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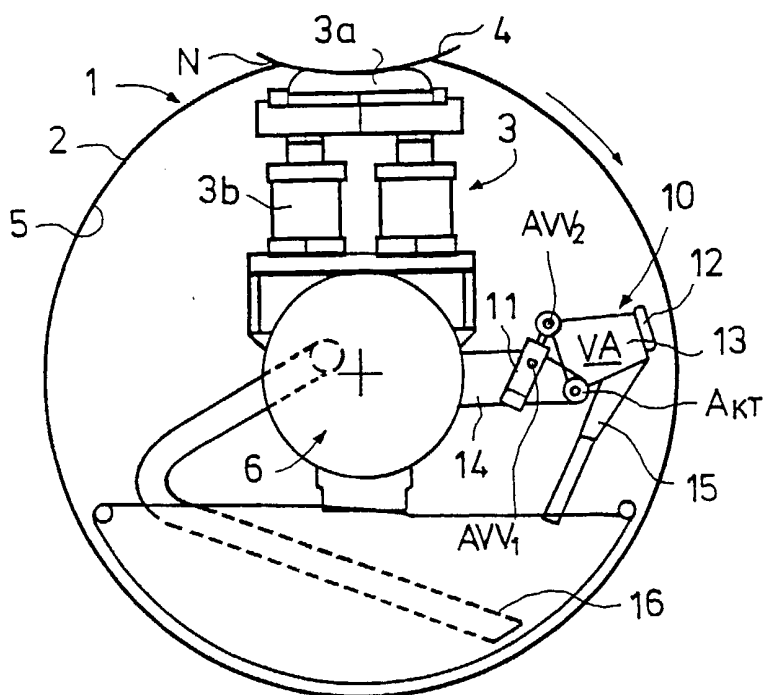
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<p>(21) International Application Number: PCT/FI00/00424</p> <p>(22) International Filing Date: 11 May 2000 (11.05.00)</p> <p>(30) Priority Data: 991104 14 May 1999 (14.05.99) FI</p> <p>(71) Applicant (for all designated States except US): VALMET CORPORATION [FI/FI]; Fabianinkatu 9 A, FIN-00130 Helsinki (FI).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): KOIVUKUNNAS, Pekka [FI/FI]; Kauhavankuja 5, FIN-04430 Järvenpää (FI). TORVI, Timo [FI/FI]; Wärtsiläkatu 76 B 40, FIN-04440 Järvenpää (FI).</p> <p>(74) Agent: FORSSÉN & SALOMAA OY; Yrjönkatu 30, FIN-00100 Helsinki (FI).</p>		<p>(81) Designated States: CA, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</p>

(54) Title: METHOD AND ARRANGEMENT FOR AN EXTENDED-NIP ROLL, IN PARTICULAR FOR A PRESS SHOE ROLL OF A SHOE CALENDER

(57) Abstract

The invention relates to a method and an arrangement for an extended-nip roll, in particular for a press shoe roll of a shoe calender, which extended-nip roll includes: a press shoe roll (1) which is provided with a flexible roll mantle (2); a press shoe unit (3) inside the press shoe roll (1) for loading and pressing the flexible roll mantle (2) against a backup roll (4) of the press shoe roll, in which connection the extended nip (N) is closed and in operation; and at least one support shoe member (10) inside the press shoe roll (1) for attenuating the vibration of the flexible roll mantle (2) and for supporting the roll mantle. In order to minimize friction forces and to support the roll mantle and to prevent vibrations, the invention is characterized in that the support shoe member (10) is kept either in a stand-by position (VA), in which connection it is spaced

from the inner surface (5) of the flexible roll mantle (2), or in an operating position (TA), in which connection it is placed either against or at a small distance from the inner surface (5) of the flexible roll mantle (2).



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Method and arrangement for an extended-nip roll,
in particular for a press shoe roll of a shoe calender

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The present invention relates to paper, pulp and/or board machines. More specifically, the present invention relates to a method and an arrangement for an extended-nip roll, in particular for a press shoe roll of a shoe calender, which extended-nip
10 roll includes: a press shoe roll which is provided with a flexible roll mantle; a press shoe unit inside the press shoe roll for loading and pressing the flexible roll mantle against a backup roll of the press shoe roll, in which connection the extended nip is closed and in operation; and at least one support shoe member inside the press shoe roll for attenuating the vibration of the flexible roll mantle and for supporting the
15 roll mantle when the flexible roll mantle is substantially unloaded and the extended nip is open and out of operation.

