 6-1, Marunouchi 2-chome Chiyoda-ku Tokyo 100-8071 (JP)
Representative:	Vossius & Partner Patentanwälte Rechtsanwälte mbB Siebertstrasse 3 81675 München (DE)
Party as of right: (Opponent 1)	Siemens Aktiengesellschaft Wittelsbacherplatz 2 80333 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 20 December 2011 rejecting the opposition filed against European patent No. 1607149 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	G. Ashley
Members:	C. Donnelly
	M. Blasi

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division rejecting the oppositions against the European Patent EP-B-1 607 149.

II. Opponent II (hereinafter: the "appellant") filed notice and grounds of appeal against this decision in due form and time.

In its grounds of appeal the appellant based its case on the following documents which had been cited in the opposition proceedings:

OII-D9: DE-A-197 18 529;
OII-D5: EP-A-0 763 391;
OI-D6: JP 06 339 717 with computer translation into English, and Patent Abstracts of Japan;
OII-D8: JP-A-2001 105013 and Patent Abstracts of Japan;
Annex C: JP-A-8-257 613 with translation into English and Patent Abstracts of Japan;
Annex B: H. Grützbach et al, "20-Rollen-Reversier-Kaltwalzwerk für Edelstahl in neuer technischer Konzeption", Stahl und Eisen 113(1993), No. 3, pages 97 to 103;
OII-D10: JP-A-05-138219 with computer translation into English, and Patent Abstracts of Japan;
OII-D6: US-A-3 290 912.

The appellant also cited the following documents in its grounds of appeal which were not part of the opposition proceedings:
OII-D12: JP 06-091314
OII-D13: JP 63-076710
OII-D14: JP 62-38311
OII-D15: US 4 312 209

OII-D16: JP 10-005808

III. In a communication pursuant to Article 15(1) RPBA, annexed to the summons to oral proceedings, the Board informed the parties of its provisional opinion. The oral proceedings were held on 9 June 2015. As indicated in its letter of 9 April 2015, opponent I did not attend these proceedings. At the conclusion of the debate the parties made the following requests:

The appellant (opponent II) requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed or, alternatively, that the patent be maintained in amended form on the basis of one of the sets of claims filed as auxiliary requests 1 to 3 with the letter of 18 May 2015.

IV. Claim 1 as granted reads:

"A rolling method of a flat-rolled metal material, for executing rolling by using a rolling mill having at least work rolls (1,2) and backup rolls (3,4) for a flatrolled metal material, characterized in that the method comprises the steps of:

measuring rolling direction force acting on roll chocks (5,6) on a operator side and a driving side of said work rolls; calculating the difference of said rolling direction force between the operator side and the driving side; and controlling a left-right swivelling component of roll gap of said rolling mill on the basis of said difference."

Independent Claim 3 as granted reads:

"A rolling apparatus for a flat-rolled material including a rolling mill having at least work rolls (1,2) and backup rolls (3,4) characterized in that the apparatus comprises
load detection devices (9,10) for measuring rolling direction force acting on work roll chocks (5,6), arranged on both entry side and exit side of said roll chocks in a rolling direction on both operator side and driving side of said work rolls (12);
a calculation device (18) for calculating a difference of rolling direction force acting on said work roll chock (5,6) between the operator side and the driving side on the basis of a measurement value by said load detection device;
a calculation device (19) for calculating a left-right swivelling component control quantity of roll gap of said rolling mill on the basis of the calculation value of the difference of said rolling direction force between the operator side and the driving side; and
a control device (20) for controlling the roll gap of said rolling mill on the basis of the calculation value of the left-right swivelling component control value of the roll gap."

V. The relevant arguments of the parties can be summarised as follows:

a) The appellant referred to submissions made before the opposition division concerning sufficiency of disclosure and extension of subject-matter (Articles 100(b) and 100(c) EPC); reference was also made to further unspecified objections made during opposition proceedings.

b) Claims 1 and 3 as granted, Novelty

i) Appellant

The subject-matter of claims 1 and 3 as granted is not new in view of OII-D9, in particular col. 2, lines 8 to 13, and OI-D6.

