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**Datasheet for the decision  
of 22 July 2009**

**Case Number:** T 0177/07 - 3.2.05

**Application Number:** 99910906.9

**Publication Number:** 1071847

**IPC:** D21F 3/00

**Language of the proceedings:** EN

**Title of invention:**

Paper machine and method of manufacturing a paper web

**Patentee:**

Metso Paper, Inc.

**Opponent:**

Voith Patent GmbH

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 56

**Relevant legal provisions (EPC 1973):**

-

**Keyword:**

"Inventive step - yes"

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 0177/07 - 3.2.05

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.05  
of 22 July 2009

**Appellant:**  
(Opponent)

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**Decision under appeal:**

**Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
23 November 2006 concerning maintenance of  
European patent No. 1071847 in amended form.**

**Composition of the Board:**

**Chairman:** W. Zellhuber  
**Members:** H. Schram  
E. Lachacinski

## Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal against the decision of the Opposition Division posted on 23 November 2006 maintaining the European patent No. 1 071 847 in amended form.

The Opposition Division held that the grounds of opposition under Article 100(a) EPC (lack of novelty, Article 54 EPC, and lack of inventive step, Article 56 EPC) and under Article 100(b) EPC (insufficiency of disclosure, Article 83 EPC) did not prejudice the maintenance of the patent in amended form on the basis of claims 1 to 15 filed as main request on 18 October 2006.

- II. Oral proceedings were held before the Board of Appeal on 22 July 2009.

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

The respondent (patent proprietor) requested that the appeal be dismissed.

- IV. Claim 1 as maintained by the Opposition Division reads as follows:

1. A paper machine for manufacturing a continuous paper web (1), comprising:
  - a wet section (2),
  - a press section (3) having at least two consecutive first and second double-felted presses (6, 7), each of which comprises an upper press

member (8, 15), a lower press member (9,16), said press members (8, 9; 15, 16) forming first and second press nips, respectively, (N1, N2) with each other, an upper press felt (10, 17) which runs in a loop through the first press nip (N1) and second press nip (N2), respectively, and a lower press felt (13, 19) which runs in a loop through the first press nip (N1) and second press nip (N2), respectively,

- a drying section (25),
- a clothing (4) disposed upstream of the first press (6),
- a clothing (22) disposed downstream of the second press (7),
- a first transfer zone (T1) arranged between said clothing (4) disposed upstream and the first press (6),
- a second transfer zone (T2) arranged between the first press (6) and the second press (7), and
- a third transfer zone (T3) arranged between the second press (7) and said clothing (22) disposed downstream, one of the press felts (10, 13, 17, 19) in each of said first and second presses (6, 7), in an alternating relationship between the presses (6, 7), being arranged to pick up the paper web (1) in the transfer zone (T1, T2) situated upstream of the press nip (N1, N2) belonging to it, and said press felts (10, 19) used as pick-up felts also being arranged to carry and transfer the paper web (1) from the press nip (N1, N2) belonging to it to the following transfer zone (T2, T3), both the first and the second presses (6, 7) being shoe presses (6, 7) and one press member (8, 16) of

both shoe presses (6, 7) being a shoe press roll (8, 16), characterized in that the shoe press roll (8, 16) of both the first and the second shoe press (6, 7) is arranged in the loop formed by the press felt (10, 19) which also functions as pick-up and transfer felt.

V. The following documents were *inter alia* referred to in the appeal proceedings:

D2 EP-A 0 598 991

D4 DE-U 297 01 382

D6 DE-A 36 04 522

VI. The arguments of the appellant, in writing and during the oral proceedings, can be summarized as follows:

The subject-matter of claim 1 as maintained differed from the paper machine for manufacturing a continuous paper web shown in Figure 4 of document D4 only in its characterizing part, namely that "*the shoe press roll (8, 16) of both the first and the second shoe press (6, 7) is arranged in the loop formed by the press felt (10, 19) which also functions as pick-up and transfer felt*". The characterizing feature allegedly solved the problem of reducing, or eliminating, the risk of web theft, cf. paragraph [0008] of the patent in suit without using a suction device during normal operation. In Figure 4 of document D4 the "opposite" rolls (Gegenwalzen 14, 44) —rather than the shoe press rolls as in the alleged invention— were arranged in the loop formed by the pick-up and transfer press felts 26, 48.