US Patent 5,645,691 (Voith Sulzer Papiermaschinen) discloses a press shoe roll for an extended-nip press, which roll is provided with several internal glide support
20 shoes, of which two are situated immediately before and after a press shoe and the rest at regular intervals, and which are spring-loaded against the inner surface of the roll mantle of the press shoe roll.

US Patent 4,673,461 (Beloit Corp.) discloses a press shoe roll for an extended-nip
25 press, which roll is provided with several internal stationary glide guide shoes having a curved surface, said shoes being situated at a small distance from one another in the direction of the circumference of the press shoe roll and covering almost entirely the inner surface of the roll mantle of the press shoe roll.

30 *US Patents 4,555,305 and 4,584,059* (J.M. Voith GmbH) discloses a press shoe roll for an extended-nip press, which roll is provided with several internal glide support shoes which are arranged to cover the portion outside the press shoe at regular

intervals from one another and which are spring-loaded against the inner surface of the roll mantle of the press shoe roll.

5 *US Patent 4,287,021* (Beloit Corp.) discloses a press shoe roll for an extended-nip press, which roll is provided with an external cover with a view to providing vibration-free operation of a flexible roll mantle. Furthermore, the publication discloses internal doctoring of oil from the inner surface of the flexible roll mantle immediately before a press shoe.

10 Irrespective of whether the nip is closed or open, regarding the weaknesses of the prior art arrangements, it may be mentioned that the flexible roll mantle of the press shoe roll or the shoe calender roll is

- subjected to either continuous, i.e. fixed, or spring-loaded internal support and attenuation of vibration, which are accomplished by means of stationary
15 glide guide shoes or by means of glide support shoes loaded with springs against the inner surface of the flexible roll mantle,
- totally without any internal support and attenuation of vibration, in which connection support has been sought by an external rigid support mantle.

A further weakness is that previously, no particular attention has been paid to the
20 wiping of oil on the inside.

In accordance with the first aspect, the primary object of the present invention is to reduce the above-mentioned drawbacks and weaknesses associated with the prior art structures and arrangements and to provide an improved method and arrangement for
25 an extended-nip roll, in particular for a press shoe roll of a shoe calender for attenuating the vibration of the flexible roll mantle of the press shoe roll and for supporting the mantle when the press shoe roll is operating while the extended nip is open.

30 In accordance with a first further aspect of the invention, an object is to enable attenuation of vibrations during operation and, when needed, removal of oil.

In accordance with a second further aspect of the invention, an object is also to enable a novel and inventive type of doctoring of oil from the inner surface of the flexible roll mantle when the extended nip is open.

5 This objective is achieved by the method and the arrangement for an extended-nip roll, in particular a press shoe roll of a shoe calender according to the invention, the special features characteristic of the method and the arrangement being set forth in the accompanying claims.

10 The invention is thus based on the new and inventive basic idea that, for minimizing the friction forces caused by the support members inside a roll mantle when the extended nip is closed and for supporting the roll mantle and for preventing its vibrations when the extended nip is open, the invention is characterized in that, when the extended nip is in operation, the support shoe member is kept in a stand-by
15 position, in which connection it is substantially apart and spaced from the inner surface of the flexible roll mantle, and that, when the extended nip is out of operation, the support shoe member is kept in an operating position, in which connection it is situated either against or very close to the inner surface of the flexible roll mantle.

20

It is advantageous that the support shoe member is moved from the stand-by position to the operating position and vice versa, preferably by means of a hydraulically and/or pneumatically operated power means, and that the support shoe member is kept in its stand-by position continuously pulled back and in its operating position
25 continuously pushed out. In that connection, the friction forces and wear effects produced by the support shoe member are minimal, it being also possible to regulate the pressing of the support shoe member against the inner surface of the flexible roll mantle without any difficulty.

30 In accordance with an embodiment of the invention considered to be particularly advantageous, in order to maximize support and vibration attenuation, the individual

support shoe member 10 is situated with respect to the direction of rotation of the flexible roll mantle

- a) 90° after a press shoe unit 3,
- b) 90° before the press shoe unit 3,
- 5 c) 90° both before and after the press shoe unit 3.

In accordance with a further aspect of the invention, it is advantageous that the support shoe member includes a support shoe element which is designed to serve as a doctor for oil in order to wipe oil from the inner surface of the flexible roll mantle
10 when the support shoe member is in the operating position, and that the support shoe member is provided with a discharge tube means or equivalent in order to pass the collected oil into a collecting means for recovery and/or removal.

