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Datasheet for the decision of 23 November 2010

Case Number: T 0280/08 - 3.2.05

Application Number: 01929674.8

Publication Number: 1285127

IPC: D21G 1/00

Language of the proceedings: EN

Title of invention:
Method for calendering a board web

Patentee:
Metso Paper, Inc.

Opponent:
Andritz Küsters GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Novelty - yes"
"Inventive step - yes"

Decisions cited:
-

Catchword:
-

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Case Number: T 0280/08 - 3.2.05

D E C I S I O N
of the Technical Board of Appeal 3.2.05
of 23 November 2010

Appellant: (Opponent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 4 December 2007 rejecting the opposition filed against European patent No. 1285127 pursuant to Article 102(2) EPC 1973.**

Composition of the Board:

Chairman: W. Zellhuber
Members: H. Schram
M. J. Vogel

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the decision of the Opposition Division posted on 4 December 2007 rejecting its opposition against European patent No. 1 285 127.

The Opposition Division held that the grounds of opposition under Article 100(a) EPC (lack of novelty, Article 54 EPC, lack of inventive step, Article 56 EPC) did not prejudice the maintenance of the patent as granted.

II. Oral proceedings were held before the Board of Appeal on 23 November 2010.

III. The appellant requested that the decision under appeal be set aside and that the patent in suit be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed (main request), or, as an auxiliary measure, that the decision under appeal be set aside and the patent be maintained on the basis of any of the sets of claims filed as first and second auxiliary requests on 12 October 2007 and as third and fourth auxiliary requests on 25 October 2010.

IV. The sole claim 1 of the main request, ie claim 1 as granted, reads as follows:

"1. A method for calendering an uncoated board web (W) used for the manufacture of board grades known under the trade names White Lined Chipboard (WLC) and Folding Box Board (FBB) in a long nip (N) shoe calender formed

of a shoe roll (10) and a thermo roll (20), wherein a nip dwell time which is over 10 ms, advantageously over 20 ms, a nip pressure which is below 3 MPa, advantageously below 1 MPa, and a surface temperature of the thermo roll (20) which is over 200 °C, advantageously over 250 °C, are used, wherein the board web (W) surface to be pressed against the thermo roll (20) is moisturized before the nip (N) by spraying atomized water onto the board web (W) surface to be placed against the thermo roll (20) in an amount of 1-20 g/m^2 such that the time of action of the water before the nip is about 0.1-2 s, and wherein a calender belt (12) having a hardness of below 100 ShA, advantageously below 80 ShA, is used on the shoe roll (10)."

V. The documents referred to in the appeal proceedings included the following:

D1 *OptiDwell - The New Bulk Preserving Calendering Method*, Turtinen, P. and Tani, M., 1998 Paper Industry Technical Association (PITA) Annual Conference 1998, October 1998, Bolton, UK, pages 1 to 5, 55 to 59.

D9 WO 99/67462

VI. The arguments of the appellant, in writing and during the oral proceedings, can be summarized as follows:

Document D1 disclosed a method for calendering an uncoated board web (W) used for the manufacture of board grades comprising all the features of claim 1 as granted. The method known from document D1 was used to manufacture the board grade White-top Liner (WTL) (see

page 57, right column, line 7 from the bottom) and could be used to manufacture the board grades WLC and FBB, which were very similar to WTL. For a shoe length of from 50 to 270 mm and a speed of 800 to 1000 m/min, which was a common speed in board manufacture (cf document D9, page 7, lines 25 to 29), the nip time was from 3 to 20 ms. The nip pressure was in the range between 2 - 12 MPa, see page 56, right column, line 6 of section 4.1. The thermo-roll used in document D1 was of the same type of roll as used in soft calenders (see page 55, right column, lines 4 to 6 of section 3.1), which were known to be heated to 230°C. Moistening the web with water in an amount of 1-20 g/m^2 such that the time of action of the water before the nip was about 0.1-2 s was known from the prior art, see paragraph [0010] of the patent in suit. Finally, document D1 disclosed a very soft calender belt (91 ShA in section 4.1 on page 57; see also section 7 on page 59). The subject-matter of claim 1 as granted therefore lacked novelty with respect to document D1.

In respect of inventive step, the closest prior art document was document D9. This document disclosed a method for calendering paper or board, whereby the uncoated web was pre-calendered before it was coated (see page 1, lines 11 to 26), just as in the method according to the patent in suit. The effectiveness of calendering (glazing) for achieving good smoothness was based on the application of heat and wetting of the web, see page 2, lines 1 to 7. The advantages of using a shoe calender included a longer dwell time and a smaller compression load (see page 2, lines 7 to 17), which in turn preserved bulk and provided better gloss (see also page 7, lines 3 to 10). The parameter ranges

mentioned in claim 1 as granted were very broad and would be readily obtained by the person skilled in the art, since this merely involved optimising the parameter ranges known in the art. Increasing the temperature while keeping the nip pressure low was beneficial for saving the stiffness (see document D1, page 58, section 4.3, lines 1 to 11). Whereas a longer dwell time enabled using a lower nip pressure, because the time of action of the pressure on the web was fast, this was not true for the temperature since the effect of the temperature on the web took longer. This meant that when the temperature was relatively high, the effect of the temperature on the web was still restricted to the surface layer only, even for a long nip. The amount of water for moistening the web and the time of action of the water before the nip determined the moisture gradient in the web and were known in the art (see above, see also document D1, where a steam amount of 8 g/m^2 is mentioned in Figure 13 on page 59, left column). The advantages of extremely soft belt covers for preserving bulk were known from document D1. It followed that the subject-matter of claim 1 as granted did not involve an inventive step with respect to documents D9 and D1 and the general technical knowledge of the person skilled in the art.

