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) [X] To Chairmen
(D) [ ] No distribution

Datasheet for the decision of 13 February 2007

Case Number: T 0454/04 - 3.2.07

Application Number: 97926023.9

Publication Number: 0853703

IPC: D21F 1/00

Language of the proceedings: EN

Title of invention:
Roll and blade twin-wire gap former for a paper machine

Patentee:
Metso Paper, Inc.

Opponent:
Voith Paper Patent GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56, 100(b), 123

Keyword:
"Sufficiency of disclosure (yes)"
"Admissibility of amendments (yes)"
"Inventive step (main request and first auxiliary request - no, second auxiliary request - yes)"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0454/04 - 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 13 February 2007

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:	**Decision of the Opposition Division of the European Patent Office posted 27 January 2004 rejecting the opposition filed against European patent No. 0853703 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: H. Felgenhauer
Members: H. Hahn
C. Holtz

Summary of Facts and Submissions

I. The Opponent lodged an appeal against the decision of the Opposition Division to reject the opposition against European patent No. 0 853 703.

II. An opposition had been filed against the patent as a whole under the grounds of Article 100(a) EPC (i.e. lack of inventive step). Against independent method claim 14 the ground of opposition under Article 100(b) EPC (insufficient disclosure) has been admitted in the course of the opposition proceedings.

The Opposition Division held that the skilled person would have no difficulty in carrying out the invention according to method claim 14 in view of the values given in the description for the parameters to be set. Furthermore, a combination of documents D3 or D6 or D7 with one of D4 or D5 was considered as not leading the skilled person to the invention according to claims 1 and 14, particularly as D3, D6 and D7 are silent with respect to turbulence generating vanes and their effect onto the stock suspension jet prior to its discharge from the slice opening of the slice channel of the head box.

III. With a communication dated 22 November 2006 and annexed to the summons to oral proceedings the Board gave its non-binding preliminary opinion based on claims 1 to 17 according to the main request (claims as granted), and on the claims of the first, second and the third auxiliary request as filed with letter dated 14 October 2004.

IV. With letter dated 12 January 2007 the respondent (proprietor) submitted auxiliary requests 1 to 4 in combination with arguments concerning the allowability of the amendments, sufficiency of disclosure of the method claims and inventive step.

V. Oral proceedings before the Board were held on 13 February 2007.

(a) The appellant requested that the decision under appeal be set aside and the patent be revoked.

(b) The respondent requested that the appeal be dismissed, alternatively that the decision be set aside and that the patent be maintained on the basis of either one of the first to fourth auxiliary request filed with letter dated 12 January 2007.

(c) The following documents were referred to in the oral proceedings:

D3 = EP-A-0 475 921

D6 = EP-A-0 699 798

D7 = DE-A-40 02 305

D14 = K. Schmidt, "Der Voith-Duoformer, seine Konstruktion und Anwendung", Das Papier, Heft 3, 1977, pages 94 to 106

D15 = DE-C-28 57 473

D17 = Scott B. Pantaleo, "A new headbox design …", Tappi Journal, Vol. 78, No. 11, November 1995, pages 89 to 95

D18 = James L. Ewald et al., "Concept III Headbox", Tappi Proceedings 1989, Annual Meeting, New York, pages 3 to 11

VI. Claims 1 and 14 according to the main request read as follows:

"1. A roll and blade gap former for a paper machine having first and second wires (10,20) guided each in a respective loop and defining a twin-wire forming zone, means for defining a forming gap (G) in which the first and second wires (10,20) converge before the twin-wire zone, a headbox (30) including a slice channel (35) having a slice opening (37) through which a stock suspension jet (J) is fed into the forming gap (G) to form a web (W) between the wires (10,20), a first forming roll (11,21) defining in part said forming gap (G), means for directing a run of said twin-wire zone after said forming gap (G) in a curve over a wrap angle sector (a) of said first forming roll (11,21) and means (50) for producing a pulsating pressure effect on the web (W) after said curved run of said twin-wire zone over said wrap angle sector (a) of said first forming roll (11,21), **characterized in that** it comprises the combination of:
a) turbulence generating vanes (36) arranged in said slice channel (35) in said headbox (30) to cause turbulence in the stock suspension jet (J) prior to its discharge from the slice opening (37) of the slice channel (35) of the headbox (30),

