

Internal distribution code:

- (A) [ ] Publication in OJ  
(B) [ ] To Chairmen and Members  
(C) [X] To Chairmen

D E C I S I O N  
of 7 November 1995

Case Number: T 0015/93 - 3.3.1

Application Number: 87305847.3

Publication Number: 0251787

IPC: D21C 9/18

Language of the proceedings: EN

Title of invention:

Apparatus and method for thickening pulp and paper stock

Patentee:

THE BLACK CLAWSON COMPANY

Opponent:

SULZER-ESCHER WYSS GmbH

Headword:

Thickening of pulp/BLACK CLAWSON

Relevant legal provisions:

EPC Art. 56 and 111(1)

Keyword:

"Inventive step (yes - after amendment) - non-obvious  
modification of a known apparatus"

"Remittal to the first instance - description remains to be  
adapted to present claims"

Decisions cited:

T 0127/85; T 0550/88

Catchword:

-



Case Number: T 0015/93 - 3.3.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.1  
of 7 November 1995

**Appellant:**  
(Proprietor of the patent) THE BLACK CLAWSON COMPANY  
605 Clark Street  
Middletown, Ohio 45042 (US)

**Representative:**  
Reimann, Thomas, Dr  
Pünder, Volhard, Weber & Axster  
Cecilienallee 6  
W-40474 Düsseldorf (DE)

**Respondent:**  
(Opponent) SULZER-ESHER WYSS GmbH  
Postfach 13 80, Escher Wyss-Strasse 25  
D-88183 Ravensburg (DE)

**Representative:**  
Dipl.-Phys. Dr Manitz  
Dipl.-Phys. Finsterwald  
Dipl.-Phys. Grämkow Dipl.-Chem. Dr Heyn  
Dipl.-Phys. Rottermund  
Morgan, B.Sc.(Phys)  
Postfach 22 16 11  
D-80506 München (DE)

**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office delivered orally on  
8 October 1992, with written reasons posted on  
3 November 1992, revoking European patent  
No. 0 251 787 pursuant to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** A. J. Nuss  
**Members:** J. M. Jonk  
S. C. Ferryman

## Summary of Facts and Submissions

- I. The Appellant (proprietor of the patent) lodged an appeal against the decision of the Opposition Division by which European patent No. 0 251 787 was revoked in response to an opposition, based on Article 100(a) EPC, which had been filed against the patent as a whole.

The Opposition Division held that neither the subject-matter of amended Claim 1 according to the then standing main request, nor that of the main claims of three auxiliary requests, all these claims being directed to an apparatus for thickening a suspension of pulp material in water, involved an inventive step in the light of the disclosure of

(8) US-A-1 241 905,

particularly in view of the apparatus indicated in Figure 4 of that document.

- II. Together with the grounds of appeal the Appellant filed a new Claim 1, which on 15 September 1994 was replaced by an amended one indicating that the claimed subject-matter was related to an apparatus suitable for thickening a suspension of **paper pulp material of a consistency of about 1.5 % solids** in water.

The Appellant essentially argued that a skilled person in the field of thickening dilute paper pulp, i. e. paper pulp containing about 1.5 % solids, would not have considered document (8) as relevant state of the art since this document only dealt with apparatus for a continuous separation of liquids from solids without any incentive that a paper pulp suspension as indicated in present Claim 1 could be handled. In this context, he

also argued that document (8) was published already in 1917 and that it had not in any way influenced the paper making industry. Moreover, even if the skilled person would have considered document (8) and the apparatus of Figure 4 disclosed therein, he would still be left with an apparatus that was particularly designed for the elevation of filtered solids, i. e. an application which was of no relevance to the paper industry, and also differed from the apparatus according to the present Claim 1 in no less than 10 features.

The Appellant also filed on 15 September 1994 an additional new set of claims as an auxiliary request directed to a **method of washing** a suspension of paper pulp.