OII-D9 deals with the same problems as the patent, namely reducing meandering of the rolled material and improving planarity. Axial and horizontal forces are measured using load detection devices (see col. 1, lines 49 to 52 and column 2, lines 8 to 13). The authors of OI-D9 use terminology which clearly distinguishes between horizontal forces in the rolling direction and axial forces along the axis of the rolls.

Regarding OI-D6, figure 3 shows a plan view of the rolls, according to which the displacement in the rolling direction P measured by the sensors 9 (see figures 2 and 7) corresponds to the resultant force applied to the roll chock in the rolling direction, since measurement of displacement is a standard way of measuring force.

From paragraphs [0015] to [0017] of OI-D6 it can be directly deduced that the value Um corresponding to the rolling direction force (see paragraph [0013]) is used by the calculating means 11 to control the roll gap ("board wedge").

ii) Respondent

OII-D9 at col. 2, lines 8 to 13, fails to disclose the measurement of a rolling direction force on the roll chocks on an operator side and a driving side. The method of OII-D9 relates to the correction of differences in the vertical forces (roller forces), which are calculated using an equilibrium equation of moment from the horizontal forces of the individual rolls, as described in claim 1 of OII-D9.

As regards claim 3, the force pick-ups which are provided at the rolls supports in the apparatus of OII-D9 detect the forces in the vertical direction which are applied to the roll chocks (i. e. rolling force) and do not measure the forces in the rolling direction as in the contested patent.

OI-D6 concerns a method which controls the amount of slab reduction in roll cross-milling, while considering the geometric asymmetry of the roll gap resulting from the displacement of the roll chocks. Only displacements of roll chocks are measured; nothing concerning "rolling direction" or "rolling direction forces" is measured or discussed in the document.

The appellant's allegation that the displacement in the rolling direction P corresponds to the elastic deformation of housing resulting from the rolling force

is wrong, since this "rolling force" is the vertical rolling force which has nothing to do with "forces in the rolling direction".

Furthermore, the appellant has failed to provide a certified translation of OI-D6 as requested by the opposition division and has only referred to an unreliable computer translation.

(a) Claim 1 and 3 as granted, Inventive step

(i) Appellant

The subject-matter of claim 1 lacks an inventive step in view of:
(i) OI-D6 taken alone and the skilled person's general knowledge;
(ii) OII-D9 taken alone and the skilled person's general knowledge.
(iii) OII-D8 or Annex C in combination with the skilled person's general knowledge;
(iv) Annex B in combination with OII-D6;
(v) Annex B in combination with OII-D10

and that the subject-matter of claim 3 lacks an inventive step in view of:
(i) annex B in combination with OII-D6 or OII-D10.

Should the method of claim be considered to be novel, then it can only possibly differ from that of OI-D6 in that the force value is measured directly at the roll chock and fed into the calculating means, instead of measuring the change in distance between the housing and the roll chock. However, it is generally well known that in an elastic system the force is directly proportional to displacement, thus substituting one

technique by the other would not require any inventive activity.

In OII-D9 axial and horizontal forces are measured using load detection devices (see col. 1, lines 49 to 52 and col. 2, lines 8 to 13). In view of this, the skilled person is given a direct suggestion to measure the horizontal forces in the rolling direction as well as in the axial direction, should this be considered a difference.

OII-D8 discloses a method for controlling the left-right swivelling component of roll gap on the basis of the force on the band in the vertical direction at both the operator and driving sides. Annex C discloses a method wherein the roll gap is controlled by comparing the actual vertical force on the working roll to a fixed value. Thus, the only difference between the subject-matter of claim 1 and these known methods is that the force is measured in the rolling direction. Since the skilled person only has two alternatives for measuring the force i. e. either in the vertical direction or in the rolling direction, no inventive step can be recognised in selecting one over the other.

Furthermore, the contested patent does not describe any particular effect associated with making the measurement in the rolling direction.

Annex B discloses a mathematical method in which the tensile stresses on the operator and driving sides are compared and used to control the left-right swivelling component of roll gap. The only difference between this and the claimed method lies in the technique used to determine the tensile stress distribution. Thus, taking Annex B as the most promising prior art, the objective

technical problem would be one of improving the method such that it could be carried out with compact unit.

