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(54) **ROTARY HIGH-SPEED WEB DIE-CUTTING MACHINE AND USING METHOD THEREOF**

(57) Disclosed in the present invention is a rotary high-speed web die-cutting machine which comprises a frame and a bed. The bed comprises a paper guiding device and a paper linking device. The paper linking device comprises a first work module and a second work module. A paper feeding gap is provided between the first work module and the second work module. A paper changing cutter and a paper changing cutter sleeve which can cooperate with each other at the paper feeding gap, and a left bonding device and a right bonding device which can be lifted to the height of the paper changing cutter are respectively arranged between the first work module and the second work module. The paper guiding device comprises an upper guiding roller at a paper outlet of the paper feeding gap. A paper pressing roller is arranged at the upper paper guiding roller. An electric eye detection device is arranged at the paper pressing roller. The paper linking device is used for cutting the paper. The paper pressing roller and the upper guiding roller can cooperate with each other, thus preventing the paper of web I at the upper paper guiding roller from shaking. The electric eye detection device can obtain a stable cursor signal, so that the paper linking accuracy of the paper linking device is improved greatly, and the waste of paper

during the production process is reduced.

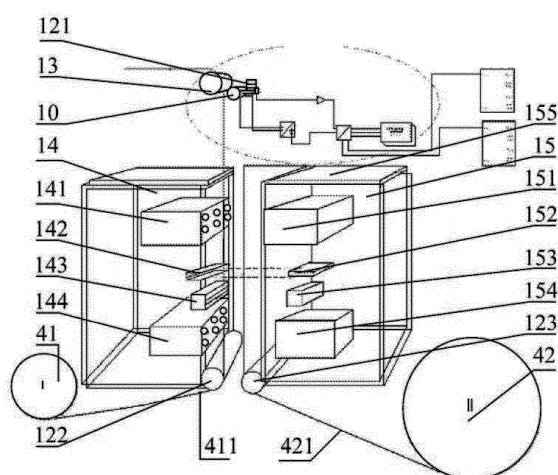


Fig. 1

Description

[0001] The present application claims priority to the Chinese application No. 201110399262.6 filed before SIPO on December 5, 2011 and titled "Rotary High-speed Web Die-cutting Machine and Using Method Thereof", whose whole content is incorporated in the present application by way of reference.

Technical Field

[0002] The present invention relates to the technical field of paper die-cutting machinery, and more specifically, to a rotary high-speed web die-cutting machine and using method thereof.

Background Art

[0003] In prior art, there are various die-cutting methods for die-cutting machines, among which the common ones are flatbed and rotary die-cutting methods. Wherein, the flatbed die-cutting method is often used for single paper production, which adopts a face-contact way for stamping. However, it is slow in speed and cannot clear waste completely and the die-cutting position is determined via the edge of a single paper. As a comparison, the rotary die-cutting method is often used for web production, which adopts a line-contact way for stamping. It has high accuracy, is quick in speed, and has high production efficiency. The paper die-cutting position is determined via an electric eye by tracing printed cursors.

[0004] As the roller keep rotating during the operation of the rotary high speed web die-cutting machine, its production efficiency is the highest among various die-cutting machines. However, since roller of the rotary die-cutting machine has to be bent into a surface, the plate-making is inconvenience and it costs much and difficult to realize in technology. Therefore, the rotary high-speed web die-cutting machine is often used for mass production.

[0005] In order to improve production efficiency, the rotary high-speed web die-cutting machine adopts automatically paper changing without stop, which requires that paper is accurately spliced during the paper linking process. This will reduce waste of paper during the paper linking process and improve output rate of product.

[0006] In prior art, the BOBST-DR82 rotary high-speed web die-cutting machine is illustrated as an example. For the paper linking device of the machine, a cursor-targeting electric eye detection device is provided at the paper changing cutter and the paper linking position is then determined via the electric eye detection device tracing printed cursors.

[0007] The following is a description of the BOBST-DR82 rotary high-speed web die-cutting machine, which is taken as an example. During the production process of the BOBST-DR82 rotary high-speed web die-cutting machine, due to a deficiency in design of the device itself,

the distance between the positions of the paper linking cutter and the cursor-targeting electric eye and the positions of the upper paper guiding roller and the lower paper guiding roller is too long (1.6m), no paper guiding stabilizing device or pressing device is provided there between, causing shaking of paper; and the electric eye often misreads printed cursors during the automatic paper linking process, causing the paper linking inaccurate, with the paper linking accuracy only reaching 92%. One has to relocate cursors and adjust the die-cutting position. As a result, the waste of paper is huge, with around 4000 paper being wasted for each inaccurate paper linking.

[0008] Accordingly, the existing rotary high-speed web die-cutting machine leads to a lot of waste of paper during the production process.

[0009] Therefore, how to provide a rotary high-speed web die-cutting machine and using method hereof to improve paper linking accuracy and reduce waste of paper during the production process is a technical problem needed to be solved by persons skilled in the art.

Summary

[0010] For the above, there is provided in the present invention a rotary high-speed web die-cutting machine and a method of operating the same. This rotary high-speed web die-cutting machine may improve the paper linking accuracy and further reduce waste of paper during the production process.

