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**Datasheet for the decision
of 28 January 2009**

Case Number: T 1748/06 - 3.2.07

Application Number: 99931334.8

Publication Number: 1121487

IPC: D21G 1/00

Language of the proceedings: EN

Title of invention:

Method and arrangement for calendering paper and board before and after coating

Patentee:

Metso Paper, Inc.

Opponent:

Andritz Küsters GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 56

Relevant legal provisions (EPC 1973):

-

Keyword:

"Inventive step - (no all requests)"

Decisions cited:

-

Catchword:

-



Case Number: T 1748/06 - 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 28 January 2009

Appellant:
(Opponent)

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Respondent:
(Patent Proprietor)

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Decision under appeal:

Decision of the Opposition Division of the
European Patent Office posted 21 September 2006
rejecting the opposition filed against European
patent No. 1121487 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: H. Meinders
Members: P. O'Reilly
I. Beckedorf

Summary of Facts and Submissions

- I. Opposition was filed against European patent No. 1 121 487 as a whole based on Article 100(a) EPC (lack of novelty and lack of inventive step).

The opposition division rejected the opposition. It held that the subject-matter of each of claims 1 and 9 of the main request (maintenance unamended) was novel and involved an inventive step.

- II. The appellant (opponent) filed an appeal against that decision.

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

The respondent (patent proprietor) requested that in setting aside the decision under appeal, the patent be maintained in amended form on the basis of the set of claims filed as 3rd auxiliary request with letter dated 23 December 2008 (main request), or on the basis of one of the sets of claims filed as 4th and 5th auxiliary request with letter dated 23 December 2008 or on the basis of the set of claims filed as 6th auxiliary request with letter dated 29 December 2008.

- IV. Oral proceedings were held before the Board on 28 January 2009. During the oral proceedings the respondent withdrew its previous main request and first and second auxiliary requests and made its third auxiliary request into its new main request which is the main request to which reference is made in this decision.

The numbering of the remaining fourth to sixth auxiliary requests has not been changed.

V. The independent claims of the **main** request read as follows (amendments when compared to the corresponding claims of the **patent as granted** are depicted in bold or struck through):

"1. A method for calendering paper and board when manufacturing coated grades of paper or board, comprising calendering at least one of the surfaces of an uncoated base material web, applying at least one layer of coating at least onto the calendered surface of the base web, and calendering at least the coated surface of the base web, calendering the coated surface of the base web by means of a calender having a nip length of 50 mm at the most,

characterized ~~by~~ **in that**

~~calendering~~ the uncoated surface of the base web **is calendered** by means of a shoe calender having a nip length ~~of at least~~ **exceeding** 50 mm **and in that, during the calendering that is performed before coating, the web is subjected to treatment in a treatment zone of the shoe calender and in that the fibres forming the web are subjected to treatment in said zone during which the pressure in the treatment zone rises to 15 MPa at the most and the temperature of the web surface reaches at least the glass transition temperature of the cellulose fibres.**"

"~~9~~7. An arrangement for calendering paper and board in the manufacture of coated grades of paper or board, the

arrangement comprising at least one first calender for treating at least one of the surfaces of an uncoated base material web, means for coating at least the calendered surface of the base web with at least one coating mix layer, and at least one second calender for treating at least the coated surface the base web, the second calender is a calender having a nip length of 50 mm at the most,

characterized in that

the first calender is a shoe calender having a nip length ~~of at least~~ **exceeding** 50 mm **and in that the first calender comprises a backing roll that is arranged to be heated.**"

The independent claim of the **fourth** auxiliary request reads as follows (amendments when compared to the corresponding claim of the **main** request are depicted in bold or struck through):

"1. A method for calendering paper and board when manufacturing coated grades of paper or board, comprising calendering at least one of the surfaces of an uncoated base material web **formed by cellulose fibres**, applying at least one layer of coating at least onto the calendered surface of the base web, and calendering at least the coated surface of the base web, calendering the coated surface of the base web by means of a calender having a nip length of 50 mm at the most,

characterized in that

the uncoated surface of the base web is calendered by means of a shoe calender having a nip length exceeding 50 mm and in that, during the calendering that is performed before coating, ~~the web is subjected to treatment in a treatment zone of the shoe calender and in that~~ the fibres forming the web are subjected to treatment in **said a treatment zone of the shoe calender** during which the pressure in the treatment zone rises to 15 MPa at the most and the temperature of the web surface reaches at least the glass transition temperature of the cellulose fibres."

