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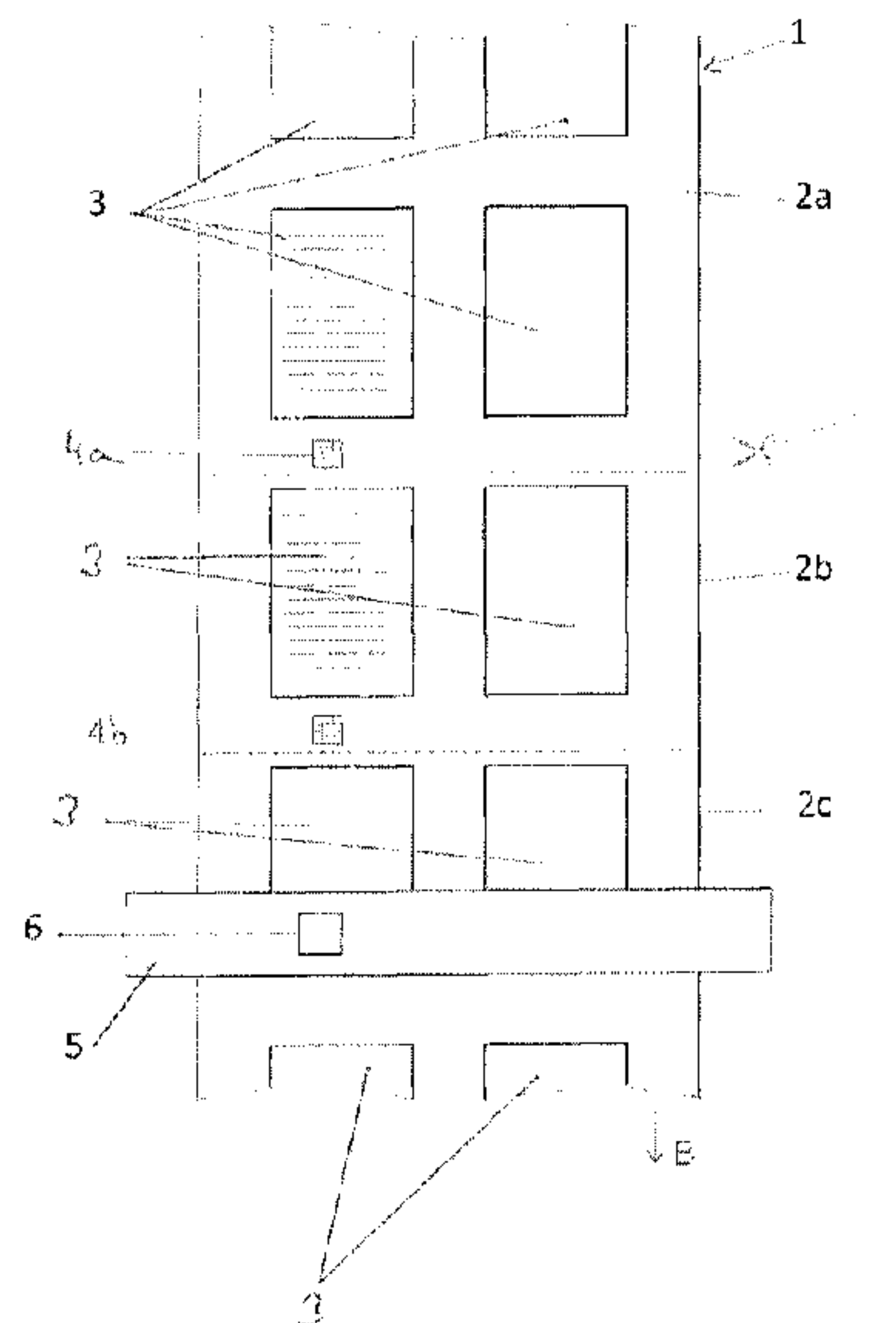
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(54) Titre : METHODE DE CONTROLE OU REGULATION, RESPECTIVEMENT, D'UN PROCEDE DE PRODUCTION
DANS LA PRODUCTION DE PRODUITS IMPRIMES

(54) Title: METHOD FOR CONTROLLING OR REGULATING, RESPECTIVELY, A PRODUCTION PROCESS IN THE
PRODUCTION OF PRINTED PRODUCTS



