

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
3 April 2008 (03.04.2008)

PCT

(10) International Publication Number
WO 2008/037841 A1

(51) International Patent Classification:
D21G 5/00 (2006.01) *D21G 1/00* (2006.01)

(74) Agent: LEITZINGER OY; Tammasaarekatu 1,
FI-00180 Helsinki (FI).

(21) International Application Number:
PCT/FI2007/050473

(22) International Filing Date:
5 September 2007 (05.09.2007)

(25) Filing Language: Finnish

(26) Publication Language: English

(30) Priority Data:
20065588 25 September 2006 (25.09.2006) FI

(71) Applicant (for all designated States except US): METSO
PAPER, INC. [FI/FI]; Fabianinkatu 9 A, FI-00130
Helsinki (FI).

(72) Inventors; and

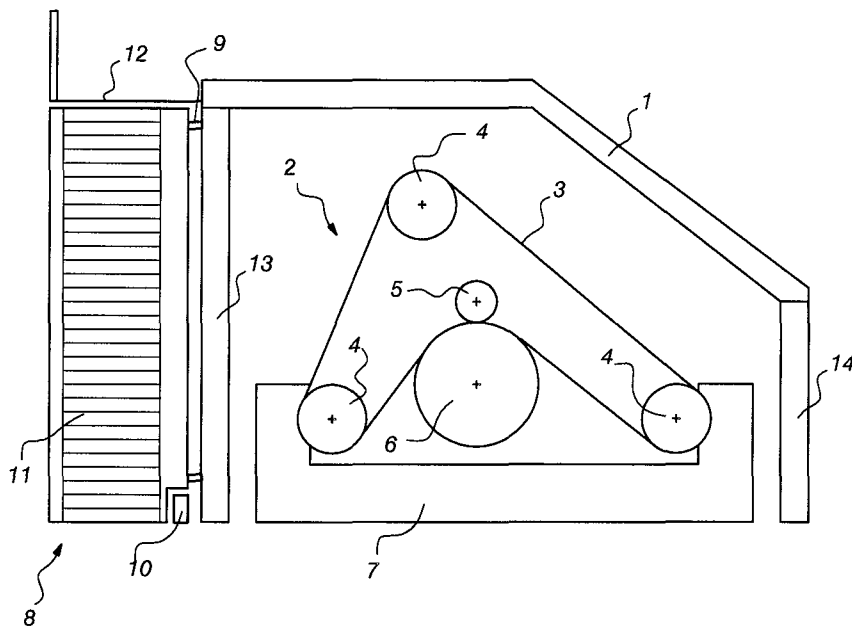
(75) Inventors/Applicants (for US only): VILJANMAA,
Mika [FI/FI]; Kalliotie 8, FI-00760 Helsinki (FI).
KIRVESMÄKI, Markku [FI/FI]; Tupalantie 7 B 19,
FI-04400 Järvenpää (FI).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH,
CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG,
ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL,
IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK,
LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW,
MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL,
PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY,
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA,
ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,
PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

(54) Title: FIBROUS WEB PROCESSING APPARATUS WITH A METAL BELT LOOP



(57) Abstract: The invention relates to a fibrous web processing apparatus (2) with a metal belt loop, the processing apparatus comprising a metal belt (3) arranged to rotate around at least one guide means (4), and outside the metal belt loop a counter-element (6) forming an extended web processing zone with the metal belt, through which processing zone the fibrous web to be processed is led. Around the processing apparatus (2) is provided a separate protective construction comprising a body part provided with a protective casing (1), above the processing apparatus, extending as seen in the direction of travel of the fibrous web brought to the processing apparatus from the front end area of the processing apparatus to its rear end area. At

the opposite side ends (tending side and drive side) of the processing apparatus are side casings, at least one of which is made into a door construction (8) that may be opened.

Fibrous web processing apparatus with a metal belt loop

The present invention relates to a fibrous web processing apparatus with a metal belt loop, the processing apparatus comprising a metal belt arranged to rotate
5 around at least one guide means, and outside the metal belt loop a counter-element forming an extended fibrous web processing zone with the metal belt, through which processing zone the fibrous web to be processed is led.

This type of a fibrous web processing apparatus with a metal belt loop may be, for
10 example, a metal belt calender, a drying apparatus, a press, a coating apparatus, a sizing apparatus, a printing apparatus or the like, as disclosed, for example, in an earlier international published application WO 03/064761 A1 of the Applicant of the present application. This apparatus can conceivably replace, for example, a soft
15 calender, a multi-nip calender, a machine calender, a shoe calender or a Yankee cylinder.

The use of an apparatus of this type, where the metal belt moves rapidly and the temperatures may be relatively high, for example, within the range from 150 to
20 400°C, involves various safety risks both in normal operating situations and especially in fault situations, such as the breakage of the fibrous web, and in extreme cases even the breakdown of the metal belt.

