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**D E C I S I O N**  
**of 11 January 2000**

**Case Number:** T 0099/96 - 3.2.3

**Application Number:** 87630144.1

**Publication Number:** 0258169

**IPC:** D21F 3/02

**Language of the proceedings:** EN

**Title of invention:**

A press apparatus

**Patentee:**

BELOIT TECHNOLOGIES, INC.

**Opponent:**

J.M. VOITH GmbH  
SULZER-ESCHER WYSS GmbH

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 52, 54, 56

**Keyword:**

"Inventive step (yes)"

**Decisions cited:**

-

**Catchword:**

-



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Boards of Appeal

Chambres de recours

**Case Number:** T 0099/96 - 3.2.3

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.3**  
**of 11 January 2000**

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**Decision under appeal:** Interlocutory decision of the Opposition Division

of the European Patent Office posted 8 January  
1996 concerning maintenance of European patent  
No. 0 258 169 in amended form.

**Composition of the Board:**

**Chairman:** C. T. Wilson  
**Members:** J. du Pouget de Nadaillac  
M. Aúz Castro

## Summary of Facts and Submissions

I. The appeal is directed against the interlocutory decision dated 8 January 1996 of an Opposition Division of the European Patent Office, which maintained the European patent EP-B1-0 258 169 on the basis of the amended claims 1 to 14, as filed on 3 June 1994. According to this decision, the subject-matter of these claims is new and involves an inventive step, having regard to the disclosures of the following prior art citations E1, E8 and E7, which were considered the most relevant documents among those cited by the opponents I and II and by the patentee during the opposition proceedings:

E1: DE-A-19 23 784

E7: EP-A-0 060 878

E8: DE-A1-34 10 171

II. The amended Claim 1 reads as follows:

"An extended nip press apparatus for removing fluid from a fibrous web (W; WA to WN) during passage of the web through the press section of a papermaking machine, said apparatus comprising:

a press roll (12; 12A to 12N),  
blanket means (14; 14A to 14N) cooperating with said press roll (12; 12A to 12N) for defining therebetween elongate pressing section (20; 20A to 20K) such that the web is-pressed between said press roll (12; 12A to 12N) and said blanket means (14; 14A to 14N) during passage through said pressing section (20,

20A to 20K3,

an elongate extended nip press shoe (22, 22A to 22K) for urging said blanket means (14; 14A to 14N) towards said press roll (12; 12A to 12N),

said elongate press shoe (22, 22A to 22K) having a concave surface cooperating with a convex surface defined by said press roll (12; 12A to 12N) such that when said blanket means (14; 14A to 14N) and the web (W; WA to WN) pass through said pressing section (20; 20A to 20K), fluid is removed from the web, and

a preheater (32A; 32B) disposed adjacent to the web (W, WA to WN) for heating the web prior to the passage of the web (W; WA to WN) through the pressing section (20, 20 to 20K),

characterized in that said apparatus comprises further heating means (28; 28A to 28K) disposed adjacent to said press roll (12; 12A to 12N) for transferring thermal energy to the web during passage of the web through said pressing section (20; 20A to 20K),

said thermal energy being transferred to the web either by said press roll (12A; 12B; 12E; 12F; 12I; 12J; 12K)

or by a thermal transfer means (18; 18C; 18D; 18G; 18L; 18M; 18N) cooperating with said blanket means (14; 14A to 14N) for defining said pressing section therebetween,

and that when the web (W; WA to WN) passes through the pressing section between said elongate press shoe (22; 22A to 12N) and said press roll (12; 12A to 12N), the web (W; WA to WN) is continuously subjected for an extended period to increased pressure and temperature, so that water vapor generated within said pressing section (20; 20A to 20K) during the passage of the web

through the pressing section (20; 20A to 20K) forces the fluid in the liquid phase away from the web."

The other independent claim, namely Claim 14 in the amended set of claims, reads as follows:

"A method of pressing fluid from a fibrous web (W; WA to WN) in an extended nip press apparatus during passage of the web through the press section of a papermaking machine, said method including the steps of:

passing the web (W;WA to WN) between a rotatable press roll (12; 12A to 12K) and a blanket (14; 14A to 14N) cooperating with the press roll such that the web passes through an elongate pressing section (20; 20A to 20K) for removing the fluid from the fibrous web,

urging the blanket (14; 14A to 14N) towards the press roll by an elongate extended nip press shoe (22; 22A to 22K) having an concave surface cooperating with a convex surface defined by the press roll (12; 12A to 12N) such that when the blanket (14; 14A to 14N) and the web (W; WA to WN) pass through the pressing section, fluid is pressed from the web, and

preheating the fibrous web (W; WA to WN) to a first temperature prior to passing through said pressing section,

characterized by transferring thermal energy to the web within the pressing section by heating means (28; 28A to 28K) disposed adjacent to the press roll (12; 12A to 12N),

the fibrous web being heated during passage through said pressing section (20; 20A to 20K) either by said press roll (12A; 12B; 12E; 12F; 12I; 12J; 12K) or by a thermal transfer means (18; 18C; 18D; 18G; 18L;

