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Bezeichnung der Erfindung: Deflection control in a roll

Title of invention:

Titre de l'invention :

Klassifikation / Classification / Classement : F16C 13/00

### ENTSCHEIDUNG / DECISION

vom / of / du 17 January 1989

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /

Titulaire du brevet :

Oy Wärtsilä Ab

Einsprechender / Opponent / Opposant :

Kleinewefers GmbH

Stichwort / Headword / Référence : Roll deflection/Wärtsilä

EPÜ / EPC / CBE Article 56 EPC

Schlagwort / Keyword / Mot clé : "Inventive step (no)"

Leitsatz / Headnote / Sommaire

Europäisches  
Patentamt

European Patent  
Office

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des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number : T 394/86 - 3.2.1



**DECISION**  
of the Technical Board of Appeal 3.2.1  
of 17 January 1989

**Appellant :** Kleinewefers GmbH  
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**Representative :** Knoblauch, Ulrich, Dr.-Ing.  
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**Respondent :** Oy Wärtsilä Ab  
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**Decision under appeal :** Decision of the Opposition Division of the European  
Patent Office dated 1 October 1986 rejecting  
the opposition filed against European patent  
No. 0 039 042 pursuant to Article 102(2) EPC.

**Composition of the Board :**

**Chairman :** F. Gumbel

**Members :** C.T. Wilson  
R. Schulte

## Summary of Facts and Submissions

I. European patent No. 0 039 042 was granted on 13 February 1985 with ten claims, on the basis of European patent application No. 81 103 019.6. The independent Claims 1 and 5 are worded as follows:

1. A method for compensating load produced deflections in a roll comprising a supporting, non-rotating shaft (1) and a rotatable mantle portion (2) supported on the shaft (1) by means of a plurality of bearing units (3a, 3b), of which those (3a) at the end portions of said shaft (1) are provided with a flexible mounting with respect to said shaft (1) and/or said mantle portion (2), characterized in that said flexible mountings are connected to respective flexible elements (4) influencing the support of said mantle portion (2), and that the spring modulus of said flexible elements (4) is adapted to the stiffness of said shaft (1), so that, under external loading of the roll, said flexible elements (4), while allowing the ends of said shaft (1) to move radially relative to said mantle portion (2), resist this movement with an elastic force being dependent on the angle of deflection of said shaft (1), thereby keeping the deflection of said mantle portion (2) within predetermined limits.
  
5. A deflection compensating roll for applying the method according to any of the preceding claims, which comprises a supporting, non-rotating shaft (1) and a rotatable mantle portion (2) supported on the shaft (1) by means of a plurality of bearing units (3a, 3b) axially spaced along the shaft (1), of which bearing units (3a, 3b) at least those (3a) at the end

portions of the shaft (1) are flexibly mounted with respect to said shaft (1) and/or said mantle portion (2), characterized in that there are flexible elements (4) influencing, through said flexibly mounted bearing units (3a), the support of said mantle portion (2), and that the spring modulus of said flexible elements (4) is adapted to the stiffness of said shaft (1), so that, under external loading of the roll, said flexible elements (4), while allowing the end of said shaft (1) to move radially relative to said mantle portion (2), resist this movement with an elastic force being dependent on the angle of deflection of the shaft (1), thereby keeping the deflection of said mantle portion (2) within predetermined limits.

- II. The patent was opposed in due time and form on 30 October 1985. The Opponent requested revocation of the patent in its entirety on the grounds inter alia that:

the European 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, and that:

the subject-matter of the European patent is not patentable within the terms of Articles 52 to 57.

In addition to the documents cited in the pre-grant proceedings, in particular DE-C-1 218 392, the Opponent also cited:

DE-A- 2 042 001, and

Panzer-Beitler "Arbeitsbuch der Ölhydraulik", 2nd Edition, 1969, pages 272 and 273.

