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(54) DEVICE FOR APPLYING PRE-GLUED SHEETS OF PAPER TO PAPER OR CARDBOARD BOXES

VORRICHTUNG ZUM AUFBRINGEN VON VORVERKLEBTEN PAPIERBÖGEN AUF PAPIER ODER KARTONSCHACHTELN

DISPOSITIF D'APPLICATION DE FEUILLES DE PAPIER PRÉ-COLLÉES SUR DES BOÎTES EN PAPIER OU EN CARTON

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Description

Field of the Invention

[0001] The invention refers to a device for applying sheets of pre-glued paper to paper or cardboard boxes, in particular a system to allow the application of pre-glued paper to the side or bottom walls of the box, which prevents the formation of air bubbles.

State of the art

[0002] Traditionally, the sequence of application of sheets of pre-glued paper to paper or cardboard boxes, called "wrapping", provides for a single pressing step designed only to make the wrapped paper adhere to the box.

[0003] This may cause entrapment of air bubbles below the coating paper.

[0004] A similar defect may also occur on the coated bottom of the box, caused by a low pressure force of the "under mould" pump against the box itself.

[0005] The standard configuration of the heads of the coating machine provides for the anchoring of the sheet spreading brushes directly on the head itself rather than on its base, thus linking the vertical movement of one to the that of the other, and thus fixing the distance that separates the "wrapping" assembly from the brush itself, thus forcing the rod, even for low boxes, to descend beyond what is necessary to reach the press and the strip, resulting in the loss of productivity of the machine.

[0006] Moreover, in the case of boxes with more than one height, the heads, in fact, must be at different heights but, in this case, the brushes will also be forced to follow this configuration, which is not optimal for "rolling up".

[0007] In fact, at the state of the art there are numerous systems known for the forming paper or cardboard boxes, and in particular for covering the box with sheets of pre-glued paper

[0008] In particular, WO2015079342 describes a machine and a method for covering paper or cardboard boxes comprising a vertical movable plane supporting the sheet and the box, means for folding the sheet on the box and the contact plates positioned outside the box, to prevent the sides of the box and the sheet pressing elements on the walls of the box from moving outwards, the sheet pressing elements being movable with respect to the plates so as to allow, in contrast with the contact plates, the folding and adhesion of the sheet of paper to the box.

[0009] From WO2013098682 it also known a device for applying sheets of pre-glued paper to cardboard boxes in which a rotating brush is provided for folding the vertical outer flaps of the sheet beyond the walls of a box, and a support for a horizontal strip is provided for folding the horizontal outer flaps. In order to cover the box walls, an horizontal presser is configured to apply the pre-glued sheets to the walls of the box, while a top holder is vertically movable to insert a counter-mould in the box and to wrap the external flaps of the folded sheet on the internal walls of the box

[0010] However, there is no way of preventing bubbles from forming and, in particular, the method utilized does not prevent it.

Object of the invention

[0011] It is therefore felt the need for a device for applying sheets of pre-glued paper to paper or cardboard boxes, in particular a system to allow the application of pre-glued paper to the side or bottom walls of the box, which prevents the formation of air bubbles.

Summary of the Invention

[0012] These objects have been achieved by developing a device according to one or more of the appended claims.

[0013] A first advantage is that the lack of mechanical connection elements in the system, between the press and the strip, allows wrapping sequences to remove the presence of bubbles below the paper coating, this is possible by performing a series of successive pressing of the wrapping paper, from top to bottom.

[0014] A further advantage is that the system allows trapped air on the bottom to escape as it includes a "under mould" pump, a single or multistage telescopic cylinder, that is in contrast to the mould and pushed down by it in its work cycle; during this step, the valve that controls the air inlet and outlet from the pump is never unloaded, so as to compress the air inside the cylinder, thus increasing its pressure and, therefore, the force against the box, so as to allow the trapped air to escape.

[0015] Advantageously, in addition to increasing the force that the pump exerts on the box, the pressure produced is fed back into the machine circuit, producing a boost-pressure throughout the circuit so as to increase the overall performance of all pneumatic actuators.

[0016] A further advantage is that the system allows the independent adjustment of the pressing height of each head allowing, in turn, to realize boxes with multiple heights independent of the orientation of the sheet on the mat, this is because the high brush is supported by a structure anchored to the base of the head itself, and this allows it to remain at the optimum height (that of the mat) despite the head is free to move vertically.