[0011] In order to achieve the above purpose, embodiments of the present invention provide the following technical solutions:

A rotary high-speed web die-cutting machine comprises a frame and a bed; the bed comprises a paper guiding device and a paper linking device;

The paper linking device comprises a first work module and a second work module; a paper feeding gap is provided between the first work module and the second work module; the paper feeding gap is provided with a paper inlet and a paper outlet;

A paper changing cutter and a paper changing cutter sleeve which can cooperate with each at the paper feeding gap, and a left bonding device and a right bonding device which can be lifted to the height of the paper changing cutter are respectively provided between the first work module and the second work module; an upper left negative-pressure panel and an upper right negative-pressure panel which can cooperate with each other at the paper feeding gap are respectively provided above the paper changing cutter and the paper changing cutter sleeve; a lower left negative-pressure panel and a lower right negative-pressure panel which can cooperate with each at the paper feeding gap are respectively provided

below the paper changing cutter and the paper changing cutter sleeve; a paper linking right platform which can be lifted up and down is provided at the upper end of the second work module;

The paper guiding device comprises an upper paper guiding roller disposed at the paper outlet of the paper feeding gap, and also includes a first lower paper guiding roller and a second lower paper guiding roller disposed at the paper inlet of the paper feeding gap; the upper paper guiding roller is provided with a paper pressing roller; an electric eye detection device is provided at the paper pressing roller.

[0012] Preferably, two ends of the paper pressing roller are respectively axially rotatably hinged to the bed, with direction of the axis of the paper pressing roller being consistent with the direction of the axis of the upper paper guiding roller.

[0013] Preferably, two sides of the bed are respectively provided with a base fixedly connected to the bed; the two bases are respectively provided with a bearing pedestal and the two bearing pedestals are provided with a bearing the direction of whose axis is consistent with the axis direction of the upper paper guiding roller 13; two ends of the paper pressing roller are respectively mounted on the bearing.

[0014] Preferably, a lifting device is provided between the two bearing pedestals and their corresponding bases.

[0015] Preferably, the lifting device may be a cylinder with its first end fixedly connected to the base and its second end connected to the bearing pedestal.

[0016] Preferably, the extending direction of the cylinder is perpendicular to the moving direction of paper.

[0017] Preferably, the lifting device may be a screw rod device specifically.

[0018] Preferably, the paper pressing roller may be a rubber pressing roller specifically.

[0019] Preferably, the paper pressing roller is provided with a number of troughs.

[0020] Based on the above technical solution, the present invention also provides a using method of the rotary high-speed web die-cutting machine in the above technical solution, comprising the following steps:

Presetting of Paper of Web II: paper with a predetermined pattern on web II is preset on the paper linking right platform which can be lifted up and down and disposed on the upper end of the second work module in such a way that the position of the paper cursor provided at the predetermined paper changing position is located at the matching position of the paper changing cutter and the paper changing cutter sleeve;

Cursor Reading of Web I: each complete picture on the paper with a predetermined pattern on web I is provided with a paper cursor at the same position;

for the rotary high-speed web die-cutting machine, the distance between the location of the electric eye detection device and the matching position of the paper changing cutter and the paper changing cutter sleeve is an integral multiple of the distance between two adjacent paper cursors on paper of the web I; in this way, when the electric eye detection device detects a paper cursor, another paper cursor is located right at the matching position of the paper changing cutter and the paper changing cutter sleeve;

Paper Location: when the electric eye detection device reads the paper cursor on paper of web I indicating a need to change paper, the upper left negative-pressure panel and upper right negative-pressure panel, the lower left negative-pressure panel and the lower right negative-pressure panel provided on the first work module and the second work module cooperate with each other to suck and locate paper of web I and web II, and make sure that paper cursor on paper of web I aligns with paper cursor on paper of web II;

Paper Cutting: the paper changing cutter and the paper changing cutter sleeve cooperate with each other to die-cutting the located paper of web I and web II;

Pre-bonding Paper Processing: the paper changing cutter and the paper changing cutter sleeve separate from each other and go back to their initial positions; motor of web I inverts to bring paper of web I located below the paper linking position away from the paper linking position; meanwhile, the paper linking right platform which can be lifted up and down and provided on the upper end of the second work module rises up to bring the paper of web II located below the paper linking position away from the paper linking position;

Paper linking and Bonding: the left bonding device and the right bonding device rises up to the height of the paper changing cutter and the paper changing cutter sleeve to splice the portion of paper of web I above the paper linking position to the portion of paper of web II below the paper linking position.

[0021] Based on the above technical solution, the present invention provides a rotary high-speed web die-cutting machine comprising a frame and a bed. The bed comprises a paper guiding device and a paper linking device. The paper linking device comprises a first work module and a second work module. A paper feeding gap is provided between the first work module and the second work module. The paper feeding gap is provided with a paper inlet and a paper outlet. A paper changing cutter and a paper changing cutter sleeve which can cooperate with each at the paper feeding gap, and a left bonding

device and a right bonding device which can be lifted to the height of the paper changing cutter are respectively provided between the first work module and the second work module. An upper left negative-pressure panel and an upper right negative-pressure panel which can cooperate with each at the paper feeding gap are respectively provided above the paper changing cutter and the paper changing cutter sleeve. A lower left negative-pressure panel and a lower right negative-pressure panel which can cooperate with each at the paper feeding gap are respectively provided below the paper changing cutter and the paper changing cutter sleeve. A paper linking right platform which can be lifted up and down is provided at the upper end of the second work module. The paper linking device comprises an upper paper guiding roller disposed at the paper outlet of the paper feeding gap, and also includes a first lower paper guiding roller and a second lower paper guiding roller disposed at the paper inlet of the paper feeding gap. The upper paper guiding roller is provided with a paper pressing roller. An electric eye detection device is provided at the paper pressing roller.