b) said first forming roll (11,21) having a diameter (D_1) greater than or equal to about 1.4 m,
c) said wrap angle sector (a) of said first forming roll (11, 21) being less than about 25°, and
d) said pulsating pressure effect producing mans (50) comprising a support member (13b,23a) arranged in one of the wire loops (10,20) and including support blades (13L) in operative engagement with said wire (10,20), and a drainage and loading member (13a,23b) arranged in the other one of said wire loops (10,20) and including adjustable loading blades (23L) arranged in opposed relationship to said support blades (13L) and in operative engagement with said wire (10,20)."

"14. A method for controlling the anisotropy of a web formed in a roll and blade gap former, **characterized in that** it comprises the steps of:
generating turbulence in a stock suspension jet (J) in a slice channel (35) of a headbox (30), discharging the stock suspension jet (J) from a slice opening (37) of the slice channel (35) of the headbox (30) and directing the stock suspension jet (J) into a forming gap (G) defined in part by a first forming roll (11, 21) having a diameter (D_1) greater than or equal to about 1.4 m, the stock suspension jet (J) being directed into a convergence of first and second wires (10, 20) which define a twin-wire zone after said forming gap (G), said first forming roll (11, 21) being arranged in a loop of one of said first and second wires (10, 20), directing a run of said twin-wire zone after said forming gap (G) in a curve over a wrap angle sector (a) of said first forming roll (11, 21) having a magnitude less than about 25°,

producing a pulsating pressure effect on the web (W) after said curved run of said twin-wire zone over said wrap angle (a) of said first forming roll (11, 21), and setting the diameter (D_1) of said first forming roll (11, 21), said wrap angle sector (a) of said first forming roll (11, 21), a magnitude of the pulsating pressure effect and an amount of the turbulence in the stock suspension jet (J) relative to one another to provide for an optimum anisotropy in the web."

VII. Claims 1 to 13 according to the first auxiliary request are identical with claims 1 to 13 of the main request but the process claims 14 to 17 have been deleted.

VIII. Claim 1 according to the second auxiliary request differs from independent process claim 14 of the main request in that the additional feature "by means of turbulence generating vanes (36) arranged in said slice channel (35)" is incorporated in the first characterising feature of claim 1 between the terms "a headbox (30)" and "discharging the stock suspension jet (J) from …".

IX. The appellant argued essentially as follows:

Novelty of claims 1 and 14 of the main request is not disputed. However, claim 1 of the main request lacks an inventive step over a combination of the closest prior art D3 and the common general knowledge of the skilled person as represented by D14 or D17, or over a combination of D3 and D15. The roll and blade former of D3 discloses all features of the preamble plus the features b), c) and d) of claim 1 of the main request (see D3, page 6, lines 35 and 36; claim 1). The

preferred wrap angle range of 35-55° according to D3 does not restrict the disclosed general range. The apparatus can be used for making fine paper (see page 7, lines 10 to 12) which implies the use of a wood-free suspension. According to D3 the first forming roll may provide for 40-80% dewatering of the paper sheet (see claim 2) so that a value of 70%, which corresponds to that of figure 12 of the patent in suit, is included. Having a value of 70% the dewatering in the forming roll area is restricted, so that dewatering via the MB unit still has an influence on the formation of the sheet. According to D3 the MB unit is provided with grooves 35 which produce micro turbulences to improve the formation of the sheet. It belongs to the common general knowledge that the formation step also focuses on the fiber orientation and that the skilled person always considers the base weight, the formation, the orientation etc. (see D17, page 89, middle column, second paragraph to right hand column, first paragraph) and that sheets provided to divide a nozzle minimize turbulence scales (see D17, page 93, right hand column, last paragraph; figures 15 and 16). It also belongs to the common general knowledge that fast formation on the forming roll in gap formers leads to an improvement that due to the short distances the formed sheet represents a picture of the pulp distribution in the stock suspension jet (see D14, page 95, left hand column, fourth and eighth paragraph; and right hand column, third and sixth paragraph). The key for obtaining a good formation is a stable and bundled suspension jet having high turbulence energy in low wavelengths, resulting in an excellent random orientation of the fibers in the jet (see D14, page 96, left hand column, last paragraph). Low wavelengths