[0017] A further advantage is that the system provides a mechanical bond that connects the rotating brushes to the heads and then, in addition to keeping them at the optimum level, allows to control its movement depending on the type of product being processed, so that, for example, by means of appropriate interpolations, countersunk boxes having walls not perpendicular to the base can be realized.

[0018] These and other advantages will be better understood by anyone skilled in the art from the following

description and the accompanying drawings, given as a non-limiting example, wherein:

- fig. 1 shows an overview of the device;
- fig.1a shows a detail in side view of the device of fig.1 ;
- fig.2a shows the beginning of the sequence of covering the box operated by the device in fig. 1 with the pre-glued sheet of paper placed under the paper or cardboard box;
- fig.2b shows the first step of the covering sequence of the box operated by the device in fig. 1 with the pre-glued sheet of paper adhering to the walls of the paper or cardboard box;
- fig.2c shows the second step of the covering sequence of the box operated by the device in fig. 1 with the pre-glued sheet of paper adhering to the upper edges of the paper or cardboard box;
- fig.2d shows the last step of the covering sequence of the box operated by the device in fig. 1 with the pre-glued sheet of paper adhering to the internal edges of the paper or cardboard box;
- fig.2e shows the formation of a vertical bubble between the sheet of pre-glued paper and the box of paper or cardboard;
- fig.2f shows the formation of a horizontal bubble between the pre-glued sheet of paper and the paper or cardboard box.
- fig. 3 shows a general scheme of a wrapping device of the known type.
- fig.4a, 4b show respectively a perspective and side view of an embodiment of the invention.

Detailed Description

[0019] With reference to the attached drawings, a preferred embodiment of a device for applying sheets of pre-glued paper to paper or cardboard boxes is described, in particular a system to allow the application of pre-glued paper to the side or bottom walls of the box, which prevents the formation of air bubbles according to the invention.

[0020] Figure 3 shows in general the structure of a coating machine provided with a device of the type described later in greater detail, and which includes a base 13 supporting a coating sheet F, supported by a upright 6 and vertically movable between operating heads R provided with brushes that apply the sheet on the walls of the box, and vertical and horizontal blades for folding the edges of the sheet protruding sideways the box.

[0021] In the illustrated scheme, which is a traditional type per se, the sheet is rolled up onto the internal walls of the box by means of a counter-mould C moved vertically by an upper shaft A that enters the box S, resting on plane 13, dragging the flaps of the sheet folded inwards by the horizontal folding blades.

[0022] The device comprise at least one operating unit or head R, preferably at least two, each provided with,

a brush 1, horizontally movable, supported by a brush support 7 fixed in relation to the brush 1,
means 2a and 2b for folding the vertical outer flaps of the sheet beyond the box walls,
a support 3 for a horizontal strip 14 for folding the horizontal outer flaps,
a presser 4 horizontally movable and configured to exert pressure on box S for adhesion of the pre-glued sheet of paper F to the walls of the paper or cardboard box,

- a top mould holder shaft A vertically movable configured to insert a counter-mould C in the said box S and to wrap the external flaps of the folded sheet on the internal walls of the box,
- a plate supporting the sheet 13 vertically movable to act against the counter-mould C.

[0023] According to the invention, the device includes a height-adjustable presser holding head 5 independent of said brush support 7 and of said support 3 for said horizontal strip 14, in order to allow the independent adjustment of the pressing height of the head 5 independent of the height of the rotating brushes 1 and to allow the coating of boxes with multiple heights.

[0024] In a preferred embodiment, the support 7 of the brush 1 is anchored to a base 20 of said presser holding head 5, so that it can remain at an optimum work height and head 5 is free to move vertically independently.

[0025] In addition, the brush 1 can be conveniently carried by a movable arm 15, which in turn is attached to support 3, provided with a movement axis (a) inclined at an angle (alpha), preferably 45°, to the vertical, in order to adapt and press at a favourable angle on the sides of the box S both vertically and horizontally.

[0026] Preferably, the plate 13 is supported below by a single or multistage telescopic cylinder 6 configured to be against to the counter-mould C in order to allow wrapping sequences suitable for removing the presence of bubbles below the coating paper.

[0027] In order to be able to cover also countersunk or curved boxes i.e. having walls not perpendicular to the base, it is possible to provide a motor 21 of the support 7 of the brush 1 and means 22 for controlling the motor 21 configured to control its movement according to the type of box being processed.

[0028] Preferably, the device is provided with several operating units R, each with motors 21 independent of the others, and a control unit 22 for their management.

[0029] Advantageously, the lack of mechanical connecting elements between presser 4 and strip 14 allows for wrapping sequences to remove the presence of bubbles 10, 12 below the coating paper.

