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**D E C I S I O N**  
**of 21 March 2001**

**Case Number:** T 0420/97 - 3.2.2

**Application Number:** 88120268.3

**Publication Number:** 0319886

**IPC:** D21G 1/00

**Language of the proceedings:** EN

**Title of invention:**  
System of rolls in a supercalender

**Patentee:**  
VALMET PAPER MACHINERY INC.

**Opponent:**  
01: Kleinewefers GmbH  
02: SULZER-ESCHER WYSS GmbH

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 54, 56

**Keyword:**  
"Novelty - main request (yes)"  
"Inventive step - all requests (no)"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0420/97 - 3.2.2

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.2**  
**of 21 March 2001**

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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 6 February 1997  
revoking European patent No. 0 319 886 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** W. D. Weiß

**Members:** M. G. Noël  
R. T. Menapace

## Summary of Facts and Submissions

I. By decision of 6 February 1997 the Opposition Division revoked European patent No. 0 319 886 on the ground of lack of inventive step of its subject-matter vis-à-vis the state of the art represented principally by prior art documents:

D1: DE-A-3 101 429

D2: "Die Escher Wyss Nipco-Walze und deren Anwendung in der Papierindustrie" by R. Lehmann, Wochenblatt für Papierfabrikation, Nr. 22, 1973, pages 871 to 874,

D5: "Nipco-Walzen in Superkalandern" by G.W. Stotz, Wochenblatt für Papierfabrikation, Nr. 23/24, 1986, pages 976 to 983.

II. The appellant (patentee) lodged an appeal against the first instance's decision on 16 April 1997 and filed a statement of grounds on 16 June 1997.

III. Oral proceedings were held before the Board on 21 March 2001. At the oral proceedings the appellant filed amended claims according to a main request and two auxiliary requests.

At the end of the oral proceedings the request of the parties were as follows:

The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of claim 1 in the version of either the main, first or second auxiliary request and, in each case,

with claims 2 to 5 as granted.

The respondents requested that the appeal be dismissed.

IV. The claims 1 according to these three requests read as follows:

(i) Main request:

"Supercalender comprising:

- a stationary variable crown upper roll (1) adjustable in zones, the roll mantle (12) thereof being supported on the roll shaft by means of hydrostatic loading elements (13) acting in the direction of compression and the roll mantle (12) thereof being supported also by means of end bearings placed at the ends of the roll mantle, said bearings preventing displacement of the mantle ends in the radial direction relative to the shaft (11) of the upper roll; and
- a floating variable crown lower roll (2) adjustable in zones, the roll mantle (22) thereof being supported on the roll shaft (21) adjustable in the direction of compression by means of hydrostatic loading elements (23);
- several intermediate rolls (3,4) placed between the upper roll (1) and lower roll (2);
- position detectors (27,31) provided at the

ends of the shaft of at least one roll (2),

- a hydraulic system for the system of rolls;
- a control computer (5) to control the hydraulic system on the basis of the measurement impulses received from the position detectors (27,31) and from the hydrostatic loading elements (23) of at least the lower roll which impulses from the hydrostatic loading elements represent zone pressures of the loading elements (23) of the roll to regulate the position of the rolls (1-4) in the system of rolls and to balance the force effective in the system of rolls based on the measurement of position."

(ii) First auxiliary request:

Claim 1 according to the first auxiliary request differs from the main request in that the following feature is added at its end:

"and that the control computer (5) calculates from the zone pressures at the lower roll the loading of the system of rolls and regulates the regulation valves (16, 26) of the hydrostatic loading elements (13, 23) of the upper and the lower rolls, so as to adjust the linear load to correct values across the width of the system of rolls".

(iii) Second auxiliary request:

Claim 1 according to the second auxiliary

request differs from the main request

- in that at the end of the first feature (between "upper roll" and "and") is inserted:

"the shaft of the roll being supported on the frame of the supercalender by means of external loading means (14)"

- and in that at the end of the claim is added:

"and that the control computer (5) calculates from these zone pressures the loading of the system of rolls and

- on one hand adjusts the external loading means (14) of the upper roll (1) as to provide a correct level of linear load in accordance with the control impulses of the hydrostatic loading elements, and
- on the other hand regulates the regulation valves (16, 26) of the hydrostatic loading elements (13, 23) of the upper and the lower roll, so as to adjust the linear load to correct values across the width of the system of rolls."

