BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

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

Datasheet for the decision of 6 November 2008

Case Number: T 0973/06 - 3.2.06

Application Number: 98959304.1

Publication Number: 1037721

IPC: B21B 1/46

Language of the proceedings: EN

Title of invention:
Process and device for producing a ferritically rolled steel strip

Patentee:
Corus Staal BV

Opponent:
ThyssenKrupp Steel AG

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0973/06 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 6 November 2008

Appellant: (Patent Proprietor)
Corus Staal BV
P.O. Box 10000
NL-1970 CA IJmuiden (NL)

Representative:
Hansen, Willem Joseph Maria
Corus Technology BV
Corus Intellectual Property Department
PO Box 10000
NL-1970 CA IJmuiden

Respondent: (Opponent)
ThyssenKrupp Steel AG
Kaiser-Wilhelm-Strasse 100
D-47161 Duisburg (DE)

Representative:
Simons, Johnannes
COHAUSZ & FLORACK
Patent- und Rechtsanwälte
Postfach 10 18 30
D-40009 Düsseldorf (DE)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 2 June 2006 revoking European patent No. 1037721 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: P. Alting Van Geusau
Members: M. Harrison
W. Sekretaruk

Summary of Facts and Submissions

I. With its decision posted on 2 June 2006, the Opposition Division revoked European patent number 1 037 721.

The opposition division found *inter alia* that the subject matter of claim 1 of the patent as granted lacked inventive step with regard to the following documents:

D1: DE-A-196 00 990
D2: EP-B-0 505 088

II. The appellant (proprietor) filed an appeal against this decision and cited *inter alia* the following further document in support of its case:

D4: DE 195 20 832

III. The respondent (opponent) requested dismissal of the appeal.

IV. In its communication of 30 September 2008, the Board mentioned *inter alia* which features of claim 1 it considered to be known from D1 and that the combination of the teaching of D2 with that of D1 to arrive at an endless rolling process as defined in claim 1 appeared to be an obvious step.

V. Oral proceedings were held before the Board on 6 November 2008.

The appellant's sole request was that the decision under appeal be set aside and the patent be maintained as granted.

The respondent confirmed its request for dismissal of the appeal.

VI. Claim 1 of the request reads as follows:

"Process for producing a ferritically rolled steel strip, in which liquid steel is cast in a continuous-casting machine (1) to form a slab and, utilizing the casting heat, is conveyed through a furnace device (7), undergoes preliminary rolling in a preliminary rolling device (10) and, in a final rolling device (14), is finishing-rolled to form the ferritic steel strip with a desired final thickness, characterized in that, in an endless or a semi-endless process, the slab is rolled in the austenitic range in the preliminary rolling device (10) and, after rolling in the austenitic range in the preliminary rolling device (10) and, after rolling in the austenitic range, is cooled to a temperature at which the steel has a substantially ferritic structure, and the strip is rolled, in the final rolling device (14), at speeds which substantially correspond to the speed at which it enters the final rolling device (14) and the following thickness reduction stages, and in at least one stand of the final rolling device (14), the strip is ferritically rolled at a temperature of between 850°C and 600°C, and, after leaving the final rolling device (14), is cooled rapidly to a temperature below 500°C thereby substantially avoiding recrystallization."

VII. The appellant's submissions may be summarised as follows:

Claim 1 differed over D1 in view of two features:
(1) the process is "an endless or semi-endless process",
(2) "the strip ... is cooled ... to a temperature below 500°C."

As regards feature (1), D1 concerned a coil-by-coil process. The use of a continuous casting rolling device ("kontinuierliche Gieß-Walzanlage") with further inline rolling as disclosed in D1 (see page 3, lines 32 to 34) however did not imply an endless process as had been incorrectly concluded by the opposition division. This was clear since e.g. D4 disclosed a continuous casting rolling device as in D1 but still used coil-by-coil rolling downstream. The patent itself explained that an endless process required the strips to be coupled together to allow endless rolling to occur; no coupling occurred in D1. Endless rolling had many advantages compared to coil-by coil rolling, in particular due to the increased homogeneity of the finished strip given by the constant rolling speed when compared to acceleration and deceleration of each strip required in a coil-by-coil process.

As regards feature (2), the cooling used in D1 to cool the ferritically rolled steel down to a temperature more than 150°C below the Ar1-temperature of about 710°C, did not mean that it was necessarily cooled below 500°C as claimed.

Whilst D2 disclosed an endless process, and indeed such processes were well known, the skilled person had no

reason to combine such a process with D1, since whilst D1 did not state that an endless process was excluded, it also made no mention of using an endless process. Since the advantages of such an endless process used with rapid cooling were evident, it is clear that endless rolling would have been mentioned had its advantages been understood.

As regards the second feature, it was to be noted that even small differences in one part of the steel production process were well known to play an important role on the finished steel strip characteristics.

Only with hindsight of the invention would the skilled person therefore combine the teaching of D2 with D1.

VIII. The respondent's arguments may be summarised as follows:

Even if D1 were considered not to disclose endless rolling, it was well known to the skilled person to use endless rolling with continuous casting due to the problems of using an entirely continuous process; D2 was just one example of how to join cast slabs and then roll continuously. The problem to be solved starting from D1 could thus be seen as simply providing a suitable known way to carry out the process disclosed in D1.