The independent claim of the **fifth** auxiliary request reads as follows (amendments when compared to the corresponding claim of the **patent as granted** are depicted in bold or struck through):

"1. A method for calendering paper and board when manufacturing coated grades of paper or board, comprising calendering at least one of the surfaces of an uncoated base material web, applying at least one layer of coating at least onto the calendered surface of the base web, and calendering at least the coated surface of the base web, calendering the coated surface of the base web by means of a calender having a nip length of 50 mm at the most,

characterized ~~by~~ **in that**

~~calendering~~ the uncoated surface of the base web **is calendered** by means of a shoe calender having a nip length of at least 50 mm **and in that the web is taken to a calender before coating in a state in which the glass**

transition temperature of at least its surface fibres has been reached."

The independent claim of the **sixth** auxiliary request reads as follows (amendments when compared to the corresponding claim of the **fourth** auxiliary request are depicted in bold or struck through):

"1. A method for calendering paper and board when manufacturing coated grades of paper or board, comprising calendering ~~at least~~ one of the surfaces of an uncoated base material web formed by cellulose fibres **such that this surface becomes a calendered surface**, applying at least one layer of coating ~~at least~~ onto the calendered surface of the base web **such that the calendered surface becomes a coated surface**, and ~~calendering at least the coated surface of the base web~~, calendering the coated surface of the base web by means of a calender having a nip length of 50 mm at the most,

characterized in that

the uncoated surface of the base web is calendered by means of a shoe calender having a nip length exceeding 50 mm and in that, during the calendering that is performed before coating, **the web is subjected to treatment in a treatment zone of the shoe calender and in that** the fibres forming the web are subjected to treatment in **said** ~~a treatment zone of the shoe calender~~ during which the pressure in the treatment zone rises to 15 MPa at the most and the temperature of the web surface reaches at least the glass transition temperature of the cellulose fibres."

VI. The documents of the opposition proceedings cited in the present decision are the following:

D1: WO-A-96/28609

D3: Wochenblatt für Papierfabrikation 21, 1997,
page 1050, Neue Produkte, Langnipkalandierung für
Karton

of the appeal proceedings:

D13: WO-A-97/13035

D14: EP-A-0 141 614

VII. The relevant arguments of the appellant may be summarised as follows:

- (i) There are no objections to any of the amendments made to the claims of the requests.
- (ii) The subject-matter of claim 1 of the main request lacks an inventive step. The nearest prior art document is D1 which discloses all the features of the preamble of claim 1. D1 indicates that precalandering would be performed in special cases where particular surface properties are required (cf. page 5, lines 14 to 15). In order to do this whilst minimising the extra amount of material required the skilled person would chose a long nip calender since this allows a surface treatment at a lower pressure so that there would be less volume loss. D3 discloses a long nip calender which allows surface treatment without volume loss in the form of a shoe calender with a nip length of 50 to 70 mm, i.e. exceeding 50 mm.

The feature of claim 1 that the maximum surface pressure for the web is 15 MPa does not form the basis for a selection invention since there is no minimum value given. The skilled person wishing to avoid volume loss would minimise the required pressure since higher pressure increases volume loss with consequent loss of stiffness.

It is also self-evident to the skilled person that when surface properties of the paper or board web are to be permanently affected it is necessary to carry out the treatment above the glass transition temperature of the web fibres. Otherwise, as a result of the viscoelastic properties of the paper or board web, after it leaves the nip the surface of the web will return elastically to the form it had before entering the nip.

The skilled person would therefore apply the teaching of D3 and his general knowledge to the method disclosed in D1 and would arrive at a method in accordance with claim 1 of the main request.

(iii) The subject-matter of each claim 1 of the auxiliary requests also lacks an inventive step. The amendments made to these claims do not add any essential features and in the case of the fifth auxiliary request claim 1 it may even be broader than claim 1 of the main request.

VIII. The relevant arguments of the respondent may be summarised as follows:

- (i) A basis for all the amendments to the claims of the requests may be found in the application as originally filed.

- (ii) The subject-matter of claim 1 of the main request involves an inventive step. It is clear from D1 that there should only be a postcalendering. Even when a precalendering is mentioned it is stated that this can be carried out with any calender so that it is unimportant to the invention of D1. Indeed, it is indicated that employing precalendering could result in a loss of the savings achieved by the invention of D1. The statement regarding employing any calender does not give any information to the skilled person about the actual calender to be used; in particular there is no indication to use a shoe calender with a nip length exceeding 50 mm. There is therefore no reason for the skilled person to consider the calender disclosed in D3 as being suitable for this purpose. If the skilled person were to consider the teaching of D3 he would likely use the calender disclosed therein also for the postcalendering step in the method disclosed in D1 which would result in both calenders having a length of more than 50 mm.