18M; 18K) cooperating with said blanket means (14; 14A to 14N) for defining the pressing section therebetween, and that when the web passes through the pressing section, the web is subjected for an extended period to increased pressure and temperature so that water vapor generated within the pressing section during the passage of the web through the pressing section forces the fluid in the liquid phase away from the web."

III. The appellant (opponent I) lodged the appeal on 19 January 1996 and paid the appeal fee at the same time. Together with the statement of grounds of appeal which was received on 26 August 1996, thus beyond the four months time limit prescribed by Article 108, third sentence, EPC, the appellant, making use of Article 122 EPC, filed a request for re-establishment of rights and paid the appropriate fee. The board of appeal by an interlocutory decision dated 18 December 1997 re-established the rights of the appellant.

Oral proceedings were then held on 11 January 2000.

IV. In these oral proceedings, the appellant and the party as of rights (opponent II) first contended that only the feature given in the first paragraph of the characterising portion of Claim 1 is a true feature and, thus, constitutes the sole distinguishing feature of the claim vis-a-vis the disclosure of citation E8, which represents the prior art closest to the present invention. The features which follow in Claim 1 are either a mere repetition of this feature or implicitly disclosed by it.

As far as the two other citations E7 and E1 are

concerned, they argued as follows:

In the citation E7, linear and not elongate press nips are indeed disclosed, but the person skilled in the art nevertheless receives from this document the teaching of providing pre-heating means and further heating means, both for heating the web during its passage through the press section, and that in particular near the nips so that the thermal energy is utilized in the nips. The main object of this heating is given as to improve the dewatering in the press section. In this prior art, the web itself is first heated by the heating means, but it is clear that the press roll, on the surface of which the web is partly wrapped, is also heated. This way of indirectly heating the roll through the web is not excluded by Claim 1 of the patent in suit. As far as the heating temperatures are concerned, they are firstly not mentioned in said Claim 1 and secondly, the upper limit of 95°C given in E7 is only a preferred upper limit, and nothing more. In view of this teaching, it is consequently obvious to improve the dewatering of the press section according to document E8 by means of further heating means disposed adjacent to the press roll, arriving thereby at the subject-matter of Claim 1 of the patent in suit. The patentee has argued that, prior to the present invention, a prejudice was existing against the simultaneous application of high pressures and high temperatures in an extended press nip because of a possible delamination of the web, however he has never substantiated this statement.

The disclosure of document E1 is not limited to the drying section of a paper machine; it also concerns the



pressing section or at least a pressing step, since page 1 of this document indicates that the invention disclosed therein concerns an apparatus for pressing a web.

V. The respondent (patentee) essentially replied that the core of the present invention is not only to be seen in the heating of a paper web before its entry into a press nip, but also in its heating when it is inside the extended press nip. He moreover submitted that, in contrast thereto, the teaching of E7 is limited to heating means which are located between the nips, and that the object of the second heating means is to compensate the heat loss of the web between the nips. Moreover, the press roll of this prior art, which is adjacent to the second heating means, is a stone press. This kind of press roll requires long heating times in order to be warmed. Therefore, the treatment of the web according to this prior art does not correspond to the solution of the present invention. Attention is also drawn to the fact that both citations E7 and E8 are the property of the same firm, which however did not combine their teachings.

VI. The appellant and the party as of right requested that the decision under appeal be set aside and that the European patent No. 258 169 be revoked.

The respondent requested that the appeal be dismissed.

