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(54) **METHOD AND SYSTEM FOR OBTAINING PAPER STRIPS AND/OR TAPES**

(57) Method which comprises the passage of a paper band through a cutting zone, forming the paper strips that are subsequently wound via an independent tensioning device at the exit from the cutting zone and the individual winding of each paper strip on a reel with an individual traction system with a speed and power adjusted to a

tension that can be withstood by said paper strip. In the cutting zone, the system has a blade carrier with blades secured to and spaced over a rule by a plurality of calibrated spacers which are alternately intercalated. The tensioning means are defined by a plurality of independent tensioners and the winding means for the paper strips comprise independent motors for each reel.

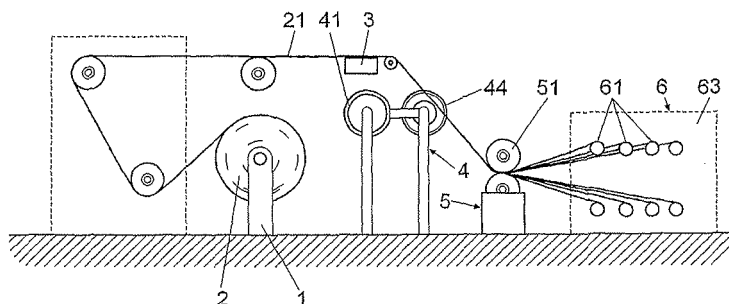


Fig. 1

Description

Object of the invention

[0001] The present invention refers to a method and system for obtaining paper strips and/or tapes, especially adapted for obtaining multiple strips of paper of a narrow width from a single wide paper band.

Antecedents of the invention

[0002] At present, paper yarns obtained through twisting one or more paper strips or tape are used in different ways. Sometimes these paper yarns have to be very fine and it is necessary to use the thinnest possible paper strips.

[0003] These paper strips are currently obtained industrially from a reel of a certain width which is unwound, and then passes through a cutting area with blades on a blade carrier, lying parallel in the direction in which the paper band is being moved.

[0004] In this cutting area, the paper band is divided continuously among the blades into a plurality of thin strips, which subsequently pass through a reel area where tensioning and winding takes place for them together.

[0005] This tensioning is carried out using one or more transversal tensioning rollers which are shared by all the strips. Equally, the winding is carried out on independent tensioners, arranged on the spindle of a shared winding mechanism.

[0006] In this way, all the cut paper strips are tensioned and wound in the same way, but the cut is not as homogeneous across the whole width of the band, which means that the paper strips do not have the same traction tension in the whole width of the band. Furthermore, the spindle or the receiving drum is made up of only one motor and a shared tensioner for all strips, which means that, sooner or later, the paper strips end up breaking as they are much more delicate than the original band, which was substantially wider and able to withstand tension better. This means that the cutting machine has to be stopped and the broken strip rejoined, through a system of soldering, an adhesive element or another joining element. Joining or soldering paper strips leads to subsequent problems in the process of twisting the paper strip and obtaining the yarn of paper.

[0007] There are other engageable systems which do not enable the manufacturing of large quantities of strips or tapes. In these systems, strips are maximum 800m long and they are considerably more expensive than conventional machines.

[0008] Furthermore, this situation is not advantageous as it stops the cutting process constantly and, on starting it again, it is possible that the paper deteriorates, causing numerous defects.

Description of the invention

[0009] The method and system for obtaining paper strips and/or tapes, the object of this invention, presents technical particularities which aim to make it possible to obtain paper strips and/or tapes of better quality and make the manufacturing process more constant and less susceptible to stopping.

[0010] The method to obtain paper strips therefore includes the independent tensioning of each paper strip at the end of the cutting area and the individual winding of each paper strip on a reel with an individual traction system of speed and power adapted to the level of tension that can be withstood by each paper strip. This makes it possible to avoid some strips having higher resistance to tension as occurs in the uniform turning of the reels in the traditional system, as these levels of tension are the reason why strips break.

[0011] The system to conduct this method comprises the blades in the blade carrier being secured to and spaced over a rule, in a plurality of calibrated intermediate removable separators, which are alternated, to define the width of the paper strip cut by two blades by measuring the calibrated thickness of this separator.