[0022] For the convenience of illustration, a web I and a web II for paper linking and a driving motor for driving web I and web II are introduced herein.

[0023] For the rotary high-speed web die-cutting machine provided in the present invention, the working process is as follows: at first, the rotary high-speed web die-cutting machine processes paper in web I, during which time, the upper end of the paper of web II is fixed in accordance with a required size to the paper linking right platform of the second work module; when paper of web I is to run out, the electric eye detection device disposed at the paper pressing roller starts to collect cursor information preset on the paper of web I; according to feedback information from the cursor, the current transmission speed of paper as well as the current size of diameter of web I, after calculation of a movement control program, the paper linking process starts step by step: at first, when web I is to reach its preset smallest size of diameter, driver of web I perform brake control over driving motor of web I; and then, the upper left negative-pressure panel and the upper right negative-pressure panel, the lower left negative-pressure panel and the lower right negative-pressure panel start to approach the paper feeding gap and suck paper of web I and web II, and then, the paper changing cutter and the paper changing cutter sleeve approaches the paper feeding gap and shut together, cutting paper of web I and web II; and then, the paper linking right platform goes up meanwhile driving motor of web I inverts, thus moving away the upper portion of paper of web II and the lower portion of paper of web I; and then, the paper changing cutter separates from the paper changing cutter sleeve, and the left bonding device and the right bonding device goes up to the height of the paper changing cutter and then approaches the paper feeding gap to splice the lower portion of paper of web II to the upper portion of paper of web I, thus realizing paper

splicing of web I and web II.

[0024] Since the structure of the paper linking device in the rotary high-speed web die-cutting machine provided in the present invention may effectively cut and splice paper of web I and web II, and the paper pressing roller disposed at the upper paper guiding roller may cooperate with the upper paper guiding roller to prevent paper of web I at the upper paper guiding roller from shaking, and the electric eye detection device may obtain a stable cursor signal, greatly improving paper linking accuracy of the paper linking device.

[0025] Therefore, the rotary high-speed web die-cutting machine provided in the present invention may improve paper linking accuracy and further reduce waste of paper during the production process.

[0026] In addition, the present invention also provides a using method of the above rotary high-speed web die-cutting machine, comprising the following steps:

Presetting of Paper of Web II: paper with a predetermined pattern on web II is preset on the paper linking right platform which can be lifted up and down and disposed on the upper end of the second work module in such a way that the position of the paper cursor provided at the predetermined paper changing position is located at the matching position of the paper changing cutter and the paper changing cutter sleeve;

Cursor Reading of web I: each complete picture on the paper with a predetermined pattern on web I is provided with a paper cursor at the same position; for the rotary high-speed web die-cutting machine, the distance between the position of the electric eye detection device and the matching position of the paper changing cutter and the paper changing cutter sleeve is an integral multiple of the distance between two adjacent paper cursors on paper of the web I; in this way, when the electric eye detection device detects a paper cursor, another paper cursor is located right at the matching position of the paper changing cutter and the paper changing cutter sleeve;

Paper Location: when the electric eye detection device reads the paper cursor on paper of web I indicating a need to change paper, the upper left negative-pressure panel and upper right negative-pressure panel, the lower left negative-pressure panel and the lower right negative-pressure panel provided on the first work module and the second work module cooperate with each other to perform absorption location to paper of web I and web II, and make sure that the paper cursor on paper of web I aligns with the paper cursor on paper of web II;

Paper Cutting: the paper changing cutter and the paper changing cutter sleeve cooperate with each other to die-cutting the located paper of web I and

web II;

Pre-bonding Paper Processing: the paper changing cutter and the paper changing cutter sleeve separate from each other and go back to their initial positions; motor of web I inverts to bring paper of web I located below the paper linking position away from the paper linking position; meanwhile, the paper linking right platform which can be lifted up and down and provided on the upper end of the second work module rises up to bring the paper of web II located below the paper linking position away from the paper linking position;

Paper linking and Bonding: the left bonding device and the right bonding device rises up to the height of the paper changing cutter and the paper changing cutter sleeve to splice the portion of paper of web I above the paper linking position to the portion of paper of web II below the paper linking position.

[0027] The using method of the rotary high-speed web die-cutting machine provided in the present invention is capable of performing accurate paper linking for paper already printed with a certain pattern.

Description of Drawings

[0028] In order to better illustrate embodiments of the present invention or technical solutions in prior art, the following is a brief description of the drawings in the embodiments or prior art. Apparently, the following illustrated drawings are only some embodiments of the present invention. For a person with ordinary skill in the art, other drawings may be obtained according to these drawings without paying any creative effort.