## **Reasons for the Decision**

1. The appeal is admissible.
2. Since none of the cited prior art documents discloses an extended press nip apparatus having all the features of Claim 1, its subject-matter is considered to be new (Articles 52 and 54 EPC). In the oral proceedings on appeal, this issue was no longer contested.
3. Not disputed is also the fact that the apparatus described in citation E8, which is cited in the introductory part of the description of the patent in suit, represents the prior art closest to the present invention. It describes a two-nip press section of a paper machine, which comprises all the features of the preamble of Claim 1. At least the second nip is an elongate extended press nip comprising a press shoe, which urges the blanket means and the fibrous web against a press roll. Before this nip, heating means, in the form of a steam supply box and considered as the preheater in Claim 1, is disposed adjacent to the web, as said web is moving over a 180° sector of a suction roll surface, towards said extended press nip. According to page 13 of citation E8, the dewatering in the extended press nip is thereby improved.
4. According to the description of the patent in suit, the main object of the invention is to remove greater quantities of water from the fibrous web, in other words to improve the dewatering capacity or drying efficiency of such a known press section, which comprises an extended nip press shoe.
5. This problem is solved by the features of the characterising portion of Claim 1, namely that:

- (a) said apparatus comprises further heating means (...) disposed adjacent to said press roll (...) for transferring thermal energy to the web during passage of the web through said pressing section (...),
- (b) **said thermal energy being transferred to the web** either by said press roll (...) or by a thermal transfer means (...) cooperating with said blanket means (...) for defining said pressing section therebetween, and
- (c) that when the web (...) passes through the press section between said elongate press shoe (...) and said press roll (...), the web is continuously subjected for an extended period **to increased pressure and temperature**, so
- (d) that water vapor generated within said pressing section (...) during the passage of the web through the pressing section forces the fluid **in the liquid phase** away from the web.

6. During the discussions in the oral proceedings on appeal, the respondent acknowledged that the reference signs, briefly shown above by the signs (...) when relating to the further heating means, were incomplete (according to Rule 29(7) EPC, such a deficiency has no effect on the scope of the claim) and that the further heating means according to the invention can comprise means heating directly the press roll surface (Figures 2, 3, 9 and 10), or means heating the roll through the web combined with means heating directly the transfer means (Figures 4 and 5), or means heating

the roll through the web, possibly associated with the blanket, these means being combined with means heating directly the press roll (Figures 6 and 5), means heating the transfer means through the blanket (Figure 8), or heating means located inside the press roll (Figure 11). In each embodiment, therefore, either the press roll or the transfer heating means directly transfers heat to the web, when said web is passing through the extended nip. This aspect of the invention is emphasized by the above feature (b) in combination with the expression "subjected continuously to increased pressure and temperature" (in the extended press nip) of the following feature (c).

Feature (d) moreover indicates the result which has to be obtained and sets out precisely that, due to the increased pressure and temperature, first water vapor is generated in the pressing section and that further said vapor forces the fluid **in the liquid phase** away from the web. Such a result implies temperatures inside the pressing section, which are at least at the boiling point of water, and consequently temperatures of the thermal transfer means, namely the press roll or the mentioned particular transfer means, which are well above this point. This interpretation of the above features (b) to (c) is confirmed by the description of the patent as granted, see column 3, lines 46 ff., and line 1 of column 17, which disclose that the basic concept of the invention is the application of high temperatures to the web in order to obtain such an effect, namely that a rapid evolution of water vapor forces the water remaining in the web to flow out of the web in the liquid phase, that is to say under its boiling point. Pressures of up to 107 bar and temperatures of up to 649°C for the press roll are given. According to the description of the patent in suit, it is the combination of high pressures and high temperatures inside the extended nip, which allows such a result to be obtained.

As a consequence, the board of appeal cannot follow the statement of the appellant that features (b) to (c) of the above solution are to be neglected. Claim 1, although it is drafted as an apparatus claim, is in fact to be considered as a mixture of apparatus and process claim, and the solution as claimed does not reside in the feature (a) alone, but in the provision of heating means disposed adjacent to said press roll

for transferring thermal energy to the web by means of either the press roll or particular thermal transferring means **during** the passage of the web through the pressing section, so that said web inside said section is **continuously** subjected to increased pressure and temperature in order to obtain the result claimed in feature (d). Increased temperatures mean temperatures not only higher than those of the preheated web just before it enters into the pressing section, but higher enough so that the feature (b) is obtained. Therefore, the heating means and their cooperation with the roll or thermal transfer means are to be constructed or arranged so as to obtain this result.

7. In the oral proceedings on appeal the appellants have essentially based their objection of lack of inventive step on the combination of the above mentioned closest prior art with the teaching of the citation E7 .