(57) Abrégé/Abstract:

A method for controlling or regulating, respectively, a production process in the production of printed products of a web-shaped or sheet-shaped printing material (1) in a printing system, wherein the method has the following steps: printing a code (4a, 4b), in particular a matrix code, with production information included therein for the control or regulation, respectively, of the production process onto the printing material (1); detecting the code (4a, 4b) by means of a detection device (6); evaluating the production information included in the code (4a, 4b) by means of an evaluation unit; carrying out the control or regulating actions, respectively, on the basis of the determined production information by means of the printing system; wherein a code (4a, 4b), which includes production information relating to a plurality of different signatures, is printed onto at least one signature (2a, 2b, 2c), which is to be separated from the web-shaped printing material (1) by means of cross-cutting.

Abstract

A method for controlling or regulating, respectively, a production process in the
5 production of printed products of a web-shaped or sheet-shaped printing material (1)
in a printing system, wherein the method has the following steps: printing a code (4a,
4b), in particular a matrix code, with production information included therein for the
control or regulation, respectively, of the production process onto the printing material
(1); detecting the code (4a, 4b) by means of a detection device (6); evaluating the
10 production information included in the code (4a, 4b) by means of an evaluation unit;
carrying out the control or regulating actions, respectively, on the basis of the
determined production information by means of the printing system; wherein a code
(4a, 4b), which includes production information relating to a plurality of different
signatures, is printed onto at least one signature (2a, 2b, 2c), which is to be separated
15 from the web-shaped printing material (1) by means of cross-cutting. Fig. 1

Method for Controlling or Regulating, Respectively, a Production Process in the
Production of Printed Products

- 5 The invention relates to a method for controlling or regulating, respectively, a
production process in the production of printed products.

The application and detection of so-called printed marks, via the positioning or design
of which corresponding control commands for typically following processing units can
10 be transferred to the printing system, is a widespread method for controlling printed
products and for controlling or regulating, respectively, the printing process. A
characteristic of such printed marks are, for example, contrast marks, which are used
for cutting the printing material and the further processing, for example. The correct
point in time for a cut can be transferred to a cutting device via the position of these
15 contrast marks, so that said cut can be positioned as desired. An encoding of a few
pieces of further information, via which gathering and stitching information, for
example, for the further processing can be stored and recalled, is furthermore
possible across the length of the contrast marks in direction of travel of the printing
material. Only very little information and few control commands can be stored in such
20 contrast marks, so that the field of application is limited.

It is already known from practice to print codes onto the printing material for
controlling or regulating, respectively, a production process in the production of
printed products, and to detect and evaluate the codes, such as in particular 2-D
25 codes, so as to carry out control or regulating actions, respectively, in the production
process in the production of the printed produces, based on the production
information included in the codes. For example, such codes can be 1-D codes, such
as bar codes or 2-D codes or 2-D stacking codes or also 2-D matrix codes, for
example.

The basic setup of such 2-D codes, for example, is known from the product catalogue “Competence Direct Part Marking, Sick Sensor Intelligence, November 2007, Sick AG”. For example, 2-D codes thus have different sections, namely edge sections as
5 well as inner sections. The edge sections serve in particular to identify or find, respectively, the 2-D code as such. The actual content of the 2-D code is stored in the inner sections. It is already known thereby to store data in different partial areas of the inner section in a redundant manner within the same 2-D code, thus in the inner section thereof.

10

Even if one-dimensional codes, such as bar codes, for example, do not have a redundancy in the classical sense, such as 2-D codes, for example, a redundancy can nonetheless be established to a certain extent by means of different measures, such as, for example, the formation of sub-totals or cross-totals. In particular if only a
15 few process steps are controlled or monitored by means of such a 1-D code, sufficient additional information in terms of a redundancy can also be depicted by means of such codes.

In the case of so-called multi-dimensional 3-D or 4-D codes, for example when 2-D
20 codes are printed with different colors or gray scales, the number of the information included therein and thus also the available redundancy can be increased significantly once again.

Due to the numerous options of available codes, the general term code will be used
25 below.