OII-D6 shows such a unit which measures forces in the horizontal direction using sensors 24. By using such an arrangement for the method according to Annex B the need for a separate roller to measure flatness would be avoided. Similarly OII-D10 also describes a method in which tensile stress is measured using load detectors 7.

(ii) Respondent

The respondent argued that the objections based on OII-D9 and OI-D6 alone with the skilled person's general knowledge should not be admitted into the proceedings, since they were presented for the first time during the oral proceedings and were not *prima facie* relevant.

As discussed in relation to novelty, OII-D9 fails to disclose the measurement of a rolling direction force on the roll chocks on an operator side and a driving side, and concerns the correction of differences in the vertical forces (roller forces), which are calculated using an equilibrium equation of moment from the horizontal forces of the individual rolls, as defined in claim 1 of OII-D9.

In the method according to OII-D8 the differential load distribution on the rolled material in the width direction is detected at the time of the previous pass of rolling by using load detecting means. Such a method differs from that claimed not only in the detection of vertical rather than horizontal forces, but also in that the control is based on values from previous passes.

Annex C is directed to control based on the detection of vertical roll forces. Thus, the technical idea of Annex C is completely different to that of the contested patent.

The measurement of tensile stress distribution in the width direction of the strip using flatness measuring roll of Annex B is quite different from the measurement of forces acting on the roll chocks at the operator and driving sides of the work rolls. In Annex B, the flatness measuring roll is only located at the exit side and constitutes a feed-back control based on a detected value at a distance from the rolling mill, with the result that there is a time delay and consequently poor control response. On the other hand, in the method of the contested patent, the left-right difference in the rolling direction force reflects the left-right difference without any time delay.

OII-D6 discloses a tension control apparatus which measures the total tension of a rolled material by using a roll force transducer provided at roll chocks (col. 1, lines 9 to 12 and col. 2, lines 15 to 18). There is no mention of camber control nor measurement of forces at both the operator and driving sides. Thus, the methods of Annex B and OII-D6 are very different and the skilled person has no motivation to combine the two documents.

OII-D10 discloses a method in which there is measurement of horizontal forces acting on the roll chocks. This is completely different to the technique used in Annex B. Thus, the skilled person also has no motivation to combine these two documents. Even if Annex B and OII-D10 were combined it would not lead to

the subject-matter of claim 1. Similar reasoning applies to claim 3.

Reasons for the Decision

1. *Documents OII-D12 to OII-D16*

In accordance with Article 12(2) Rules of Procedure of the Boards of Appeal (RPBA), the statement of grounds of appeal shall contain the appellant's complete case. Since no supporting facts and arguments with respect to OII-D12 to OII-D16 have been provided in the grounds, these documents were not considered (Article 12(4) RPBA).

2. *Sufficiency of disclosure and extension of subject-matter, Articles 100(b), 100(c) EPC and unspecified further objections.*

On page 18 of the statement of grounds of appeal, the appellant referred to its submissions before the opposition division concerning the grounds of opposition under Articles 100(b) and 100(c) EPC. Reference was also made to further objections which were not specified (section e on page 18).

A general, unspecified reference to basically all submissions before the opposition division does not meet the requirement of Article 12(2) RPBA, which stipulates that the statement of grounds itself shall contain the complete case. Moreover, from a logical point of view, submissions pre-dating the decision under appeal cannot, as such, constitute explanations as to why the decision should be reversed (cf. Article 12(2), second sentence RPBA). Hence, the objections

under Articles 100(b) and 100(c) EPC and the further unspecified objections were not considered by the Board in the present appeal proceedings.

3. Claims 1 and 3 as granted, Novelty

3.1 With respect to OII-D9

3.1.1 The passage at column 1, lines 49 to 52 of OII-D9, discussing the prior art, states that horizontal forces which, depending upon their direction, can lead to considerable force differences in the setting system, had not been previously taken into account ("Horizontalkräfte, die je nach ihrer Richtung zu erheblichen Differenzkräften in den Anstellsystemen führen können"). However, it does not state exactly which horizontal forces, i.e. those in the axial direction of the rolls or in the rolling direction, are meant.