V. The appellant put forward the following arguments:

- The new claims were amended so as to include only wordings fairly supported by the

application as filed. Moreover, claim 1 of either request was recast in a one-part form since the combination of a stationary variable crown upper roll and a floating variable crown lower roll was not known from the closest prior art document D5, this feature alone already providing the subject-matter of claim 1 with novelty with respect to the disclosure of document D5.

- Moreover, claim 1 according to the main request involved an inventive step since the device disclosed in document D5 comprised only one position control of the system of rolls based on signals received from position detectors on the lower roll. Since the hydrostatic loading elements of this roll were not adapted to deliver additional pressure measurements, no zone pressure control was possible. The oil pressure controller illustrated e.g. on Figures 12 to 17 of document D5 acted merely as intermediate regulating element under the supervision of the position controller. In contrast thereto, the present invention used two combined control systems in order to control both the position of the rolls and the balance of forces effective in the system of rolls, warranting an adequate and rapid attenuation of vibrations.
  
- The features of claim 1 according to the first auxiliary request provided the additional function that zone pressure measurements on the lower roll were processed in the computer to regulate the hydrostatic loading elements of



both the upper and the lower rolls, so as to adjust the linear load of the system of rolls. This feature was not disclosed by the state of the art.

- Claim 1 of the second auxiliary request provided further for external loading means on the upper stationary roll, so as to correct the level of linear load in accordance with zone pressure measurements received from the hydrostatic loading elements. Also this feature was novel.

VI. The respondent submitted the following arguments:

- Although the amended claims were now based on the description, the invention was not sufficiently disclosed, however, for it to be carried out by a person skilled in the art.
- The subject-matter claim 1 according to the main request was not new or at least did not involve an inventive step vis-à-vis document D5 which disclosed, besides different embodiments including a stationary upper roll and a floating variable crown lower roll, also two independent control systems comprising position control means and zone pressure control means based on signal measurements received from detectors placed on the shaft and on the hydrostatic loading elements of the lower roll, respectively. The use of variable crown rolls adjustable in zones implied the feature of zone pressure control means, e.g. of the type identified on Figures 12 to 17 of document D5 by the bloc "oil pressure regulator".

- Claim 1 according to either the first or the second auxiliary requests did not add anything inventive to the main request. Also according to document D5 (Figure 17) controlled parameters were applied simultaneously on both the upper and the lower rolls, so as to regulate the position of the rolls and to balance the forces in the system of rolls. The provision of additional external loading means on the upper roll was considered close at hand for a person skilled in the art, as need be.

### **Reasons for the Decision**

1. The appeal is admissible.

2. *Formal aspects*

The question of whether there are any formal objections to the current versions of the claims need not be investigated since the claims according to any request are anyway unallowable on other substantive grounds, as hereinafter explained.

3. *Main request*

3.1 Document D5 represents the closest prior art. It discloses (Figures 16, 17) a supercalender comprising upper and lower floating variable crown rolls ("selbstbelastende Nipco-Walzen") adjustable in zones, i.e. with the roll mantle being supported on the roll shaft by means of hydrostatic loading elements adjustable in the direction of compression, and several intermediate rolls placed between the upper and the

lower rolls.

A control system controls the hydraulic system of the system of rolls on the basis of measurement signals received from position detectors provided at the ends of the shaft of the lower roll. The use of a control computer is not mentioned explicitly in document D5 in connection with Figures 16 or 17, but the operating principle of this device is obviously similar to that of the control system referred to on page 980 (right column) in relation to Figure 12. Since computing means are normal requisites in modern control systems, (see D5, page 976, second paragraph: "mit Hilfe digitaler Regelung"), a control computer for controlling the hydraulic system can be taken as implicitly disclosed in document D5. In this respect, attention is drawn to document D2 (page 871, third paragraph and page 873, right column, seventh dash) where it is mentioned the use of a computer to efficiently control the operation of variable crown rolls (Nipco-Walzen), i.e. of the same type as those used in document D5.

The control system depicted in Figures 16 and 17 of D5, in addition to position signals, further receives zone pressure signals from the hydrostatic loading elements of the lower roll. Like in the present patent both types of signals, position and pressure, are used to regulate the position of the rolls and to balance the force effective in the system of rolls based on measurements of position. As a matter of fact, a second control of the pressure on the hydrostatic loading elements will necessarily be present in the control system in addition to the first control of position, which is clearly shown in Figure 16 or 17 and referred to on page 980 (right column) in connection with

Figure 12, because it is inherent to the working of a variable crown roll adjustable in zones (Nipco-Walzen). Accordingly, a closed loop for automatically controlling the zones of pressure on the hydrostatic loading elements is mentioned on page 983, last paragraph of document D5, among the listed well-known advantages and properties of variable crown rolls. Consequently, the bloc identified in Figures 16 and 17 as oil pressure regulator ("Öldruckregler") is not only there as part of the position controller for the lower roll, but also as an independent pressure controller for directly controlling the zone pressures of the loading elements of the variable crown roll.