Fig.1 is a schematic of the structure of the paper linking device of a rotary high-speed web die-cutting machine provided in the present invention;

Fig.2 is a schematic of the structure of the paper pressing roller of a rotary high-speed web die-cutting machine provided in the present invention;

Fig.3 is a schematic of the main view of the structure of the base in a rotary high-speed web die-cutting machine provided in the present invention;

Fig.4 is a schematic of the top view of the structure of the base in a rotary high-speed web die-cutting machine provided in the present invention;

Fig.5 is a schematic of the structure of the bearing pedestal in a rotary high-speed web die-cutting machine provided in the present invention;

Fig.6 is a flow chart of a using method of a rotary

high-speed web die-cutting machine provided in the present invention.

Embodiments

[0029] Hereinafter, technical solutions in embodiments of the present invention will be clearly and fully described, taken in conjunction with the accompanying drawings in embodiments of the present invention. Apparently, the illustrated embodiments are only a part of the embodiments of the present invention rather than all of them. Based on embodiments in the present invention, all other embodiments a person with ordinary skill in the art obtained without any creative effort shall fall within the protection scope of the present invention.

[0030] Refer to Figure 1-Figure 6, wherein Fig.1 is a schematic of the structure of the paper linking device of a rotary high-speed web die-cutting machine provided in the present invention; Fig.2 is a schematic of the structure of the paper pressing roller of a rotary high-speed web die-cutting machine provided in the present invention; Fig.3 is a schematic of the main view of the structure of the base in a rotary high-speed web die-cutting machine provided in the present invention; Fig.4 is a schematic of the top view of the structure of the base in a rotary high-speed web die-cutting machine provided in the present invention; Fig.5 is a schematic of the structure of the bearing pedestal in a rotary high-speed web die-cutting machine provided in the present invention; Fig.6 is a flow chart of a using method of a rotary high-speed web die-cutting machine provided in the present invention.

[0031] The rotary high-speed web die-cutting machine provided in the present invention comprises a frame and a bed. The bed comprises a paper guiding device and a paper linking device. The paper linking device comprises a first work module 14 and a second work module 15. A paper feeding gap is provided between the first work module 14 and the second work module 15. The paper feeding gap has a paper inlet and a paper outlet. A paper changing cutter 142 and a paper changing cutter sleeve 152 which can cooperate with each other at the paper feeding gap, and a left bonding device 143 and a right bonding device 153 which can be lifted at the height of the paper changing cutter are respectively provided between the first work module 14 and the second working module 15. An upper-left negative-pressure panel 141 and an upper-right negative-pressure panel 151 which can cooperate with each other at the paper feeding gap are respectively provided above the paper changing cutter 142 and the paper changing cutter sleeve 152. A lower-left negative-pressure panel 144 and a lower-right negative-pressure panel 154 which can cooperate with each other at the paper feeding gap are respectively below the paper changing cutter 142 and the paper changing cutter sleeve 152. A paper linking right platform 155 which can be lifted up and down is provided at the upper end of the second work module 15. The paper guiding device comprises an upper paper guiding roller 13 dis-

posed at the paper outlet of the paper feeding gap, and also includes a first lower paper guiding roller 122 and a second lower paper guiding roller 123 disposed at the paper inlet of the paper feeding gap. A paper pressing roller 10 is provided at the upper paper guiding roller 13. An electric eye detection device 121 is provided at the paper pressing roller 10.

[0032] For the convenience of illustration, a web I and a web II for paper linking and a driving motor for driving web I and web II are introduced herein.

[0033] For the rotary high-speed web die-cutting machine provided in the present invention, the working process is as follows: at first, the rotary high-speed web die-cutting machine processes paper in web I, during which time, the upper end of the paper of web II is fixed in accordance with a required size to the paper linking right platform 155 of the second work module 15; when paper of web I is to run out, the electric eye detection device 121 disposed at the paper pressing roller 10 starts to collect cursor information preset on the paper of web I; according to feedback information from the cursor, the current transmission speed of paper and the current size of diameter of web I, after calculation of a movement control program, the paper linking process starts step by step: at first, when web I is to reach its preset smallest size of diameter, driver of web I perform brake control over driving motor of web I; and then, the upper left negative-pressure panel 141 and the upper right negative-pressure panel 151, the lower left negative-pressure panel 144 and the lower right negative-pressure panel 154 start to approach the paper feeding gap and suck paper of web I and web II, and then, the paper changing cutter 142 and the paper changing cutter sleeve 152 approaches the paper feeding gap and shut together, cutting paper of web I and web II; and then, the paper linking right platform 155 goes up meanwhile driving motor of web I inverts, thus moving away the upper portion of the paper of web II and lower portion of the paper of web I; and then, the paper changing cutter 142 separates from the paper changing cutter sleeve 152, and the left bonding device 143 and the right bonding device 153 moves to the height of the paper changing cutter 142 and then approaches the paper feeding gap to splice the lower portion of the paper of web II to the upper portion of the paper of web I, thus realizing paper splicing of web I and web II.