All that was needed to arrive at the invention was to swap the (location of the) shoe press rolls and the opposite rolls in Figure 4 of document D4. That this measure was obvious followed from page 8, fourth paragraph, of document D4 itself, where it was stated that the purpose of the suction device 60 (shown in Figures 2 and 4) was to separate the paper web 56 from the lower "shoe press" felt 36. This was a hint to the person skilled in the art that the paper web had a tendency to adhere more strongly to the shoe press felts 36, 62 in Figure 4 (cf. column 2, lines 41 to 45, of the patent in suit). The person skilled in the art seeking to eliminate the risk of web theft would readily realize that by switching the locations of the shoe press rolls and the opposite rolls in Figure 4 of document D4, the risk of web theft would be reduced. This followed also from the first press section shown in Figure 1 of document D4, wherein the shoe press roll was arranged in the loop formed by the pick-up and transfer press felt and wherein a suction device was not needed. Moreover, it was general knowledge in the art that a paper web had a tendency to adhere more strongly to the roll with the smoother surface. The subject-matter of claim 1 as maintained therefore did not involve an inventive step with respect to document D4, taken alone or in combination with the general technical knowledge of a person skilled in the art.

Document D6 taught (see page 8, lines 7 to 11, and claim 1) the use of so-called extended nip presses ("Langspaltpressen"), whereby an elastic nip-extending resilient belt 100 ran about the upper smooth-faced roll 24 and the lower press roll 25 was provided with a hollow face ("hohlprofilierte Oberfläche"). A striking

difference between Figures 1 and 2 of document D6 was that in Figure 1 a suction device was present in the lower loop formed by the transfer press felt 40, although the paper web was guided from the press nip  $N_1$  to the lower lying transfer nip  $N_0$ , so that the paper web was supported by gravity. In contrast, in Figure 2 a suction device was absent in the upper loop formed by the pick-up and transfer press felt 21 (see page 14, lines 23 to 25), although the paper web was guided from the press nip  $N_1$  to the higher lying transfer nip  $N_0$  against the force of gravity. This was again a hint to the person skilled in the art that a paper web had a tendency to adhere more strongly to the roll with the smoother surface, irrespective of whether a transfer of the web took place after the nip. The person skilled in the art would apply the teaching of Figure 2 of document D6, ie arranging the smooth-faced roll in the loop formed by the pick-up and transfer press felt obviates the use of a suction device, to the paper making machine known from Figure 4 of document D4 and arrange the shoe press rolls 16 and 46 in the loop formed by the pick-up and transfer press felts. The subject-matter of claim 1 as maintained therefore did not involve an inventive step with respect to document D4 in combination with document D6.

Document D2 disclosed (see Figures 1 to 3) a press section for a paper machine having at least one press unit (shoe press roll 3, opposite roll 1) as well as sections connected after the press section, e.g. a second press unit or a drying section, furthermore having an upper pick-up and transfer press felt 5 and a lower press felt 4 guided through the press nip, whereby the shoe press roll 3 was arranged in the loop

of the pick-up and transfer press felt 5 just as in the patent in suit. A suction pipe 9 was arranged after the press nip, which vacuum however was switched off in normal operation, see column 5, lines 15 to 18, of document D2. The person skilled in the art seeking to reduce, or to eliminate, the risk of web theft in the paper machine shown in Figure 4 of document D4 without using a suction device in normal operation, would therefore switch the locations of the shoe press rolls and the opposite rolls in Figure 4 of document D4, and would thus have arrived at the invention. The subject-matter of claim 1 as maintained therefore did not involve an inventive step with respect to document D4 in combination with document D2.

Document D6, which was filed in 1986, could also be taken as a starting point for assessing inventive step. The subject-matter of claim 1 as maintained differed from the paper machine shown in Figure 2 of document D6 in that shoe presses, rather than extended nip presses as in document D6, were used. Although in document D6 it was stated (see paragraph bridging pages 8 and 9) that so-called shoe solutions were difficult to accomplish, this no longer applied at the relevant filing date of the patent in suit, see eg document D2. Moreover, the alleged difficulties of shoe presses mentioned in document D6 had nothing to do with the problem of web theft. The person skilled in the art was therefore not discouraged from replacing the extended nip presses by shoes presses. The subject-matter of claim 1 as maintained therefore did not involve an inventive step with respect to document D6, taken alone or in combination with document D2.



VII. The respondent's arguments in writing can be summarized as follows:

The inventor of the present invention performed experiments with a paper machine for manufacturing a continuous paper web with a view to find the cause why the paper web sometimes did not accompany the desired press felt. It was found that the web had a tendency to follow the pick-up felt and that the web had a tendency to adhere to the press felt forming the loop wherein the shoe press roll was arranged. The present invention advantageously used this insight to reduce or eliminate the risk of web theft. Whilst it was general knowledge that the smoother the surface of a roll paper webs adhered more easily to it, this was not to say that it was known in the art that this also applied to the case where there was a felt in between the web and the roll. From the passage in column 2, lines 41 to 55, of the patent in suit referred to by the appellant describing general knowledge, it could not be derived that it belonged to the common general knowledge that the paper web had a tendency to adhere to the press felt forming the loop wherein the shoe press roll was arranged. Documents D4 and D2, and document D6 were silent about the tendency of the web to adhere to the press felt forming the loop wherein the shoe press roll and the extended nip roll, respectively, were arranged.