3.1.2 When specifying the technical problem that the method of OII-D9 aims to overcome, a general reference is made to the effect of horizontal forces which occur during rolling operations (see col. 1 lines 55 to 56). However, OII-D9 goes on to state at col. 1, lines 59 to 62 that the invention aims to ensure that changes in the magnitude and direction of the axial forces do not affect the differential roll force between the operating and driving sides.

3.1.3 The passage at col. 2, lines 8 to 13 refers firstly to the measurement of forces in the individual rolls ("Kräfte in einzelnen Arbeitswalzen") using load detectors placed in the roll chocks, but the direction is not specified; secondly the passage refers to the measurement of axial forces on the basis of the

hydraulic pressure. The description at col. 2, lines 14 to 23 only discusses how the axial force measurements are used to set the rolls.

3.1.4 In view of this, the board agrees with the conclusion drawn by the opposition division at point 5.3 of its decision, that the only horizontal forces of interest in OII-D9 are the axial forces. Accordingly, it fails directly and unambiguously to disclose the measurement of the rolling direction forces acting on the roll chocks at the operator and driving sides of the work rolls.

3.1.5 Thus, the subject-matter of claims 1 and 3 is new with respect to OII-D9.

3.2 With respect to OI-D6

3.2.1 The respondent has noted that the appellant failed to provide a certified translation of OI-D6, as requested by the opposition division, but instead referred to an unreliable computer translation. The Board agrees that the computer translation is of such poor quality that it cannot be relied upon, other than to aid interpretation of the figures contained in the original Japanese document and the Abstract.

3.2.2 In this regard, figure 3 of OI-D6, illustrating a plan view of the roll mill, is of particular relevance since it shows various distances Ur, Um and Uh in the plane of the rolling direction P. By using the equations (6) to (7) specified in paragraph [0014] Ur, Um and Uh can be calculated on the basis of measurements given by displacement sensors 9, which correspond to positions S1 to S4, as shown in figure 3. Therefore, it must be seen whether these measurements are a direct and

unambiguous disclosure of measuring the rolling direction forces acting on roll chocks on the operator and driving sides of the work rolls, and whether the difference between these values is used in controlling a left-right swivelling component of the roll gap.

3.2.3 The appellant has drawn specific attention to the final sentence of paragraph [0013] on page 3 of the machine translation of OI-D6, which reads:

"The amount of displacement of roll pass direction P in a sensor installed position (it is hereafter called the amount of roll crosses) is shown, and Um shows the amount of approach of roll pass direction P to the roll chock 3 by the elastic deformation of the housing 6 resulting from rolling load."

It argues that since the distance Um is directly proportional to the force acting on roll chocks in the rolling direction, this is the same as measuring the horizontal force itself directly at the roll chock.

3.2.4 Although little weight can be attached to the computer translation itself, in the Board's opinion, the "rolling load" referred to in OI-D6 is the vertical force applied to the sheet being rolled by the work-rolls, which deforms the housing and leads to a change in the gap Um between the roll chock 3 and the housing 6 (see figure 3).

3.2.5 It is accepted that in an elastic system a displacement is directly proportional to the force producing it. However, in this case it is not possible to determine the relevant contributions to the changes in the distance Um made respectively by the vertical rolling load force and the rolling direction force.

3.2.6 Furthermore, it is impossible to determine from the confused language of paragraphs [0015] to [0017] of the translation which value or combination of values of Uh, Ur and Um is actually fed into the calculating means 11 to control the "board wedge". The Abstract of OI-D6 also fails to provide further information on these values. Thus, leaving aside the question of whether any of the distances Uh, Ur, Um or combination thereof correspond directly to the force measured on the roll chock in the rolling direction, OI-D6 fails to disclose how these values are used.

Consequently there is no clear disclosure of the use of the difference in rolling direction forces between the operator and driving sides to control the left-right swivelling component of the roll gap.

3.2.7 Thus, the subject-matter of claims 1 and 3 is new with respect to OI-D6.

4. Claims 1 and 3, Inventive step

4.1 Admissibility of the objections made for the first time during the oral proceedings.

The Board accepts that the objections of lack of inventive step based on OI-D6 and OII-D9 alone can be admitted into the proceedings in accordance with Article 13(1),(3) RPBA, since both documents have already been thoroughly discussed when considering the novelty objections, such that the Board and the respondent could be expected to deal with the issue without undue difficulty.