correspond to micro turbulences. Thus the skilled person knows that high turbulences are necessary to obtain a good sheet formation and that he has to provide means for producing such micro turbulences. Applying his general knowledge onto the teaching of D3 the skilled person arrives at the subject-matter of claim 1. Claim 1 defining an apparatus does not imply any effects since these would be related to specific operating conditions or setting of parameters of the apparatus, such as the utilisation of a wood-free suspension or of a specific jet-to-wire ratio etc. and settings, however, do not form part of the apparatus claim 1.

A combination of D3 and D15 likewise leads to the subject-matter of claim 1 of the main request. D15 indicates that the micro turbulence generating means, which improve the distribution of the pulp and of the random fiber orientation, can be used for gap formers whereby the disadvantages of the prior can be prevented (see column 5, lines 3 to 10, lines 20 to 25 and lines 35 to 40; column 6, lines 30 to 33; claim 9; figure 3). The same arguments are valid for a combination of D6 and D15 or D7 and D15.

The objection to insufficiency of disclosure is maintained for the process claim 1 of the second auxiliary request. Furthermore, this claim 1 is unclear due to it being amended, since the added feature concerning said "turbulence generating vanes" influences said "amount of turbulences" to be set relative to the other three parameters defined in the last feature of claim 1. Since the skilled person has to consider several parameters for the formation of the

sheet he is restricted and has no real freedom of choice in selecting one of the four parameters of claim 1 and then in setting the others relative to each other. Furthermore, the patent contains no information as to how a low or high orientation of the fibers can be obtained and it has to be taken into consideration that the formation always influences the orientation of the fibers. No concrete values are disclosed in the context of e.g. figures 14 and 15. The patent itself states that "the exact formation optimum differs for different pulps and running conditions and must be found experimentally for each case" (see column 15, lines 22 to 24). It is clear from figure 13 that the optimum formation differs from the optimum of the orientation and if the latter would be selected irrespective of the formation then the paper would no longer be suitable for use. Any change of the wrap angle shifts the point of optimum formation. The skilled person is left alone with this teaching and this applies also to the fine-tuning of the MB unit (see column 15, lines 23 to 56; and figure 15). Only at low orientation an effect of the MB unit can be seen which, however, does not influence the orientation. It is apparent that the jet-to-wire ratio has an influence onto the formation and orientation (see column 12, lines 38 and 39; column 15, lines 1 to 15). The orientation is predetermined by said jet-to-wire ratio so that the skilled person is taught to change the orientation by said jet-to-wire ratio. Concerning sufficiency of disclosure the skilled person would not use D3 as a starting point since it does not belong to the common general knowledge. Consequently the process according to the second auxiliary request cannot be

considered as being sufficiently disclosed in the patent in suit.

D3 also represents the closest prior art for process claim 1 of the second auxiliary request. Since process claim 1 differs from that of apparatus claim according to the main request only in the last feature concerning the four parameters to be set relative to each other the arguments with respect to the apparatus claim are still valid. The process of D3 is suitable for producing fine paper which fact implies that a high turbulence is required. The skilled person knows from D14 that a high turbulence of the stock suspension jet results in an excellent random orientation of the fibers in the jet (see page 96, left hand column, last paragraph) and that the jet-to-wire ratio influences the breaking length ratio of the sheet, i.e. the orientation of the fibers (see page 97, right hand column, eighth paragraph; page 102, left hand column, paragraph 5.3). From D7 the skilled person knows that the pressure of the blades of the MB unit influences the fiber orientation whereby said breaking length ratio can be increased in an undesired manner (see column 2, lines 21 to 29). D7 does not teach that the blades in the MB unit should apply a high pressure but that it should be kept small so that the orientation of the fibers in machine direction (MD) is kept small. This corresponds to the optimisation of the orientation of wood-free papers. Consequently, the skilled person knows from his common general knowledge as to how to set the four parameters relative to each other to optimise the orientation of the fibers in the fine paper sheet. Therefore claim 1 of the second auxiliary request lacks inventive step.