Even if the skilled person considered employing the shoe calender known from D3 there is no indication therein that the pressure should be kept below 15 MPa; it could just as well be kept above 15 MPa.

There is also no indication in D1 or D3 that the temperature of the web surface should be kept above the glass transition temperature of the fibres in the web.

(iii) The claims of the fourth auxiliary request are similar to those of the main request though there are no apparatus claims. Therefore any possible objections to the apparatus claims of the main request do not apply to this request.

Claim 1 of the fifth auxiliary request is a combination of claims 1 and 7 as originally filed. There is therefore no doubt as to the original disclosure of the subject-matter of these claims.

The claims of the sixth auxiliary request are similar to those of the fourth auxiliary request except that claim 1 has been amended to make it clear that it is the same surface that is precalendered, coated and then postcalendered. This is intended to remove any doubts on this point.

IX. In a communication from the Board in preparation for the oral proceedings it had indicated that it was not inclined to admit D13 and D14 which were filed by the appellant along with its appeal grounds since the appellant had not indicated the reasons for their late filing and their relevance. At the oral proceedings the appellant indicated that it did not wish to rely on these documents.

Reasons for the Decision

All requests

1. *Allowability of the amendments to the claims*

The appellant raised no objections to the amendments to the claims with regards to Articles 83, 84, 123(2) and 123(3) EPC. The Board also saw no need to raise any objections.

Main request (originally filed as third auxiliary request)

2. *Inventive step*

2.1 As is agreed by the parties the closest prior art document is D1 which discloses the features of the preamble of claim 1. In particular, the feature of the claim that the coated surface of the base web is calendered by means of a calender having a nip length of 50 mm at the most is disclosed on page 3, lines 24 to 25 wherein the ranges of 3 to 10 cm and 4 to 8 cm are disclosed for the nip length of the calender used after coating.

2.2 The subject-matter of claim 1 is distinguished over the method disclosed in D1 by the features that:

(a) the uncoated surface of the base web is calendered before coating by means of a shoe calender having a nip length exceeding 50 mm, and

(b) during this calendering the fibres forming the web are subjected to treatment in the treatment zone of the shoe calender during which

(b1) the pressure in the zone rises to 15 MPa at the most and

(b2) the temperature of the web surface reaches at least the glass transition temperature of the cellulose fibres.

- 2.3 According to the appellant the objective problem to be solved by the distinguishing features of the claim is to avoid losing the savings of raw material achieved by the method disclosed in D1 when the optional use of pre-calendering mentioned in D1 is applied.

The Board agrees with the appellant regarding the objective problem. D1 is principally directed to a method in which the only calendering is carried out by an extended nip calender after the coating stage (cf. page 2, line 32 to page 3, line 8). This has the effect of saving on raw materials (cf. page 3, lines 6 to 8). However, in D1 it is explained that there may be special circumstances in which precalendering would be preferred such as high demands for surface properties (cf. page 5, lines 14 to 15). Although this precalendering is preferred in these special circumstances it is explained in D1 that this has the disadvantage that the savings made in raw materials will be less in this case (cf. page 5, lines 15 to 16). It is therefore plausible that in the said special circumstances of applying precalendering the skilled person will seek to minimise the mentioned loss in savings of raw material.

- 2.4 With regard to the solution to the problem, D1 contains the general instruction that the precalendering may be performed "with any type of calender" (cf. page 5, lines 17 to 18). The Board understands this to mean that there is no restriction as to the size and type of

calender that will be chosen by the skilled person as a function of the material being processed and the result to be achieved.

Since precalendering is generally intended to influence the surface properties before coating it must necessarily involve exerting pressure on the web. This pressure can lead to an increase in density and a loss of volume, i.e. reduction in thickness. The stiffness of board is, however, dependent upon volume in that a reduction in volume leads to thinner board which is less stiff. If the stiffness of the board is to be maintained then it would be necessary to increase the grammage of the input material which leads to the loss of savings mentioned in D1.

From these considerations the skilled person understands that it is desirable to minimise the pressure necessary to achieve the desired surface changes. It is also known to the skilled person that surface changes are enhanced by heat and that high pressures can be avoided by allowing the pressure and heat to act over a longer time period on the web. The treatment time of the web by a calender can be increased either by slowing the web speed or by increasing the length of the calender nip. It is clear that slowing the web increases production costs which is undesirable. Therefore the skilled person will seek to increase the length of the calender nip.

