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Datasheet for the decision of 29 January 2008

Case Number: T 0377/06 - 3.2.05

Application Number: 97946772.7

Publication Number: 0943034

IPC: D21F 5/04

Language of the proceedings: EN

Title of invention:
Method for drying of paper and dry end of a paper machine

Patentee:
Metso Paper, Inc.

Opponent:
Voith Paper Patent GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56, 123(2),(3)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Added subject-matter (main request, no)"
"Extension of protection (main request, no)"
"Inventive step (main request, yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0377/06 - 3.2.05

D E C I S I O N
of the Technical Board of Appeal 3.2.05
of 29 January 2008

Appellant: (Opponent)	Voith Paper Patent GmbH St. Pöltener Strasse 43 D-89522 Heidenheim (DE)
Representative:	Kurz, Günther Manitz, Finsterwald & Partner GbR Postfach 31 02 20 D-80102 München (DE)
Respondent: (Patent Proprietor)	Metso Paper, Inc. Fabianinkatu 9 A FI-00130 Helsinki (FI)
Representative:	TBK-Patent Bavariaring 4-6 D-80336 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted 24 February 2006 concerning maintenance of European patent No. 0943034 in amended form.**

Composition of the Board:

Chairman: W. Zellhuber
Members: P. Michel
M. J. Vogel

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the interlocutory decision of the Opposition Division maintaining European patent No. 0 943 034 in amended form.

II. The Opposition Division was of the opinion that the claims of the patent in suit as granted did not satisfy the requirements of Article 123(2) EPC, but maintained the patent in suit in accordance with a first auxiliary request of the respondent (patentee).

III. Oral Proceedings were held before the Board of Appeal on 29 January 2008.

The appellant requested that the decision under appeal be set aside and that the European Patent No. 0 943 034 be revoked.

The respondent requested that the appeal be dismissed or, as an auxiliary request, that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the documents filed as second auxiliary request on 17 January 2006 during oral proceedings.

IV. Claims 1 and 13 as maintained by the Opposition Division read as follows:

"1. A method for drying of paper, which method comprises the following steps:

a) the paper web (W) to be dried is passed from the press section into a forward dryer section (D_1), in which the paper web (W) is dried from the side of its bottom face in dryer groups ($R_{1…}R_N$) that apply a normal single-wire draw, said forward dryer section (D_1) comprising exclusively single-wire groups ($R_{1…}R_N$) with normal single-wire draw,

b) from the forward dryer section (D_1) the paper web (W) is passed into a finishing section (D_2), in which the paper web (W) is coated/surface-sized by means of a coating/surface-sizing equipment (20), dried in an after-dryer section (30), in which the paper web (W) is dried in at least one dryer group (R_{21}) that applies a normal single-wire draw, after which the paper web (W) is calendered in a calender (40) and passed to a reeling station (50), in which the paper web (W) is reeled into a machine reel (MR), and

c) the curling of the paper web is controlled by means of elements (19;32;33;34;35;36;D_{syl},D_{tela}) and/or by means of assemblies and combinations formed out of said elements and by means of at least one steam box (31) at least in the area of the finishing section (D_2),

characterized in that, in the method, the condensation of the steam fed by said steam box is intensified by cooling the web prior to said steam box, by using a cooling cylinder with adjustable temperature."

"13. A dry end of a paper machine, which comprises a forward dryer section (D_1) and a finishing section (D_2), which finishing section (D_2) comprises a coating/surface-sizing equipment (20), an after-dryer

(30), a calender (40), and a reeling station (50), and the dry end of a paper machine further comprises elements (19;32;33;34;35;36;D_{syl},D_{tela}) and/or assemblies and combinations formed out of said elements and at least one steam box (31) in view of controlling the curling of the paper web (W) at least in the area of the finishing section (D_2), **characterized in that** said dry end of a paper machine comprises a cooling cylinder of adjustable temperature for lowering the temperature of the web (W) prior to said steam box in order to intensify the condensation of the steam fed by said steam box."

V. The following documents are referred to in the present decision:

D1: EP-A-0 726 353

D7: DE-A-41 12 537

D10: Leaflet "Calendizer - System Manual Set", Devron-Hercules, March 1990

D11: "Glättwerksuntersuchungen - Zusammenhänge zwischen Glättparametern und Messgrößen", Krenkel, Thesis at the Fakultät für Maschinenwesen und Elektrotechnik der Technischen Hochschule Graz, Heidenheim, 28 October, 1975, pages 43 to 46 and 141 to 144

D13: "The Role of Nip Temperature and Surface Moisture in the Calendering and Supercalendering Processes",Jackson et al, Svensk Papperstidning, No. 5, March 1966, pages 131 to 138

D15 and D16: Drawings relating to a paper machine which is the subject of an alleged prior use

VI. The appellant's arguments in connection with the main request in the written and oral proceedings can be summarised as follows:

The deletion of the wording "i.e. cooling/heating cylinders" at column 6, line 55, of the patent in suit as amended enables the references to an adjustable temperature to be construed as requiring a greater degree of adjustment than merely switching between two values. Such a greater degree of adjustment is not disclosed in the application as filed. The requirements of Article 123(2) EPC are thus not satisfied.