X. The respondent argued essentially as follows:

The former of claim 1 of the main request is intended to produce fine paper having a low orientation of the fibers, i.e. of wood-free papers. D3 represents the closest prior art and discloses a former according to the preamble of claim 1. D3 further discloses features b) and d) of the characterising portion. It does not disclose features a) and c) since it does not disclose turbulence generating vanes in the head box and since it only discloses a wrap angle a of from 5-120°, and preferably of 35-55° (see page 3, lines 53 and 54; page 7, line 34). Furthermore, said wrap angle of D3 should be large (see page 4, line 5) so that it has not been recognized that the angle should be limited to a low value. The problem to be solved is the provision of a former which can manufacture fine paper having good formation and a low orientation of the fibers. The said constructional features a) to d) according to claim 1 of the patent in suit have an impact to the intended purpose of being suitable for producing fine paper. If the MB unit of D3 were to provide a similar micro turbulence generating effect the question arises why the skilled person should provide additional means.

D14 does not represent common general knowledge for the former of claim 1 since it only concerns a gap former having a forming roll without containing any MB unit as required by feature d). Furthermore, it does not disclose a wrap angle smaller than about 25° as required by feature c) since the disclosed standard diameter of 1.6 m is linked with a wrap angle of greater than 90° (see page 96, picture 3 and right hand

column, seventh paragraph). Said small wrap angle according to the patent in suit improves the orientation of the fibers by reducing the center layers anisotropy. The passage at page 96, left hand column of D14 is understood as requiring the use of a high turbulent energy jet. Thus D14 cannot prompt the skilled person to use turbulence generating vanes arranged in the slice channel, let alone in combination with an MB unit.

D7 discloses a wrap angle of smaller than 25° but only in combination with a calculable diameter of the forming roll of about 0.97 m (based on the described forming roll sector length of 200 mm).

D15 discloses turbulence generating vanes (see figure 3) but only in the context of a Fourdrinier former or a gap former with two converging wires (see column 1, line 12, lines 41 to 42, line 52 and line 60; column 2, line 12; column 5, lines 35 to 39). These statements would be too vague to lead the skilled person towards claim 1.

D17 concerns consistency profiling and thus head boxes which dilute the suspension. D17 mentions that slice lip bending can adversely affect cross-direction (CD) fiber orientation profiles which represents an alternative approach to control the CD basis weight (see page 94, middle column to right hand column). Furthermore, the turbulence generating means of D17 as disclosed and described in figures 15 to 17 are used in combination with a Fourdrinier former.

D18 discloses that the Converflo design represents a low turbulence head box (see page 4, left hand column, first paragraph).

Since the documents referred to do not lead to a gap former according to claim 1 of the main request, this claim involves an inventive step.

Claim 1 of auxiliary request 2 is based on claim 14 as granted in combination with the description at column 6, lines 28 to 33 of the patent in suit (corresponding to claim 21 and page 10, lines 15 to 18 of the application as originally filed, see the published WO-A-97 47803). Thus the amendment made to claim 1 of the second auxiliary request meets the requirements of Articles 123(2) and (3) EPC.

The feature added to claim 1 does not cause any unclarity as it only defines more precisely an aspect of the apparatus, while the last feature of claim 1 was already comprised in claim 14 as granted. Thus the amendment of claim 1 does not lead to an objection under Article 84 EPC being admissible. The person skilled in the art is enabled to perform the process of claim 1 which in its last paragraph defines that four parameters have to be set relative to each other. Concerning setting of these parameters it is evident from the description that reducing the wrap angle shifts the orientation to lower values when the jet-to-wire ratio is held constant (see column 11, lines 30 to 39 and figure 11). In the context of figure 11 it is obvious that the skilled person has to consider that at the same time a good formation is obtained. The skilled person knows that changing the length of the vanes in

the slice channel changes the turbulence level generated. It is apparent that the orientation is reduced when the turbulence level is increased (see figure 13). Likewise it is clear that the MB unit improves the formation at a jet-to-wire ratio of about 1 (see figure 15). The orientation of the fibers is not only dependent on the jet-to-wire ratio (see column 15, lines 9 to 14; figures 11, 13 and 14). The diameter of the forming roll limits the dewatering pressure. D15 or D17 give the skilled person an indication with respect to turbulence levels to be produced by the vanes.