The object of this last document is to improve the dewatering action of the press section of a paper machine running at high speeds. According to this document, it was already known to boost the dewatering by raising the temperature of the felt, web or press roll, however only small improvements were obtained, since on the one hand, the heating temperatures were to be kept relatively low to avoid deteriorations of the felt, which moves with the web, and, on the other hand, the time available for heat transfer was limited because of the high velocities. The solution proposed by this document consists, in a press section comprising three linear press nips, in having first heating means between the first and second press nips

for one side of the web and second heating means between the second and third nips for the other side of the web, the thermal energy of these two heating effects being such that the temperature of the web rises before the last nip at least above 50°C but remains preferably below 95°C, since one basic idea of the solution is to create strengthening bonds of hemicellulose (a kind of fibres of the web) contained within the web, while taking care not to heat the web past the softening points of other kinds of fibres of the web, for example lignite and cellulose. The first heating means consists of a hood supplying hot steam onto the web during its passage over a section of the suction roll, which is one of the two rolls defining the second nip, the web passing over the surface of the other roll after said nip. The second heating means in the form of infra-red radiators extends over the largest possible sector of this other roll between the second and third nips, said roll being a smooth-surface stone roll. This particular kind of heating means is used, since it provides heat deeply enough in the web in order to reach the wished bond effect which strengthens the web simultaneously with the increase of dryness of the web and, thus, permits higher speeds. It is moreover disclosed in this citation E7 that it is possible in both heat treatment steps to extend the heat treatment very close up to the nips so that the thermal energy directed to the web is efficiently used in the nips (column 4, last lines). In the last part of the description, see column 12, lines 4 to 12, a short sentence at the end of the paragraph indicates that, because of the second heating means, the stone roll fairly soon acquires a certain constant temperature and, thus, heats the web in the second nip and

thereafter (column 12, lines 4 to 12).

8. It is first pointed out that this prior art does not deal with extended press nips, thus even less with press shoe nip, so that, having regard to the problem underlying the present invention, it is already doubtful whether the person skilled in the art would have considered this document.



Should he nevertheless have done so because of the broad aim of improving the dewatering of a web in a press section, he would not have found a teaching which substantially brings much more than that which was already known from the closest prior art according to E8. As mentioned above in Point 3, it was known from this closest prior art that the dewatering effect in the extended nip was improved by the heat provided by the steam pre-heater. What can be further suggested by the citation E7 is eventually to bring the heating means very close up to a nip for the same object, since otherwise this prior art only teaches to provide heating means between each pair of nips and nothing more, and that for a different purpose, namely for alternate heating of both sides of the web. Contrary to the opinion of the appellants, no clear suggestion appears in this prior art to provide further heating means for the same nip additionally to first heating means, such as the pre-heater according to E7. The only possible step for improving the dewatering effect, which could be deduced from E7, would therefore have been to bring the pre-heater closer to the pressing section in the arrangement according to E8.

9. The heating means in the disclosure of E7 can only heat the rolls through the web, since the web is the element of the press section, which is heated first. There is no direct heating of the roll or of thermal transfer means, so that, inside the nip, the temperatures which could be obtained are lower than or equivalent to those of the web given by the upstream located heating means. Therefore, there is no suggestion in E7 to provide further heating means, which constitutes means for subjecting the preheated web continuously and

simultaneously to an increased pressure and temperature inside the pressing zone, that is to say for an extended period. By locating the heating means between the nips, E7 rather teaches a successive application of heat and pressure. Moreover, the limited temperature range given in E7, even if it is only disclosed as preferable, at least cannot suggest the result according to feature (d) of the claimed solution.

For all these reasons, the combination of the prior art according to E8 with the teaching of the citation E7 does not lead to the subject-matter of Claim 1 of the patent in suit.

10. In his written submissions, the appellant has further combined E8 with the citation E1. This last citation concerns a quite particular apparatus comprising hose rolls, whose first object is to improve the elasticity of the paper web. In the drying section of a paper machine, these hose rolls are located between and pressed by drying cylinders of larger diameters. Consequently, between the drying cylinders and the hose rolls extended nips are formed, in which the paper web travels. The appellant has assimilated these extended nips to the extended nip obtained between a press shoe and a press roll, although a press shoe forms a solid surface. Already for this reason, the production of this document appears to be the result of a search a posteriori.

Moreover, this document does not relate to the press section of a paper machine. It is clearly indicated on page 1 of this citation that the therein disclosed invention concerns an apparatus for pressing a web

against a movable counter-surface, and as far as a paper machine is given as example, it is the drying section of this machine which is mentioned. As a consequence, a dewatering process by pressing is not disclosed, nor an extended press. Moreover, this document does not teach to remove water in the liquid phase from a web by a simultaneous application of heat and pressure over a long period, so that an important concept of the present invention as claimed is missing. Thus, this citation E1 cannot suggest the solution of the present invention according to Claim 1.

11. It follows that the apparatus according to present Claim 1 of the patent in suit involves an inventive step. Since the method according to Claim 14 comprises all the same features, however presented in the form of process steps, the same conclusion applies for this claim.

## **Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

N. Maslin

C. T. Wilson