[0034] Since the structure of the paper linking device in the rotary high-speed web die-cutting machine provided in the present invention may effectively cut and splice paper of web I and web II, and the paper pressing roller 10 disposed at the upper paper guiding roller 13 may cooperate with the upper paper guiding roller 13 to prevent paper of web I at the upper paper guiding roller from shaking, the electric eye detection device 121 may obtain a stable cursor signal, which greatly improves paper linking accuracy of the paper linking device.

[0035] Therefore, the rotary high-speed web die-cutting machine provided in the present invention may im-

prove paper linking accuracy and further reduce waste of paper during the production process.

[0036] Specifically, two ends of the paper pressing roller 10 are respectively axially rotatably hinged to the bed, with direction of the axis of the paper pressing roller 10 being consistent with the direction of the axis of the upper paper guiding roller 13.

[0037] Specifically, two sides of the bed are respectively provided with a base 20 fixedly connected to the bed. The two bases are respectively provided with a bearing pedestal 30 and the two bearing pedestals are provided with a bearing 31 the direction of whose axis is consistent with the axis direction of the upper paper guiding roller 13. Two ends of the paper pressing roller 10 are respectively mounted on the bearing 31.

[0038] Wherein, preferably, the base 20 is provided with a dead plate 21 which fits the bed. Mounting holes 211 which could fit the bed are provided on the dead plate 21. That is to say, the base 20 may be removably fixed to the bed via fixing bolts, and as a result, the type of paper pressing roller 10 may be changed according to different types of paper.

[0039] Further, in order to better control distance between the paper pressing roller 10 and the upper paper guiding roller 13, a lifting device may be provided between the two bearing pedestals 30 and the corresponding base 20 as the base 20 is fixedly connected to the bed. Accordingly, the distance between the bearing pedestal 30 and the base 20 may be regulated via the lifting device, thus facilitating the control and adjustment of distance between the paper pressing roller 10 and the upper paper guiding roller 13.

[0040] The lifting device mentioned in the above technical solution may be various. For example, a cylinder may be an alternative. A first end of the cylinder may be connected to the mounting hole 34 provided at the lower end of the bearing pedestal 30. A second end of the cylinder may match the mounting hole 22 provided on the base 20, thus realizing stability of the configuration of cylinder. Preferably, the extending direction of the cylinder is perpendicular to the moving direction of paper.

[0041] Besides, the above lifting device may also be a screw rod device specifically, and may also be a chain control and so forth. The lifting device in the above technical solution may also have other various alternatives, for which this description will not go into details herein as long as it can realize control and adjustment of distance between the paper pressing roller 10 and the upper paper guiding roller 13.

[0042] Meanwhile, in order to reduce the damage caused by the paper pressing roller 10 to the paper during the pressing process, the paper pressing roller 10 mentioned in the above technical solution may be a rubber pressing roller specifically. This is because that the rubber pressing roller has certain flexibility and elasticity which can reduce damage caused to the paper.

[0043] Of course, some paper may have to be printed with marks such as anti-counterfeiting mark. Therefore,

in order to reduce damage caused by the paper pressing roller 10 to this anti-counterfeiting mark, a number of troughs 11 may be provided on the paper pressing roller 10.

[0044] In addition, the present invention also provides a using method of the above rotary high-speed web die-cutting machine, comprising the following steps:

Presetting of Paper of Web II: paper with a predetermined pattern on web II is preset on the paper linking right platform 155 which can be lifted up and down and disposed at the upper end of the second work module 15 in such a way that the position of the paper cursor provided at the predetermined paper changing position is located at the matching position of the paper changing cutter 142 and the paper changing cutter sleeve 152;

Cursor Reading of web I: each complete picture on the paper with a predetermined pattern on web I is provided with a paper cursor at the same position. For the rotary high-speed web die-cutting machine, the distance between the position of the electric eye detection device 121 and the matching position of the paper changing cutter 142 and the paper changing cutter sleeve 152 is an integral multiple of the distance between two adjacent paper cursors on paper of the web I. In this way, when the electric eye detection device 121 detects a paper cursor, another paper cursor is located right at the matching position of the paper changing cutter 142 and the paper changing cutter sleeve 152;

Paper Location: when the electric eye detection device 121 reads the paper cursor on paper of web I indicating a need to change paper, the upper left negative-pressure panel 141 and upper right negative-pressure panel 151, the lower left negative-pressure panel 144 and the lower right negative-pressure panel 154 provided on the first work module 14 and the second work module 15 cooperate with each other to perform absorption location to paper of web I and web II, and make sure that paper cursor on paper of web I aligns with paper cursor on paper of web II;

Paper Cutting: the paper changing cutter 142 and the paper changing cutter sleeve 152 cooperate with each other to die-cutting the located paper of web I and web II;

Pre-bonding Paper Processing: the paper changing cutter 142 and the paper changing cutter sleeve 152 separate from each other and go back to their initial positions; motor of web I inverts to bring paper of web I located below the paper linking position away from the paper linking position; meanwhile, the paper linking right platform 155 which can be lifted up and down and provided on the upper end of the second

work module 15 rises up to bring the paper of web II located below the paper linking position away from the paper linking position;

Paper linking and Bonding: the left bonding device 143 and the right bonding device 153 rises up to the height of the paper changing cutter 142 and the paper changing cutter sleeve 152 to splice the portion of paper of web I above the paper linking position to the portion of paper of web II below the paper linking position.