The aim of the present invention is to provide a solution by means of which the safety of the operating personnel can be reliably ensured in different situations and
25 which allows relatively simple access to the processing apparatus for performing the necessary service and repair measures. To achieve this aim, the processing apparatus according to the invention is characterised in that around the processing apparatus is provided a separate protective construction comprising a body part provided with a protective casing, above the processing apparatus, extending, as
30 seen in the direction of travel of the fibrous web brought to the processing apparatus, from the front end area of the processing apparatus to its rear end area, and with side casings at the opposite side ends (tending side and drive side) of the processing apparatus, at least one of which is made into a door construction that may be opened.

The solution according to the invention improves safety and it is relatively easy to make the protective construction advantageous also in respect of sound and heat insulation. In addition, easy and safe access to the working plane is provided both while the processing apparatus is in operation and during maintenance measures.

5

The invention is described in greater detail in the following, with reference to the accompanying drawings, in which:

Figure 1 shows a diagrammatic view in principle of one embodiment of the invention, and

10

Figure 2 shows the embodiment of Figure 1 as a diagrammatic top view.

In Figure 1, reference numeral 2 designates a metal belt calender comprising a calendering belt 3 rotating around guide rolls 4, and outside the belt a counter-roll 6, preferably a thermo roll, whereby a web processing zone is thus formed between the belt and the counter-element, through which zone the web to be calendered is led. Inside the belt loop 3 is, in addition, a nip roll 5 acting as a pressing means pressing the metal belt against the roll 6, thus forming a higher pressure within the calendering zone of the nip zone. The guide rolls, or at least some of them, may be arranged to be movable for adjusting the tension of the belt 3 as desired. Reference numeral 7 denotes the body part of the metal belt calender. The solution according to the invention comprises a protective construction separate from the metal belt calender, which is comprised – as seen in the direction of travel of the fibrous web (from the left side to the right side in Figures 1 and 2) – of front and rear frame posts 13 and 14, respectively, and of a protective casing 1 above the metal belt calender. In the embodiment shown, the protective casing 1 is provided with longitudinal openings 15, 16, but the protective casing can conceivably also be completely solid. The protective construction extends over the entire transverse length of the metal belt calender 2, as seen in the direction of travel of the fibrous web, and is provided at its opposite longitudinal ends, that is, the tending side and the drive side, with side casings, one of which is formed into a door construction 8, hinged by means of hinges 9 to the body part 13 of the protective casing. In the door construction is, in addition, formed a stair part 11, along which one can climb to the working plane 12 above the machine, which is arranged at the front of the

15

20

25

30

35

machine in the embodiment shown. In the lower part of the opening edge opposite to the hinged edge 9 of the door construction is preferably arranged a traversing wheel 10 which facilitates the opening and closing of the door.

- 5 At the front and rear of the protective casing are provided openings (not shown), through which the fibrous web being processed can be led to the metal belt calender, where it is guided to the processing zone between the belt 3 and the roll 6, and further away from the calender to further processing, such as coating or reeling.