[0030] This is achieved by a series of successive presses of the wrapping paper from top to bottom.

[0031] The pressing sequence is illustrated in Fig.2a, 2b, 2c and 2d with the subsequent folding of the pre-glued sheet of paper from a flat position to a first adhesion

on the walls made by brush 1, and a subsequent folding towards the inside of the box, made by the horizontal blades.

[0032] Another mechanism to remove air bubbles 10,12 is that of the "under mould" pump 6, single or multi-stage telescopic cylinder, which is put against to the mould and thrust down by it in its working cycle.

[0033] During this step, the valve that controls the air inlet and outlet from the "under mould" pump 6 is never unloaded, so as to compress the air inside the cylinder, thus increasing the pressure and, therefore, the force against the box, so as to allow the trapped air 10,12 to escape.

[0034] The high brush 1 is supported by a structure anchored to the base of the head itself, so as to allow it to remain at the optimum level, that of the mat, despite the head is free to move vertically.

[0035] This allows the independent adjustment of the pressing height of each single head allowing, in turn, to realize boxes with multiple heights regardless of the orientation of the sheet on the mat.

[0036] The mechanical constraint that connects the rotating brushes 1 to the heads, in addition to keeping them at the optimum height, allows to control its movement depending on the type of product being processed, so that, for example, by means of appropriate interpolations, countersunk boxes having walls not perpendicular to the base can be realized.

[0037] According to an advantageous aspect of the invention, the wrapping heads R are moved in an integrated way with the processing process, in order to adapt to the shape and size of the box to be produced.

[0038] In particular, the position of the wrapping heads is continuously recalculated dynamically, in order to be able to make changes in real time of all corrections applied to the on-going processing, i.e., to be able to make precise changes to the theoretically calculated operating parameters.

[0039] More generally, according to the invention, the actuators responsible for the moving axes of the machine during the work process act themselves to adapt in real time the position and movements of the operating heads according to the format of the product to be worked and the working step, thus making any change of format during the same process in progress and moving the work components (such as the moving brushes horizontally and the moving press vertically) in accordance with the new format to be worked and the work step in progress, without interruption and machine downtime.

[0040] The displacements of the actuators are calculated cycle by cycle to ensure that the machine can adapt in real time to the needs of production, while eliminating machine downtime due to adjustment operations and reducing the waste due to the delay in the correction intervention compared to the identification of the problem.

[0041] With reference to Figure 4a, 4b, a preferred embodiment of the device of the invention is illustrated.

[0042] In order to help the tensioning of the coating paper F along the external vertical walls of the box S, at the top of each wrapping head, aligned with the rotating brush 1, a pneumatic suction cup 25 was inserted operating with the Bernoulli's principle, as shown in figure attached 4.

[0043] This suction cup, activated in an appropriate way during the working cycle, emits an air flow 26 that pretensions the covering paper F in such a way that it perfectly follows the path of the rotating brush 1 (pre-aligned) on the box S, preventing the imperfections of the covering (e.g. bubbles) thanks to the progressive and controlled application of the paper along the walls. In an advantageous way, the suction cup 25 works without direct contact with the paper and therefore without causing scratches on the coating sheet F itself.

[0044] In different embodiments, the suction cup 25 can be a separable component or a component integral with the operating head.

[0045] The present invention has been described according to preferred embodiments, however equivalent variants can be conceived without departing from the scope of the present invention.

Claims

1. Device for applying sheets (F) of pre-glued paper to the walls of paper or cardboard boxes (S), comprising

- at least one operating unit (R) provided with,

  a rotating brush (1), supported by a brush support (7) fixed in relation to the rotating brush,
  means (2a) and (2b) for folding the vertical outer flaps of the sheet beyond the box walls,
  a support (3) for a horizontal strip (14) for folding the horizontal outer flaps,
  a presser (4) horizontally movable and configured to exert pressure on the box (S) for adhesion of the pre-glued sheet of paper (F) to the walls of the paper or cardboard box,

- a top mould holder shaft (A) vertically movable configured to insert a counter-mould (C) in the said box (S) and to wrap the external flaps of the folded sheet on the internal walls of the box,
- a plate supporting the sheet (13) vertically movable to act against the mould (C)

characterized in that is comprises

a horizontal motor (21) of the support (7) of an horizontally movable, rotating brush (1),
means (22) for controlling the motor (21),

a height-adjustable presser holding head (5) independent of said brush support (7) and of said support (3) for said horizontal strip (14), in order to allow the independent adjustment of the pressing height of the head (5) independent of the height of the rotating brushe (1) and to allow the coating of boxes with multiple heights.