The embodiment shown in Figure 4 of document D4 represented the closest prior art. This document disclosed a paper machine for manufacturing a continuous paper web according to the preamble of claim 1 as maintained. In that embodiment the shoe press rolls 16, 44 were not arranged in the loop formed by

the pick-up and transfer press felts. It could not be inferred from the presence of the suction devices 60, 68 in the loop formed by the pick-up and transfer press felts 26, 48 in Figure 4 of document D4, that the reason for that was that the web had a tendency to adhere to the opposite press felts 36, 62 forming the loop wherein the shoe press roll was arranged. Likewise, it could not be inferred from the absence of a suction device in the paper machine shown in Figure 1 of document D4, that the web had a tendency to adhere to the press felt 26 forming the loop wherein the shoe press roll 14 was arranged.

The person skilled in the art starting from the paper machine known from Figure 4 of document D4 and seeking to optimize the location of the shoe press roll with a view to ensuring that the paper web accompanied the desired press felt would not consider document D6 in the first place, because the paper machine disclosed in document D6 did not have shoe presses. Moreover, other measures for ensuring that the paper web accompanied the desired press felt were available to the person skilled in the art, cf. column 3, lines 14 to 19, of the patent in suit. Document D6 was not a good starting point for assessing inventive step, since it pointed away from the use of shoe presses. The appellant's argument based on Figure 3 of document D2 (whereby the suction pipe 9 was switched off) was very similar to its argument based on Figure 1 of document D4. Document D2 did not teach that the paper web had a tendency to adhere to the press felt 5 forming the loop wherein the shoe press roll was arranged.

It followed from the above that the subject-matter of claim 1 as maintained involved an inventive step with respect to document D4, or the combination of documents D4 and D6 or D2, or with respect to document D6, taken alone or in combination with document D2.

## **Reasons for the Decision**

### 1. *Objection of lack of inventive step, Article 56 EPC*

#### 1.1 The closest prior art, the problem and its solution

Document D4 represents the closest prior art.

The subject-matter of claim 1 as maintained by the Opposition Division differs from the paper machine for manufacturing a continuous paper web shown in Figure 4 of document D4 in that *"the shoe press roll (8, 16) of both the first and the second shoe press (6, 7) is arranged in the loop formed by the press felt (10, 19) [which also functions as pick-up and transfer felt]"*, cf. the characterizing feature of claim 1 as maintained.

This arrangement *"avoids the problem discussed in the introduction, viz. the paper web having a tendency to be drawn towards the opposite press felt when the shoe press roll is arranged in the loop of this press felt"*, cf. paragraph [0026] of the patent in suit. The respondent has submitted that the present invention is based on the insight that the web has a tendency to follow the pick-up felt and a tendency to adhere to the press felt forming the loop wherein the shoe press roll

is arranged. This effect was not contested by the appellant. The characterizing feature of claim 1 as maintained thus reduces, or eliminates, the risk of "web theft", ie the risk that the paper web is drawn towards the press felt which is not the transfer felt, cf. paragraph [0008] of the patent in suit.

It may be noticed that a known way to avoid web theft is to use a suction shoe, as discussed in the introduction of the patent in suit, see paragraph [0003]. In the sole drawing of the patent in suit a suction device 24 is shown in dash lines, which device is arranged in the loop of the press felt 10, see eg paragraph [0025] of the patent in suit, where it is stated: *The suction device 24 may be operated temporarily during the initial stage after changing a press felt, for instance, until the press felt has become sealed resulting in increased adhesion ability of the paper web thereto. It may also be used under difficult production circumstances entailing low grammage and high speeds.* This makes it clear that the suction device 24 is optional, see also claim 13 as maintained.

- 1.2 The inventor of document D4 evidently did not realize that swapping the location of the shoe press rolls and the opposite rolls in Figure 4 of document D4 reduced or eliminated the risk of web theft, otherwise he would have done so. In the judgement of the Board, it cannot be inferred from the presence or absence of a suction device in a Figure (cf. Figure 4 and Figure 1, of document D4, respectively), nor from the passage on page 8, fourth paragraph, of document D4, that the paper web has a tendency to adhere to the press felt

forming the loop wherein the shoe press roll is arranged. In Figure 1 of document D4 the double felt section extends beyond the nip of the first press section until the suction roll 34, so that web theft is not possible in that section (see page 6, fourth paragraph). In Figure 4 of document D4 the suction device 60 may be present to prevent the paper web sticking to the lower press felt 36 or to minimize the risk of remoistening the paper web (see eg document D2, column 5, lines 9 to 14).

