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(54) **WEB PROCESSING SYSTEM AND METHOD FOR PROCESSING A WEB**

BAHNVERARBEITUNGSSYSTEM UND VERFAHREN ZUR VERARBEITUNG EINER BAHN
SYSTÈME DE TRAITEMENT DE BANDE ET PROCÉDÉ DE TRAITEMENT D'UNE BANDE

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Description

Field of the invention

[0001] The invention pertains to a web processing system and a method for processing a web, particularly for printing random patterns or layouts onto a continuous web of material.

Background of the invention

[0002] Articles of value are usually protected by some sort of authenticity measures that are put into place by the manufacturer to prevent the forgery of such an article. For example, cigarette boxes may be tagged in way that allows to track its origin and to confirm its authenticity. Conventionally employed techniques involve methods of recording identification codes or the like on cardboard or paper using sophisticated printing techniques to tag the desired articles of value with a seal of genuineness. Those printing techniques are hard to reproduce for imitators or plagiarists since the techniques either involve specific knowledge about the manufacturing process or the use of hard to obtain materials.

[0003] The document EP 1 125 758 A1 discloses a system for tagging sheets of paper with a random pattern, the system using a series of printing rollers that may apply phase shifted random patterns to one or both sides of the sheet. Document EP 1 318 486 A1 discloses a processing system according to the preamble of claim 1.

Summary of the invention

[0004] One idea of the present invention is to provide a web processing system that is able to generate a patterned image on the web which patterned image is truly random or at least pseudo-random in nature.

[0005] A first aspect of the present invention therefore relates to a processing system for a web, comprising a conveying mechanism configured to feed a continuous web of material along a conveying path in the processing system; a first printing cylinder having a first diameter and a first printing pattern, the first printing cylinder being arranged adjacent to the conveying path and configured to print a first image pattern on at least one surface of the continuous web; at least one second printing cylinder having a second diameter different from the first diameter and a second printing pattern, the second printing cylinder being arranged adjacent to the conveying path and configured to print a second image pattern on top of the first image pattern on the continuous web; and a system controller coupled to the conveying mechanism and configured to control the conveying mechanism according to at least one registration procedures, wherein the system controller is configured to selectively disable at least one of the registration procedures when printing the first and second image patterns to print a final random image pattern on the at least one surface of the continuous web.

[0006] A second aspect of the present invention relates to a method for processing a web, the method comprising conveying a continuous web of material along a conveying path in a processing system by a conveying mechanism; printing a first image pattern on at least one surface of the continuous web using a first printing cylinder having a first diameter and a first printing pattern; printing a second image pattern on top of the first image pattern on the continuous web using at least one second printing cylinder having a second diameter different from the first diameter and a second printing pattern; and selectively disabling at least one registration procedure for the conveying mechanism when printing the first and second image patterns to print a final random image pattern on the at least one surface of the continuous web.

[0007] The dependent claims provide additional technical features of advantageous embodiments and further improvements of the invention.

[0008] According to an embodiment of the processing system, the first printing pattern and/or the second printing pattern may be different.

[0009] According to another embodiment of the processing system, the registration procedures may comprise one or more of control of web conveying speed, control of lateral web alignment, control of conveying path length between the printing cylinders and control of web tension.

[0010] According to another embodiment of the processing system, the system controller may further be coupled to the first printing cylinder and the at least one second printing cylinder and configured to drive the first printing cylinder and the at least one second printing cylinder at different rotational speed.

[0011] According to another embodiment of the processing system, the system controller may further be configured to drive the first printing cylinder and the at least one printing cylinder at the same tangential speed.

[0012] According to an embodiment of the method, the first image pattern and/or the second image pattern may comprise random image patterns.

[0013] According to another embodiment of the method, the first printing pattern and the second printing pattern may comprise different patterns.

[0014] According to another embodiment of the method, the registration procedures may comprise one or more of control of web conveying speed, control of lateral web alignment, control of conveying path length between the printing cylinders and control of web tension.

[0015] According to another embodiment of the method, the continuous web material may comprise one of cardboard, paper, cellulose, textile fabric, plastic, metal or a laminate combination thereof.

[0016] According to another embodiment of the method, the first printing cylinder and the at least one second printing cylinder may be driven at different rotational speed.

[0017] According to another embodiment of the method, the first printing cylinder and the at least one second

printing cylinder may be driven at the same tangential speed.