2. Device according to claim 1, in which said support (3) of the rotating brush (1) is anchored to a base (20) of said presser holding head (5), so that it can remain at an optimum working height and the head (5) is free to move vertically independently.

3. Device as defined in claim 1 or 2, comprising a single or multistage telescopic cylinder (6) supporting said plate (13), configured to be put against the countermould (C) in order to allow wrapping sequences to remove the presence of bubbles below the wrapping paper, said cylinder (6) never being unloaded when the mould is descending, so that the pressure produced is fed back into the machine circuit, producing a boost-pressure throughout the pneumatic circuit, in order to increase the efficiency of all the pneumatic actuators connected to the circuit.

4. Device according to one of the previous claims, in which said rotating brush (1) is carried by a movable arm (15) of an axis (a) inclined by an angle (α), preferably 45°, with respect to the vertical, in order to press at a favourable angle on the sides of the box (S) both vertically and horizontally.

5. Device according to one of the previous claims, comprising a motor (21) of the support (7) of the rotating brush (1) and means (22) for controlling the motor (21) configured to control its movement according to the type of box being processed, in order to cover also countersunk or curved boxes, with walls not perpendicular to the base.

6. Device according to one of the previous claims, comprising a pneumatic suction cup (25) placed in a position aligned with the rotating brush (1) to emit an air flow (26) which pretensions the covering paper (F) so that it follows the path of the rotating brush (1).

7. Method for applying sheets (F) of pre-glued paper to the walls of paper or cardboard boxes (S) by means of a device of the type comprising

at least one operating unit (R) provided with a rotating brush (1), horizontally movable, supported by a brush support (7) fixed in relation to the rotating brush (1),
at least one presser (4), horizontally and vertically movable, and configured to apply pressure to the box (S) to adhere the pre-glued sheet of paper (F) to the walls of the paper or cardboard box,
characterized by the fact that the device further comprise

a horizontal motor (21) of the support (7) of an horizontally movable rotating brush (1), and
means (22) for controlling the motor (21),

and by the fact that horizontal movement of the rotating brush (1) is controlled by means of interpolations, depending on the size of the box being processed, a height-adjustable presser holding head (5) independent of said brush support (7) and of said support (3) for said horizontal strip (14) being provided in order to allow the independent adjustment of the pressing height of the head (5) independent of the height of the rotating brush (1) and to allow the coating of boxes with multiple heights.

8. Method according to claim 7, in which the position of the rotating brushe (1) is continuously recalculated dynamically in order to make precise changes to theoretically calculated operating parameters.

9. Method according to claim 7, in which at least the horizontal movement of the rotating brush (1) and the vertical movement of the presser (4) are controlled independently to adapt in real time the position and the movements of the rotating brush and the presser according to the size of the product to be processed, during the same process in progress, in accordance with a new format to be processed, so as to operate each format change, without interruption and machine downtime.

Patentansprüche

1. Vorrichtung zum Aufbringen von Blättern (F) aus vorgeklebtem Papier an den Wänden von Papier- oder Pappkartons (S), umfassend

- mindestens eine Betriebseinheit (R), die versehen ist mit

einer Drehbürste (1), die von einem Bürstenträger (7) getragen ist, der in Bezug auf die Drehbürste befestigt ist,
Mitteln (2a) und (2b) zum Falten der vertikalen äußeren Klappen des Blattes über die Kartonwände hinaus,
einem Träger (3) für einen horizontalen Streifen (14) zum Falten der horizontalen äußeren Klappen,
einer Druckeinrichtung (4), die horizontal

beweglich und eingerichtet ist, um Druck auf den Karton (S) auszuüben, damit das vorgeklebte Blatt Papier (F) an den Wänden des Papier- oder Pappkartons haftet,

- eine obere Formhalterwelle (A), die vertikal beweglich eingerichtet ist, um eine Gegenform (C) in den Karton (S) einzuführen und die externen Klappen des gefalteten Blattes auf die Innenwände des Kartons zu wickeln,
- eine Platte, die das Blatt (13) trägt, vertikal beweglich, um gegen die Form (C) zu wirken,

dadurch gekennzeichnet, dass sie umfasst:

einen horizontalen Motor (21) des Trägers (7) einer horizontal beweglichen Drehbürste (1),
Mittel (22) zum Steuern des Motors (21),
einen höhenverstellbaren Druckeinrichtungs-Haltekopf (5), der unabhängig von dem Bürstenträger (7) und dem Träger (3) für den horizontalen Streifen (14) ist, um die unabhängige Einstellung der Druckhöhe des Kopfes (5) unabhängig von der Höhe der Drehbürste (1) zu ermöglichen und um die Beschichtung von Kartons mit mehreren Höhen zu ermöglichen.