In the following, the invention will be described by way of example by means of one
15 embodiment thereof considered to be advantageous with reference to the accompanying drawing in which

- FIG. 1 is a schematic sectional view of a press shoe roll of a shoe calender provided with an arrangement in accordance with the invention, when an
20 extended nip is closed, and
- FIG. 2 is a schematic sectional view of a press shoe roll of a shoe calender provided with an arrangement in accordance with the invention, when an extended nip is open.

25 As shown in Figs. 1 and 2, a shoe calender provided with an arrangement in accordance with the invention includes:

- a press shoe roll 1 having a flexible roll mantle 2,
- a press shoe unit 3 inside the press shoe roll 1 in order to load and to press the flexible roll mantle 2 against a backup roll 4 of the press
30 shoe roll, in which connection the extended nip N is closed and in operation, said press shoe unit 3 comprising a press shoe 3a and at

least one power means 3b, such as a power cylinder, for moving the press shoe, and

- at least one support shoe member 10 inside the press shoe roll 1 in order to attenuate the vibration of the flexible roll mantle 2 and to support it when the flexible roll mantle 2 is substantially unloaded and the extended nip N is open and out of operation.

With a view to achieving the objective of the invention, i.e., during operation when the extended nip N is closed, in order to minimize the friction forces caused by the support members situated inside the roll mantle 2 and to minimize possible vibrations and, when needed, in order to remove oil from the inner surface of the roll mantle, and when the extended nip N is open, in order to support the roll mantle and to prevent its vibrations, the support shoe member 10 in the arrangement in accordance with the invention can be moved between an operating position TA, in which the extended nip N is open, and a stand-by position VA, in which the extended nip N is closed. In that connection, the support shoe member 10 is placed in the operating position TA against an inner surface 5 of the flexible roll mantle 2 or at a small distance from it, the vibration of the roll mantle 2 arising from time to time being killed by the contact between the inner surface 5 of the roll mantle 2 and the support shoe member 10, in order to attenuate the vibration of the flexible roll mantle 2 and to support the roll mantle, and in the stand-by position VA, it is preferably continuously spaced from the inner surface 5 of the flexible roll mantle 2. Thus, owing to the method according to the invention, the support shoe member 10 can be kept in the stand-by position VA when the extended nip N is in operation, in which connection the support shoe member 10 is spaced from the inner face 5 of the flexible roll mantle 2, and when the extended nip is out of operation, in the operating position TA, in which connection the support shoe member 10 is placed against the inner surface 5 of the flexible roll mantle 2 or at a small distance from it, in that connection in particular for attenuating the vibration of the roll mantle 2 and for supporting it, as well as in accordance with a further aspect of the invention, for wiping oil from the inner face 5 of the roll mantle 2.

In order to assure the continuous operation of the support shoe member 10, i.e. support and attenuation of vibration as well as wiping of oil, it is advantageous to the arrangement in accordance with the invention that the support shoe member 10 is in its operating position TA continuously pushed out against or at a small distance
5 from the inner surface 5 of the roll mantle 2, and in order that the support shoe member 10 of the arrangement in accordance with the invention should cause as little friction as possible when the calender nip is in operation, it is advantageous that the support shoe member 10 is in its stand-by position VA continuously pulled back and apart from the inner surface of the roll mantle 2. For providing drive for such a
10 movable support shoe member 10, the support shoe member 10 of the arrangement in accordance with the invention includes a hydraulically and/or pneumatically operated power means 11 for keeping the support shoe member 10 in the stand-by or the operating position VA,TA and for moving it from the stand-by position VA to the operating position TA and vice versa.

15

In order to support the flexible roll mantle and to provide attenuation of vibration when the calender is operated while the extended nip N is open, it is advantageous, in particular with a view to minimizing the number of support shoe members, that the support shoe member 10 is situated, in the direction of rotation of the flexible
20 roll mantle, optionally 90° after the press shoe unit 3 and/or 90° before the press shoe unit 3. In that connection, in order to maximize support and attenuation of vibration, the individual support shoe member 10 is situated with respect to the direction of rotation of the flexible roll mantle

- 90° after the press shoe unit 3,
- 25 — 90° before the press shoe unit 3, or
- 90° both before and after the press shoe unit 3.