[0045] The using method of the rotary high-speed web die-cutting machine provided in the present invention is capable of performing accurate paper linking for paper already printed with a certain pattern.

[0046] With the above description of the disclosed embodiments, a person skilled in the art may realize or utilize the present invention. Various modifications to these embodiments are obvious to persons skilled in the art. The general principle defined herein may be realized in other embodiments without departing from the spirit or scope of the present invention. Therefore, the present invention will not be limited to these embodiments illustrated herein, but has the broadest scope corresponding to the principle and novelty disclosed herein.

Claims

1. A rotary high-speed web die-cutting machine, comprising a frame and a bed; the bed comprising a paper guiding device and a web linking device, **characterized in that:**

the web linking device comprises a first work module and a second work module; a paper feeding gap is provided between the first work module and the second work module; the paper feeding gap has a paper inlet and a paper outlet; a paper changing cutter and a paper changing cutter sleeve which can cooperate with each other at the paper feeding gap, and a left bonding device and a right bonding device which can be lifted to the height of the paper changing cutter are respectively arranged between the first work module and the second work module; an upper left negative-pressure panel and an upper right negative-pressure panel which can cooperate with each other at the paper feeding gap are respectively provided above the paper changing cutter and the paper changing cutter sleeve; a lower left negative-pressure panel and a lower right negative-pressure panel which can cooperate with each other at the paper feeding gap are respectively provided below the paper changing cutter and the paper changing cutter sleeve; a paper linking right platform capable of

- being lifted up and down is provided at the upper end of the second work module;
the paper guiding device comprises an upper paper guiding roller disposed at the paper outlet of the paper feeding gap, and further includes a first lower paper guiding roller and a second lower paper guiding roller disposed at the paper inlet of the paper feeding gap; a paper pressing roller is provided at the upper paper guiding roller; and an electric eye detection device is provided at the paper pressing roller.
2. The rotary high-speed web die-cutting machine of Claim 1, **characterized in that**: two ends of the paper pressing roller are respectively axially rotatably hinged to the bed, the direction of the axis of the paper pressing roller being consistent with the direction of the axis of the upper paper guiding roller.
 3. The rotary high-speed web die-cutting machine of Claim 2, **characterized in that**: two sides of the bed are respectively provided with bases fixedly connected to the bed; the two bases are respectively provided with bearing pedestals and the two bearing pedestals are provided with bearings, the axis direction of the bearings is consistent with the axis direction of the upper paper guiding roller 13; two ends of the paper pressing rollers are respectively mounted on the bearings.
 4. The rotary high-speed web die-cutting machine of Claim 3, **characterized in that**: a lifting device is provided between the two bearing pedestals and the corresponding bases.
 5. The rotary high-speed web die-cutting machine of Claim 4, **characterized in that**: the lifting device is a cylinder whose first end fixedly connected to the base and second end connected to the bearing pedestal.
 6. The rotary high-speed web die-cutting machine of Claim 5, **characterized in that**: the extending direction of the cylinder is perpendicular to the moving direction of paper.
 7. The rotary high-speed web die-cutting machine of Claim 4, **characterized in that**: the lifting device is specifically a screw rod device.
 8. The rotary high-speed web die-cutting machine of any one of Claims 1-7, **characterized in that**: the paper pressing roller is a rubber pressing roller specifically.
 9. The rotary high-speed web die-cutting machine of Claim 8, **characterized in that**: the paper pressing roller is provided with a number of troughs.

10. An operating method of the rotary high-speed web die-cutting machine of any one of Claims 1-9, **characterized in that**: comprising the following steps:

Presetting of Paper of Web II: paper with predetermined pattern on web II is preset on the paper linking right platform disposed at the upper end of the second work module which can be lifted up and down in such a way that the position of the paper cursor provided at the predetermined paper changing position is located at the matching position of the paper changing cutter and the paper changing cutter sleeve;

Cursor Reading of web I: each complete picture on the paper with a predetermined pattern on web I is provided with a paper cursor at identical position; for the rotary high-speed web die-cutting machine, the distance between the position of the electric eye detection device and the matching position of the paper changing cutter and the paper changing cutter sleeve is an integral multiple of the distance between two adjacent paper cursors on paper of the web I; thereby, when the electric eye detection device detects a paper cursor, another paper cursor is located right at the matching position of the paper changing cutter and the paper changing cutter sleeve;

Paper Location: when the electric eye detection device reads the paper cursor on paper of web I indicating a need to change paper, the upper left negative-pressure panel and the upper right negative-pressure panel, the lower left negative-pressure panel and the lower right negative-pressure panel provided on the first work module and the second work module cooperate with each other to perform absorption location to paper of web I and web II, and make sure that the paper cursor on paper of web I aligns with paper cursor on paper of web II;

Paper Cutting: the paper changing cutter and the paper changing cutter sleeve cooperate with each other to die-cutting the located paper of web I and web II;

Pre-bonding Paper Processing: the paper changing cutter and the paper changing cutter sleeve separate from each other and go back to their initial positions; motor of web I inverts to bring paper of web I located below the paper linking position away from the paper linking position; meanwhile, the paper linking right platform provided on the upper end of the second work module rises up to bring the paper of web II located below the paper linking position away from the paper linking position;

Paper linking and Bonding: the left bonding device and the right bonding device rises up to the height of the paper changing cutter and the pa-

per changing cutter sleeve to splice the portion of paper of web I above the paper linking position to the portion of paper of web II below the paper linking position.