2. Vorrichtung nach Anspruch 1, bei der der Träger (3) der Drehbürste (1) an einer Basis (20) des Druckeinrichtungs-Haltekopfes (5) verankert ist, so dass er in einer optimalen Arbeitshöhe bleiben kann und der Kopf (5) frei ist, sich unabhängig vertikal zu bewegen.

3. Vorrichtung nach Anspruch 1 oder 2, umfassend einen ein- oder mehrstufigen Teleskopzylinder (6), der die Platte (13) trägt, der eingerichtet ist, um gegen die Gegenform (C) angelegt zu werden, um Wickelsequenzen zu ermöglichen, die das Vorhandensein von Blasen unter dem Wickelpapier verhindern, wobei der Zylinder (6) niemals entlastet wird, wenn sich die Form absenkt, so dass der erzeugte Druck in den Maschinenkreislauf zurückgeführt wird, wodurch ein Verstärkungsdruck im gesamten pneumatischen Kreislauf erzeugt wird, um die Effizienz aller pneumatischen Antriebe zu erhöhen, die mit dem Kreislauf verbunden sind.

4. Vorrichtung nach einem der vorherigen Ansprüche, bei der die Drehbürste (1) von einem beweglichen Arm (15) mit einer Achse (a) getragen ist, die um einen Winkel (α), vorzugsweise 45°, in Bezug auf die Vertikale geneigt ist, um in einem günstigen Winkel sowohl vertikal als auch horizontal auf die Seiten des Kartons (S) zu drücken.

5. Vorrichtung nach einem der vorherigen Ansprüche, umfassend einen Motor (21) des Trägers (7) der Drehbürste (1) und Mittel (22) zum Steuern des Motors (21), die eingerichtet sind, um seine Bewegung gemäß der Art des zu bearbeitenden Kartons zu steuern, um auch versenkte oder gekrümmte Kartons mit nicht senkrecht zu der Basis stehenden Wänden abzudecken.

6. Vorrichtung nach einem der vorherigen Ansprüche, umfassend einen pneumatischen Saugnapf (25), der in einer Position platziert ist, die mit der Drehbürste (1) ausgerichtet ist, um einen Luftstrom (26) abzugeben, der das abdeckende Papier (F) derart vorspannt, dass es dem Weg der Drehbürste (1) folgt.

7. Verfahren zum Aufbringen von Blättern (F) aus vorgeklebtem Papier an den Wänden von Papier- oder Pappkartons (S) mittels einer Vorrichtung der Art, umfassend

mindestens eine Betriebseinheit (R), die versehen ist mit einer Drehbürste (1), die horizontal beweglich ist, die von einem Bürstenträger (7) getragen ist, der in Bezug auf die Drehbürste (1) befestigt ist,
mindestens eine Druckeinrichtung (4), die horizontal und vertikal beweglich und eingerichtet ist, um Druck auf den Karton (S) aufzubringen, damit das vorgeklebte Blatt Papier (F) an den Wänden des Papier- oder Pappkartons haftet,
gekennzeichnet durch die Tatsache, dass die Vorrichtung ferner umfasst:
einen horizontalen Motor (21) des Trägers (7) einer horizontal beweglichen Drehbürste (1), und
Mittel (22) zum Steuern des Motors (21),
und durch die Tatsache, dass eine horizontale Bewegung der Drehbürste (1) mittels Interpolationen abhängig von der Größe des zu bearbeitenden Kartons gesteuert wird, wobei ein höhenverstellbarer Druckeinrichtungs-Haltekopf (5) unabhängig von der Bürstenhalterung (7) und der Halterung (3) für den horizontalen Streifen (14) vorgesehen ist, um die unabhängige Einstellung der Druckhöhe des Kopfes (5) unabhängig von der Höhe der Drehbürste (1) zu ermöglichen und um die Beschichtung von Kartons mit mehreren Höhen zu ermöglichen.

8. Verfahren nach Anspruch 7, bei dem die Position der Drehbürste (1) kontinuierlich dynamisch neu berechnet wird, um theoretisch berechnete Betriebsparameter präzise zu verändern.