- III. The Opposition Division rejected the opposition in a decision dated 1 October 1986. According to the decision the use of the phrase "within predetermined limits" in the independent claims does not render the disclosure insufficient since this phrase merely reflects what is to be achieved by the technical features of the claim, the limits being selected by the user according to the field of application. Moreover, a combination of the teachings of DE-C-1 218 392 (cited in the pre-grant proceedings) and of DE-A-2 042 001 would not lead to the subject-matter of the independent claims, as alleged by the Opponents, since in the roll of DE-C-1 218 392, the flexible mountings supporting the mantle portion on the shaft are intended to maintain concentricity therebetween, rather than to allow the ends of the mantle to move into an eccentric position relative to the shaft to achieve the deflection compensation of the present invention.
- IV. The Opponent filed an appeal against this decision on 15 October 1986 with the payment of the appropriate fee, and submitted a Statement of grounds on 4 February 1987. He maintains his objection to the phrase "within predetermined limits" stating that, in the light of the arguments put forward in the contested decision, either the disclosure is insufficient or the phrase is superfluous. Moreover, he asserts that the assessment of inventive step of the subject-matter of the independent claims as set out in the contested decision is not convincing since it is based largely on an incorrect interpretation of the manner of working of the roll

disclosed in DE-C-1 218 392. He also raises objection to the method Claim 1 which appears to be characterised by the presence of a constructive feature, namely "flexible elements" which do not belong correctly in a method claim.

- V. The Respondent (Patentee) contests the arguments of the Appellant (Opponent), and alleges that the objection to the "flexible elements" in Claim 1 is not in accordance with Article 100 EPC.
- VI. In reply to a communication dated 29 June 1988 from the Board, setting out the provisional opinion that no objection to the wording of the claims, nor under Article 83 EPC, arose, but that doubts existed in respect of the patentability of the subject-matter of Claim 1 in the light of the disclosures of DE-C-1 218 392 and DE-A-2 042 001, the Respondent emphasised two points in his letter received 1 September 1988, namely,
- (i) the object of DE-C-1 218 392 is to make a correction of the mantle line to overcome material deficiencies, and
  - (ii) the correction is done by (manually) changing the stiffness of the elastic supports to meet the particular operational requirements.

This does not in his opinion correspond with the teaching of the present invention which starts where DE-C-1 218 392 ends, i.e. with the finding that in a roll of the assumed type "variations in the load require corresponding adjustment of the counter force", (see column 1, lines 40 till 42). Beyond this, the present invention's idea is "when the flexible elements used in the roll are suitable

adopted to the roll stiffness, the roll will be self-adjusting. Hence, there is no need for adjustment to meet load variations", (see column 1, lines 52 till 55).

He is further of the opinion that the average man skilled in the art could not derive this teaching from the citations.

- VII. In the oral proceedings held on 17 January 1989, the Appellant maintained his objections against the phrase "within predetermined limits" in the independent claims, and against the patentability of these claims in the light of the disclosures of DE-C-1 218 392 together with DE-A-2 042 001.

The Respondent rejected these arguments and maintained his argument that the flexible mountings supporting the mantle portion on the shaft of DE-C-1 218 392 are intended to maintain concentricity therebetween by expanding the mantel ends, compensating for material defects in the mantel portions rather than for bending under load. In support of his interpretation of this document he referred to DE-U-1 740 817 and DE-U-1 793 723 considered by the Examiner during examination of the invention claimed in DE-C-1 218 392 in the German Patent Office. He maintained that this prior art roll was intended to conform to the shape of any roll against which it was pressed, the flexible mountings not being comparable with normal supports. The roll was therefore of a type in which only the centre was supported, and could not therefore be considered to be of the same type as the present invention, so that the man skilled in the art would not have even considered this document. Moreover, since the problem to be solved was different, the elastic elements are also completely different. They are simply adapted to compensate for bending of the mantel by expanding the ends

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thereof. They need not therefore be selected dependent on the stiffness of the shaft.

VIII. The Appellant requests that the decision under appeal be set aside and the patent be revoked. The Respondent requests that the appeal be dismissed and the patent be maintained.

#### Reasons for the Decision

1. The appeal is admissible.
2. The Board is of the opinion that the wording of the claims is unobjectionable, and that no objection arises under Article 83 EPC (see paragraph IV above). Since the patent cannot be maintained for other reasons, there is no need to justify the above findings of the Board in any detail.
3. A direct comparison of the disclosure of DE-C-1 218 392, (considered by the Board to represent the nearest prior art), with the subject-matter of Claim 1 of the present patent shows that this subject-matter is new. For example, whereas in the citation the inner shaft (14, 10) rotates with the mantle portions, the pre-characterising part of the present Claim 1 is concerned with a non-rotating support shaft.
4. On the issue of inventive step, the following points arise:
  - 4.1 In DE-C-1 218 392 is disclosed a method for compensating load produced deflections in a roll comprising a supporting shaft (10, 14) and a rotatable mantle portion (11, 12) supported on the shaft by means of a plurality of

units, of which those at the ends portions of said shaft are provided with a flexible mounting with respect to said shaft and/or said mantle portion. Moreover, the flexible mountings are connected to respective flexible elements influencing the support of said mantle portion, and the spring modulus of said flexible elements is adapted to the stiffness of said shaft so that, under external loading of the roll, said flexible elements, while allowing the ends of said shaft to move radially relative to said mantle portion, resist this movement with an elastic force being dependent on the angle of deflection of said shaft, thereby keeping the deflection of said mantle portion within predetermined limits.