[0018] According to another embodiment of the method, printing the first and second printing pattern may comprise transferring compositions comprising at least one of an ink, a varnish and a wax onto the at least one surface of the web.

[0019] The web may in an embodiment include separation means adapted to allow separation of at least one sheet from the web, the at least one sheet comprising a portion of the printed random pattern. The separation means may comprise score lines, perforation lines or die cuts formed in the material of the web.

[0020] The web material may in an embodiment comprise one of cardboard, paper, cellulose, textile fabric, plastic, metal or a laminate combination thereof.

[0021] A package comprising at least one part thereof made from a web may be manufactured using a web of material comprising a random pattern printed on a surface thereof, wherein the random pattern is obtained according to the method of the first aspect of the invention.

[0022] The invention will be explained in greater detail with reference to exemplary embodiments depicted in the drawings as appended.

Brief description of the drawings

[0023] The accompanying drawings are included to provide a further understanding of the present invention and are incorporated in and constitute a part of this specification.

[0024] The drawings illustrate the embodiments of the present invention and together with the description serve to explain the principles of the invention. Other embodiments of the present invention and many of the intended advantages of the present invention will be readily appreciated as they become better understood by reference to the following detailed description. The elements of the drawings are not necessarily to scale relative to each other. Like reference numerals designate corresponding similar parts.

Fig. 1 shows a schematical illustration of a processing system in isometric view according to one embodiment of the invention.

Fig. 2 schematically illustrates a portion of a base web according to a further embodiment of the invention.

Fig. 3 depicts a functional block diagram of stages in a method for processing a web according to yet another embodiment of the invention.

Detailed description of the embodiments

[0025] Although specific embodiments have been illustrated and described herein, it will be appreciated by

those of ordinary skill in the art that a variety of alternate and/or equivalent implementations may be substituted for the specific embodiments shown and described. Generally, this application is intended to cover any adaptations or variations of the specific embodiments discussed herein. In particular, specific features, characteristics and properties of different embodiments as discussed hereinbelow may be combined, if not explicitly indicated otherwise.

[0026] In the present invention, reference is made to printing machines and printing systems. Such printing apparatuses are generally intended to comprise any combination or structural arrangement of units, modules and registers that are able to convey a web to be processed along a conveying path within the apparatus. Moreover, the printing apparatuses may comprise any components that are adapted to imprint, stamp or press-work patterns, images, text or coloured areas onto one or both sides of the web being processed. The printing apparatus may comprise one or more of laser beam devices, developing devices, transfer devices, fixation devices, cutting devices, folding devices and similar conventionally known components in gravure and offset printing.

[0027] Fig. 1 schematically illustrates a processing system 100. The processing system 100 may particularly be configured to process and produce printed webs Wp of material, the web Wp comprising material such as cardboard, paper, cellulose, textile fabric, plastic, metal or a laminate combination thereof. The processing system 100 generally comprises a plurality of processing stages 12 that are equipped with rollers or feed units, generally denoted with the reference sign 10 in Fig. 1. The rollers 10 form part of a conveying mechanism 11 that is configured to feed a continuous web W of material along a conveying path in the processing system 100.

[0028] Fig. 2 illustrates a functional view of a processing system for processing webs W and may be seen as conceptual depiction of the processing system 100 in Fig. 1. The web W may be input to the processing system at a system input 8, conveyed through the various processing stages 12 and output as printed web Wp at a system output 9. Among other not specifically indicated processing units and modules, the processing system 100 comprises a first printing cylinder 1 having a first diameter d1 and a first printing pattern formed thereon. The first printing cylinder 1 is arranged adjacent to the conveying path and configured to print a first image pattern, i.e. a printed image of the printing pattern of the first printing cylinder, on at least one surface of the continuous web W. In Fig. 1 and 2 the first printing cylinder 1 is configured to print the first image pattern on the bottom surface of the web W running between the first printing cylinder 1 and a corresponding pressure roller 4.

[0029] The processing system 100 further comprises at least one second printing cylinder 2 having a second diameter d2 different from the first diameter d1 and a second printing pattern formed thereon. For example,

the second diameter d_2 may be larger than the first diameter d_1 . The second printing cylinder 2 is arranged in series with the first printing cylinder 1 and may be arranged downstream of the first printing cylinder 1 in the conveying path of the web W . The second printing cylinder 2 is likewise arranged adjacent to the conveying path and is configured to print a second image pattern, i.e. a printed image of the second printing pattern of the second printing cylinder, on top of the first image pattern on the continuous web W . To that end, the second printing cylinder 2 may be configured to print the second image pattern on the bottom surface of the web W running between the second printing cylinder 2 and a corresponding pressure roller 5.