In addition, the deletion of this wording gives rise to a different interpretation of claims 1 and 13, which results in an extension of protection, so that the requirements of Article 123(3) EPC are also not satisfied.

The closest prior art is document D1. In the apparatus shown in this document, it is inevitable that cooling takes place at the reversing cylinders 11 which exert a suction effect on the web. The independent claims do not specify the degree of cooling, nor that the cooling cylinder is spaced from the steam box. The reversing cylinders can thus be regarded as cooling cylinders. In addition, in view of the fact that condensation takes place at the steam box, it is implicit that the web must be cooled to the dew point.

The reference in claims 1 and 13 to an adjustable temperature merely refers to the possibility of heating or cooling and do not mean that the cooling temperature can be adjusted. In addition, the claims as maintained include the case in which the cooling cylinder merely contributes a small amount to the cooling of the web.

The problem to be solved is to provide an alternative form of cooling cylinders.

The solution to this problem is provided in the prior use described in the grounds of opposition, or any of documents D7, D10, D11 or D13.

In the prior use, cylinders 26 to 31 as shown in documents D15 and D16 are cooling cylinders.

Document D7 also discloses a suitable cooling cylinder arranged in a housing which is full of steam, so that condensation occurs on the web downstream of the cooling cylinders.

Document D10 discloses the desirability of increasing the temperature difference between the web and the steam at page 2, second paragraph.

Document D11 in the paragraph common to pages 43 and 44 and document D13 at page 138, right hand column, lines 9 to 13, disclose cooling of the web before heating and moisturisation with steam.

The subject-matter of claims 1 and 13 thus lacks an inventive step in view of the disclosure of document D1 either alone, or in combination with the prior use

described in the grounds of opposition, or any of documents D7, D10, D11 or D13.

VII. The respondent's arguments in connection with the main request in the written and oral proceedings can be summarised as follows:

Claims 1 and 13 are distinguished over the disclosure of the closest prior art represented by document D1 by virtue of the features of the respective characterising clauses. These features enable control of paper curling and are not suggested by the prior art.

The suction supplied to the reversing rolls of document D1 serves to hold the web on the roll. It would not produce a cooling effect.

The drawings relating to the alleged prior use do not show any cooling cylinders.

Document D7 merely shows a method in which a web is cooled by cooling rolls on which condensation takes place before calendering. There is no suggestion of cooling associated with a steam box and the document is not concerned with problems associated with curling.

Document D10 proposes the use of steam to raise the temperature before calendering.

The cited passage in document D11 is merely an acknowledgement of document D13. These documents are concerned with calendering and not the problem solved by the invention of the patent in suit.

The subject-matter of claims 1 and 13 thus involves an inventive step.

Reasons for the Decision

1. *Main Request*

1.1 Amendments

1.1.1 Articles 123(2) EPC

In the description of the patent in suit as maintained by the Opposition Division, a passage at column 6, lines 47 to 55, was deleted. This passage was present in the application as filed (published version) at page 8, lines 24 to 30. It was suggested on behalf of the appellant that the deletion of the words "i.e. cooling/heating", which occur at the end of this passage, results in an extension beyond the content of the application as filed. This objection is based on the suggestion that references in the application as filed to "cylinders with adjustable temperatures" would be understood as referring to cylinders only having two possible temperatures, one for heating the web and the other for cooling the web.

In the application as filed, it is disclosed at page 16, lines 11 and 12, that "of the drying cylinders 10, three cylinders are cylinders C with adjustable temperature, so that they can be used as cooling or heating cylinders". At page 17, lines 12 to 16, it is disclosed that "by means of a combination of steam boxes 31 and adjustable-temperature cylinders C, a

particularly efficient combination is achieved, because, the hotter the web W is, the less readily is the steam condensed, in which connection, when cooling cylinders are used, efficient condensation of the steam is obtained."

The application as filed thus contains a disclosure of cooling cylinders whose temperature can be adjusted, whereby, when that temperature is below that of the web, cooling occurs and when that temperature is above that of the web, heating occurs. There is thus no suggestion in the application as filed that the cooling cylinders can have only two temperature states.

The amendments thus satisfy the requirement of Article 123(2) EPC.

1.1.2 Article 123(3) EPC

Claim 1 as granted specifies that "the effect of the steam box is intensified by cooling the web prior to said steam box". In claim 1 according to the main request, it is specified that "the condensation of the steam fed by said steam box is intensified by cooling the web prior to said steam box, by using a cooling cylinder with adjustable temperature."