When large portions of a code are illegible, for example approximately 50% of a code, the total content of the code can then typically not be detected and evaluated

subsequently any longer, so that a redundant storing of data in a code also does not help. This is problematic in particular in the case of production processes, which do not always run the same. This can be gathering processes, e.g., of different amounts of signatures to form individually designed
 5 books or inner books, respectively. In this case, a code, which cannot be evaluated, can lead to the production interruption and/or to the creation of waste paper and/or to an inconsistent monitoring or control, respectively, and possibly to inconsistent documentation of the production.

10 In the case of the invention at hand, a sheet-shaped, unprinted printing material is defined as sheet, whereas an already printed sheet is identified as signature. In the event a printing material web is printed, a printed and separated printing material is also identified as signature, wherein such a signature can optionally also be folded, in particular in the case of a folding process, which takes place
 15 in the web-fed printing press. Accordingly, signatures are intermediate products, which are processed into a final printing product by means of or without at least one further additional operating step, such as a folding process, for example.

20 Based on this, the invention at hand is based on the object of creating a novel method, in which a plurality of production information for controlling or regulating, respectively, and/or monitoring or controlling, respectively, a production process can be stored on the printing material and can be recalled safely with a low susceptibility to errors.

25

This object is solved by means of a method for controlling or regulating, respectively, a production process in the production of printed products.

The method according to the invention has at least the following steps: printing
 30 a code, in particular a matrix code, with production information included therein for the

control or regulation, respectively, and/or monitoring or control, respectively, of the production process onto the printing material; printing a code onto at least two signatures, which are to be separated from the web-shaped printing material by means of cross-cutting, or onto at least two signatures, which are produced from a sheet-shaped substrate, wherein a code includes production information relating to a plurality of different signatures; detecting the code by means of a detection device; evaluating the production information included in the code by means of an evaluation unit; utilizing the information of at least one preceding and/or at least one following code in the event of a non-decodability of the evaluated code; carrying out the control or regulating actions, respectively, and/or monitoring or control functions, respectively, on the basis of the determined production information by means of the printing system.

According to the invention, the invention uses codes for printing production information required for a production process in the production of printed products, onto the printing material, wherein these codes were detected and evaluated subsequently, so as to carry out control and regulating actions, based on the production information determined therefrom. The code includes production information relating to or for a plurality of signatures, respectively, preferably production information relating to the respective signature, onto which the respective code is printed, and production information relating to another signature of the printing material. The quantity of the production information, which is printed onto a printing material in a coded manner and which is detected and evaluated subsequently, can be increased by using codes. Provision is thereby preferably made for a code to be printed onto at least one signature, which is to be separated from the web-shaped printing material by means of cross-cutting, or onto every signature, which is printed separately in the sheet-fed printing process, with said code not only including production information relating to the respective, current signature, onto which said code is printed, but also production information relating to a different signature of the printing material, namely a following and/or preceding signature, which has been

separated from the web-shaped printing material or which is to be separated, respectively, or onto every signature, which is printed separately in the sheet-fed printing process,

- 5 In the event that a majority of the code, which is printed onto a signature, should thus not be legible, the production information stored redundantly in the code of a different signature can be fallen back on. The production process in the production of printed products can be carried out in a more stable manner with a smaller susceptibility to errors through this, so that less waste paper is manufactured or produced,
- 10 respectively. A consistent monitoring and/or control and, if necessary, a consistent documentation of the respective print job is thus possible through this as well.

According to an advantageous further development of the invention, the respective code includes production information relating to the respective signature and

15 production information relating to at least one following signature, preferably relating to the immediately following signature and/or relating to at least one preceding signature, preferably relating to the immediately preceding signature. The production process can be carried out on the printing system in a stable manner with a smaller susceptibility to errors through this.

20

According to an advantageous further development of the invention, the production information of the code, which is printed onto a signature and which relates to a following and/or a preceding signature, is redundant production information, which is also included in the code, which is printed onto the respective following or preceding

25 signature. Due to this redundancy, the production process as a whole can be carried out in a more stable manner and with a smaller susceptibility to errors on the printing system.

According to an advantageous further development of the invention, the production information of the code, which is printed onto a signature and which relates to a following and/or a preceding signature, serves to complete and/or verify production information, which is included in the code, which is printed onto the respective
 5 following or preceding signature. These details also increase the stability of the production process on the printing system with a reduced susceptibility to errors.

Preferred further developments of the invention follow from the following description. Exemplary embodiments of the invention will be specified in more
 10 detail by means of the drawing, without being limited thereto.