As is clear from Figs. 1 and 2, the support shoe member 10 incorporates a support shoe element 12 and a pivot support arm 13 having the support shoe element 12 at
30 its free end, as well as the power means 11 moving the pivot support arm 13. In that connection, the support shoe member 10 is connected by means of a rigid support element 14 to support structures 6 inside the press shoe roll or the shoe calender

roll, and the support element 14 has a first linkage point A_{kt} , to which the pivot support arm 13 is linked pivotally and as an extension of the support element 14. In order to move the support shoe element 12, the power means 11 is disposed between the pivot support arm 13 and the support element 14 for pivoting the pivot support arm 13 about its linkage point A_{kt} by lengthening or shortening the power means 11, in which connection the support element 14 has a second linkage point A_{vv1} , to which a first end of the power means 11 is linked and which is spaced from the first linkage point A_{kt} , and in which connection the pivot support arm 13 has a third linkage point A_{vv2} , to which a second end of the power means 11 is linked and which is spaced from the first linkage point A_{kt} .

With a view to achieving the object according to the first and second additional aspects of the invention, the support shoe element 12 at the free end of the support shoe member 10 has been designed to serve as an oil doctor in order to wipe oil from the inner surface 5 of the flexible roll mantle 2 when the support shoe member 10 is in the operating position TA. Furthermore, it is advantageous, as illustrated in the figures, that the support shoe member 10 is provided with a discharge tube means 15 or equivalent for passing the collected oil into a collecting means 16 for recovery and/or removal. It shall be emphasized that, from the standpoint of the primary object of the invention, it is not essential how the support shoe element serving the function of the doctor and, in addition thereto, the function of oil recovery, is shaped, and so many different alternatives are thus feasible in order to achieve the desired objective.

In the foregoing, the invention has been described only by way of example by means of one of its embodiments considered to be advantageous. Naturally, this has not been intended to limit the present invention in any way, but various alternative problem-solutions or modifications are feasible within the inventive idea defined in the accompanying claims and within its scope of protection.

Claims

1. A method for an extended-nip roll, in particular for a press shoe roll of a shoe calender, which extended-nip roll includes:

- 5 — a press shoe roll (1) which is provided with a flexible roll mantle (2),
— a press shoe unit (3) inside the press shoe roll (1) for loading and pressing the flexible roll mantle (2) against a backup roll (4) of the press shoe roll, in which connection the extended nip (N) is closed and in operation, and
— at least one support shoe member (10) inside the press shoe roll (1) for
10 attenuating the vibration of the flexible roll mantle (2) and for supporting the roll mantle when the flexible roll mantle (2) is substantially unloaded and the extended nip (N) is open and out of operation,

characterized in that

- when the extended nip (N) is in operation, the support shoe member (10) is
15 kept in a stand-by position (VA), in which connection it is spaced from the inner surface (5) of the flexible roll mantle (2), and that
— when the extended nip is out of operation, the support shoe member (10) is kept in an operating position (TA), in which connection it is placed either against or at a small distance from the inner surface (5) of the flexible roll
20 mantle (2) in order to attenuate the vibration of the flexible roll mantle (2) and to support the mantle, which short distance allows contact with the support shoe member (10) as a result of the vibration of the roll mantle (2).

2. A method according to claim 1, **characterized** in that in the stand-by position
25 (VA) of the support shoe member (10), the support shoe member (10) is kept continuously pulled back, and that in the operating position (TA) of the support shoe member (10), the support shoe member is kept continuously pushed out.

3. A method according to claim 2, **characterized** in that the support shoe member
30 (10) is kept in the stand-by and the operating position (VA, TA) and moved from the stand-by position (VA) to the operating position (TA) and vice versa, advantageously by means of a hydraulically and/or pneumatically operated power means (11).

4. An arrangement for an extended nip roll, in particular for a press shoe roll of a shoe calender, which extended-nip roll includes:

- a press shoe roll (1) which is provided with a flexible roll mantle (2),
- a press shoe unit (3) inside the press shoe roll (1) for loading and pressing the flexible roll mantle (2) against a backup roll (4) of the press shoe roll, in which connection the extended nip (N) is closed and in operation, and
- at least one support shoe member (10) inside the press shoe roll (1) for attenuating the vibration of the flexible roll mantle (2) and for supporting the roll mantle when the flexible roll mantle (2) is substantially unloaded and the extended nip (N) is open and out of operation,

characterized in that

the support shoe member (10) can be moved between an operating position (TA), in which the extended nip (N) is open, and a stand-by position (VA), in which the extended nip (N) is closed, in which connection

- in the operating position (TA), the support shoe member (10) is either against or at a small distance from the inner surface (5) of the flexible roll mantle (2) in order to attenuate the vibration of the flexible roll mantle (2) and to support the mantle, which small distance allows contact with the support shoe member (10) when the roll mantle (2) vibrates, and
- in the stand-by position (VA), the support shoe member (10) is spaced from the inner surface (5) of the flexible roll mantle (2).