- 1.3 Document D2, which is cited in paragraph [0006] of the patent in suit, discloses in Figure 3 a paper machine wherein the shoe press roll is arranged in the loop formed by the press felt 5, which functions as pick-up and transfer felt. However, there is no indication or suggestion in document D2 that this arrangement is advantageously used to reduce or eliminate the risk of web theft. It may be noticed that the deflection rolls make it possible that the web travels in a straight line, which ensures that the paper web stays with the pick-up and transfer felt 5, see column 2, line 55, to column 3, line 5.
- 1.4 Document D6 discloses a paper machine, wherein the press sections comprise so-called extended nip presses due to elastic nip-extending bands. Document D6 emphasizes that constructing a press section of a paper machine for manufacturing a continuous paper web comprising shoe presses is difficult to realize, see paragraph bridging pages 8 and 9. The subject-matter of claim 1 as maintained differs from the paper machine shown in Figure 2 of document D6 in that *"both the first and the second presses (6, 7) being shoe presses*

(6, 7) and one press member (8, 16) of both shoe presses (6, 7) being a shoe press roll (8, 16)", cf. the last feature of the preamble of that claim (assuming that the smooth-faced rolls 24, 35 and the hollow face rolls 25, 34 of Figure 2 of document D6 are simultaneously replaced by shoe press rolls and their opposite rolls, respectively). However, there is no indication or suggestion in document D6 to replace the nip presses with the elastic nip-extending bands by shoe press rolls, nor would the person skilled in the art consider this on the basis of his or her general knowledge (irrespective of whether the alleged difficulties with shoe presses mentioned in document D6 have been overcome). The argument of the appellant that the person skilled in the art would consider such a modification is, in the judgement of the Board, based on an *ex post facto analysis*, i.e. based on hindsight with knowledge of the invention.

- 1.5 The appellant has submitted that since it was general knowledge in the art that a paper web had a tendency to adhere more strongly to the roll with the smoother surface, it followed that the paper web had a tendency to adhere to the press felt forming the loop wherein the shoe press roll was arranged, since the shoe press roll had a smoother surface than the opposite roll. This argument however cannot be accepted since the strength of the adherence between the paper web and the press felt seems to be *prima facie* dependent on the surface properties of the press felt (see eg document D6, page 15, lines 19 to 24).

1.6 The appellant has constructed a further argument based on the difference between Figure 1 and Figure 2 of document D6, namely that the suction device 28 present in Figure 1 was no longer present in Figure 2.

However, in the judgement of the Board the main difference between the paper machines shown in Figures 1 and 2 is that in the paper machine shown in Figure 1 the upper felt 20 is the pick-up felt and the lower felt 40 is the transfer felt, whereas in the paper machine shown in Figure 2 the upper felt is the pick-up and transfer felt. In other words, in the paper machine according to Figure 1 the paper web is transferred from the upper felt to the lower felt as it leaves the nip. The suction device 28 in Figure 1 is needed to ensure that the paper web follows the lower felt 40 (see page 14, lines 12 to 17). The appellant has submitted that the adherence of a paper web to the upper or lower felt in the press nip did not depend on whether or not a transfer took place in the nip. However, evidence for this allegation was not provided. Moreover, this argument is not convincing, see eg point 1.3 above and claim 7 and Figure 4 of document D4. The conclusion of the appellant that a suction device was not necessary in the paper machine shown in Figure 2 of document D6, because the extended nip press was arranged in the loop formed by the pick-up and transfer press felt, is therefore based on an unproved assumption. In the opinion of the Board, a suction device can be omitted in the paper machine shown in Figure 2 of document D6 in normal operation for the same reason as the paper machine shown in Figure 3 of document D2, namely because the paper web is made to travel in a straight line from the press nip N<sub>1</sub> to the

suction zone 57a (see page 14, lines 27 to 32) without transferring from the upper to the lower felt.

- 1.7 Whilst press sections of a paper machine, wherein the shoe press roll is arranged in the loop formed by the pick-up and transfer felt, are known in the art (see eg Figure 1 of document D4 and Figure 3 of document D2), it follows from points 1.2 to 1.6 above that there is no indication, hint or suggestion in any of the documents cited by the appellant that this arrangement is advantageously used to reduce or eliminate the risk of web theft.

In the judgement of the Board, it was therefore not obvious for the person skilled in the art, starting from the paper machine for manufacturing a continuous paper web known from document D4, and seeking to solve the problem of eliminating or reducing the risk of web theft, to arrange the shoe press rolls of both the first and the second shoe presses in the respective loops formed by the press felts which also function as pick-up and transfer felts.

Consequently, the subject-matter of claim 1 as maintained involves an inventive step in the meaning of Article 56 EPC.



**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

S. Sánchez Chiquero

W. Zellhuber