[0030] As shown in Fig. 1, there may be a third printing cylinder 3 downstream of the second printing cylinder 2, the third printing cylinder 3 having a diameter different from the diameter of the first and/or second printing cylinder 1 and 2, and preferably a third printing pattern formed thereon. A corresponding pressure roller 6 may be provided in order to have the third printing cylinder 3 print a third image pattern, i.e. a printed image of the third printing pattern of the third printing cylinder, on a surface of the web W running between the third printing cylinder 3 and the pressure roller 6. Generally, the number of printing cylinders 1, 2 and 3 is not limited to two or three, but may instead be any desired number greater than two.

[0031] The first printing pattern and/or the second printing pattern may be printed on the web W as image patterns or layouts, for example as ornamental designs or lines, dots or geometrical shapes in various colours and/or line thickness. The first printing pattern and the second printing pattern may for example be different patterns providing a final image pattern made of an overlapping of the first and second image patterns on the web W , i.e. the different printing cylinders 1, 2 and 3 print different image patterns on top of each other. The printing cylinders 1, 2 and 3 may be configured to transfer compositions in liquid form onto the at least one surface of the web W , such as ink, varnish or wax. Once transferred to the surface of the web W , the processing system 100 may comprise a drying module downstream of each of the printing cylinders 1, 2 and 3 that is configured to dry the compositions in liquid form printed on the web W .

[0032] The processing system 100 further comprises a system controller 7 which is coupled to the conveying mechanism 11 and the printing cylinders 1, 2 and 3. The system controller 7 is on one hand responsible for control of the printing cylinders 1, 2 and 3. For example, the system controller 7 may be configured to drive the printing cylinders 1, 2 and 3 at different rotational speed. Depending on the diameters d_1 and d_2 of the printing cylinders 1, 2 and 3 the system controller 7 may adapt the rotational speed of each of the printing cylinders 1, 2 and 3 in such a way that the printing cylinders 1, 2 and 3 are driven at the same tangential speed. This way, the speed of the web W passing by the printing cylinders 1, 2 and 3 will remain constant throughout the whole printing process.

[0033] On the other hand, the system controller 7 is configured to control the conveying mechanism 11 according to at least one registration procedure. Such registrations procedures may for example include control of web conveying speed, control of lateral web alignment, control of conveying path length between the printing cylinders and control of web tension. By selectively disabling at least one of the registration procedures when printing the first and second printing patterns, the system controller 7 is able to provide a certain randomness in the printing parameters of the processing system 100, thereby introducing a degree of irreproducibility to the printed patterns. In particular, owing to disabling of one or more of the registration procedures each of the first second image patterns has a certain degree of randomness due to the granted ability for the web W to move out of registry over the first and/or second and/or third printing rollers. Consequently, each of the first, second and third image patterns are random or at least pseudo-random and the final image pattern obtained at the outlet 9 of the processing system 100, which is made of a combination of the first, second and third image patterns is also random or at least pseudo-random. The printed web W_p is therefore printed with a unique final image pattern, which is therefore very hard to reproduce.

[0034] The processing system 100 may be used to print continuous webs W_p of material that include a truly or at least pseudo-random pattern printed on a surface thereof. The web W_p may for example comprise separation means, such as score lines, perforation lines or die cuts formed in the material of the web W_p , that are adapted to allow separation of at least one sheet from the web W_p . Each separated sheet then comprises a portion of the printed random pattern. Such sheets may subsequently be used in manufacturing or tagging a package, for example a cigarette box.

[0035] Fig. 3 schematically illustrates a block diagram of a method M for processing a continuous web of material, such as the web W of Figs. 1 and 2. The method M may particularly be implemented with a web processing system, such as the processing system 100 as illustrated in and explained in conjunction with Figs. 1 and 2.

[0036] In a first stage, the method M may comprise at M1 the process of conveying a continuous web W of material along a conveying path in a processing system 100 by a conveying mechanism 11. The web W may for example be made from a material comprising one of cardboard, paper, cellulose, textile fabric, plastic, metal or a laminate combination thereof. The conveying mechanism 11 may for example comprise a number of rollers and web feed modules, such as rollers 10. The conveying mechanism may in particular be distributed over a series of processing stages 12 of the processing system 100.