The amendments thus have the effect of restricting the effect to that of condensation of the steam, and restricting the method of cooling to using a cooling cylinder with adjustable temperature. A corresponding amendment occurs in claim 13. The amendments thus do not extend the protection conferred by the claims and

accordingly comply with the requirements of Article 123(3) EPC.

1.2 Inventive Step

1.2.1 Closest Prior Art

The closest prior art is represented by document D1, and, in particular, the embodiment illustrated in Figures 11 and 11A. These figures illustrate a paper machine dry end which includes steam boxes (43S and 44S) in the area of the finishing section (D_2), as well as a steam box (45S) in the forward dryer section, for controlling the curling of the paper web (see column 21, lines 3 to 15).

It was suggested on behalf of the appellant that the reversing cylinder 11 around which the web passes as it is subjected to steam from the steam box 45S could be considered as being a cooling cylinder. The reversing cylinders 11 are provided with a grooved mantle 12 which is supplied with negative pressure so as to retain the web on the cylinders (see column 12, lines 19 to 36). There is, however, no suggestion in document D1 that a cooling effect is exerted by the reversing cylinders and, indeed, this would not be expected in view of the intended function of the negative pressure, which is to retain the web on the cylinder. In addition, the reversing cylinders do not have an adjustable temperature.

Claim 1 is thus distinguished over the closest prior art in that the condensation of the steam fed by the steam box on the paper web is intensified by cooling

the web prior to the steam box, by using a cooling cylinder with adjustable temperature. It is noted that it is also specified in claim 1 that the steam box serves to control the curling of the paper web.

Owing to the provision of a cooling cylinder with adjustable temperature prior to the steam box, the amount of condensation on the paper occurring at the steam box can be controlled, thus enabling more efficient control of curling of the paper.

1.3 Problem to be Solved

The problem to be solved can thus be regarded as being to improve control of curling of the paper web.

The suggestion that the problem to be solved is to provide an alternative form of cooling cylinder cannot be accepted in view of the fact that the person skilled in the art would not recognise the reversing cylinders of document D1 as being cooling cylinders.

1.4 Solution

The paper machine which is the subject of an alleged prior use, as shown in the drawings constituting documents D15 and D16, does not have a cooling cylinder arranged prior to a steam box, so that it does not suggest the solution to the above problem as claimed in claim 1. Cylinders 26 to 31 are supplied with steam and do not constitute cooling cylinders with adjustable temperature. It is thus not necessary to consider the question of whether or not the alleged prior use did, in fact, take place.

Document D7, with particular reference to the embodiment of Figure 2, discloses a method of calendering, in which the paper web passes through a heater (3) and cooling rollers (4) arranged in a housing (5) before entering a calender nip. At column 2, lines 17 to 22, it is mentioned that steam may be supplied to the housing. The method is, however, intended to improve the calendering of a web and does not address the problem of curling with which the patent in suit is concerned. In addition, there is no indication that the temperature of the cooling cylinders can be adjusted.

Document D10, whilst referring to the importance of high temperature difference between the paper and the steam for achieving effective condensation prior to calendering in the second paragraph on page 2, does not disclose the provision of a cooling cylinder arranged prior to a steam box.

In the paragraph common to pages 43 and 44, document D11 discusses the disclosure of document D13. Document D13 itself discloses an investigation into the effects of temperature and surface moisture during calendering. On page 138, right hand column, lines 9 to 13, it is stated that the sheet should be dried and cooled before being reheated and reconditioned by steam before the hot nip. There is, however, no suggestion of the use of a cooling cylinder with adjustable temperature for cooling a web prior to a steam box. In addition, the document is concerned with improving paper smoothness, gloss and strength in a calendering process and is not concerned with problems of curling.

The cited prior art thus does not suggest modifying the method for drying of paper disclosed in document D1 by intensifying the condensation of the steam fed by the steam box by cooling the web prior to the steam box, by using a cooling cylinder with adjustable temperature. The subject-matter of claim 1 thus involves an inventive step within the meaning of Article 56 EPC.

2. *Inventive Step of Claim 13*

Claim 13 is directed to a dry end of a paper machine which comprises a cooling cylinder of adjustable temperature for lowering the temperature of the web prior to the steam box in order to intensify the condensation of the steam fed by the steam box.

The subject-matter of claim 13 thus involves an inventive step for reasons analogous to those set out above in section 1 with respect to claim 1.

3. Claims 2 to 12 and 14 to 24 are directed to preferred features of the method and device of claims 1 and 13 respectively, so that the subject-matter of these claims similarly involves an inventive step.

4. Since the main request of the respondent is allowable, it is not necessary to consider the auxiliary request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Meyfarth W. Zellhuber