- 2.4.1 D3 discloses a type of calender whose nip can have an increased length. It is a long-nip shoe calender which has a nip length of 50 to 70 mm. The calender is formed by a thermo-roll and a shoe roll. It is stated in D3 that such a calender maintains the volume whilst

improving the print quality. It is also indicated that the long-nip calender has the same improvement to the constancy of surface characteristics as was the result when changing from hard-nip calendars to soft-nip calendars. It is further explained that the improved constancy in the microroughness of the surface leads to better printing.

It is thus clear to the skilled person that the employment of a shoe calender as disclosed in D3 would be appropriate when the surface characteristics are being considered and there is a desire to maintain volume.

This obvious employment of the calender disclosed in D3 in an arrangement according to D1 as the precalender would result in the feature (a) indicated above.

- 2.4.2 The respondent argued that if the skilled person considered D3 and employed the calender disclosed therein then he would also employ it for the postcalendering and thus this would result in a method with a nip length for postcalendering that is outside the length specified in claim 1. The Board can agree with the respondent that if the preferred nip length of D1 of 6 to 7 cm is considered that is specified on page 3, lines 24 to 25 then the calender disclosed in D3 could be considered by the skilled person for postcalendering. However, as explained in point 2.1 above that paragraph of D1 also discloses preferred ranges of 3 to 10 cm and 4 to 8 cm for which the skilled person would not consider the calender disclosed in D1 in view of the lower values of these ranges.

2.5 Feature (b1) specifies a maximum limit for the pressure to which the web is subjected. As already explained above, the skilled person seeks to avoid a high pressure so as to avoid a loss of volume. There is no indication that the specific limit of 15 MPa has any significance which could possibly lend support to a selection invention. Therefore this limitation in the maximum pressure must be considered to be obvious to the skilled person.

2.6 Feature (b2) relates to the treatment temperature of the web of cellulose fibres as a function of its glass transition temperature. D1 discloses on page 3, lines 27 to 32 that its process is applied to a cellulose web. It is also indicated in D1 that the purpose of the precalender is to affect the surface properties (cf. page 5, lines 14 to 15). It is clear that this change in the surface properties must be permanent. Paper and board are made up of cellulose fibres, i.e. viscoelastic substances, which means that for any changes in their form to be permanent they must take place above the glass transition temperature; otherwise they will return elastically to their original shape when the pressure source is removed.

The skilled person would thus ensure that the precalendering is done above this glass transition temperature. It would not require any extra considerations with regard to the necessary apparatus since it is already disclosed in D3 that the shoe calender has a heated backing roll so that it is just a matter of setting an appropriate temperature for this backing roll.

2.7 Therefore, the subject-matter of claim 1 of the main request does not involve an inventive step in the sense of Article 56 EPC.

Fourth auxiliary request

3. *Inventive step*

3.1 The claims of the fourth auxiliary request differ from those of the main request essentially in that the apparatus claims 7 to 11 contained in the main request are no longer present in this request.

3.2 Claim 1 of this request is essentially the same as claim 1 of the main request. Therefore, the subject-matter of claim 1 of the fourth auxiliary request does not involve an inventive step in the sense of Article 56 EPC for the same reasons as explained with respect to the main request.

Fifth auxiliary request

4. *Inventive step*

4.1 Claim 1 of the fifth auxiliary request differs from claim 1 of the main request in that:

instead of "exceeding 50 mm" it is indicated that the shoe calender has a nip length of "at least 50 mm",

and the limitations to a pressure in the treatment zone of 15 MPa at the most and to cellulose fibres are not present.

Claim 1 of this request is thus broader in scope than claim 1 of the main request.

- 4.2 Therefore, the subject-matter of claim 1 of the fifth auxiliary request does not involve an inventive step in the sense of Article 56 EPC for the same reasons as already explained above with respect to the main request.

Sixth auxiliary request

5. *Inventive step*

- 5.1 Claim 1 of the sixth auxiliary request differs from claim 1 of the fourth auxiliary request in that the wording "such that this surface becomes a calendered surface" and "such that this surface becomes a coated surface" has been added.

The purpose of these amendments is to make it certain that it is the one and the same surface that is precalendered, coated and postcalendered. In the discussion above regarding inventive step in claim 1 of the main request and, as a consequence, of the fourth auxiliary request it was already assumed that precalendering, coating and postcalendering treatments were all effected on the same surface.

The discussion of inventive step for claim 1 of the main and fourth auxiliary requests hence also applies to this request.

- 5.2 Therefore, the subject-matter of claim 1 of the sixth auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

G. Nachtigall

H. Meinders