Consequently, claim 1 of the second auxiliary request meets the requirements of Article 100(b) EPC.

Claim 1 of the second auxiliary request is not rendered obvious. According to D3 considered as the closest prior art the diameter of the forming roll, the wrap angle a and the magnitude of the pulsating pressure in the MB unit are set relative to each other to obtain a good formation. The problem underlying the patent in suit is to improve the method of D3 so that an optimum anisotropy in the web is achieved. This problem is solved by generating an amount of turbulence in the head box and by setting this turbulence and the other three parameters known from D3 relative to each other together with a specific wrap angle of smaller than about 25° to provide for optimum anisotropy. The preferred wrap angle according to D3 is 35-55° and thus outside the range defined in claim 1. D3 contains no hint to the effect obtained; instead D3 aims to improve the formation and its parameters are set to provide an optimum formation (see page 3, line 57 to page 4, line 3).

D14 although teaching that the key to a good formation is a stable bundled suspension jet of high turbulence energy does not suggest that a high turbulence is generated in the slice channel of the head box as required by claim 1. Furthermore, D14 is silent with respect to setting of parameters and the wrap angle of the gap former (without MB unit) is greater than 90° so that it cannot suggest a wrap angle smaller than about 25°. Hence D14 cannot lead towards the claimed process.

D7 discloses what happens in the MB unit, namely that the fibers are oriented in the MD direction if a pulsating pressure is applied. According to the invention this is counteracted by the turbulence level in the slice channel of the head box and the small wrap angle. D7 proposes another solution to this negative effect, namely to apply a negative pressure (vacuum) onto the upper wire in the MB unit so that the pressure of the blades can be kept low (see column 2, lines 21 to 24). Thus D7 cannot lead to the claimed process.

D15 discloses turbulence generating vanes but no indication is given to combine these vanes with the method according to D3 and to set the four parameters defined in claim 1 relative to each other to obtain an optimum anisotropy. Hence also D15 cannot lead to the claimed process.

Reasons for the Decision

1. *Admissibility of new requests and documents*

Admissibility of the new requests and the new documents has not been disputed by the parties. The Board likewise does not see any reason for not admitting the new requests and documents. The claims of the new requests can be considered as having been filed as a response to the communication of the Board; the new documents as having been filed in response to the decision under appeal filed with the grounds of appeal.

Main request

2. *Novelty (Article 54 EPC)*

Novelty was not disputed by the appellant. The Board is satisfied that none of the submitted documents, particularly D3 or D6, discloses a roll and blade gap former having all the features of claim 1 of the main request or a process for controlling the anisotropy of a web formed in a roll and blade gap former having all the features of claim 1 of the second auxiliary request.

The Board therefore concludes that the subject-matter of claims 1 according to the main request and the second auxiliary request are novel with respect to these documents.

3. *Inventive step (Article 56 EPC)*

3.1 Document D3 is undisputedly considered to represent the closest prior art for apparatus claim 1 according to the main request. It discloses a roll and blade gap former comprising wires 10, 20, a forming roll 21, 11, breast roll 26a, 16a which form a twin-wire section having a forming gap G into which the suspension jet is delivered through the opening of discharge part 60 (see figures 1 to 4; page 4, lines 28 to 33). The wires 10, 20 are arranged after said gap G in a curve over a wrap angle sector of said forming roll and thereafter the wires run over a so-called MB-unit 50, which produces a pulsating dewatering pressure (see page 3, lines 57 and 58; page 4, lines 41 and 42; figures 1 to 4). Said MB-unit comprises foils 51', 51'', rubber hoses 32 and beam members 31 (see e.g. page 5, line 35 and page 6, lines 1 and 2; figure 5). The diameter of forming roll 21, 11 is equal or greater than 1.5 m and said wrap angle a can be within 5° to 120°, preferably within 35 to 55° (see page 6, lines 35 and 36). The formers according to D3 are stated to be suitable for manufacturing newsprint, fine paper and SC-paper (see page 7, lines 10 to 12).