10

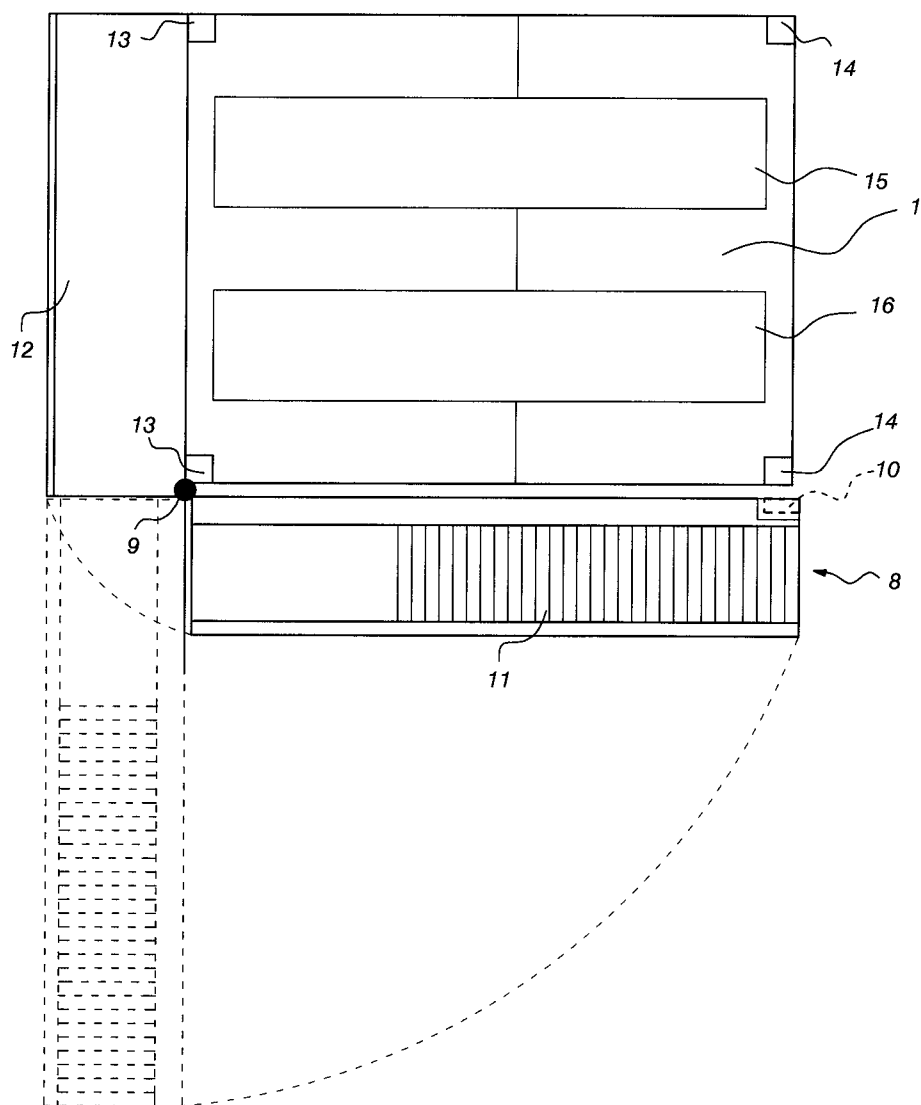
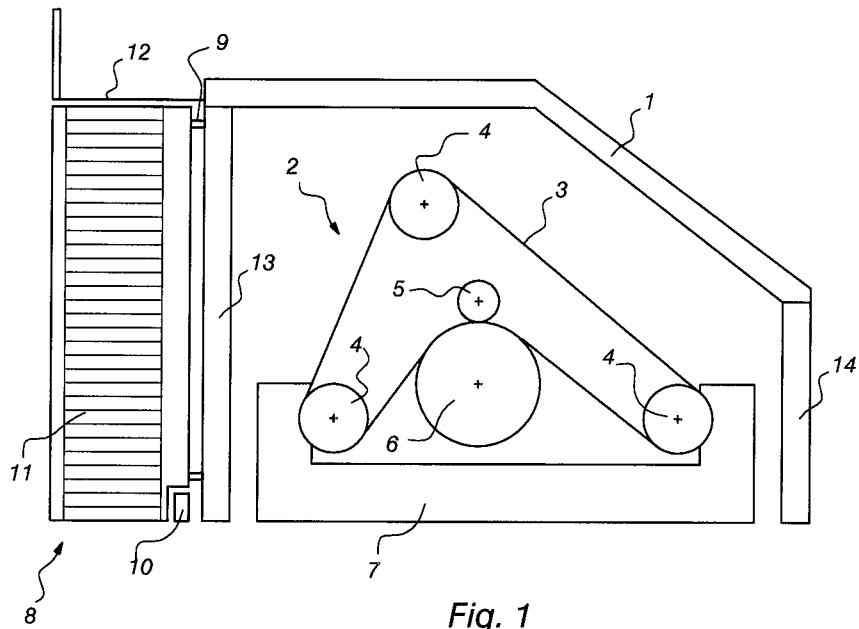
In connection with the door construction 8 and the opposite protective side casing may additionally be arranged sound and heat insulation structures.

- The door construction may conceivably also be realised in two parts, whereupon
15 one part is hinged to body part 14, while the other is hinged to body part 13. The space required to open the door will thus be smaller.

Claims

1. A fibrous web processing apparatus (2) with a metal belt loop (3), the processing apparatus comprising a metal belt (3) arranged to rotate around at least one guide means (4), and outside the metal belt loop a counter-element (6) forming an extended fibrous web processing zone with the metal belt, through which processing zone the fibrous web to be processed is led, **characterised** in that around the processing apparatus (2) is provided a separate protective construction comprising a body part provided with a protective casing (1), above the processing apparatus, extending, as seen in the direction of travel of the fibrous web brought to the processing apparatus, from the front end of the processing apparatus to its rear end, and with side casings at the opposite side ends (tending side and drive side) of the processing apparatus, at least one of which is made into a door construction (8) that may be opened.
2. A processing apparatus as claimed in claim 1, **characterised** in that the door construction (8) of the protective construction is hinged (9) to the body part of the protective construction.
3. A processing apparatus as claimed in claim 2, **characterised** in that on the opposite edge with respect to the hinged edge of the door construction is arranged a traversing wheel (10) resting on the base.
4. A processing apparatus as claimed in claim 1, **characterised** in that the door construction of the protective casing is made in two parts, one of which is hinged, as seen in the direction of travel of the fibrous web, to the front-most frame part (13) and the other part is hinged to the rear-most frame part (14).
5. A processing apparatus as claimed in any of the above claims, **characterised** in that the door construction is provided with an external stair part (11) turning with the door construction, which makes possible access to a higher working plane in the front or rear end area.
6. A processing apparatus as claimed in any of the claims 1 to 5, **characterised** in that the protective casing is made as an essentially solid structure.