[0012] The means of tensioning the paper strips are then defined by a plurality of independent tensioners for the respective strips of paper. This enables greater control over the level of tension to which each strip is individually subject.

[0013] To make this control complete, the winding means for the paper strips are made up of at least two of the independent spindles, with their corresponding motors and means of tensioning and regulating, adjusting the speed and twisting power of each reel for the winding of each paper strip in ideal conditions and to avoid breakage. With two or more spindles, whether they are winding the consecutive strips or tapes alternately or through individual winding, it is possible to avoid friction and any crossing over of strips or tapes while winding, thereby reducing the risk of breakage of these strips and tapes.

[0014] Each separator is configured with different colours and has two opposing main bases which are separated by a certain distance for its calibration. If the strips to be obtained must be five millimetres thick, separators calibrated at five millimetres among the special cutting blades are used. If the strips need to be a different width, the separators used previously in the blade carrier can easily be changed and the blade carrier is recreated with other suitable blades.

[0015] The blades used are preferably circular and have a peripheral cutting edge, which ensures less waste, as it is uniform, meaning that there is a notable increase in the time blades are used and a reduction in the number of staff required to change them regularly.

[0016] In another use, to achieve the correct winding of the independent reels of the paper strips, the reels and motors of the different winding means are arranged on a platform such as a cupboard for storage and independ-

ent access. Each group of motors and reels can therefore make bigger reels of thinner paper strips.

[0017] In one use of the invention, the system includes a treatment area for the paper band, available in a previous or subsequent area in relation to the cutting area. In this treatment of the paper, substances which provide colour or improve the technical and mechanical characteristics of the paper strips and tapes are added.

Description of diagrams

[0018] To complete the description and facilitate understanding of the different features of the invention, the present descriptive report includes a set of illustrative but not limiting diagrams in which the following can be seen:

- Figure 1 shows a schematic front view of the invention.
- Figure 2 shows a schematic plan view of the invention.
- Figure 3 shows a detailed view in perspective of an example of a blade carrier,
- Figures 4 and 5 shows a plan view and a front view of the different alternatives for the winding means using two spindles.

State of the prior art

[0019] As can be seen in the diagrams referenced, the system is made up of an unwinding mechanism (1) using a reel (2) which passes a paper band (21) to rollers for unwinding before the paper band is passed to a treatment area (3) where substances are added to improve the technical and mechanical characteristics of the paper, and then to the cutting area (4) for the different paper strips (22).

[0020] In the cutting area (4) there is a blade carrier (41) which is spaced over a rule (42) on a tilting spindle to calibrate the cutting of the paper band (21). On the rule (42) there is a plurality of calibrated separators (43) and special blades (44) for cutting paper, arranged alternately, defining each separator (43) by the width of space between each pair of adjacent blades (44) and therefore the width of the cut paper strip (22).

[0021] This calibrated separator (43) presents a prismatic configuration with two main opposing bases (43a), separated by a defined distance, and these bases (43a) are aimed at establishing direct contact with the adjacent blades (44).

[0022] After each cutting area (4), there are tensioning means (5) made up of a crossways area with independent tensioners (51) for each paper strip (22), which provide the paper strips (22) to the independent winding means (6). The winding means (6) are made up of a plurality of reels (61) for winding the paper strip (22), and these reels (61) are associated to an exclusive individual traction system (62) with regulating tensioning devices (not shown) for the paper strip (22) to prevent it from breaking.

The sets of reels (61) and motors (62) are arranged crossways on a platform (63) for ease of storage and independent access,

[0023] The blades (44) are preferably circular, with a cutting edge, to allow more prolonged use and less maintenance.

[0024] Figures 4 and 5 show an alternative way of making the paper strips (22), by winding them alternately on reels (61) on two parallel spindles (64). Each spindle has its own motor (62) for movement and tensioning.

[0025] Having described in sufficient detail the nature of the invention, and provided an example of preferential use, it is stated for relevant purposes that the materials, shape, size and arrangement of the elements described can be modified, as long as they do not suppose an alteration of the essential features of the invention which are outlined below.