[0037] In a second stage M_2 , a first image pattern is printed on at least one surface of the continuous web W , for example the upper surface, using a first printing cylinder 1 having a first diameter d_1 and a first printing pattern. Then, in a third stage M_3 , a second image pattern

may be printed on top of the first image pattern on the continuous web W using at least one second printing cylinder 1 having a second diameter d2 different from the first diameter d1 and a second printing pattern, preferably different from the first printing pattern. The printing processes of M2 and M3 may for example comprise transferring compositions in liquid form, such as ink, varnish or wax, onto the at least one surface of the web W.

[0038] In a fourth stage M4, while the first and second image patterns are printed on the web W by the printing cylinders 1, 2 and 3, at least one registration procedure for the conveying mechanism 11 in the processing system 100 may be selectively disabled. The processing system 100 may be under control of a system controller 7 that controls various registration procedures in the system such as the control of web conveying speed, the control of lateral web alignment, the control of conveying path length between the printing cylinders 1, 2 and 3, and the control of web tension.

[0039] Due to disabling at least one registration procedure for the conveying mechanism 11 the first and second printing pattern of the printing cylinders may each provide random image patterns onto the web W. In order to create as much randomness in the resulting overall final image pattern on the web W, the first printing pattern and the second printing pattern may each provide different image patterns. To achieve an independence of the image patterns, the first printing cylinder 1 and the at least one printing cylinder 2, 3 may be driven at different rotational speed, but at the same tangential speed. This ensures that the sequence of the first and second image patterns is randomly shifted with respect to each other. On the other hand, having the first and second printing cylinders 1, 2 and 3 run at the same tangential speed will guarantee a constant web speed of the web W in the conveying mechanism without the risk of mechanical or tensile stress due to the printing processes at the different cylinders.

[0040] If the image patterns have been transferred from the printing cylinders to the web W as compositions in liquid form, those compositions may be dried in an optional stage M5 of the method M. Said drying stage may alternatively be carried out after each of the printing processes M2 and M3.

[0041] Particular features of an embodiment of the invention may have been disclosed with respect to only one of several implementations, however, said feature may be combined with one or more other features of the other implementations as may be desired and advantageous for any given or particular application. Furthermore, to the extent that the terms "include", "have", "with", or other variants thereof are used in either the detailed description or the claims, such terms are intended to be inclusive in a manner similar to the term "comprise". The terms "coupled" and "connected", along with derivatives may have been used. It should be understood that these terms may have been used to indicate that two components work together or interact with each other, irrespec-

tive of whether they are in direct physical or electrical contact or not. Additionally, any terminology used in the foregoing description related to the spatial arrangement of features, elements or components of the embodiments depicted in the drawings, such as "top", "bottom", "left", "right", "lower", "upper" and similar terms, is used solely for purposes of an easier understanding and is not intended to limit the invention in any way.

10 List of Reference Signs

[0042]

1	Printing cylinder
2	Printing cylinder
3	Printing cylinder
4	Pressure roller
5	Pressure roller
6	Pressure roller
7	System controller
8	Web inlet
9	Web outlet
10	Conveying roller
11	Conveying mechanism
12	Processing stage
d1	Cylinder diameter
d2	Cylinder diameter
M	Method
M1	Method step
M2	Method step
M3	Method step
M4	Method step
M5	Method step
W	Web
Wp	Printed web

Claims

1. Processing system (100) for a web (W), comprising:
 - a conveying mechanism (11) configured to feed a continuous web (W) of material along a conveying path in the processing system (100);
 - a first printing cylinder (1) having a first diameter (d1) and a first printing pattern, the first printing cylinder (1) being arranged adjacent to the conveying path and configured to print a first image pattern on at least one surface of the continuous web (W);
 - at least one second printing cylinder (2; 3) having a second diameter (d2) different from the first diameter (d1) and a second printing pattern, the second printing cylinder (2, 3) being arranged adjacent to the conveying path and configured to print a second image pattern on top of the first image pattern on the continuous web (W); and