III. The Respondent (Opponent) fully agreed with the reasoning of the Opposition Division regarding lack of inventive step. In this connection he submitted that the skilled person would have understood that the apparatus and the process disclosed in Document (8) were also suitable for thickening of **paper pulp**. Moreover, starting from the apparatus indicated in Figure 4, a skilled person trying to provide a simpler apparatus would have had no difficulties in achieving this in view of the further disclosure contained in document (8), thereby arriving at the apparatus of the disputed patent.

IV. On 24 July 1995 the Board informed the parties that, in applying the "problem-solution-approach" in assessing whether or not the claimed invention involved an inventive step, the closest prior art, in the preliminary judgment of the Board, seemed to be

(3) DE-C-3 005 681.

In addition, the Board observed that the process claims according to the auxiliary request, filed on 15 September 1994, represented a change of category, which in view of the decision of the Enlarged Board of Appeal, G 2/88, was likely to be considered as an inadmissible amendment.

V. In reply the Appellant filed on 6 October 1995 new Claims 1 to 15, Claim 1 having the same wording as Claim 1 of the main request filed on 15 September 1994.

The Appellant agreed that document (3) was the closest state of the art and submitted that, in relation to this closest state of the art, the problem to be solved according to the disputed patent could be defined as the provision of a simpler apparatus having an improved efficiency in terms of capacity in tons per day of dewatered pulp containing up to about 12% of solids. In order to support the alleged improvement he referred to technical drawings and data (Exhibits Ax 7a to d submitted on 6 October 1995) of the so called "Vario-Split" apparatus disclosed in

(4) Escher Wyss, "Der Vario-Split, eine neue Maschine zur Verbesserung von AP-Rohstoffen", a special printing from "Wochenblatt für Papierfabrikation", Heft 21/1981,

which apparatus corresponded to that of document (3). The solution of this technical problem was considered to be neither obvious in view of the disclosure of document (3) nor in view of the other documents cited.

VI. Oral proceedings were held on 7 November 1995.

In response to the doubts expressed by the Board concerning the compliance with Article 123(2) EPC of the expression "about" in relation to the content of solids of the paper pulp to be thickened, the Appellant submitted during these oral proceedings new Claims 1 to 15, Claim 1 reading as follows:

"Apparatus for thickening a suspension of paper pulp material of a consistency of 1.5% solids in water, comprising:

- (a) a frame (10 to 13)
- (b) first and second liquid-impervious rolls (20, 22) rotatably mounted on substantially horizontal axes in spaced relation in said frame,
- (c) an endless wire belt arrangement trained around said rolls in wrapping relation with the surface thereof,
- (d) headbox means (40) mounted on said frame and including an outlet (41, 42) for the pulp suspension to be thickened;
- (e) said headbox means being so positioned that said outlet is operable to discharge the pulp suspension into or towards a wedge zone defined in part by the belt arrangement where it approaches said first roll,
- (f) means (24, 25) for driving one (22) of said rolls to cause said belt arrangement to travel around said rolls at a speed effecting the development of centrifugal action causing liquid to be expressed

through the belt arrangement where it wraps said rolls and thereby to thicken the pulp carried by said belt arrangement, and

(g) means (50,55) mounted on said frame in a position to collect the resulting thickened pulp,

characterised

(1) in that the belt arrangement comprises a belt (130) having an inner surface which cooperates with a substantial portion of the surface of the rolls (120, 122) to define a space, bounded by the rolls and opposed upper and lower runs of the belt, in which the headbox means (140) is mounted,

(2) in that the wedge zone (144) into which the outlet (141, 142) of the headbox is operable to discharge the pulp suspension is defined by the first roll (120) and the inner surface of the upper run of the belt where it approaches the first roll,

(3) in that the first roll (120) has indentations (121) in the surface thereof, wherein the pulp suspension is received and retained by the belt,

(4) in that said centrifugal force is operable to cause liquid to be expressed through the belt where it wraps each of said rolls and thereby to thicken the pulp carried on the inner surface of the belt, and

(5) in that upon separation of the belt from the surface of the first roll the partially thickened pulp is discharged from the indentations and carried on the upwardly facing inner surface of the lower run of the belt towards the second roll (122), the pulp collecting means (150, 155) being

mounted in said space, between the headbox means and the second roll (122), to collect the resulting thickened pulp from the surface of the second roll."