9. Verfahren nach Anspruch 7, bei dem zumindest die horizontale Bewegung der Drehbürste (1) und die vertikale Bewegung der Druckeinrichtung (4) unabhängig voneinander gesteuert werden, um die Posi-

tion und die Bewegungen der Drehbürste und der Druckeinrichtung in Echtzeit an die Größe des zu bearbeitenden Produkts anzupassen, während desselben laufenden Vorgangs in Übereinstimmung mit einem neuen zu bearbeitenden Format, so dass jeder Formatwechsel ohne Unterbrechung und Maschinenstillstand durchgeführt wird.

Revendications

1. Dispositif d'application de feuilles (F) de papier pré-collé sur les parois de boîtes (S) en papier ou en carton, comprenant

   - au moins une unité de travail (R) munie,

     d'une brosse rotative (1), supportée par un support de brosse (7) fixe par rapport à la brosse rotative,
     de moyens (2a) et (2b) pour plier les rabats externes verticaux de la feuille dépassant des parois de boîte,
     d'un support (3) pour une bande horizontale (14) pour plier les rabats externes horizontaux,
     d'un presseur (4) mobile horizontalement et configuré pour exercer une pression sur la boîte (S) pour faire adhérer la feuille (F) de papier pré-collée sur les parois de la boîte en papier ou en carton,

   - un arbre porte-moule supérieur (A) mobile verticalement configuré pour insérer un contre-moule (C) dans ladite boîte (S) et pour envelopper les rabats externes de la feuille pliée sur les parois internes de la boîte,
   - une plaque (13) supportant la feuille mobile verticalement pour agir contre le moule (C)

   caractérisé en ce qu'il comprend

   un moteur horizontal (21) du support (7) d'une brosse rotative (1) mobile horizontalement,
   un moyen (22) pour commander le moteur (21),
   une tête (5) de maintien de presseur réglable en hauteur indépendante dudit support de brosse (7) et dudit support (3) de ladite bande horizontale (14), afin de permettre le réglage indépendant de la hauteur de pression de la tête (5) indépendamment de la hauteur de la brosse rotative (1) et de permettre le revêtement de boîtes à plusieurs hauteurs.

2. Dispositif selon la revendication 1, dans lequel ledit support (3) de la brosse rotative (1) est ancré à une base (20) de ladite tête (5) de maintien de presseur, de manière à pouvoir rester à une hauteur de travail optimale et la tête (5) est libre de se mettre en mouvement verticalement indépendamment.

3. Dispositif selon la revendication 1 ou 2, comprenant un vérin télescopique à un ou plusieurs étages (6) supportant ladite plaque (13), configuré pour être mis contre le contre-moule (C) afin de permettre à des séquences d'emballage de supprimer la présence de bulles sous le papier d'emballage, ledit vérin (6) n'étant jamais déchargé lorsque le moule descend, de sorte que la pression produite soit réinjectée dans le circuit de machine, produisant une surpression dans tout le circuit pneumatique, afin d'augmenter l'efficacité de tous les actionneurs pneumatiques connectés au circuit.

4. Dispositif selon l'une quelconque des revendications précédentes, dans lequel ladite brosse rotative (1) est portée par un bras mobile (15) d'un axe (a) incliné d'un angle (α), de préférence 45°, par rapport au plan vertical, afin de presser selon un angle favorable sur les côtés de la boîte (S) à la fois verticalement et horizontalement.

5. Dispositif selon l'une quelconque des revendications précédentes, comprenant un moteur (21) du support (7) de la brosse rotative (1) et un moyen (22) de commande du moteur (21) configuré pour commander son mouvement en fonction du type de boîte en cours de traitement, afin de couvrir également les boîtes fraisées ou courbées, ayant des parois non perpendiculaires à la base.

6. Dispositif selon l'une quelconque des revendications précédentes, comprenant une ventouse pneumatique (25) placée dans une position alignée avec la brosse rotative (1) pour émettre un flux d'air (26) qui précontraint le papier de couverture (F) afin qu'il suive la trajectoire de la brosse rotative (1).