- 4.2 The only essential difference between the subject-matter of Claim 1 and the disclosure of DE-C-1 218 392 is that in Claim 1 a "non-rotating" shaft is specified, and the supporting units are consequentially defined as "bearing" units, both in the pre-characterising part of the claim.
- 4.3 However, as pointed out by the Appellant, such non-rotating shafts are well known in the art, e.g. in DE-A-2 042 001. The selection of one of two well-known alternatives cannot be considered as inventive, particularly since no great practical difficulties can be seen in replacing the rotating shaft (14, 10) of DE-C-1 218 392 by a non-rotating shaft and suitable bearings.
- 4.4 The subject-matter of Claim 1 is therefore lacking in inventive step, and the claim is not allowable.
- 4.5 The arguments advanced by the Respondent are not persuasive in refuting this conclusion.

In particular, although he argues that the pressure roll according to DE-C-1 218 392, being of the type supported only at the centre, is of a completely different type from the present roll, so that also a different problem is solved by the elastic supports, this is not clearly so from a reading of the cited document. Firstly, the prior art discussed in this document is not clearly restricted to pressure rolls in which the mantle or mantle halves are supported on the shaft only at the middle, (column 1, lines 13-20). Furthermore, the particular embodiment of the cited document clearly shows two mantle halves supported on a shaft at the centre and at the ends. Moreover, it is made clear in this document that the invention of fixing the mantle halves to the middle portion of the shaft was to eliminate bending of the roll. This measure is stated to be completely successful for the middle region of the mantle (column 1, lines 20-24), but it does not eliminate unequal bending at the end portions (column 1, lines 26-29). It is therefore proposed to support the ends of the mantle (or mantle halves) by means of elastic supports on the shaft. In this manner, according to the cited document (column 2, lines 18-22), the profile of the roll can be made to correspond to the working requirements, and the contact pressure may be maintained constant across the width of the roll. This must clearly therefore be referring to the roll under load. This, however, is exactly what the present invention is intended to achieve. Since the end supports are elastic, they are positioned as in the present patent, and they have the same end effect, it would appear logical that they operate in the same way, i.e. that they are adapted to the stiffness of the shaft and act elastically dependent on the angle of deflection of the roll ends. The Appellant's argument that with the above construction the spring modulus of the elastic support is

not adapted to the stiffness of the shaft, cannot therefore be accepted.

There is no sufficient indication in the cited document that the elastic supports are intended to spread the ends of the mantle to compensate for bending. The Respondent refers to the passage (column 1, lines 43-46) stating the problem to be solved, namely to allow adjustment of the relative radial position of the mantle ends with respect to the shaft. This passage can, however, in the Board's view not be understood as maintaining the mantle ends concentric (expanding the mantle ends) but rather as allowing them to move to an eccentric position (as in the present patent). Equally, the Appellant's reference to the German Utility Model documents is not helpful since there is no suggestion in the cited document that the invention thereof started out from this prior art, so that these documents cannot be used to help interpret the cited document. No other passages in DE-C-1 218 392 serve to suggest that the operation of that roll is to expand the mantle ends rather than to aid in compensating for bending of the shaft under external loading. Finally, it appears to be extremely unlikely to the Board, that the mantle should be expanded by means of elastic elements.

5. Technically, Claim 5 corresponds to Claim 1 being merely directed to the roll per se rather than to a method. This claim is also therefore not allowable for the same reasons as set out above in respect of Claim 1.
6. Dependent Claims 2 to 4 and 6 to 10 presuppose the allowability of their respective independent claims and cannot be maintained either.

**Order**

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

1. The decision under appeal is dismissed.
2. The European patent 0 039 042 is revoked.

**The Registrar:**

*S. Fabiani*

S. Fabiani

**The Chairman:**

*F. Gumbel*

F. Gumbel