PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 :		(11) International Publication Number:
D21F 7/00, D21G 9/00	A1	WO 93/10307
		(43) International Publication Date: 27 May 1993 (27.05.93)

(21) International Application Number: PCT/FI92/00311

(22) International Filing Date: 18 November 1992 (18.11.92)

(30) Priority data:
915450 19 November 1991 (19.11.91) FI

(71) Applicant *(for all designated States except US):* VALMET PAPER MACHINERY INC. [FI/FI]; Panuntie 6, SF-00620 Helsinki (FI).

(72) Inventors; and
(75) Inventors/Applicants *(for US only) :* KOPONEN, Ismo [FI/FI]; Kourulantie 6 B 3, SF-26660 Rauma (FI). VAINIO, Jari [FI/FI]; Hirvitie 14 A, SF-26200 Rauma (FI). RINTASALO, Ilmari [FI/FI]; Luotsinkatu 2 A, SF-26100 Rauma (FI).

(74) Agent: FORSSÉN & SALOMAA OY; Yrjönkatu 30, SF-00100 Helsinki (FI).

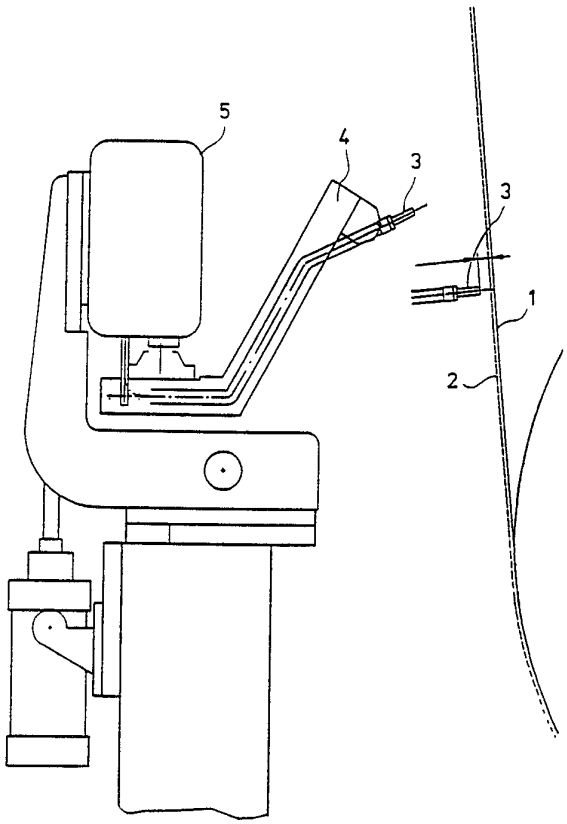
(81) Designated States: CA, JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, SE).

Published
With international search report.
In English translation (filed in Finnish).

(54) Title: METHOD FOR CUTTING OF THE LEADER OF THE WEB IN A PAPER OR BOARD MACHINE IN THE DRYING SECTION OF THE MACHINE

(57) Abstract

The invention concerns a method for cutting of the leader of the web in a paper or board machine in the drying section of the machine by means of a jet of pressurized water. According to the method, the web is placed against the drying wire when it is being cut, and the jet is directed at the web from the free side of the web. The water-jet pressure used is 40...400 bar, preferably about 100 bar, which is produced by an ordinary pressure washer.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria
AU	Australia
BB	Barbados
BE	Belgium
BF	Burkina Faso
BG	Bulgaria
BJ	Benin
BR	Brazil
CA	Canada
CF	Central African Republic
CG	Congo
CH	Switzerland
CI	Côte d'Ivoire
CM	Cameroon
CS	Czechoslovakia
CZ	Czech Republic
DE	Germany
DK	Denmark
ES	Spain
FI	Finland
FR	France
GA	Gabon
GB	United Kingdom
GN	Guinea
GR	Greece
HU	Hungary
IE	Ireland
IT	Italy
JP	Japan
KP	Democratic People's Republic of Korea
KR	Republic of Korea
KZ	Kazakhstan
LI	Liechtenstein
LK	Sri Lanka
LU	Luxembourg
MC	Monaco
MG	Madagascar
ML	Mali
MN	Mongolia
MR	Mauritania
MW	Malawi
NL	Netherlands
NO	Norway
NZ	New Zealand
PL	Poland
PT	Portugal
RO	Romania
RU	Russian Federation
SD	Sudan
SE	Sweden
SK	Slovak Republic
SN	Senegal
SU	Soviet Union
TD	Chad
TG	Togo
UA	Ukraine
US	United States of America
VN	Viet Nam

Method for cutting of the leader of the web in a paper or board machine in the drying section of the machine

The invention concerns the cutting of the leader of the web in a paper or board machine in the drying section of said machine and in cylinder drying sections of on-machine coating machines. At present, for said purpose, a revolving toothed circular blade (circular saw) is used, in which case the paper web must be separated from the drying wire at the cutting point in order that the blade should not cut the drying wire as well.