Fig. 1 shows a schematic design of a printing system for clarifying the method according to the invention for controlling or regulating, respectively, a production process in the production of printed
 15 products.

The invention relates to a method for controlling or regulating, respectively, and/or monitoring or controlling, respectively, a production process in the production of printed products.

20

Fig. 1 shows a printed printing material web 1. Signatures 2a, 2b, 2c can be separated from the web-shaped printing material illustrated in this exemplary embodiment by cross-cutting with the help of a cutting device 7, wherein printed pages 3 are printed onto the individual signatures 2a, 2b, 2c in the exemplary
 25 embodiment of Fig. 1. It can be gathered from Fig. 1 that the signatures 2a, 2b, 2c can differ with regard to the number of the printed pages 3, which are printed thereon. It is also possible for all signatures to be printed with the same number of printed pages 3.

- To control or regulate, respectively, and/or monitor or control, respectively, the production process in the production of printed products, codes 4, preferably 2-D codes or matrix codes in the form of a data matrix code or QR code, which include production information for the control or regulation, respectively, of the production process, are printed onto the printing material web 1. According to Fig. 1, at least one code is in each case printed onto each signature 2a, 2b, 2c, wherein the code 4a is printed onto the signature 2a and the code 4b is printed onto the signature 2b in Fig. 1. The code printed onto the signature 2c is not visible in Fig. 1.
- 10 The production information can be all of the data relating to the print job and to the further processing and final processing of the signatures, in particular data for positioning the printed pages 2, the sequence of the printed pages 3, the gathering sequence and the folding sequence.
- 15 As already specified, the codes 4a, 4b, which are printed onto the signatures 2a, 2b, 2c of the printing material web 1, include production information relating to the control or regulation, respectively, of the production process, wherein the codes are detected with the help of a detection device 6, which is assembled on a traverse 5, and which can be shifted at right angles to the web travel direction B of the printing material web
- 20 1.
- The detected codes are evaluated in a non-illustrated evaluation unit, so as to obtain production information, which is included in the codes, therefrom, wherein control or regulating actions, respectively, for the production process are carried out
- 25 subsequently on the printing system on the basis of the production information determined in the evaluation unit.

It is proposed with the invention at hand here that at least one code 4a, 4b, which includes production information relating to a plurality of different signatures, in particular relating to the respective, current signature, onto which the code is printed, and additionally production information relating to a different signature of the printing material 1, is printed onto at least one signature 2a, 2b, 2c of the printing material 1, which is separated from the printing material 1 by means of cross-cutting, in the example shown in Fig. 1.

The respective code 4a, 4b can thereby include production information relating to at least one following signature and/or at least one preceding signature, in addition to the production information of the signature, onto which said code is printed.

In the example shown in Fig. 1, a code 4a, 4b, which, on the one hand, includes production information relating to the current signature, onto which said code is printed, as well as production information relating to at least two other signatures, namely at least one following and at least one preceding signature, is preferably printed onto each signature 2a, 2b, 2c, which is to be separated from the web-shaped printing material 1 by means of cross-cutting.

An embodiment of the invention, in which the code, which is printed onto a signature, also includes production information relating to the signature immediately following and/or immediacy preceding the respective signature, in addition to the production information of the signature, onto which said code is printed, is particularly preferred.

The production information of the code, which is printed onto a signature 2a, 2b, 2c and which relates to a following and/or a preceding signature, is preferably redundant production information, which is also included in the code, which is printed onto the respective following or preceding signature. If a signature code 4a, which, on the one

hand, includes production information relating to the signature 2a and, on the other hand, production information relating to the immediately preceding signature 2b, is printed onto the signature 2a, for example, according to the example, the production information of the code 4a relating to the immediately preceding signature 2b is also
5 included in the code 4b, which is printed onto the signature 2b.

It is furthermore possible for a code 4b, which, on the one hand, includes production information relating to the signature 2b and, on the other hand, production information relating to the immediately following signature 2a, is printed onto the signature 2b,
10 wherein the production information of the code 4b, which relates to the immediately following signature 2a, is also included in the code 4a, which is printed onto the immediately following signature 2a.