Document D5 goes on to explain (Figure 16 and text referred to, page 982, last paragraph) that uniform correction of the force distributing profile may be attained by additional and direct loading of the upper roll through the hydrostatic zone pressure elements, whereas (Figure 17, and related text, page 983, first paragraph), when additional corrections are made simultaneously on both the upper and the lower rolls, a balance of forces throughout the system of rolls is obtained. As a consequence, the last feature of claim 1 related to the control of the system of rolls is also known from document D5.

- 3.2 From the foregoing, it results that the subject-matter of claim 1 differs from the disclosure of document D5 only by the provision of a stationary upper roll, more particularly by the combination of a stationary upper roll with a floating lower roll, both having variable crown rolls adjustable in zones.

Therefore, claim 1 according to the main request is

novel within the meaning of Article 54(1) EPC.

- 3.3 The problem underlying the present patent (column 2, lines 20 to 23) also when starting from documents D5 as the closest prior art is to avoid the drawbacks of the prior art solutions, in particular to attenuate vibrations generated by the system of rolls (column 1, lines 34 to 37).

This problem is solved by the differentiating features identified above. In particular, the solution is provided by hydrostatic zone pressure elements in the floating lower roll (column 2, lines 49 to 56).

- 3.4 It is, however, known that variable crown rolls adjustable in zones have excellent vibration reducing properties (D5, page 983, fourth paragraph, sixth dash and D2, page 872, right column, last paragraph). Therefore, the provision of two variable crown rolls at the top and the bottom of the system of rolls as illustrated by Figures 16 and 17 of document D5, is sufficient to warrant vibration attenuation. The additional measure of rendering the upper roll stationary, is of minor importance to the solution of the problem as stated and is also not indispensable to control the loading of the system of rolls since, as demonstrated before, in variable crown rolls the mantle can be loaded directly by means of zone pressure elements. To choose a floating or a stationary crown roll at this position is, therefore, a mere matter of discretion. As also explained in document D2 (page 873, left column, second paragraph) when two variable crown rolls are associated in pair, one of which is stationary (type K) and the other floating (type F), so as to work together, external loading can be dispensed

with. The same applies to the embodiments of Figure 11 (page 874) where, in a supercalender like in the present patent, different combinations of two variable crown rolls with the upper roll stationary and the lower roll floating, are clearly disclosed (examples 3 and 5).

- 3.5 It results therefrom that the subject-matter of claim 1 according to the main request does not involve an inventive step having regard to the combined disclosures of documents D5 and D2.

4. *First auxiliary request*

In the embodiment according to Figure 17 of document D5, like in the present patent, controlling signals at the output of the position controller are simultaneously applied to the hydrostatic loading elements of both the upper and the lower rolls, so as to adjust the linear load of the system of rolls.

Therefore, the feature introduced in claim 1 of the first auxiliary request fails to add any inventive step to the subject-matter of the claim according to the main request.

5. *Second auxiliary request*

With respect to the first auxiliary request, the subject-matter of claim 1 according to the second auxiliary request is supplemented by the provision of external loading means placed on the shaft of the upper roll and adjusted by the controlling signals at the output of the control computer so as to provide the correct level of linear load throughout the system of

rolls.

As demonstrated in section 3.4 above, the solution to the problem of vibrations reducing in a supercalender combining a stationary variable crown upper roll and a floating variable crown lower roll does not require external loading means. Consequently, the choice of a stationary upper roll is merely offering an additional possibility of loading the system of rolls externally. This feature, which is directed to another problem and, therefore, is to be considered independently, is known from document D1 (see Figure 9). Therefore, there is no inventive step in using controlling signals already present in Figure 17 of document D5 and by dividing the overall loading of the upper roll

- partly internally by means of the hydrostatic loading elements acting on the mantel by compression, and
- partly externally by means of additional loading means pressing on a stationary roll shaft, in the manner illustrated in Figure 5 (page 978) of the same document D5.

It results therefrom that the subject-matter of claim 1 according to the second auxiliary request is not inventive vis-à-vis the cited prior art either.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

V. Commare

W. D. Weiß