A second mode is cutting of the web that has been separated from the drying wire by means of a high-pressure water jet (P > 400 bar). The required pressure is high, because, with lower pressures, the web that is not supported against the drying wire at the cutting point is torn irregularly, which results in web breaks.

In many paper and board machines, the cutting of the leader of the web is carried out at the so-called wet end of the machine on the Fourdrinier wire or below the so-called pick-up felt in the press section. In said cutting processes, the dry solids content of the web placed on the Fourdrinier wire is about 10...20%, commonly about 15%. The strength of such a wet web is very low, and it can be cut readily. In the cutting performed in the wet end of a paper and board machine, it is possible to use low pressures in the diagonal cutting. The pressure values are, as a rule, about 10...20 bar, more commonly about 12...14 bar.

At the end of the drying section, the dry solids content of the web is about 90...98%, most commonly about 94...95%. After the drying section of a coater, the dry solids content is commonly about 96...98%. The strength of such a web is far higher than the strength of a web whose dry solids content is about 20% or less, the latter sort of web being usually cut by means of a water jet.

The method has incontestable advantages over the methods that are used currently. It does not produce cutting dust in the air, which dust is detrimental when it adheres to the paper web and to the equipment in the paper mill. The devices in accordance with the method of the invention are simple and durable, and they require little maintenance. The cutting process does not increase the noise level in the premises to a significant extent. The web is not torn irregularly, nor is it broken because of the cutting, which is of great importance. In the cutting in accordance with the method, the web is not separated from the drying wire, which simplifies and improves the transfer of the web, which results in an improved efficiency in the time of utilization of the machine.

By means of the method in accordance with the invention, the leader can be cut, without risk of being torn, by means of a simple and inexpensive low-pressure water jet, whose pressure is of an order of 100 bar. The invention is characterized in that the web is cut against the drying wire by means of a pressurized water jet, whose pressure is 40...400 bar.

In the following, the invention will be described in detail with reference to some exemplifying embodiments of the invention illustrated in the figures in the accompanying drawing, the invention being not confined to the details of said embodiments.

Figures 1, 2, 3, 4, and 5 show a water-jet device in accordance with the method of the invention for cutting of the leader as viewed from the side of the paper machine.

The drying wire is denoted with the numeral 1, the web to be cut with the numeral 2, the cutting nozzle with the numeral 3, the cutter transfer sledge with the numeral 4, and the cutter transfer beam with the numeral 5. The drying cylinders are denoted with the numeral 7, the perforated and/or grooved suction roll with the numeral 8. In Fig. 1, the nozzle of the cutter device is illustrated when in the rest position of the mechanism, whereas a separate nozzle illustrates

its position when the nozzle arm 4 and the nozzle 3 are in the cutting position. The pressure-pump/motor assembly is usually placed at the operating side or at the driving side, from which the water is passed by means of a flexible hose into the nozzle, which moves along with the transfer sledge.

The cutting is carried out by spraying a water jet against the face of the paper web 2 which rests on the drying wire 1, which water jet cuts through the paper web 2 and passes through the drying wire 1 without damaging the wire, while, at the same time, carrying away any fibres separated from the web. The cutting nozzle 3 is guided in a way in itself known from other cutters across the web 2 with a suitable speed distribution so that the result is a web 2 leader and a widening portion of appropriate shape. By means of suitable arrangements, the leader can be cut both in the case of single-wire draw and in the case of twin-wire draw. The cutter can be mounted at a rising or falling side of the web 2.

In the following, the patent claims will be given, and the various details of the invention may show variation within the scope of the inventive idea defined in said claims.