7. Procédé d'application de feuilles (F) de papier pré-collé sur les parois de boîtes (S) en papier ou en carton au moyen d'un dispositif du type comprenant

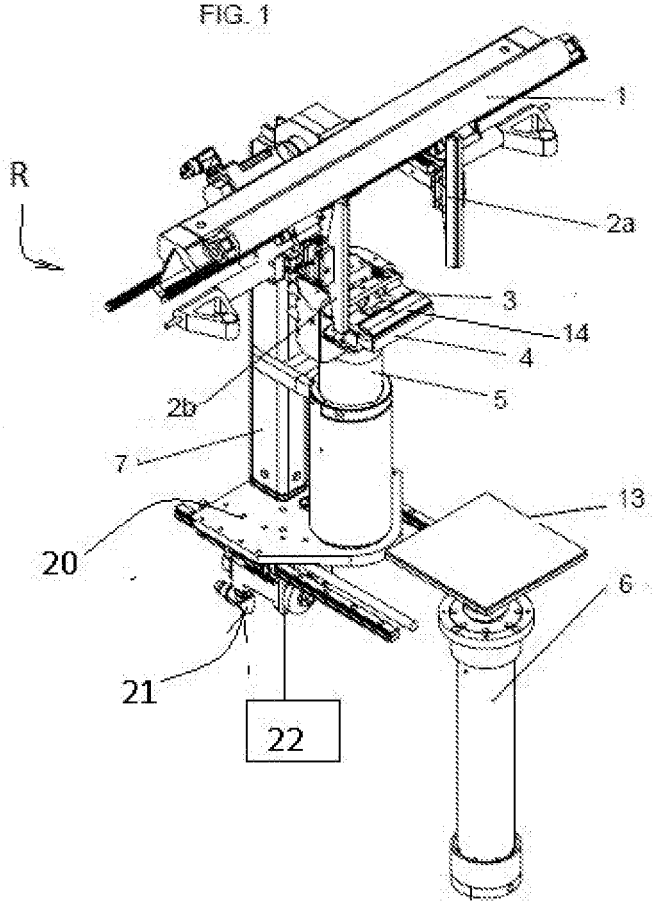
   au moins une unité de travail (R) munie d'une brosse rotative (1), mobile horizontalement, supportée par un support de brosse (7) fixe par rapport à la brosse rotative (1),
   au moins un presseur (4), mobile horizontalement et verticalement, et configuré pour appliquer une pression sur la boîte (S) pour faire adhérer la feuille de papier (F) pré-collée sur les parois de la boîte en papier ou en carton,
   caractérisé par le fait que le dispositif comprend en outre un moteur horizontal (21) du support (7) d'une brosse rotative (1) mobile horizontalement, et
   un moyen (22) pour commander le moteur (21),

et **par le fait que** le mouvement horizontal de la brosse rotative (1) est commandé au moyen d'interpolations, en fonction de la taille de la boîte en cours de traitement, une tête (5) de maintien de presseur réglable en hauteur indépendante dudit support de brosse (7) et dudit support (3) de ladite bande horizontale (14) étant prévue afin de permettre le réglage indépendant de la hauteur de pression de la tête (5) indépendamment de la hauteur de la brosse rotative (1) et de permettre le revêtement de boîtes à plusieurs hauteurs.

8. Procédé selon la revendication 7, dans lequel la position de la brosse rotative (1) est continuellement recalculée dynamiquement afin d'apporter des modifications précises à des paramètres de fonctionnement théoriquement calculés.

9. Procédé selon la revendication 7, dans lequel au moins le mouvement horizontal de la brosse rotative (1) et le mouvement vertical du presseur (4) sont commandés indépendamment pour adapter en temps réel la position et les mouvements de la brosse rotative et du presseur en fonction de la taille du produit à traiter, durant un même processus en cours de réalisation, selon un nouveau format à traiter, de manière à opérer chaque modification de format, sans interruption ni temps d'arrêt machine.