- VII. The Respondent disputed that document (3) represented the closest state of the art, since this document related to an apparatus for **washing** stock suspensions obtained from waste paper, whereas the subject-matter now claimed concerned an apparatus for **thickening** suspensions of paper pulp, i.e. one designed for a quite different purpose. In this context, he argued that the conditions to be applied for washing were different from those for thickening, so that the data provided for the apparatus of document (3) and for that of the patent in suit, with respect to capacity (tons/day) and efficiency in terms of thickening, were not comparable. In line with his written submissions, he also argued that, starting from document (8) as closest state of the art, the claimed subject-matter did not involve an inventive step in view of the teaching of this document, particularly in relation to the apparatus of Figure 4.
- VIII. The Appellant denied that the subject-matter of document (3) was only related to washing and that the data submitted by him regarding capacity and efficiency would not be comparable with those of the claimed apparatus. In this context he referred in particular to document (4) (page 3, left column, first paragraph) indicating that the "Vario-Split" apparatus was also suitable for thickening. In addition he defended inventive step for the claimed subject-matter essentially in line with his written submissions.



IX. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the set of claims (Claims 1 to 15) submitted during the oral proceedings on 7 November 1995.

The Respondent requested that the appeal be dismissed.

X. At the conclusion of the oral proceedings the Board's decision to allow the Appellant's request was pronounced.

### Reasons for the Decision

1. The appeal is admissible.
2. The amendments to Claim 1 as granted are based on Claims 1 and 12 in combination with column 9, lines 40 to 43, column 7, lines 27 to 34, and Figures 4 and 5 of the patent in suit, and are also supported by Claims 1 and 11 in combination with page 14, lines 3 to 6, page 9, line 30 to page 10, line 5, and Figures 4 and 5 of the patent application as filed.

Present Claims 2 to 15 correspond essentially to Claims 2 to 11 and 13 to 16 as granted, and are also supported by Claims 2 to 6, 7 and 10 (supports present Claims 7 and 8), 8, 9, 16 (supports present Claim 11), and 12 to 15 of the originally filed patent application.

Thus, all amendments made to the claims as granted comply with the requirements of Article 123 EPC. This was not contested by the Respondent.

3. After examination of the cited prior art, the Board has reached the conclusion that the subject-matter as defined in all claims is novel. Since this issue was not in dispute, it is not necessary to give reasons for this finding.
4. The remaining issue to be dealt with is whether the subject-matter of the present claims involves an inventive step.
  - 4.1 Article 56 EPC sets forth that an invention involves an inventive step if, having regard to the state of the art (in the sense of Article 54(2) EPC), it is not obvious to a person skilled in the art.

For deciding whether or not a claimed invention meets this criterion, the Boards of Appeal consistently apply the "problem-solution-approach", which consists in

- (a) identifying the "closest prior art", which - according to the established jurisprudence of the Boards of Appeal - is normally a prior document disclosing subject-matter conceived for the same purpose as the claimed invention and having the most relevant technical features in common, whereby in cases where it is not immediately apparent which of the cited prior art documents is "closest" to the claimed invention only such a document should be considered as the closest prior art for which a skilled person would have had good reasons to select its content as a basis for further development,
- (b) assessing the technical results (or effects) achieved by the claimed invention when compared with the "closest state of the art" established,

- (c) defining the technical problem to be solved as the object of the invention to achieve these results, and
- (d) examining whether the claimed solution to this technical problem involves an inventive step in view of the state of the art in the sense of Article 54(2) EPC, or expressed in an other way, whether or not a skilled person, having regard to the state of the art, would have suggested the claimed technical features for obtaining the results achieved by the claimed invention.