5. An arrangement according to claim 4, **characterized** in that the support shoe member (10) is in its stand-by position (VA) continuously pulled back, and that the support shoe member (10) is in its operating position (TA) continuously pushed out.

6. An arrangement according to claim 5, **characterized** in that the support shoe member (10) includes a power means (11) which is advantageously hydraulically and/or pneumatically operated, for keeping the support shoe member (10) in the stand-by or the operating position (VA, TA) and for moving it from the stand-by position (VA) to the operating position (TA) and vice versa.

7. An arrangement according to any one of claims 4 to 6, **characterized** in that the support shoe member (10) is situated, in the direction of rotation of the flexible roll mantle, optionally 90° after the press shoe unit (3) and/or 90° before the press shoe unit (3).

5

8. An arrangement according to any one of claims 4 to 7, **characterized** in

— that the support shoe member (10) comprises a support shoe element (12) and a pivot support arm (13) having the support shoe element (12) at its free end, as well as the power means (11) moving the pivot support arm (13),

10 — that the support shoe member (10) is connected by means of a rigid support element (14) to support structures (6) inside the press shoe roll or the shoe calender roll,

— that the support element (14) has a first linkage point (A_{kt}), to which the pivot support arm (13) is linked pivotally and as an extension of the support element (14), and

15

— that in order to move the support shoe element (12), the power means (11) is disposed between the pivot support arm (13) and the support element (14) for pivoting the pivot support arm (13) about its linkage point (A_{kt}) by lengthening or shortening the power means (11), in which connection the support element (14) has a second linkage point (A_{vv1}), to which a first end of the power means (11) is linked and which is spaced from the first linkage point (A_{kt}), and in which connection the pivot support arm (13) has a third linkage point (A_{vv2}), to which a second end of the power means (11) is linked and which is spaced from the first linkage point (A_{kt}).

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25

9. An arrangement according to any one of the preceding claims 4 to 8, **characterized** in that the support shoe member (10) has at its free end a support shoe element (12) that is designed to serve as an oil doctor for wiping oil from the inner surface (5) of the flexible roll mantle (2), when the support shoe member (10) is in the operating position (TA), and that the support shoe member (10) is advantageously provided with a discharge tube means (15) or equivalent for passing the collected oil into a collecting means (16) for recovery and/or removal.

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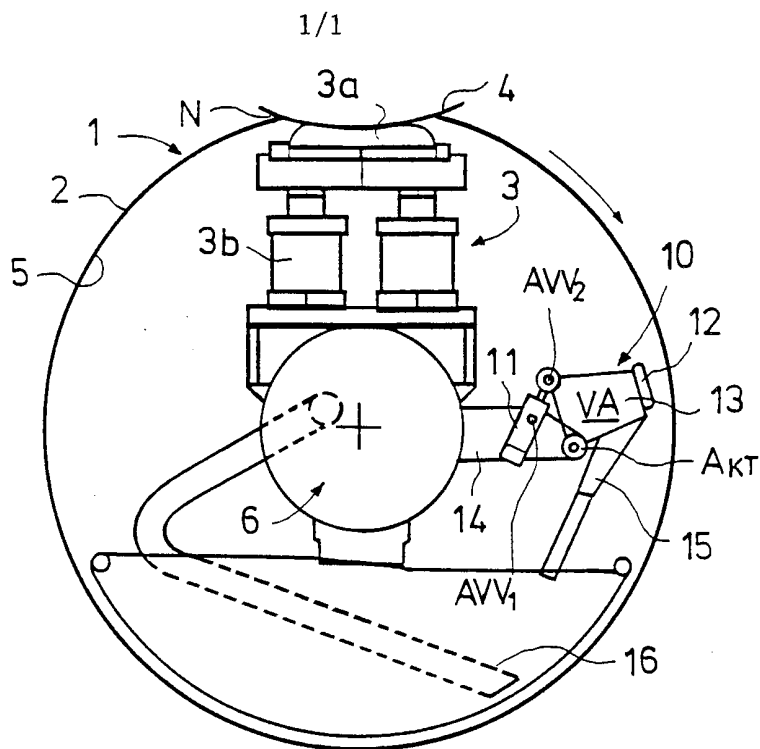