Claims

1. Method for obtaining paper strips and/or tapes of the type which comprises the passage of a paper band (21) through a reel (2) and through a cutting zone (4), through blades (44), arranged transversally to the paper band (21), to make the paper strips (22) that are subsequently wound, **characterised in that** there is independent tensioning of each paper strip (22) on leaving the cutting area (4), and the individual winding of each paper strip (22) on a reel (61) with an individual traction system with a speed and power adjusted for a tensioning that can be withstood by the paper strip in question (22).
2. System for obtaining paper strips and/or tapes of the type which comprises an unwinding mechanism (1) using a reel (2) to pass a paper band (21) of a certain width through rollers to pass the paper band (21) to a cutting area (4) with a blade carrier (41) with a plurality of blades (44) for cutting the paper band (21) into thin strips of paper (22). Tensioning means (5) and winding means (6) for the strips of paper (22) on reels (61) are **characterised in that** the blade carrier (41) presents the blades (44) secured to and spaced over a rule (42) by a plurality of removable intermediate calibrated separators (43) which are alternated to define the width of the paper (22) cut by two blades (44) due to the calibrated thickness of the separator (43), and that the tensioning means (5) for the paper strips (22) defined by a plurality of independent tensioners (51) for the respective paper strips (22), and the winding means (6) for the paper strips (22) are made up of at least two spindles (64) of independent reels (61) with their corresponding motors (62) and means of tensioning and regulating, adjusting the speed and power of the spinning of the reels (61) for the strip or strips of paper (22) so that they are produced in ideal conditions to avoid break-

age.

3. According to claim 2, this system is **characterised in that** each separator (43) is configured with different colours and presents two main opposing bases (43a), separated by a defined distance. 5
4. According to claim 2, the system is **characterised in that** the blades (44) are circular with a rounded edge. 10
5. According to claim 2, the system is **characterised in that** the reels (61) and motors (62) of the different winding means (6) are arranged crossways on a platform for storage and independent access. 15
6. According to claim 2, the system is **characterised in that** it comprises a treatment area (3) for the paper band (21) arranged in a previous or subsequent area to the cutting area (4). 20

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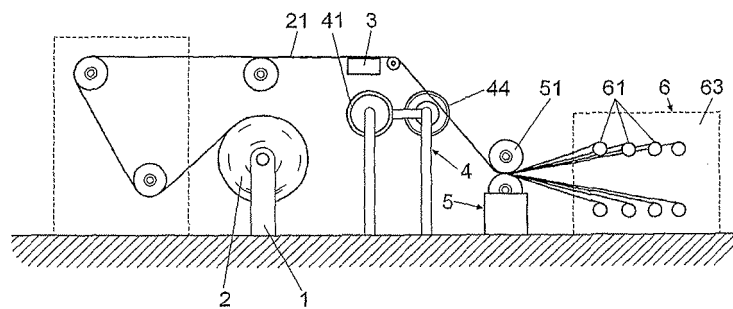