3.2 The respondent's arguments that the skilled person would consider only the wrap angle range of 35-55° cannot be followed since D3 discloses no specific advantage which would be associated to said preferred range. Furthermore, the formers of figures 1 to 3 are stated to be best suitable for newsprint and reveal wrap angles in the drawings, which apparently range from values within the preferred range to values well above 90° while the former best suitable for fine paper

and SC-paper according to figure 4 reveals about the same wrap angle as figure 2 (compare figures 1 to 4). Thus it is evident to the skilled person that he can use wrap angles outside the preferred range within the broad general wrap angle range of 5 to 120°.

3.2.1 Since apparatus claim 1 does not contain any structural features or definitions which would imply a specific setting of the defined parameters with respect to a particular effect to be achieved the respondent's arguments concerning a synergistic effect obtainable by a process using said apparatus with specific parameter settings, cannot be followed.

3.2.2 Taking account of points 3.1 to 3.2.1 above the roll and blade gap former according to D3 thus reveals, besides the features of the preamble of claim 1, features b) and d) of claim 1.

The subject-matter of apparatus claim 1 thus differs from the former according to D3 in that it contains turbulence generating vanes arranged in the slice channel of the head box. In view of the problem to be solved in view of D3 (see the following point 3.3) it can be left open whether or not within the combination of features of claim 1 feature c) is disclosed by D3.

3.3 Problem to be solved

The objective technical problem is thus considered to be the provision of an alternative roll and blade gap former.

3.4 Solution to the problem

The problem of point 3.3 above is solved by the roll and blade former as defined in claim 1 of the main request. It is evident that this problem has been solved.

3.5 The Board, however, considers that the subject-matter of claim 1 of the main request is obvious to the person skilled in the art for the following reasons:

3.6 The former according to claim 1 differs from the one according to D3 in that it has turbulence generating vanes arranged in the slice channel of the head box to cause turbulence in the stock suspension jet; and in that the wrap angle sector of the first forming roll is less than about 25°. It is obvious for the person skilled in the art that in order to arrive at an alternative former turbulence generating vanes can be arranged in the slice channel.

3.7 D15 clearly teaches that the turbulence generating vanes in the slice channel of the head box produce micro turbulences which improve the formation and the random fiber orientation in the sheet (see column 5, lines 3 to 9; column 6, lines 20 to 34; claim 9; figure 3). Furthermore, D15 states that these turbulence generating vanes can be used with Fourdrinier formers and with twin wire gap formers (see column 5, lines 35 to 39). Consequently, the appellant's arguments that said passage in D15 would be too vague for the skilled person to give an incentive towards the arrangement of vans cannot be followed.

3.7.1 A roll and blade gap former differs structurally from an ordinary gap former as mentioned in D15 only in the additional MB unit. This additional MB unit, however, only implies that the forming roll of said roll and blade gap former has to remove less water than the forming roll of said ordinary gap former. Consequently, there is no reason given for the skilled person which would have prevented provision of said turbulence generating vanes in a roll and blade gap former in order to arrive at an alternative design of the former.

3.7.2 The Board therefore considers that for the person skilled in the art providing an alternative roll and blade gap former (cf. point 3.3 above) it would have been obvious to add to the roll and blade gap former according to D3, which has a forming roll diameter of 1.5-2 m and a wrap angle of from 5-120°, the turbulence generating vanes suggested in D15. Thereby the person skilled in the art, however, would arrive at the subject-matter of claim 1 of the main request without inventive skill. Consequently, claim 1 of the main request lacks an inventive step.

3.8 The main request is thus not allowable.

First auxiliary request

Since claim 1 of the first auxiliary request is identical with claim 1 of the main request the conclusion of paragraph 3.6.2 applies *mutatis mutandis* to claim 1 of the first auxiliary request. This claim 1 thus likewise lacks inventive step. The first auxiliary request is therefore also not allowable.

Second auxiliary request

4. *Admissibility of amendments (Articles 123(2) and (3) EPC)*

4.1 Claim 1 of the second auxiliary request is based on claim 14 as granted in combination with the description at column 6, lines 28 to 33 of the patent in suit (corresponding to claim 21 and page 10, lines 15 to 18 of the application as originally filed which corresponds to the published WO-A-97 47803) from which passage the incorporated feature "by means of turbulence generating vanes (36) arranged in said slice channel (35)" is derived. By incorporating this additional feature claim 1 has been restricted compared to claim 14 as granted.