FIG. 1

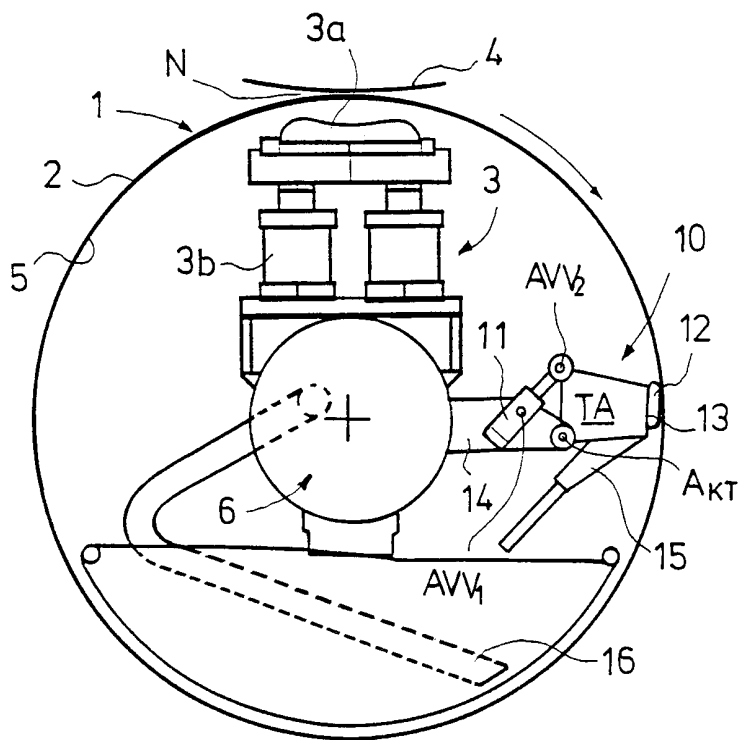


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 00/00424

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: D21F 3/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: D21F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4563245 A (WILHELM WANKE ET AL), 7 January 1986 (07.01.86), column 2, line 19 - line 24; column 3, line 48 - line 56; column 4, line 24 - line 32, column 5, line 6 - line 16; figure 1	1-7,9
A	--	8
A	GB 2182367 A (SULZER-ESCHER WYSS GMBH), 13 May 1987 (13.05.87)	1-9
A	US 4518460 A (LUDWIG HAUSER ET AL), 21 May 1985 (21.05.85)	1-9
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 Further documents are listed in the continuation of Box C. See patent family annex.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5645691 A (THOMAS ZUEFLE ET AL), 8 July 1997 (08.07.97) --	1-9
A	US 4584059 A (CHRISTIAN SCHIEL ET AL), 22 April 1986 (22.04.86) -- -----	1-9

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

01/08/00

PCT/FI 00/00424

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4563245 A	07/01/86	DE 3317455 A	15/11/84
		JP 1057199 B	04/12/89
		JP 1569574 C	10/07/90
		JP 59211696 A	30/11/84
GB 2182367 A	13/05/87	AT 263886 A	15/01/90
		AT 390974 B	25/07/90
		DE 3607941 A,C	07/05/87
		FI 86095 B,C	31/03/92
		FI 864344 A	01/05/87
		GB 8625791 D	00/00/00
		JP 62104994 A	15/05/87
US 4518460 A	21/05/85	AT 16029 T	15/10/85
		CA 1172888 A	21/08/84
		DE 3102526 A,C	12/08/82
		EP 0070869 A,B	09/02/83
		SE 0070869 T3	
		FI 78753 B	31/05/89
		FI 823139 A	10/09/82
		IT 1154466 B	21/01/87
		IT 8267075 D	00/00/00
		JP 2000477 B	08/01/90
		JP 58500071 T	13/01/83
		WO 8202567 A	05/08/82
		US 5645691 A	08/07/97
CA 2147730 A	05/11/95		
CN 1115832 A	31/01/96		
DE 4415645 A	09/11/95		
DE 9421207 U	13/07/95		
EP 0685660 A	06/12/95		
EP 0795643 A	17/09/97		
FI 952138 A	05/11/95		
JP 8013374 A	16/01/96		
US 4584059 A	22/04/86		
		DE 3311998 A	04/10/84
		FI 840984 A	03/10/84
		JP 59187693 A	24/10/84
		SE 8401741 A	03/10/84