FIG. 1



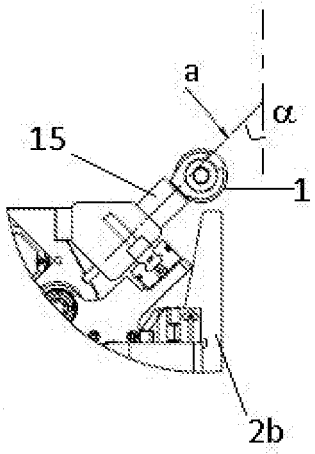


FIG.1a

FIG. 2a

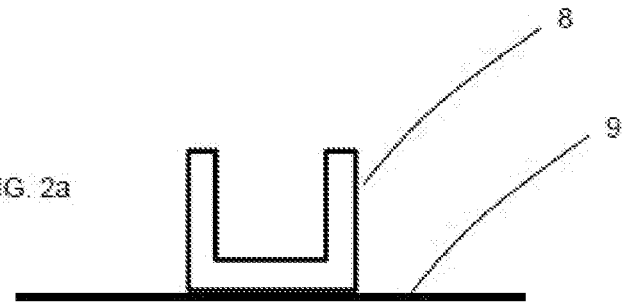


FIG. 2b

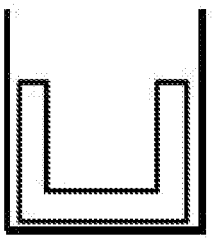


FIG. 2c

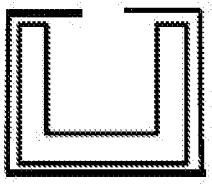


FIG. 2d

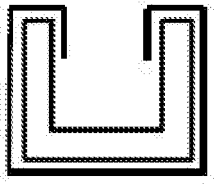


FIG. 2e

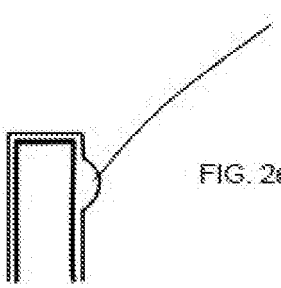


FIG. 2f

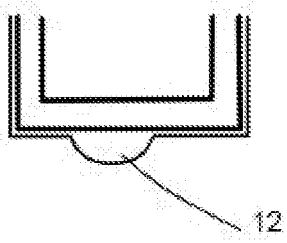
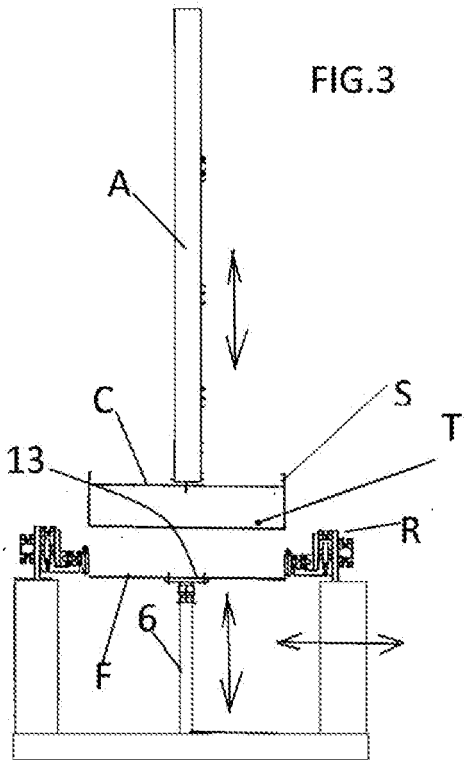


FIG.3



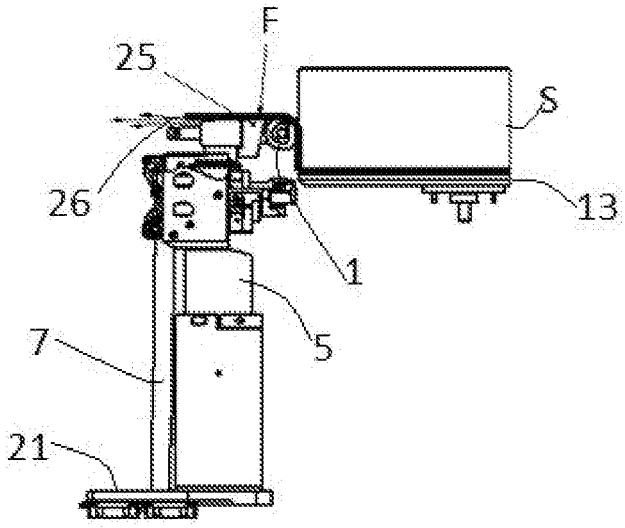


FIG.4a

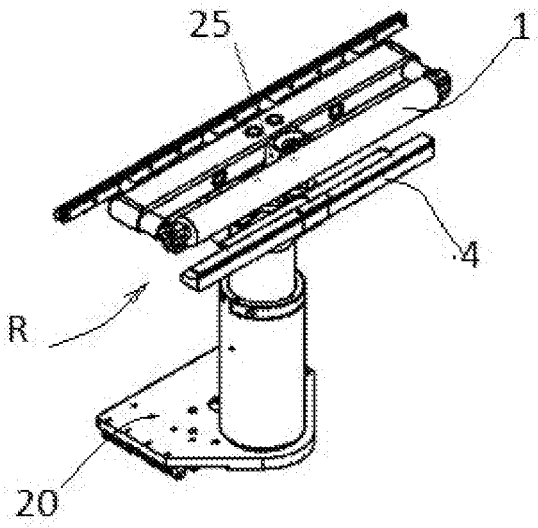


FIG.4b

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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