4.2 The dependent claims 2 to 4 of the second auxiliary request correspond to claims 15 to 17 as granted.

4.3 The description pages according to the second auxiliary request were only amended for being consistent with the process claims 1 to 4.

4.4 The Board therefore concludes that the claims 1 to 4 and the amended description according to the second auxiliary request meet the requirements of Articles 123(2) and (3) EPC.

4.5 Furthermore, said newly incorporated feature only more precisely defines a structural aspect of the used apparatus, i.e. the turbulence generating vanes. The effect obtained by this structural feature, namely generating turbulence in the stock suspension jet was

already comprised in claim 14 as granted. Consequently, contrary to the arguments of the appellant this amendment cannot be objected in the opposition and appeal proceedings under Article 84 EPC (compare Case Law of the Boards of Appeal of the European Patent Office, 4th edition, 2001, section VII.C.10.2).

5. *Sufficiency of disclosure (Article 100b) EPC)*

The appellant's arguments that the patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art is not considered as valid.

As can be concluded from the arguments of both parties the skilled person when carrying out the claimed process would consider that a good formation of the paper sheet has to be obtained together with an optimum anisotropy. Furthermore, since the structural elements of the turbulence generating vanes in the slice channel of the head box as well as the MB units belong to the prior art (compare e.g. D3, D15, D17) the person skilled in the art knows how to set these parameters, is familiar with the parameters concerned and in this connection it is e.g. evident that changing the length of the vanes in the slice channel changes the generated turbulence level. Furthermore, the person skilled in the art knows which turbulence levels in the head box have to be set depending on circumstances. Likewise he knows how the amplitude levels of the pulsating pressure generated by the MB unit have to be set based on stock suspensions used in a particular case.

It is evident from the figures 11 and 13 to 15 of the patent in suit that the four parameters actually can be set relative to each other to influence fiber orientation contrary to the appellant's allegations. Figure 11 shows that that lowering the wrap angle at a given jet-to-wire ratio shifts the orientation of the fibres to a lower MD/CD ratio while figure 13 depicts that an increasing turbulence level at a given jet-to-wire ratio shifts the orientation to a lower MD/CD ratio. Likewise it is clear from figures 14 and 15 that the MB unit influences the orientation and improves the formation at a jet-to-wire ratio of about 1 (see figures 14 and 15).

In order to perform the process according to claim 1 the skilled person is thus expected to start from known parameter levels for given conditions and - taking account of the importance of the formation - to modify these parameters known as such in order to optimise the fiber orientation. Although this implies that the person skilled in the art has to carry out some experiments the Board considers that such parameter setting is commonly practised in this particular technical field (e.g. when a web former of the kind disclosed in D3 is put to practice) and that no undue burden is thereby put on him.

Therefore the invention as defined by claim 1 of the second auxiliary request is disclosed in the patent in suit in a manner sufficiently clear and complete such that the requirements of Article 100(b) EPC are met.

6. *Inventive step (Article 56 EPC)*

6.1 D3 undisputedly represents the closest prior art for process claim 1 since its process using a roll and blade gap former is suitable for producing fine paper (see page 7, line 11). D3 aims to provide twin-wire gap formers whose dewatering capacity and efficiency can be increased as compared with the roll-shoe formers of the "Speed Former" type and other corresponding formers, and in which an increased proportion of dewatering can be carried out on the first forming roll without deterioration of the formation (see page 4, lines 1 to 3). Additionally, the former shall be suitable for different paper qualities, and the formation of the paper produced shall be good and the porosity shall be low, i.e. the paper shall be free of so-called pinholes (see page 3, lines 38 to 46).

Furthermore, as consented to by the respondent, it is credible that the diameter of the first forming roll, the wrap angle a and the magnitude of the pulsating pressure in the MB unit are set relative to each other according to the process to be carried out with the former according to D3.