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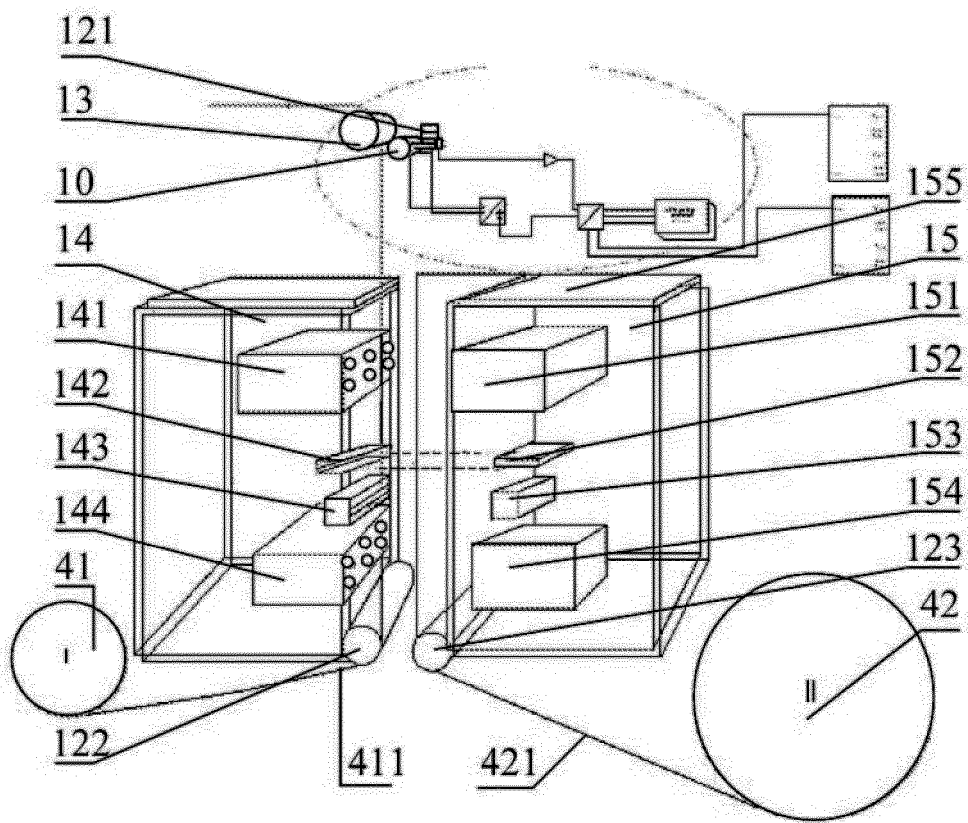