It is furthermore possible for the code 4b, which is printed onto the signature 2b, to
15 include production information relating to the signature 2b as well as production information relating to the immediately following signature 2a as well as the immediately preceding signature 2c. This production information of the code 4b, which relates to the immediately following signature 2a, is then also included again in code 4a of signature 2a, in this case. The production information of the code 4b,
20 which relates to the immediately preceding signature 2c, is furthermore also included in the code (not visible), which is printed onto this immediately preceding signature 2c.

If a code, which is printed onto a signature 2a, 2b, 2c, should accordingly not be
25 capable of being detected and evaluated, the code of a different signature, namely of a preceding and/or subsequent signature can be accessed in order to detect the relevant production information, to evaluate it and to use it to carry out control and regulating actions.

Production information of the code, which is printed onto a signature, which relates to a following signature, can serve to complete as well as verify production information, which is included in the code, which is printed onto the respective following signature. Production information of the code, which is printed onto a signature and which
5 relates to a preceding signature, serves in particular to verify production information, which is included in the code, which is printed onto the respective preceding signature. It can thus be checked online during the production process, whether the production runs properly in the production of printed products. In the event that there are deviations between production information, which serves verification purposes, of
10 codes, which are printed onto different signatures, counterbalancing measures can be taken during the production process, for example by discharging affected signatures and/or by reprinting corresponding signatures, so as to avoid waste paper and so as to produce error-free printed products.

15 It is thus in accordance with the invention at hand here that codes 4a, 4b, which preferably in each case include at least two types of production information, preferably at least production information relating to the current signature, onto which the current code is printed, as well as at least also production information relating to at least one signature, namely at least one following signature and/or at least one
20 preceding signature, are printed onto signatures 2a, 2b, 2c of a printing material web 1. If a code should thus be unusable and not readable, the redundant production information included in the codes of preceding and/or following signatures can be accessed. The proper production process can furthermore be verified by comparing production information.

25

Even though it is not preferred, it is also possible that a code, which is printed onto a signature, does not include any production information relating to the signature, onto which said code is printed, but only production information relating to different following and/or preceding signatures.

30

Reference List

- 1 printing material
- 2a signature
- 5 2b signature
- 2c signature
- 3 printed page
- 4a code
- 4b code
- 10 5 traverse
- 6 detection device
- 7 cutting device

Patent Claims

1. A method for controlling or regulating, respectively, a production process in the production of printed products of a web-shaped or sheet-shaped printing material in a printing system, wherein the method has the following steps:
- printing a code with production information included therein for at least one of (i) control or regulation, respectively, and (ii) monitoring or control, respectively, of the production process onto the printing material;
- wherein the code, which includes production information relating to a plurality of different signatures, is printed onto at least two signatures, which are to be separated from the web-shaped printing material by means of cross-cutting, or onto at least two signatures, which are produced from a sheet-shaped printing material;
- detecting the code by means of a detection device;
- evaluating the production information included in the code by means of an evaluation unit;
- utilizing the information of one or more of at least one preceding code and at least one following code, in the event of a non-decodability of the evaluated code;
- carrying out the at least one of (i) the control or regulating actions, respectively, and (ii) the monitoring or control functions, respectively, on the basis of the determined production information by means of the printing system.
2. The method according to claim 1, wherein the respective code includes production information relating to the respective signature and production information relating to at least one other signature of the printing material.

3. The method according to claim 1 or 2, wherein the code, which includes production information relating to a plurality of different signatures of the printing material, is printed onto each signature, which is to be separated from the web-shaped printing material by means of cross-cutting, or onto each signature, which is produced from a sheet-shaped printing material.
5
4. The method according to one of claims 1 to 3, wherein the respective code includes production information relating to the respective signature and production information relating to at least one following signature.
10
5. The method according to claim 4, wherein the respective code includes production information relating to the respective signature and production information relating to the immediately following signature.
- 15 6. The method according to one of claims 1 to 5, wherein the respective code includes production information relating to the respective signature and production information relating to at least one preceding signature.
- 20 7. The method according to claim 6, wherein the respective code includes production information relating to the respective signature and production information relating to the immediately preceding signature.
- 25 8. The method according to one of claims 1 to 7, wherein the production information of the code, which is printed onto a signature and which relates to at least one of a following signature and a preceding signature, is redundant production information, which is also included in the code, which is printed onto the at least one of the following signature and the preceding signature.