Claim 1 thus differs from the process carried out with the former according to D3 in that the head box of the roll and blade gap former comprises turbulence generating vanes for the generation of turbulence in the stock suspension. Furthermore, the parameters defined in claim 1 are set relative to each other. As compared to D3 these parameters additionally include the amount of turbulence in the stock suspension jet; additionally a specific wrap angle of smaller than

about 25° is selected. These four parameters, namely the diameter of first forming roll, the wrap angle a, the magnitude of pulsating pressure effect and the amount of turbulence in stock suspension jet are set relative to each other such that an optimum anisotropy in the web is obtained.

6.2 *Problem to be solved*

The problem underlying the patent is thus to improve the process to be performed with the former of D3 so that an optimum anisotropy in the web is achieved.

6.3 *Solution to the problem*

The problem as specified in point 6.2 above is solved by the method for controlling the anisotropy of a web formed in a roll and blade gap former as defined in claim 1.

Taking account of figures 10, 11 and 13 to 15 of the patent in suit it is credible that the claimed process solves the aforementioned problem taking due account of the formation obtained.

6.4 The Board considers that the process according to claim 1 is not obvious to the person skilled in the art for the following reasons:

6.5 Neither one of the documents D3, D7, D14, D15 cited by the appellant in the context of the claimed process suggests this solution of claim 1 to the skilled person nor do these documents contain any hint or incentive leading in this direction.

6.6 D3 aims to improve the formation and its parameters are set to provide an optimum formation, particularly as higher covering angles can be used on the first forming roll and the preferred wrap angle according to D3 is 35-55° (see page 3, line 57 to page 4, line 3; claim 1). Therefore, D3 is considered as not suggesting a wrap angle of smaller than about 25° in the combination of parameters defined in claim 1 and in view of the setting of these parameters to provide for the optimum anisotropy of the web. Consequently the appellant's arguments concerning D3 and that the skilled person would select a wrap angle smaller than 25° cannot be followed, particularly as he cannot expect any advantage in the context of D3 which would be associated to such a wrap angle.

6.6.1 Furthermore in view of the effect to be achieved by the process of claim 1 namely to provide for an optimum anisotropy in the web, it is not apparent to provide the apparatus according to D3 with turbulence generating vanes according to D15, since no indication is given from which it could be derived that the effect to be obtained is related to such a measure.

6.6.2 The conclusion of point 6.6.1 above is also based on the fact that D15 - although mentioning that the random fiber distribution is improved by the described head box containing turbulence generating vanes - actually only discloses that said head box can be used with a twin-wire gap former. D15, however, is silent about the further process parameters required by claim 1, particularly with respect to the diameter of the first forming roll, the amplitude of the pulsating pressure

and the wrap angle, let alone the value ranges given for these parameters according to which these parameters, the further feature of claim 1, should be set relative to each other to obtain the desired effect.

6.7 The roll and blade gap former according to D7 has a calculable diameter of the first forming roll of about 0.97 m (compare point X. third paragraph, above). This fact was not contested by the appellant. Furthermore, D7 proposes a different solution to the disadvantage that by applying a high pressure from the blades onto the wires in the MB unit a disadvantageous orientation of the fibers in the MD direction is caused. To avoid this undesired effect D7 proposes that a negative pressure is to be applied to the upper wire (see column 2, lines 21 to 29). Thus D7 actually leads in a different direction as the claimed solution according to claim 1. Consequently, the appellant's arguments with respect to D7 cannot be followed.

6.8 D14 concerns only the formation of paper and is silent with respect to controlling the anisotropy of the fibers. Furthermore D14, although representing common general knowledge for a twin-wire gap former using a wrap angle of greater than 90° cannot be considered as making suggestions for the setting of parameters of a roll and blade gap former which are non-described. Therefore the appellant's arguments with respect to D14 cannot be followed.

6.9 The subject-matter of claim 1 of the second auxiliary request thus involves an inventive step within the meaning of Article 56 EPC.

The same conclusion applies to the dependent claims 2 to 4 which define preferred embodiments of the method of claim 1.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent with the following documents:

Claims: 1 to 4 of the second auxiliary request as filed with letter of 12 January 2007

Description: columns 1 to 16 as filed in the oral proceedings on 13 February 2007

Drawings: figures 1 to 16 as granted

The Registrar: The Chairman:

G. Nachtigall H. P. Felgenhauer