4.2 OI-D6 and the skilled person's general knowledge

4.2.1 As set out above, it is not possible to determine from the disclosure of OI-D6 the relevant contributions to the changes in the distance Um made by the vertical rolling force through deformation of the housing on the one hand, and by the rolling direction force on the other. Thus, the question of inventive step is not reduced to one of asking whether measuring the rolling direction force directly at the roll chocks is an obvious alternative to calculating it on the basis of the displacement value Um.

4.2.2 Applying the problem-solution approach, the objective technical problem the invention aims to solve is, as identified by the opposition division and as defined in the patent at paragraph [0013], that of providing a rolling method and a rolling apparatus to produce a flat-rolled metal material with minimal camber.

4.2.3 Faced with this problem, it would not be obvious for the skilled person, on the basis of general knowledge alone, to modify the method and apparatus of OI-D6 to obtain the subject-matter of claims 1 and 3 respectively, since there are many options available and there is no particular incentive or suggestion to select the solution proposed in the patent. Indeed, in order to arrive at the claimed solution, the skilled person would need not only to decide to measure each individual force component instead of displacements produced by a combination of forces, but also to carry out the control step on the basis of the calculated

value for the difference in the rolling direction force between the operator side and the driving side.

4.3 OII-D9 alone and the skilled person's general knowledge

4.3.1 OII-D9 fails directly and unambiguously to disclose the measurement of the rolling direction forces acting on the roll chocks at the operator and driving sides of the work rolls. The Board cannot see any reason why the skilled person, on the basis of OII-D9 alone, would decide to measure these forces when the solution already proposed in OII-D9 is based on a different concept and there is no indication as to how such measurements might be incorporated into the control system.

4.3.2 Thus, the subject-matter of claims 1 and 3 also involves an inventive step also when taking OII-D9 alone.

4.4 OII-D8 or Annex C in combination with the skilled person's general knowledge

4.4.1 The appellant's argument that, taking either OII-D8 or Annex C as the most promising starting point, no inventive step can be recognised, since the skilled person only has two alternatives for measuring the force, i.e. either in the vertical direction or in the rolling direction, is not persuasive. As shown in OII-D9 and OII-D5, horizontal forces are often measured in the axial direction of the rolls, rather than in the rolling direction.

4.4.2 Furthermore, the method according to OII-D8 is based on a different technical idea from that of the patent,

whereby the differential load distribution of the rolled material in the width direction is detected using load detecting means during a first pass; this load distribution is then used to set the rolling conditions for suppressing camber in the next pass. Thus, unlike the claimed invention, no control is performed using values from the pass actually being executed.

4.4.3 In the roll mill according to Annex C, position control is based on the rolling load (vertical force) variation on the left and right sides. There is no indication in Annex C that horizontal forces, and in particular horizontal forces in the rolling direction, could also be used for position control. The skilled person would therefore not be motivated to depart from using vertical rolling forces to control the position of the rolls, as taught in Annex C.

4.5 Annex B in combination with OII-D6 or OII-D10

4.5.1 Annex B states that in order to carry out high performance and high speed rolling it is essential to maintain a uniform tensile stress distribution in the strip being rolled. To do this, it proposes using a flatness measuring roll located at the exit side to detect changes in plate flatness. This constitutes a feed-back control based on a value detected at a distance from the rolling mill, with a corresponding time delay in the control response. Therefore, this technique is fundamentally different to that proposed in the patent, and cannot lead to the claimed invention.

4.5.2 Although OII-D6 and OII-D10 show the measurement of forces in the horizontal direction using load

sensors (features 24 and 7 respectively), both of these documents relate to control techniques which are different from that used in Annex B. A combination of either of these documents with Annex B can only be made with the benefit of hindsight in an attempt to piece together all the components of the claimed roll mill from documents having no common technical thread.

4.5.3 In conclusion the subject-matter of claims 1 and 3 involves an inventive step and meets the requirements of Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

B. Atienza Vivancos G. Ashley

Decision electronically authenticated