Whilst D1 did not state that the strip should be cooled to below 500°C, it did however state that it should be cooled at least 150°C below the Ar1-temperature and that the purpose was to freeze the structure so as to avoid recrystallization. This was exactly the same purpose as in the patent and as defined by the last

four words of claim 1. If the cooling process in D1 did not immediately result in the disclosed result at any temperature above 500°C it is obvious that the skilled person would merely cool to a lower temperature until the desired result was achieved. Also, no further effect than avoiding recrystallization by cooling to below 500°C was stated in the patent.

The subject matter of claim 1 thus lacked inventive step.

Reasons for the Decision

Inventive step

D1 discloses a process whereby continuous slab casting and rolling are used, resulting in a pre-rolled strip (see e.g. page 3, lines 32 to 34 and lines 40 to 43).

In the description of the opposed patent, the following is stated in column 5, lines 52 to 55:

"In an endless rolling process, the slabs, or, after preliminary rolling, strips are coupled together so that an endless rolling process can be carried out in the final rolling device".

Taking this explanation from the patent, to be a definition of the term "endless process" in claim 1, as submitted by the appellant, the Board concludes that D1 does not disclose such an endless process, since merely the use of a continuous casting and rolling device ("kontinuierliche Gieß-Walzanlage") would not

necessarily result in an endless process. Based on the disclosure in D4 (see e.g. the sole Figure and column 2, line 41 to column 3, line 38) the strips could theoretically be finishing-rolled in the process of D1 on a coil-by-coil basis.

The Board therefore concludes that D1 does not unambiguously disclose an endless process. Instead, D1 leaves open the matter of which process should be used for final rolling.

The presence of the further possibility defined in claim 1, namely a "semi-endless" process, does not need to be considered for the purposes of this decision, since this further possibility is defined only as an alternative to an "endless" process.

Regarding the second difference submitted by the appellant as being present when compared to D1, namely the cooling of the strip after finishing rolling to a temperature below 500°C, the Board concludes that D1 does not specify how much further than 150°C below the Ar1-temperature (about 710°C) the cooling process in D1 proceeds. Merely because the effect achieved is the same, it cannot be excluded that the cooling in D1 is stopped at a temperature somewhere between e.g. 500 and 550°C.

With these two differences in mind and starting from D1, the objective problem to be solved must be considered. These differences relate to different aspects of the process and will thus be considered separately.

With respect to the "endless process" feature, as stated above, D1 does not state how the final rolling process should be carried out after continuously casting and initially rolling the steel. Starting from D1, the objective problem to be solved by this first feature can thus be formulated as being to find a suitable way of carrying out the process of D1 while allowing production flexibility and while providing high productivity. It is well known in the art of steel production, as also admitted by the appellant, not to feed slabs or strips directly into a final rolling device in a continuous manner from a continuous casting machine, since this can result in production flexibility problems. To solve such problems it is well known, *per se*, that the cast slabs or strips are typically temporarily stored before rolling. To solve the problem of obtaining high productivity it is also known to join steel slabs or strips together before they are rolled and then to continuously roll them, as disclosed for example in D2 (see column 1, lines 5 to 22). Here it should be noted that the "continuous rolling" process described in D2 is identical to the "endless rolling" process in as far as this has been described in the patent.

Thus, when solving the aforementioned problems starting from D1, the skilled person knows from his general knowledge and also from the teaching of D2 that these problems would be solved.

The appellant's argument that the advantages of endless rolling if used in the process of D1 would be such that D1 would have mentioned this process had this ever been envisaged is found unconvincing, since this argument

does not take account of an objective problem/solution approach. Merely because D1 did not specify the use of an endless rolling process, and indeed did not specify any particular rolling process, would in no way deter a skilled person from using his own general knowledge, nor applying the teaching of D2 to arrive at the use of an endless process.

Therefore, nothing inventive can be seen in the feature of using "endless rolling" in the process according to claim 1.

As regards the second feature, whereby the cooling of the strip after finishing rolling is such that it proceeds to "a temperature below 500°C", this must be seen in conjunction with its purpose which is also defined in claim 1 as being "thereby substantially avoiding recrystallization". In D1 precisely this effect is also to be obtained by cooling the strip using strong cooling down to a temperature which is more than 150°C ("mehr als 150°C") below the Ar1-temperature. As long as this effect of avoiding recrystallization is achieved, there is no technical significance in providing further cooling. If it were not achieved sufficiently at about 150°C below the Ar1-temperature, it is self-evident that the skilled person would cool the strip further, especially as D1 states that the temperature should drop not only by 150°C but more specifically by more than 150°C.

The appellant's argument that small differences in a process can result in improved characteristics is in principle accepted. However, no disclosure exists in the patent or in any other filed evidence that the

temperature of 500°C is in any way advantageous or technically significant compared to the cooling disclosed in D1.

Thus, based on the evidence presented and the disclosure of D1, the Board also finds nothing inventive in cooling the strip to below 500°C.

Since neither of the aforementioned features provides anything inventive over D1, and the appellant did not submit that any other features of claim 1 differed over D1, the Board concludes that the subject matter of claim 1 lacks an inventive step. The requirements of Article 56 EPC 1973 are therefore not met.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Patin P. Alting van Geusau