VII. The arguments of the respondent, in writing and during the oral proceedings, can be summarized as follows:

The good calendering results of the invention were not based on some well-known parameters but achieved by calendering the web with a shoe calender in a parameter range that was contrary to the current preconception of a person skilled in the art at the time of filing of

the application (see paragraph [0015] of the patent in suit).

The only reference to board grades in document D1 was on page 57, right column, lines 6 to 8 from the bottom, where White-top Liner was mentioned in connection with Figure 11. Document D1 did not disclose the board grades known under the trade names White Lined Chipboard (WLC) and Folding Box Board (FBB) as recited in claim 1 as granted. Document D1 disclosed neither a nip dwell time > 10 ms, nor a nip pressure < 3 MPa (in Figure 4 the peak pressure was 8 MPa), nor a thermo roll temperature > 200°C (only temperatures of 140°C, 150°C, 180°C and 200°C were disclosed). Document D1 did not disclose that the web was moisturized before the nip (N) by spraying atomized water onto the board web in an amount of 1-20 g/m^2 and with a time of action of about 0.1-2 s. The only feature of claim 1 as granted that document D1 disclosed was the use of a long nip shoe calender in combination with a calender belt having a hardness of below 100 ShA. The subject-matter of claim 1 as granted was therefore clearly new with respect to document D1.

Document D9 represented the closest prior art. This document referred to the calendering of paper and board. The given parameters were in a very broad range. For example, the nip pressure was kept at 0 to 15 MPa, preferably at 4 to 12 MPa, while the nip dwell time was in between 3 and 40 ms. Nothing was mentioned in document D9 about using an extremely low nip pressure, ie below 3 MPa, in combination with a nip dwell time over 10 ms and also a very high thermal roll surface temperature over 200°C. Moreover, document D9 was

silent about the manufacture of WLC or FBB, and silent about the use of atomized water and the time of action of the water before the nip. A combination of document D9 and document D1 would not lead to all the features of claim 1 as granted. Consequently, the subject-matter of claim 1 as granted involved an inventive step.

Reasons for the Decision

MAIN REQUEST

1. Objection of lack of novelty, Article 54 EPC

1.1 Claim 1 of the main request relates to a method for calendering an uncoated board web used for the manufacture of board grades known under the trade names White Lined Chipboard and Folding Box Board in a long nip shoe calender formed by a shoe roll and a thermo roll. A long nip calender is a calender in which a nip is formed between a heatable steel roll and a belt, cf paragraph [0013] of the patent in suit. Claim 1 of the main request defines parameter ranges (labelled (a) through (f) by the Board) for the following six physical quantities: (a) the nip dwell time; (b) the nip pressure; (c) the surface temperature of the thermo roll; (d) the amount of atomized water sprayed onto the board web before the nip; (e) the time of action of the water before the nip; and (f) the hardness of the calender belt.

The established case law of the Boards of Appeal of the EPO holds that for an invention to lack novelty its subject-matter must be clearly and directly derivable

from a single piece of prior art. If the claimed subject-matter pertains to numerical values of, or ranges for, physical quantities, these values or ranges must be clearly and directly derivable *in combination* from said prior art, it not being permissible to combine values or ranges pertaining to different embodiments, unless it is explicitly disclosed that embodiments may be combined.

In the following it is investigated whether the parameter ranges for (a) the nip dwell time, (b) the nip pressure, and (c) the surface temperature of the thermo roll are known *in combination* from document D1 (leaving aside the quantities (d) to (f)).

1.2 Document D1 discloses a calendering concept named OptiDwell™. The OptiDwell™ method is based on the use of a shoe calender having a length of 50 to 270 mm providing a long dwell time, and the use of a soft elastic belt (see section 1 (Abstract), lines 1 to 10 and section 3.1 (OptiDwell Shoe™), lines 10 to 13).