Fig. 1

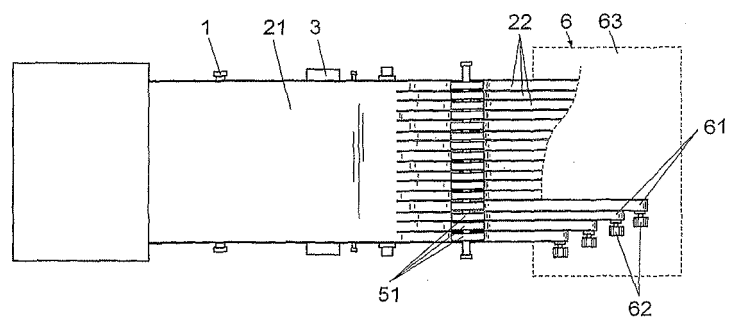


Fig. 2

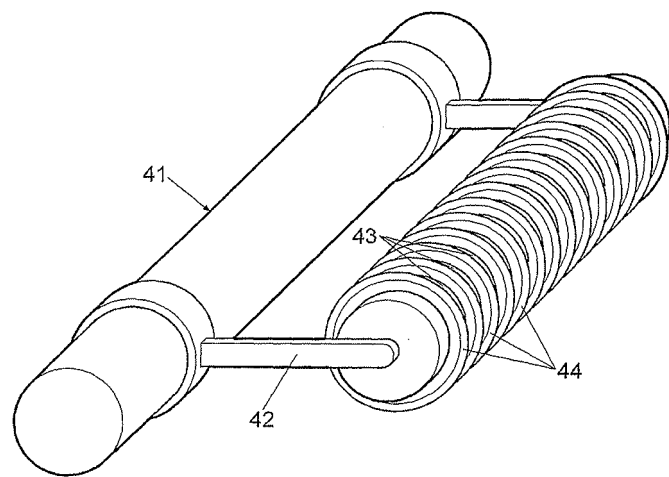


Fig. 3

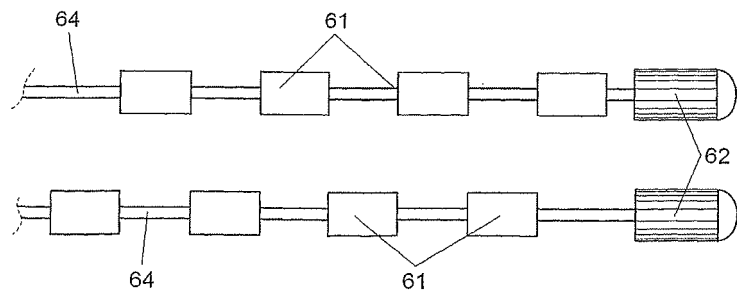


Fig. 4

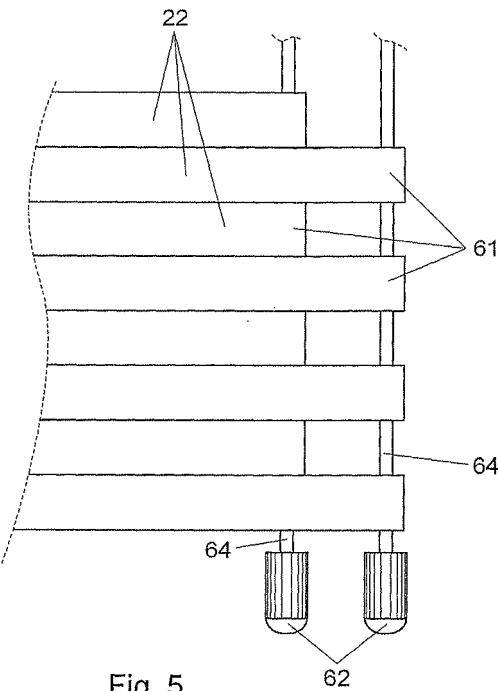


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2008/000771

A. CLASSIFICATION OF SUBJECT MATTER

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)

B65H

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

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

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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 5490639 A (DROUTSAS) 13.02.1996, Abstract	1
Y		2-6
Y	EP 1023974 A2 (BADENIA BETTCOMFORT) 02.08.2000, Abstract; figures	2-4,6
Y	JP 59070402 A (HITACHI) 20.04.1984, Abstract, figure 5	5
X	GB 745763 A (AMERICAN VISCOSE) 29.02.1956, Page 1, line 33 - page 2, line 2	1
A	US 2007194169 A1 (HERBERT et al.) 23.08.2007, the whole document	1-6
A	EP 1637488 A2 (S.I.A.T.) 22.03.2006, the whole document	1-6

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

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance.	
"E" earlier 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)	"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
"O" document referring to an oral disclosure use, exhibition, or other means	"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 documents, such combination being obvious to a person skilled in the art
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search

17.July.2009 (17.07.2009)

Date of mailing of the international search report

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Form PCT/ISA/210 (second sheet) (July 2008)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/ ES 2008/000771

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US 5490639 A	13.02.1996	NONE	-----
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EP 1637488 A	22.03.2006	ITMI 20041669 EP 20050107780	26.11.2004 24.08.2005

Form PCT/ISA/210 (patent family annex) (July 2008)

INTERNATIONAL SEARCH REPORT

International application No.

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CLASSIFICATION OF SUBJECT MATTER

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B65H 23/198 (2006.01)