- a system controller (7) coupled to the conveying mechanism (11) and configured to control the conveying mechanism (11) according to at least one registration procedure,
characterized in that the the system controller (7) is configured to selectively disable at least one of the registration procedures when printing the first and second image patterns to print a final random image pattern on the at least one surface of the continuous web (W).
2. Processing system (100) according to claim 1, wherein the first printing pattern and/or the second printing pattern are different.
 3. Processing system (100) according to one of the claims 1 or 2, wherein the registration procedures comprise one or more of control of web conveying speed, control of lateral web alignment, control of conveying path length between the printing cylinders (1; 2; 3) and control of web tension.
 4. Processing system (100) according to one of the claims 1 to 3, wherein the system controller (7) is further coupled to the first printing cylinder (1) and the at least one second printing cylinder (2; 3) and configured to drive the first printing cylinder (1) and the at least one second printing cylinder (2; 3) at different rotational speed.
 5. Processing system (100) according to claim 4, wherein the system controller (7) is further configured to drive the first printing cylinder (1) and the at least one second printing cylinder (2; 3) at the same tangential speed.
 6. Method (M) for processing a web (W), the method (M) comprising:

conveying (M1) a continuous web (W) of material along a conveying path in a processing system (100) by a conveying mechanism (11);
 printing (M2) a first image pattern on at least one surface of the continuous web (W) using a first printing cylinder (1) having a first diameter (d1) and a first printing pattern; and
 printing (M3) a second image pattern on top of the first image pattern on the continuous web (W) using at least one second printing cylinder (2, 3) having a second diameter (d2) different from the first diameter (d1) and a second printing pattern; the method being **characterized by** the step of
 selectively disabling (M4) at least one registration procedure for the conveying mechanism (11) when printing the first and second image patterns to print a final random image pattern on the at least one surface of the continuous web

(W).

7. Method (M) according to claim 6, wherein the first image pattern and/or the second image pattern comprise random image patterns.
8. Method (M) according to one of the claims 6 and 7, wherein the first printing pattern and the second printing pattern comprise different patterns.
9. Method (M) according to one of the claims 6 to 8, wherein the registration procedures comprise one or more of control of web conveying speed, control of lateral web alignment, control of conveying path length between the printing cylinders (1; 2; 3) and control of web tension.
10. Method (M) according to one of the claims 6 to 9, wherein the continuous web (W) material comprises one of cardboard, paper, cellulose, textile fabric, plastic, metal or a laminate combination thereof.
11. Method (M) according to one of the claims 6 to 10, wherein the first printing cylinder (1) and the at least one second printing cylinder (2; 3) are driven at different rotational speed.
12. Method (M) according to claim 11, wherein the first printing cylinder (1) and the at least one second printing cylinder (2; 3) are driven at the same tangential speed.
13. Method (M) according to one of the claims 6 to 12, wherein printing (M2; M3) the first and second printing pattern comprises transferring compositions onto the at least one surface of the web (W) comprising at least one of an ink, a varnish and a wax onto the at least one surface of the web (W).

Patentansprüche

1. Verarbeitungssystem (100) für eine Bahn (W), umfassend:

einen Fördermechanismus (11), der dafür ausgestaltet ist, eine kontinuierliche Bahn (W) aus Material entlang eines Förderpfades in dem Verarbeitungssystem (100) voranzuschieben,
 einen ersten Druckzylinder (1), der einen ersten Durchmesser (d1) und ein erstes Druckmuster aufweist, wobei der erste Druckzylinder (1) neben dem Förderpfad angeordnet ist und dafür ausgestaltet ist, ein erstes Bildmuster auf mindestens eine Fläche der kontinuierlichen Bahn (W) zu drucken,
 mindestens einen zweiten Druckzylinder (2, 3), der einen zweiten Durchmesser (d2), der sich