This disqualifies document (8) as the "closest state of the art", since, in the Board's judgment, there is no indication in this document that the process and the various types of apparatus suggested for the continuous separation of liquids from solids, let alone the particular apparatus for elevating separated solids according to Figure 4, disclosed therein would be suitable for thickening a dilute suspension of paper pulp material, such as one of a consistency of 1.5% solids in water, as aimed for in the disputed patent. In this context it is observed by the Board, that one cannot ignore that it is stated in this document, that for the sake of brevity the mixture of solid and liquid to be separated will in the following be designated as "pulp". Thus, in the Board's view, a skilled reader would not have had any incentive to interpret this expression as having the meaning of a paper pulp of a dilute consistency as indicated in present Claim 1 of the patent in suit. Moreover, this document was published in 1917, i. e. about 70 years before the filing date of the disputed patent, and yet - as contended by the Appellant and not disputed by the Respondent - did not have had any influence in the field of paper industry, thus rendering it unlikely that at

the time of the filing date of the patent in suit a skilled person would have had considered its technical teaching as a promising basis for further development.

4.2 In these circumstances, the Board considers that the apparatus described in document (3), about which apparatus additional technical information was given in document (4), represents the closest state of the art. Both documents relate to one and the same apparatus, namely the so called "Vario-Split" apparatus, which is not only suitable for washing aqueous fiber stock suspensions obtained from waste paper as contended by the Respondent, but - as described in document (4) - can also be applied for simple thickening of such suspensions (cf. (3), column 2, lines 30 to 34, in combination with column 2, line 68 to column 3, line 41, and the single Figure; and (4), Figure 3 on page 2, page 3, left column, first paragraph, and page 9, lines 11 to 13 of point 6). A typical stock suspension to be treated is stated to have a consistency of less than 1.5%, preferably 0.4 to 0.8% (cf. (3), column 3, lines 61 to 67).

The "Vario Split" apparatus comprises, according to a preferred embodiment, an endless wire or filter band having an outer surface which cooperates with a substantial portion of the surface of a rotatable cylinder, a flat jet nozzle forming a flat suspension jet which is introduced into a substantially wedge-shaped intermediate space between the outer surface of the wire band and the cylinder, a take-off roll, a catch container for the pressed-out water, means for collecting the thickened pulp and three guide rolls (cf. (3), column 2, last line to column 3, line 41, and the single figure; and (4), Figure 3). In washing the stock suspension, the apparatus is operated in such a way that the fiber web formed between the outer surface

of the wire band and the cylinder has a weight of less than 100 g/m<sup>2</sup>, preferably 30 to 70 g/m<sup>2</sup>, and the wire speed and the circumferential speed of the cylinder is in the order of 400 to 1200 m/min (cf. (3), Claim 1 and column 3, last line to column 4, line 8).

The Appellant argued essentially that by using this apparatus, which is rather complicated in construction, a high production of thickened pulp in tons per day and a high content of solids in this product are not satisfactorily achieved.

4.3 Therefore, the Board sees the technical problem underlying the disputed patent, in the light of the closest state of the art as represented by document (3) completed with the technical information contained in document (4), in providing a simple apparatus having an improved capacity for producing dewatered paper pulp containing a higher content of solids.

4.4 According to the present Claim 1 of the disputed patent, this technical problem is solved by an apparatus which is essentially characterised by an endless wire belt arrangement comprising an inner surface which cooperates with a substantial portion of a first liquid-impervious roll (120) having indentations (121) in its surface and a second liquid-impervious roll (122), headbox means operable to discharge the pulp suspension into a wedge zone which is defined by the first roll (120) and the inner surface of the belt where it approaches the first roll, and pulp collecting means (150, 155) to collect the resulting thickened paper pulp from the surface of the second roll (122).