Claims

1. Method for cutting of the leader of the web in a paper or board machine in the drying section of the machine, c h a r a c t e r i z e d in that the paper web (2) is cut when it is placed against the drying wire (1) by means of a pressurized water jet applied to the paper web (2) face at the free side of the web.

2. Method as claimed in claim 1, c h a r a c t e r i z e d in that the pressure of the pressurized water jet is 40...400 bar, preferably about 100 bar.

3. Method as claimed in claim 1 or 2, c h a r a c t e r i z e d in that the cutting nozzle (3) moves in a pocket between the drying cylinders (7).

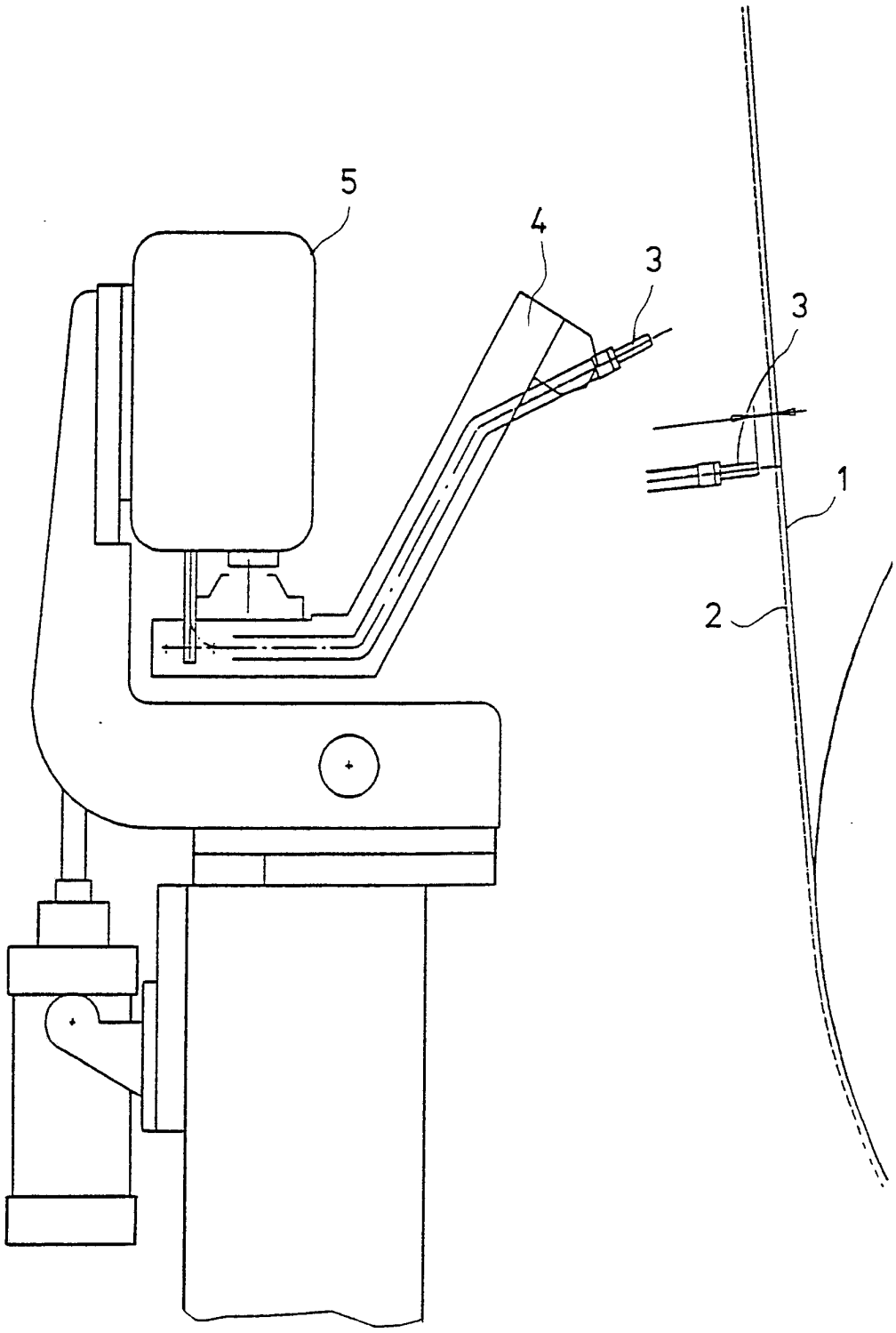


FIG. 1

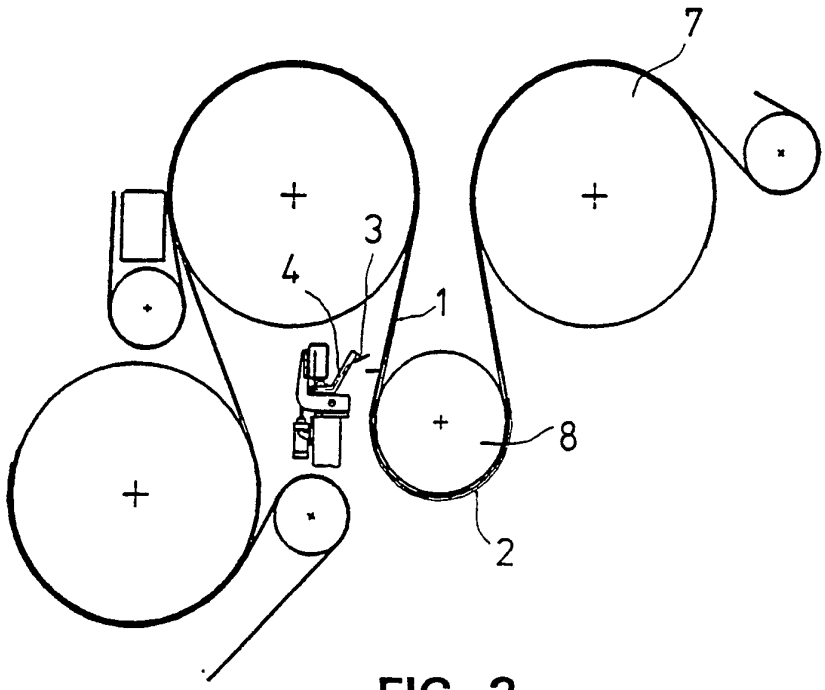


FIG. 2

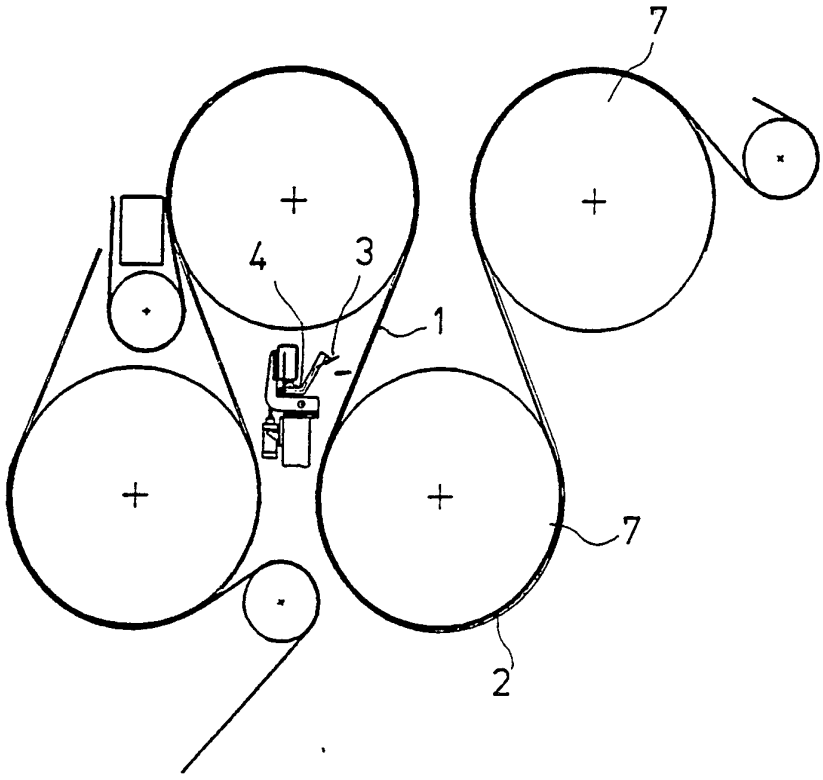


FIG. 3

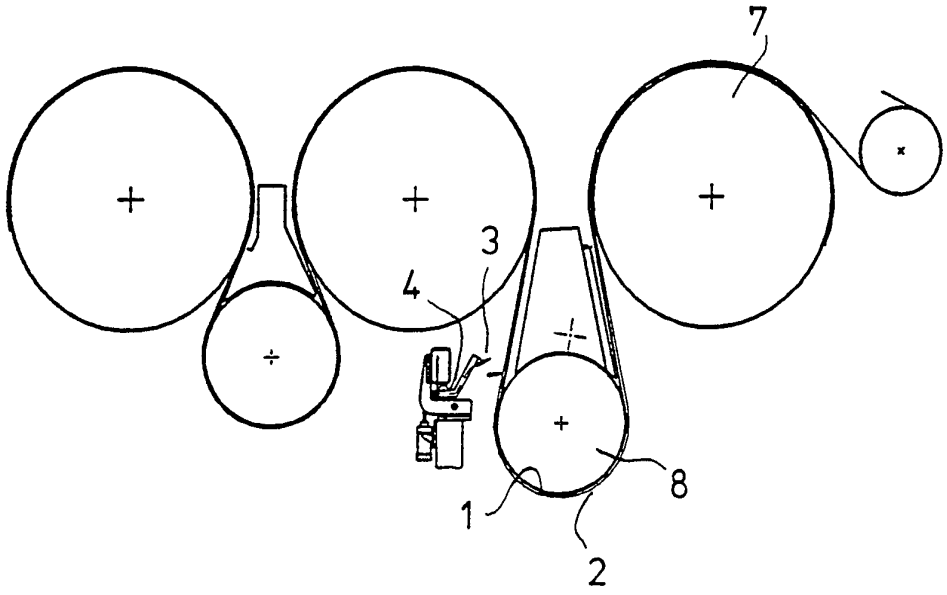


FIG. 4

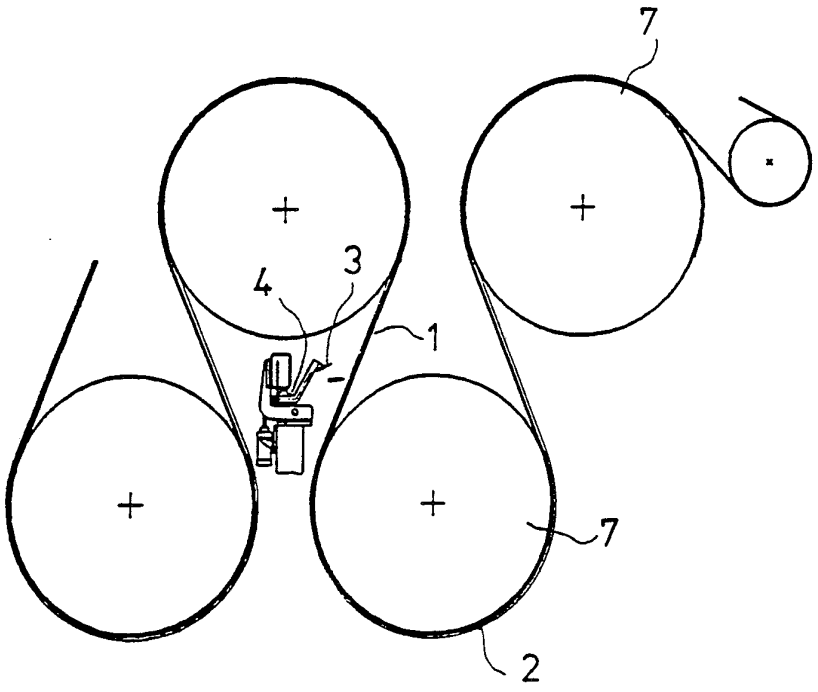


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 92/00311

A. CLASSIFICATION OF SUBJECT MATTER

IPC5: D21F 7/00, D21G 9/00
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)

IPC5: D21F, 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)

PAPERCHEM, PIRA, DERWENT WORLD PATENTS INDEX, CLAIMS/U.S. PATENTS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE, A1, 3924897 (SULZER-ESCHER WYSS GMBH), 7 February 1991 (07.02.91) --	1
A	EP, A2, 0444316 (VALMET PAPER MACHINERY INC.), 4 Sept 1991 (04.09.91) --	1

☐ 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" erlier document 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	Date of mailing of the international search report
25 February 1993	02 -03- 1993
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 Olov Jensén Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

29/01/93

International application No.
PCT/FI 92/00311

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A1- 3924897	07/02/91	NONE	
EP-A2- 0444316	04/09/91	NONE	