- von dem ersten Durchmesser (d1) unterscheidet, und ein zweites Druckmuster aufweist, wobei der zweite Druckzylinder (2, 3) neben dem Förderpfad angeordnet und dafür ausgestaltet ist, ein zweites Bildmuster auf das erste Bildmuster auf der kontinuierlichen Bahn (W) zu drucken, und
- eine Systemsteuereinheit (7), die mit dem Fördermechanismus (11) gekoppelt und dafür ausgestaltet ist, den Fördermechanismus (11) gemäß mindestens einem Registrierungsverfahren zu steuern,
- dadurch gekennzeichnet, dass** die Systemsteuereinheit (7) dafür ausgestaltet ist, mindestens eines der Registrierungsverfahren selektiv zu deaktivieren, wenn die ersten und zweiten Bildmuster gedruckt werden, um ein finales zufälliges Bildmuster auf der mindestens einen Fläche der kontinuierlichen Bahn (W) zu drucken.
2. Verarbeitungssystem (100) nach Anspruch 1, wobei das erste Druckmuster und/oder das zweite Druckmuster verschieden sind.
 3. Verarbeitungssystem (100) nach einem der Ansprüche 1 oder 2, wobei die Registrierungsverfahren eines oder mehrere von einer Steuerung der Bahnfördergeschwindigkeit, einer Steuerung der seitlichen Bahnausrichtung, einer Steuerung der Förderpfadlänge zwischen den Druckzylindern (1, 2, 3) und einer Steuerung der Bahnspannung umfassen.
 4. Verarbeitungssystem (100) nach einem der Ansprüche 1 bis 3, wobei die Systemsteuereinheit (7) des Weiteren mit dem ersten Druckzylinder (1) und dem mindestens einen zweiten Druckzylinder (2, 3) gekoppelt ist und dafür ausgestaltet ist, den ersten Druckzylinder (1) und den mindestens einen zweiten Druckzylinder (2, 3) mit unterschiedlicher Drehzahl anzutreiben.
 5. Verarbeitungssystem (100) nach Anspruch 4, wobei die Systemsteuereinheit (7) des Weiteren dafür ausgestaltet ist, den ersten Druckzylinder (1) und den mindestens einen zweiten Druckzylinder (2, 3) mit derselben Tangentialgeschwindigkeit anzutreiben.
 6. Verfahren (M) zum Verarbeiten einer Bahn (W), wobei das Verfahren (M) Folgendes umfasst:

Befördern (M1) einer kontinuierlichen Bahn (W) aus Material entlang eines Förderpfades in einem Verarbeitungssystem (100) durch einen Fördermechanismus (11),

Drucken (M2) eines ersten Bildmusters auf mindestens eine Fläche der kontinuierlichen Bahn (W) unter Verwendung eines ersten Druckzylinders (1), der einen ersten Durchmesser (D1) und ein erstes Druckmuster aufweist, und

Drucken (M3) eines zweiten Bildmusters auf das erste Bildmuster auf der kontinuierlichen Bahn (W) unter Verwendung mindestens eines zweiten Druckzylinders (2, 3), der einen zweiten Durchmesser (d2), der sich von dem ersten Durchmesser (d1) unterscheidet, und ein zweites Druckmuster aufweist, wobei das Verfahren durch folgenden Schritt gekennzeichnet ist: selektives Deaktivieren (M4) mindestens eines Registrierungsverfahrens für den Fördermechanismus (11), wenn die ersten und zweiten Bildmuster gedruckt werden, um ein finales zufälliges Bildmuster auf der mindestens einen Fläche der kontinuierlichen Bahn (W) zu drucken.
 7. Verfahren (M) nach Anspruch 6, wobei das erste Bildmuster und/oder das zweite Bildmuster zufällige Bildmuster umfassen.
 8. Verfahren (M) nach einem der Ansprüche 6 und 7, wobei das erste Druckmuster und das zweite Druckmuster unterschiedliche Muster umfassen.
 9. Verfahren (M) nach einem der Ansprüche 6 bis 8, wobei die Registrierungsverfahren eines oder mehrere von einer Steuerung der Bahnfördergeschwindigkeit, einer Steuerung der seitlichen Bahnausrichtung, einer Steuerung der Förderpfadlänge zwischen den Druckzylindern (1, 2, 3) und einer Steuerung der Bahnspannung umfassen.
 10. Verfahren (M) nach einem der Ansprüche 6 bis 9, wobei das Material der kontinuierlichen Bahn (W) eines von Pappe, Papier, Zellulose, Textilgewebe, Kunststoff, Metall oder eine Laminatkombination davon umfasst.
 11. Verfahren (M) nach einem der Ansprüche 6 bis 10, wobei der erste Druckzylinder (1) und der mindestens eine zweite Druckzylinder (2, 3) mit unterschiedlicher Drehzahl angetrieben werden.
 12. Verfahren (M) nach Anspruch 11, wobei der erste Druckzylinder (1) und der mindestens eine zweite Druckzylinder (2, 3) mit derselben Tangentialgeschwindigkeit angetrieben werden.
 13. Verfahren (M) nach einem der Ansprüche 6 bis 12, wobei das Drucken (M2, M3) der ersten und zweiten Druckmuster umfasst, Zusammensetzungen, die mindestens eines von einer Drucktinte, einem Lack und einem Wachs umfassen, auf die mindestens eine Fläche der Bahn (W) zu übertragen.