9. The method according to one of claims 1 to 8, wherein the production information of the code, which is printed onto a signature and which relates to at least one of a following signature and a preceding signature, serves to at least one of complete and verify production information, which is included in the code, which is printed onto the at least one of the following signature and the preceding signature.
10. The method according to one of claims 1 to 9, wherein the code is a matrix code.
11. The method of claim 10, wherein the matrix code is a data matrix code or a QR code.

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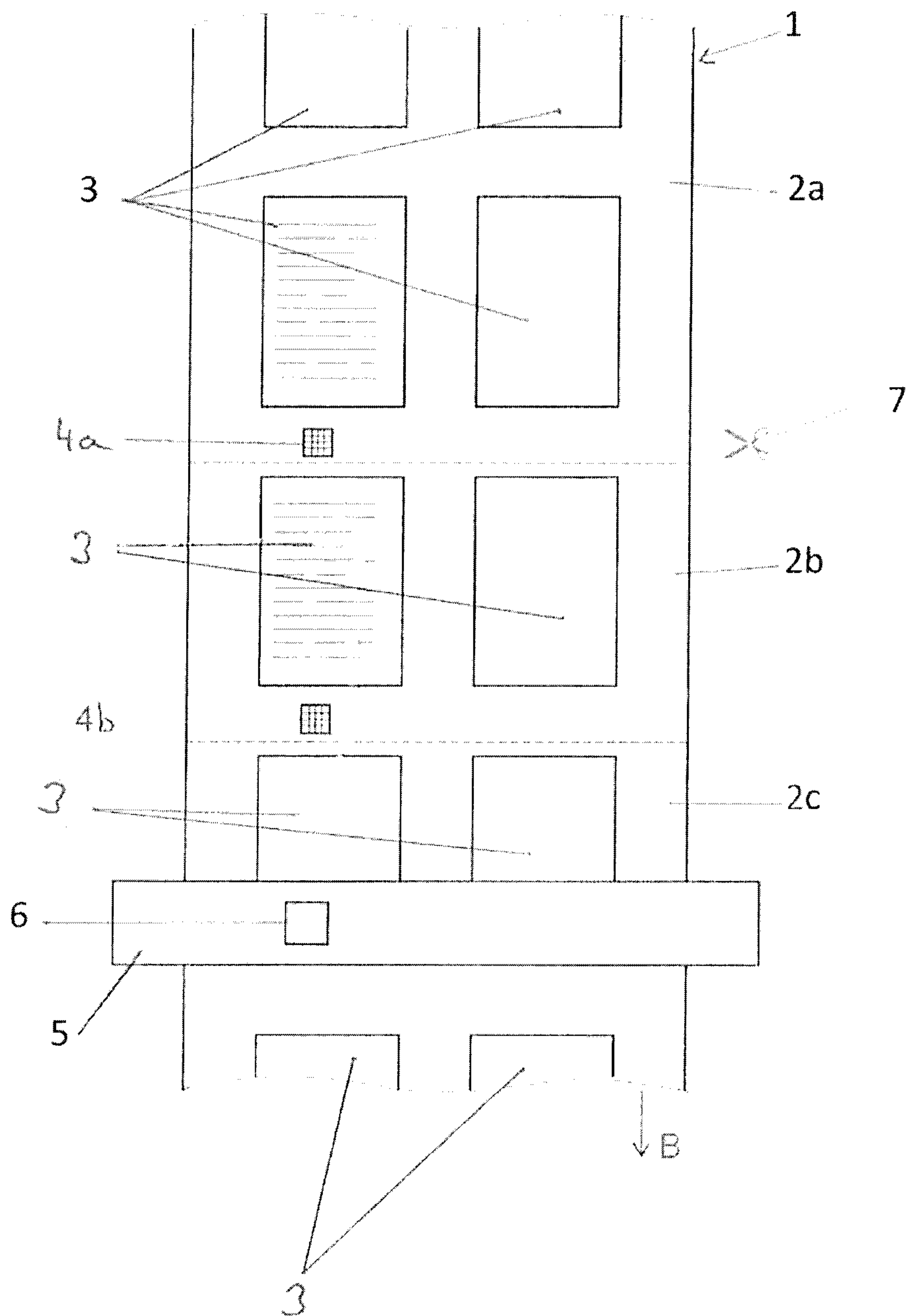


Fig. 1