Fig. 1

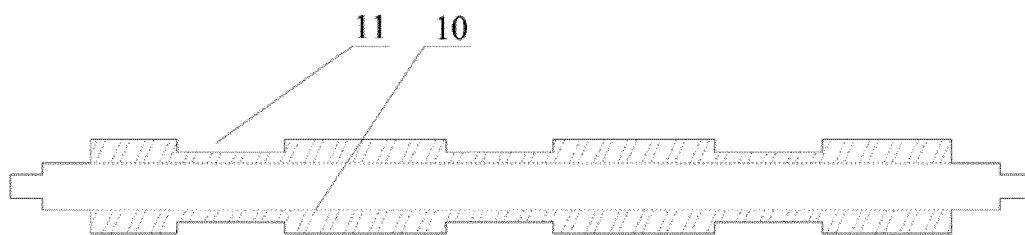


Fig.2

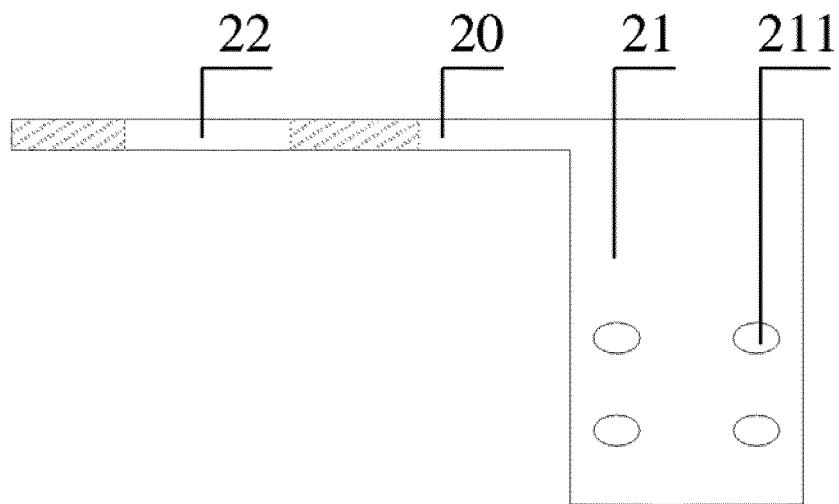


Fig. 3

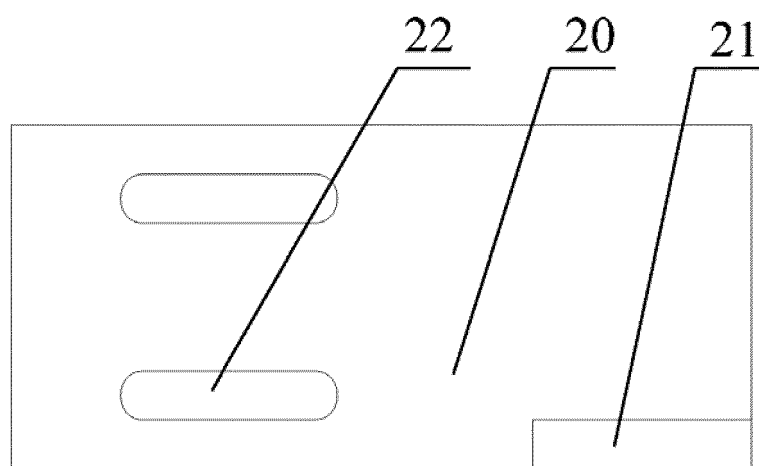


Fig. 4

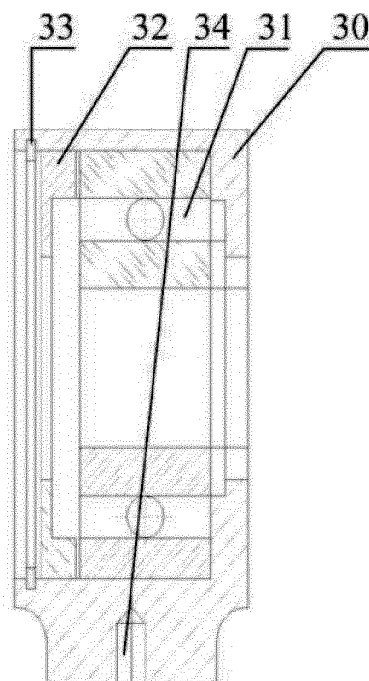


Fig. 5

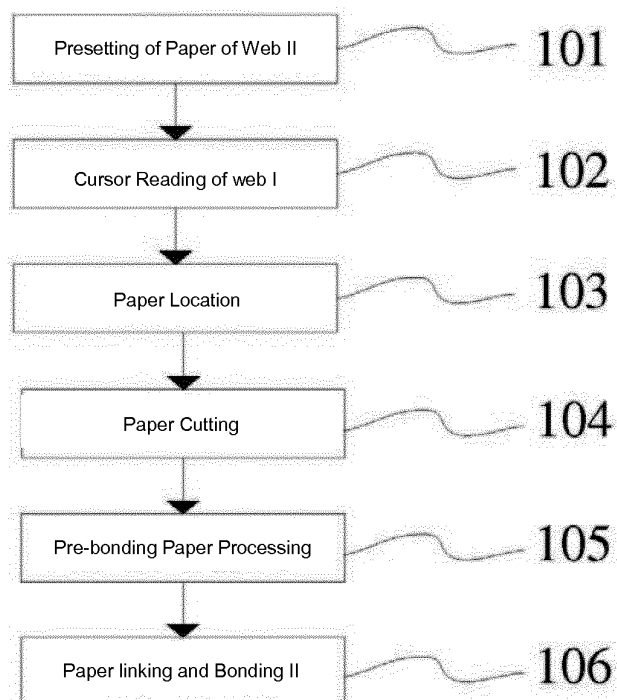


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2012/074089

A. CLASSIFICATION OF SUBJECT MATTER

See the extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B65H19, B65H21, B65H23, B65H41, B26D, B41F

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)

WPI, EPODOC, CNPAT, CNKI, die w cut+, web+, splic+, cut+, adher+, adhes+, affix+, stick+, negative w pressure, vacuum, suck+, detect+, sensor?

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 2570223 Y (SHANTOU HUAYING SOFT PACKAGE EQUIP GEN FACTORY CO LTD) 03 September 2003 (03.09.2003) the whole document	1-10
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A	WO 2007/009585 A1 (KRONES AG et al.) 25 January 2007 (25.01.2007) the whole document	1-10
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A	WO 2008/017450 A2 (KHS AG et al.) 14 February 2008 (14.02.2008) the whole document	1-10

☒ 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	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"&" document member of the same patent family
"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	

Date of the actual completion of the international search 28 August 2012 (28.08.2012)	Date of mailing of the international search report 18 October 2012 (18.10.2012)
Name and mailing address of the ISA State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	Authorized officer CHENG, Hong Telephone No. (86-10) 62085065

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2012/074089

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Form PCT/ISA/210 (continuation of second sheet) (July 2009)

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Form PCT/ISA/210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2012/074089

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CLASSIFICATION OF SUBJECT MATTER

B65H 19/10 (2006.01) i
B26D 1/00 (2006.01) i

REFERENCES CITED IN THE DESCRIPTION

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