Revendications

1. Système de traitement (100) d'une bande (W), comprenant :
 - un mécanisme de transport (11) conçu pour introduire une bande continue (W) de matériau le long d'un chemin de transport dans le système de traitement (100) ;
 - un premier cylindre d'impression (1) présentant un premier diamètre (d1) et un premier motif d'impression, le premier cylindre d'impression (1) étant disposé au voisinage du chemin de transport et étant conçu pour imprimer un premier motif d'image sur au moins une surface de la bande continue (W) ;
 - au moins un second cylindre d'impression (2, 3) présentant un second diamètre (d2) différent du premier diamètre (d1) et un second motif d'impression, le second cylindre d'impression (2, 3) étant disposé au voisinage du chemin de transport et étant conçu pour imprimer un second motif d'image par-dessus le premier motif d'image sur la bande continue (W) ; et
 - un dispositif de commande de système (7) couplé au mécanisme de transport (11) et conçu pour commander le mécanisme de transport (11) selon au moins une procédure de repérage, **caractérisé en ce que** le dispositif de commande de système (7) est conçu pour désactiver sélectivement au moins l'une des procédures de repérage lors de l'impression des premier et second motifs d'images afin d'imprimer un motif d'image aléatoire final sur la ou les surface(s) de la bande continue (W).
2. Système de traitement (100) selon la revendication 1, dans lequel le premier motif d'impression et/ou le second motif d'impression sont différents.
3. Système de traitement (100) selon l'une des revendications 1 et 2, dans lequel les procédures de repérage comprennent une ou plusieurs commande(s) parmi la commande de vitesse de transport de bande, la commande d'alignement latéral de bande, la commande de longueur de chemin de transport entre les cylindres d'impression (1 ; 2 ; 3) et la commande de tension de bande.
4. Système de traitement (100) selon l'une des revendications 1 à 3, dans lequel le dispositif de commande de système (7) est couplé en outre au premier cylindre d'impression (1) et à l'au moins un second cylindre d'impression (2 ; 3) et est conçu pour entraîner le premier cylindre d'impression (1) et l'au moins un second cylindre d'impression (2 ; 3) à une vitesse de rotation différente.
5. Système de traitement (100) selon la revendication 4, dans lequel le dispositif de commande de système (7) est conçu en outre pour entraîner le premier cylindre d'impression (1) et l'au moins un second cylindre d'impression (2 ; 3) à la même vitesse tangentielle.
6. Procédé (M) de traitement d'une bande (W), le procédé (M) comprenant les étapes suivantes :
 - transporter (M1) une bande continue (W) de matériau le long d'un chemin de transport dans un système de traitement (100), au moyen d'un mécanisme de transport (11) ;
 - imprimer (M2) un premier motif d'image sur au moins une surface de la bande continue (W) à l'aide d'un premier cylindre d'impression (1) présentant un premier diamètre (d1) et un premier motif d'impression ; et
 - imprimer (M3) un second motif d'image par-dessus le premier motif d'image sur la bande continue (W) à l'aide d'au moins un second cylindre d'impression (2, 3) présentant un second diamètre (d2) différent du premier diamètre (d1) et un second motif d'impression ; le procédé étant **caractérisé par** l'étape consistant à : désactiver sélectivement (M4) au moins une procédure de repérage destinée au mécanisme de transport (11), lors de l'impression des premier et second motifs d'images afin d'imprimer un motif d'image aléatoire final sur la ou les surface(s) de la bande continue (W).
7. Procédé (M) selon la revendication 6, dans lequel le premier motif d'image et/ou le second motif d'image comprend ou comprennent des motifs d'images aléatoires.
8. Procédé (M) selon l'une des revendications 6 et 7, dans lequel le premier motif d'image et le second motif d'image comprennent des motifs différents.
9. Procédé (M) selon l'une des revendications 6 à 8, dans lequel les procédures de repérage comprennent une ou plusieurs commande(s) parmi la commande de vitesse de transport de bande, la commande d'alignement latéral de bande, la commande de longueur de chemin de transport entre les cylindres d'impression (1 ; 2 ; 3) et la commande de tension de bande.
10. Procédé (M) selon l'une des revendications 6 à 9, dans lequel le matériau de bande continue (W) comprend un matériau parmi le carton, le papier, la cellulose, une étoffe, une matière plastique, un métal ou une combinaison stratifiée de ceux-ci.
11. Procédé (M) selon l'une quelconque des revendica-

tions 6 à 10, dans lequel le premier cylindre d'impression (1) et l'au moins un second cylindre d'impression (2 ; 3) sont entraînés à une vitesse de rotation différente.

