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D E C I S I O N
of 11 January 1996

Case Number: T 0730/94 - 3.2.1

Application Number: 88201777.5

Publication Number: 0306076

IPC: B21B 1/46, C21D 8/04

Language of the proceedings: EN

Title of invention:
Method and apparatus for the manufacture of formable steel strip

Patentee:
Hoogovens Groep B.V.

Opponent:
01: SMS Schloemann-Siemag AG
02: Voest-Alpine Industrieanlagenbau GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 111(1)

Keyword:
"Decision re appeals - remittal (yes)"

Decisions cited:
T 0273/84

Catchword:
-

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Case Number: T 0730/94 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 11 January 1996

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Decision under appeal: **Decision of the Opposition Division of the European Patent Office dated 19 July 1994 rejecting the opposition filed against European patent No. 0 306 076 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane
J. Van Moer

Summary of Facts and Submissions

I. European patent No. 0 306 076 was granted on 25 September 1991 on the basis of European patent application No. 88 201 777.5.

Claim 1 of the granted patent reads as follows:

"Method for the manufacture of formable steel strip having a thickness between 0.5 and 1.5 mm comprising the following process steps which are performed sequentially in a continuous process:

(a) in a continuous casting machine forming liquid steel into a hot slab having a thickness of less than 100 mm,
(b) hot rolling the hot slab from step (a), in the austenitic region and below 1100°C, to form strip having a thickness of between 2 and 5 mm,
(c) cooling the strip from step (b) to a temperature between 300°C and the temperature T_t at which 75% of the steel is converted to ferrite,
(d) rolling the cooled strip from step (c) at said temperature between 300°C and T_t with a thickness reduction of at least 25% at a rolling speed not more than 1000 m/min.,
(e) coiling the rolled strip from step (d)."

Dependent claims 2 to 16 relate to preferred embodiments of the method according to claim 1.

Claim 17 of the granted patent reads as follows:

"Apparatus for carrying out the method of claim 1, having the following items arranged in the sequence below so as to perform a continuous process:

(i) at least one continuous casting machine for forming liquid steel into slabs having a thickness of 30 to 100 mm,

(ii) a homogenizing furnace (6) for the slab from (i),

(iii) a planetary mill (8) followed by a planishing mill stand (8) for hot rolling of the hot slab from (ii) into strip,

(iv) means (11) for cooling the strip from (iii) to a temperature in the range of 300 to 850°C and homogenizing the strip at that temperature,

(v) at least one four-high mill (12, 19) for rolling the strip from (iv),

(vi) a furnace (13) for recrystallization-annealing of the strip from (v) at a temperature of at least 620°C,

(vii) cooling means (14) for cooling the strip from (vi), and

(viii) at least one strip coiler (17).

Dependent claims 18 and 19 relate to preferred embodiments of the apparatus according to claim 17.

II. The granted patent was opposed by the present appellants on the grounds that its subject-matter lacked novelty and/or inventive step (Article 100(a) EPC). In the course of the opposition proceedings the following documents were relied upon as representing the relevant state of the art:

(D1) EP-A-0 226 446

(D2) Prospectus SMS Schloemann-Siemag AG "CSP compact strip production" carrying printing date of 8/87

(D3) DE-A-2 653 847

(D4) DE-C-2 124 994

(D5) Data Sheet of THYSSEN STAHL AG

(D6) 11. Umformtechniches Kolloquium, held on 23 and 24 September 1982 in Karman Auditorium, Aachen, P. Fink: "Neue Entwicklungen bei KRUPP-PLATZER-Hochumformungswalzwerken"

(D7) EP-A-0 194 118

(D8) US-A-3 969 162.

III. With its decision issued in writing on 19 July 1994 the Opposition Division rejected the oppositions.

IV. Appeals against this decision were filed on 7 September 1994 (by opponent 02) and 13 September 1994 (by opponents 01) with the respective appeal fees being paid at the same time. The respective Statements of Grounds of Appeal were filed on 18 November 1994 (opponents 02) and 25 November (opponents 01).

In the statement of grounds of opponents 02 reference was made to three further state of the art documents, viz:

(D9) "Manufacture of deep-drawing sheet by warm rolling", Sheet Metal Industries, May 1973, pages 297 to 302.

(D10) DE-A-1 903 554

(D11) Lueger, Lexikon der Hüttentechnik, Volume 5, pages 163 and 632.

Both appellants requested that the contested decision be set aside and the patent revoked in its entirety. They also requested oral proceedings as an auxiliary measure.

V. With a reply dated 14 June 1995 the respondents (proprietors of the patent) requested that the appeal be dismissed. Oral proceedings were requested as an auxiliary measure.

VI. In a communication pursuant to Article 110(2) EPC dated 11 October 1995 the Board indicated that it intended to allow the introduction of newly cited documents D9 and D10 into the procedure and accordingly to remit the case to the Opposition Division for further examination. In reply to this communication all parties withdrew their auxiliary requests for oral proceedings.

Reasons for the Decision

1. The appeals comply with the formal requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC. They are therefore admissible.

2. In general terms the invention is concerned with a strip mill in which a hot steel slab issuing from a continuous casting machine is hot rolled into a strip of thickness between 0.5 and 1.5 mm. To this end the patent proposes rolling in two stages (features "b" and "d" of claim 1). In the first stage the steel is in the austenitic region, in the second stage the steel is at least 75% ferritic. This combination allows the customary cold rolling and annealing steps to be dispensed with.

The main citation relied upon by the opponents is document D1. This is also concerned with hot rolling steel strip to give good formability without the need for the customary cold rolling and annealing steps. Again here two stage rolling of a continuously cast slab is proposed. Of the 17 embodiments disclosed in document D1 the most relevant are those of Figures 5 and 6, 11 and 12, and 33 and 34. These three embodiments are very similar. In all of them a continuously cast strip of thickness 5-50 mm is first rolled to thickness of 2-6 mm at a temperature of 1100-700°C (see for example column 5, last paragraph) and then lubrication rolled at

high speed at a temperature between 300°C and the Ar3 transformation point. It is an essential feature of the proposed method that the rolling speed in the second rolling step is at least 1500 m/min. The metallurgical background to this is explained in column 5, paragraph 3 of document D1.

Now, the two temperature ranges given in D1 are very broad. Both cover the two phase austenite/ferrite region. Thus the phase requirements of steps "b" and "d" of claim 1 cannot be said to be directly taught by document D1. This forms the main basis for the positive decision on inventive step in the contested decision.

The newly cited documents D9 and D10, which are similar in content and stem from the same authors, teach the production of formable steel strip, in particular of deep-drawing quality, in which the strip is first hot rolled in the austenitic region and then warm rolled in the ferritic region. According to document D9 the strip is subsequently cold rolled to the finished product, so that the warm rolling replaces one of the customary cold rolling and annealing steps. In document D10, example II, the subsequent cold rolling is dispensed with completely.

The documents D9 and D10 would therefore appear to be of significant relevance to the question of how the person skilled in the art would have interpreted the broad temperature ranges given in document D1 when seeking to put the teachings of that document into practical effect, in particular as to whether he would be encouraged to perform the first rolling step in the austenitic region and the second rolling step in the ferritic region. It would therefore not be appropriate for these newly cited documents to be disregarded pursuant to Article 114(2) EPC.

In order to allow the parties the opportunity to argue their case fully before two instances the Board finds it appropriate in the present circumstances to remit the matter to the Opposition Division (see for example decision T 273/84, OJ EPO 1986, 346).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the fist instance for further examination.

The Registrar: The Chairman:

S. Fabiani F. Gumbel