4.5 Having regard to the description of the patent in suit indicating that rolls provided with indentations increase the space wherein fibers can be received and held and that, due to the effect of centrifugal force, these indentations do not retain liquid, but do increase the capacity of the apparatus (cf. column 4, lines 18 to 34), as well as in view of the technical data of the apparatus claimed in the disputed patent compared with those of the "Vario-Split" apparatus submitted by the Appellant on 6 October 1995 (cf. particularly points 4 and 5 of the letter and Exhibit Ax 7d), the Board considers it plausible that the technical problem as defined above has been solved. According to the description of the patent in suit a thickening apparatus embodying the claimed invention, wherein the first and second roll are 0.61 m in diameter and **only 0.38 m in width** and have their axes 1.83 m apart, operated at a feed consistency of 1.5% solids and speeds in the range of 457 to 914 m/min can handle 63 (instead of the faulty indicated 71.12) metric tons per day (70 tons/day) and increase the consistency of the feed to between 9 and 12% solids (cf. column 7, lines 27 to 42), whereas a "Vario-Split" apparatus **having a working width of 2.4 m** gives a maximum production of 100 t/24h (cf. the Table in Exhibit 7d) and a thickened suspension having 5 to 8% solids (cf. (3), column 4, lines 9 to 14) at comparable feed consistency and operating speeds (up to 1.5% of solids and a rotation speed of 400 to 1200 m/min respectively as indicated in (3), column 3, line 61 to column 4, line 5). These results as such were not contested by the Respondent.

In this context the Respondent only contended that the data in question were not comparable, since the capacity and thickening data indicated for the "Vario-Split" apparatus were obtained under conditions for providing optimum washing results, whereas the corresponding data

indicated for the apparatus of the patent in suit were achieved by using operating conditions for realising an optimum thickening of the paper pulp suspension. However, this contention, which was disputed by the Appellant by arguing that washing out of fines and ink particles was more effective at larger outputs of water, cannot be accepted by the Board, since it follows from the test-results provided in document (4) (published by the Respondent himself) that in operating the "Vario-Split" apparatus optimum thickening results are obtained by forming a fiber web between the movable wire belt and the rotatable cylinder having a weight of about 30 to 50 g/m<sup>2</sup> and by using wire speeds between 400 and 800 m/min (cf. (4), points 4.1 to 4.3, particularly Figures 9, 11 and 13), i.e. in using operating conditions which are essentially the same as those preferably used for washing (cf. (3), column 3, last line to column 4, line 5, and Claim 1; and (4), Figures 7, 8, 11 and 12).

- 4.6 The question now is whether the cited prior art would have suggested to a person skilled in the art solving the above-indicated technical problem in the proposed way.
- 4.7 Although documents (3) and (4) - like the claimed apparatus of the disputed patent - both relate to an apparatus for thickening a suspension of paper pulp of a very low consistency of solids in water, it is clear from the preceding considerations that these documents do not give any pointer to the skilled person that the technical problem underlying the disputed patent in suit could be solved by an apparatus as now claimed.

4.8 Document (8) describes a variety of apparatus for the continuous separation of liquids from solids, such as the apparatus shown in Figures 1, 3, 4, 7 and 9 having in common a construction capable of providing a very thin layer of a mixture of solid and liquid to be separated, designated as "pulp", between pressure surfaces formed by the face of one or more rapidly rotating pulleys and at least one revolving foraminous belt so that the liquid of the "pulp" is forced through the belt (acting as a filter) by centrifugal force (cf. page 1, lines 82 to 107). In addition, it is indicated in this document that the invention also contemplates aiding the expulsion of liquid from the "pulp" by the introduction of air between the pulley face and the belt, which may be accomplished in different ways, but - as can be deduced from the claims and the variety of apparatus shown in the drawings - is preferably achieved by one or more pulleys provided with perforations in their rim and means for forcing air successively through the rim, the "pulp" and the belt (cf. page 2, lines 5 to 14; apparatus claims 2 to 5; and Figures 1, 3, 4, 7 and 9, as well as the corresponding parts of the description).