7. A processing apparatus as claimed in any of the claims 1 to 5, **characterised** in that the protective casing is made as a partly open structure.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI2007/050473

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

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)

IPC: D21G

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

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ, TXTE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 03064764 A1 (METSO PAPER, INC), 7 August 2003 (07.08.2003), page 5, line 1 - line 13, figure 1, claims 1,2 --	1-7
Y	SE 512747 C2 (ABB FLÄKT AB), 8 May 2000 (08.05.2000), figure 1, claim 1, abstract --	1-7
Y	US 20030131738 A1 (HENDRIX), 17 July 2003 (17.07.2003), figures 1,6, claims 1-27, [0008],[0014],[0026],[0047],[0048] --	1-7

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

12 December 2007

Date of mailing of the international search report

17-12-2007

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Marianne Bratsberg/ci

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI2007/050473

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 0235140 A1 (METSO PAPER, INC), 2 May 2002 (02.05.2002), page 2, line 12 - line 19, figures 1-3, claims 1-14, abstract -- -----	1-7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI2007/050473

International patent classification (IPC)

D21G 5/00 (2006.01)

D21G 1/00 (2006.01)

Download your patent documents at www.prv.se

The cited patent documents can be downloaded at www.prv.se by following the links:

- In English/Searches and advisory services/Cited documents (service in English) or
- e-tjänster/anförda dokument (service in Swedish).

Use the application number as username.

The password is **SWUUITWKWJ**.

Paper copies can be ordered at a cost of 50 SEK per copy from PRV InterPat (telephone number 08-782 28 85).

Cited literature, if any, will be enclosed in paper form.

INTERNATIONAL SEARCH REPORT

Information on patent family members

01/09/2007

International application No.

PCT/FI2007/050473

WO	03064764	A1	07/08/2003	BR	0307269	A	14/12/2004
				CA	2469666	A	07/08/2003
				CA	2471935	A	07/08/2003
				CA	2472307	A	07/08/2003
				CN	1625627	A	08/06/2005
				CN	1625628	A	08/06/2005
				CN	1625629	A	08/06/2005
				EP	1470289	A	27/10/2004
				EP	1470290	A	27/10/2004
				EP	1478805	A	24/11/2004
				FI	5419	U	10/07/2002
				FI	20020159	A,V	30/07/2003
				FI	20021366	A	30/07/2003
				FI	20021367	A	30/07/2003
				FI	20021368	A	30/07/2003
				FI	20022082	A	30/07/2003
				FI	20022083	A	30/07/2003
				FI	20022084	A	30/07/2003
				FI	20022085	A	30/07/2003
				FI	20022086	A	30/07/2003
				FI	20022087	A	30/07/2003
				FI	20022088	A	30/07/2003
				JP	2005516132	T	02/06/2005
				JP	2005516133	T	02/06/2005
				JP	2005516134	T	02/06/2005
				RU	2004123644	A	10/07/2005
				US	20050251976	A	17/11/2005
				US	20050251977	A	17/11/2005
				US	20060060322	A	23/03/2006
				WO	03064761	A	07/08/2003
				WO	03064762	A	07/08/2003
				FI	20021673	A	21/03/2004

SE	512747	C2	08/05/2000	AU	5506598	A	17/07/1998
				EP	1012592	A	28/06/2000
				JP	2001516447	T	25/09/2001
				SE	9702201	A,L	07/12/1998
				US	6361670	B	26/03/2002

INTERNATIONAL SEARCH REPORT

Information on patent family members

01/09/2007

International application No.

PCT/FI2007/050473

US	20030131738	A1	17/07/2003	DE	10201349 A,B	14/08/2003
				DE	50207780 D	00/00/0000
				EP	1329550 A,B	23/07/2003
				SE	1329550 T3	
				US	7013799 B	21/03/2006

WO	0235140	A1	02/05/2002	AT	331913 T	15/07/2006
				AU	1058202 A	06/05/2002
				DE	60121204 D,T	31/05/2007
				EP	1334305 A,B	13/08/2003
				FI	4757 U	18/12/2000
				FI	20000420 D,V	24/10/2000
				US	20040029663 A	12/02/2004