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12. Procédé (M) selon la revendication 11, dans lequel le premier cylindre d'impression (1) et l'au moins un second cylindre d'impression (2 ; 3) sont entraînés à la même vitesse tangentielle.

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13. Procédé (M) selon l'une quelconque des revendications 6 à 12, dans lequel l'impression (M2 ; M3) des premier et second motifs d'impression comprend le transfert de compositions sur la ou les surface(s) de la bande (W) comprenant une encre et/ou un vernis et/ou une cire sur la ou les surface(s) de la bande (W).

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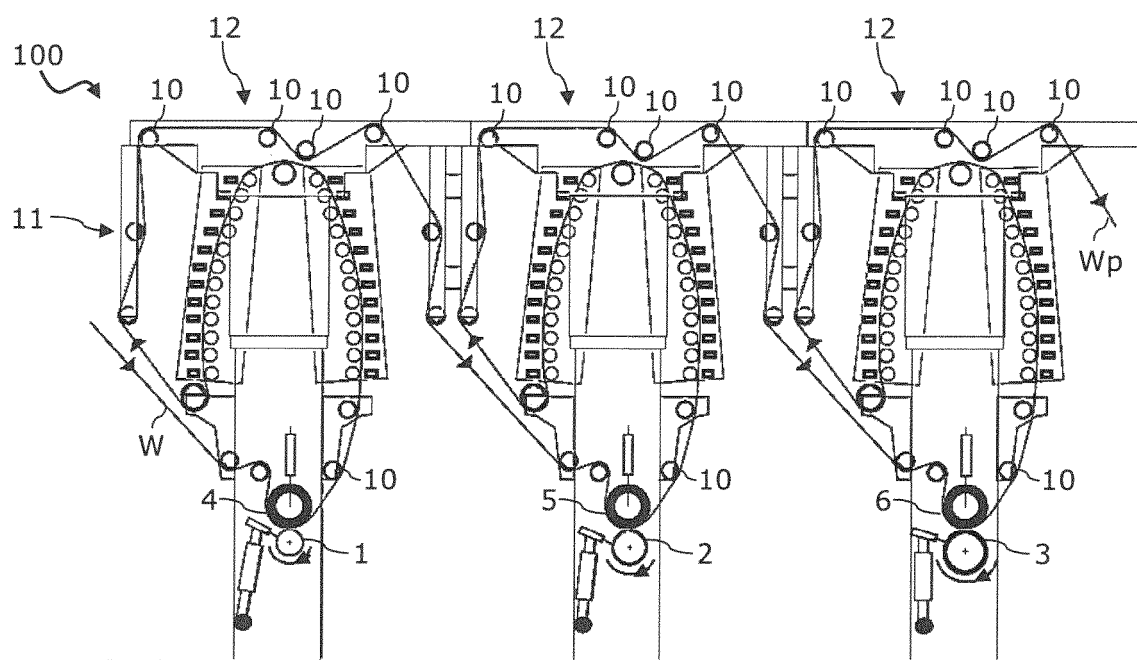


Fig. 1

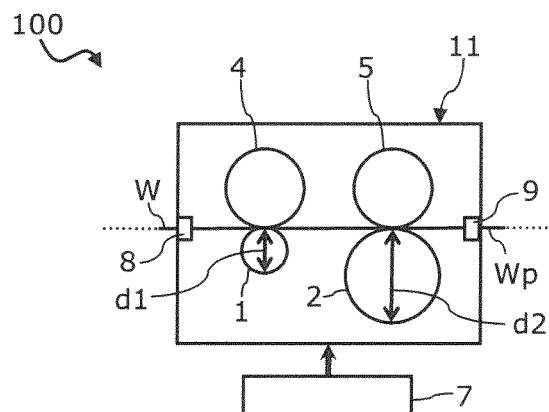


Fig. 2

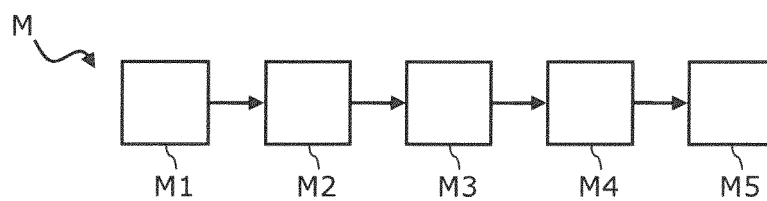


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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