In the penultimate sentence of section 4.1 (Nip dwell time and pressure - bulk preservation), see page 57, right column, a hardness of the calender belt of 91 ShA is disclosed (cf the last feature of claim 1 of the main request). In the first sentence of section 4.1, see page 56, right column, it is stated that "[in] a shoe calender, the nip dwell time depends solely on the length of the shoe". It is clear that this is true for a given operating speed. A particular value or range for the nip dwell time, or for the operating speed, is not disclosed in section 4.1. The thermo roll temperature is given as 180°C, see the last line of

section 4.1 on page 57, right column. In lines 5 and 6 of section 4.1 it is stated that "[the] nip pressure is adjusted using a linear loading and the tilt of the shoe and can vary between 2 - 12 MPa". In the judgment of the Board the expression "nip pressure ... can vary" must be construed as meaning that the nip pressure distribution in a shoe calender can vary between a low value (eg 2 MPa) at the entry of the nip and a high value at the exit of the nip, depending on the tilt of the shoe (eg 8 MPa and 12 MPa for a low and a high tilt, respectively, see page 56, right column, lines 15 to 19, and Figure 4). Document D1 does not clearly and directly disclose that the peak value of the nip pressure distribution can be kept at 2 MPa.

Section 4.1 of document D1 thus fails to disclose a nip dwell time over 10 ms, a nip pressure which is below 3 MPa, and a surface temperature of the thermo roll which is over 200°C.

The appellant argued that since the length of the shoe varied from 50 to 270 mm, a nip time of 3 to 20 ms was obtained for a speed of 800 to 1000 m/min, which was common in board manufacture (cf document D9, page 7, lines 25 to 29).

However, a speed of 800 to 1000 m/min is nowhere disclosed in document D1. In section 4.2 of document D1 (see page 58, left column, lines 7 to 11) an operating speed of the long nip calender of 350 m/min (nip dwell time 7.4 ms) is disclosed (and only in combination with calendering of a *coated* board, a thermo-roll temperature of 140°C and a nip pressure of 9,3 MPa, see also Table 1 on page 58, left column).

Whilst in section 4.3 of document D1 a surface temperature of the thermo roll of 200°C is disclosed (which is strictly speaking not encompassed by claim 1 of the main request) this temperature is only disclosed in connection with a *coated* packaging board, see Figure 12 on page 58.

It follows that document D1 does not disclose, in combination, "a nip dwell time which is over 10 ms", "a nip pressure which is below 3 MPa", and "a surface temperature of the thermo roll which is over 200 °C", as recited in claim 1 of the main request.

1.3 For the above reasons the subject-matter of claim 1 of the main request is new with respect to document D1.

2. *Objection of lack of inventive step, Article 56 EPC*

2.1 The invention relates to a method for calendering an uncoated board web (W) used for the manufacture of board grades known under the trade names White Lined Chipboard (WLC) and Folding Box Board (FBB). In the prior art, a Yankee cylinder, or a wet stack calender, is generally used in the manufacture of stiff board grades. The problem that the invention seeks to solve is to provide a method wherein the Yankee cylinder, or the wet stack calender, is replaced by an improved arrangement, eg by a long nip calender, which gives good calendering results (good smoothness while preserving bulk, ie without losing too much bulk).

This problem is solved by the method according to claim 1 of the main request, ie by using a long nip

calender and operating it in the parameter ranges as recited in claim 1 of the main request, in particular by using a long nip dwell time, an extremely low nip pressure and a high surface temperature of the thermo roll.

2.2 Document D9, which is cited in paragraph [0008] of the patent in suit, represents the closest prior art. This document discloses a method for calendering paper or board in two stages (see page 4, lines 1 to 3, and page 5, line 32, to page 7, line 29). In the first stage, ie the pre-calendering stage, the uncoated web is pre-calendered with a shoe calender having a shoe length of at least 50 mm after which the web is coated. In the second stage the coated web is calendered with a calender having a nip length of 50 mm at the most. The maximum pressure in the pre-calendering nip is kept at 0 to 15 MPa, preferably at 4 to 12 MPa. The web is pre-calendered at a moisture and at a temperature, at which at least the glass transition temperature of the web surface part has been reached. The web may be pre-treated eg by steaming and/or wetting with water, or a combination of pre-wetting and the use of a heated backing roll in the shoe calender, whereby the temperature of the web surface reaches at least the glass transition temperature of the cellulose fibres. The dwell time of the web in the calender is in the range from 3 to 40 ms.

On page 6, lines 27 to 31, it is stated that "*The lower limit of the pressure range is reached, for example, such that the calendering zone is formed between at least two belts stretched by belt guiding means, and a*

stop surface, and the upper limit e. g. by so called shoe calender technology".

In the judgment of the Board, it cannot fairly be said that document D9 teaches "a nip pressure which is below 3 MPa" for pre-calendering the uncoated web with a shoe calender. Document D1, too, fails to teach the use of a nip pressure which is below 3 MPa, see point 1.2 above.

It follows that neither of the prior art documents suggests, or hints at, the solution to the problem of providing a method based on a long nip calender giving good calendering results which includes the combination of the following features: using a long nip dwell time (> 10 ms), a very low nip pressure (< 3 MPa) and a high surface temperature of the thermo roll (> 200°C).

2.3 The subject-matter of claim 1 of the main request is therefore not obvious to the person skilled in the art, and hence involves an inventive step, Article 56 EPC.

3. Since the claims of the main request are allowable, there is no need to consider any of the auxiliary requests of the respondent.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Schalow W. Zellhuber