The Respondent contended lack of inventive step essentially on the basis of the construction of the apparatus according to Figure 4 when combined with the further technical teaching of document (8). He argued that this particular apparatus could be easily modified in order to provide the claimed apparatus.

However, according to the description of document (8) the apparatus of Figure 4 is particularly designed for the elevation of the separated solid material and for drying the "pulp" as thoroughly as possible (cf. page 1, lines 32 to 37; page 2, lines 65 to 68; and page 3, line 95 to page 4, line 3). Therefore, in the Board's



judgment, a skilled person wishing nothing more than to provide an improved apparatus for thickening very thin paper pulp suspensions to a consistency of solids which can be suitably further applied in the paper industry (i. e. without any need for elevating the solid separated material), would have had no reason for picking out this particular apparatus from the variety of apparatus disclosed in this document.

Moreover, even if he had done so, he would have been left with an apparatus comprising a first pulley (55) having a perforated rim, and a filter belt which may be provided on the side coming onto the filter pulley with a number of narrow longitudinal non filtering ridges serving to regulate the depth of the layer of "pulp" and to prevent its lateral squeezing out at the edges of the belt, as well as to increase the strength of the belt (cf. page 3, lines 117 to 124; page 2, lines 87 to 119; and Figure 6). It is true, that document (8) also describes that in some cases, and for some materials, the perforated rim may not be advantageous and ordinary pulleys may be used, and that in such cases air may be injected by any suitable means (cf. page 3, lines 18 to 26). Moreover, it is also true that it discloses that the pulley (47) may have circumferential ridges (40) as shown in Figure 5 (instead of ridges on the belt) involving the same idea of regulating the depth of the "pulp" and confining it laterally (cf. page 2, lines 106 to 113). Thus, although, in the Board's judgment, it could be derived from the disclosure of this document that the pulley (55) of the apparatus of Figure 4 which comprises a smooth and perforated rim may be replaced by a plain pulley containing circumferential ridges, the

relevant fact remains, however, that it does not comprise any suggestion that by doing so any advantage would be achieved, let alone that the capacity and the thickening efficiency of the apparatus would be improved.

Therefore, also document (8) does not hold out any prospect to the skilled person for the solution of the existing technical problem.

5. In conclusion, the Board finds that the apparatus according to Claim 1 involves an inventive step.

Since Claims 2 to 15 relate to particular embodiments of the apparatus claimed in Claim 1, they are also allowable.

6. The Board observes that on 6 October 1995 the Appellant filed an amended description to bring it into conformity with the amended claims. This amended description also comprised a discussion of document (3) including statements indicating less satisfying properties of the apparatus described therein when compared with the apparatus of the disputed patent. However, in this context the Board wishes to observe that in accordance with the established jurisprudence of the Boards of Appeal any amendment of a granted patent in the course of opposition and subsequent appeal proceedings, including amendments to the description, should be **strictly limited to what is necessary in order to meet the grounds of opposition raised during such proceedings** (cf., for instance, T 127/85, OJ EPO 1989, 271, point 7.1 of the reasons; and T 550/88, OJ EPO 1992, 117, point 4.5 of the reasons).

Thus, in the present case, statements in the amended description filed on 6 October 1995 going beyond this should not be put forward. In addition amendments are required in order to bring the description in line with the present claims. Therefore, the Board remits the case to the Opposition Division in accordance with Article 111(1) EPC for the purpose of properly adapting the description of the patent in suit to the present claims, whereby these amendments should be limited to the deletion of the subject-matter no longer covered by the claims.

**Order**

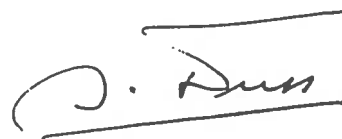
**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order that the patent be maintained on the basis of the set of claims submitted at the oral proceedings on 7 November 1995, and a description to be adapted.

The Registrar:

  
E. Gorgmajer

The Chairman:

  
A. Nuss

